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Determination of Curie Content and $^{134}/^{137}$ Cesium Ratios by Gamma Spectroscopy of High Burnup Plutonium-Aluminum Fuel Assemblies

D. L. Haggard
J. E. Tanner

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Richland, Washington 99352 under Contract
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Executive Summary

Nondestructive assay (NDA) gamma spectroscopy techniques were used to measure $^{134}\text{Cs}/^{137}\text{Cs}$ ratios on nine PuAl Mark 42 fuel assemblies. The purpose of the ratio measurement was to confirm theoretical burnup calculations. $^{134}\text{Cs}/^{137}\text{Cs}$ ratios were determined from the measured activity based on corrected net peak area counts for the 605 keV peak from ^{134}Cs and the 662 keV peak from $^{137}\text{Cs}/^{137\text{m}}\text{Ba}$. Assembly #2 $^{134}\text{Cs}/^{137}\text{Cs}$ ratio measured on 4-15-92 was 0.19. The measured $^{134}\text{Cs}/^{137}\text{Cs}$ ratio was decay corrected to be 2.11 on 8-1-84 based on the half lives of ^{134}Cs and ^{137}Cs . The measured $^{134}\text{Cs}/^{137}\text{Cs}$ ratio range was 1.90-2.14 for all nine assemblies. These measured values compare to a theoretical ratio of 1.7 on 8-1-84 determined by burnup calculations.

Total cesium curie content was also requested and determined using the NDA direct measurements. Gamma spectral data were measured on the nine sectioned Mark 42 fuel assemblies. Measured cesium curie content, decay corrected to 8-1-84, ranged from 18170-24480 curies of ^{134}Cs and 8620-11646 curies of ^{137}Cs . Theoretical cesium curie content as of 8-1-84 was 15200 curies ^{134}Cs and 8973 curies ^{137}Cs .

Direct assay cesium ratio is 12% to 26% higher than the predicted ratio of 1.7. The measured ^{134}Cs data indicate between 20%-61% more activity than that predicted by the burnup code, whereas the measured ^{137}Cs activity is between 4% less to 30% more than the predicted activity.

This information may be used to address issues concerning criticality safety, storage, and shipping of this type of material.

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Contents

Executive Summary	iii
Acknowledgments	v
1.0 Introduction	1
2.0 Measurement Plan	3
2.1 Fuel Assembly Positioning in REC	3
2.2 Collimators.....	3
2.3 Measurement Equipment	3
2.4 Calibration and Measurement Control.....	5
2.5 Data Collection and Analysis	5
3.0 Results	9
4.0 Conclusions	11
5.0 References	13
Appendix A	A.1

Figures

1	Cross Section of the Fuel Assembly.....	4
2	Collimator Drawing Details.....	4
3	Corrected peak area counts for ^{134}Cs at 605 keV and ^{137}Cs - $^{137\text{m}}\text{Ba}$ 662 keV as measured on 15-April-92.	9
4	Curie plot of ^{134}Cs and ^{137}Cs - $^{137\text{m}}\text{Ba}$ decayed to time of discharge in 15-April-92	9
5	Curie plot of ^{134}Cs and ^{137}Cs - $^{137\text{m}}\text{Ba}$ decayed to time of discharge in August 1984.	10

Tables

1	Results of the Mark 42 Target Assembly #2 Measurements.....	8
2	Listing of Decay-Corrected Cesium Ratios and Curie Contents for Nine Mark 42 Fuel Assemblies.....	10

1.0 Introduction

Nondestructive assay of nine highly radioactive irradiated fuel assemblies was completed at the Radiochemical Engineering Cells (REC) located in the 324 Building at Pacific Northwest National Laboratory in Richland, Washington. The REC was chosen to conduct this work because of its ability to accommodate the high dose rates associated with these fuel assemblies. The four feet thick high density concrete cell walls provide more than adequate shielding. Remote handling equipment, manipulators, cutting equipment and experienced operating personnel were available and used for this project. The NDA effort was focused on obtaining total cesium contents of the fuel assemblies, and $^{134}/^{137}\text{Cs}$ ratios to confirm burnup calculations.

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2.0 Measurement Plan

2.1 Fuel Assembly Positioning In REC

Gamma measurements were performed on nine Pu-Al fuel assemblies, identified as numbers 2 through 10. As shown in Figure 1, each assembly contains PuO₂-Al fuel; with cladding, target-sleeve-housing, and end fittings all made from Type 6063 aluminum. Each original assembly was cut into eight equal lengths of approximately fifty centimeters each. These sections were placed into separate 304L-SS canisters. Each canister was placed into a measurement rack which had five equidistant measurement positions along the vertical centerline of the fuel assembly section.

2.2 Collimators

The unattenuated gamma radiation emitted by a canister would overwhelm a gamma spectrometer, so dose rate reduction was required. This dose rate reduction was accomplished by inserting a collimator into a special access port in the cell wall, as shown in Figure 2. The collimator design was based on the theoretical curie content of the fuel assembly and physical limitations such as the thickness of the cell wall. Overall physical dimensions of the access port are 137-cm long, 10-cm in diameter. A centered 2.5-cm diameter pipe was used as the initial collimator. Six collimator inserts were fabricated from 5.0-cm diameter stainless steel rods. Two of these collimators have 0.95-cm holes drilled along the centerline; two had 0.635-cm central holes; and two had no central holes (for use in background measurements). Each insert is 27.5-cm long, 2.5-cm in diameter for nine inches and stepped to 5-cm at the exterior end. This stepped design prevents possible radiation streaming effects at the collimator - insert interface. The collimator was back filled with steel shot. Alignment measurements were conducted on the collimator with all collimator inserts using a low power neon laser.

2.3 Measurement Equipment

The gamma ray spectra were obtained using a coaxial hyperpure germanium (HPGe) detector. Physical dimensions of the Ge crystal are 49.7 mm diameter, 54.7 mm length, with a 0.5 mm beryllium window. Performance specifications for this crystal are full-width-at-half-max resolution of 1.82 keV, peak-to-Compton ratio of 52/1 and a relative efficiency of 21.5% at the 1.33 MeV peak of ⁶⁰Co.

A cadmium filter was placed over the detector to prevent any neutrons emitted by the fuel from striking the detector. This cadmium filter was backed by a copper filter to shield against any x-rays created in the cadmium.

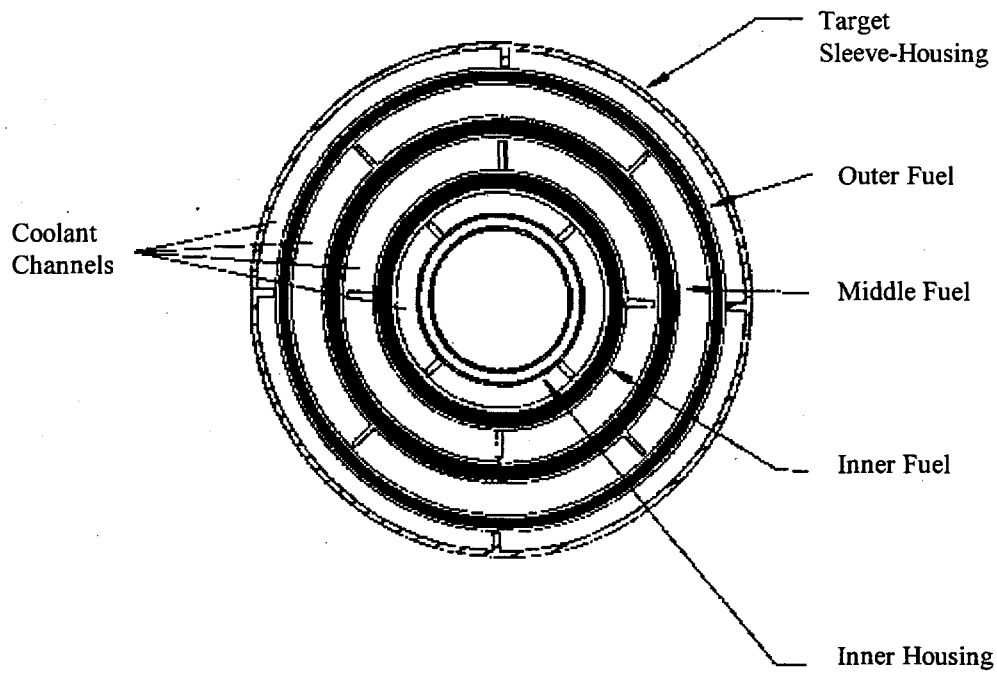


Figure 1. Cross section of the fuel assembly

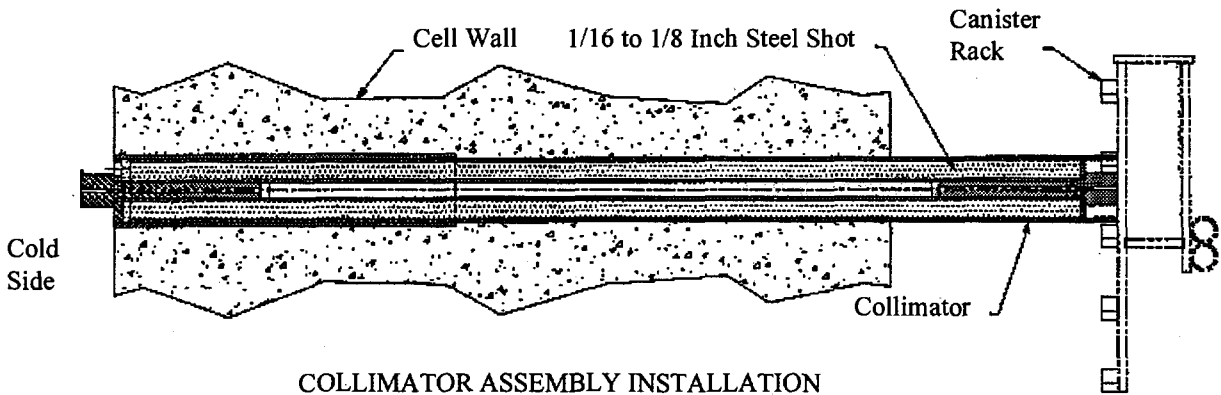


Figure 2. Collimator drawing details

Gamma ray spectra were acquired using a multichannel analyzer with a 100 MHz 4096/8192 channel analog-to-digital converter. The acquired spectral data were transferred to a laptop computer. The spectral data were then analyzed and subsequently archived on 3.5", 1.44 MB floppy disk.

2.4 Calibration And Measurement Control

Measurement system calibration was accomplished using a mixed standard of 50 μCi ^{137}Cs and 20 μCi ^{60}Co . The standard was prepared from calibrated stock solutions. A uniform volumetric sealed source standard was required. A 2.5 cm high by 2.5 cm diameter aluminum container was chosen to house the standard material. The standard solution was pipetted onto 2.2 g of aluminum oxide in the container and dried under a heat lamp. Resin was added and the mixture stirred until the resin started to gel. A screw cap was affixed to the top of the standard container and sealed with resin.

A series of measurements were taken at various distances from the standard, with and without the collimator, CD-CU filters and collimator inserts. These response measurements were taken at the cold side of the cell prior to collimator placement into the cell porthole.

Background measurements were taken with the 0.635 cm collimator insert on the hot side and the 0.635 cm and solid collimator inserts on the cold side. The shielded cell has an enhanced ^{137}Cs background (~ 3 counts/sec) remaining from previous REC activities.

During the course of the assembly measurements, measurement control of the counting system was maintained by counting a ^{133}Ba standard traceable to the national institute of standards and technology prior to each measurement session. Rate-loss correction was monitored using a ^{60}Co standard affixed to the HPGE detector housing. Counts on the ^{60}Co source between fuel canister changes provided continuous measurement control data. Cobalt-60 was an excellent correction source for this study since sources of ^{60}Co do not exist in the assembly.

2.5 Data Collection And Analysis

Gamma measurements on the assemblies were taken using the 0.635 cm (0.25") collimator inserts. There were eight, 50.8 cm long fuel sections per assembly. Each section was measured at five equidistant locations along the canister rack, as shown in Figure 2. Counting eight canisters per assembly at five rack positions resulted in a total of forty measurements per fuel assembly.

Gamma spectra were acquired on the multichannel analyzer with specific regions-of-interest (ROIs) set up for the 605 keV gamma-ray of ^{134}Cs , 661.6 keV gamma-ray of $^{137}\text{Cs}/^{137\text{m}}\text{Ba}$, and the 1332.5 keV gamma-ray from ^{60}Co (for rate-loss corrections). The ROIs were recorded on computer disk for each peak at each measurement location. The recorded spectrum for each measurement location was then analyzed using gamma-peak-analysis software to determine the activity of ^{134}Cs , ^{137}Cs and ^{154}Eu .

The activity of an isotope in a sample is determined from the isotope net peak area corrected for container and matrix attenuation, branching ratio, and detector efficiency.

$$A = \text{Pk}_c / (\text{BR} * \epsilon) \quad (1)$$

where

Pk_c = gamma-ray peak area corrected for container and sample attenuation (cts/s),

BR = gamma-ray branching ratio, and

ϵ = detector efficiency at the gamma-ray energy of interest.

Container attenuation and sample absorption corrections are calculated using the following formulas:

$$Pk_c = Pk * CF_{cont} * Cf_{samp} \quad (2)$$

where

Pk = net gamma peak area (cts/s),
 CF_{cont} = container attenuation correction factor, and
 Cf_{samp} = sample self-absorption correction factor.

The correction factor for the container attenuation is computed as follows:

$$CF_{cont} = \exp(-\mu_{cont} * \rho_{cont} * x_{cont}), \quad (3)$$

where

μ_{cont} = mass-attenuation coefficient of the container material at the energy of interest (cm^2/g),
 ρ_{cont} = density of the container (g/cm^3), and
 x_{cont} = container thickness (cm).

The correction factor (Augustson & Reilly, 1974) for sample self-absorption for a slab sample is given by:

$$CF_{samp} = -\mu_{samp} * \rho_{samp} * x_{samp} / [1 - \exp(-\mu_{samp} * \rho_{samp} * x_{samp})] \quad (4)$$

where

μ_{samp} = mass-attenuation coefficient of the sample at the energy of interest (cm^2/g),
 ρ_{samp} = density of the sample (g/cm^3), and
 x_{samp} = sample thickness (cm).

