EML-612

EML GAMMA SPECTROMETRY DATA EVALUATION PROGRAM

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ABSTRACT

This report presents the results of the analyses for the third EML Gamma Spectrometry Data Evaluation Program (October 1999). This program assists laboratories in providing more accurate gamma spectra analysis results and provides a means for users of gamma data to assess how a laboratory performed on various types of gamma spectrometry analyses. This is accomplished through the use of synthetic gamma spectra. A calibration spectrum, a background spectrum, and three sample spectra are sent to each participant in the spectral file format requested by the laboratory. The calibration spectrum contains nuclides covering the energy range from 59.5 keV to 1836 keV. The participants are told fallout and fission product nuclides could be present. The sample spectra are designed to test the ability of the software and user to properly resolve multiplets and to identify and quantify nuclides in a complicated fission product spectrum. The participants were asked to report values and uncertainties as Becquerel per sample with no decay correction.

Thirty-one sets of results were reported from a total of 60 laboratories who received the spectra. Six foreign laboratories participated. The percentage of the results within 1 F of the expected value was 68, 33, and 46 for samples 1, 2, and 3, respectively. From all three samples, 18% of the results were more than 3 F from the expected value. Eighty-three (12%) values out of a total of 682 expected results were not reported for the three samples. Approximately 30% of these false negatives were due the laboratories not reporting ^{144}Pr in sample 2 which was present at the minimum detectable activity level. There were 53 false positives reported with 25% of these responses due to problems with background subtraction. The results show improvement in the ability of the software or user to resolve peaks separated by 1 keV. Improvement is still needed either in the analysis report produced by the software or in the review of these results by the users.

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INTRODUCTION

This report presents the results of the analyses of 31 sets of results from 60 laboratories who received the spectra for the third EML Gamma Spectrometry Data Evaluation Program sent out in October of 1999. The Program's objectives are to improve the gamma analysis techniques of the participants and provide a means for users of gamma spectrometry data to assess the capability of laboratories in performing gamma spectra analyses. These objectives are achieved through the use of synthetic spectra. By using synthetic spectra one can provide spectra of varying degrees of complexity or spectra designed to test a specific feature of gamma spectrometry. Data reduction of gamma spectra is normally performed with computer codes supplied by commercial manufacturers or developed "in house." An evaluation of some of the commercially available software was performed by EML in 1987 (Sanderson 1988), and again in 1991 (Decker and Sanderson 1992). The first study indicated that there were substantial differences in the ability of the programs to detect small peaks and to deconvolute overlapping peaks. The second evaluation showed most of the programs had fairly good results in peak detection and deconvolution, but the analysis of a complex spectrum still gave inconsistent results with some programs not reporting nuclides that were present and others reporting activities varying by more than 20% for certain nuclides. The results of the first Gamma Spectrometry Data Evaluation Program (Decker et al. 1996) in which 31 laboratories using 16 different software packages participated concluded that the results were not dependent on which software program was used but rather on who was using them. Many of the available commercial programs are easy to use and do not require the user to be an expert in gamma spectrometry. This may lead to errors because even the best programs occasionally give inaccurate results without user intervention. Conclusions drawn from the August 1997 distribution in which 29 laboratories participated were that most laboratories have the ability to detect and quantify nuclides that are present at levels close to the MDA (minimum detectable activity) and many laboratories have difficulty in quantifying peaks separated by only 1 keV.

The participants in the Program receive synthetic spectra designed to test the sensitivity and capability of their gamma spectrometry data reduction system on a data disk or tape or by e-mail. The participating laboratories are asked to identify and quantify the radionuclides in the three

sample spectra. The spectra are designed to test both the gamma-ray spectrometry software and the ability of the user to properly utilize the software.

The Gamma Spectrometry Data Evaluation Program is sponsored by EM-5 within the DOE Office of Environmental Management (EM). The program is part of the services provided through the Environmental Measurements Laboratory's (EML) Quality Assessment Program for environmental radiological analyses (Greenlaw and Berne 2000). The synthetic spectra are sent out by EML to previous participants and to those who register through the EML Web Site, with the results to be reported within 90 days. The expected values will be available immediately after the reporting deadline on EML's Web Site (http://www.eml.doe.gov/).

SYNTHETIC SPECTRA

The EML Gamma Spectrometry Data Evaluation Program is designed to test the ability of the commercially available software and "in house" programs to accurately identify and quantify the nuclides in complex spectra, independent of the sample's geometry or matrix. Synthetic spectra, created using a computer code, SYNTH, developed by Hensley et al. (1997) are converted into a variety of formats and put on 3.5 in. floppy disks that can be read by most PC-BASED systems. The available formats include APTEC, ASCII, CANBERRA Spectran-AT, CANBERRA MicroSAMPO, CANBERRA Gamma-AT, CANBERRA Genie Systems, IAEA Ganaas, NUCLEAR DATA Asap, NUCLEUS PCA, ORTEC Minigam II, ORTEC ACE, SILENA SilGamma, and SILENA EMCAplus. The data are put on magnetic tape for users of microvax-based systems. The participants can also have the spectra sent electronically.

The data used in this evaluation simulate the spectra obtained from air filters counted 10 cm from a 50% coaxial germanium detector with a 0.5 mm beryllium window. The detector was calibrated at 0.5 keV per channel. A calibration spectrum, a background spectrum and three sample spectra were included for each format. The calibration spectrum contained nuclides covering the energy range from 59.5 keV to 1836 keV. Participants were told to subtract the background spectrum and that fallout and fission product nuclides could be present. Table 1 lists

the expected nuclides and their concentrations for each sample. Sample 1 contained easily measurable levels of commonly encountered nuclides. Sample 2 was a fairly complex fission product spectrum. Sample 3 was designed to test the ability of the software to deconvolute multiplets. A data reporting program that saves the data in a Microsoft Database file was sent to all of the laboratories. The database file was then received electronically or on a floppy disk by EML. Participants were asked to report values, error terms and minimum detectable activities as Becquerel (Bq) per sample as of the count date. The participants were also asked to indicate which nuclear data reference or references they had used.

EVALUATION CRITERIA

The evaluation of the results was done by using the counting uncertainty associated with the main peak or peaks for each nuclide. The 1 F counting error was calculated by EML using the background counts and gross counts in the peak of interest in both the sample and calibration spectrum. These errors were then combined using the standard method of error propagation. If a nuclide had more than one major line, the average of the two main lines was used in determining the 1 F value. All the results were then evaluated as either within 1, 2 or 3 F, or more than 3 F from the expected value. The expected values come from the synthetic spectra creation program SYNTH (Hensley et al. 1997) that creates spectra based on input from the user as to the type and size of the detector, radiation source, absorbers and distance from the source to the detector. SYNTH obtains the gamma-ray energies, half lives and branching ratios of particular nuclides from the gamma-ray library compiled by Erdtmann and Soyka (1979). The expected results with the 1 F error calculated by EML are found in Table 1. All values are in Bq per sample with no decay correction unless otherwise noted. The results were also evaluated as false positive or as not reported.

RESULTS AND DISCUSSION

Thirty-one sets of results were received. Thirty laboratories sent in results, with one laboratory having two groups sending in results separately. The participating laboratories are listed in Table 2. Three laboratories took the option of having their results reported anonymously and are identified as X1, X2 and X3. Six foreign laboratories participated. Nine different commercially available software packages were used, with one group using an "in-house" created program. The software packages used by the laboratories are listed in Table 3.

The results from the Program are sorted by laboratory (Appendix A), nuclide results by laboratory (Appendix B), and nuclide results sorted by software and evaluation (Appendix C). All values are in Bq per sample as of the count date unless otherwise noted. The laboratory results are compared to the expected value. The ratio is the laboratory value divided by the expected value. The error terms are the uncertainties reported by the laboratories. The mean and standard deviation of the results for each nuclide were calculated excluding outliers. Outliers were determined using the method for SPSS Base 8.0 (SPSS 1998). The means after exclusion of the outliers were usually within 1 F of the expected values. A summary of the evaluations for the three samples (see Table 4) shows that 68%, 33% and 46%, respectively, of the results were within 1 F of the expected value. Eighteen percent of the results from all three samples were more than 3 F from the expected value.

Sample 1 contained ^{54}Mn, ^{57}Co, ^{60}Co, ^{65}Zn and ^{137}Cs at levels where the 1 F counting error was less than 4%. Most laboratories did a good job of identifying and quantifying these isotopes. Eighty six percent of the results were within 2 F of the expected value. The means of all the results for each isotope were within 1 F of the expected value. The calculated 1 F counting errors were small, causing a few laboratories to fall more than 3 F from the expected value even though they were less than 15% from the value.

Sample 2 contained eleven fission product isotopes, ^{95}Zr, ^{95}Nb, ^{140}Ba, ^{140}La, ^{141}Ce, ^{143}Ce, ^{144}Ce, ^{144}Pr, ^{153}Sm, ^{155}Eu and ^{156}Eu. Most laboratories did very well on ^{95}Nb with 77% of the laboratories within 2 F of the expected value. ^{95}Zr in this sample was difficult to quantitate correctly due to

the overlap of its 724.2 keV (43.7% branching ratio) peak with the 723.5 keV (6.0% branching ratio) peak of ^{156}Eu. There was also a small peak at 722.0 keV due to ^{143}Ce which should be resolvable. One could calculate the amount of the "724 keV" peak to assign each nuclide based on the other lines from each nuclide that were present. Some software may be able to resolve the two peaks though they are separated by only 0.7 keV, especially if instructed as to what lines to look for. If the contribution from ^{156}Eu was not subtracted there would be an overestimation of the ^{95} Zr activity. The mean of the reported results is higher than the expected value by a few percent.

Many laboratories reported low values for ^{140}Ba whose two main lines are at 162.6 keV and 537.4 keV. This may be partly explained by differing values for the branching ratios found in various nuclear data references. Values for the 537.4 keV peak ranged from 19.9% to 25.5%, a 22% difference partially explaining the range of results. Ortec Gammavision had better results than the other programs for this nuclide in this evaluation, indicating that many of the Gammavision users had the same nuclear data reference as the SYNTH program. Table 5 lists the branching ratios from some of the available nuclear data references for ^{140}Ba.

Approximately 70% of the laboratories were within 2 F of the expected result for the ^{141}Ce. Results for ^{144}Ce were similar to those of ^{141}Ce with 61% of the results within 2 F of the expected value. ^{144}Ce has an energy of 133.5 while ^{141}Ce has an energy of 145.5 keV, both falling in the region close to the knee of the efficiency curve which is difficult to calibrate.

The results for ^{143}Ce and ^{153}Sm, which have short half-lives relative to the count time, were treated as if they had two expected values. One value was the concentration at the midpoint of counting and one value was the concentration decayed to the beginning of counting. The instructions only say to decay to the count date. Many gamma analysis programs automatically decay results to the start of counting. Using the two expected values, approximately 50% of the laboratories were within 2 F for both ^{143}Ce and ^{153}Sm. Eight laboratories did not report the ^{143}Ce even though there was a large peak at 293 keV, while nine did not report ^{153}Sm despite an easily measurable peak at 103 keV.

The mean of the results for ^{155}Eu excluding outliers was 13.9 Bq, 10% lower than the expected result. ^{155}Eu has peaks at 86.5 keV and 105.3 keV. This is the area that falls around the knee of the efficiency curve where correct calibration is difficult.

Fifty-five percent of the laboratories were within 2 F of the expected results for ^{156}Eu. A few participants may have overestimated the ^{156}Eu concentration if they used the 723 keV peak in the activity calculation and did not take into account that a large fraction of this peak was due to ^{95}Zr.

^{144}Pr, the progeny of ^{144}Ce, which was present at MDA levels was detected by only six of the thirty-one laboratories. Those six laboratories were all within 1 F of the expected value.

Sample 3 contained two of the europium isotopes, ^{152}Eu and ^{154}Eu, and ^{57}Co, ^{125}Sb, ^{136}Cs and ^{137}Cs. The main lines of ^{57}Co (122.1 keV, 85.5% branching ratio and 136.5 keV, 10.6% branching ratio) and ^{152}Eu (121.8 keV, 28.4% branching ratio) and ^{154}Eu (123.0 keV, 40.5% branching ratio) are difficult to resolve and to assign to the correct isotopes. The "122 keV" line for ^{57}Co and ^{152}Eu cannot be resolved and the peak's activity must be assigned to each isotope based on the other lines that are present. More than half of the thirty-one laboratories were more than 3 F from the expected value for ^{57}Co in sample 3, indicating that many of the analysis programs still have difficulty in assigning the activity of a peak based on the other lines present. For ^{57}Co in sample 1, more than 80% of the laboratories were within 2 F of the expected value. The "122 keV" and the 123.0 keV peaks should be resolved by most analysis programs. More than 75% of the participants were within 2 F of the expected value for ^{152}Eu. ^{152}Eu has other peaks that are helpful in correctly quantitating its concentration. Overall, the results for ^{154}Eu were good with 81% of the laboratories within 10% of the expected value. Some of the participants may have underestimated the ^{154}Eu concentration if they assigned some of its activity of the 723 keV peak to ^{95}Zr, which was not present. Table 6 lists the nuclides, energies and branching ratios of the nuclides involved.

Results for ^{136}Cs and ^{137}Cs in sample 3 were similar with 77% of the laboratories falling within 2 F of the expected value. Both of these nuclides are straightforward to quantitate with abundant peaks at 340.6 keV, 818.5 keV and 1048.1 keV for ^{136}Cs, and 661.7 keV for ^{137}Cs. Results for ^{137}Cs in sample 1 were slightly better than in sample 3 with only three laboratories more than 3 F

from the expected value in sample 1, while six were more than 2 F from the expected value in sample 3. The reason for this is not clear since there are no interferences for the 661.6 keV peak in either sample and the energy/efficiency value should be the same.

Approximately 68% of the results were within 2 F of the expected value for ^{125}Sb.

Eighty-three nuclides, out of a total of 682 expected results (12%), were not reported (Table 4). Sixteen of these results were due to one laboratory not reporting any results for samples 1 and 2. Twenty-five of these false negative results came from sample 2, where ^{144}Pr was present at close to the MDA level. ^{144}Pr has a half life of 17.3 min and is in secular equilibrium with its parent ^{144}Ce. Many participants were not looking for a nuclide with such a short half-life and may not have taken the equilibrium relationship into consideration since these are synthetic spectra. ^{143}Ce (half life=33.7 h) and ^{153}Sm (half life=46.7 h) in sample 2, which were not reported by nine and eight laboratories, respectively, also have relatively short half lives. Some laboratories may not have been looking for isotopes with half lives this short even though they were present in easily measurable quantities. Seven laboratories did not report ^{156}Eu even though most of the peaks used in its determination had 1 F errors of approximately 5%. There may be some correlation between software used and the false negative results for the short-lived isotopes, but there are not enough results to draw any conclusions. It seems that both Canberra Genie-2000 and Canberra Genie-VMS had more false negatives for the two short-lived isotopes than they did for the other nuclides, indicating they may not consider isotopes with short half lives compared to the count time.

There were 53 false positives reported (Table 7). Approximately 25% of these were due to the reporting of ^{40}K and ^{214}Bi, which were present in the background spectrum and should have been subtracted from the sample spectrum. These were the only false positives reported in sample 1, which contained only isotopes with a small number of easily recognizable peaks.

There were 11 different isotopes identified in sample 2 that were not present. Four laboratories reported ^{58}Co in sample 2. ^{58}Co has a large peak at 810.8 keV (99.4 % branching ratio) and only one other reasonably abundant line at 511 keV. The annihilation peak at 511 keV is not useful as a confirming line since it is always present. All the activity in the 811.8 keV peak

from sample two can be accounted for by the ^{156}Eu which has four confirming lines present. The energy of the peak used was 1 keV above the library energy. Having a very accurate energy calibration is very helpful in properly identifying nuclides. If all the other lines used in identifying nuclides are falling in the same direction from the expected energies, it would be unusual for one of the lines to be 1 keV less than the library energy unless the peak is very small and misshapen.

^{109}Cd was reported by three laboratories as present in sample 2. Sample 2 has peaks at 86.5 keV and 89.0 keV that could have been identified as the 88 keV peak of ^{109}Cd. The 86.5 keV peak can be accounted for by ^{155}Eu, which has other confirming lines present, and the 89.0 keV is one of the lines of ^{156}Eu that has at least five other peaks present.

^{108M}Ag was reported as present in sample 2. This nuclide has peaks at 79.2 keV, 433.9 keV, 614.4 keV and 722.95 keV. There were peaks in sample 2 close to three of the lines. However the 614.4 keV peak, one of the most abundant lines, was not found. ^{207}Bi was identified by one laboratory as present in sample 2. There was a peak at 1065 keV very close to the 1063.6 keV of ^{207}Bi. However, the predominant peak of ^{207}Bi at 569.8 keV (branching ratio 97.7%) is not present.

^{153}Gd was identified by two laboratories in sample 2. ^{153}Gd has very similar lines to ^{153}Sm which is present in the sample. However, ^{153}Gd has an abundant line at 97.4 keV which is not present.

^{125}I was identified by one participant in sample 2. This iodine isotope has lines at 27 keV, 31 keV and 35 keV. The most abundant line at 27 keV was not present, and the 31 keV and 35 keV lines were not present in the correct ratio. It is difficult to make accurate nuclide identifications using this area of the energy range because so many nuclides have low energy X-rays at these energies.

^{185}Os was identified by two laboratories in sample 2. ^{185}Os has peaks at 59.7 keV, 61.1 keV, 69.3 keV, and 646.1 keV. The peaks at 646.1 keV and 69.3 keV are present but the 646.1 keV peak can be accounted for by the ^{156}Eu which has four other lines present. The other two confirming lines for ^{185}Os at 59.7 keV and 61.1 keV are not present.

The identification of ^{210}Pb in sample 2 by two participants was caused by the using the 47.0 keV peak of ^{153}Sm as the 46.5 keV peak of ^{210}Pb. ^{133}Xe, which has peaks at 30.8 keV, 35.0 keV and 81.0 keV, was identified in sample 2. The 81.0 keV peak is present, but can be accounted for by the ^{144}Ce which is present.

The ^{95}Zr (724.2 keV, 43.7% branching ratio and 756.7 keV, 55.3% branching ratio) that seven laboratories reported for sample 3 has two very similar lines to ^{154}Eu (723.3 keV and 756.9 keV). However ^{154}Eu has three other abundant lines present that account for all the activity present in those two peaks.

One laboratory identified ^{22}Na (1274.5 keV, 99.9% branching ratio) as present in sample 3. ^{22}Na does not have other lines that could confirm its presence, but ^{154}Eu, which should have been identified due to its other peaks, has a fairly abundant line at 1274.5 keV, 35.5% branching ratio, accounting for all the activity at this energy.

^{109}Cd was identified by two laboratories in sample 3. There is a peak at 86.5 keV belonging to ^{136}Cs which could be mistaken for the 88 keV peak of ^{109}Cd. However, ^{136}Cs has five other confirming lines present. The peak at 86.5 keV was also used by the three laboratories who reported ^{155}Eu as present in sample 3. ^{1553}Eu has peaks at 86.5 keV (30.9% branching ratio) and 105.3 keV (20.7% branching ratio). The peak at 86.5 keV is small so one could assume that the 105.3 keV peak is below the limit of detection and report the ^{155}Eu but with a very large uncertainty. However if ^{136}Cs was properly identified it will account for all the activity in the 86.5 keV peak.

^{210}Pb was identified by two laboratories as present in sample 3. There is a peak at 45.4 keV belonging to ^{152}Eu that will account for all the activity in this peak. ^{152}Eu has 10 other confirming lines available.

CONCLUSIONS

The percentage of the results within 2 F of the expected value, was 86, 51 and 65 for samples 1, 2, and 3, respectively. Eighteen percent of the results from all three samples were more than 3 F from the expected value. The results from sample 1 indicate that almost all the laboratories did a good job of correctly calibrating their systems. The results for sample 2 highlighted problems involving the variations in branching ratio values for certain nuclides in various nuclear data references, difficulties in calibrating the correct efficiency in the area around 100 keV, and problems in identifying all the nuclides when a spectrum becomes more complicated. Almost 20% of the nuclides in sample 2 were not reported as present. Results for sample 3 indicated a need for improving analyses when the activity calculation depends on assigning the area of a peak based on the activity of other lines present. The resolution of peaks separated by only 1 keV showed improvement from the previous evaluation. The importance of carefully checking the analysis report is shown when one goes over the large number of false positives reported. Most of the reported nuclides are missing one of the peaks that should be present if that nuclide were actually there. After a complicated spectrum is analyzed, it is very useful to have a report of which peaks and how much of each peak was used in determining the activity. This report should be checked carefully to see if everything makes sense. A hundred percent of one peak cannot be used by more than one nuclide. The ability to easily create and modify a nuclide library is very helpful in correctly determining a radionuclide concentration.

Seventy percent of the laboratories that previously participated in the program were using the same or a newer version of the same software. Of the laboratories that changed software most stayed with the same manufacturer but chose a different program. A few may have been forced to change when there was no longer any support from the manufacturer for certain software.

In order to see if any improvements were made since the last evaluation, the third spectrum, containing ^{57}Co, ^{152}Eu and ^{154}Eu, was similar to a spectrum used in the previous evaluation. The results for ^{57}Co were similar with approximately a third of the laboratories in both evaluations more than 15% from the expected value, indicating that some software still had difficulty in correctly assigning the activity in a peak belonging to two isotopes. The results for ^{152}Eu

improved from the last evaluation. Almost all the laboratories were within 10% of the expected value for ^{152}Eu. Quantification of the ^{152}Eu is made easier by the many peaks available for determining the correct activity. Results for ^{154}Eu also improved with more than 85% of the responses within 10% of the expected value. In the last evaluation almost 30% of the participants were more than 15% from the expected value. This indicates improvement in the ability of the software or the user of the software to resolve peaks separated by only 1 keV.

Again a wide range of values was being reported for both the error terms and the MDA. Values for the error term for a nuclide such as ^{137}Cs, which has one energy line used for quantification, ranged from 0.2 to 3.15 Bq per sample. MDAs for the same nuclide ranged from 0.009 to 0.436 Bq, an improvement over the previous evaluation where values ranged from 0 to 1.8 Bq per sample, with ^{137}Cs levels approximately the same in both evaluations. One would expect some relationship between the software used and the error term reported. This did not seem to be the case with error terms for one package ranging from 0.37 to 1.8 Bq, and for another from 0.42 to 3.15 Bq. Results for an isotope such as ^{152}Eu, which has many lines used in its analysis, had MDA values ranging from 0 to 3.43 Bq per sample. There again seemed to be no relationship between the MDA value and the software used with values for one package ranging from 0.22 to 1.94 Bq and for another from 0.39 to 1.29 Bq. There should not be such a wide range of values for the MDA for any nuclides in these samples since each participants has the same background and sample spectrum, calibration values and counting times. It is helpful for those reviewing radiological data to have more consistent and meaningful numbers reported for the MDA.

The results of the third evaluation of EML's Gamma Spectrometry Data Evaluation Program indicate an improvement in the ability of the software or the user to resolve closely spaced peaks. The overall results for this program and for all gamma analyses in general would improve if there was more user oversight of the data produced by the software. Plans for the fourth distribution will be announced on EML's Web Site (http://www.eml.doe.gov/).

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TABLE 1

GAMMA SPECTROMETRY DATA EVALUATION PROGRAM
EXPECTED VALUES FOR THE OCTOBER 1999 DISTRIBUTION

Nuclide	Sample No. 1 (Value " 1 F,** Bq)	Sample No. 2 (Value " 1 F,** Bq)	Sample No. 3 (Value " 1 F,** Bq)
^{54}Mn	7.40 ± 0.23	-	-
^{57}Co	8.90 ± 0.25		7.10 ± 0.21
^{60}Co	9.60 ± 0.27	-	-
^{65}Zn	9.70 ± 0.39	-	-
^{137}Cs	11.2 ± 0.31	-	7.80 ± 0.23
^{95}Nb		7.90 ± 0.24	-
^{95}Zr	-	6.70 ± 0.31	-
^{140}Ba	-	11.90 ± 0.55	-
^{140}La	-	9.90 ± 0.35	-
^{141}Ce	-	7.40 ± 0.20	-
^{143}Ce *	-	6.60 ± 0.22 midpoint 7.9 ± 0.22 start	-
^{144}Ce	-	30.10 ± 0.90	-
^{144}Pr	-	29.50 ± 4.66	-
^{153}Sm *	-	16.30 ± 0.46 midpoint 18.3 ± 0.46 start	-
^{155}Eu	-	14.60 ± 0.42	-
^{156}Eu	-	27.40 ± 1.28	-
^{125}Sb	-	-	14.3 ± 0.51
^{136}Cs	-	-	6.40 ± 0.22
^{152}Eu	-	-	5.30 ± 0.23
^{154}Eu	-	-	18.00 ± 0.6

*Results for ^{143}Ce and ^{153}Sm which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concentration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.

