EML GAMMA SPECTROMETRY DATA EVALUATION PROGRAM

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ABSTRACT

This report represents the results of the analyses for the second EML Gamma Spectrometry Data Evaluation Program (August 1997). A calibration spectrum, a background spectrum and three sample spectra were included for each software format as part of the evaluation. The calibration spectrum contained nuclides covering the range from 59.5 keV to 1836 keV. The participants were told fallout and fission product nuclides as well as naturally occurring nuclides could be present. The samples were designed to test the detection and quantification of very low levels of nuclides and the ability of the software and user to properly resolve multiplets. The participants were asked to report values and uncertainties as Becquerel per sample with no decay correction.

Twenty-nine sets of results were reported from a total of 70 laboratories who received the spectra. The percentage of the results within 1 σ of the expected value was 76, 67, and 55 for samples 1, 2, and 3, respectively. From all three samples, 12% of the results were more than 3 σ from the expected value. Sixty-two nuclides out of a total of 580 expected results were not reported for the three samples. Sixty percent of these false negatives were due to nuclides which were present at the minimum detectable activity level. There were 53 false positives reported with 60% of the responses due to problems with background subtraction. The results indicate that the Program is beneficial to the participating laboratories in that it provides them with analysis problems that are difficult to create with spiked samples due to the unavailability of many nuclides and the short half-lives of others. EML will continue its annual distribution, the third is to be held in March 1999.

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INTRODUCTION

This report presents the results of the analyses of 29 sets of results received from 70 laboratories who received the spectra for the second annual EML Gamma Spectrometry Data Evaluation Program sent out in August of 1977. The Program's objectives are to assess the capability of DOE's laboratories and contractors to perform routine gamma spectra analyses which are required for EM projects, site evaluations and other DOE programs, and to be an aid to the participants by providing them with analysis problems which are difficult to create with spiked samples due to the unavailability of many nuclides and the short half-lives of others. 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 which 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.

The participants in the Program receive a data disk or tape containing synthetic spectra designed to test the sensitivity and capability of their gamma spectrometry data reduction system. The participating laboratories are asked to identify and quantify the radionuclides in the three sample spectra identified as sample 4, 5 and 6 in the letter accompanying the spectra. Samples 4, 5 and 6 will be called samples 1, 2 and 3, respectively, in this report. 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 the National Analytical Management Program of the Office of Site Operations (EM-70) within the DOE Office of Environmental Management (EM). The Program is administered as part of the services provided through the Environmental Measurements Laboratory's Quality Assessment Program (EML QAP) for environmental radiological analyses (Greenlaw 1998). The first distribution for this Program was in May 1996 with 31 laboratories participating. The second distribution was in August 1997 with 29 sets of results received. In the future, the synthetic spectra will be sent out annually 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 on the internet immediately after the reporting deadline on EML's Web Site (http://www.eml.doe.gov/).

SYNTHETIC SPECTRA

The 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 at the Pacific Northwest National Laboratory were converted into a variety of formats and put on 3.5 in. floppy disks which could be read by most PC based systems. The available formats included APTEC, APTEC version 4.3, ASCII, CANBERRA Spectran-AT, CANBERRA MicroSAMPO, CANBERRA Gamma-AT, CANBERRA Genie Systems, IAEA Ganaas and Qxas, NUCLEAR DATA Asap, NUCLEUS PCA, ORTEC Minigam II, ORTEC ACE, SILENA SilGamma, and SILENA EMCAplus. The data was also put on magnetic tape for users of microvax based systems. The participants also had the option of having the spectra sent electronically.

The data used in this evaluation simulates the spectra obtained from air filters counted 15 cm from a 22% coaxial germanium detector with a 0.5 mm beryllium window. The detector is 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, as well as naturally occurring

nuclides could be present. Table 1 lists the expected nuclides and their concentrations for each sample. Sample 1 had fairly high levels of commonly encountered nuclides. Sample 2 had very low levels of some nuclides and the participants were told to lower their peak search sensitivity levels for that sample. Sample 3 was designed to test the ability of the software to deconvolute multiplets. A data reporting program which saves the data in a Microsoft Database file was sent to all 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 using the counting uncertainty associated with the main peak or peaks for each nuclide. The 1 σ counting error was calculated by EML using the background counts and gross counts in the peak of interest. If a nuclide had more than one major line, the average of the two main lines was used in determining the 1 σ value. All the results were then evaluated as either within 1, 2 or 3 σ, or more than 3 σ from the expected value. The expected values come from the synthetic spectra creation program SYNTH (Hensley et al. 1997) which creates spectra based on input from the user as to the type and size of detector, radiation source, absorbers and distance from the source to the detector. SYNTH obtained 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 σ error calculated by EML are found in Table 1. All values are Bq per sample with no decay correction. The results were also evaluated as false positive or not reported. Sample 2 results were reported even if they were below the laboratory's reported minimum detectable activity (MDA).