Branching ratios, half lives, and gamma-ray energy data were taken from RADDECAY (Grove Engineering, 1987). Data on the cladding and PuO_2 -Al thickness, as well as assembly densities are sensitive and will not be reported in this document. The pertinent data was incorporated into a spreadsheet and the correction factors determined.

A second approach was taken to determine an overall correction factor by direct measurement. Briefly, the technique (Morel, Chauvenet, Etchverry, 1987) can be used when there are multiple gamma-rays detected from the same isotope. Apparent activity can be calculated for each energy and plotted as a function of the inverse energy in MeV. The intercept of the plotted data is the "true" activity of the measured isotope. The intercept represents a gamma ray of infinite energy and therefore no gamma losses due to attenuation or absorption. Limitations attributed to this technique occur when you have low energy gammas and high density absorbers. Attenuation correction factors, using this technique, agree within 15% of the calculated correction factors.

3.0 Results

Table 1 lists the net peak area counts, corrected peak area counts, and rate loss correction factors for Assembly #2, the first assembly measured. Ratios for the two cesium radionuclides are listed by activity at the time of the measurements and also decay corrected back to the date when the fuel assembly was removed from the reactor. Figure 3 is a graphical representation of the net peak area counts for the 605 keV peak from ^{134}Cs and the 662 keV peak from $^{137}\text{Cs}/^{137\text{m}}\text{Ba}$ decay as a function of relative location along the fuel assembly for Assembly #2. Figure 4 is a plot of the activities at the time of the measurement (15,16-Apr-92). Figure 5 presents the activities at the time of removal from the reactor (01-Aug-84). Theoretical data suggests the $^{134}/^{137}\text{Cs}$ ratio from burnup calculations to be 1.7 for Assembly #2, which can be compared to the measured ratio of 2.11.

Appendix A provides data listings of all measured assemblies in a format similar to Table 1 and Figure 5. The data in Table 1 and Appendix A are used to produce the values in Table 2, which lists the decay-corrected measured cesium ratios and curie contents for all nine Mark 42 assemblies.

Table 1. Results of the Mark 42 Target Assembly #2 Measurements

CAN ID	NET AREA ¹³⁴ Cs	CORRECTED COUNTS MCF	NET AREA ¹³⁷ Cs	CORRECTED COUNTS MCF	⁶⁰ Co	RATE LOSS CF	15-APR-92 CURIES ¹³⁴ Cs	CURIES ¹³⁷ Cs	RATIO	01-AUG-84 CURIES ¹³⁴ Cs	CURIES ¹³⁷ Cs	RATIO ¹³⁴ Cs/ ¹³⁷ Cs
C8-2-1	66	131	865	1678	6369	0.99	0.0001	0.0011	0.0598	0.0009	0.0014	0.6672
C8-2-2	39614	82097	263177	534182	6086	0.95	0.0429	0.3637	0.1179	0.5714	0.4341	1.3163
C8-2-3	64863	136691	360683	744448	5985	0.93	0.0714	0.5068	0.1409	0.9513	0.6049	1.5726
C8-2-4	80630	173012	376406	791043	5878	0.92	0.0904	0.5385	0.1679	1.2041	0.6428	1.8732
C8-2-5	89253	189101	380930	790464	5953	0.93	0.0988	0.5381	0.1836	1.3161	0.6423	2.0489
C7-2-1	90793	195451	382178	805778	5859	0.91	0.1021	0.5486	0.1862	1.3602	0.6548	2.0775
C7-2-2	97146	205963	398071	826589	5949	0.93	0.1076	0.5627	0.1912	1.4334	0.6717	2.1341
C7-2-3	99323	212507	403414	845357	5895	0.92	0.1110	0.5755	0.1929	1.4790	0.6869	2.1530
C7-2-4	100098	212293	397421	825517	5947	0.93	0.1109	0.5620	0.1974	1.4775	0.6708	2.2025
C7-2-5	101110	216698	403938	847893	5885	0.92	0.1132	0.5772	0.1961	1.5081	0.6890	2.1889
C6-2-1	124249	261532	494112	1018643	5290	0.93	0.1366	0.6935	0.1970	1.8201	0.8277	2.1989
C6-2-2	121835	263167	480583	1016698	5155	0.91	0.1375	0.6922	0.1987	1.8315	0.8262	2.2169
C6-2-3	121125	261076	479033	1011261	5166	0.91	0.1364	0.6885	0.1981	1.8170	0.8217	2.2111
C6-2-4	117346	253569	463487	980911	5153	0.91	0.1325	0.6678	0.1984	1.7647	0.7971	2.2140
C6-2-5	113950	249621	451210	968079	5083	0.90	0.1304	0.6591	0.1979	1.7373	0.7866	2.2084
C5-2-1	126214	270891	497406	1045595	5188	0.92	0.1415	0.7118	0.1988	1.8853	0.8496	2.2189
C5-2-2	130133	277006	514343	1072310	5231	0.92	0.1447	0.7300	0.1983	1.9278	0.8713	2.2125
C5-2-3	128270	273669	503579	1052283	5219	0.92	0.1430	0.7164	0.1996	1.9046	0.8551	2.2274
C5-2-4	126148	276887	499919	1074699	5073	0.90	0.1447	0.7316	0.1977	1.9270	0.8733	2.2066
C5-2-5	121608	257042	484908	1003843	5268	0.93	0.1343	0.6834	0.1965	1.7889	0.8157	2.1930
C4-2-1	134988	291125	537274	1134870	5163	0.91	0.1521	0.7726	0.1969	2.0261	0.9222	2.1971
C4-2-2	136486	287344	543306	1120271	5289	0.93	0.1501	0.7627	0.1969	1.9998	0.9103	2.1968
C4-2-3	135862	301297	542343	1177975	5021	0.89	0.1574	0.8020	0.1963	2.0969	0.9572	2.1906
C4-2-4	138539	293107	545412	1130169	5263	0.93	0.1531	0.7694	0.1990	2.0399	0.9184	2.2212
C4-2-5	135698	280853	538203	1090978	5380	0.95	0.1467	0.7427	0.1976	1.9546	0.8865	2.2048
C3-2-1	158027	335421	627019	1303481	5246	0.93	0.1753	0.8874	0.1975	2.3344	1.0592	2.2039
C3-2-2	151714	323316	602789	1258147	5225	0.92	0.1689	0.8565	0.1972	2.2501	1.0224	2.2009
C3-2-3	149839	317860	598267	1242999	5249	0.93	0.1661	0.8462	0.1963	2.2122	1.0100	2.1902
C3-2-4	142556	295486	594369	1206625	5372	0.95	0.1544	0.8215	0.1879	2.0564	0.9805	2.0974
C3-2-5	150280	323541	600164	1265504	5172	0.91	0.1690	0.8615	0.1962	2.2517	1.0283	2.1897
C2-2-1	155242	328258	616168	1276058	5266	0.93	0.1715	0.8687	0.1974	2.2845	1.0369	2.2032
C2-2-2	145688	315608	589258	1250244	5140	0.91	0.1649	0.8512	0.1937	2.1965	1.0159	2.1620
C2-2-3	141196	294310	573374	1170540	5342	0.94	0.1538	0.7969	0.1930	2.0483	0.9512	2.1534
C2-2-4	138888	302170	576214	1227823	5118	0.90	0.1579	0.8359	0.1889	2.1030	0.9977	2.1078
C2-2-5	134054	283564	574611	1190448	5264	0.93	0.1482	0.8104	0.1828	1.9735	0.9673	2.0401
C1-2-1	148654	318317	661990	1388354	5200	0.92	0.1663	0.9452	0.1760	2.2153	1.1282	1.9637
C1-2-2	115650	242972	576382	1186006	5300	0.94	0.1269	0.8074	0.1572	1.6910	0.9637	1.7546
C1-2-3	88718	183210	521480	1054727	5392	0.95	0.0957	0.7181	0.1333	1.2751	0.8571	1.4877
C1-2-4	1200	2372	5254	10170	5634	0.99	0.0012	0.0069	0.1790	0.0165	0.0083	1.9973
C1-2-5	0	0	1174	2308	5548	0.98	0.0009	0.0016	0.0000	0.0000	0.0019	0.0000
Curie content for the 40 measurement points is:							5.0099	20.5134	66.7319	0.0000	31.6462	2.11
Curie content based on total fuel assembly volume is:							1364.2	7219.7	18171.3		8617.4	

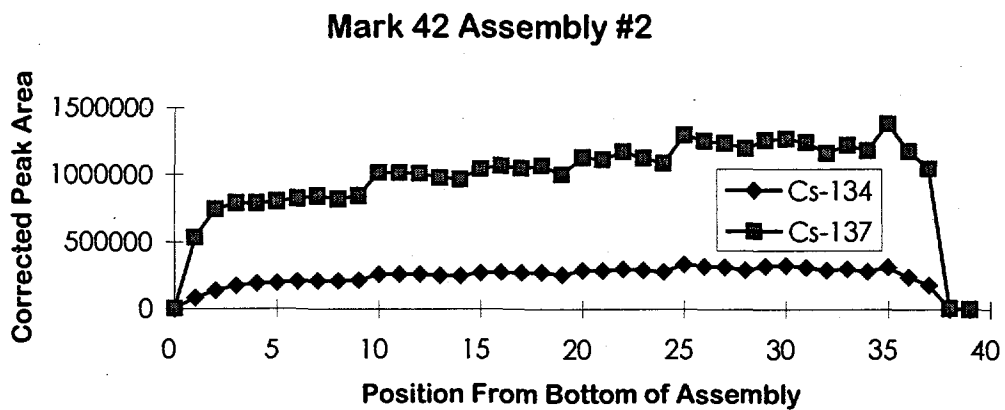


Figure 3. Corrected peak area counts for ^{134}Cs at 605 keV and ^{137}Cs - $^{137\text{m}}\text{Ba}$ 662 keV as measured on 15-April-92

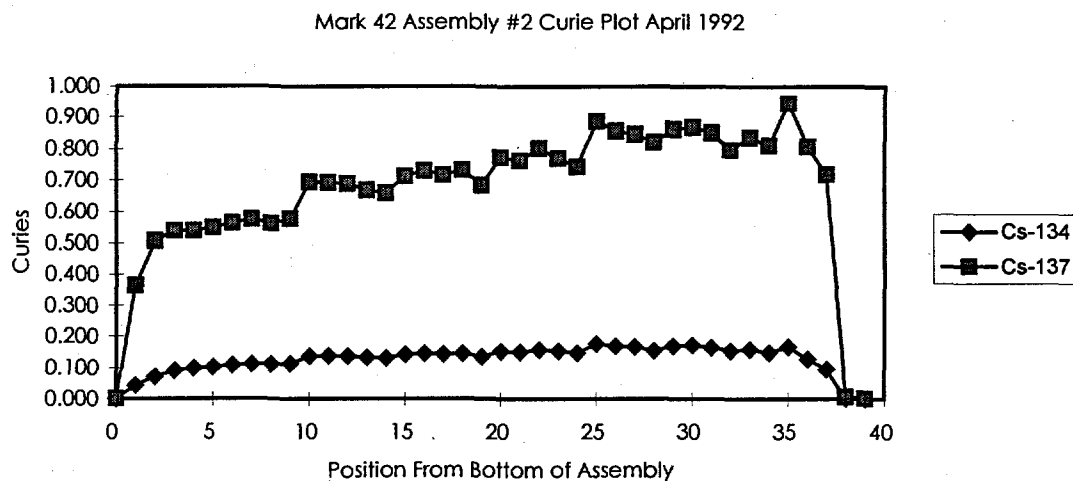


Figure 4. Curie plot of ^{134}Cs and ^{137}Cs - $^{137\text{m}}\text{Ba}$ as measured on 15-April-92

Mark 42 Assembly #2 Curie Plot August 1984

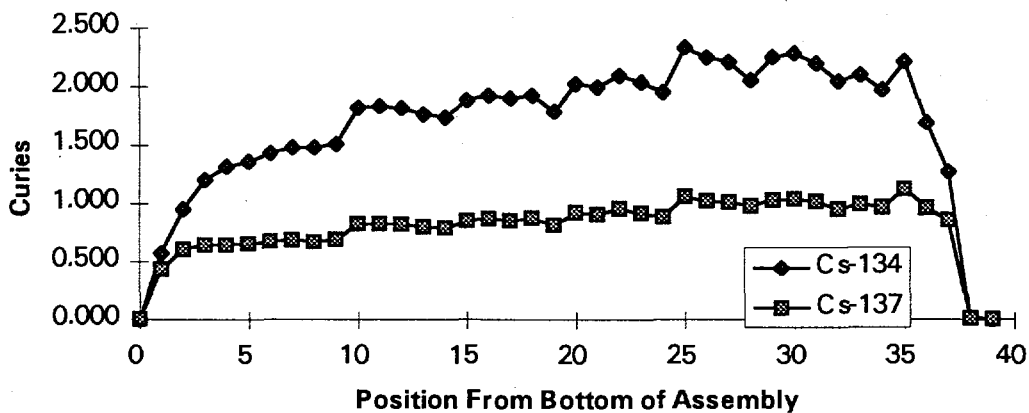


Figure 5. Curie plot of ^{134}Cs and ^{137}Cs - $^{137\text{m}}\text{Ba}$ decayed to time of discharge in August 1984

Table 2. Listing of Decay-Corrected Cesium Ratios and Curie Content for Nine Mark 42 Fuel Assemblies

Assembly ID	Curies			Ratio $^{134}/^{137}\text{Cs}$
	^{134}Cs	^{137}Cs	^{154}Eu	
2	18171	8617	NA	2.11
3	19402	9184	NA	2.11
4	22343	10446	614	2.14
5	24480	11573	660	2.12
6	20567	10536	667	1.95
7	22492	11646	675	1.93
8	21501	10412	576	2.06
9	21201	10816	668	1.96
10	20652	10863	628	1.90

4.0 Conclusions

Nondestructive gamma assay, for cesium ratios, of PuAl fuel assemblies is a viable technique for determining fuel burnup. The agreement between the theoretical and measured cesium ratio is within 30%. This method is cost effective compared to radiochemical methods which require physical samples to be taken for analysis.