**One sigma uncertainty was calculated by EML using the background counts and gross counts in the peak of interest.

TABLE 2

LABORATORIES REPORTING DATA

Laboratory	Labcode
American Radiation Services, Inc., Baton Rouge, LA	AM
ORISE RSAT/ESSAP, Oak Ridge, TN	AU
Barringer Laboratories, Inc. Golden, CO	BL
Autoridad Regulatoria, Buenos Aires, Argentina	BU
Atomic Energy Control Board, Ottowa, Canada	CA
Carlsbad Envir. Mon. Research Center, NM	CW
Envirocare, Clive, UT	EC
Florida Dept. of Health, Bureau of Radiation Control, Orlando, FL	FL
Florida Dept. of Health, Envir. Rad. Control, Orlando, FL	FM
Georgia Institute of Technology, Atlanta, GA	GT
Water Resources Research Centre (VITUKI), Budapest, Hungary	HU
Korea Institute of Nuclear Safety, Taejon 305-338, Korea	KO
Los Alamos National Laboratory, Los Alamos, NM	LA
Los Alamos National Laboratory, Los Alamos, NM	LA1
Lawrence Berkley Laboratory UCB, Berkley, CA	LB
Los Alamos National Laboratory, Los Alamos, NM	LN
UNLV, Dept. of Health Physics, Las Vegas, NV	LV
Radiation Control Program, Envir. Rad. Lab., Jamaica Plain, MA	ME
NDL Organization Inc., Peekskill, NY	NO
JAF Environmental Laboratory, New York Power Authority, Fulton, NY	NP
Bechtel Nevada, Mercury, NV	RE
RMI Environmental Services, Astabula, OH	RM
Sandia Labs, Radioactive Sample Diagnostic Program, Albuquerque, NM	SA
Josef Stefan Institute, Slovenia	SI
Stanford Linear Accelerator Center, Menlow Park, CA	SL
Syrian Atomic Energy Commission, Damascus, SY	SY
Texas Dept. of Health/Laboratories, Austin, TX	TX
Duke Engineering Services, Bolton, MA	YA
Knolls Atomic Energy Commission	
Lockheed Martin Energy Systems, Y-12, Oak Ridge, TN	
Puget Sound Naval Shipyard Environmental Lab., Bremerton, WA	

TABLE 3

SOFTWARE USED BY LABORATORIES

Laboratory Code	Software
AM	Ortec Gammavision
AU	Canberra Genie-VMS
BL	Aptec
BU	Ortec Gammavision
CA	Aptec ver. 6.31
CW	Canberra Genie-2000
EC	Canberra Genie-2000
FL	Canberra Genie-PC
FM	Canberra Genie-2000
GT	Canberra Genie-VMS
HU	Canberra Genie-2000
KO	Aptec ver. 6.31
LA	Ortec Gammavision-32 ver. 5.0
LA1	Ortec Gammavision ver. 4.10
LB	Aptec ver. 4.3
LN	Ortec Gammavision
LV	Canberra Genie-PC
ME	Canberra Genie-2000
NO	Aptec ver. 6.31
NP	Vertechs Seeker ver. 1.8
RE	In House
RM	Ortec Gammavision
SA	Canberra Genie-2000
SI	Canberra Genie-VMS
SL	Canberra Sampo-90
SY	GammaTrac

TABLE 3 (Cont'd)

Laboratory Code	Software
TX	Canberra Genie-PC
YA	Vertechs Seeker ver. 2.0
	Canberra Genie-PC
	Canberra Genie-2000
	Canberra Procount

TABLE 4
NUMBER OF REPORTED RESULTS WITHIN 1, 2, 3, OR > 3 F*
FROM EXPECTED VALUE

Sample No.	Nuclide	1 F	2 F	3 F	> 3 F	Not Reported
1	^{57}Co	15	10	1	4	1
1	^{60}Co	26	3	0	0	2
1	^{137}Cs	23	2	1	3	2
1	^{54}Mn	21	5	2	2	1
1	^{65}Zn	20	9	0	1	1
2	^{95}Nb	18	6	2	1	4
2	^{95}Zr	13	8	1	6	3
2	^{140}Ba	6	1	2	21	1
2	^{140}La	8	4	7	9	3
2	^{141}Ce	16	6	2	5	2
2	^{143}Ce	10	5	2	6	8
2	^{144}Ce	7	12	3	6	3
2	^{144}Pr	6	0	0	0	25
2	^{153}Sm	8	8	0	6	9
2	^{155}Eu	8	8	4	7	4
2	^{156}Eu	12	5	3	4	7
3	^{57}Co	8	2	5	16	0
3	^{136}Cs	15	9	2	2	3
3	^{137}Cs	15	9	1	6	0
3	^{152}Eu	17	7	3	3	1
3	^{154}Eu	14	6	4	5	2
3	^{125}Sb	17	4	3	6	1

* One sigma uncertainty was calculated by EML using the background counts and gross counts in the peak of interest.

TABLE 5

BRANCHING RATIOS FOR ^{140}Ba

Reference	Half-Life (d)	Energy (keV)	Branching Ratio (%)	Energy (keV)	Branching Ratio (%)
Kocher (1981)	12.79	537.3	25.5	162.6	6.73
Erdtmann and Soyka (1979)	12.79	537.38	19.9	162.6	5.07
Brown et al. (1986)	12.746	537.31	24.39	162.6	6.21
Lederer and Shirley (1978)	12.789	537.3	23.65	162.6	6.72

TABLE 6

NUCLIDES, ENERGIES AND BRANCHING RATIOS FOR SAMPLE 3

Nuclide	Energy (keV), %	Energy (keV), %	Energy (keV), %	Energy (keV), %
^{57}Co	122.1, 85.5	136.5, 10.6	-	-
^{152}Eu	121.8, 28.4	344.3, 26.4	964.0, 14.4	1408.0, 20.7
^{154}Eu	123.1, 40.5	723.3, 19.7	756.9, 4.3	1274.5, 35.5
^{95}Zr	724.2, 43.7	756.7, 55.3	-	-
^{22}Na	1274.5, 99.9	-	-	-

TABLE 7

FALSE POSITIVES IDENTIFIED IN SAMPLE Nos. 1, 2 AND 3

Nuclide	Sample No. 1	Sample No. 2	Sample No. 3
^{108m}Ag	0	1	0
^{140}Ba	0	0	1
^{207}Bi	0	1	0
^{214}Bi	2	0	0
^{109}Cd	0	3	2
^{58}Co	0	4	0
^{155}Eu	0	0	3
^{153}Gd	0	2	0
^{125}I	0	1	0
^{40}K	4	3	4
^{22}Na	0	0	1
^{185}Os	0	2	0
^{210}Pb	0	2	2
^{161}Tb	0	1	0
^{201}Tl	0	1	1
^{208}Tl	0	0	2
^{131m}Xe	0	0	2
^{133}Xe	0	1	0
^{95}Zr	0	0	7

RESULTS BY LABORATORY

AM American Radiation Services, Inc. Baton Rouge, LA

Software: Ortec Gammavision

Reference(s): The Gamma Rays of Radionuclides, (Erdtmann and Soyka, 1979)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.1226	0.24	0.0696	8.9	0.91	More than 3 Sigma
1	Co-60	9.6858	0.39	0.1207	9.6	1.01	1 Sigma
1	Cs-137	11.363	0.5	0.11	11.2	1.01	1 Sigma
1	Mn-54	7.1603	0.36	0.0990	7.4	0.97	2 Sigma
1	Zn-65	9.5509	0.69	0.2166	9.7	0.98	1 Sigma
2	Ba-140	11.8	0.83	0.54	11.9	0.99	1 Sigma
2	Ce-141	7.31	0.17	0.12	7.4	0.99	1 Sigma
2	Ce-143	6.31	0.2	0.15	6.6	0.96	2 Sigma
2	Ce-144	28.82	0.72	0.52	30.1	0.96	2 Sigma
2	Eu-155	13.1	0.25	0.17	14.6	0.90	More than 3 Sigma
2	Eu-156	27.57	1.2	1.21	27.4	1.01	1 Sigma
2	La-140	9.87	0.27	0.12	9.9	1.00	1 Sigma
2	Nb-95				7.9		Not Reported
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95				6.7		Not Reported
3	Co-57	8.499	0.19	0.79	7.1	1.20	More than 3 Sigma
3	Cs-136	6.47	0.18	0.09	6.4	1.01	1 Sigma
3	Cs-137	7.53	0.2	0.11	7.8	0.97	2 Sigma
3	Eu-152	5.63	0.28	0.36	5.3	1.06	2 Sigma
3	Eu-154	17.42	0.45	0.4	18	0.97	1 Sigma
3	Sb-125	14.1	0.45	0.28	14.3	0.99	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

AU ORISE RSAT/ESSAP Oak Ridge, TN

Software: Canberra Genie-VMS

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	9.315	0.157	0	8.9	1.05	2 Sigma
1	Co-60	9.745	0.2836	0	9.6	1.02	1 Sigma
1	Cs-137	11.05	0.2309	0	11.2	0.99	1 Sigma
1	Mn-54	7.028	0.1989	0	7.4	0.95	2 Sigma
1	Zn-65	9.277	0.4212	0	9.7	0.96	2 Sigma
2	Ba-140	9.311	0.5568	0	11.9	0.78	More than 3 Sigma
2	Ce-141	8.063	0.1887	0	7.4	1.09	More than 3 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	32.14	1.0606	0	30.1	1.07	3 Sigma
2	Eu-155	15.14	0.3982	0	14.6	1.04	2 Sigma
2	Eu-156				27.4		Not Reported
2	La-140	11.78	0.3558	0	9.9	1.19	More than 3 Sigma
2	Nb-95	7.676	0.2011	0	7.9	0.97	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	18.47	0.3694	0	16.3	1.13	1 Sigma
2	Zr-95	11.31	0.4298	0	6.7	1.69	More than 3 Sigma
3	Co-57	9.61	0.1663	0	7.1	1.35	More than 3 Sigma
3	Cs-136				6.4		Not Reported
3	Cs-137	7.337	0.1959	0	7.8	0.94	2 Sigma
3	Eu-152	5.79	0.3405	0	5.3	1.09	3 Sigma
3	Eu-154	17.17	0.7486	0	18	0.95	2 Sigma
3	Sb-125	14.68	0.4991	0	14.3	1.03	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

BL Barringer Laboratories, Inc.
Golden, CO

Software: Aptec ver. 6.3.1

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.64	0.39	0.06	8.9	0.97	2 Sigma
1	Co-60	9.64	0.34	0.05	9.6	1.00	1 Sigma
1	Cs-137	11.16	0.37	0.13	11.2	1.00	1 Sigma
1	Mn-54	7.22	0.26	0.13	7.4	0.98	1 Sigma
1	Zn-65	9.6	0.4	0.25	9.7	0.99	1 Sigma
2	Ba-140	9.22	0.79	0.55	11.9	0.77	More than 3 Sigma
2	Ce-141	7.58	0.37	0.13	7.4	1.02	1 Sigma
2	Ce-143	10.39	1.14	0.23	6.6	1.57	More than 3 Sigma
2	Ce-144	28.36	1.65	0.65	30.1	0.94	2 Sigma
2	Eu-155	14.28	0.62	0.26	14.6	0.98	1 Sigma
2	Eu-156	26.63	2.07	0.99	27.4	0.97	1 Sigma
2	La-140	9.88	0.53	0.11	9.9	1.00	1 Sigma
2	Nb-95	7.99	0.28	0.12	7.9	1.01	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	18.98	0.82	0.29	16.3	1.16	2 Sigma
2	Zr-95	7.21	0.28	0.19	6.7	1.08	2 Sigma
3	Co-57	5.66	0.32	0.04	7.1	0.80	More than 3 Sigma
3	Cs-136	6.77	0.4	0.13	6.4	1.06	2 Sigma
3	Cs-137	7.57	0.35	0.14	7.8	0.97	1 Sigma
3	Eu-152	5.02	0.53	0.22	5.3	0.95	2 Sigma
3	Eu-154	18.78	1.09	0.13	18	1.04	2 Sigma
3	Sb-125	14.37	0.88	0.33	14.3	1.00	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

BU Autoridad Regulatoria, Buenos Aires, Argentina

Software: Ortec Gammavision

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	9.19	0.23	0.22	8.9	1.03	2 Sigma
1	Co-60	9.81	0.33	0.16	9.6	1.02	1 Sigma
1	Cs-137	11.3	0.42	0.18	11.2	1.01	1 Sigma
1	Mn-54	7.36	0.34	0.18	7.4	0.99	1 Sigma
1	Zn-65	9.74	0.64	0.45	9.7	1.00	1 Sigma
2	Ba-140	11.6	0.74	0.79	11.9	0.97	1 Sigma
2	Ce-141	7.65	0.31	0.26	7.4	1.03	2 Sigma
2	Ce-143	6.52	0.31	0.35	6.6	0.99	1 Sigma
2	Ce-144	30.3	1.3	1.44	30.1	1.01	1 Sigma
2	Eu-155	12.9	0.34	0.4	14.6	0.88	More than 3 Sigma
2	Eu-156	26.8	1.1	1.73	27.4	0.98	1 Sigma
2	La-140	9.94	0.3	0.31	9.9	1.00	1 Sigma
2	Nb-95	8.2	0.36	0.18	7.9	1.04	2 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	6.33	0.28	0.33	6.7	0.94	2 Sigma
3	Co-57	7.73	0.8	0.48	7.1	1.09	3 Sigma
3	Cs-136	6.41	0.19	0.18	6.4	1.00	1 Sigma
3	Cs-137	7.68	0.34	0.21	7.8	0.98	1 Sigma
3	Eu-152	5	0.43	0.58	5.3	0.94	2 Sigma
3	Eu-154	18.3	1.1	0.43	18	1.02	1 Sigma
3	Sb-125	14.4	0.48	0.56	14.3	1.01	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

CA Atomic Energy Control Board, Ottowa, Canada

Software: Aptec ver. 6.31

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.5	0.4	0.18	8.9	0.96	2 Sigma
1	Co-60				9.6		Not Reported
1	Cs-137	16.3	0.7	0.32	11.2	1.46	More than 3 Sigma
1	Mn-54	10.5	0.5	0.17	7.4	1.42	More than 3 Sigma
1	Zn-65	11.4	0.6	0.54	9.7	1.18	More than 3 Sigma
2	Ba-140	13.6	1.4	1.3	11.9	1.14	More than 3 Sigma
2	Ce-141	6.7	0.3	0.26	7.4	0.91	More than 3 Sigma
2	Ce-143	7.6	0.7	0.25	6.6	1.15	2 Sigma
2	Ce-144				30.1		Not Reported
2	Eu-155	12.3	0.7	0.52	14.6	0.84	More than 3 Sigma
2	Eu-156				27.4		Not Reported
2	La-140	12.9	0.9	1.1	9.9	1.30	More than 3 Sigma
2	Nb-95	11.7	0.5	0.22	7.9	1.48	More than 3 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	20.4	1.2	0.46	16.3	1.25	More than 3 Sigma
2	Zr-95	12.6	0.6	0.38	6.7	1.88	More than 3 Sigma
3	Co-57	15.4	0.8	0.17	7.1	2.17	More than 3 Sigma
3	Cs-136	7.6	0.6	0.37	6.4	1.19	More than 3 Sigma
3	Cs-137	11.4	0.5	0.36	7.8	1.46	More than 3 Sigma
3	Eu-152	5.7	0.8	0.48	5.3	1.08	2 Sigma
3	Eu-154	21.9	1.7	0.54	18	1.22	More than 3 Sigma
3	Sb-125	17.2	1.9	0.7	14.3	1.20	More than 3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

CW Carlsbad Env. Mon. Research Center

Software: Canberra Genie-2000

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.78	0.22	0.19	8.9	0.99	1 Sigma
1	Co-60	9.83	0.18	0.33	9.6	1.02	1 Sigma
1	Cs-137	11.15	0.25	0.36	11.2	1.00	1 Sigma
1	Mn-54	7.32	0.21	0.37	7.4	0.99	1 Sigma
1	Zn-65	9.77	0.34	0.64	9.7	1.01	1 Sigma
2	Ba-140	9.04	0.63	1.33	11.9	0.76	More than 3 Sigma
2	Ce-141	7.54	0.25	0.38	7.4	1.02	1 Sigma
2	Ce-143	7.24	0.24	0.44	6.6	1.10	3 Sigma
2	Ce-144	28.62	0.95	1.68	30.1	0.95	2 Sigma
2	Eu-155	14.16	0.41	0.54	14.6	0.97	2 Sigma
2	Eu-156	27.87	1.19	2	27.4	1.02	1 Sigma
2	La-140	9.14	0.2	0.4	9.9	0.92	3 Sigma
2	Nb-95	8.02	0.2	0.31	7.9	1.02	1 Sigma
2	Pr-144	28.84	8.13	25.97	29.5	0.98	1 Sigma
2	Sm-153	14.12	0.48	0.48	16.3	0.87	More than 3 Sigma
2	Zr-95	6.7	0.23	0.47	6.7	1.00	1 Sigma
3	Co-57	6.58	0.56	1.54	7.1	0.93	3 Sigma
3	Cs-136	6.21	0.15	0.32	6.4	0.97	1 Sigma
3	Cs-137	7.61	0.21	0.33	7.8	0.98	1 Sigma
3	Eu-152	5.4	0.21	0.64	5.3	1.02	1 Sigma
3	Eu-154	18.1	0.48	0.94	18	1.01	1 Sigma
3	Sb-125	14.07	0.39	0.86	14.3	0.98	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

EC Envirocare, Clive, UT

Software: Canberra Genie-2000

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	9	0.49	0.58	8.9	1.01	1 Sigma
1	Co-60	9.67	0.4	0.69	9.6	1.01	1 Sigma
1	Cs-137	9.86	0.52	0.52	11.2	0.88	More than 3 Sigma
1	Mn-54	6.87	0.38	0.63	7.4	0.93	3 Sigma
1	Zn-65	9.14	0.66	1.67	9.7	0.94	2 Sigma
2	Ba-140	8.75	0.69	0	11.9	0.74	More than 3 Sigma
2	Ce-141	7.67	0.51	0	7.4	1.04	2 Sigma
2	Ce-143	7.84	0.52	0.76	6.6	1.19	1 Sigma
2	Ce-144	27.3	3.22	0	30.1	0.91	More than 3 Sigma
2	Eu-155	13.59	0.66	0.7	14.6	0.93	3 Sigma
2	Eu-156	29.6	1.2	2.63	27.4	1.08	2 Sigma
2	La-140	9.22	0.36	0	9.9	0.93	2 Sigma
2	Nb-95	7.39	0.43	0	7.9	0.94	3 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	6.17	0.38	0	6.7	0.92	2 Sigma
3	Co-57	7.9	0.67	0.67	7.1	1.11	More than 3 Sigma
3	Cs-136	6.15	0.21	0.43	6.4	0.96	2 Sigma
3	Cs-137	7.1	0.43	0.81	7.8	0.91	More than 3 Sigma
3	Eu-152	5.25	0.33	0	5.3	0.99	1 Sigma
3	Eu-154	16.5	0.67	1.35	18	0.92	3 Sigma
3	Sb-125	13.6	0.56	0	14.3	0.95	2 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

FL Florida Dept. of Health, Bureau of Rad. Control, Orlando, FL

Software: Canberra Genie-PC

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.9	0.3	0.24	8.9	1.00	1 Sigma
1	Co-60	9.7	0.3	0.33	9.6	1.01	1 Sigma
1	Cs-137	11.4	0.5	0.38	11.2	1.02	1 Sigma
1	Mn-54	7.4	0.3	0.37	7.4	1.00	1 Sigma
1	Zn-65	9.4	0.4	0.97	9.7	0.97	1 Sigma
2	Ba-140	7	0.4	1.1	11.9	0.59	More than 3 Sigma
2	Ce-141	7.5	0.4	0.49	7.4	1.01	1 Sigma
2	Ce-143	8	0.4	0.51	6.6	1.21	1 Sigma
2	Ce-144	30	1	2.1	30.1	1.00	1 Sigma
2	Eu-155	13.8	0.4	0.55	14.6	0.95	2 Sigma
2	Eu-156	29.4	0.6	2.1	27.4	1.07	2 Sigma
2	La-140	9.4	0.3	0.4	9.9	0.95	2 Sigma
2	Nb-95	8.2	0.3	0.33	7.9	1.04	2 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	17.6	0.9	0.66	16.3	1.08	2 Sigma
2	Zr-95	7	0.3	0.47	6.7	1.04	1 Sigma
3	Co-57	7.2	0.5	0.27	7.1	1.01	1 Sigma
3	Cs-136	6.5	0.2	0.39	6.4	1.02	1 Sigma
3	Cs-137	7.7	0.4	0.43	7.8	0.99	1 Sigma
3	Eu-152	5.3	0.3	0.43	5.3	1.00	1 Sigma
3	Eu-154	17.2	0.5	0.57	18	0.96	2 Sigma
3	Sb-125	13.8	0.5	1.3	14.3	0.97	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

FM Florida Dept. of Health, Envir. Rad. Control, Orlando, FL

Software: Canbera Genie-PC

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.5	0.4	0.18	8.9	0.96	2 Sigma
1	Co-60	9.5	0.4	0.32	9.6	0.99	1 Sigma
1	Cs-137	11.3	0.5	0.36	11.2	1.01	1 Sigma
1	Mn-54	7.4	0.4	0.37	7.4	1.00	1 Sigma
1	Zn-65	9.3	0.4	0.85	9.7	0.96	2 Sigma
2	Ba-140	5.2	0.2	0.74	11.9	0.44	More than 3 Sigma
2	Ce-141	6.6	0.4	0.34	7.4	0.89	More than 3 Sigma
2	Ce-143	0.63	0.04	0.04	6.6	0.10	More than 3 Sigma
2	Ce-144	29	1	1.7	30.1	0.96	2 Sigma
2	Eu-155	13.8	0.6	0.53	14.6	0.95	2 Sigma
2	Eu-156	22.4	0.7	1.7	27.4	0.82	More than 3 Sigma
2	La-140	6.8	0.2	0.27	9.9	0.69	More than 3 Sigma
2	Nb-95	7.4	0.2	0.29	7.9	0.94	3 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	2.9	0.2	0.092	16.3	0.18	More than 3 Sigma
2	Zr-95	6.4	0.5	0.49	6.7	0.96	1 Sigma
3	Co-57	5.7	0.3	0.21	7.1	0.80	More than 3 Sigma
3	Cs-136	4.7	0.1	0.28	6.4	0.73	More than 3 Sigma
3	Cs-137	7.7	0.3	0.4	7.8	0.99	1 Sigma
3	Eu-152	5.1	0.2	0.61	5.3	0.96	1 Sigma
3	Eu-154	16.8	0.5	0.42	18	0.93	2 Sigma
3	Sb-125	12.9	0.4	0.76	14.3	0.90	3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

GT Georgia Institute of Technology, Atlanta, GA

Software: Canberra Genie-VMS

Reference(s): National Nuclear Data Center, BNL

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	7.8	1.1	0.1	8.9	0.88	More than 3 Sigma
1	Co-60	9.7	0.7	0.1	9.6	1.01	1 Sigma
1	Cs-137	11	2.5	0.1	11.2	0.98	1 Sigma
1	Mn-54	7.1	1.1	0.1	7.4	0.96	2 Sigma
1	Zn-65	9.5	1.6	0.2	9.7	0.98	1 Sigma
2	Ba-140	10	3.3	0.4	11.9	0.84	More than 3 Sigma
2	Ce-141	7	0.9	0.1	7.4	0.95	2 Sigma
2	Ce-143	30	7	0.7	6.6	4.55	More than 3 Sigma
2	Ce-144	26	6.5	0.5	30.1	0.86	More than 3 Sigma
2	Eu-155	15	2.7	0.2	14.6	1.03	1 Sigma
2	Eu-156	32	3.5	0.8	27.4	1.17	More than 3 Sigma
2	La-140	11	0.9	0.1	9.9	1.11	More than 3 Sigma
2	Nb-95	8.2	1.6	0.1	7.9	1.04	2 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	49	7.3	0.5	16.3	3.01	More than 3 Sigma
2	Zr-95	7.2	1.6	0.2	6.7	1.07	2 Sigma
3	Co-57	5.4	2.1	0.1	7.1	0.76	More than 3 Sigma
3	Cs-136	6.7	0.6	0.1	6.4	1.05	2 Sigma
3	Cs-137	7.1	1.7	0.1	7.8	0.91	More than 3 Sigma
3	Eu-152	5.7	0.8	0.2	5.3	1.08	2 Sigma
3	Eu-154	18	1.3	0.1	18	1.00	1 Sigma
3	Sb-125	13	1.7	0.2	14.3	0.91	3 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

HU Water Resources Research Centre (VITUKI), Budapest, Hungary

Software: Canberra Genie-2000

Reference(s): Lund/LNBL Nuclear Data Search

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57				8.9		Not Reported
1	Co-60				9.6		Not Reported
1	Cs-137				11.2		Not Reported
1	Mn-54				7.4		Not Reported
1	Zn-65				9.7		Not Reported
2	Ba-140				11.9		Not Reported
2	Ce-141				7.4		Not Reported
2	Ce-143				6.6		Not Reported
2	Ce-144				30.1		Not Reported
2	Eu-155				14.6		Not Reported
2	Eu-156				27.4		Not Reported
2	La-140				9.9		Not Reported
2	Nb-95				7.9		Not Reported
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95				6.7		Not Reported
3	Co-57	6.2	0.64	0.13	7.1	0.87	More than 3 Sigma
3	Cs-136	6.83	0.13	0.07	6.4	1.07	2 Sigma
3	Cs-137	7.43	0.25	0.24	7.8	0.95	2 Sigma
3	Eu-152	4.58	0.14	0.07	5.3	0.86	More than 3 Sigma
3	Eu-154	16.8	0.3	0.04	18	0.93	2 Sigma
3	Sb-125	12.2	0.27	0.4	14.3	0.85	More than 3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