RESULTS AND DISCUSSION

Twenty-nine sets of results were received. Twenty-six laboratories sent in results, with three laboratories having two groups using different software packages sending in results separately. The participating laboratories are listed in Table 2. Three foreign laboratories participated. Ten 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 Bq per sample as of the count date. The laboratory's 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 ouliers were usually within 1 σ of the expected values. A summary of the evaluations for each sample (see Table 4) shows that 76%, 67% and 55%, respectively, of the results were within 1 σ of the expected value. Twelve percent of the results from all three samples were more than 3 σ from the expected value.

Sample 1 contained ^{141}Ce, ^{134}Cs, ^{137}Cs, ^{125}Sb and ^{65}Zn at levels where the 1 σ counting error averaged 4%. The results evaluated as being more than 3 σ from the expected value can be attributed to errors in the efficiency calibration by some laboratories. No individual nuclide caused a disproportionate number of these results. Problems in the efficiency calibration determinations were divided among several software packages.

Sample 2 had seven isotopes, ^{141}Ce, ^{134}Cs, ^{137}Cs, ^{125}Sb, ^{95}Nb, ^{103}Ru, and ^{95}Zr which were present at the MDA level and two isotopes, ^{7}Be and ^{210}Pb present at higher levels (Table 1). Participants were told that very small quantities of some nuclides might be present. This sample was designed to evaluate the analysis of samples containing nuclides close to the MDA. The 1 σ counting error for the low level nuclides was 30%. Sixty five percent of the laboratories were within 1 σ of the expected values for the low activity nuclides. For ^{137}Cs at the MDA level, 27 out of 29 participants were within 1 σ of the expected value. Less than half the laboratories detected

the ^{141}Ce. ^{141}Ce has an energy of 145.5 keV and is in an energy region where there are more interferences from Compton scatter. Twelve laboratories did not report ^{210}Pb in sample 2 even though it was well above the MDA. Many laboratories have a lower energy cutoff above the 46.5 keV of ^{210}Pb.

Sample 3 contained three of the europium isotopes and ^{57}Co, ^{60}Co and ^{137}Cs. Seventy five percent of the results for ^{155}Eu, which has low energy lines at 86.5 keV and 105.3 keV, were within 2 σ of the expected value. Four laboratories did not report ^{155}Eu even though it was present at a fairly high level. An error in the letter accompanying the spectra said sample 3 contained nuclides with half-lives of over 1 year. Therefore, participants that did not report ^{57}Co (half-life-270.9 days) were not evaluated as "Not Reported" but were given an asterisk. Most laboratories ignored that sentence and reported ^{57}Co anyway. 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 which are present. The "122 keV" and the 123.0 keV peaks should be resolved by most analysis programs. Many of the laboratories that did very well on the other isotopes had trouble resolving these three nuclides. Only 12 laboratories were within 1 σ of the expected value on the ^{152}Eu. Table 5 lists the nuclides, energies and branching ratios of the nuclides involved.

Fifty-nine nuclides, out of a total of 560 expected results, were not reported (Table 6). Forty-seven of these false negative results came from sample 2 where many of the nuclides were present at very low levels. However, 11 of these were the ^{210}Pb which was present in significant quantities. Fifteen laboratories did not detect the ^{141}Ce. The false negatives could not be attributed to any particular software.

There were 53 false positives reported (Table 7). Approximately 60% of these were due to either not subtracting the background file or subtracting it incorrectly. The ^{95}Zr (724.2 keV, 43.7% branching ratio and 756.7 keV, 55.3% branching ratio) which six laboratories reported for sample 3 could be accounted for by the 723.3 keV and 756.9 keV lines of ^{154}Eu. Five laboratories identified ^{22}Na (1274.5 keV, 99.9% branching ratio) as being present in sample 3. ^{22}Na does not

have other lines which could confirm its presence but ^{154}Eu, which should have been identified, has a fairly abundant line at 1274.5 keV, 35.5% branching ratio.

There is a wide range of values being reported for both the error term and the MDA. The error terms for ^{137}Cs in sample 1, a nuclide with one energy line used for quantification, ranged from 0.13 to 2.74 Bq per sample. This cannot be explained by the laboratories reporting either the 1 σ or 2 σ error. MDAs for the same nuclide in the same sample ranged from 0 to 1.8 Bq per sample. Every laboratory had the same background and sample spectra, calibration uncertainties, and counting times for each sample. MDA values would be more meaningful and useful to someone reviewing radiological data if the values were more consistent among the different laboratories. There should be a uniformly accepted equation with clearly defined parameters for determining the MDA.