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5.0 References

Augustson, R.H. and T.D. Reilly, 1974. *Fundamentals of Passive Nondestructive Assay of Fissionable Material*, LA-5651-M, Los Alamos National Laboratory Los Alamos, New Mexico.

Morel, J., B. Chauvenet, and M. Etchverry, 1987. "A Non-destructive Method Based On Gamma Spectrometry For The Measurements Of Plutonium Hold-up or Plutonium Wastes," In *Proceedings of the 3rd International Conference on Facility Operations - Safeguards Interface*, ANS, November 29-December 4, 1987.

RADDECAY Version 2.1, 1987. Grove Engineering, Rockville, Maryland.

APPENDIX A.

Mark 42 Assemblies

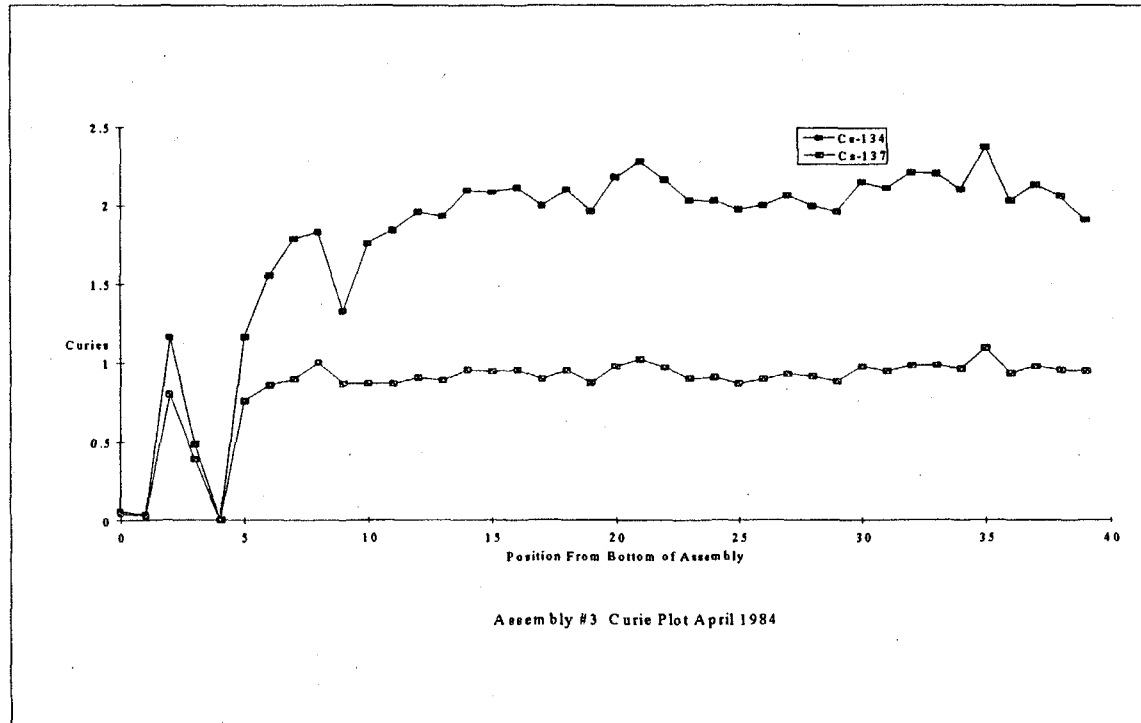
Mark 42 Target Assembly #3
 Assayed October 08,11 1993
 324 Building C-Cell
 NDA Specialist DL Haggard

Can ID	10-Oct-93		10-Oct-93		⁶⁰ Co	Rate Loss CF	10-Oct-93			01-Aug-84		
	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF			Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs
C3-1-1	2.7E+03	5.2E+03	2.6E+04	4.9E+04	3322	1.0050	0.0027	0.0334	0.0820	0.0602	0.0413	1.4580
C3-1-2	1.7E+03	3.2E+03	1.7E+04	3.1E+04	3416	1.0335	0.0017	0.0210	0.0800	0.0370	0.0260	1.4240
C3-1-3	4.7E+04	1.0E+05	4.5E+05	9.5E+05	3007	0.9097	0.0529	0.6436	0.0822	1.1618	0.7949	1.4616
C3-1-4	2.1E+04	4.2E+04	2.4E+05	4.6E+05	3242	0.9808	0.0219	0.3147	0.0697	0.4821	0.3887	1.2401
C3-1-5	0.0E+00	0.0E+00	8.3E+02	1.6E+03	3344	1.0117	0.0000	0.0011	0.0000	0.0000	0.0013	0.0000
C3-2-1	4.6E+04	1.0E+05	4.2E+05	9.0E+05	2964	0.8967	0.0529	0.6141	0.0862	1.1629	0.7584	1.5333
C3-2-2	5.8E+04	1.4E+05	4.5E+05	1.0E+06	2810	0.8501	0.0706	0.6944	0.1016	1.5504	0.8577	1.8076
C3-2-3	6.5E+04	1.6E+05	4.6E+05	1.1E+06	2723	0.8238	0.0816	0.7240	0.1127	1.7924	0.8943	2.0043
C3-2-4	6.4E+04	1.6E+05	4.9E+05	1.2E+06	2606	0.7884	0.0833	0.8109	0.1027	1.8307	1.0016	1.8278
C3-2-5	5.3E+04	1.2E+05	4.8E+05	1.0E+06	2943	0.8904	0.0606	0.7037	0.0861	1.3312	0.8692	1.5316
C3-3-1	6.8E+04	1.5E+05	4.7E+05	1.0E+06	2897	0.8765	0.0801	0.7032	0.1139	1.7598	0.8686	2.0261
C3-3-2	7.1E+04	1.6E+05	4.6E+05	1.0E+06	2871	0.8686	0.0838	0.7015	0.1194	1.8411	0.8665	2.1249
C3-3-3	7.3E+04	1.7E+05	4.7E+05	1.1E+06	2760	0.8350	0.0893	0.7348	0.1215	1.9614	0.9076	2.1610
C3-3-4	7.4E+04	1.7E+05	4.7E+05	1.1E+06	2848	0.8616	0.0880	0.7202	0.1222	1.9342	0.8896	2.1743
C3-3-5	8.0E+04	1.8E+05	5.1E+05	1.1E+06	2847	0.8613	0.0954	0.7709	0.1237	2.0962	0.9522	2.2014
C3-4-1	7.9E+04	1.8E+05	5.0E+05	1.1E+06	2838	0.8586	0.0950	0.7612	0.1249	2.0885	0.9402	2.2213
C3-4-2	7.9E+04	1.8E+05	4.9E+05	1.1E+06	2769	0.8377	0.0965	0.7720	0.1249	2.1193	0.9536	2.2225
C3-4-3	7.8E+04	1.7E+05	4.9E+05	1.1E+06	2902	0.8780	0.0912	0.7262	0.1256	2.0045	0.8970	2.2346
C3-4-4	7.9E+04	1.8E+05	5.0E+05	1.1E+06	2812	0.8507	0.0956	0.7682	0.1245	2.1008	0.9488	2.2142
C3-4-5	7.9E+04	1.7E+05	4.9E+05	1.0E+06	2996	0.9064	0.0894	0.7075	0.1263	1.9636	0.8738	2.2471
C3-5-1	8.3E+04	1.9E+05	5.2E+05	1.2E+06	2838	0.8586	0.0994	0.7882	0.1261	2.1843	0.9735	2.2437
C3-5-2	8.1E+04	2.0E+05	5.0E+05	1.2E+06	2643	0.7996	0.1038	0.8257	0.1257	2.2803	1.0199	2.2359
C3-5-3	8.1E+04	1.9E+05	5.1E+05	1.2E+06	2799	0.8468	0.0985	0.7850	0.1255	2.1640	0.9695	2.2319
C3-5-4	8.2E+04	1.8E+05	5.1E+05	1.1E+06	3007	0.9097	0.0925	0.7311	0.1265	2.0328	0.9030	2.2513
C3-5-5	7.7E+04	1.8E+05	4.8E+05	1.1E+06	2820	0.8532	0.0924	0.7352	0.1257	2.0307	0.9081	2.2363
C3-6-1	7.9E+04	1.7E+05	4.8E+05	1.0E+06	2979	0.9013	0.0900	0.7042	0.1278	1.9777	0.8697	2.2739
C3-6-2	7.7E+04	1.7E+05	4.8E+05	1.1E+06	2882	0.8719	0.0911	0.7234	0.1259	2.0010	0.8936	2.2394
C3-6-3	7.6E+04	1.8E+05	4.7E+05	1.1E+06	2745	0.8305	0.0940	0.7489	0.1255	2.0651	0.9249	2.2327
C3-6-4	7.8E+04	1.7E+05	5.0E+05	1.1E+06	2931	0.8867	0.0909	0.7371	0.1233	1.9969	0.9105	2.1933
C3-6-5	7.4E+04	1.7E+05	4.6E+05	1.0E+06	2813	0.8510	0.0892	0.7137	0.1250	1.9605	0.8815	2.2240
C3-7-1	8.1E+04	1.9E+05	5.1E+05	1.2E+06	2815	0.8517	0.0980	0.7896	0.1241	2.1527	0.9753	2.2073
C3-7-2	8.0E+04	1.8E+05	5.0E+05	1.1E+06	2818	0.8526	0.0959	0.7648	0.1254	2.1072	0.9446	2.2309
C3-7-3	7.9E+04	1.9E+05	4.9E+05	1.2E+06	2684	0.8120	0.1005	0.7941	0.1266	2.2086	0.9808	2.2517
C3-7-4	7.9E+04	1.9E+05	4.9E+05	1.2E+06	2660	0.8048	0.1004	0.7985	0.1257	2.2058	0.9863	2.2364
C3-7-5	7.8E+04	1.8E+05	5.0E+05	1.1E+06	2783	0.8420	0.0957	0.7782	0.1230	2.1029	0.9612	2.1879

A.2

Mark 42 Target Assembly #3
 Assayed October 08, 11 1993
 324 Building C-Cell
 NDA Specialist DL Haggard

Can ID	Net	Corrected	Net	Corrected	⁶⁰ Co	Rate Loss CF	10-Oct-93			01-Aug-84			
	Area ¹³⁴ Cs	Counts MCF	Area ¹³⁷ Cs	Counts MCF			Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	
C3-8-1	9.0E+04	2.1E+05	5.8E+05	1.3E+06	2840	0.8592	0.1080	0.8817	0.1225	2.3736	1.0890	2.1796	
C3-8-2	7.9E+04	1.8E+05	5.0E+05	1.1E+06	2891	0.8746	0.0925	0.7564	0.1223	2.0332	0.9343	2.1763	
C3-8-3	7.7E+04	1.9E+05	4.9E+05	1.2E+06	2702	0.8175	0.0970	0.7903	0.1228	2.1324	0.9761	2.1845	
C3-8-4	7.7E+04	1.8E+05	5.0E+05	1.1E+06	2805	0.8486	0.0937	0.7702	0.1217	2.0594	0.9514	2.1646	
C3-8-5	7.1E+04	1.7E+05	4.9E+05	1.1E+06	2793	0.8450	0.0867	0.7645	0.1135	1.9059	0.9442	2.0185	
TOTALS								3.2427	27.3076		71.2531	33.7285	
								883	7436		19402	9184	2.1125



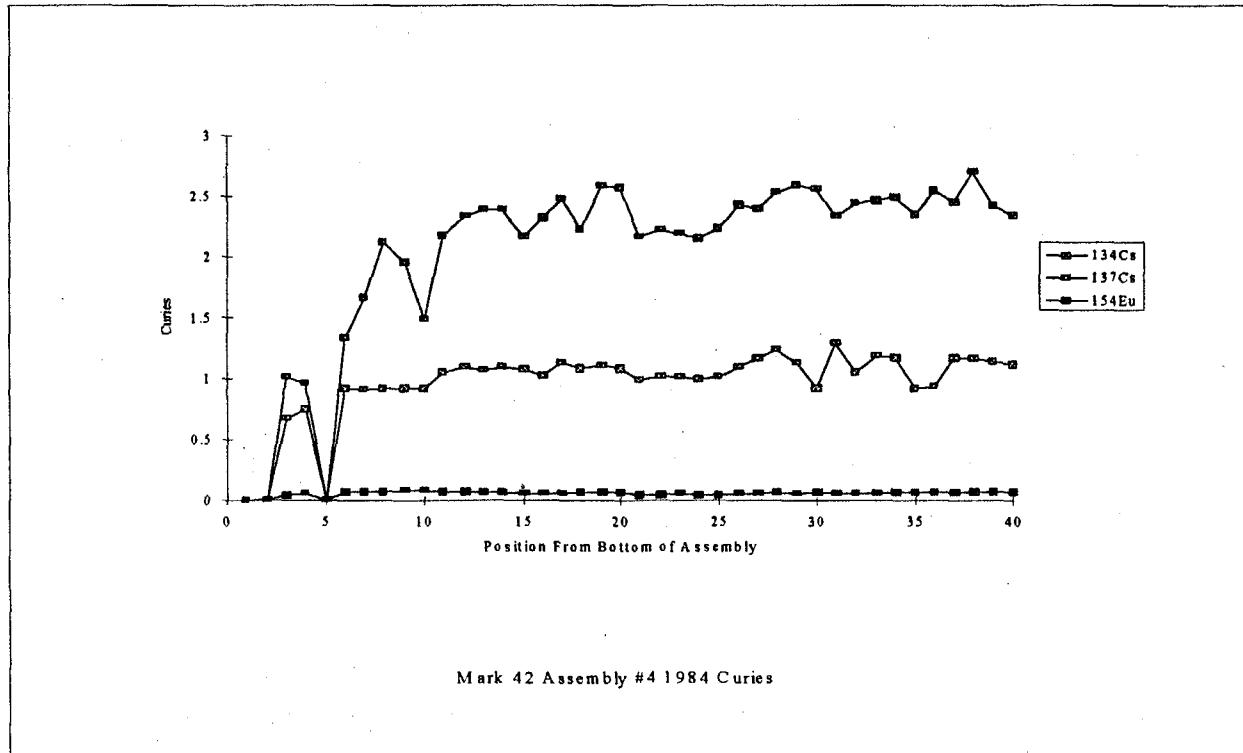
Mark 42 Target Assembly #4 Assayed
 March 22, 1994
 324 Building C-Cell
 NDA Specialist DL Haggard