KO Korea Institute of Nuclear Safety, Korea

Software: Aptec ver. 6.31

Reference(s): National Nuclear Data Center, BNL

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.6	0.39	0.18	8.9	0.97	2 Sigma
1	Co-60	9.58	0.36	0.28	9.6	1.00	1 Sigma
1	Cs-137	11.2	0.53	0.28	11.2	1.00	1 Sigma
1	Mn-54	7.31	0.26	0.28	7.4	0.99	1 Sigma
1	Zn-65	9.38	0.38	0.65	9.7	0.97	1 Sigma
2	Ba-140	9.48	0.49	1.06	11.9	0.80	More than 3 Sigma
2	Ce-141	7.32	0.37	0.36	7.4	0.99	1 Sigma
2	Ce-143	8.66	0.49	0.48	6.6	1.31	More than 3 Sigma
2	Ce-144	28.3	1.32	1.55	30.1	0.94	2 Sigma
2	Eu-155	13.8	0.71	0.82	14.6	0.95	2 Sigma
2	Eu-156	30.3	1.75	3.46	27.4	1.11	3 Sigma
2	La-140	10.9	0.55	1.09	9.9	1.10	3 Sigma
2	Nb-95	8.05	0.27	0.27	7.9	1.02	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	16.1	0.77	0.61	16.3	0.99	1 Sigma
2	Zr-95	6.83	0.3	0.43	6.7	1.02	1 Sigma
3	Co-57	7.05	0.44	1.57	7.1	0.99	1 Sigma
3	Cs-136	6.34	0.32	0.39	6.4	0.99	1 Sigma
3	Cs-137	7.85	0.32	0.3	7.8	1.01	1 Sigma
3	Eu-152	5.44	0.5	1.94	5.3	1.03	1 Sigma
3	Eu-154	17.9	0.87	1.33	18	0.99	1 Sigma
3	Sb-125	15	0.7	1.44	14.3	1.05	2 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

LA Los Alamos National Laboratory, NM

Software: Ortec Gammavision-32 Ver. 5.0

Reference(s): The Gamma Rays of the Radionuclides, (Erdtmann and Soyka, 1979)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.31	0.77	0.09	8.9	0.93	3 Sigma
1	Co-60	9.57	0.9	0.07	9.6	1.00	1 Sigma
1	Cs-137	11.1	1	0.19	11.2	0.99	1 Sigma
1	Mn-54	7.16	0.68	0.16	7.4	0.97	2 Sigma
1	Zn-65	9.52	0.94	0.44	9.7	0.98	1 Sigma
2	Ba-140	12.5	1.3	1.06	11.9	1.05	2 Sigma
2	Ce-141	7.35	0.69	0.23	7.4	0.99	1 Sigma
2	Ce-143	8.2	0.77	0.32	6.6	1.24	2 Sigma
2	Ce-144	28.1	2.6	0.91	30.1	0.93	3 Sigma
2	Eu-155	12.8	1.2	0.36	14.6	0.88	More than 3 Sigma
2	Eu-156	27.3	2.5	1.06	27.4	1.00	1 Sigma
2	La-140	11.5	1.1	0.16	9.9	1.16	More than 3 Sigma
2	Nb-95	7.9	0.71	0.2	7.9	1.00	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	16.6	1.5	0.42	16.3	1.02	1 Sigma
2	Zr-95	6.65	0.64	0.47	6.7	0.99	1 Sigma
3	Co-57	8.71	0.79	0.47	7.1	1.23	More than 3 Sigma
3	Cs-136	6.63	0.62	0.23	6.4	1.04	2 Sigma
3	Cs-137	7.54	0.7	0.22	7.8	0.97	2 Sigma
3	Eu-152	5.93	0.59	1.29	5.3	1.12	3 Sigma
3	Eu-154	17.5	1.6	0.88	18	0.97	1 Sigma
3	Sb-125	14.5	1.4	0.67	14.3	1.01	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

LA1 Los Alamos National Laboratory, NM

Software: Ortec Gammavision Ver. 4.10

Reference(s): Radioactive -Decay Gammas (Bowman & MacMurdo, 1974)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	9	2.48	0.43	8.9	1.01	1 Sigma
1	Co-60	9.56	2.64	0.07	9.6	1.00	1 Sigma
1	Cs-137	11.35	3.15	0.12	11.2	1.01	1 Sigma
1	Mn-54	7.39	2.08	0.1	7.4	1.00	1 Sigma
1	Zn-65	9.77	2.87	0.45	9.7	1.01	1 Sigma
2	Ba-140	12.12	3.61	0.71	11.9	1.02	1 Sigma
2	Ce-141	7.59	2.14	0.14	7.4	1.03	1 Sigma
2	Ce-143	6.66	1.86	0.5	6.6	1.01	1 Sigma
2	Ce-144	30.52	8.66	0.59	30.1	1.01	1 Sigma
2	Eu-155	13.75	3.81	0.42	14.6	0.94	3 Sigma
2	Eu-156	28.48	8.11	0.95	27.4	1.04	1 Sigma
2	La-140	9.65	2.72	1.17	9.9	0.97	1 Sigma
2	Nb-95	7.98	2.24	0.12	7.9	1.01	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	16.56	4.6	1.23	16.3	1.02	1 Sigma
2	Zr-95	6.22	1.8	0.38	6.7	0.93	2 Sigma
3	Co-57	8.81	2.46	0.31	7.1	1.24	More than 3 Sigma
3	Cs-136	6.71	1.87	0.72	6.4	1.05	2 Sigma
3	Cs-137	7.66	2.16	0.14	7.8	0.98	1 Sigma
3	Eu-152	5.34	1.6	0.46	5.3	1.01	1 Sigma
3	Eu-154	17.62	4.96	0.69	18	0.98	1 Sigma
3	Sb-125	13.8	3.95	0.37	14.3	0.97	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

LB Lawrence Berkeley Lab. UCB, Berkley, CA

Software: Aptec ver. 4.3

Reference(s): Atomic Data and Nuclear Data Tables

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	7.7	0.8	0.2	8.9	0.87	More than 3 Sigma
1	Co-60	10	1	0.1	9.6	1.04	2 Sigma
1	Cs-137	11	1	0.2	11.2	0.98	1 Sigma
1	Mn-54	7.3	0.7	0.2	7.4	0.99	1 Sigma
1	Zn-65	9	1	0.8	9.7	0.93	2 Sigma
2	Ba-140	10	2	1	11.9	0.84	More than 3 Sigma
2	Ce-141	7.6	0.8	0.5	7.4	1.03	1 Sigma
2	Ce-143	9	1	0.6	6.6	1.36	More than 3 Sigma
2	Ce-144	27	3	2	30.1	0.90	More than 3 Sigma
2	Eu-155				14.6		Not Reported
2	Eu-156	27	6	7	27.4	0.99	1 Sigma
2	La-140	11	1	0.5	9.9	1.11	More than 3 Sigma
2	Nb-95	7.6	0.7	0.4	7.9	0.96	2 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	8	0.9	0.7	6.7	1.19	More than 3 Sigma
3	Co-57	15	2	2	7.1	2.11	More than 3 Sigma
3	Cs-136	6.3	0.9	1	6.4	0.98	1 Sigma
3	Cs-137	7.6	0.7	0.4	7.8	0.97	1 Sigma
3	Eu-152	5	2	1	5.3	0.94	2 Sigma
3	Eu-154	18	3	2	18	1.00	1 Sigma
3	Sb-125	14	2	2	14.3	0.98	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

LN Los Alamos National Laboratory, Los Alamos, NM

Software: Ortec Gammavision

Reference(s): Not Given

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.7	0.58	0.2	8.9	0.98	1 Sigma
1	Co-60	9.3	0.92	0.435	9.6	0.97	2 Sigma
1	Cs-137	10.8	0.57	0.233	11.2	0.96	2 Sigma
1	Mn-54	5.85	0.48	0.279	7.4	0.79	More than 3 Sigma
1	Zn-65	9.45	0.73	0.395	9.7	0.97	1 Sigma
2	Ba-140	12.4	2.28	2.95	11.9	1.04	1 Sigma
2	Ce-141	7.84	0.62	0.828	7.4	1.06	3 Sigma
2	Ce-143	6.61	0.47	0.687	6.6	1.00	1 Sigma
2	Ce-144	18.9	2.71	4.8	30.1	0.63	More than 3 Sigma
2	Eu-155	13.4	0.75	0.807	14.6	0.92	3 Sigma
2	Eu-156	33.5	3.61	7.07	27.4	1.22	More than 3 Sigma
2	La-140	10.2	0.61	0.644	9.9	1.03	1 Sigma
2	Nb-95	8.11	0.69	0.594	7.9	1.03	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	16.6	0.85	1.11	16.3	1.02	1 Sigma
2	Zr-95	6.68	0.54	0.726	6.7	1.00	1 Sigma
3	Co-57	6.85	0.46	0.915	7.1	0.96	2 Sigma
3	Cs-136	6.33	0.44	0.171	6.4	0.99	1 Sigma
3	Cs-137	7.08	0.49	0.228	7.8	0.91	More than 3 Sigma
3	Eu-152	5.1	0.51	0.39	5.3	0.96	1 Sigma
3	Eu-154	17.8	1.14	0.4	18	0.99	1 Sigma
3	Sb-125	7.18	0.81	0.785	14.3	0.50	More than 3 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

LV UNLV, Dept. of Health Physics, Las Vegas, NV

Software: Canberra Genie-PC

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.75	0.36	0.17	8.9	0.98	1 Sigma
1	Co-60	9.68	0.31	0.25	9.6	1.01	1 Sigma
1	Cs-137	11.2	0.56	0.27	11.2	1.00	1 Sigma
1	Mn-54	7.43	0.36	0.26	7.4	1.00	1 Sigma
1	Zn-65	9.47	0.55	0.65	9.7	0.98	1 Sigma
2	Ba-140	9.56	0.55	1.1	11.9	0.80	More than 3 Sigma
2	Ce-141				7.4		Not Reported
2	Ce-143	7.77	0.42	0.53	6.6	1.18	1 Sigma
2	Ce-144	28.4	1.5	1.5	30.1	0.94	2 Sigma
2	Eu-155				14.6		Not Reported
2	Eu-156	30.2	0.95	1.8	27.4	1.10	3 Sigma
2	La-140	10.9	0.32	0.35	9.9	1.10	3 Sigma
2	Nb-95				7.9		Not Reported
2	Pr-144				29.5		Not Reported
2	Sm-153	5.72	0.98	0.61	16.3	0.35	More than 3 Sigma
2	Zr-95	6.34	0.42	0.54	6.7	0.95	2 Sigma
3	Co-57	6.99	0.7	1.67	7.1	0.98	1 Sigma
3	Cs-136	6.61	0.19	0.3	6.4	1.03	1 Sigma
3	Cs-137	7.7	0.42	0.3	7.8	0.99	1 Sigma
3	Eu-152	9.68	0.2	3.43	5.3	1.83	More than 3 Sigma
3	Eu-154	16.2	0.51	0.68	18	0.90	3 Sigma
3	Sb-125	13.9	0.48	0.7	14.3	0.97	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

ME Radiation Control Program, Envir. Rad. Lab., Jamaica Plain, MA

Software: Canberra Genie-2000

Reference(s): National Nuclear Data Center, BNL

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	18.7	1.1	0.7	8.9	2.10	More than 3 Sigma
1	Co-60	9.5	0.4	0.4	9.6	0.99	1 Sigma
1	Cs-137	13.3	0.7	0.6	11.2	1.19	More than 3 Sigma
1	Mn-54	7.9	0.4	0.6	7.4	1.07	3 Sigma
1	Zn-65	9.3	0.4	1.4	9.7	0.96	2 Sigma
2	Ba-140	13.1	0.8	0.3	11.9	1.10	3 Sigma
2	Ce-141	15.3	1	1.4	7.4	2.07	More than 3 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	61.4	4.3	6.2	30.1	2.04	More than 3 Sigma
2	Eu-155	31.1	1.7	1.8	14.6	2.13	More than 3 Sigma
2	Eu-156				27.4		Not Reported
2	La-140				9.9		Not Reported
2	Nb-95				7.9		Not Reported
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	9.2	0.5	0.8	6.7	1.37	More than 3 Sigma
3	Co-57	17.9	1	0.8	7.1	2.52	More than 3 Sigma
3	Cs-136				6.4		Not Reported
3	Cs-137	9.1	0.4	0.7	7.8	1.17	More than 3 Sigma
3	Eu-152				5.3		Not Reported
3	Eu-154	20	0.6	1.4	18	1.11	More than 3 Sigma
3	Sb-125	17.4	0.7	3.5	14.3	1.22	More than 3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

NO NDL Organization, Inc., Peekskill, NY

Software: Aptec PCMA/Super ver. 6.31

Reference(s): Isotope.LIB listing 7/22/97

The Gamma Rays of the Radionuclides, (Erdtmann and Soyka, 1979)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.8	0.8	0.7	8.9	0.99	1 Sigma
1	Co-60	9.6	2	0.2	9.6	1.00	1 Sigma
1	Cs-137	11.6	1.8	0.2	11.2	1.04	2 Sigma
1	Mn-54	7.4	1.3	0.2	7.4	1.00	1 Sigma
1	Zn-65	9.3	1.8	0.4	9.7	0.96	2 Sigma
2	Ba-140	11.7	2.1	3.7	11.9	0.98	1 Sigma
2	Ce-141	7.8	0.7	0.3	7.4	1.05	2 Sigma
2	Ce-143	8.2	1.4	3.3	6.6	1.24	2 Sigma
2	Ce-144	28.4	2.9	4.2	30.1	0.94	2 Sigma
2	Eu-155	14.4	1.3	0.4	14.6	0.99	1 Sigma
2	Eu-156				27.4		Not Reported
2	La-140	12.1	2.4	4.4	9.9	1.22	More than 3 Sigma
2	Nb-95	8.3	1.4	0.2	7.9	1.05	2 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	19.2	1.7	1.6	16.3	1.18	2 Sigma
2	Zr-95	8.9	1.5	4	6.7	1.33	More than 3 Sigma
3	Co-57	5.8	0.9	1.4	7.1	0.82	More than 3 Sigma
3	Cs-136	6.7	1.2	1.3	6.4	1.05	2 Sigma
3	Cs-137	8	1.3	0.3	7.8	1.03	1 Sigma
3	Eu-152	5.2	1.2	1.5	5.3	0.98	1 Sigma
3	Eu-154	22.7	3.9	2.2	18	1.26	More than 3 Sigma
3	Sb-125	14.3	2.3	1.5	14.3	1.00	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

NP JAF Environmental Laboratory,
New York Power Authority,

Fulton, NY

Software: Vertechs Seeker ver. 1.5

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.48	0.12	0.0037	8.9	0.95	2 Sigma
1	Co-60	9.74	0.16	0.224	9.6	1.01	1 Sigma
1	Cs-137	10.5	0.2	0.009	11.2	0.94	3 Sigma
1	Mn-54	7.26	0.18	0.0098	7.4	0.98	1 Sigma
1	Zn-65	9.38	0.34	0.0245	9.7	0.97	1 Sigma
2	Ba-140	9.88	0.27	0.0176	11.9	0.83	More than 3 Sigma
2	Ce-141	7.4	0.16	0.0067	7.4	1.00	1 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	28.3	0.68	0.029	30.1	0.94	2 Sigma
2	Eu-155				14.6		Not Reported
2	Eu-156				27.4		Not Reported
2	La-140				9.9		Not Reported
2	Nb-95	8.02	0.18	0.0092	7.9	1.02	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	6.63	0.23	0.016	6.7	0.99	1 Sigma
3	Co-57	6.21	0.51	0.0037	7.1	0.87	More than 3 Sigma
3	Cs-136				6.4		Not Reported
3	Cs-137	7.07	0.17	0.0089	7.8	0.91	More than 3 Sigma
3	Eu-152	5.33	0.26	0.0184	5.3	1.01	1 Sigma
3	Eu-154				18		Not Reported
3	Sb-125				14.3		Not Reported

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

RE Bechtel Nevada, Mercury, NV

Software: In House

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.88	0.88	0.09	8.9	1.00	1 Sigma
1	Co-60	10.1	1.16	0.12	9.6	1.05	2 Sigma
1	Cs-137	11.3	1.22	0.11	11.2	1.01	1 Sigma
1	Mn-54	7.42	0.88	0.11	7.4	1.00	1 Sigma
1	Zn-65	9.76	1.36	0.25	9.7	1.01	1 Sigma
2	Ba-140	9.51	1.61	0.35	11.9	0.80	More than 3 Sigma
2	Ce-141	7.71	0.89	0.17	7.4	1.04	2 Sigma
2	Ce-143	9.59	1.24	0.24	6.6	1.45	More than 3 Sigma
2	Ce-144	29.9	3.62	0.72	30.1	0.99	1 Sigma
2	Eu-155	15	1.79	0.36	14.6	1.03	1 Sigma
2	Eu-156	28.1	4.47	0.91	27.4	1.03	1 Sigma
2	La-140	9.99	1.22	0.16	9.9	1.01	1 Sigma
2	Nb-95	8.09	0.92	0.1	7.9	1.02	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	18.9	2.04	0.3	16.3	1.16	2 Sigma
2	Zr-95	6.81	0.95	0.17	6.7	1.02	1 Sigma
3	Co-57	7.55	1.65	0.77	7.1	1.06	3 Sigma
3	Cs-136	6.2	0.77	0.1	6.4	0.97	1 Sigma
3	Cs-137	7.72	0.91	0.11	7.8	0.99	1 Sigma
3	Eu-152	5.61	1.35	0.67	5.3	1.06	2 Sigma
3	Eu-154	18.3	2.36	0.34	18	1.02	1 Sigma
3	Sb-125	14.3	1.74	0.26	14.3	1.00	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

RM RMI Environmental Services, Ashtabula, OH

Software: Ortec Gammavision

Reference(s): PCNUDAT

National Nuclear Data Center, BNL

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.6	1.6	0.22	8.9	0.97	2 Sigma
1	Co-60	9.7	1.8	0.31	9.6	1.01	1 Sigma
1	Cs-137	11	2	0.35	11.2	0.98	1 Sigma
1	Mn-54	7.3	1.4	0.31	7.4	0.99	1 Sigma
1	Zn-65	9.5	1.9	0.67	9.7	0.98	1 Sigma
2	Ba-140	12	2.8	1.6	11.9	1.01	1 Sigma
2	Ce-141	7.6	1.6	0.48	7.4	1.03	1 Sigma
2	Ce-143	8.1	1.5	0.44	6.6	1.23	1 Sigma
2	Ce-144	30	6	2	30.1	1.00	1 Sigma
2	Eu-155	13	2.3	0.51	14.6	0.89	More than 3 Sigma
2	Eu-156	28	5.3	2.4	27.4	1.02	1 Sigma
2	La-140	11	2.1	0.35	9.9	1.11	More than 3 Sigma
2	Nb-95	8.1	1.5	0.33	7.9	1.03	1 Sigma
2	Pr-144	29	17.4	20	29.5	0.98	1 Sigma
2	Sm-153	17	3.1	0.65	16.3	1.04	2 Sigma
2	Zr-95	6.1	1.2	0.49	6.7	0.91	2 Sigma
3	Co-57	6.9	2.4	1.8	7.1	0.97	1 Sigma
3	Cs-136	6.4	1.2	0.29	6.4	1.00	1 Sigma
3	Cs-137	7.5	1.4	0.33	7.8	0.96	2 Sigma
3	Eu-152	5.4	1.1	0.71	5.3	1.02	1 Sigma
3	Eu-154	1.8	0.34	0.75	18	0.10	More than 3 Sigma
3	Sb-125	14	2.7	0.84	14.3	0.98	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

SA Sandia Labs. Radioactive Sample Diag. Prog., NM

Software: Canberra Genie-2000

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.8	1.04	0.32	8.9	0.99	1 Sigma
1	Co-60	9.35	1.15	0.38	9.6	0.97	1 Sigma
1	Cs-137				11.2		Not Reported
1	Mn-54	7.22	0.88	0.42	7.4	0.98	1 Sigma
1	Zn-65	9.19	1.3	1.02	9.7	0.95	2 Sigma
2	Ba-140	9.77	1.15	1.72	11.9	0.82	More than 3 Sigma
2	Ce-141	7.95	0.97	0.67	7.4	1.07	3 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	30.3	4.23	3.06	30.1	1.01	1 Sigma
2	Eu-155	14.2	1.79	0.78	14.6	0.97	1 Sigma
2	Eu-156	29.3	5.55	2.52	27.4	1.07	2 Sigma
2	La-140	11.4	1.3	0.56	9.9	1.15	More than 3 Sigma
2	Nb-95	7.74	0.84	0.51	7.9	0.98	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	6.49	0.97	0.5	6.7	0.97	1 Sigma
3	Co-57	7.16	0.97	0.38	7.1	1.01	1 Sigma
3	Cs-136	5.82	0.64	0.36	6.4	0.91	3 Sigma
3	Cs-137	7.29	0.79	0.5	7.8	0.93	3 Sigma
3	Eu-152	5.19	0.59	1.14	5.3	0.98	1 Sigma
3	Eu-154	17.3	2.01	1.81	18	0.96	2 Sigma
3	Sb-125	16.3	2.03	2.27	14.3	1.14	More than 3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

SI Jozef Stefan Institute, Slovenia

Software: Canberra Genie-VMS

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986

IAEA-TECDOC-619

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.9	0.5	0.05	8.9	1.00	1 Sigma
1	Co-60	9.8	0.5	0.07	9.6	1.02	1 Sigma
1	Cs-137	11.2	0.7	0.08	11.2	1.00	1 Sigma
1	Mn-54	7.3	0.5	0.07	7.4	0.99	1 Sigma
1	Zn-65	9.7	0.7	0.2	9.7	1.00	1 Sigma
2	Ba-140	9.8	0.6	0.3	11.9	0.82	More than 3 Sigma
2	Ce-141	7.6	0.6	0.1	7.4	1.03	1 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	28.7	2.2	0.4	30.1	0.95	2 Sigma
2	Eu-155	14.4	1	0.2	14.6	0.99	1 Sigma
2	Eu-156	28.7	2.3	0.8	27.4	1.05	2 Sigma
2	La-140	9.3	0.5	0.2	9.9	0.94	2 Sigma
2	Nb-95	8	0.6	0.07	7.9	1.01	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	17.7	0.9	0.2	16.3	1.09	2 Sigma
2	Zr-95	6.8	0.4	0.2	6.7	1.01	1 Sigma
3	Co-57	7	0.5	0.06	7.1	0.99	1 Sigma
3	Cs-136	6.6	0.3	0.1	6.4	1.03	1 Sigma
3	Cs-137	7.6	0.8	0.08	7.8	0.97	1 Sigma
3	Eu-152	5.4	0.4	0.5	5.3	1.02	1 Sigma
3	Eu-154	17.4	0.7	0.2	18	0.97	1 Sigma
3	Sb-125	14.8	1	0.2	14.3	1.03	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

SL Stanford Linear Accelerator Center, Menlow Park, CA

Software: Canberra Sampo-90

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.6	0.5	0.2	8.9	0.97	2 Sigma
1	Co-60	9.7	0.4	0.2	9.6	1.01	1 Sigma
1	Cs-137	11	0.7	0.5	11.2	0.98	1 Sigma
1	Mn-54	7.2	0.5	0.2	7.4	0.97	1 Sigma
1	Zn-65	10	0.6	0.5	9.7	1.03	1 Sigma
2	Ba-140	9.4	0.8	0.5	11.9	0.79	More than 3 Sigma
2	Ce-141	7.4	0.4	0.5	7.4	1.00	1 Sigma
2	Ce-143	7.2	0.5	0.5	6.6	1.09	3 Sigma
2	Ce-144				30.1		Not Reported
2	Eu-155	13.8	0.5	0.5	14.6	0.95	2 Sigma
2	Eu-156	29	1.8	0.5	27.4	1.06	2 Sigma
2	La-140	10.9	0.4	0.4	9.9	1.10	3 Sigma
2	Nb-95	7.9	0.5	0.5	7.9	1.00	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	20	0.8	0.5	16.3	1.23	More than 3 Sigma
2	Zr-95	7.4	0.4	0.4	6.7	1.10	3 Sigma
3	Co-57	6.2	0.4	0.3	7.1	0.87	More than 3 Sigma
3	Cs-136	5.9	0.4	0.3	6.4	0.92	3 Sigma
3	Cs-137	7.7	0.5	0.4	7.8	0.99	1 Sigma
3	Eu-152	4.6	0.3	0.3	5.3	0.87	More than 3 Sigma
3	Eu-154	18.2	0.4	0.3	18	1.01	1 Sigma
3	Sb-125	7	0.4	0.3	14.3	0.49	More than 3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