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	10-Oct-93 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	01-Aug-84 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Curies ¹³⁴ Cs/ ¹³⁷ Cs	10-Oct-93 Curies ¹⁵⁴ Eu	01-Aug-84 Curies ¹⁵⁴ Eu
C4-1-1	0	0	1140	2222	6451	1	0	0	0	0	0	0	0	0	0
C4-1-2	0	0	1119	2183	6445	0.987	0	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000
C4-1-3	37534	75500	399982	788002	6381	0.977	4691	0.039	0.536	0.074	1.006	0.669	1.503	0.023	0.049
C4-1-4	34300	71586	430548	880080	6150	0.942	5011	0.037	0.599	0.062	0.954	0.748	1.276	0.025	0.054
C4-1-5	0	0	1084	2103	6481	0.993	0	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000
C4-2-1	48552	99582	535078	1074873	6258	0.958	6451	0.052	0.732	0.071	1.327	0.913	1.453	0.032	0.069
C4-2-2	61035	124866	530678	1063316	6274	0.961	7048	0.065	0.724	0.090	1.664	0.903	1.842	0.035	0.075
C4-2-3	73761	158878	507088	1069758	5959	0.913	6732	0.083	0.728	0.114	2.117	0.909	2.330	0.035	0.075
C4-2-4	71672	146862	539248	1082212	6264	0.959	7329	0.077	0.737	0.104	1.957	0.919	2.129	0.036	0.078
C4-2-5	52795	111071	522157	1075910	6101	0.934	7396	0.058	0.732	0.079	1.480	0.914	1.620	0.038	0.081
C4-3-1	78682	163074	605823	1229760	6193	0.949	6990	0.085	0.837	0.102	2.173	1.045	2.080	0.035	0.075
C4-3-2	81311	175023	607220	1280138	5963	0.913	6363	0.091	0.872	0.105	2.332	1.087	2.145	0.033	0.071
C4-3-3	85346	178937	608870	1250279	6122	0.938	5775	0.093	0.851	0.110	2.385	1.062	2.245	0.029	0.063
C4-3-4	84098	178922	617127	1285929	6033	0.924	5397	0.093	0.875	0.107	2.384	1.092	2.183	0.028	0.060
C4-3-5	75570	162475	600491	1264468	5970	0.914	4948	0.085	0.861	0.099	2.165	1.074	2.016	0.026	0.055
C4-4-1	84377	174090	590718	1193701	6221	0.953	5419	0.091	0.813	0.112	2.320	1.014	2.288	0.027	0.058
C4-4-2	89212	185287	649457	1321106	6180	0.947	5205	0.097	0.899	0.108	2.469	1.122	2.200	0.026	0.056
C4-4-3	78704	166535	616068	1276738	6066	0.929	5378	0.087	0.869	0.100	2.219	1.085	2.046	0.028	0.059
C4-4-4	91519	193619	622034	1288890	6067	0.929	5517	0.101	0.877	0.115	2.580	1.095	2.357	0.028	0.061
C4-4-5	91103	193217	610249	1267605	6052	0.927	5545	0.101	0.863	0.117	2.575	1.077	2.391	0.029	0.061
C4-5-1	78309	162301	571850	1160798	6193	0.949	4472	0.085	0.790	0.107	2.163	0.986	2.193	0.023	0.048
C4-5-2	78741	166147	573382	1184955	6083	0.932	4261	0.087	0.807	0.108	2.214	1.007	2.200	0.022	0.047
C4-5-3	76806	163897	566310	1183571	6015	0.921	4558	0.086	0.806	0.106	2.184	1.005	2.172	0.024	0.050
C4-5-4	76352	161771	559827	1161717	6058	0.928	4424	0.085	0.791	0.107	2.156	0.987	2.185	0.023	0.049
C4-5-5	77240	167383	561810	1192404	5923	0.907	4316	0.087	0.812	0.108	2.231	1.013	2.202	0.023	0.049
C4-6-1	86519	182559	621002	1283367	6083	0.932	5017	0.095	0.874	0.109	2.433	1.090	2.232	0.026	0.055
C4-6-2	84019	179497	651941	1364125	6008	0.920	4803	0.094	0.929	0.101	2.392	1.159	2.064	0.025	0.053
C4-6-3	86900	189726	678694	1451263	5879	0.900	5198	0.099	0.988	0.100	2.528	1.233	2.051	0.028	0.059
C4-6-4	87639	194180	610397	1324599	5793	0.887	5038	0.101	0.902	0.113	2.588	1.125	2.300	0.027	0.058
C4-6-5	85019	191717	490376	1083029	5692	0.872	5135	0.100	0.737	0.136	2.555	0.920	2.777	0.028	0.060
C4-7-1	81143	174955	719187	1518734	5953	0.912	5127	0.091	1.034	0.088	2.331	1.290	1.807	0.027	0.057
C4-7-2	86474	183157	594888	1234066	6060	0.928	5112	0.096	0.840	0.114	2.441	1.048	2.328	0.026	0.056
C4-7-3	86804	184709	666883	1389837	6032	0.924	5196	0.097	0.946	0.102	2.461	1.181	2.085	0.027	0.057
C4-7-4	85252	185938	643982	1375634	5885	0.901	5252	0.097	0.937	0.104	2.478	1.169	2.120	0.028	0.059
C4-7-5	81818	175967	510312	1074936	5968	0.914	5228	0.092	0.732	0.126	2.345	0.913	2.568	0.027	0.058
C4-8-1	90006	190701	527354	1094331	6058	0.928	5782	0.100	0.745	0.134	2.541	0.930	2.734	0.030	0.064

A.4

Mark 42 Target Assembly #4 Assayed
 March 22, 1994
 324 Building C-Cell
 NDA Specialist DL Haggard

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	10-Oct-93			01-Aug-84					
								Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Curies ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu	
C4-8-2	87213	183451	665954	1371980	6102	0.935	5909	0.096	0.934	0.103	2.445	1.165	2.098	0.030	0.064	
C4-8-3	93249	202657	642495	1367578	5906	0.905	6066	0.106	0.931	0.114	2.701	1.162	2.325	0.032	0.068	
C4-8-4	85831	181675	643913	1334884	6064	0.929	6399	0.095	0.909	0.104	2.421	1.134	2.135	0.033	0.070	
C4-8-5	81460	175226	621433	1309224	5967	0.914	6735	0.092	0.891	0.103	2.335	1.112	2.100	0.035	0.075	
TOTALS																
								3.22	30.74	0.105	82.05	38.36	1.97	1.06	2.26	
								876.0	8371.9	0.105	22343	10446	2.14	287.68	614.39	



A.5

Mark 42 Target Assembly #5 Assayed July
 13, 14 1994
 324 Building C-Cell
 NDA Specialist DL Haggard

Cs134/137 =2.12
 Eu154/Cs137 =0.570

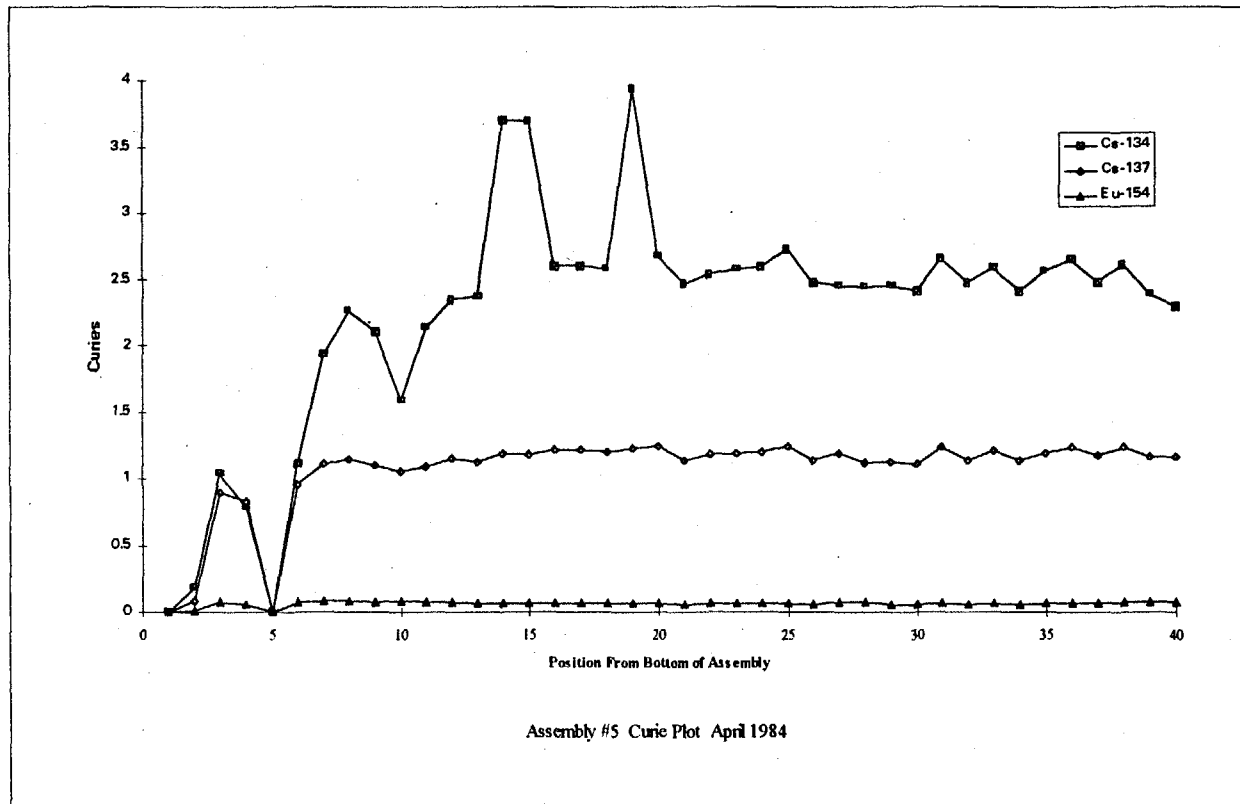
A.6

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	13-Jul-94 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹²⁴ Cs/ ¹³⁷ Cs	01-Aug-84 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	13-Jul-94 Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C5-1-1	0	0	1029	2.0E+3	4313	1.013	0	0.0000	0.0013	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000
C5-1-2	6040	12251	45614	9.1E+4	4126	0.969	500	0.0064	0.0617	0.1038	0.1812	0.0775	2.3367	0.0025	0.0054
C5-1-3	30504	70075	462050	1.0E+6	3643	0.856	5643	0.0366	0.7077	0.0517	1.0362	0.8894	1.1650	0.0315	0.0689
C5-1-4	24403	52881	456753	9.7E+5	3862	0.907	4645	0.0276	0.6600	0.0419	0.7819	0.8294	0.9428	0.0244	0.0535
C5-1-5	0	0	1265	2.5E+3	4225	0.992	0	0.0000	0.0017	0.0000	0.0000	0.0021	0.0000	0.0000	0.0000
C5-2-1	32549	74753	497043	1.1E+6	3644	0.856	6050	0.0391	0.7611	0.0513	1.1053	0.9565	1.1556	0.0337	0.0738
C5-2-2	55177	131036	555170	1.3E+6	3524	0.828	6580	0.0685	0.8791	0.0779	1.9376	1.1047	1.7538	0.0379	0.0830
C5-2-3	63238	152692	567354	1.3E+6	3466	0.814	6219	0.0798	0.9134	0.0873	2.2578	1.1479	1.9669	0.0365	0.0798
C5-2-4	61186	142834	563217	1.3E+6	3585	0.842	5991	0.0746	0.8767	0.0851	2.1120	1.1017	1.9171	0.0340	0.0743
C5-2-5	46016	107241	541954	1.2E+6	3591	0.844	6502	0.0560	0.8422	0.0665	1.5857	1.0583	1.4983	0.0368	0.0805
C5-3-1	60891	144442	549704	1.3E+6	3528	0.829	5967	0.0755	0.8695	0.0868	2.1358	1.0926	1.9547	0.0344	0.0752
C5-3-2	63831	159081	553893	1.4E+6	3358	0.789	5331	0.0831	0.9204	0.0903	2.3522	1.1567	2.0336	0.0323	0.0706
C5-3-3	66803	160375	559156	1.3E+6	3486	0.819	5019	0.0838	0.8951	0.0936	2.3714	1.1248	2.1083	0.0293	0.0640
C5-3-4	103808	250218	587175	1.4E+6	3472	0.816	4985	0.1307	0.9437	0.1385	3.6998	1.1859	3.1198	0.0292	0.0639
C5-3-5	102537	249962	578345	1.4E+6	3433	0.806	4758	0.1306	0.9401	0.1389	3.6961	1.1814	3.1286	0.0282	0.0616
C5-4-1	72606	176381	596527	1.4E+6	3445	0.809	4825	0.0922	0.9662	0.0954	2.6080	1.2143	2.1478	0.0285	0.0623
C5-4-2	73911	175975	609356	1.4E+6	3515	0.826	4912	0.0919	0.9674	0.0950	2.6020	1.2157	2.1404	0.0284	0.0622
C5-4-3	72008	174371	590585	1.4E+6	3456	0.812	4648	0.0911	0.9536	0.0955	2.5783	1.1983	2.1516	0.0273	0.0598
C5-4-4	106069	266171	583058	1.4E+6	3335	0.783	4645	0.1391	0.9756	0.1426	3.9357	1.2260	3.2102	0.0283	0.0619
C5-4-5	74720	181043	610389	1.4E+6	3454	0.811	4780	0.0946	0.9861	0.0959	2.6770	1.2392	2.1602	0.0281	0.0616
C5-5-1	72465	166883	587142	1.3E+6	3634	0.854	4556	0.0872	0.9016	0.0967	2.4676	1.1330	2.1779	0.0255	0.0558
C5-5-2	70359	171920	576769	1.4E+6	3425	0.805	4595	0.0898	0.9397	0.0956	2.5421	1.1809	2.1527	0.0273	0.0597
C5-5-3	68290	174401	555138	1.4E+6	3277	0.770	4523	0.0911	0.9453	0.0964	2.5788	1.1879	2.1708	0.0281	0.0614
C5-5-4	70225	175173	573773	1.4E+6	3355	0.788	4698	0.0915	0.9543	0.0959	2.5902	1.1993	2.1598	0.0285	0.0623
C5-5-5	75778	184354	611378	1.5E+6	3440	0.808	4961	0.0963	0.9917	0.0971	2.7259	1.2463	2.1872	0.0293	0.0641
C5-6-1	72374	167318	588161	1.3E+6	3620	0.850	4599	0.0874	0.9066	0.0964	2.4740	1.1394	2.1714	0.0258	0.0565
C5-6-2	68744	165605	588403	1.4E+6	3474	0.816	5698	0.0865	0.9451	0.0915	2.4487	1.1877	2.0617	0.0333	0.0730
C5-6-3	69369	164926	561876	1.3E+6	3520	0.827	5673	0.0862	0.8907	0.0967	2.4387	1.1194	2.1786	0.0328	0.0717
C5-6-4	69969	165835	569186	1.3E+6	3531	0.829	4616	0.0866	0.8995	0.0963	2.4521	1.1304	2.1693	0.0266	0.0581
C5-6-5	67608	163103	549697	1.3E+6	3469	0.815	4416	0.0852	0.8842	0.0964	2.4117	1.1112	2.1704	0.0259	0.0566
C5-7-1	72814	179650	595078	1.4E+6	3392	0.797	4612	0.0939	0.9790	0.0959	2.6564	1.2302	2.1592	0.0276	0.0605
C5-7-2	71954	167830	579059	1.3E+6	3588	0.843	4578	0.0877	0.9006	0.0974	2.4816	1.1317	2.1928	0.0259	0.0567
C5-7-3	70372	174862	580338	1.4E+6	3368	0.791	4623	0.0914	0.9615	0.0950	2.5856	1.2083	2.1398	0.0279	0.0610
C5-7-4	70780	163227	586230	1.3E+6	3629	0.852	4748	0.0853	0.9014	0.0946	2.4135	1.1328	2.1306	0.0266	0.0582
C5-7-5	72686	172862	598071	1.4E+6	3519	0.827	4872	0.0903	0.9484	0.0952	2.5560	1.1918	2.1447	0.0281	0.0616
C5-8-1	73313	178877	603122	1.4E+6	3430	0.806	5162	0.0935	0.9812	0.0953	2.6450	1.2331	2.1450	0.0306	0.0669
C5-8-2	70020	167617	582388	1.4E+6	3496	0.821	5080	0.0876	0.9296	0.0942	2.4785	1.1682	2.1216	0.0295	0.0646

Mark 42 Target Assembly #5 Assayed July
 13,14, 1994
 324 Building C-Cell
 NDA Specialist DL Haggard

Cs134/137 =2.12
 Eu154/Cs137 =0.570

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	13-Jul-94			01-Aug-84			13-Jul-94	
								Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C5-8-3	70115	176530	587014	1.4E+6	3324	0.781	5194	0.0922	0.9855	0.0936	2.6102	1.2384	2.1078	0.0318	0.0695
C5-8-4	67493	161753	580794	1.4E+6	3492	0.820	5512	0.0845	0.9281	0.0911	2.3917	1.1663	2.0507	0.0321	0.0702
C5-8-5	64402	155413	573241	1.4E+6	3468	0.815	5800	0.0812	0.9224	0.0880	2.2980	1.1591	1.9825	0.0340	0.0744
TOTALS								3.177	33.819	0.0939	89.900	42.500	1.992	1.108	2.425
								865	9209		24480	11573	2.12	302	660



A.7

Mark 42 Target Assembly #6
 Assayed October 3,4 1994
 324 BUILDING C-CELL
 NDA Specialist DL Haggard

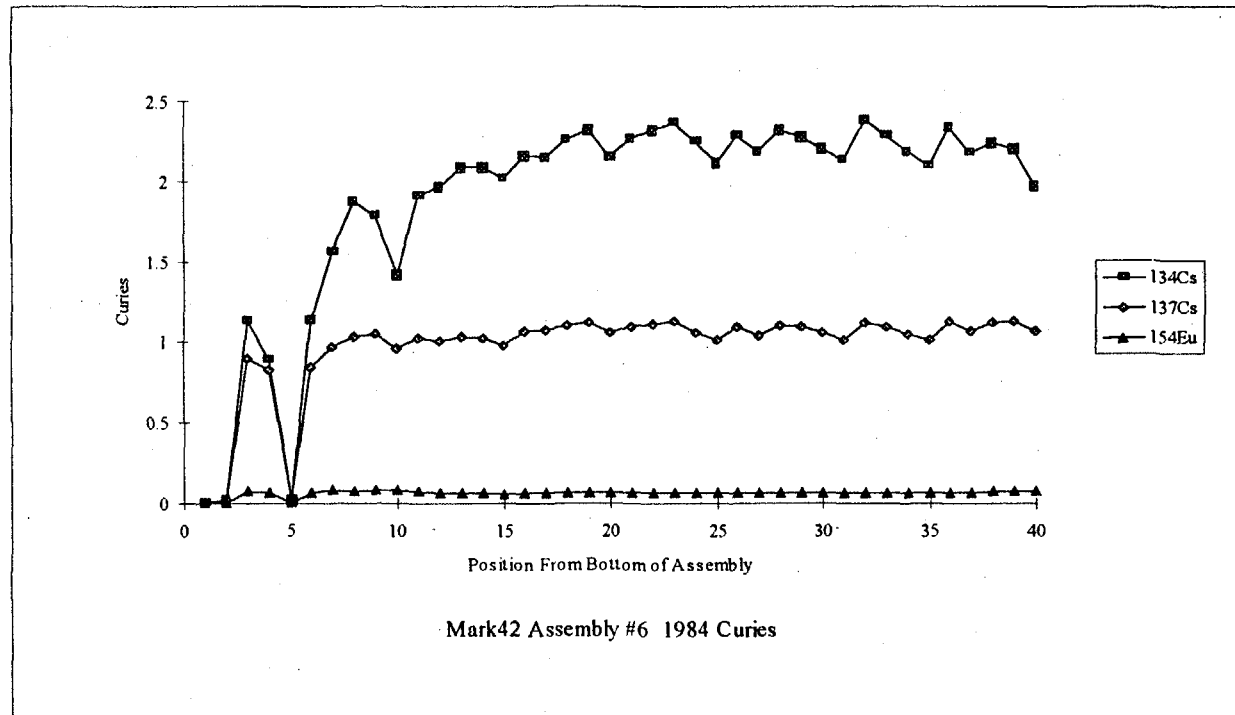
04-Oct-94

A 8

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	04-Oct-94			01-Aug-84			04-Oct-94	
								Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C6-1-2	562	1087	10223	19371	3713	1.016	105	0.00057	0.01319	0.04308	0.01735	0.01666	1.04164	0.00049	0.00110
C6-1-3	31677	70712	477752	1044513	3218	0.881	5653	0.03695	0.71110	0.05196	1.12855	0.89830	1.25632	0.03065	0.06828
C6-1-4	25816	55824	451712	956664	3322	0.909	5117	0.02917	0.65129	0.04478	0.89095	0.82275	1.08290	0.02687	0.05987
C6-1-5	513	1020	9249	18005	3614	0.989	103	0.00053	0.01226	0.04346	0.01627	0.01548	1.05095	0.00050	0.00111
C6-2-1	32369	71479	454352	982666	3253	0.890	5422	0.03735	0.66899	0.05583	1.14080	0.84511	1.34989	0.02908	0.06478
C6-2-2	43500	97619	511178	1123528	3201	0.876	6310	0.05100	0.76489	0.06668	1.55800	0.96625	1.61242	0.03439	0.07661
C6-2-3	49760	117620	518700	1200834	3039	0.832	5846	0.06145	0.81752	0.07517	1.87721	1.03274	1.81771	0.03356	0.07476
C6-2-4	48528	111909	541060	1222039	3115	0.852	6466	0.05847	0.83195	0.07028	1.78607	1.05097	1.69945	0.03621	0.08068
C6-2-5	39875	88435	513309	1114976	3239	0.886	6561	0.04621	0.75907	0.06087	1.41141	0.95890	1.47191	0.03534	0.07873
C6-3-1	51472	119543	523490	1190765	3093	0.846	5773	0.06246	0.81066	0.07705	1.90790	1.02408	1.86304	0.03256	0.07254
C6-3-2	55084	122886	531756	1161861	3220	0.881	5518	0.06421	0.79099	0.08117	1.96125	0.99922	1.96279	0.02990	0.06660
C6-3-3	56741	130640	532744	1201328	3120	0.854	5337	0.06826	0.81786	0.08346	2.08500	1.03316	2.01808	0.02984	0.06648
C6-3-4	58802	130612	545103	1185867	3234	0.885	5119	0.06824	0.80733	0.08453	2.08457	1.01986	2.04397	0.02761	0.06152
C6-3-5	55739	126468	511367	1136369	3166	0.866	4655	0.06608	0.77363	0.08541	2.01842	0.97729	2.06532	0.02565	0.05715
C6-4-1	59520	135218	558551	1242792	3162	0.865	4952	0.07065	0.84608	0.08350	2.15807	1.06882	2.01911	0.02732	0.06087
C6-4-2	59146	134496	559294	1245627	3159	0.865	4936	0.07027	0.84801	0.08287	2.14654	1.07126	2.00376	0.02726	0.06073
C6-4-3	60591	141499	558166	1276658	3076	0.842	5041	0.07393	0.86914	0.08506	2.25832	1.09794	2.05686	0.02859	0.06369
C6-4-4	59677	145614	545222	1302966	2944	0.806	5007	0.07608	0.88705	0.08577	2.32398	1.12057	2.07393	0.02967	0.06610
C6-4-5	58667	134901	544012	1225166	3124	0.855	5136	0.07048	0.83408	0.08450	2.15301	1.05366	2.04336	0.02868	0.06390
C6-5-1	63254	142127	576233	1268099	3197	0.875	5134	0.07426	0.86331	0.08602	2.26835	1.09058	2.07994	0.02802	0.06241
C6-5-2	63821	145680	576141	1288041	3147	0.861	5314	0.07612	0.87689	0.08680	2.32504	1.10773	2.09892	0.02946	0.06563
C6-5-3	62671	148139	568934	1317130	3039	0.832	5186	0.07740	0.89669	0.08632	2.36428	1.13275	2.08720	0.02977	0.06632
C6-5-4	63142	140688	565222	1233450	3224	0.882	5341	0.07351	0.83972	0.08754	2.24537	1.06079	2.11670	0.02890	0.06439
C6-5-5	59297	132285	537970	1175438	3220	0.881	5026	0.06912	0.80023	0.08637	2.11125	1.01089	2.08850	0.02723	0.06066
C6-6-1	62857	143161	568958	1269159	3154	0.863	5274	0.07480	0.86403	0.08657	2.28484	1.09150	2.09331	0.02917	0.06499
C6-6-2	59685	136891	535823	1203641	3132	0.857	4938	0.07152	0.81943	0.08728	2.18478	1.03515	2.11059	0.02750	0.06128
C6-6-3	62401	145584	560852	1281552	3079	0.843	5172	0.07607	0.87247	0.08718	2.32352	1.10215	2.10816	0.02930	0.06529
C6-6-4	62525	142767	568765	1271955	3146	0.861	5176	0.07459	0.86594	0.08614	2.27855	1.09390	2.08296	0.02870	0.06394
C6-6-5	61166	138301	557252	1234048	3177	0.869	5075	0.07226	0.84013	0.08601	2.20728	1.06130	2.07979	0.02787	0.06209
C6-7-1	61814	133585	558108	1181285	3324	0.910	5126	0.06980	0.80421	0.08679	2.13201	1.01592	2.09860	0.02690	0.05994
C6-7-2	62385	149330	555931	1303324	3001	0.821	4909	0.07802	0.88729	0.08793	2.38330	1.12088	2.12628	0.02854	0.06358
C6-7-3	59984	143011	546354	1275770	3013	0.825	5144	0.07472	0.86854	0.08603	2.28244	1.09718	2.08028	0.02978	0.06635
C6-7-4	60758	136819	553104	1219870	3190	0.873	5159	0.07149	0.83048	0.08608	2.18362	1.04911	2.08141	0.02821	0.06286
C6-7-5	59468	131119	545924	1178905	3258	0.892	5129	0.06851	0.80259	0.08536	2.09265	1.01388	2.06401	0.02746	0.06119
C6-8-1	61877	146406	567027	1314013	3036	0.831	5184	0.07649	0.89457	0.08551	2.33664	1.13007	2.06769	0.02979	0.06636
C6-8-2	60281	136472	558994	1239466	3173	0.868	5470	0.07130	0.84382	0.08450	2.17808	1.06596	2.04331	0.03007	0.06700

Mark 42 Target Assembly #6
 Assayed October 3, 4 1994
 324 BUILDING C-CELL
 NDA Specialist DL Haggard

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	04-Oct-94			01-Aug-84			04-Oct-94			
							Net Area ¹⁵⁴ Eu	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu	
C6-8-3	60401	140462	570990	1300493	3089	0.845	5671	0.07339	0.88537	0.08289	2.24176	1.11844	2.00436	0.03203	0.07135	
C6-8-4	58735	138244	569203	1312140	3052	0.835	5858	0.07223	0.89330	0.08086	2.20636	1.12846	1.95520	0.03348	0.07460	
C6-8-5	53181	123792	544938	1242364	3086	0.845	5947	0.06468	0.84579	0.07647	1.97572	1.06845	1.84914	0.03362	0.07490	
TOTALS									2.47	30.61		75.53	38.67	1.85	1.10	2.45
								673.3	8335.4	0.081	20567	10530	1.95	299.55	667.36	