SY Syrian Atomic Energy Commission, Damascus, SY

Software: GammaTrac

Reference(s): Atomic Data and Nuclear Data Tables

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	9	0.95	0.22	8.9	1.01	1 Sigma
1	Co-60	9.6	0.73	0.3	9.6	1.00	1 Sigma
1	Cs-137	11.2	1.3	0.36	11.2	1.00	1 Sigma
1	Mn-54	7.27	0.8	0.32	7.4	0.98	1 Sigma
1	Zn-65	9.46	1.2	0.74	9.7	0.98	1 Sigma
2	Ba-140	10.7	1.1	1.15	11.9	0.90	3 Sigma
2	Ce-141	7.66	1	0.5	7.4	1.04	2 Sigma
2	Ce-143	6.53	1.57	0.37	6.6	0.99	1 Sigma
2	Ce-144	27	3.8	1.9	30.1	0.90	More than 3 Sigma
2	Eu-155	13.5	1.5	0.42	14.6	0.92	3 Sigma
2	Eu-156	27	1.5	2.9	27.4	0.99	1 Sigma
2	La-140	9.47	0.58	0.42	9.9	0.96	2 Sigma
2	Nb-95	8	0.9	0.3	7.9	1.01	1 Sigma
2	Pr-144	31.4	15	23	29.5	1.06	1 Sigma
2	Sm-153	15.6	2.1	0.45	16.3	0.96	2 Sigma
2	Zr-95	8.17	1	0.4	6.7	1.22	More than 3 Sigma
3	Co-57	7.48	1.1	0.16	7.1	1.05	2 Sigma
3	Cs-136	6.64	0.45	0.36	6.4	1.04	2 Sigma
3	Cs-137	7.48	0.9	0.4	7.8	0.96	2 Sigma
3	Eu-152	5.2	0.56	0.48	5.3	0.98	1 Sigma
3	Eu-154				18		Not Reported
3	Sb-125	13.9	1	0.88	14.3	0.97	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

TX Texas Dept. of Health/Laboratories, Austin, TX

Software: Canberra Genie-PC

Reference(s): Radioactive Decay Data Tables (Kocher, 1981)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.95	0.44	0.32	8.9	1.01	1 Sigma
1	Co-60	9.5	0.37	0.48	9.6	0.99	1 Sigma
1	Cs-137	11.46	0.66	0.41	11.2	1.02	1 Sigma
1	Mn-54	7.35	0.455	0.44	7.4	0.99	1 Sigma
1	Zn-65	9.63	0.71	1.29	9.7	0.99	1 Sigma
2	Ba-140	8.2	0.97	1.18	11.9	0.69	More than 3 Sigma
2	Ce-141	7.34	0.47	0.65	7.4	0.99	1 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	28.55	2.44	2.33	30.1	0.95	2 Sigma
2	Eu-155	12.73	0.54	0.56	14.6	0.87	More than 3 Sigma
2	Eu-156	26.86	0.81	2	27.4	0.98	1 Sigma
2	La-140	9.61	0.29	0.48	9.9	0.97	1 Sigma
2	Nb-95	8.13	0.5	0.51	7.9	1.03	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153				16.3		Not Reported
2	Zr-95	6.9	0.4	0.48	6.7	1.03	1 Sigma
3	Co-57	7.02	0.66	0.38	7.1	0.99	1 Sigma
3	Cs-136	6.23	0.2	0.33	6.4	0.97	1 Sigma
3	Cs-137	8.04	0.49	0.53	7.8	1.03	2 Sigma
3	Eu-152	5.25	0.23	0.69	5.3	0.99	1 Sigma
3	Eu-154	8.14	0.94	0.79	18	0.45	More than 3 Sigma
3	Sb-125	13.94	0.53	1.68	14.3	0.97	1 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

X1 Anonymous

Software: Canberra Genie-2000
Reference(s): Canberra Software Library

Radionuclide Transformations, ICRP Pub. 38

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.83	0.72	0.23	8.9	0.99	1 Sigma
1	Co-60	9.63	0.54	0.32	9.6	1.00	1 Sigma
1	Cs-137	11.51	0.85	0.39	11.2	1.03	1 Sigma
1	Mn-54	7.39	0.61	0.41	7.4	1.00	1 Sigma
1	Zn-65	9.03	0.92	0.96	9.7	0.93	2 Sigma
2	Ba-140	9.5	1.2	1.5	11.9	0.80	More than 3 Sigma
2	Ce-141	7.42	0.86	0.48	7.4	1.00	1 Sigma
2	Ce-143	7.7	1.1	0.49	6.6	1.17	1 Sigma
2	Ce-144	28.6	3.1	2	30.1	0.95	2 Sigma
2	Eu-155	13.8	1.3	0.56	14.6	0.95	2 Sigma
2	Eu-156	31.5	1.8	2.2	27.4	1.15	More than 3 Sigma
2	La-140	10.72	0.65	0.45	9.9	1.08	3 Sigma
2	Nb-95	8.34	0.65	0.33	7.9	1.06	2 Sigma
2	Pr-144	27	18	30	29.5	0.92	1 Sigma
2	Sm-153	17.9	2	0.66	16.3	1.10	1 Sigma
2	Zr-95	7.27	0.77	0.5	6.7	1.09	2 Sigma
3	Co-57	7.12	0.79	0.19	7.1	1.00	1 Sigma
3	Cs-136	6.83	0.35	0.41	6.4	1.07	2 Sigma
3	Cs-137	7.77	0.64	0.43	7.8	1.00	1 Sigma
3	Eu-152	5.21	0.56	0.57	5.3	0.98	1 Sigma
3	Eu-154	17.56	0.85	0.43	18	0.98	1 Sigma
3	Sb-125	13.1	1.2	1.1	14.3	0.92	3 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

X2 Anonymous

Software: Canberra Genie-PC

Reference(s): Table of Radioactive Isotopes, (Brown and Firestone, 1986)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.7	0.8	0.3	8.9	0.98	1 Sigma
1	Co-60	9.6	0.8	0.5	9.6	1.00	1 Sigma
1	Cs-137	11.2	1.2	0.4	11.2	1.00	1 Sigma
1	Mn-54	7.3	0.8	0.4	7.4	0.99	1 Sigma
1	Zn-65	9.4	0.8	1.1	9.7	0.97	1 Sigma
2	Ba-140	9.5	0.8	1.2	11.9	0.80	More than 3 Sigma
2	Ce-141	7.3	1	0.7	7.4	0.99	1 Sigma
2	Ce-143	7.5	1	0.5	6.6	1.14	2 Sigma
2	Ce-144	28.4	2.4	2.3	30.1	0.94	2 Sigma
2	Eu-155	14.6	1.2	0.6	14.6	1.00	1 Sigma
2	Eu-156	31.2	1.4	2.1	27.4	1.14	3 Sigma
2	La-140	10.8	0.6	0.5	9.9	1.09	3 Sigma
2	Nb-95	7.9	1	0.5	7.9	1.00	1 Sigma
2	Pr-144	32.4	8.4	30.3	29.5	1.10	1 Sigma
2	Sm-153	16.8	1.4	0.6	16.3	1.03	1 Sigma
2	Zr-95	6.7	1	0.5	6.7	1.00	1 Sigma
3	Co-57	6.7	0.8	0.2	7.1	0.94	2 Sigma
3	Cs-136	6.6	0.4	0.3	6.4	1.03	1 Sigma
3	Cs-137	7.8	0.6	0.5	7.8	1.00	1 Sigma
3	Eu-152	5.1	0.4	0.6	5.3	0.96	1 Sigma
3	Eu-154	16.5	0.8	0.4	18	0.92	3 Sigma
3	Sb-125	14.6	1.6	1.7	14.3	1.02	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

X3 Anonymous

Software: Canberra Procount

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

The Gamma Rays of the Radionuclides, (Erdtmann and Soyka, 1979)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	9.34	0.31	0.19	8.9	1.05	2 Sigma
1	Co-60	9.75	0.54	0.26	9.6	1.02	1 Sigma
1	Cs-137	11.1	0.5	0.27	11.2	0.99	1 Sigma
1	Mn-54	7.07	0.41	0.26	7.4	0.96	2 Sigma
1	Zn-65	9.3	0.84	0.57	9.7	0.96	2 Sigma
2	Ba-140	9.2	1.1	1.1	11.9	0.77	More than 3 Sigma
2	Ce-141	8.35	0.51	0.4	7.4	1.13	More than 3 Sigma
2	Ce-143				6.6		Not Reported
2	Ce-144	32.2	2.1	1.8	30.1	1.07	3 Sigma
2	Eu-155	15.3	0.8	0.86	14.6	1.05	2 Sigma
2	Eu-156				27.4		Not Reported
2	La-140	9.59	0.42	0.34	9.9	0.97	1 Sigma
2	Nb-95	7.75	0.41	0.25	7.9	0.98	1 Sigma
2	Pr-144				29.5		Not Reported
2	Sm-153	16.8	1.9	0.71	16.3	1.03	1 Sigma
2	Zr-95				6.7		Not Reported
3	Co-57	6.69	1.7	0.23	7.1	0.94	2 Sigma
3	Cs-136	6.5	0.49	0.34	6.4	1.02	1 Sigma
3	Cs-137	7.34	0.39	0.31	7.8	0.94	2 Sigma
3	Eu-152	5.89	0.72	2.1	5.3	1.11	3 Sigma
3	Eu-154	17.8	2	0.65	18	0.99	1 Sigma
3	Sb-125	15	1.1	0.76	14.3	1.05	2 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY LABORATORY

YA Duke Engineering Services, Bolton, MA

Software: Vertechs SEEKER Gamma Spec. Software

Reference(s): Radioactive Decay Data Tables, (Kocher, 1981)

The Gamma Rays of the Radionuclides, (Erdtmann and Soyka, 1979)

Sample ID	*Analyte****	*Activity*	*Error*	*MDA*	*Exp. Value**	*Lab Value / Exp. Value*	*Comparison***
1	Co-57	8.916	0.123	0.19	8.9	1.00	1 Sigma
1	Co-60	9.731	0.168	0.291	9.6	1.01	1 Sigma
1	Cs-137	11.06	0.969	0.436	11.2	0.99	1 Sigma
1	Mn-54	7.331	0.187	0.307	7.4	0.99	1 Sigma
1	Zn-65	9.318	0.366	0.755	9.7	0.96	1 Sigma
2	Ba-140	8.804	0.377	1.137	11.9	0.74	More than 3 Sigma
2	Ce-141	7.343	0.177	0.379	7.4	0.99	1 Sigma
2	Ce-143	6.82	0.181	0.37	6.6	1.03	1 Sigma
2	Ce-144	29.257	0.755	1.702	30.1	0.97	1 Sigma
2	Eu-155	14.819	0.232	0.559	14.6	1.02	1 Sigma
2	Eu-156	26.881	0.461	1.93	27.4	0.98	1 Sigma
2	La-140	9.214	0.16	0.323	9.9	0.93	2 Sigma
2	Nb-95	8.072	0.186	0.291	7.9	1.02	1 Sigma
2	Pr-144	27.408	6.611	20.833	29.5	0.93	1 Sigma
2	Sm-153	15.698	0.287	0.575	16.3	0.96	2 Sigma
2	Zr-95	6.925	0.197	0.437	6.7	1.03	1 Sigma
3	Co-57	6.425	0.429	1.762	7.1	0.90	More than 3 Sigma
3	Cs-136	6.255	0.102	0.323	6.4	0.98	1 Sigma
3	Cs-137	7.436	0.192	0.492	7.8	0.95	2 Sigma
3	Eu-152	5.319	0.194	0.627	5.3	1.00	1 Sigma
3	Eu-154	16.688	0.193	0.406	18	0.93	3 Sigma
3	Sb-125	13.737	0.327	0.86	14.3	0.96	2 Sigma

**** Expected value is from SYNTH program.***
***** Comparison is with the expected value using the sigma values calculated by EML.***
****** The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

RESULTS BY ISOTOPE - sorted by lab

Ba-140

Expected Value* = 11.9

Calculated 1 sigma uncertainty = 0.55

Sample 2

Mean +/- SD of Reported Value = 10.1 +/- 1.8

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	11.8	0.83	0.54	Ortec Gammavision	0.99	1 Sigma
AU	9.311	0.5568	0	Canberra Genie-VMS	0.78	More than 3 Sigma
BL	9.22	0.79	0.55	Aptec	0.77	More than 3 Sigma
BU	11.6	0.74	0.79	Ortec Gammavision	0.97	1 Sigma
CA	13.6	1.4	1.3	Aptec ver. 6.31	1.14	More than 3 Sigma
CW	9.04	0.63	1.33	Canberra Genie-2000	0.76	More than 3 Sigma
EC	8.75	0.69	0	Canberra Genie-2000	0.74	More than 3 Sigma
FL	7	0.4	1.1	Canberra Genie-PC	0.59	More than 3 Sigma
FM	5.2	0.2	0.74	Canberra Genie-2000	0.44	More than 3 Sigma
GT	10	3.3	0.4	Canberra Genie-VMS	0.84	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	9.48	0.49	1.06	Aptec ver. 6.31	0.80	More than 3 Sigma
LA	12.5	1.3	1.06	Ortec Gammavision-32 ver.5	1.05	2 Sigma
LA1	12.12	3.61	0.71	Ortec Gammavision ver.4.10	1.02	1 Sigma
LB	10	2	1	Aptec ver. 4.3	0.84	More than 3 Sigma
LN	12.4	2.28	2.95	Ortec Gammavision	1.04	1 Sigma
LV	9.56	0.55	1.1	Canberra Genie-PC	0.80	More than 3 Sigma
ME	13.1	0.8	0.3	Canberra Genie 2000	1.10	3 Sigma
NO	11.7	2.1	3.7	Aptec ver. 6.31	0.98	1 Sigma
NP	9.88	0.27	0.017	Vertechs Seeker v1.8	0.83	More than 3 Sigma
RE	9.51	1.61	0.35	In House	0.80	More than 3 Sigma
RM	12	2.8	1.6	Ortec Gammavision	1.01	1 Sigma
SA	9.77	1.15	1.72	Canberra Genie-2000	0.82	More than 3 Sigma
SI	9.8	0.6	0.3	Canberra Genie-VMS	0.82	More than 3 Sigma
SL	9.4	0.8	0.5	Canberra Sampo-90	0.79	More than 3 Sigma
SY	10.7	1.1	1.15	GammaTrac	0.90	3 Sigma
TX	8.2	0.97	1.18	Canberra Genie-PC	0.69	More than 3 Sigma
X1	9.5	1.2	1.5	Canberra Genie-PC	0.80	More than 3 Sigma
X2	9.5	0.8	1.2	Canberra Genie-PC	0.80	More than 3 Sigma
X3	9.2	1.1	1.1	Canberra ProCount	0.77	More than 3 Sigma
YA	8.804	0.377	1.137	Seeker Gamma Spectrometry Software	0.74	More than 3 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Ce-141

Expected Value* = 7.4

Calculated 1 sigma uncertainty = 0.2

Sample 2

Mean +/- SD of Reported Value = 7.5 +/- 0.4

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	7.31	0.17	0.12	Ortec Gammavision	0.99	1 Sigma
AU	8.063	0.1887	0	Canberra Genie-VMS	1.09	More than 3 Sigma
BL	7.58	0.37	0.13	Aptec	1.02	1 Sigma
BU	7.65	0.31	0.26	Ortec Gammavision	1.03	2 Sigma
CA	6.7	0.3	0.26	Aptec ver. 6.31	0.91	More than 3 Sigma
CW	7.54	0.25	0.38	Canberra Genie-2000	1.02	1 Sigma
EC	7.67	0.51	0	Canberra Genie-2000	1.04	2 Sigma
FL	7.5	0.4	0.49	Canberra Genie-PC	1.01	1 Sigma
FM	6.6	0.4	0.34	Canberra Genie-2000	0.89	More than 3 Sigma
GT	7	0.9	0.1	Canberra Genie-VMS	0.95	2 Sigma
HU				Canberra Genie-2000		Not Reported
KO	7.32	0.37	0.36	Aptec ver. 6.31	0.99	1 Sigma
LA	7.35	0.69	0.23	Ortec Gammavision-32 ver.5	0.99	1 Sigma
LA1	7.59	2.14	0.14	Ortec Gammavision ver.4.10	1.03	1 Sigma
LB	7.6	0.8	0.5	Aptec ver. 4.3	1.03	1 Sigma
LN	7.84	0.62	0.828	Ortec Gammavision	1.06	3 Sigma
LV				Canberra Genie-PC		Not Reported
ME	15.3	1	1.4	Canberra Genie 2000	2.07	More than 3 Sigma
NO	7.8	0.7	0.3	Aptec ver. 6.31	1.05	2 Sigma
NP	7.4	0.16	0.006	Vertechs Seeker v1.8	1.00	1 Sigma
RE	7.71	0.89	0.17	In House	1.04	2 Sigma
RM	7.6	1.6	0.48	Ortec Gammavision	1.03	1 Sigma
SA	7.95	0.97	0.67	Canberra Genie-2000	1.07	3 Sigma
SI	7.6	0.6	0.1	Canberra Genie-VMS	1.03	1 Sigma
SL	7.4	0.4	0.5	Canberra Sampo-90	1.00	1 Sigma
SY	7.66	1	0.5	GammaTrac	1.04	2 Sigma
TX	7.34	0.47	0.65	Canberra Genie-PC	0.99	1 Sigma
X1	7.42	0.86	0.48	Canberra Genie-PC	1.00	1 Sigma
X2	7.3	1	0.7	Canberra Genie-PC	0.99	1 Sigma
X3	8.35	0.51	0.4	Canberra ProCount	1.13	More than 3 Sigma
YA	7.343	0.177	0.379	Seeker Gamma Spectrometry Software	0.99	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Ce-143 ***Expected Value* =*** 6.6 Midpoint of Counting
7.9 Beginning of Counting

Sample 2

Calculated 1 sigma uncertainty = 0.22

Mean +/- SD of Reported Value = 7.7 +/- 1.1

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	6.31	0.2	0.15	Ortec Gammavision	0.96	2 Sigma
AU				Canberra Genie-VMS		Not Reported
BL	10.39	1.14	0.23	Aptec	1.57	More than 3 Sigma
BU	6.52	0.31	0.35	Ortec Gammavision	0.99	1 Sigma
CA	7.6	0.7	0.25	Aptec ver. 6.31	1.15	2 Sigma
CW	7.24	0.24	0.44	Canberra Genie-2000	1.10	3 Sigma
EC	7.84	0.52	0.76	Canberra Genie-2000	1.19	1 Sigma
FL	8	0.4	0.51	Canberra Genie-PC	1.21	1 Sigma
FM	0.63	0.04	0.04	Canberra Genie-2000	0.10	More than 3 Sigma
GT	30	7	0.7	Canberra Genie-VMS	4.55	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	8.66	0.49	0.48	Aptec ver. 6.31	1.31	More than 3 Sigma
LA	8.2	0.77	0.32	Ortec Gammavision-32 ver.5	1.24	2 Sigma
LA1	6.66	1.86	0.5	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	9	1	0.6	Aptec ver. 4.3	1.36	More than 3 Sigma
LN	6.61	0.47	0.687	Ortec Gammavision	1.00	1 Sigma
LV	7.77	0.42	0.53	Canberra Genie-PC	1.18	1 Sigma
ME				Canberra Genie-2000		Not Reported
NO	8.2	1.4	3.3	Aptec ver. 6.31	1.24	2 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	9.59	1.24	0.24	In House	1.45	More than 3 Sigma
RM	8.1	1.5	0.44	Ortec Gammavision	1.23	1 Sigma
SA				Canberra Genie-2000		Not Reported
SI				Canberra Genie-VMS		Not Reported
SL	7.2	0.5	0.5	Canberra Sampo-90	1.09	3 Sigma
SY	6.53	1.57	0.37	GammaTrac	0.99	1 Sigma
TX				Canberra Genie-PC		Not Reported
X1	7.7	1.1	0.49	Canberra Genie-PC	1.17	1 Sigma
X2	7.5	1	0.5	Canberra Genie-PC	1.14	2 Sigma
X3				Canberra Procount		Not Reported
YA	6.82	0.181	0.37	Seeker Gamma Spectrometry Software	1.03	1 Sigma

**** Expected value is from SYNTH program. The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Ce-144

Expected Value* = 30.1

Calculated 1 sigma uncertainty = 0.9

Sample 2

Mean +/- SD of Reported Value = 28.9 +/- 1.4

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	28.82	0.72	0.52	Ortec Gammavision	0.96	2 Sigma
AU	32.14	1.0606	0	Canberra Genie-VMS	1.07	3 Sigma
BL	28.36	1.65	0.65	Aptec	0.94	2 Sigma
BU	30.3	1.3	1.44	Ortec Gammavision	1.01	1 Sigma
CA				Aptec ver. 6.31		Not Reported
CW	28.62	0.95	1.68	Canberra Genie-2000	0.95	2 Sigma
EC	27.3	3.22	0	Canberra Genie-2000	0.91	More than 3 Sigma
FL	30	1	2.1	Canberra Genie-PC	1.00	1 Sigma
FM	29	1	1.7	Canberra Genie-2000	0.96	2 Sigma
GT	26	6.5	0.5	Canberra Genie-VMS	0.86	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	28.3	1.32	1.55	Aptec ver. 6.31	0.94	2 Sigma
LA	28.1	2.6	0.91	Ortec Gammavision-32 ver.5	0.93	3 Sigma
LA1	30.52	8.66	0.59	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	27	3	2	Aptec ver. 4.3	0.90	More than 3 Sigma
LN	18.9	2.71	4.8	Ortec Gammavision	0.63	More than 3 Sigma
LV	28.4	1.5	1.5	Canberra Genie-PC	0.94	2 Sigma
ME	61.4	4.3	6.2	Canberra Genie 2000	2.04	More than 3 Sigma
NO	28.4	2.9	4.2	Aptec ver. 6.31	0.94	2 Sigma
NP	28.3	0.68	0.029	Vertechs Seeker v1.8	0.94	2 Sigma
RE	29.9	3.62	0.72	In House	0.99	1 Sigma
RM	30	6	2	Ortec Gammavision	1.00	1 Sigma
SA	30.3	4.23	3.06	Canberra Genie-2000	1.01	1 Sigma
SI	28.7	2.2	0.4	Canberra Genie-VMS	0.95	2 Sigma
SL				Canberra Sampo-90		Not Reported
SY	27	3.8	1.9	GammaTrac	0.90	More than 3 Sigma
TX	28.55	2.44	2.33	Canberra Genie-PC	0.95	2 Sigma
X1	28.6	3.1	2	Canberra Genie-PC	0.95	2 Sigma
X2	28.4	2.4	2.3	Canberra Genie-PC	0.94	2 Sigma
X3	32.2	2.1	1.8	Canberra ProCount	1.07	3 Sigma
YA	29.257	0.755	1.702	Seeker Gamma Spectrometry Software	0.97	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Co-57

Expected Value* = 8.9

Calculated 1 sigma uncertainty = 0.25

Sample 1

Mean +/- SD of Reported Value = 8.7 +/- 0.4

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	8.1226	0.24	0.069	Ortec Gammavision	0.91	More than 3 Sigma
AU	9.315	0.157	0	Canberra Genie-VMS	1.05	2 Sigma
BL	8.64	0.39	0.06	Aptec	0.97	2 Sigma
BU	9.19	0.23	0.22	Ortec Gammavision	1.03	2 Sigma
CA	8.5	0.4	0.18	Aptec ver. 6.31	0.96	2 Sigma
CW	8.78	0.22	0.19	Canberra Genie-2000	0.99	1 Sigma
EC	9	0.49	0.58	Canberra Genie-2000	1.01	1 Sigma
FL	8.9	0.3	0.24	Canberra Genie-PC	1.00	1 Sigma
FM	8.5	0.4	0.18	Canberra Genie-2000	0.96	2 Sigma
GT	7.8	1.1	0.1	Canberra Genie-VMS	0.88	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	8.6	0.39	0.18	Aptec ver. 6.31	0.97	2 Sigma
LA	8.31	0.77	0.09	Ortec Gammavision-32 ver.5	0.93	3 Sigma
LA1	9	2.48	0.43	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	7.7	0.8	0.2	Aptec ver. 4.3	0.87	More than 3 Sigma
LN	8.7	0.58	0.2	Ortec Gammavision	0.98	1 Sigma
LV	8.75	0.36	0.17	Canberra Genie-PC	0.98	1 Sigma
ME	18.7	1.1	0.7	Canberra Genie 2000	2.10	More than 3 Sigma
NO	8.8	0.8	0.7	Aptec ver. 6.31	0.99	1 Sigma
NP	8.48	0.12	0.003	Vertechs Seeker v1.8	0.95	2 Sigma
RE	8.88	0.88	0.09	In House	1.00	1 Sigma
RM	8.6	1.6	0.22	Ortec Gammavision	0.97	2 Sigma
SA	8.8	1.04	0.32	Canberra Genie-2000	0.99	1 Sigma
SI	8.9	0.5	0.05	Canberra Genie-VMS	1.00	1 Sigma
SL	8.6	0.5	0.2	Canberra Sampo-90	0.97	2 Sigma
SY	9	0.95	0.22	GammaTrac	1.01	1 Sigma
TX	8.95	0.44	0.32	Canberra Genie-PC	1.01	1 Sigma
X1	8.83	0.72	0.23	Canberra Genie-PC	0.99	1 Sigma
X2	8.7	0.8	0.3	Canberra Genie-PC	0.98	1 Sigma
X3	9.34	0.31	0.19	Canberra ProCount	1.05	2 Sigma
YA	8.916	0.123	0.19	Seeker Gamma Spectrometry Software	1.00	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Co-57