A.9

Mark 42 Target Assembly #7 Assayed
 December 21,22 1994
 324 Building C-Cell
 NDA Specialist DL Haggard

Cs134/Cs137 = 1.931
 Eu154/Cs137 = 0.058

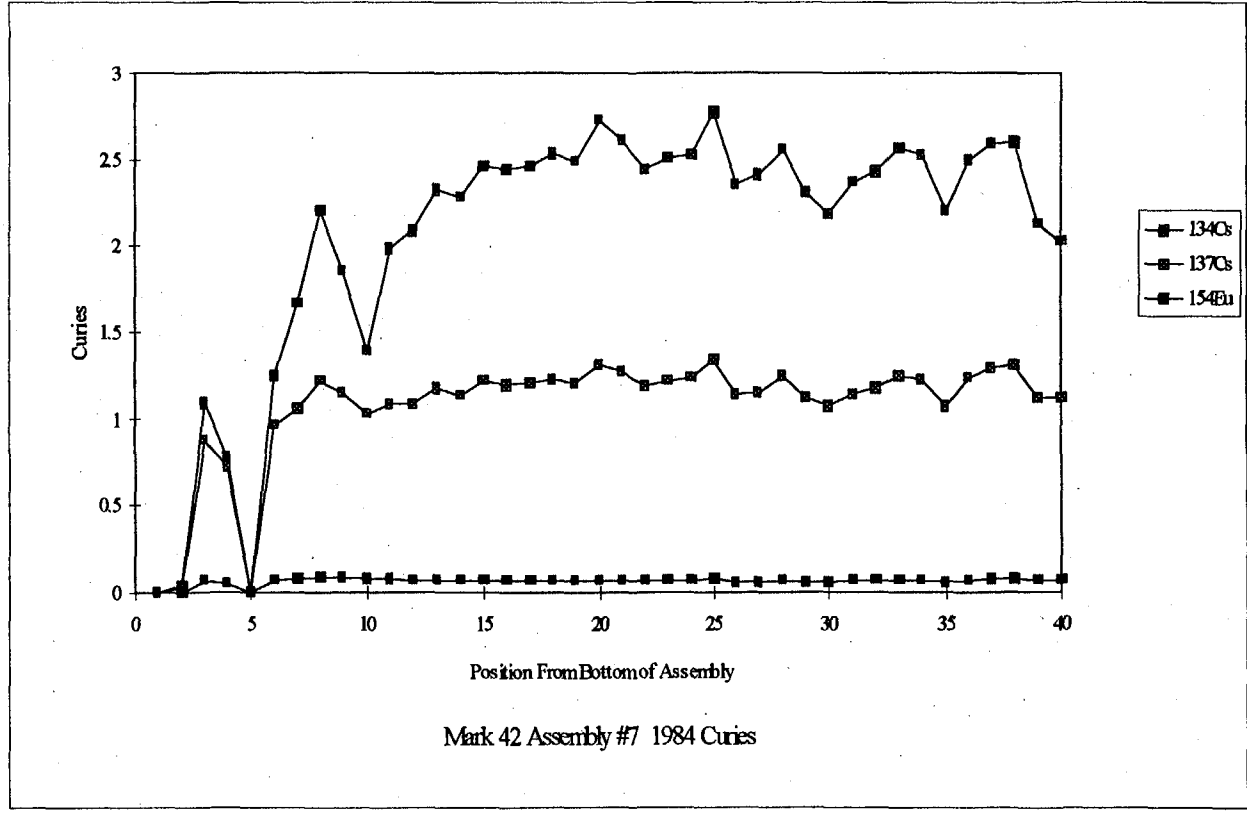
A.10

Can ID						22-Dec-94					01-Aug-84			22-Dec-94	
	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C7-1-1	0	0	1171	2256	6213	1.000	0	0.00000	0.00123	0.00000	0.00000	0.00156	0.00000	0.00000	0.00000
C7-1-2	1299	2611	21922	43152	6080	0.978	234	0.00109	0.02350	0.04643	0.03585	0.02984	1.20144	0.00080	0.00181
C7-1-3	31859	79742	515279	1263178	4882	0.785	6426	0.03333	0.68797	0.04845	1.09491	0.87341	1.25361	0.02734	0.06196
C7-1-4	23664	56654	443234	1039304	5104	0.821	5121	0.02368	0.56604	0.04184	0.77790	0.71861	1.08250	0.02084	0.04723
C7-1-5	0	0	1160	2229	6228	1.002	10	0.00000	0.00121	0.00000	0.00000	0.00154	0.00000	0.00003	0.00008
C7-2-1	36555	90477	570360	1382630	4937	0.794	7033	0.03782	0.75303	0.05022	1.24231	0.95600	1.29948	0.02959	0.06706
C7-2-2	46612	120750	599029	1519855	4717	0.759	7729	0.05047	0.82776	0.06097	1.65797	1.05089	1.57769	0.03404	0.07713
C7-2-3	56274	160103	633069	1764038	4295	0.691	7699	0.06692	0.96076	0.06965	2.19832	1.21972	1.80231	0.03724	0.08438
C7-2-4	50143	134961	630521	1662125	4540	0.730	8007	0.05641	0.90525	0.06232	1.85311	1.14926	1.61244	0.03664	0.08302
C7-2-5	38678	100859	582183	1486885	4686	0.754	7574	0.04216	0.80981	0.05206	1.38486	1.02809	1.34703	0.03358	0.07609
C7-3-1	57422	144228	638779	1571404	4865	0.783	7663	0.06029	0.85584	0.07044	1.98035	1.08653	1.82264	0.03272	0.07415
C7-3-2	60252	151867	633591	1564107	4848	0.780	6941	0.06348	0.85187	0.07452	2.08523	1.08148	1.92812	0.02974	0.06740
C7-3-3	62350	169572	640400	1705827	4493	0.723	6497	0.07088	0.92905	0.07629	2.32834	1.17947	1.97405	0.03004	0.06807
C7-3-4	64451	165872	649189	1636366	4748	0.764	6469	0.06933	0.89122	0.07779	2.27753	1.13145	2.01294	0.02830	0.06414
C7-3-5	67341	179198	676113	1762128	4592	0.739	6211	0.07490	0.95972	0.07805	2.46050	1.21840	2.01945	0.02810	0.06367
C7-4-1	65252	177425	649356	1729298	4494	0.723	5968	0.07416	0.94183	0.07874	2.43616	1.19570	2.03743	0.02759	0.06251
C7-4-2	65959	179069	656001	1744277	4501	0.724	6024	0.07485	0.94999	0.07879	2.45873	1.20606	2.03864	0.02780	0.06300
C7-4-3	66965	184672	653444	1764927	4431	0.713	6266	0.07719	0.96124	0.08030	2.53566	1.22034	2.07784	0.02938	0.06657
C7-4-4	67202	181155	660100	1742786	4533	0.729	6062	0.07572	0.94918	0.07977	2.48738	1.20503	2.06417	0.02778	0.06295
C7-4-5	69045	198237	673995	1895288	4256	0.685	6336	0.08286	1.03224	0.08027	2.72193	1.31047	2.07705	0.03093	0.07008
C7-5-1	66115	189870	653054	1836833	4255	0.685	6098	0.07936	1.00040	0.07933	2.60703	1.27006	2.05269	0.02977	0.06746
C7-5-2	63527	177962	623855	1711662	4362	0.702	6115	0.07439	0.93223	0.07979	2.44353	1.18351	2.06465	0.02912	0.06599
C7-5-3	64660	182559	637589	1763086	4328	0.696	6246	0.07631	0.96024	0.07947	2.50665	1.21907	2.05621	0.02998	0.06794
C7-5-4	63938	183834	631845	1779269	4250	0.684	5957	0.07684	0.96905	0.07929	2.52415	1.23026	2.05173	0.02912	0.06598
C7-5-5	69905	202036	683483	1934696	4228	0.680	6591	0.08445	1.05370	0.08014	2.77408	1.33772	2.07373	0.03238	0.07338
C7-6-1	65588	171765	640335	1642414	4666	0.751	5905	0.07180	0.89451	0.08026	2.35844	1.13563	2.07677	0.02629	0.05957
C7-6-2	65398	175866	631675	1663702	4544	0.731	5676	0.07351	0.90611	0.08113	2.41475	1.15035	2.09915	0.02595	0.05880
C7-6-3	65609	185969	645710	1792584	4311	0.694	6283	0.07773	0.97630	0.07962	2.55347	1.23946	2.06015	0.03028	0.06861
C7-6-4	61646	167882	607721	1620945	4487	0.722	5803	0.07017	0.88282	0.07949	2.30512	1.12078	2.05671	0.02687	0.06088
C7-6-5	59149	158991	589347	1551535	4546	0.731	5652	0.06646	0.84502	0.07864	2.18305	1.07279	2.03492	0.02583	0.05853
C7-7-1	64988	172000	638181	1654261	4617	0.743	6163	0.07189	0.90097	0.07980	2.36167	1.14382	2.06472	0.02773	0.06284
C7-7-2	63725	177176	626629	1706364	4395	0.707	5783	0.07406	0.92934	0.07969	2.43274	1.17985	2.06192	0.02733	0.06194
C7-7-3	63679	186512	627931	1801307	4172	0.671	6024	0.07796	0.98105	0.07947	2.56093	1.24549	2.05616	0.02999	0.06797
C7-7-4	65024	183799	640691	1773713	4323	0.695	6137	0.07683	0.96602	0.07953	2.52368	1.22641	2.05777	0.02949	0.06683
C7-7-5	62251	160109	616691	1553469	4751	0.764	6092	0.06692	0.84607	0.07910	2.19840	1.07413	2.04668	0.02664	0.06036
C7-8-1	66510	181614	667557	1785317	4475	0.720	6502	0.07591	0.97234	0.07807	2.49367	1.23444	2.02009	0.03018	0.06840
C7-8-2	65599	188432	661358	1860626	4254	0.684	6603	0.07876	1.01336	0.07772	2.58729	1.28651	2.01110	0.03224	0.07307
C7-8-3	65055	189543	665926	1900280	4194	0.675	6933	0.07923	1.03496	0.07655	2.60254	1.31393	1.98074	0.03434	0.07782

Mark 42 Target Assembly #7 Assayed
 December 21,22 1994
 324 Building C-Cell
 NDA Specialist DL Haggard

Cs134/Cs137 = 1.931
 Eu154/Cs137 = 0.058

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	22-Dec-94			01-Aug-84				
								Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C7-8-4	61838	154874	661640	1622972	4879	0.785	6446	0.06474	0.88393	0.07324	2.12652	1.12219	1.89498	0.02744	0.06219
C7-8-5	58489	147423	655212	1617481	4848	0.780	6999	0.06162	0.88094	0.06995	2.02422	1.11839	1.80994	0.02999	0.06796
TOTALS								2.514	33.688	0.075	82.599	42.769	1.796	1.093	2.478



A11

Mark 42 Target Assembly #8 Assayed
 April 28, 1995
 324 Building C-Cell
 NDA Specialist DL Haggard

Cs134/Cs137 = 2.065
 Eu154/Cs137 = 0.055

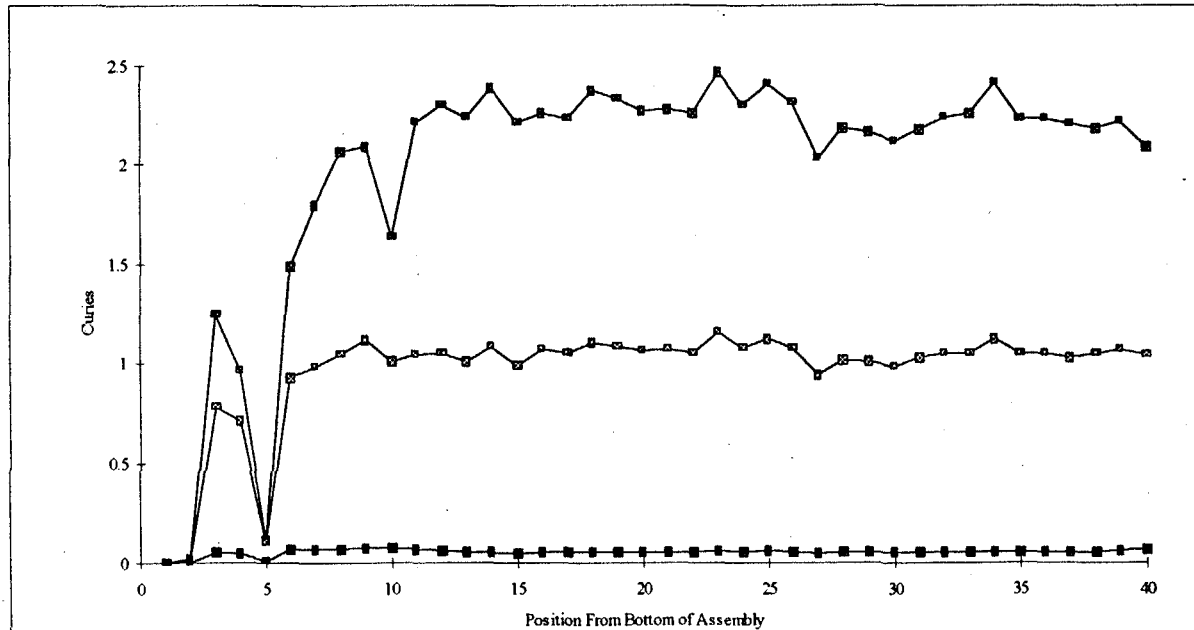
A.12

Can ID	28-APR-95						01-Aug-84						28-Apr-95		
	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area ¹⁵⁴ Eu	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C8-1-1	24	47	1075	2077	4690	0.997	10	0.00002	0.00141	0.01749	0.00091	0.00181	0.50473	0.00005	0.00011
C8-1-2	455	874	7826	14729	4814	1.023	83	0.00046	0.01003	0.04556	0.01687	0.01283	1.31439	0.00039	0.00090
C8-1-3	31635	64488	449157	896758	4538	0.964	4901	0.03369	0.61051	0.05519	1.24403	1.59230	0.78128	1.59230	0.02426
C8-1-4	24279	49778	405632	814525	4512	0.959	3953	0.02601	0.55452	0.04690	0.96026	0.70964	1.35317	0.01968	0.04584
C8-1-5	3019	5835	59228	112123	4786	1.017	473	0.00305	0.07633	0.03994	0.11257	0.09769	1.15237	0.00222	0.00517
C8-2-1	35390	77050	499057	1064155	4249	0.903	5641	0.04026	0.72447	0.05557	1.48635	0.92712	1.60319	0.02983	0.06947
C8-2-2	45132	93027	557055	1124570	4488	0.954	5497	0.04860	0.76560	0.06349	1.79457	0.97976	1.83164	0.02752	0.06409
C8-2-3	49869	106986	568027	1193525	4312	0.916	5671	0.05590	0.81254	0.06879	2.06386	1.03983	1.98480	0.02955	0.06882
C8-2-4	49281	108184	595372	1280075	4214	0.896	6223	0.05652	0.87147	0.06486	2.08695	1.11524	1.87131	0.03318	0.07727
C8-2-5	40821	84593	568849	1154554	4464	0.949	6346	0.04420	0.78601	0.05623	1.63188	1.00588	1.62234	0.03194	0.07438
C8-3-1	53941	114738	575142	1198194	4349	0.924	5424	0.05995	0.81572	0.07349	2.21339	1.04390	2.12030	0.02802	0.06526
C8-3-2	56308	119279	581210	1205844	4367	0.928	4959	0.06232	0.82093	0.07592	2.30099	1.05057	2.19024	0.02551	0.05942
C8-3-3	57436	115959	586886	1160486	4582	0.974	4886	0.06059	0.79005	0.07669	2.23695	1.01105	2.21251	0.02396	0.05580
C8-3-4	58654	123795	599427	1239100	4383	0.931	4519	0.06468	0.84357	0.07668	2.38811	1.07954	2.21215	0.02316	0.05395
C8-3-5	56798	114746	573004	1133779	4579	0.973	4407	0.05995	0.77187	0.07767	2.21355	0.98778	2.24094	0.02162	0.05036
C8-4-1	56513	116902	605045	1225822	4472	0.950	4584	0.06108	0.83453	0.07319	2.25514	1.06797	2.11162	0.02303	0.05363
C8-4-2	56298	115604	596492	1199641	4505	0.957	4638	0.06040	0.81671	0.07396	2.23011	1.04516	2.13374	0.02313	0.05387
C8-4-3	57414	122803	605260	1267936	4325	0.919	4634	0.06416	0.86320	0.07433	2.36897	1.10466	2.14452	0.02407	0.05606
C8-4-4	58073	120805	608356	1239459	4447	0.945	4652	0.06312	0.84381	0.07480	2.33042	1.07985	2.15810	0.02350	0.05474
C8-4-5	56745	117698	600948	1220797	4460	0.948	4621	0.06150	0.83111	0.07399	2.27049	1.06359	2.13474	0.02328	0.05421
C8-5-1	57434	118121	610373	1229468	4498	0.956	4861	0.06172	0.83701	0.07373	2.27865	1.07115	2.12730	0.02428	0.05655
C8-5-2	56879	116979	598053	1204652	4247	0.956	4692	0.06112	0.82012	0.07453	2.25663	1.04953	2.15014	0.02343	0.05458
C8-5-3	58718	127898	620615	1323980	4425	0.903	4717	0.06682	0.90136	0.07414	2.46727	1.15349	2.13896	0.02495	0.05811
C8-5-4	56993	119147	602966	1234585	4460	0.940	4730	0.06225	0.84050	0.07407	2.29845	1.07561	2.13689	0.02401	0.05593
C8-5-5	60144	124748	635902	1291804	4370	0.948	4921	0.06518	0.87945	0.07411	2.40650	1.12546	2.13824	0.02479	0.05773
C8-6-1	56655	119931	595650	1234955	4520	0.929	4584	0.06266	0.84075	0.07453	2.31358	1.07593	2.15031	0.02357	0.05489
C8-6-2	51366	105127	539492	1081404	4376	0.961	4090	0.05493	0.73621	0.07461	2.02799	0.94215	2.15251	0.02033	0.04735
C8-6-3	53510	113119	564429	1168620	4513	0.930	4270	0.05910	0.79559	0.07429	2.18215	1.01814	2.14328	0.02192	0.05106
C8-6-4	54659	112040	576476	1157330	4374	0.959	4430	0.05854	0.78790	0.07430	2.16134	1.00830	2.14355	0.02205	0.05136
C8-6-5	51815	109585	542741	1124230	4567	0.930	4273	0.05726	0.76537	0.07481	2.11400	0.97946	2.15833	0.02195	0.05112
C8-7-1	55810	113047	593194	1176812	4448	0.971	4432	0.05906	0.80117	0.07372	2.18076	1.02527	2.12701	0.02180	0.05078
C8-7-2	55727	115898	589436	1200641	4472	0.945	4546	0.06055	0.81739	0.07408	2.23578	1.04603	2.13739	0.02296	0.05348
C8-7-3	56594	117070	594744	1204952	4235	0.950	4557	0.06117	0.82032	0.07456	2.25838	1.04979	2.15127	0.02289	0.05332
C8-7-4	57260	125076	602831	1289685	4304	0.900	4549	0.06535	0.87801	0.07443	2.41282	1.12361	2.14739	0.02413	0.05620
C8-7-5	53861	115765	570640	1201244	4457	0.915	4384	0.06049	0.81780	0.07396	2.23321	1.04656	2.13386	0.02288	0.05330
C8-8-1	55735	115681	592728	1204909	4507	0.947	4658	0.06044	0.82029	0.07368	2.23158	1.04975	2.12582	0.02348	0.05468

Mark 42 Target Assembly #8 Assayed
 April 28, 1995
 324 Building C-Cell
 NDA Specialist DL Haggard

Cs134/Cs137 = 2.065
 Eu154/Cs137 = 0.055

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	28-APR-95			01-Aug-84			28-Apr-95		
							Net Area ¹⁵⁴ Eu	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C8-8-2	55609	114139	588660	1183364	4453	0.958	4622	0.05964	0.80563	0.07402	2.20184	1.03098	2.13567	0.02304	0.05366
C8-8-3	54521	113263	593018	1206581	4399	0.946	4766	0.05918	0.82143	0.07204	2.18494	1.05121	2.07850	0.02404	0.05600
C8-8-4	54588	114794	595188	1225862	4408	0.935	5074	0.05998	0.83456	0.07187	2.21448	1.06801	2.07347	0.02591	0.06035
C8-8-5	51651	108396	582317	1196904	4255	0.937	5456	0.05664	0.81484	0.06950	2.09105	1.04278	2.00527	0.02781	0.06476
TOTALS								2.14	29.88		78.96	38.24	1.98	0.91	2.12
TOTALS								582.3	8136.5	0.072	21501	10412	2.06	247.28	575.94



Mark 42 Assembly #8 1984 Curies

A.13

Mark 42 Target Assembly #9 Assayed
 March 10,13 1995
 324 Building C-Cell
 NDA Specialist DL Haggard

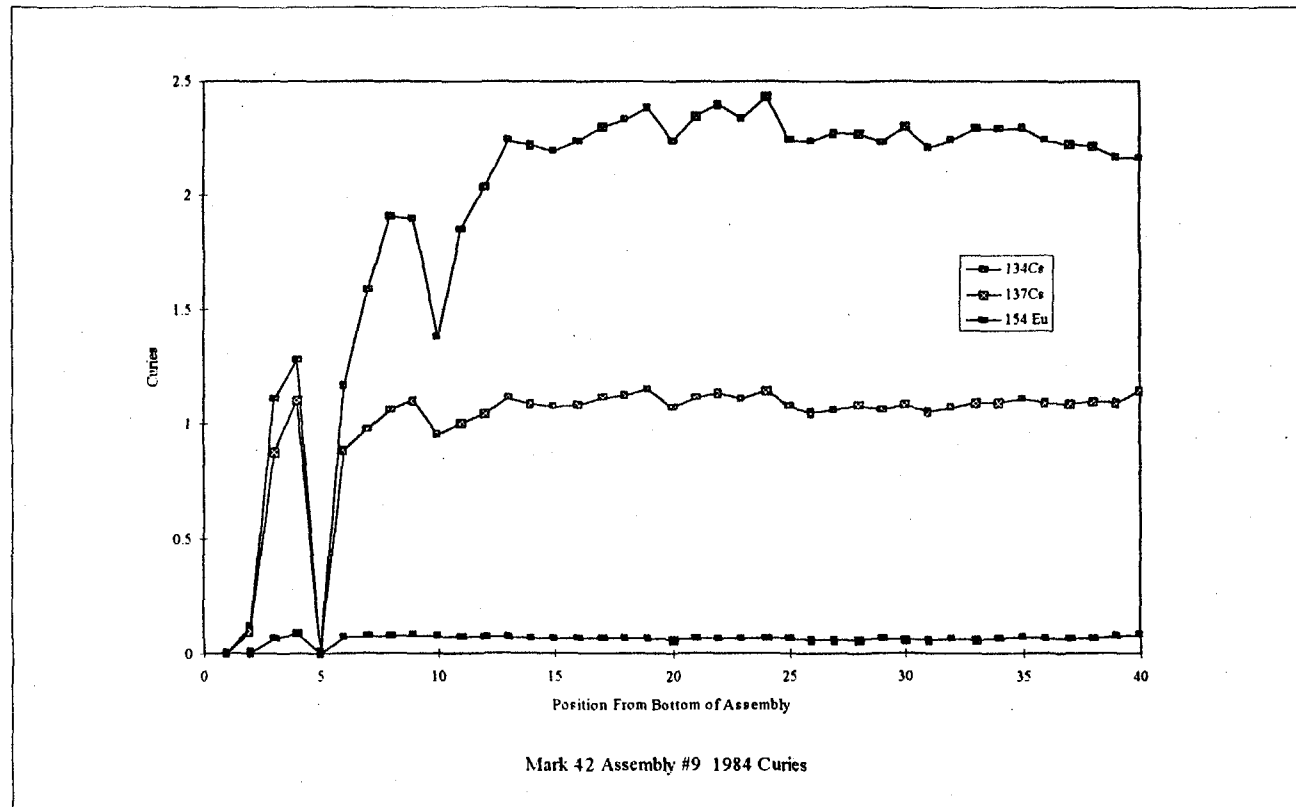
Can ID	#9										01-Aug-84		13-Mar-95		
	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area	13-MAR-95 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C9-1-1	29	58	1032	2.01E+3	7504	0.990	0	0.000	0.001	0.022	0.001	0.002	0.611	0.000	0.000
C9-1-2	3165	6323	55675	1.09E+5	7456	0.984	552	0.003	0.074	0.045	0.117	0.095	1.235	0.003	0.006
C9-1-3	29325	59965	501861	1.01E+6	7284	0.961	5669	0.031	0.684	0.046	1.109	0.873	1.270	0.028	0.065
C9-1-4	23664	69057	443234	1.27E+6	5104	0.674	5121	0.036	0.862	0.042	1.277	1.101	1.160	0.036	0.084
C9-1-5	88	172	1182	2.26E+3	7620	1.006	0	0.000	0.002	0.058	0.003	0.002	1.618	0.000	0.000
C9-2-1	30826	62896	510681	1.02E+6	7300	0.964	5968	0.033	0.695	0.047	1.163	0.887	1.312	0.030	0.068
C9-2-2	41610	85769	556667	1.12E+6	7226	0.954	6283	0.045	0.765	0.059	1.586	0.976	1.625	0.031	0.073
C9-2-3	48532	103163	586190	1.22E+6	7007	0.925	6433	0.054	0.831	0.065	1.908	1.060	1.799	0.033	0.077
C9-2-4	48251	102595	608060	1.27E+6	7005	0.925	6893	0.054	0.862	0.062	1.897	1.100	1.725	0.036	0.082
C9-2-5	36160	74432	544058	1.10E+6	7236	0.955	6565	0.039	0.747	0.052	1.376	0.953	1.444	0.033	0.076
C9-3-1	48193	99974	568645	1.16E+6	7180	0.948	6069	0.052	0.787	0.066	1.849	1.004	1.842	0.031	0.071
C9-3-2	53974	110111	600989	1.20E+6	7301	0.964	6111	0.058	0.818	0.070	2.036	1.043	1.952	0.030	0.070
C9-3-3	57328	121100	619462	1.28E+6	7051	0.931	5688	0.063	0.873	0.073	2.239	1.113	2.011	0.029	0.067
C9-3-4	58932	120160	627389	1.25E+6	7305	0.964	5632	0.063	0.853	0.074	2.222	1.088	2.041	0.028	0.064
C9-3-5	56067	118605	597357	1.24E+6	7041	0.929	5241	0.062	0.843	0.074	2.193	1.075	2.040	0.027	0.062
C9-4-1	59586	120766	627903	1.25E+6	7349	0.970	5636	0.063	0.849	0.074	2.233	1.083	2.062	0.028	0.064
C9-4-2	59812	124250	629451	1.28E+6	7170	0.946	5367	0.065	0.872	0.074	2.298	1.113	2.065	0.027	0.062
C9-4-3	60865	126051	635823	1.29E+6	7192	0.949	5383	0.066	0.878	0.075	2.331	1.120	2.080	0.027	0.062
C9-4-4	61375	129027	641318	1.32E+6	7085	0.935	5309	0.067	0.899	0.075	2.386	1.147	2.080	0.027	0.063
C9-4-5	58455	120993	606985	1.23E+6	7196	0.950	5170	0.063	0.838	0.075	2.237	1.069	2.093	0.026	0.060
C9-5-1	62170	126797	641692	1.28E+6	7303	0.964	5467	0.066	0.873	0.076	2.345	1.114	2.106	0.027	0.062
C9-5-2	61902	129695	637080	1.31E+6	7109	0.938	5368	0.068	0.890	0.076	2.398	1.136	2.112	0.027	0.063
C9-5-3	61777	126445	636270	1.28E+6	7277	0.960	5453	0.066	0.868	0.076	2.338	1.108	2.110	0.027	0.063
C9-5-4	61736	131362	632563	1.32E+6	7000	0.924	5395	0.069	0.897	0.076	2.429	1.145	2.121	0.028	0.064
C9-5-5	58695	121086	611721	1.24E+6	7220	0.953	5379	0.063	0.841	0.075	2.239	1.074	2.085	0.027	0.062
C9-6-1	58281	121002	593747	1.21E+6	7174	0.947	5223	0.063	0.822	0.077	2.238	1.049	2.133	0.026	0.061
C9-6-2	58531	122823	592845	1.22E+6	7098	0.937	5093	0.064	0.829	0.077	2.271	1.058	2.146	0.026	0.060
C9-6-3	57642	122984	594161	1.24E+6	6981	0.921	5032	0.064	0.845	0.076	2.274	1.079	2.108	0.026	0.060
C9-6-4	58108	120711	598253	1.22E+6	7170	0.946	5342	0.063	0.829	0.076	2.232	1.057	2.111	0.027	0.062
C9-6-5	60248	124307	614099	1.24E+6	7219	0.953	5192	0.065	0.845	0.077	2.299	1.078	2.132	0.026	0.060
C9-7-1	57326	119386	595197	1.21E+6	7152	0.944	5110	0.062	0.826	0.075	2.208	1.055	2.093	0.026	0.060
C9-7-2	56985	121235	591722	1.23E+6	7001	0.924	5169	0.063	0.839	0.075	2.242	1.071	2.093	0.027	0.062
C9-7-3	59298	124013	613911	1.26E+6	7122	0.940	5175	0.065	0.856	0.076	2.293	1.092	2.099	0.026	0.061
C9-7-4	58350	123786	604048	1.26E+6	7021	0.927	5500	0.065	0.854	0.076	2.289	1.090	2.099	0.028	0.065
C9-7-5	58028	124075	609078	1.28E+6	6966	0.919	5551	0.065	0.868	0.075	2.294	1.108	2.071	0.029	0.066
C9-8-1	57486	121159	607677	1.25E+6	7067	0.933	5491	0.063	0.854	0.074	2.240	1.090	2.056	0.028	0.065
C9-8-2	57189	120414	605676	1.25E+6	7074	0.934	5533	0.063	0.850	0.074	2.227	1.085	2.052	0.028	0.065