Expected Value* = 7.1

Calculated 1 sigma uncertainty = 0.21

Sample 3

Mean +/- SD of Reported Value = 7 +/- 1

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	8.499	0.19	0.79	Ortec Gammavision	1.20	More than 3 Sigma
AU	9.61	0.1663	0	Canberra Genie-VMS	1.35	More than 3 Sigma
BL	5.66	0.32	0.04	Aptec	0.80	More than 3 Sigma
BU	7.73	0.8	0.48	Ortec Gammavision	1.09	3 Sigma
CA	15.4	0.8	0.17	Aptec ver. 6.31	2.17	More than 3 Sigma
CW	6.58	0.56	1.54	Canberra Genie-2000	0.93	3 Sigma
EC	7.9	0.67	0.67	Canberra Genie-2000	1.11	More than 3 Sigma
FL	7.2	0.5	0.27	Canberra Genie-PC	1.01	1 Sigma
FM	5.7	0.3	0.21	Canberra Genie-2000	0.80	More than 3 Sigma
GT	5.4	2.1	0.1	Canberra Genie-VMS	0.76	More than 3 Sigma
HU	6.2	0.64	0.13	Canberra Genie-PC	0.87	More than 3 Sigma
KO	7.05	0.44	1.57	Aptec ver. 6.31	0.99	1 Sigma
LA	8.71	0.79	0.47	Ortec Gammavision-32 ver.5	1.23	More than 3 Sigma
LA1	8.81	2.46	0.31	Ortec Gammavision ver.4.10	1.24	More than 3 Sigma
LB	15	2	2	Aptec ver. 4.3	2.11	More than 3 Sigma
LN	6.85	0.46	0.915	Ortec Gammavision	0.96	2 Sigma
LV	6.99	0.7	1.67	Canberra Genie-PC	0.98	1 Sigma
ME	17.9	1	0.8	Canberra Genie 2000	2.52	More than 3 Sigma
NO	5.8	0.9	1.4	Aptec ver. 6.31	0.82	More than 3 Sigma
NP	6.21	0.51	0.003	Vertechs Seeker v1.8	0.87	More than 3 Sigma
RE	7.55	1.65	0.77	In House	1.06	3 Sigma
RM	6.9	2.4	1.8	Ortec Gammavision	0.97	1 Sigma
SA	7.16	0.97	0.38	Canberra Genie-2000	1.01	1 Sigma
SI	7	0.5	0.06	Canberra Genie-VMS	0.99	1 Sigma
SL	6.2	0.4	0.3	Canberra Sampo-90	0.87	More than 3 Sigma
SY	7.48	1.1	0.16	GammaTrac	1.05	2 Sigma
TX	7.02	0.66	0.38	Canberra Genie-PC	0.99	1 Sigma
X1	7.12	0.79	0.19	Canberra Genie-PC	1.00	1 Sigma
X2	6.7	0.8	0.2	Canberra Genie-PC	0.94	2 Sigma
X3	6.69	1.7	0.23	Canberra ProCount	0.94	2 Sigma
YA	6.425	0.429	1.762	Seeker Gamma Spectrometry Software	0.90	More than 3 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Co-60

Expected Value* = 9.6

Calculated 1 sigma uncertainty = 0.27

Sample 1

Mean +/- SD of Reported Value = 9.7 +/- 0.2

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	9.6858	0.39	0.120	Ortec Gammavision	1.01	1 Sigma
AU	9.745	0.2836	0	Canberra Genie-VMS	1.02	1 Sigma
BL	9.64	0.34	0.05	Aptec	1.00	1 Sigma
BU	9.81	0.33	0.16	Ortec Gammavision	1.02	1 Sigma
CA				Aptec ver. 6.31		Not Reported
CW	9.83	0.18	0.33	Canberra Genie-2000	1.02	1 Sigma
EC	9.67	0.4	0.69	Canberra Genie-2000	1.01	1 Sigma
FL	9.7	0.3	0.33	Canberra Genie-PC	1.01	1 Sigma
FM	9.5	0.4	0.32	Canberra Genie-2000	0.99	1 Sigma
GT	9.7	0.7	0.1	Canberra Genie-VMS	1.01	1 Sigma
HU				Canberra Genie-2000		Not Reported
KO	9.58	0.36	0.28	Aptec ver. 6.31	1.00	1 Sigma
LA	9.57	0.9	0.07	Ortec Gammavision-32 ver.5	1.00	1 Sigma
LA1	9.56	2.64	0.07	Ortec Gammavision ver.4.10	1.00	1 Sigma
LB	10	1	0.1	Aptec ver. 4.3	1.04	2 Sigma
LN	9.3	0.92	0.435	Ortec Gammavision	0.97	2 Sigma
LV	9.68	0.31	0.25	Canberra Genie-PC	1.01	1 Sigma
ME	9.5	0.4	0.4	Canberra Genie 2000	0.99	1 Sigma
NO	9.6	2	0.2	Aptec ver. 6.31	1.00	1 Sigma
NP	9.74	0.16	0.224	Vertechs Seeker v1.8	1.01	1 Sigma
RE	10.1	1.16	0.12	In House	1.05	2 Sigma
RM	9.7	1.8	0.31	Ortec Gammavision	1.01	1 Sigma
SA	9.35	1.15	0.38	Canberra Genie-2000	0.97	1 Sigma
SI	9.8	0.5	0.07	Canberra Genie-VMS	1.02	1 Sigma
SL	9.7	0.4	0.2	Canberra Sampo-90	1.01	1 Sigma
SY	9.6	0.73	0.3	GammaTrac	1.00	1 Sigma
TX	9.5	0.37	0.48	Canberra Genie-PC	0.99	1 Sigma
X1	9.63	0.54	0.32	Canberra Genie-PC	1.00	1 Sigma
X2	9.6	0.8	0.5	Canberra Genie-PC	1.00	1 Sigma
X3	9.75	0.54	0.26	Canberra ProCount	1.02	1 Sigma
YA	9.731	0.168	0.291	Seeker Gamma Spectrometry Software	1.01	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Cs-136

Expected Value* = 6.4

Calculated 1 sigma uncertainty = 0.22

Sample 3

Mean +/- SD of Reported Value = 6.5 +/- 0.4

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	6.47	0.18	0.09	Ortec Gammavision	1.01	1 Sigma
AU				Canberra Genie-VMS		Not Reported
BL	6.77	0.4	0.13	Aptec	1.06	2 Sigma
BU	6.41	0.19	0.18	Ortec Gammavision	1.00	1 Sigma
CA	7.6	0.6	0.37	Aptec ver. 6.31	1.19	More than 3 Sigma
CW	6.21	0.15	0.32	Canberra Genie-2000	0.97	1 Sigma
EC	6.15	0.21	0.43	Canberra Genie-2000	0.96	2 Sigma
FL	6.5	0.2	0.39	Canberra Genie-PC	1.02	1 Sigma
FM	4.7	0.1	0.28	Canberra Genie-2000	0.73	More than 3 Sigma
GT	6.7	0.6	0.1	Canberra Genie-VMS	1.05	2 Sigma
HU	6.83	0.13	0.07	Canberra Genie-PC	1.07	2 Sigma
KO	6.34	0.32	0.39	Aptec ver. 6.31	0.99	1 Sigma
LA	6.63	0.62	0.23	Ortec Gammavision-32 ver.5	1.04	2 Sigma
LA1	6.71	1.87	0.72	Ortec Gammavision ver.4.10	1.05	2 Sigma
LB	6.3	0.9	1	Aptec ver. 4.3	0.98	1 Sigma
LN	6.33	0.44	0.171	Ortec Gammavision	0.99	1 Sigma
LV	6.61	0.19	0.3	Canberra Genie-PC	1.03	1 Sigma
ME				Canberra Genie-2000		Not Reported
NO	6.7	1.2	1.3	Aptec ver. 6.31	1.05	2 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	6.2	0.77	0.1	In House	0.97	1 Sigma
RM	6.4	1.2	0.29	Ortec Gammavision	1.00	1 Sigma
SA	5.82	0.64	0.36	Canberra Genie-2000	0.91	3 Sigma
SI	6.6	0.3	0.1	Canberra Genie-VMS	1.03	1 Sigma
SL	5.9	0.4	0.3	Canberra Sampo-90	0.92	3 Sigma
SY	6.64	0.45	0.36	GammaTrac	1.04	2 Sigma
TX	6.23	0.2	0.33	Canberra Genie-PC	0.97	1 Sigma
X1	6.83	0.35	0.41	Canberra Genie-PC	1.07	2 Sigma
X2	6.6	0.4	0.3	Canberra Genie-PC	1.03	1 Sigma
X3	6.5	0.49	0.34	Canberra ProCount	1.02	1 Sigma
YA	6.255	0.102	0.323	Seeker Gamma Spectrometry Software	0.98	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Cs-137

Expected Value* = 11.2

Calculated 1 sigma uncertainty = 0.31

Sample 1

Mean +/- SD of Reported Value = 11.2 +/- 0.2

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	11.363	0.5	0.11	Ortec Gammavision	1.01	1 Sigma
AU	11.05	0.2309	0	Canberra Genie-VMS	0.99	1 Sigma
BL	11.16	0.37	0.13	Aptec	1.00	1 Sigma
BU	11.3	0.42	0.18	Ortec Gammavision	1.01	1 Sigma
CA	16.3	0.7	0.32	Aptec ver. 6.31	1.46	More than 3 Sigma
CW	11.15	0.25	0.36	Canberra Genie-2000	1.00	1 Sigma
EC	9.86	0.52	0.52	Canberra Genie-2000	0.88	More than 3 Sigma
FL	11.4	0.5	0.38	Canberra Genie-PC	1.02	1 Sigma
FM	11.3	0.5	0.36	Canberra Genie-2000	1.01	1 Sigma
GT	11	2.5	0.1	Canberra Genie-VMS	0.98	1 Sigma
HU				Canberra Genie-2000		Not Reported
KO	11.2	0.53	0.28	Aptec ver. 6.31	1.00	1 Sigma
LA	11.1	1	0.19	Ortec Gammavision-32 ver.5	0.99	1 Sigma
LA1	11.35	3.15	0.12	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	11	1	0.2	Aptec ver. 4.3	0.98	1 Sigma
LN	10.8	0.57	0.233	Ortec Gammavision	0.96	2 Sigma
LV	11.2	0.56	0.27	Canberra Genie-PC	1.00	1 Sigma
ME	13.3	0.7	0.6	Canberra Genie 2000	1.19	More than 3 Sigma
NO	11.6	1.8	0.2	Aptec ver. 6.31	1.04	2 Sigma
NP	10.5	0.2	0.009	Vertechs Seeker v1.8	0.94	3 Sigma
RE	11.3	1.22	0.11	In House	1.01	1 Sigma
RM	11	2	0.35	Ortec Gammavision	0.98	1 Sigma
SA				Canberra Genie-2000		Not Reported
SI	11.2	0.7	0.08	Canberra Genie-VMS	1.00	1 Sigma
SL	11	0.7	0.5	Canberra Sampo-90	0.98	1 Sigma
SY	11.2	1.3	0.36	GammaTrac	1.00	1 Sigma
TX	11.46	0.66	0.41	Canberra Genie-PC	1.02	1 Sigma
X1	11.51	0.85	0.39	Canberra Genie-PC	1.03	1 Sigma
X2	11.2	1.2	0.4	Canberra Genie-PC	1.00	1 Sigma
X3	11.1	0.5	0.27	Canberra ProCount	0.99	1 Sigma
YA	11.06	0.969	0.436	Seeker Gamma Spectrometry Software	0.99	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Cs-137

Expected Value* = 7.8

Calculated 1 sigma uncertainty = 0.23

Sample 3

Mean +/- SD of Reported Value = 7.5 +/- 0.3

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	7.53	0.2	0.11	Ortec Gammavision	0.97	2 Sigma
AU	7.337	0.1959	0	Canberra Genie-VMS	0.94	2 Sigma
BL	7.57	0.35	0.14	Aptec	0.97	1 Sigma
BU	7.68	0.34	0.21	Ortec Gammavision	0.98	1 Sigma
CA	11.4	0.5	0.36	Aptec ver. 6.31	1.46	More than 3 Sigma
CW	7.61	0.21	0.33	Canberra Genie-2000	0.98	1 Sigma
EC	7.1	0.43	0.81	Canberra Genie-2000	0.91	More than 3 Sigma
FL	7.7	0.4	0.43	Canberra Genie-PC	0.99	1 Sigma
FM	7.7	0.3	0.4	Canberra Genie-2000	0.99	1 Sigma
GT	7.1	1.7	0.1	Canberra Genie-VMS	0.91	More than 3 Sigma
HU	7.43	0.25	0.24	Canberra Genie-PC	0.95	2 Sigma
KO	7.85	0.32	0.3	Aptec ver. 6.31	1.01	1 Sigma
LA	7.54	0.7	0.22	Ortec Gammavision-32 ver.5	0.97	2 Sigma
LA1	7.66	2.16	0.14	Ortec Gammavision ver.4.10	0.98	1 Sigma
LB	7.6	0.7	0.4	Aptec ver. 4.3	0.97	1 Sigma
LN	7.08	0.49	0.228	Ortec Gammavision	0.91	More than 3 Sigma
LV	7.7	0.42	0.3	Canberra Genie-PC	0.99	1 Sigma
ME	9.1	0.4	0.7	Canberra Genie 2000	1.17	More than 3 Sigma
NO	8	1.3	0.3	Aptec ver. 6.31	1.03	1 Sigma
NP	7.07	0.17	0.008	Vertechs Seeker v1.8	0.91	More than 3 Sigma
RE	7.72	0.91	0.11	In House	0.99	1 Sigma
RM	7.5	1.4	0.33	Ortec Gammavision	0.96	2 Sigma
SA	7.29	0.79	0.5	Canberra Genie-2000	0.93	3 Sigma
SI	7.6	0.8	0.08	Canberra Genie-VMS	0.97	1 Sigma
SL	7.7	0.5	0.4	Canberra Sampo-90	0.99	1 Sigma
SY	7.48	0.9	0.4	GammaTrac	0.96	2 Sigma
TX	8.04	0.49	0.53	Canberra Genie-PC	1.03	2 Sigma
X1	7.77	0.64	0.43	Canberra Genie-PC	1.00	1 Sigma
X2	7.8	0.6	0.5	Canberra Genie-PC	1.00	1 Sigma
X3	7.34	0.39	0.31	Canberra ProCount	0.94	2 Sigma
YA	7.436	0.192	0.492	Seeker Gamma Spectrometry Software	0.95	2 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Eu-152

Expected Value* = 5.3

Calculated 1 sigma uncertainty = 0.23

Sample 3

Mean +/- SD of Reported Value = 5.3 +/- 0.3

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	5.63	0.28	0.36	Ortec Gammavision	1.06	2 Sigma
AU	5.79	0.3405	0	Canberra Genie-VMS	1.09	3 Sigma
BL	5.02	0.53	0.22	Aptec	0.95	2 Sigma
BU	5	0.43	0.58	Ortec Gammavision	0.94	2 Sigma
CA	5.7	0.8	0.48	Aptec ver. 6.31	1.08	2 Sigma
CW	5.4	0.21	0.64	Canberra Genie-2000	1.02	1 Sigma
EC	5.25	0.33	0	Canberra Genie-2000	0.99	1 Sigma
FL	5.3	0.3	0.43	Canberra Genie-PC	1.00	1 Sigma
FM	5.1	0.2	0.61	Canberra Genie-2000	0.96	1 Sigma
GT	5.7	0.8	0.2	Canberra Genie-VMS	1.08	2 Sigma
HU	4.58	0.14	0.07	Canberra Genie-PC	0.86	More than 3 Sigma
KO	5.44	0.5	1.94	Aptec ver. 6.31	1.03	1 Sigma
LA	5.93	0.59	1.29	Ortec Gammavision-32 ver.5	1.12	3 Sigma
LA1	5.34	1.6	0.46	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	5	2	1	Aptec ver. 4.3	0.94	2 Sigma
LN	5.1	0.51	0.39	Ortec Gammavision	0.96	1 Sigma
LV	9.68	0.2	3.43	Canberra Genie-PC	1.83	More than 3 Sigma
ME				Canberra Genie-2000		Not Reported
NO	5.2	1.2	1.5	Aptec ver. 6.31	0.98	1 Sigma
NP	5.33	0.26	0.018	Vertechs Seeker v1.8	1.01	1 Sigma
RE	5.61	1.35	0.67	In House	1.06	2 Sigma
RM	5.4	1.1	0.71	Ortec Gammavision	1.02	1 Sigma
SA	5.19	0.59	1.14	Canberra Genie-2000	0.98	1 Sigma
SI	5.4	0.4	0.5	Canberra Genie-VMS	1.02	1 Sigma
SL	4.6	0.3	0.3	Canberra Sampo-90	0.87	More than 3 Sigma
SY	5.2	0.56	0.48	GammaTrac	0.98	1 Sigma
TX	5.25	0.23	0.69	Canberra Genie-PC	0.99	1 Sigma
X1	5.21	0.56	0.57	Canberra Genie-PC	0.98	1 Sigma
X2	5.1	0.4	0.6	Canberra Genie-PC	0.96	1 Sigma
X3	5.89	0.72	2.1	Canberra ProCount	1.11	3 Sigma
YA	5.319	0.194	0.627	Seeker Gamma Spectrometry Software	1.00	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Eu-154

Expected Value* = 18

Calculated 1 sigma uncertainty = 0.6

Sample 3

Mean +/- SD of Reported Value = 17.9 +/- 1.5

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	17.42	0.45	0.4	Ortec Gammavision	0.97	1 Sigma
AU	17.17	0.7486	0	Canberra Genie-VMS	0.95	2 Sigma
BL	18.78	1.09	0.13	Aptec	1.04	2 Sigma
BU	18.3	1.1	0.43	Ortec Gammavision	1.02	1 Sigma
CA	21.9	1.7	0.54	Aptec ver. 6.31	1.22	More than 3 Sigma
CW	18.1	0.48	0.94	Canberra Genie-2000	1.01	1 Sigma
EC	16.5	0.67	1.35	Canberra Genie-2000	0.92	3 Sigma
FL	17.2	0.5	0.57	Canberra Genie-PC	0.96	2 Sigma
FM	16.8	0.5	0.42	Canberra Genie-2000	0.93	2 Sigma
GT	18	1.3	0.1	Canberra Genie-VMS	1.00	1 Sigma
HU	16.8	0.3	0.04	Canberra Genie-PC	0.93	2 Sigma
KO	17.9	0.87	1.33	Aptec ver. 6.31	0.99	1 Sigma
LA	17.5	1.6	0.88	Ortec Gammavision-32 ver.5	0.97	1 Sigma
LA1	17.62	4.96	0.69	Ortec Gammavision ver.4.10	0.98	1 Sigma
LB	18	3	2	Aptec ver. 4.3	1.00	1 Sigma
LN	17.8	1.14	0.4	Ortec Gammavision	0.99	1 Sigma
LV	16.2	0.51	0.68	Canberra Genie-PC	0.90	3 Sigma
ME	20	0.6	1.4	Canberra Genie 2000	1.11	More than 3 Sigma
NO	22.7	3.9	2.2	Aptec ver. 6.31	1.26	More than 3 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	18.3	2.36	0.34	In House	1.02	1 Sigma
RM	1.8	0.34	0.75	Ortec Gammavision	0.10	More than 3 Sigma
SA	17.3	2.01	1.81	Canberra Genie-2000	0.96	2 Sigma
SI	17.4	0.7	0.2	Canberra Genie-VMS	0.97	1 Sigma
SL	18.2	0.4	0.3	Canberra Sampo-90	1.01	1 Sigma
SY				GammaTrac		Not Reported
TX	8.14	0.94	0.79	Canberra Genie-PC	0.45	More than 3 Sigma
X1	17.56	0.85	0.43	Canberra Genie-PC	0.98	1 Sigma
X2	16.5	0.8	0.4	Canberra Genie-PC	0.92	3 Sigma
X3	17.8	2	0.65	Canberra ProCount	0.99	1 Sigma
YA	16.688	0.193	0.406	Seeker Gamma Spectrometry Software	0.93	3 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Eu-155

Expected Value* = 14.6

Calculated 1 sigma uncertainty = 0.42

Sample 2

Mean +/- SD of Reported Value = 13.9 +/- 0.8

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	13.1	0.25	0.17	Ortec Gammavision	0.90	More than 3 Sigma
AU	15.14	0.3982	0	Canberra Genie-VMS	1.04	2 Sigma
BL	14.28	0.62	0.26	Aptec	0.98	1 Sigma
BU	12.9	0.34	0.4	Ortec Gammavision	0.88	More than 3 Sigma
CA	12.3	0.7	0.52	Aptec ver. 6.31	0.84	More than 3 Sigma
CW	14.16	0.41	0.54	Canberra Genie-2000	0.97	2 Sigma
EC	13.59	0.66	0.7	Canberra Genie-2000	0.93	3 Sigma
FL	13.8	0.4	0.55	Canberra Genie-PC	0.95	2 Sigma
FM	13.8	0.6	0.53	Canberra Genie-2000	0.95	2 Sigma
GT	15	2.7	0.2	Canberra Genie-VMS	1.03	1 Sigma
HU				Canberra Genie-2000		Not Reported
KO	13.8	0.71	0.82	Aptec ver. 6.31	0.95	2 Sigma
LA	12.8	1.2	0.36	Ortec Gammavision-32 ver.5	0.88	More than 3 Sigma
LA1	13.75	3.81	0.42	Ortec Gammavision ver.4.10	0.94	3 Sigma
LB				Aptec ver. 4.3		Not Reported
LN	13.4	0.75	0.807	Ortec Gammavision	0.92	3 Sigma
LV				Canberra Genie-PC		Not Reported
ME	31.1	1.7	1.8	Canberra Genie 2000	2.13	More than 3 Sigma
NO	14.4	1.3	0.4	Aptec ver. 6.31	0.99	1 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	15	1.79	0.36	In House	1.03	1 Sigma
RM	13	2.3	0.51	Ortec Gammavision	0.89	More than 3 Sigma
SA	14.2	1.79	0.78	Canberra Genie-2000	0.97	1 Sigma
SI	14.4	1	0.2	Canberra Genie-VMS	0.99	1 Sigma
SL	13.8	0.5	0.5	Canberra Sampo-90	0.95	2 Sigma
SY	13.5	1.5	0.42	GammaTrac	0.92	3 Sigma
TX	12.73	0.54	0.56	Canberra Genie-PC	0.87	More than 3 Sigma
X1	13.8	1.3	0.56	Canberra Genie-PC	0.95	2 Sigma
X2	14.6	1.2	0.6	Canberra Genie-PC	1.00	1 Sigma
X3	15.3	0.8	0.86	Canberra ProCount	1.05	2 Sigma
YA	14.819	0.232	0.559	Seeker Gamma Spectrometry Software	1.02	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Eu-156

Expected Value* = 27.4

Calculated 1 sigma uncertainty = 1.28

Sample 2

Mean +/- SD of Reported Value = 28.6 +/- 2.3

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	27.57	1.2	1.21	Ortec Gammavision	1.01	1 Sigma
AU				Canberra Genie-VMS		Not Reported
BL	26.63	2.07	0.99	Aptec	0.97	1 Sigma
BU	26.8	1.1	1.73	Ortec Gammavision	0.98	1 Sigma
CA				Aptec ver. 6.31		Not Reported
CW	27.87	1.19	2	Canberra Genie-2000	1.02	1 Sigma
EC	29.6	1.2	2.63	Canberra Genie-2000	1.08	2 Sigma
FL	29.4	0.6	2.1	Canberra Genie-PC	1.07	2 Sigma
FM	22.4	0.7	1.7	Canberra Genie-2000	0.82	More than 3 Sigma
GT	32	3.5	0.8	Canberra Genie-VMS	1.17	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	30.3	1.75	3.46	Aptec ver. 6.31	1.11	3 Sigma
LA	27.3	2.5	1.06	Ortec Gammavision-32 ver.5	1.00	1 Sigma
LA1	28.48	8.11	0.95	Ortec Gammavision ver.4.10	1.04	1 Sigma
LB	27	6	7	Aptec ver. 4.3	0.99	1 Sigma
LN	33.5	3.61	7.07	Ortec Gammavision	1.22	More than 3 Sigma
LV	30.2	0.95	1.8	Canberra Genie-PC	1.10	3 Sigma
ME				Canberra Genie-2000		Not Reported
NO				Aptec PCMA/Super ver. 6.31		Not Reported
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	28.1	4.47	0.91	In House	1.03	1 Sigma
RM	28	5.3	2.4	Ortec Gammavision	1.02	1 Sigma
SA	29.3	5.55	2.52	Canberra Genie-2000	1.07	2 Sigma
SI	28.7	2.3	0.8	Canberra Genie-VMS	1.05	2 Sigma
SL	29	1.8	0.5	Canberra Sampo-90	1.06	2 Sigma
SY	27	1.5	2.9	GammaTrac	0.99	1 Sigma
TX	26.86	0.81	2	Canberra Genie-PC	0.98	1 Sigma
X1	31.5	1.8	2.2	Canberra Genie-PC	1.15	More than 3 Sigma
X2	31.2	1.4	2.1	Canberra Genie-PC	1.14	3 Sigma
X3				Canberra Procount		Not Reported
YA	26.881	0.461	1.93	Seeker Gamma Spectrometry Software	0.98	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

La-140

Expected Value* = 9.9

Calculated 1 sigma uncertainty = 0.35

Sample 2

Mean +/- SD of Reported Value = 10.3 +/- 0.9

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	9.87	0.27	0.12	Ortec Gammavision	1.00	1 Sigma
AU	11.78	0.3558	0	Canberra Genie-VMS	1.19	More than 3 Sigma
BL	9.88	0.53	0.11	Aptec	1.00	1 Sigma
BU	9.94	0.3	0.31	Ortec Gammavision	1.00	1 Sigma
CA	12.9	0.9	1.1	Aptec ver. 6.31	1.30	More than 3 Sigma
CW	9.14	0.2	0.4	Canberra Genie-2000	0.92	3 Sigma
EC	9.22	0.36	0	Canberra Genie-2000	0.93	2 Sigma
FL	9.4	0.3	0.4	Canberra Genie-PC	0.95	2 Sigma
FM	6.8	0.2	0.27	Canberra Genie-2000	0.69	More than 3 Sigma
GT	11	0.9	0.1	Canberra Genie-VMS	1.11	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	10.9	0.55	1.09	Aptec ver. 6.31	1.10	3 Sigma
LA	11.5	1.1	0.16	Ortec Gammavision-32 ver.5	1.16	More than 3 Sigma
LA1	9.65	2.72	1.17	Ortec Gammavision ver.4.10	0.97	1 Sigma
LB	11	1	0.5	Aptec ver. 4.3	1.11	More than 3 Sigma
LN	10.2	0.61	0.644	Ortec Gammavision	1.03	1 Sigma
LV	10.9	0.32	0.35	Canberra Genie-PC	1.10	3 Sigma
ME				Canberra Genie-2000		Not Reported
NO	12.1	2.4	4.4	Aptec ver. 6.31	1.22	More than 3 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	9.99	1.22	0.16	In House	1.01	1 Sigma
RM	11	2.1	0.35	Ortec Gammavision	1.11	More than 3 Sigma
SA	11.4	1.3	0.56	Canberra Genie-2000	1.15	More than 3 Sigma
SI	9.3	0.5	0.2	Canberra Genie-VMS	0.94	2 Sigma
SL	10.9	0.4	0.4	Canberra Sampo-90	1.10	3 Sigma
SY	9.47	0.58	0.42	GammaTrac	0.96	2 Sigma
TX	9.61	0.29	0.48	Canberra Genie-PC	0.97	1 Sigma
X1	10.72	0.65	0.45	Canberra Genie-PC	1.08	3 Sigma
X2	10.8	0.6	0.5	Canberra Genie-PC	1.09	3 Sigma
X3	9.59	0.42	0.34	Canberra ProCount	0.97	1 Sigma
YA	9.214	0.16	0.323	Seeker Gamma Spectrometry Software	0.93	2 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Mn-54

Expected Value* = 7.4

Calculated 1 sigma uncertainty = 0.23

Sample 1

Mean +/- SD of Reported Value = 7.3 +/- 0.2

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	7.1603	0.36	0.099	Ortec Gammavision	0.97	2 Sigma
AU	7.028	0.1989	0	Canberra Genie-VMS	0.95	2 Sigma
BL	7.22	0.26	0.13	Aptec	0.98	1 Sigma
BU	7.36	0.34	0.18	Ortec Gammavision	0.99	1 Sigma
CA	10.5	0.5	0.17	Aptec ver. 6.31	1.42	More than 3 Sigma
CW	7.32	0.21	0.37	Canberra Genie-2000	0.99	1 Sigma
EC	6.87	0.38	0.63	Canberra Genie-2000	0.93	3 Sigma
FL	7.4	0.3	0.37	Canberra Genie-PC	1.00	1 Sigma
FM	7.4	0.4	0.37	Canberra Genie-2000	1.00	1 Sigma
GT	7.1	1.1	0.1	Canberra Genie-VMS	0.96	2 Sigma
HU				Canberra Genie-2000		Not Reported
KO	7.31	0.26	0.28	Aptec ver. 6.31	0.99	1 Sigma
LA	7.16	0.68	0.16	Ortec Gammavision-32 ver.5	0.97	2 Sigma
LA1	7.39	2.08	0.1	Ortec Gammavision ver.4.10	1.00	1 Sigma
LB	7.3	0.7	0.2	Aptec ver. 4.3	0.99	1 Sigma
LN	5.85	0.48	0.279	Ortec Gammavision	0.79	More than 3 Sigma
LV	7.43	0.36	0.26	Canberra Genie-PC	1.00	1 Sigma
ME	7.9	0.4	0.6	Canberra Genie 2000	1.07	3 Sigma
NO	7.4	1.3	0.2	Aptec ver. 6.31	1.00	1 Sigma
NP	7.26	0.18	0.009	Vertechs Seeker v1.8	0.98	1 Sigma
RE	7.42	0.88	0.11	In House	1.00	1 Sigma
RM	7.3	1.4	0.31	Ortec Gammavision	0.99	1 Sigma
SA	7.22	0.88	0.42	Canberra Genie-2000	0.98	1 Sigma
SI	7.3	0.5	0.07	Canberra Genie-VMS	0.99	1 Sigma
SL	7.2	0.5	0.2	Canberra Sampo-90	0.97	1 Sigma
SY	7.27	0.8	0.32	GammaTrac	0.98	1 Sigma
TX	7.35	0.455	0.44	Canberra Genie-PC	0.99	1 Sigma
X1	7.39	0.61	0.41	Canberra Genie-PC	1.00	1 Sigma
X2	7.3	0.8	0.4	Canberra Genie-PC	0.99	1 Sigma
X3	7.07	0.41	0.26	Canberra ProCount	0.96	2 Sigma
YA	7.331	0.187	0.307	Seeker Gamma Spectrometry Software	0.99	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Nb-95

Expected Value* = 7.9

Calculated 1 sigma uncertainty = 0.24

Sample 2

Mean +/- SD of Reported Value = 8 +/- 0.3

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM				Ortec Gammavision		Not Reported
AU	7.676	0.2011	0	Canberra Genie-VMS	0.97	1 Sigma
BL	7.99	0.28	0.12	Aptec	1.01	1 Sigma
BU	8.2	0.36	0.18	Ortec Gammavision	1.04	2 Sigma
CA	11.7	0.5	0.22	Aptec ver. 6.31	1.48	More than 3 Sigma
CW	8.02	0.2	0.31	Canberra Genie-2000	1.02	1 Sigma
EC	7.39	0.43	0	Canberra Genie-2000	0.94	3 Sigma
FL	8.2	0.3	0.33	Canberra Genie-PC	1.04	2 Sigma
FM	7.4	0.2	0.29	Canberra Genie-2000	0.94	3 Sigma
GT	8.2	1.6	0.1	Canberra Genie-VMS	1.04	2 Sigma
HU				Canberra Genie-2000		Not Reported
KO	8.05	0.27	0.27	Aptec ver. 6.31	1.02	1 Sigma
LA	7.9	0.71	0.2	Ortec Gammavision-32 ver.5	1.00	1 Sigma
LA1	7.98	2.24	0.12	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	7.6	0.7	0.4	Aptec ver. 4.3	0.96	2 Sigma
LN	8.11	0.69	0.594	Ortec Gammavision	1.03	1 Sigma
LV				Canberra Genie-PC		Not Reported
ME				Canberra Genie-2000		Not Reported
NO	8.3	1.4	0.2	Aptec ver. 6.31	1.05	2 Sigma
NP	8.02	0.18	0.009	Vertechs Seeker v1.8	1.02	1 Sigma
RE	8.09	0.92	0.1	In House	1.02	1 Sigma
RM	8.1	1.5	0.33	Ortec Gammavision	1.03	1 Sigma
SA	7.74	0.84	0.51	Canberra Genie-2000	0.98	1 Sigma
SI	8	0.6	0.07	Canberra Genie-VMS	1.01	1 Sigma
SL	7.9	0.5	0.5	Canberra Sampo-90	1.00	1 Sigma
SY	8	0.9	0.3	GammaTrac	1.01	1 Sigma
TX	8.13	0.5	0.51	Canberra Genie-PC	1.03	1 Sigma
X1	8.34	0.65	0.33	Canberra Genie-PC	1.06	2 Sigma
X2	7.9	1	0.5	Canberra Genie-PC	1.00	1 Sigma
X3	7.75	0.41	0.25	Canberra ProCount	0.98	1 Sigma
YA	8.072	0.186	0.291	Seeker Gamma Spectrometry Software	1.02	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Pr-144

Expected Value* = 29.5

Calculated 1 sigma uncertainty = 4.66

Sample 2

Mean +/- SD of Reported Value = 29.3 +/- 2.2

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM				Ortec Gammavision		Not Reported
AU				Canberra Genie-VMS		Not Reported
BL				Aptec ver. 6.3.1		Not Reported
BU				Ortec Gammavision		Not Reported
CA				Aptec ver. 6.31		Not Reported
CW	28.84	8.13	25.97	Canberra Genie-2000	0.98	1 Sigma
EC				Canberra Genie-2000		Not Reported
FL				Canberra Genie-PC		Not Reported
FM				Canbera Genie-PC		Not Reported
GT				Canberra Genie-VMS		Not Reported
HU				Canberra Genie-2000		Not Reported
KO				Aptec ver. 6.31		Not Reported
LA				Ortec Gammavision-32 Ver. 5.0		Not Reported
LA1				Ortec Gammavision Ver. 4.10		Not Reported
LB				Aptec ver. 4.3		Not Reported
LN				Ortec Gammavision		Not Reported
LV				Canberra Genie-PC		Not Reported
ME				Canberra Genie-2000		Not Reported
NO				Aptec PCMA/Super ver. 6.31		Not Reported
NP				Vertechs Seeker ver. 1.5		Not Reported
RE				In House		Not Reported
RM	29	17.4	20	Ortec Gammavision	0.98	1 Sigma
SA				Canberra Genie-2000		Not Reported
SI				Canberra Genie-VMS		Not Reported
SL				Canberra Sampo-90		Not Reported
SY	31.4	15	23	GammaTrac	1.06	1 Sigma
TX				Canberra Genie-PC		Not Reported
X1	27	18	30	Canberra Genie-PC	0.92	1 Sigma
X2	32.4	8.4	30.3	Canberra Genie-PC	1.10	1 Sigma
X3				Canberra Procount		Not Reported
YA	27.408	6.611	20.83	Seeker Gamma Spectrometry Software	0.93	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Sb-125

Expected Value* = 14.3

Calculated 1 sigma uncertainty = 0.51

Sample 3

Mean +/- SD of Reported Value = 14.2 +/- 1

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	14.1	0.45	0.28	Ortec Gammavision	0.99	1 Sigma
AU	14.68	0.4991	0	Canberra Genie-VMS	1.03	1 Sigma
BL	14.37	0.88	0.33	Aptec	1.00	1 Sigma
BU	14.4	0.48	0.56	Ortec Gammavision	1.01	1 Sigma
CA	17.2	1.9	0.7	Aptec ver. 6.31	1.20	More than 3 Sigma
CW	14.07	0.39	0.86	Canberra Genie-2000	0.98	1 Sigma
EC	13.6	0.56	0	Canberra Genie-2000	0.95	2 Sigma
FL	13.8	0.5	1.3	Canberra Genie-PC	0.97	1 Sigma
FM	12.9	0.4	0.76	Canberra Genie-2000	0.90	3 Sigma
GT	13	1.7	0.2	Canberra Genie-VMS	0.91	3 Sigma
HU	12.2	0.27	0.4	Canberra Genie-PC	0.85	More than 3 Sigma
KO	15	0.7	1.44	Aptec ver. 6.31	1.05	2 Sigma
LA	14.5	1.4	0.67	Ortec Gammavision-32 ver.5	1.01	1 Sigma
LA1	13.8	3.95	0.37	Ortec Gammavision ver.4.10	0.97	1 Sigma
LB	14	2	2	Aptec ver. 4.3	0.98	1 Sigma
LN	7.18	0.81	0.785	Ortec Gammavision	0.50	More than 3 Sigma
LV	13.9	0.48	0.7	Canberra Genie-PC	0.97	1 Sigma
ME	17.4	0.7	3.5	Canberra Genie 2000	1.22	More than 3 Sigma
NO	14.3	2.3	1.5	Aptec ver. 6.31	1.00	1 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	14.3	1.74	0.26	In House	1.00	1 Sigma
RM	14	2.7	0.84	Ortec Gammavision	0.98	1 Sigma
SA	16.3	2.03	2.27	Canberra Genie-2000	1.14	More than 3 Sigma
SI	14.8	1	0.2	Canberra Genie-VMS	1.03	1 Sigma
SL	7	0.4	0.3	Canberra Sampo-90	0.49	More than 3 Sigma
SY	13.9	1	0.88	GammaTrac	0.97	1 Sigma
TX	13.94	0.53	1.68	Canberra Genie-PC	0.97	1 Sigma
X1	13.1	1.2	1.1	Canberra Genie-PC	0.92	3 Sigma
X2	14.6	1.6	1.7	Canberra Genie-PC	1.02	1 Sigma
X3	15	1.1	0.76	Canberra ProCount	1.05	2 Sigma
YA	13.737	0.327	0.86	Seeker Gamma Spectrometry Software	0.96	2 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Sm-153 ***Expected Value* =*** 16.3 Midpoint of Counting

18.3 Beginning of Counting

Sample 2

Calculated 1 sigma uncertainty = 0.46

Mean +/- SD of Reported Value = 17.4 +/- 1.6

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM				Ortec Gammavision		Not Reported
AU	18.47	0.3694	0	Canberra Genie-VMS	1.13	1 Sigma
BL	18.98	0.82	0.29	Aptec	1.16	2 Sigma
BU				Ortec Gammavision		Not Reported
CA	20.4	1.2	0.46	Aptec ver. 6.31	1.25	More than 3 Sigma
CW	14.12	0.48	0.48	Canberra Genie-2000	0.87	More than 3 Sigma
EC				Canberra Genie-2000		Not Reported
FL	17.6	0.9	0.66	Canberra Genie-PC	1.08	2 Sigma
FM	2.9	0.2	0.092	Canberra Genie-2000	0.18	More than 3 Sigma
GT	49	7.3	0.5	Canberra Genie-VMS	3.01	More than 3 Sigma
HU				Canberra Genie-2000		Not Reported
KO	16.1	0.77	0.61	Aptec ver. 6.31	0.99	1 Sigma
LA	16.6	1.5	0.42	Ortec Gammavision-32 ver.5	1.02	1 Sigma
LA1	16.56	4.6	1.23	Ortec Gammavision ver.4.10	1.02	1 Sigma
LB				Aptec ver. 4.3		Not Reported
LN	16.6	0.85	1.11	Ortec Gammavision	1.02	1 Sigma
LV	5.72	0.98	0.61	Canberra Genie-PC	0.35	More than 3 Sigma
ME				Canberra Genie-2000		Not Reported
NO	19.2	1.7	1.6	Aptec ver. 6.31	1.18	2 Sigma
NP				Vertechs Seeker ver. 1.5		Not Reported
RE	18.9	2.04	0.3	In House	1.16	2 Sigma
RM	17	3.1	0.65	Ortec Gammavision	1.04	2 Sigma
SA				Canberra Genie-2000		Not Reported
SI	17.7	0.9	0.2	Canberra Genie-VMS	1.09	2 Sigma
SL	20	0.8	0.5	Canberra Sampo-90	1.23	More than 3 Sigma
SY	15.6	2.1	0.45	GammaTrac	0.96	2 Sigma
TX				Canberra Genie-PC		Not Reported
X1	17.9	2	0.66	Canberra Genie-PC	1.10	1 Sigma
X2	16.8	1.4	0.6	Canberra Genie-PC	1.03	1 Sigma
X3	16.8	1.9	0.71	Canberra ProCount	1.03	1 Sigma
YA	15.698	0.287	0.575	Seeker Gamma Spectrometry Software	0.96	2 Sigma

**** Expected value is from SYNTH program. The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Zn-65

Expected Value* = 9.7

Calculated 1 sigma uncertainty = 0.39

Sample 1

Mean +/- SD of Reported Value = 9.5 +/- 0.2

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM	9.5509	0.69	0.216	Ortec Gammavision	0.98	1 Sigma
AU	9.277	0.4212	0	Canberra Genie-VMS	0.96	2 Sigma
BL	9.6	0.4	0.25	Aptec	0.99	1 Sigma
BU	9.74	0.64	0.45	Ortec Gammavision	1.00	1 Sigma
CA	11.4	0.6	0.54	Aptec ver. 6.31	1.18	More than 3 Sigma
CW	9.77	0.34	0.64	Canberra Genie-2000	1.01	1 Sigma
EC	9.14	0.66	1.67	Canberra Genie-2000	0.94	2 Sigma
FL	9.4	0.4	0.97	Canberra Genie-PC	0.97	1 Sigma
FM	9.3	0.4	0.85	Canberra Genie-2000	0.96	2 Sigma
GT	9.5	1.6	0.2	Canberra Genie-VMS	0.98	1 Sigma
HU				Canberra Genie-2000		Not Reported
KO	9.38	0.38	0.65	Aptec ver. 6.31	0.97	1 Sigma
LA	9.52	0.94	0.44	Ortec Gammavision-32 ver.5	0.98	1 Sigma
LA1	9.77	2.87	0.45	Ortec Gammavision ver.4.10	1.01	1 Sigma
LB	9	1	0.8	Aptec ver. 4.3	0.93	2 Sigma
LN	9.45	0.73	0.395	Ortec Gammavision	0.97	1 Sigma
LV	9.47	0.55	0.65	Canberra Genie-PC	0.98	1 Sigma
ME	9.3	0.4	1.4	Canberra Genie 2000	0.96	2 Sigma
NO	9.3	1.8	0.4	Aptec ver. 6.31	0.96	2 Sigma
NP	9.38	0.34	0.024	Vertechs Seeker v1.8	0.97	1 Sigma
RE	9.76	1.36	0.25	In House	1.01	1 Sigma
RM	9.5	1.9	0.67	Ortec Gammavision	0.98	1 Sigma
SA	9.19	1.3	1.02	Canberra Genie-2000	0.95	2 Sigma
SI	9.7	0.7	0.2	Canberra Genie-VMS	1.00	1 Sigma
SL	10	0.6	0.5	Canberra Sampo-90	1.03	1 Sigma
SY	9.46	1.2	0.74	GammaTrac	0.98	1 Sigma
TX	9.63	0.71	1.29	Canberra Genie-PC	0.99	1 Sigma
X1	9.03	0.92	0.96	Canberra Genie-PC	0.93	2 Sigma
X2	9.4	0.8	1.1	Canberra Genie-PC	0.97	1 Sigma
X3	9.3	0.84	0.57	Canberra ProCount	0.96	2 Sigma
YA	9.318	0.366	0.755	Seeker Gamma Spectrometry Software	0.96	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by lab

Zr-95

Expected Value* = 6.7

Calculated 1 sigma uncertainty = 0.31

Sample 2

Mean +/- SD of Reported Value = 7 +/- 0.8

Lab Code	*Activity*	*Error*	*MDA*	*Software*	*Lab Value / Exp. Value*	*Comparison***
AM				Ortec Gammavision		Not Reported
AU	11.31	0.4298	0	Canberra Genie-VMS	1.69	More than 3 Sigma
BL	7.21	0.28	0.19	Aptec	1.08	2 Sigma
BU	6.33	0.28	0.33	Ortec Gammavision	0.94	2 Sigma
CA	12.6	0.6	0.38	Aptec ver. 6.31	1.88	More than 3 Sigma
CW	6.7	0.23	0.47	Canberra Genie-2000	1.00	1 Sigma
EC	6.17	0.38	0	Canberra Genie-2000	0.92	2 Sigma
FL	7	0.3	0.47	Canberra Genie-PC	1.04	1 Sigma
FM	6.4	0.5	0.49	Canberra Genie-2000	0.96	1 Sigma
GT	7.2	1.6	0.2	Canberra Genie-VMS	1.07	2 Sigma
HU				Canberra Genie-2000		Not Reported
KO	6.83	0.3	0.43	Aptec ver. 6.31	1.02	1 Sigma
LA	6.65	0.64	0.47	Ortec Gammavision-32 ver.5	0.99	1 Sigma
LA1	6.22	1.8	0.38	Ortec Gammavision ver.4.10	0.93	2 Sigma
LB	8	0.9	0.7	Aptec ver. 4.3	1.19	More than 3 Sigma
LN	6.68	0.54	0.726	Ortec Gammavision	1.00	1 Sigma
LV	6.34	0.42	0.54	Canberra Genie-PC	0.95	2 Sigma
ME	9.2	0.5	0.8	Canberra Genie 2000	1.37	More than 3 Sigma
NO	8.9	1.5	4	Aptec ver. 6.31	1.33	More than 3 Sigma
NP	6.63	0.23	0.016	Vertechs Seeker v1.8	0.99	1 Sigma
RE	6.81	0.95	0.17	In House	1.02	1 Sigma
RM	6.1	1.2	0.49	Ortec Gammavision	0.91	2 Sigma
SA	6.49	0.97	0.5	Canberra Genie-2000	0.97	1 Sigma
SI	6.8	0.4	0.2	Canberra Genie-VMS	1.01	1 Sigma
SL	7.4	0.4	0.4	Canberra Sampo-90	1.10	3 Sigma
SY	8.17	1	0.4	GammaTrac	1.22	More than 3 Sigma
TX	6.9	0.4	0.48	Canberra Genie-PC	1.03	1 Sigma
X1	7.27	0.77	0.5	Canberra Genie-PC	1.09	2 Sigma
X2	6.7	1	0.5	Canberra Genie-PC	1.00	1 Sigma
X3				Canberra Procount		Not Reported
YA	6.925	0.197	0.437	Seeker Gamma Spectrometry Software	1.03	1 Sigma

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Ba-140

Sample 2

Expected Value* = 11.9

Calculated 1 sigma uncertainty = 0.55

Mean +/- SD of Reported Value = 10.1 +/- 1.8

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	More than 3 Sigma	9.22	0.79	0.55	0.77
Aptec ver. 4.3	More than 3 Sigma	10	2	1	0.84
Aptec ver. 6.31	1 Sigma	11.7	2.1	3.7	0.98
Aptec ver. 6.31	More than 3 Sigma	9.48	0.49	1.06	0.80
Aptec ver. 6.31	More than 3 Sigma	13.6	1.4	1.3	1.14
Canberra Genie 2000	3 Sigma	13.1	0.8	0.3	1.10
Canberra Genie-2000	More than 3 Sigma	5.2	0.2	0.74	0.44
Canberra Genie-2000	More than 3 Sigma	8.75	0.69	0	0.74
Canberra Genie-2000	More than 3 Sigma	9.04	0.63	1.33	0.76
Canberra Genie-2000	More than 3 Sigma	9.77	1.15	1.72	0.82
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	More than 3 Sigma	7	0.4	1.1	0.59
Canberra Genie-PC	More than 3 Sigma	8.2	0.97	1.18	0.69
Canberra Genie-PC	More than 3 Sigma	9.5	0.8	1.2	0.80
Canberra Genie-PC	More than 3 Sigma	9.56	0.55	1.1	0.80
Canberra Genie-PC	More than 3 Sigma	9.5	1.2	1.5	0.80
Canberra Genie-VMS	More than 3 Sigma	9.311	0.5568	0	0.78
Canberra Genie-VMS	More than 3 Sigma	9.8	0.6	0.3	0.82
Canberra Genie-VMS	More than 3 Sigma	10	3.3	0.4	0.84
Canberra ProCount	More than 3 Sigma	9.2	1.1	1.1	0.77
Canberra Sampo-90	More than 3 Sigma	9.4	0.8	0.5	0.79
GammaTrac	3 Sigma	10.7	1.1	1.15	0.90
In House	More than 3 Sigma	9.51	1.61	0.35	0.80
Ortec Gammavision	1 Sigma	11.6	0.74	0.79	0.97
Ortec Gammavision	1 Sigma	11.8	0.83	0.54	0.99
Ortec Gammavision	1 Sigma	12	2.8	1.6	1.01
Ortec Gammavision	1 Sigma	12.4	2.28	2.95	1.04
Ortec Gammavision ver.4.10	1 Sigma	12.12	3.61	0.71	1.02
Ortec Gammavision-32 ver.5	2 Sigma	12.5	1.3	1.06	1.05
Seeker Gamma Spectrometry	More than 3 Sigma	8.804	0.377	1.137	0.74
Vertechs Seeker v1.8	More than 3 Sigma	9.88	0.27	0.0176	0.83

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Ce-141

Expected Value* = 7.4

Calculated 1 sigma uncertainty = 0.2

Sample 2

Mean +/- SD of Reported Value = 7.5 +/- 0.4

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	7.58	0.37	0.13	1.02
Aptec ver. 4.3	1 Sigma	7.6	0.8	0.5	1.03
Aptec ver. 6.31	1 Sigma	7.32	0.37	0.36	0.99
Aptec ver. 6.31	2 Sigma	7.8	0.7	0.3	1.05
Aptec ver. 6.31	More than 3 Sigma	6.7	0.3	0.26	0.91
Canberra Genie 2000	More than 3 Sigma	15.3	1	1.4	2.07
Canberra Genie-2000	1 Sigma	7.54	0.25	0.38	1.02
Canberra Genie-2000	2 Sigma	7.67	0.51	0	1.04
Canberra Genie-2000	3 Sigma	7.95	0.97	0.67	1.07
Canberra Genie-2000	More than 3 Sigma	6.6	0.4	0.34	0.89
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	7.3	1	0.7	0.99
Canberra Genie-PC	1 Sigma	7.34	0.47	0.65	0.99
Canberra Genie-PC	1 Sigma	7.42	0.86	0.48	1.00
Canberra Genie-PC	1 Sigma	7.5	0.4	0.49	1.01
Canberra Genie-PC	Not Reported				
Canberra Genie-VMS	1 Sigma	7.6	0.6	0.1	1.03
Canberra Genie-VMS	2 Sigma	7	0.9	0.1	0.95
Canberra Genie-VMS	More than 3 Sigma	8.063	0.1887	0	1.09
Canberra ProCount	More than 3 Sigma	8.35	0.51	0.4	1.13
Canberra Sampo-90	1 Sigma	7.4	0.4	0.5	1.00
GammaTrac	2 Sigma	7.66	1	0.5	1.04
In House	2 Sigma	7.71	0.89	0.17	1.04
Ortec Gammavision	1 Sigma	7.31	0.17	0.12	0.99
Ortec Gammavision	1 Sigma	7.6	1.6	0.48	1.03
Ortec Gammavision	2 Sigma	7.65	0.31	0.26	1.03
Ortec Gammavision	3 Sigma	7.84	0.62	0.828	1.06
Ortec Gammavision ver.4.10	1 Sigma	7.59	2.14	0.14	1.03
Ortec Gammavision-32 ver.5	1 Sigma	7.35	0.69	0.23	0.99
Seeker Gamma Spectrometry	1 Sigma	7.343	0.177	0.379	0.99
Vertechs Seeker v1.8	1 Sigma	7.4	0.16	0.0067	1.00