A.14

Mark 42 Target Assembly #9 Assayed
 March 10,13 1995
 324 Building C-Cell
 NDA Specialist DL Haggard

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area	Corrected Counts MCF	⁶⁰ Co	Rate Loss CF	Net Area	#9			01-Aug-84		13-Mar-95		
								13-MAR-95 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C9-8-3	55985	119603	602358	1.26E+6	6972	0.920	5381	0.062	0.858	0.073	2.212	1.095	2.020	0.028	0.064
C9-8-4	56072	117233	612801	1.25E+6	7124	0.940	6116	0.061	0.854	0.072	2.168	1.090	1.989	0.031	0.072
C9-8-5	55481	116999	636674	1.31E+6	7063	0.932	6771	0.061	0.895	0.068	2.163	1.142	1.894	0.035	0.080
TOTALS								2.20	31.13	0	77.86	39.72	2	1.06	2.45
								599	8476	0	21201	10816	2	290	668

A.15



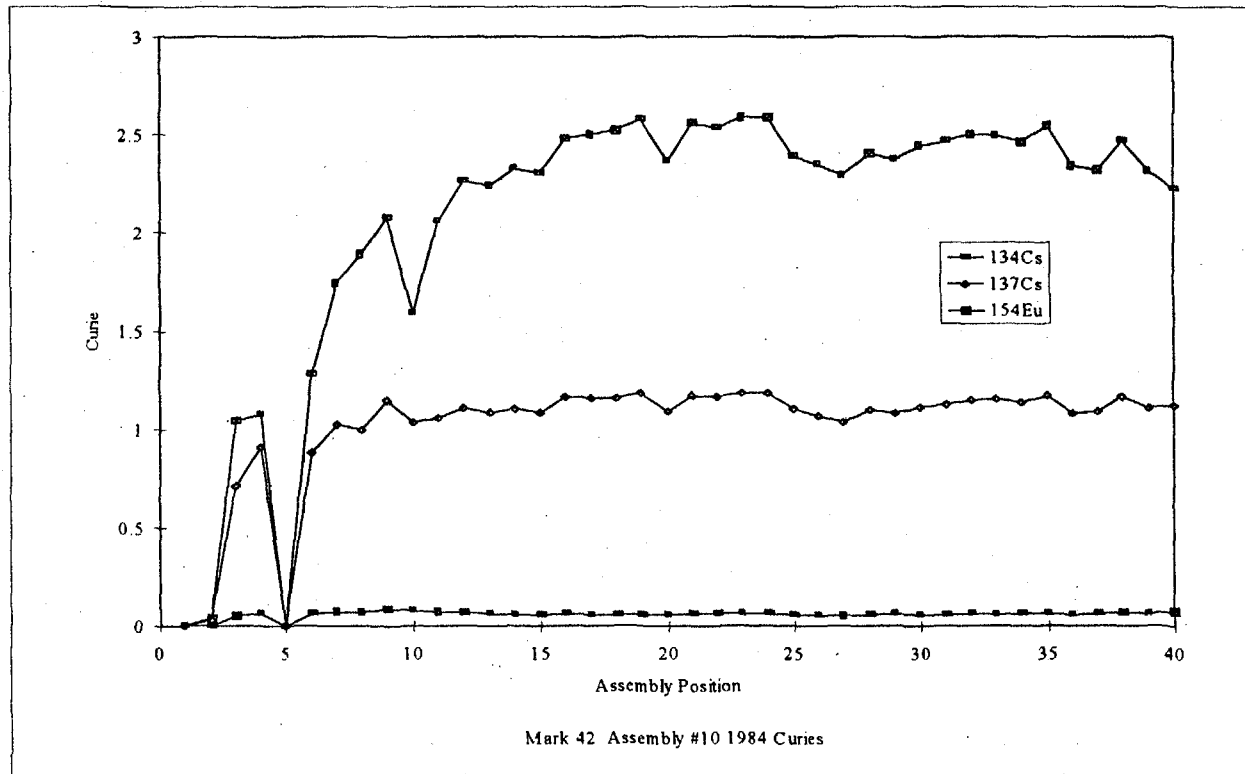
Mark 42 Target Assembly #10
 Assayed June 13,14 1995
 324 BUILDING C-CELL
 NDA Specialist DL Haggard

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ CO	Rate Loss CF	Net Area ¹⁵⁴ Eu	#9			01-Aug-84				
								14-Jun-95 Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹³⁴ Cs	Curies ¹³⁷ Cs	Ratio ¹³⁴ Cs/ ¹³⁷ Cs	Curies ¹⁵⁴ Eu	Curies ¹⁵⁴ Eu
C10-1-1	0	0	1123	2.17E+3	19097	0.994	0	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000
C10-1-2	1003	1977	17262	3.33E+4	19158	0.998	160	0.001	0.023	0.046	0.040	0.029	1.368	0.001	0.002
C10-1-3	25168	51563	405337	8.13E+5	18429	0.960	4553	0.027	0.554	0.049	1.039	0.711	1.461	0.023	0.053
C10-1-4	25768	53248	512083	1.04E+6	18271	0.951	5214	0.028	0.706	0.039	1.073	0.906	1.184	0.026	0.062
C10-1-5	11	22	1149	2.22E+3	19102	0.995	20	0.000	0.002	0.008	0.000	0.002	0.225	0.000	0.000
C10-2-1	30993	63270	501720	1.00E+6	18495	0.963	5533	0.033	0.683	0.048	1.274	0.877	1.454	0.027	0.065
C10-2-2	41095	86401	566497	1.17E+6	17958	0.935	6318	0.045	0.794	0.057	1.740	1.019	1.707	0.032	0.076
C10-2-3	45516	93688	562105	1.13E+6	18343	0.955	5758	0.049	0.771	0.063	1.887	0.990	1.906	0.029	0.068
C10-2-4	48813	103179	633518	1.31E+6	17862	0.930	7041	0.054	0.893	0.060	2.078	1.146	1.814	0.036	0.085
C10-2-5	38070	78700	582807	1.18E+6	18264	0.951	6868	0.041	0.803	0.051	1.585	1.031	1.537	0.034	0.081
C10-3-1	48425	102314	584739	1.21E+6	17870	0.930	6109	0.053	0.824	0.065	2.061	1.057	1.949	0.031	0.074
C10-3-2	52470	112318	604762	1.27E+6	17638	0.918	5662	0.059	0.863	0.068	2.262	1.108	2.042	0.029	0.069
C10-3-3	53128	111205	603829	1.24E+6	18038	0.939	5215	0.058	0.843	0.069	2.240	1.082	2.071	0.027	0.062
C10-3-4	54490	115542	606665	1.26E+6	17806	0.927	4868	0.060	0.858	0.070	2.327	1.101	2.114	0.025	0.059
C10-3-5	53992	114319	596863	1.24E+6	17832	0.928	4577	0.060	0.843	0.071	2.303	1.082	2.129	0.024	0.055
C10-4-1	58953	123056	649567	1.33E+6	18088	0.942	5084	0.064	0.904	0.071	2.479	1.160	2.136	0.026	0.061
C10-4-2	58273	124051	634012	1.32E+6	17736	0.923	4835	0.065	0.900	0.072	2.499	1.155	2.163	0.025	0.059
C10-4-3	59683	125203	643878	1.32E+6	17998	0.937	4950	0.065	0.901	0.073	2.522	1.156	2.182	0.025	0.059
C10-4-4	60306	127881	649695	1.35E+6	17805	0.927	4870	0.067	0.919	0.073	2.576	1.179	2.185	0.025	0.059
C10-4-5	56172	117264	609485	1.25E+6	18086	0.942	4734	0.061	0.848	0.072	2.362	1.089	2.169	0.024	0.056
C10-5-1	60414	126955	651049	1.34E+6	17967	0.936	4961	0.066	0.912	0.073	2.557	1.171	2.184	0.025	0.060
C10-5-2	59857	125855	644791	1.33E+6	17957	0.935	5020	0.066	0.904	0.073	2.535	1.160	2.185	0.026	0.060
C10-5-3	60334	128445	647878	1.35E+6	17735	0.923	4925	0.067	0.920	0.073	2.587	1.180	2.192	0.025	0.060
C10-5-4	60300	128359	647605	1.35E+6	17737	0.924	4950	0.067	0.919	0.073	2.586	1.180	2.192	0.026	0.060
C10-5-5	56454	118429	611835	1.26E+6	17998	0.937	4892	0.062	0.856	0.072	2.386	1.098	2.172	0.025	0.059
C10-6-1	55800	116423	595725	1.22E+6	18096	0.942	4602	0.061	0.829	0.073	2.345	1.064	2.205	0.023	0.055
C10-6-2	54160	113724	574289	1.18E+6	17981	0.936	4195	0.059	0.804	0.074	2.291	1.032	2.220	0.021	0.050
C10-6-3	56442	119406	605135	1.25E+6	17847	0.929	4766	0.062	0.854	0.073	2.405	1.096	2.195	0.024	0.058
C10-6-4	56246	117777	602793	1.24E+6	18031	0.939	4993	0.062	0.842	0.073	2.372	1.080	2.196	0.025	0.060
C10-6-5	57852	121375	619440	1.27E+6	17996	0.937	4960	0.063	0.867	0.073	2.445	1.112	2.198	0.025	0.059
C10-7-1	59269	122550	635967	1.29E+6	18260	0.951	4892	0.064	0.877	0.073	2.469	1.125	2.194	0.025	0.058
C10-7-2	58181	124198	626436	1.31E+6	17687	0.921	4918	0.065	0.892	0.073	2.502	1.144	2.186	0.025	0.060
C10-7-3	58046	123791	629564	1.31E+6	17704	0.922	4808	0.065	0.895	0.072	2.494	1.149	2.170	0.025	0.059
C10-7-4	57957	122248	628903	1.30E+6	17900	0.932	5006	0.064	0.885	0.072	2.462	1.135	2.169	0.026	0.060
C10-7-5	59556	126312	642818	1.34E+6	17802	0.927	5116	0.066	0.909	0.073	2.544	1.167	2.181	0.026	0.062
C10-8-1	56124	116270	608621	1.23E+6	18225	0.949	4986	0.061	0.841	0.072	2.342	1.079	2.170	0.025	0.059

A.16

Mark 42 Target Assembly #10
 Assayed June 13,14 1995
 324 BUILDING C-CELL
 NDA Specialist DL Haggard

Can ID	Net Area ¹³⁴ Cs	Corrected Counts MCF	Net Area ¹³⁷ Cs	Corrected Counts MCF	⁶⁰ CO	Rate Loss CF	#9				#9					
							14-Jun-95 Net Area ¹⁵⁴ Eu	14-Jun-95 Curies ¹³⁴ Cs	14-Jun-95 Curies ¹³⁷ Cs	14-Jun-95 Ratio ¹³⁴ Cs/ ¹³⁷ Cs	01-Aug-84 Curies ¹³⁴ Cs	01-Aug-84 Curies ¹³⁷ Cs	01-Aug-84 Ratio ¹³⁴ Cs/ ¹³⁷ Cs	01-Aug-84 Curies ¹⁵⁴ Eu	01-Aug-84 Curies ¹⁵⁴ Eu	
C10-8-2	55335	115135	610572	1.24E+6	18146	0.945	5056	0.060	0.847	0.071	2.319	1.087	2.133	0.026	0.060	
C10-8-3	57874	122524	642231	1.33E+6	17834	0.929	5436	0.064	0.907	0.071	2.468	1.164	2.121	0.028	0.066	
C10-8-4	54467	114733	614152	1.27E+6	17924	0.933	5418	0.060	0.863	0.069	2.311	1.107	2.087	0.028	0.065	
C10-8-5	52119	110328	617087	1.28E+6	17836	0.929	6006	0.058	0.871	0.066	2.222	1.118	1.988	0.031	0.073	
TOTALS									2.15	31.42	0.069	82.99	40.33	0.98	2.31	628
TOTALS								586	8556	0.069	22599	10982	2.06	267	628	



A.17