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Ce-143

Expected Value* = 6.6 Midpoint of Counting
7.9 Beginning of Counting

Sample 2

Calculated 1 sigma uncertainty = 0.22

Mean +/- SD of Reported Value = 7.7 +/- 1.1

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	More than 3 Sigma	10.39	1.14	0.23	1.57
Aptec ver. 4.3	More than 3 Sigma	9	1	0.6	1.36
Aptec ver. 6.31	2 Sigma	7.6	0.7	0.25	1.15
Aptec ver. 6.31	2 Sigma	8.2	1.4	3.3	1.24
Aptec ver. 6.31	More than 3 Sigma	8.66	0.49	0.48	1.31
Canberra Genie-2000	1 Sigma	7.84	0.52	0.76	1.19
Canberra Genie-2000	3 Sigma	7.24	0.24	0.44	1.10
Canberra Genie-2000	More than 3 Sigma	0.63	0.04	0.04	0.10
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	7.7	1.1	0.49	1.17
Canberra Genie-PC	1 Sigma	7.77	0.42	0.53	1.18
Canberra Genie-PC	1 Sigma	8	0.4	0.51	1.21
Canberra Genie-PC	2 Sigma	7.5	1	0.5	1.14
Canberra Genie-PC	Not Reported				
Canberra Genie-VMS	More than 3 Sigma	30	7	0.7	4.55
Canberra Genie-VMS	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Procount	Not Reported				
Canberra Sampo-90	3 Sigma	7.2	0.5	0.5	1.09
GammaTrac	1 Sigma	6.53	1.57	0.37	0.99
In House	More than 3 Sigma	9.59	1.24	0.24	1.45
Ortec Gammavision	1 Sigma	6.52	0.31	0.35	0.99
Ortec Gammavision	1 Sigma	6.61	0.47	0.687	1.00
Ortec Gammavision	1 Sigma	8.1	1.5	0.44	1.23
Ortec Gammavision	2 Sigma	6.31	0.2	0.15	0.96
Ortec Gammavision ver.4.10	1 Sigma	6.66	1.86	0.5	1.01
Ortec Gammavision-32 ver.5	2 Sigma	8.2	0.77	0.32	1.24
Seeker Gamma Spectrometry	1 Sigma	6.82	0.181	0.37	1.03
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program. The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Ce-144

Sample 2

Expected Value* = 30.1

Calculated 1 sigma uncertainty = 0.9

Mean +/- SD of Reported Value = 28.9 +/- 1.4

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	28.36	1.65	0.65	0.94
Aptec ver. 4.3	More than 3 Sigma	27	3	2	0.90
Aptec ver. 6.31	2 Sigma	28.3	1.32	1.55	0.94
Aptec ver. 6.31	2 Sigma	28.4	2.9	4.2	0.94
Aptec ver. 6.31	Not Reported				
Canberra Genie 2000	More than 3 Sigma	61.4	4.3	6.2	2.04
Canberra Genie-2000	1 Sigma	30.3	4.23	3.06	1.01
Canberra Genie-2000	2 Sigma	28.62	0.95	1.68	0.95
Canberra Genie-2000	2 Sigma	29	1	1.7	0.96
Canberra Genie-2000	More than 3 Sigma	27.3	3.22	0	0.91
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	30	1	2.1	1.00
Canberra Genie-PC	2 Sigma	28.4	2.4	2.3	0.94
Canberra Genie-PC	2 Sigma	28.4	1.5	1.5	0.94
Canberra Genie-PC	2 Sigma	28.6	3.1	2	0.95
Canberra Genie-PC	2 Sigma	28.55	2.44	2.33	0.95
Canberra Genie-VMS	2 Sigma	28.7	2.2	0.4	0.95
Canberra Genie-VMS	3 Sigma	32.14	1.0606	0	1.07
Canberra Genie-VMS	More than 3 Sigma	26	6.5	0.5	0.86
Canberra ProCount	3 Sigma	32.2	2.1	1.8	1.07
Canberra Sampo-90	Not Reported				
GammaTrac	More than 3 Sigma	27	3.8	1.9	0.90
In House	1 Sigma	29.9	3.62	0.72	0.99
Ortec Gammavision	1 Sigma	30	6	2	1.00
Ortec Gammavision	1 Sigma	30.3	1.3	1.44	1.01
Ortec Gammavision	2 Sigma	28.82	0.72	0.52	0.96
Ortec Gammavision	More than 3 Sigma	18.9	2.71	4.8	0.63
Ortec Gammavision ver.4.10	1 Sigma	30.52	8.66	0.59	1.01
Ortec Gammavision-32 ver.5	3 Sigma	28.1	2.6	0.91	0.93
Seeker Gamma Spectrometry	1 Sigma	29.257	0.755	1.702	0.97
Vertechs Seeker v1.8	2 Sigma	28.3	0.68	0.029	0.94

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Co-57

Expected Value* = 8.9

Calculated 1 sigma uncertainty = 0.25

Sample 1

Mean +/- SD of Reported Value = 8.7 +/- 0.4

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	8.64	0.39	0.06	0.97
Aptec ver. 4.3	More than 3 Sigma	7.7	0.8	0.2	0.87
Aptec ver. 6.31	1 Sigma	8.8	0.8	0.7	0.99
Aptec ver. 6.31	2 Sigma	8.5	0.4	0.18	0.96
Aptec ver. 6.31	2 Sigma	8.6	0.39	0.18	0.97
Canberra Genie 2000	More than 3 Sigma	18.7	1.1	0.7	2.10
Canberra Genie-2000	1 Sigma	8.78	0.22	0.19	0.99
Canberra Genie-2000	1 Sigma	8.8	1.04	0.32	0.99
Canberra Genie-2000	1 Sigma	9	0.49	0.58	1.01
Canberra Genie-2000	2 Sigma	8.5	0.4	0.18	0.96
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	8.7	0.8	0.3	0.98
Canberra Genie-PC	1 Sigma	8.75	0.36	0.17	0.98
Canberra Genie-PC	1 Sigma	8.83	0.72	0.23	0.99
Canberra Genie-PC	1 Sigma	8.9	0.3	0.24	1.00
Canberra Genie-PC	1 Sigma	8.95	0.44	0.32	1.01
Canberra Genie-VMS	1 Sigma	8.9	0.5	0.05	1.00
Canberra Genie-VMS	2 Sigma	9.315	0.157	0	1.05
Canberra Genie-VMS	More than 3 Sigma	7.8	1.1	0.1	0.88
Canberra ProCount	2 Sigma	9.34	0.31	0.19	1.05
Canberra Sampo-90	2 Sigma	8.6	0.5	0.2	0.97
GammaTrac	1 Sigma	9	0.95	0.22	1.01
In House	1 Sigma	8.88	0.88	0.09	1.00
Ortec Gammavision	1 Sigma	8.7	0.58	0.2	0.98
Ortec Gammavision	2 Sigma	8.6	1.6	0.22	0.97
Ortec Gammavision	2 Sigma	9.19	0.23	0.22	1.03
Ortec Gammavision	More than 3 Sigma	8.1226	0.24	0.0696	0.91
Ortec Gammavision ver.4.10	1 Sigma	9	2.48	0.43	1.01
Ortec Gammavision-32 ver.5	3 Sigma	8.31	0.77	0.09	0.93
Seeker Gamma Spectrometry	1 Sigma	8.916	0.123	0.19	1.00
Vertechs Seeker v1.8	2 Sigma	8.48	0.12	0.0037	0.95

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Co-57

Expected Value* = 7.1

Calculated 1 sigma uncertainty = 0.21

Sample 3

Mean +/- SD of Reported Value = 7 +/- 1

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	More than 3 Sigma	5.66	0.32	0.04	0.80
Aptec ver. 4.3	More than 3 Sigma	15	2	2	2.11
Aptec ver. 6.31	1 Sigma	7.05	0.44	1.57	0.99
Aptec ver. 6.31	More than 3 Sigma	5.8	0.9	1.4	0.82
Aptec ver. 6.31	More than 3 Sigma	15.4	0.8	0.17	2.17
Canberra Genie 2000	More than 3 Sigma	17.9	1	0.8	2.52
Canberra Genie-2000	1 Sigma	7.16	0.97	0.38	1.01
Canberra Genie-2000	3 Sigma	6.58	0.56	1.54	0.93
Canberra Genie-2000	More than 3 Sigma	5.7	0.3	0.21	0.80
Canberra Genie-2000	More than 3 Sigma	7.9	0.67	0.67	1.11
Canberra Genie-PC	1 Sigma	6.99	0.7	1.67	0.98
Canberra Genie-PC	1 Sigma	7.02	0.66	0.38	0.99
Canberra Genie-PC	1 Sigma	7.12	0.79	0.19	1.00
Canberra Genie-PC	1 Sigma	7.2	0.5	0.27	1.01
Canberra Genie-PC	2 Sigma	6.7	0.8	0.2	0.94
Canberra Genie-PC	More than 3 Sigma	6.2	0.64	0.13	0.87
Canberra Genie-VMS	1 Sigma	7	0.5	0.06	0.99
Canberra Genie-VMS	More than 3 Sigma	5.4	2.1	0.1	0.76
Canberra Genie-VMS	More than 3 Sigma	9.61	0.1663	0	1.35
Canberra ProCount	2 Sigma	6.69	1.7	0.23	0.94
Canberra Sampo-90	More than 3 Sigma	6.2	0.4	0.3	0.87
GammaTrac	2 Sigma	7.48	1.1	0.16	1.05
In House	3 Sigma	7.55	1.65	0.77	1.06
Ortec Gammavision	1 Sigma	6.9	2.4	1.8	0.97
Ortec Gammavision	2 Sigma	6.85	0.46	0.915	0.96
Ortec Gammavision	3 Sigma	7.73	0.8	0.48	1.09
Ortec Gammavision	More than 3 Sigma	8.499	0.19	0.79	1.20
Ortec Gammavision ver.4.10	More than 3 Sigma	8.81	2.46	0.31	1.24
Ortec Gammavision-32 ver.5	More than 3 Sigma	8.71	0.79	0.47	1.23
Seeker Gamma Spectrometry	More than 3 Sigma	6.425	0.429	1.762	0.90
Vertechs Seeker v1.8	More than 3 Sigma	6.21	0.51	0.0037	0.87

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Co-60

Expected Value* = 9.6

Calculated 1 sigma uncertainty = 0.27

Sample 1

Mean +/- SD of Reported Value = 9.7 +/- 0.2

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	9.64	0.34	0.05	1.00
Aptec ver. 4.3	2 Sigma	10	1	0.1	1.04
Aptec ver. 6.31	1 Sigma	9.58	0.36	0.28	1.00
Aptec ver. 6.31	1 Sigma	9.6	2	0.2	1.00
Aptec ver. 6.31	Not Reported				
Canberra Genie 2000	1 Sigma	9.5	0.4	0.4	0.99
Canberra Genie-2000	1 Sigma	9.35	1.15	0.38	0.97
Canberra Genie-2000	1 Sigma	9.5	0.4	0.32	0.99
Canberra Genie-2000	1 Sigma	9.67	0.4	0.69	1.01
Canberra Genie-2000	1 Sigma	9.83	0.18	0.33	1.02
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	9.5	0.37	0.48	0.99
Canberra Genie-PC	1 Sigma	9.6	0.8	0.5	1.00
Canberra Genie-PC	1 Sigma	9.63	0.54	0.32	1.00
Canberra Genie-PC	1 Sigma	9.7	0.3	0.33	1.01
Canberra Genie-PC	1 Sigma	9.68	0.31	0.25	1.01
Canberra Genie-VMS	1 Sigma	9.7	0.7	0.1	1.01
Canberra Genie-VMS	1 Sigma	9.8	0.5	0.07	1.02
Canberra Genie-VMS	1 Sigma	9.745	0.2836	0	1.02
Canberra ProCount	1 Sigma	9.75	0.54	0.26	1.02
Canberra Sampo-90	1 Sigma	9.7	0.4	0.2	1.01
GammaTrac	1 Sigma	9.6	0.73	0.3	1.00
In House	2 Sigma	10.1	1.16	0.12	1.05
Ortec Gammavision	1 Sigma	9.7	1.8	0.31	1.01
Ortec Gammavision	1 Sigma	9.6858	0.39	0.1207	1.01
Ortec Gammavision	1 Sigma	9.81	0.33	0.16	1.02
Ortec Gammavision	2 Sigma	9.3	0.92	0.435	0.97
Ortec Gammavision ver.4.10	1 Sigma	9.56	2.64	0.07	1.00
Ortec Gammavision-32 ver.5	1 Sigma	9.57	0.9	0.07	1.00
Seeker Gamma Spectrometry	1 Sigma	9.731	0.168	0.291	1.01
Vertechs Seeker v1.8	1 Sigma	9.74	0.16	0.224	1.01

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Cs-136

Sample 3

Expected Value* = 6.4

Calculated 1 sigma uncertainty = 0.22

Mean +/- SD of Reported Value = 6.5 +/- 0.4

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	6.77	0.4	0.13	1.06
Aptec ver. 4.3	1 Sigma	6.3	0.9	1	0.98
Aptec ver. 6.31	1 Sigma	6.34	0.32	0.39	0.99
Aptec ver. 6.31	2 Sigma	6.7	1.2	1.3	1.05
Aptec ver. 6.31	More than 3 Sigma	7.6	0.6	0.37	1.19
Canberra Genie-2000	1 Sigma	6.21	0.15	0.32	0.97
Canberra Genie-2000	2 Sigma	6.15	0.21	0.43	0.96
Canberra Genie-2000	3 Sigma	5.82	0.64	0.36	0.91
Canberra Genie-2000	More than 3 Sigma	4.7	0.1	0.28	0.73
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	6.23	0.2	0.33	0.97
Canberra Genie-PC	1 Sigma	6.5	0.2	0.39	1.02
Canberra Genie-PC	1 Sigma	6.6	0.4	0.3	1.03
Canberra Genie-PC	1 Sigma	6.61	0.19	0.3	1.03
Canberra Genie-PC	2 Sigma	6.83	0.13	0.07	1.07
Canberra Genie-PC	2 Sigma	6.83	0.35	0.41	1.07
Canberra Genie-VMS	1 Sigma	6.6	0.3	0.1	1.03
Canberra Genie-VMS	2 Sigma	6.7	0.6	0.1	1.05
Canberra Genie-VMS	Not Reported				
Canberra ProCount	1 Sigma	6.5	0.49	0.34	1.02
Canberra Sampo-90	3 Sigma	5.9	0.4	0.3	0.92
GammaTrac	2 Sigma	6.64	0.45	0.36	1.04
In House	1 Sigma	6.2	0.77	0.1	0.97
Ortec Gammavision	1 Sigma	6.33	0.44	0.171	0.99
Ortec Gammavision	1 Sigma	6.41	0.19	0.18	1.00
Ortec Gammavision	1 Sigma	6.4	1.2	0.29	1.00
Ortec Gammavision	1 Sigma	6.47	0.18	0.09	1.01
Ortec Gammavision ver.4.10	2 Sigma	6.71	1.87	0.72	1.05
Ortec Gammavision-32 ver.5	2 Sigma	6.63	0.62	0.23	1.04
Seeker Gamma Spectrometry	1 Sigma	6.255	0.102	0.323	0.98
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Cs-137

Expected Value* = 11.2

Calculated 1 sigma uncertainty = 0.31

Sample 1

Mean +/- SD of Reported Value = 11.2 +/- 0.2

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	11.16	0.37	0.13	1.00
Aptec ver. 4.3	1 Sigma	11	1	0.2	0.98
Aptec ver. 6.31	1 Sigma	11.2	0.53	0.28	1.00
Aptec ver. 6.31	2 Sigma	11.6	1.8	0.2	1.04
Aptec ver. 6.31	More than 3 Sigma	16.3	0.7	0.32	1.46
Canberra Genie 2000	More than 3 Sigma	13.3	0.7	0.6	1.19
Canberra Genie-2000	1 Sigma	11.15	0.25	0.36	1.00
Canberra Genie-2000	1 Sigma	11.3	0.5	0.36	1.01
Canberra Genie-2000	More than 3 Sigma	9.86	0.52	0.52	0.88
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	11.2	1.2	0.4	1.00
Canberra Genie-PC	1 Sigma	11.2	0.56	0.27	1.00
Canberra Genie-PC	1 Sigma	11.46	0.66	0.41	1.02
Canberra Genie-PC	1 Sigma	11.4	0.5	0.38	1.02
Canberra Genie-PC	1 Sigma	11.51	0.85	0.39	1.03
Canberra Genie-VMS	1 Sigma	11	2.5	0.1	0.98
Canberra Genie-VMS	1 Sigma	11.05	0.2309	0	0.99
Canberra Genie-VMS	1 Sigma	11.2	0.7	0.08	1.00
Canberra ProCount	1 Sigma	11.1	0.5	0.27	0.99
Canberra Sampo-90	1 Sigma	11	0.7	0.5	0.98
GammaTrac	1 Sigma	11.2	1.3	0.36	1.00
In House	1 Sigma	11.3	1.22	0.11	1.01
Ortec Gammavision	1 Sigma	11	2	0.35	0.98
Ortec Gammavision	1 Sigma	11.3	0.42	0.18	1.01
Ortec Gammavision	1 Sigma	11.363	0.5	0.11	1.01
Ortec Gammavision	2 Sigma	10.8	0.57	0.233	0.96
Ortec Gammavision ver.4.10	1 Sigma	11.35	3.15	0.12	1.01
Ortec Gammavision-32 ver.5	1 Sigma	11.1	1	0.19	0.99
Seeker Gamma Spectrometry	1 Sigma	11.06	0.969	0.436	0.99
Vertechs Seeker v1.8	3 Sigma	10.5	0.2	0.009	0.94

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Cs-137

Expected Value* = 7.8

Calculated 1 sigma uncertainty = 0.23

Sample 3

Mean +/- SD of Reported Value = 7.5 +/- 0.3

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	7.57	0.35	0.14	0.97
Aptec ver. 4.3	1 Sigma	7.6	0.7	0.4	0.97
Aptec ver. 6.31	1 Sigma	7.85	0.32	0.3	1.01
Aptec ver. 6.31	1 Sigma	8	1.3	0.3	1.03
Aptec ver. 6.31	More than 3 Sigma	11.4	0.5	0.36	1.46
Canberra Genie 2000	More than 3 Sigma	9.1	0.4	0.7	1.17
Canberra Genie-2000	1 Sigma	7.61	0.21	0.33	0.98
Canberra Genie-2000	1 Sigma	7.7	0.3	0.4	0.99
Canberra Genie-2000	3 Sigma	7.29	0.79	0.5	0.93
Canberra Genie-2000	More than 3 Sigma	7.1	0.43	0.81	0.91
Canberra Genie-PC	1 Sigma	7.7	0.42	0.3	0.99
Canberra Genie-PC	1 Sigma	7.7	0.4	0.43	0.99
Canberra Genie-PC	1 Sigma	7.77	0.64	0.43	1.00
Canberra Genie-PC	1 Sigma	7.8	0.6	0.5	1.00
Canberra Genie-PC	2 Sigma	7.43	0.25	0.24	0.95
Canberra Genie-PC	2 Sigma	8.04	0.49	0.53	1.03
Canberra Genie-VMS	1 Sigma	7.6	0.8	0.08	0.97
Canberra Genie-VMS	2 Sigma	7.337	0.1959	0	0.94
Canberra Genie-VMS	More than 3 Sigma	7.1	1.7	0.1	0.91
Canberra ProCount	2 Sigma	7.34	0.39	0.31	0.94
Canberra Sampo-90	1 Sigma	7.7	0.5	0.4	0.99
GammaTrac	2 Sigma	7.48	0.9	0.4	0.96
In House	1 Sigma	7.72	0.91	0.11	0.99
Ortec Gammavision	1 Sigma	7.68	0.34	0.21	0.98
Ortec Gammavision	2 Sigma	7.5	1.4	0.33	0.96
Ortec Gammavision	2 Sigma	7.53	0.2	0.11	0.97
Ortec Gammavision	More than 3 Sigma	7.08	0.49	0.228	0.91
Ortec Gammavision ver.4.10	1 Sigma	7.66	2.16	0.14	0.98
Ortec Gammavision-32 ver.5	2 Sigma	7.54	0.7	0.22	0.97
Seeker Gamma Spectrometry	2 Sigma	7.436	0.192	0.492	0.95
Vertechs Seeker v1.8	More than 3 Sigma	7.07	0.17	0.0089	0.91

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Eu-152

Expected Value* = 5.3

Calculated 1 sigma uncertainty = 0.23

Sample 3

Mean +/- SD of Reported Value = 5.3 +/- 0.3

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	5.02	0.53	0.22	0.95
Aptec ver. 4.3	2 Sigma	5	2	1	0.94
Aptec ver. 6.31	1 Sigma	5.2	1.2	1.5	0.98
Aptec ver. 6.31	1 Sigma	5.44	0.5	1.94	1.03
Aptec ver. 6.31	2 Sigma	5.7	0.8	0.48	1.08
Canberra Genie-2000	1 Sigma	5.1	0.2	0.61	0.96
Canberra Genie-2000	1 Sigma	5.19	0.59	1.14	0.98
Canberra Genie-2000	1 Sigma	5.25	0.33	0	0.99
Canberra Genie-2000	1 Sigma	5.4	0.21	0.64	1.02
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	5.1	0.4	0.6	0.96
Canberra Genie-PC	1 Sigma	5.21	0.56	0.57	0.98
Canberra Genie-PC	1 Sigma	5.25	0.23	0.69	0.99
Canberra Genie-PC	1 Sigma	5.3	0.3	0.43	1.00
Canberra Genie-PC	More than 3 Sigma	4.58	0.14	0.07	0.86
Canberra Genie-PC	More than 3 Sigma	9.68	0.2	3.43	1.83
Canberra Genie-VMS	1 Sigma	5.4	0.4	0.5	1.02
Canberra Genie-VMS	2 Sigma	5.7	0.8	0.2	1.08
Canberra Genie-VMS	3 Sigma	5.79	0.3405	0	1.09
Canberra ProCount	3 Sigma	5.89	0.72	2.1	1.11
Canberra Sampo-90	More than 3 Sigma	4.6	0.3	0.3	0.87
GammaTrac	1 Sigma	5.2	0.56	0.48	0.98
In House	2 Sigma	5.61	1.35	0.67	1.06
Ortec Gammavision	1 Sigma	5.1	0.51	0.39	0.96
Ortec Gammavision	1 Sigma	5.4	1.1	0.71	1.02
Ortec Gammavision	2 Sigma	5	0.43	0.58	0.94
Ortec Gammavision	2 Sigma	5.63	0.28	0.36	1.06
Ortec Gammavision ver.4.10	1 Sigma	5.34	1.6	0.46	1.01
Ortec Gammavision-32 ver.5	3 Sigma	5.93	0.59	1.29	1.12
Seeker Gamma Spectrometry	1 Sigma	5.319	0.194	0.627	1.00
Vertechs Seeker v1.8	1 Sigma	5.33	0.26	0.0184	1.01

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Eu-154

Expected Value* = 18

Calculated 1 sigma uncertainty = 0.6

Sample 3

Mean +/- SD of Reported Value = 17.9 +/- 1.5

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	18.78	1.09	0.13	1.04
Aptec ver. 4.3	1 Sigma	18	3	2	1.00
Aptec ver. 6.31	1 Sigma	17.9	0.87	1.33	0.99
Aptec ver. 6.31	More than 3 Sigma	21.9	1.7	0.54	1.22
Aptec ver. 6.31	More than 3 Sigma	22.7	3.9	2.2	1.26
Canberra Genie 2000	More than 3 Sigma	20	0.6	1.4	1.11
Canberra Genie-2000	1 Sigma	18.1	0.48	0.94	1.01
Canberra Genie-2000	2 Sigma	16.8	0.5	0.42	0.93
Canberra Genie-2000	2 Sigma	17.3	2.01	1.81	0.96
Canberra Genie-2000	3 Sigma	16.5	0.67	1.35	0.92
Canberra Genie-PC	1 Sigma	17.56	0.85	0.43	0.98
Canberra Genie-PC	2 Sigma	16.8	0.3	0.04	0.93
Canberra Genie-PC	2 Sigma	17.2	0.5	0.57	0.96
Canberra Genie-PC	3 Sigma	16.2	0.51	0.68	0.90
Canberra Genie-PC	3 Sigma	16.5	0.8	0.4	0.92
Canberra Genie-PC	More than 3 Sigma	8.14	0.94	0.79	0.45
Canberra Genie-VMS	1 Sigma	17.4	0.7	0.2	0.97
Canberra Genie-VMS	1 Sigma	18	1.3	0.1	1.00
Canberra Genie-VMS	2 Sigma	17.17	0.7486	0	0.95
Canberra ProCount	1 Sigma	17.8	2	0.65	0.99
Canberra Sampo-90	1 Sigma	18.2	0.4	0.3	1.01
GammaTrac	Not Reported				
In House	1 Sigma	18.3	2.36	0.34	1.02
Ortec Gammavision	1 Sigma	17.42	0.45	0.4	0.97
Ortec Gammavision	1 Sigma	17.8	1.14	0.4	0.99
Ortec Gammavision	1 Sigma	18.3	1.1	0.43	1.02
Ortec Gammavision	More than 3 Sigma	1.8	0.34	0.75	0.10
Ortec Gammavision ver.4.10	1 Sigma	17.62	4.96	0.69	0.98
Ortec Gammavision-32 ver.5	1 Sigma	17.5	1.6	0.88	0.97
Seeker Gamma Spectrometry	3 Sigma	16.688	0.193	0.406	0.93
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Eu-155

Expected Value* = 14.6

Calculated 1 sigma uncertainty = 0.42

Sample 2

Mean +/- SD of Reported Value = 13.9 +/- 0.8

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	14.28	0.62	0.26	0.98
Aptec ver. 4.3	Not Reported				
Aptec ver. 6.31	1 Sigma	14.4	1.3	0.4	0.99
Aptec ver. 6.31	2 Sigma	13.8	0.71	0.82	0.95
Aptec ver. 6.31	More than 3 Sigma	12.3	0.7	0.52	0.84
Canberra Genie 2000	More than 3 Sigma	31.1	1.7	1.8	2.13
Canberra Genie-2000	1 Sigma	14.2	1.79	0.78	0.97
Canberra Genie-2000	2 Sigma	13.8	0.6	0.53	0.95
Canberra Genie-2000	2 Sigma	14.16	0.41	0.54	0.97
Canberra Genie-2000	3 Sigma	13.59	0.66	0.7	0.93
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	14.6	1.2	0.6	1.00
Canberra Genie-PC	2 Sigma	13.8	0.4	0.55	0.95
Canberra Genie-PC	2 Sigma	13.8	1.3	0.56	0.95
Canberra Genie-PC	More than 3 Sigma	12.73	0.54	0.56	0.87
Canberra Genie-PC	Not Reported				
Canberra Genie-VMS	1 Sigma	14.4	1	0.2	0.99
Canberra Genie-VMS	1 Sigma	15	2.7	0.2	1.03
Canberra Genie-VMS	2 Sigma	15.14	0.3982	0	1.04
Canberra ProCount	2 Sigma	15.3	0.8	0.86	1.05
Canberra Sampo-90	2 Sigma	13.8	0.5	0.5	0.95
GammaTrac	3 Sigma	13.5	1.5	0.42	0.92
In House	1 Sigma	15	1.79	0.36	1.03
Ortec Gammavision	3 Sigma	13.4	0.75	0.807	0.92
Ortec Gammavision	More than 3 Sigma	12.9	0.34	0.4	0.88
Ortec Gammavision	More than 3 Sigma	13	2.3	0.51	0.89
Ortec Gammavision	More than 3 Sigma	13.1	0.25	0.17	0.90
Ortec Gammavision ver.4.10	3 Sigma	13.75	3.81	0.42	0.94
Ortec Gammavision-32 ver.5	More than 3 Sigma	12.8	1.2	0.36	0.88
Seeker Gamma Spectrometry	1 Sigma	14.819	0.232	0.559	1.02
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Eu-156

Sample 2

Expected Value* = 27.4

Calculated 1 sigma uncertainty = 1.28

Mean +/- SD of Reported Value = 28.6 +/- 2.3

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	26.63	2.07	0.99	0.97
Aptec PCMA/Super ver. 6.31	Not Reported				
Aptec ver. 4.3	1 Sigma	27	6	7	0.99
Aptec ver. 6.31	3 Sigma	30.3	1.75	3.46	1.11
Aptec ver. 6.31	Not Reported				
Canberra Genie-2000	1 Sigma	27.87	1.19	2	1.02
Canberra Genie-2000	2 Sigma	29.3	5.55	2.52	1.07
Canberra Genie-2000	2 Sigma	29.6	1.2	2.63	1.08
Canberra Genie-2000	More than 3 Sigma	22.4	0.7	1.7	0.82
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	26.86	0.81	2	0.98
Canberra Genie-PC	2 Sigma	29.4	0.6	2.1	1.07
Canberra Genie-PC	3 Sigma	30.2	0.95	1.8	1.10
Canberra Genie-PC	3 Sigma	31.2	1.4	2.1	1.14
Canberra Genie-PC	More than 3 Sigma	31.5	1.8	2.2	1.15
Canberra Genie-VMS	2 Sigma	28.7	2.3	0.8	1.05
Canberra Genie-VMS	More than 3 Sigma	32	3.5	0.8	1.17
Canberra Genie-VMS	Not Reported				
Canberra Procount	Not Reported				
Canberra Sampo-90	2 Sigma	29	1.8	0.5	1.06
GammaTrac	1 Sigma	27	1.5	2.9	0.99
In House	1 Sigma	28.1	4.47	0.91	1.03
Ortec Gammavision	1 Sigma	26.8	1.1	1.73	0.98
Ortec Gammavision	1 Sigma	27.57	1.2	1.21	1.01
Ortec Gammavision	1 Sigma	28	5.3	2.4	1.02
Ortec Gammavision	More than 3 Sigma	33.5	3.61	7.07	1.22
Ortec Gammavision ver.4.10	1 Sigma	28.48	8.11	0.95	1.04
Ortec Gammavision-32 ver.5	1 Sigma	27.3	2.5	1.06	1.00
Seeker Gamma Spectrometry	1 Sigma	26.881	0.461	1.93	0.98
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

La-140

Expected Value* = 9.9

Calculated 1 sigma uncertainty = 0.35

Sample 2

Mean +/- SD of Reported Value = 10.3 +/- 0.9

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	9.88	0.53	0.11	1.00
Aptec ver. 4.3	More than 3 Sigma	11	1	0.5	1.11
Aptec ver. 6.31	3 Sigma	10.9	0.55	1.09	1.10
Aptec ver. 6.31	More than 3 Sigma	12.1	2.4	4.4	1.22
Aptec ver. 6.31	More than 3 Sigma	12.9	0.9	1.1	1.30
Canberra Genie-2000	2 Sigma	9.22	0.36	0	0.93
Canberra Genie-2000	3 Sigma	9.14	0.2	0.4	0.92
Canberra Genie-2000	More than 3 Sigma	6.8	0.2	0.27	0.69
Canberra Genie-2000	More than 3 Sigma	11.4	1.3	0.56	1.15
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	9.61	0.29	0.48	0.97
Canberra Genie-PC	2 Sigma	9.4	0.3	0.4	0.95
Canberra Genie-PC	3 Sigma	10.72	0.65	0.45	1.08
Canberra Genie-PC	3 Sigma	10.8	0.6	0.5	1.09
Canberra Genie-PC	3 Sigma	10.9	0.32	0.35	1.10
Canberra Genie-VMS	2 Sigma	9.3	0.5	0.2	0.94
Canberra Genie-VMS	More than 3 Sigma	11	0.9	0.1	1.11
Canberra Genie-VMS	More than 3 Sigma	11.78	0.3558	0	1.19
Canberra ProCount	1 Sigma	9.59	0.42	0.34	0.97
Canberra Sampo-90	3 Sigma	10.9	0.4	0.4	1.10
GammaTrac	2 Sigma	9.47	0.58	0.42	0.96
In House	1 Sigma	9.99	1.22	0.16	1.01
Ortec Gammavision	1 Sigma	9.94	0.3	0.31	1.00
Ortec Gammavision	1 Sigma	9.87	0.27	0.12	1.00
Ortec Gammavision	1 Sigma	10.2	0.61	0.644	1.03
Ortec Gammavision	More than 3 Sigma	11	2.1	0.35	1.11
Ortec Gammavision ver.4.10	1 Sigma	9.65	2.72	1.17	0.97
Ortec Gammavision-32 ver.5	More than 3 Sigma	11.5	1.1	0.16	1.16
Seeker Gamma Spectrometry	2 Sigma	9.214	0.16	0.323	0.93
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Mn-54

Expected Value* = 7.4

Calculated 1 sigma uncertainty = 0.23

Sample 1

Mean +/- SD of Reported Value = 7.3 +/- 0.2

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	7.22	0.26	0.13	0.98
Aptec ver. 4.3	1 Sigma	7.3	0.7	0.2	0.99
Aptec ver. 6.31	1 Sigma	7.31	0.26	0.28	0.99
Aptec ver. 6.31	1 Sigma	7.4	1.3	0.2	1.00
Aptec ver. 6.31	More than 3 Sigma	10.5	0.5	0.17	1.42
Canberra Genie 2000	3 Sigma	7.9	0.4	0.6	1.07
Canberra Genie-2000	1 Sigma	7.22	0.88	0.42	0.98
Canberra Genie-2000	1 Sigma	7.32	0.21	0.37	0.99
Canberra Genie-2000	1 Sigma	7.4	0.4	0.37	1.00
Canberra Genie-2000	3 Sigma	6.87	0.38	0.63	0.93
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	7.35	0.455	0.44	0.99
Canberra Genie-PC	1 Sigma	7.3	0.8	0.4	0.99
Canberra Genie-PC	1 Sigma	7.39	0.61	0.41	1.00
Canberra Genie-PC	1 Sigma	7.43	0.36	0.26	1.00
Canberra Genie-PC	1 Sigma	7.4	0.3	0.37	1.00
Canberra Genie-VMS	1 Sigma	7.3	0.5	0.07	0.99
Canberra Genie-VMS	2 Sigma	7.028	0.1989	0	0.95
Canberra Genie-VMS	2 Sigma	7.1	1.1	0.1	0.96
Canberra ProCount	2 Sigma	7.07	0.41	0.26	0.96
Canberra Sampo-90	1 Sigma	7.2	0.5	0.2	0.97
GammaTrac	1 Sigma	7.27	0.8	0.32	0.98
In House	1 Sigma	7.42	0.88	0.11	1.00
Ortec Gammavision	1 Sigma	7.36	0.34	0.18	0.99
Ortec Gammavision	1 Sigma	7.3	1.4	0.31	0.99
Ortec Gammavision	2 Sigma	7.1603	0.36	0.0990	0.97
Ortec Gammavision	More than 3 Sigma	5.85	0.48	0.279	0.79
Ortec Gammavision ver.4.10	1 Sigma	7.39	2.08	0.1	1.00
Ortec Gammavision-32 ver.5	2 Sigma	7.16	0.68	0.16	0.97
Seeker Gamma Spectrometry	1 Sigma	7.331	0.187	0.307	0.99
Vertechs Seeker v1.8	1 Sigma	7.26	0.18	0.0098	0.98

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Nb-95

Expected Value* = 7.9

Calculated 1 sigma uncertainty = 0.24

Sample 2

Mean +/- SD of Reported Value = 8 +/- 0.3

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	7.99	0.28	0.12	1.01
Aptec ver. 4.3	2 Sigma	7.6	0.7	0.4	0.96
Aptec ver. 6.31	1 Sigma	8.05	0.27	0.27	1.02
Aptec ver. 6.31	2 Sigma	8.3	1.4	0.2	1.05
Aptec ver. 6.31	More than 3 Sigma	11.7	0.5	0.22	1.48
Canberra Genie-2000	1 Sigma	7.74	0.84	0.51	0.98
Canberra Genie-2000	1 Sigma	8.02	0.2	0.31	1.02
Canberra Genie-2000	3 Sigma	7.4	0.2	0.29	0.94
Canberra Genie-2000	3 Sigma	7.39	0.43	0	0.94
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	7.9	1	0.5	1.00
Canberra Genie-PC	1 Sigma	8.13	0.5	0.51	1.03
Canberra Genie-PC	2 Sigma	8.2	0.3	0.33	1.04
Canberra Genie-PC	2 Sigma	8.34	0.65	0.33	1.06
Canberra Genie-PC	Not Reported				
Canberra Genie-VMS	1 Sigma	7.676	0.2011	0	0.97
Canberra Genie-VMS	1 Sigma	8	0.6	0.07	1.01
Canberra Genie-VMS	2 Sigma	8.2	1.6	0.1	1.04
Canberra ProCount	1 Sigma	7.75	0.41	0.25	0.98
Canberra Sampo-90	1 Sigma	7.9	0.5	0.5	1.00
GammaTrac	1 Sigma	8	0.9	0.3	1.01
In House	1 Sigma	8.09	0.92	0.1	1.02
Ortec Gammavision	1 Sigma	8.1	1.5	0.33	1.03
Ortec Gammavision	1 Sigma	8.11	0.69	0.594	1.03
Ortec Gammavision	2 Sigma	8.2	0.36	0.18	1.04
Ortec Gammavision	Not Reported				
Ortec Gammavision ver.4.10	1 Sigma	7.98	2.24	0.12	1.01
Ortec Gammavision-32 ver.5	1 Sigma	7.9	0.71	0.2	1.00
Seeker Gamma Spectrometry	1 Sigma	8.072	0.186	0.291	1.02
Vertechs Seeker v1.8	1 Sigma	8.02	0.18	0.0092	1.02

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Pr-144

Sample 2

Expected Value* = 29.5

Calculated 1 sigma uncertainty = 4.66

Mean +/- SD of Reported Value = 29.3 +/- 2.2

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec PCMA/Super ver. 6.31	Not Reported				
Aptec ver. 4.3	Not Reported				
Aptec ver. 6.3.1	Not Reported				
Aptec ver. 6.31	Not Reported				
Aptec ver. 6.31	Not Reported				
Canbera Genie-PC	Not Reported				
Canberra Genie-2000	1 Sigma	28.84	8.13	25.97	0.98
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	27	18	30	0.92
Canberra Genie-PC	1 Sigma	32.4	8.4	30.3	1.10
Canberra Genie-PC	Not Reported				
Canberra Genie-PC	Not Reported				
Canberra Genie-PC	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Procount	Not Reported				
Canberra Sampo-90	Not Reported				
GammaTrac	1 Sigma	31.4	15	23	1.06
In House	Not Reported				
Ortec Gammavision	1 Sigma	29	17.4	20	0.98
Ortec Gammavision	Not Reported				
Ortec Gammavision	Not Reported				
Ortec Gammavision	Not Reported				
Ortec Gammavision Ver. 4.10	Not Reported				
Ortec Gammavision-32 Ver. 5.0	Not Reported				
Seeker Gamma Spectrometry	1 Sigma	27.408	6.611	20.833	0.93
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Sb-125

Expected Value* = 14.3

Calculated 1 sigma uncertainty = 0.51

Sample 3

Mean +/- SD of Reported Value = 14.2 +/- 1

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	14.37	0.88	0.33	1.00
Aptec ver. 4.3	1 Sigma	14	2	2	0.98
Aptec ver. 6.31	1 Sigma	14.3	2.3	1.5	1.00
Aptec ver. 6.31	2 Sigma	15	0.7	1.44	1.05
Aptec ver. 6.31	More than 3 Sigma	17.2	1.9	0.7	1.20
Canberra Genie 2000	More than 3 Sigma	17.4	0.7	3.5	1.22
Canberra Genie-2000	1 Sigma	14.07	0.39	0.86	0.98
Canberra Genie-2000	2 Sigma	13.6	0.56	0	0.95
Canberra Genie-2000	3 Sigma	12.9	0.4	0.76	0.90
Canberra Genie-2000	More than 3 Sigma	16.3	2.03	2.27	1.14
Canberra Genie-PC	1 Sigma	13.8	0.5	1.3	0.97
Canberra Genie-PC	1 Sigma	13.94	0.53	1.68	0.97
Canberra Genie-PC	1 Sigma	13.9	0.48	0.7	0.97
Canberra Genie-PC	1 Sigma	14.6	1.6	1.7	1.02
Canberra Genie-PC	3 Sigma	13.1	1.2	1.1	0.92
Canberra Genie-PC	More than 3 Sigma	12.2	0.27	0.4	0.85
Canberra Genie-VMS	1 Sigma	14.8	1	0.2	1.03
Canberra Genie-VMS	1 Sigma	14.68	0.4991	0	1.03
Canberra Genie-VMS	3 Sigma	13	1.7	0.2	0.91
Canberra ProCount	2 Sigma	15	1.1	0.76	1.05
Canberra Sampo-90	More than 3 Sigma	7	0.4	0.3	0.49
GammaTrac	1 Sigma	13.9	1	0.88	0.97
In House	1 Sigma	14.3	1.74	0.26	1.00
Ortec Gammavision	1 Sigma	14	2.7	0.84	0.98
Ortec Gammavision	1 Sigma	14.1	0.45	0.28	0.99
Ortec Gammavision	1 Sigma	14.4	0.48	0.56	1.01
Ortec Gammavision	More than 3 Sigma	7.18	0.81	0.785	0.50
Ortec Gammavision ver.4.10	1 Sigma	13.8	3.95	0.37	0.97
Ortec Gammavision-32 ver.5	1 Sigma	14.5	1.4	0.67	1.01
Seeker Gamma Spectrometry	2 Sigma	13.737	0.327	0.86	0.96
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Sm-153

Expected Value* = 16.3 Midpoint of Counting
18.3 Beginning of Counting

Sample 2

Calculated 1 sigma uncertainty = 0.46

Mean +/- SD of Reported Value = 17.4 +/- 1.6

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	18.98	0.82	0.29	1.16
Aptec ver. 4.3	Not Reported				
Aptec ver. 6.31	1 Sigma	16.1	0.77	0.61	0.99
Aptec ver. 6.31	2 Sigma	19.2	1.7	1.6	1.18
Aptec ver. 6.31	More than 3 Sigma	20.4	1.2	0.46	1.25
Canberra Genie-2000	More than 3 Sigma	2.9	0.2	0.092	0.18
Canberra Genie-2000	More than 3 Sigma	14.12	0.48	0.48	0.87
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	16.8	1.4	0.6	1.03
Canberra Genie-PC	1 Sigma	17.9	2	0.66	1.10
Canberra Genie-PC	2 Sigma	17.6	0.9	0.66	1.08
Canberra Genie-PC	More than 3 Sigma	5.72	0.98	0.61	0.35
Canberra Genie-PC	Not Reported				
Canberra Genie-VMS	1 Sigma	18.47	0.3694	0	1.13
Canberra Genie-VMS	2 Sigma	17.7	0.9	0.2	1.09
Canberra Genie-VMS	More than 3 Sigma	49	7.3	0.5	3.01
Canberra ProCount	1 Sigma	16.8	1.9	0.71	1.03
Canberra Sampo-90	More than 3 Sigma	20	0.8	0.5	1.23
GammaTrac	2 Sigma	15.6	2.1	0.45	0.96
In House	2 Sigma	18.9	2.04	0.3	1.16
Ortec Gammavision	1 Sigma	16.6	0.85	1.11	1.02
Ortec Gammavision	2 Sigma	17	3.1	0.65	1.04
Ortec Gammavision	Not Reported				
Ortec Gammavision	Not Reported				
Ortec Gammavision ver.4.10	1 Sigma	16.56	4.6	1.23	1.02
Ortec Gammavision-32 ver.5	1 Sigma	16.6	1.5	0.42	1.02
Seeker Gamma Spectrometry	2 Sigma	15.698	0.287	0.575	0.96
Vertechs Seeker ver. 1.5	Not Reported				

**** Expected value is from SYNTH program. The results for Ce-143 and Sm-153 which have short half-lives relative to the count time were treated as if they had two expected values. One value was the concetration at the midpoint of counting and one value was the concentration decayed to the beginning of counting.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Zn-65

Expected Value* = 9.7

Calculated 1 sigma uncertainty = 0.39

Sample 1

Mean +/- SD of Reported Value = 9.5 +/- 0.2

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	1 Sigma	9.6	0.4	0.25	0.99
Aptec ver. 4.3	2 Sigma	9	1	0.8	0.93
Aptec ver. 6.31	1 Sigma	9.38	0.38	0.65	0.97
Aptec ver. 6.31	2 Sigma	9.3	1.8	0.4	0.96
Aptec ver. 6.31	More than 3 Sigma	11.4	0.6	0.54	1.18
Canberra Genie 2000	2 Sigma	9.3	0.4	1.4	0.96
Canberra Genie-2000	1 Sigma	9.77	0.34	0.64	1.01
Canberra Genie-2000	2 Sigma	9.14	0.66	1.67	0.94
Canberra Genie-2000	2 Sigma	9.19	1.3	1.02	0.95
Canberra Genie-2000	2 Sigma	9.3	0.4	0.85	0.96
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	9.4	0.8	1.1	0.97
Canberra Genie-PC	1 Sigma	9.4	0.4	0.97	0.97
Canberra Genie-PC	1 Sigma	9.47	0.55	0.65	0.98
Canberra Genie-PC	1 Sigma	9.63	0.71	1.29	0.99
Canberra Genie-PC	2 Sigma	9.03	0.92	0.96	0.93
Canberra Genie-VMS	1 Sigma	9.5	1.6	0.2	0.98
Canberra Genie-VMS	1 Sigma	9.7	0.7	0.2	1.00
Canberra Genie-VMS	2 Sigma	9.277	0.4212	0	0.96
Canberra ProCount	2 Sigma	9.3	0.84	0.57	0.96
Canberra Sampo-90	1 Sigma	10	0.6	0.5	1.03
GammaTrac	1 Sigma	9.46	1.2	0.74	0.98
In House	1 Sigma	9.76	1.36	0.25	1.01
Ortec Gammavision	1 Sigma	9.45	0.73	0.395	0.97
Ortec Gammavision	1 Sigma	9.5	1.9	0.67	0.98
Ortec Gammavision	1 Sigma	9.5509	0.69	0.2166	0.98
Ortec Gammavision	1 Sigma	9.74	0.64	0.45	1.00
Ortec Gammavision ver.4.10	1 Sigma	9.77	2.87	0.45	1.01
Ortec Gammavision-32 ver.5	1 Sigma	9.52	0.94	0.44	0.98
Seeker Gamma Spectrometry	1 Sigma	9.318	0.366	0.755	0.96
Vertechs Seeker v1.8	1 Sigma	9.38	0.34	0.0245	0.97

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***

RESULTS BY ISOTOPE - sorted by software and evaluation

Zr-95

Expected Value* = 6.7

Calculated 1 sigma uncertainty = 0.31

Sample 2

Mean +/- SD of Reported Value = 7 +/- 0.8

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec	2 Sigma	7.21	0.28	0.19	1.08
Aptec ver. 4.3	More than 3 Sigma	8	0.9	0.7	1.19
Aptec ver. 6.31	1 Sigma	6.83	0.3	0.43	1.02
Aptec ver. 6.31	More than 3 Sigma	8.9	1.5	4	1.33
Aptec ver. 6.31	More than 3 Sigma	12.6	0.6	0.38	1.88
Canberra Genie 2000	More than 3 Sigma	9.2	0.5	0.8	1.37
Canberra Genie-2000	1 Sigma	6.4	0.5	0.49	0.96
Canberra Genie-2000	1 Sigma	6.49	0.97	0.5	0.97
Canberra Genie-2000	1 Sigma	6.7	0.23	0.47	1.00
Canberra Genie-2000	2 Sigma	6.17	0.38	0	0.92
Canberra Genie-2000	Not Reported				
Canberra Genie-PC	1 Sigma	6.7	1	0.5	1.00
Canberra Genie-PC	1 Sigma	6.9	0.4	0.48	1.03
Canberra Genie-PC	1 Sigma	7	0.3	0.47	1.04
Canberra Genie-PC	2 Sigma	6.34	0.42	0.54	0.95
Canberra Genie-PC	2 Sigma	7.27	0.77	0.5	1.09
Canberra Genie-VMS	1 Sigma	6.8	0.4	0.2	1.01
Canberra Genie-VMS	2 Sigma	7.2	1.6	0.2	1.07
Canberra Genie-VMS	More than 3 Sigma	11.31	0.4298	0	1.69
Canberra Procount	Not Reported				
Canberra Sampo-90	3 Sigma	7.4	0.4	0.4	1.10
GammaTrac	More than 3 Sigma	8.17	1	0.4	1.22
In House	1 Sigma	6.81	0.95	0.17	1.02
Ortec Gammavision	1 Sigma	6.68	0.54	0.726	1.00
Ortec Gammavision	2 Sigma	6.1	1.2	0.49	0.91
Ortec Gammavision	2 Sigma	6.33	0.28	0.33	0.94
Ortec Gammavision	Not Reported				
Ortec Gammavision ver.4.10	2 Sigma	6.22	1.8	0.38	0.93
Ortec Gammavision-32 ver.5	1 Sigma	6.65	0.64	0.47	0.99
Seeker Gamma Spectrometry	1 Sigma	6.925	0.197	0.437	1.03
Vertechs Seeker v1.8	1 Sigma	6.63	0.23	0.016	0.99

**** Expected value is from SYNTH program.***

***** Comparison is with the expected value using the sigma values calculated by EML.***