CONCLUSIONS

The percentage of the results within 1 σ of the expected value, was 76, 67 and 55 for samples 1, 2, and 3, respectively. Twelve percent of the results from all three samples were more than 3 σ from the expected value. The results for sample 2 indicate that most laboratories are capable of detecting and accurately quantifying nuclides which are present at levels close to the MDA.   The results for sample 3 in which participants had to quantify peaks separated by 1 keV and assign the activity in one of those peaks based on the activity of other lines showed a need for improvement with 30% of the laboratories reporting results more than 3 σ from the expected value. Sixty-two nuclides out of a total of 580 expected results were not reported for the three samples. Sixty percent of these false negatives were due to nuclides which were present at the MDA level. There were 53 false positives reported with 60% of the responses due to problems with background subtraction. It was difficult to determine if one software package performed better than the others because of the large number of packages used by the participating laboratories. Even though it appeared that some systems were better at certain functions no attempt was made to do a statistical analysis of the results for each software package used.

The spectra used in the evaluation are designed to test the ability of the spectroscopist to accurately identify and quantify nuclides in both routine and more complicated analyses. The objective of the Program is not to grade participants as passing or failing, but rather to be an aid to the laboratories by providing them with analysis problems that are difficult to create with spiked samples due to the unavailability of many nuclides and the short half-lives of others. It also provides an opportunity for participants to determine if there are problems in their data reduction software. For these reasons, the Program is beneficial to the participating laboratories and EML will continue its distribution annually. The third distribution of the Program will be in March 1999.

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TABLE 1

GAMMA SPECTROMETRY DATA EVALUATION PROGRAM
EXPECTED VALUES FOR THE AUGUST 1997 DISTRIBUTION

Nuclide	Sample No. 1 (Value ± 1 σ,* Bq)	Sample No. 2 (Value ± 1 σ,* Bq)	Sample No. 3 (Value ± 1 σ,* Bq)
^{141}Ce	24.0 ± 0.5	0.18 ± 0.06	-
^{134}Cs	14.0 ± 0.5	0.21 ± 0.05	-
^{137}Cs	10.0 ± 0.5	0.18 ± 0.05	12.0 ± 0.5
^{125}Sb	23.0 ± 1.1	0.52 ± 0.15	-
^{65}Zn	11.0 ± 0.7	-	-
^{7}Be	-	6.0 ± 0.5	-
^{95}Nb	-	0.17 ± 0.05	-
^{210}Pb	-	5.1 ± 0.5	-
^{103}Ru	-	0.14 ± 0.04	-
^{95}Zr	-	0.35 ± 0.12	-
^{57}Co	-	-	4.0 ± 0.7
^{60}Co	-	-	3.0 ± 0.3
^{152}Eu	-	-	8.30 ± 0.5
^{154}Eu	-	-	13.0 ± 0.7
^{155}Eu	-	-	6.0 ± 0.4

* 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
US Army Research Laboratory, Aberdeen Proving Ground, MD	BR
US Army Research Laboratory, Aberdeen Proving Ground, MD	BR1
B&W Nuclear Envir. Services, Lynchburg, VA	BX
Atomic Energy Control Board, Ottowa, Canada	CA
California State Dept. Health Serv., Sanitation and Radiation Lab., Berkeley, CA	CH
FGL Environmental, Santa Paula, CA	FG
Florida Dept. of Health & Rehab. Serv., Orlando, FL	FL
Florida Mobile Emergency Radiobiological Laboratory, Orlando, FL	FM
Georgia Institute of Technology, Atlanta, GA	GT
Quanterra-St. Louis, Earth City, MO	IS
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
EG&G Mound Applied Technologies, Miamisburg, OH	ML
EG&G Mound Applied Technologies, Miamisburg, OH	ML1
RIKILT-DLO, Wageningen, The Netherlands	NE
FERMCO Fernald Envir. Restoration, Cincinnati, OH	NL
NDL Organization Inc., Peekskill, NY	NO
JAF Environmental Laboratory, New York Power Authority, Fulton, NY	NP
ORNL, Radiobioassay Laboratory, Oak Ridge, TN	OD
ORNL, Radioactive Materials Analysis Laboratory, Oak Ridge, TN	OT
Bechtel Nevada, Mercury, NV	RE
Sandia Labs, Radioactive Sample Diagnostic Program, Albuquerque, NM	SA
Stanford Linear Accelerator Center, Menlow Park, CA	SL
Texas Dept. of Health/Laboratories, Austin, TX	TX
Lockheed Martin Energy Systems, Y-12, Oak Ridge, TN	UP
Environmental Radiation Lab., Office of Public Health Labs., Seattle, WA	WA
Duke Engineering Services, Bolton, MA	YA

TABLE 3

SOFTWARE USED BY LABORATORIES

Lab Code	Software
BR	Ortec Maestro-Omnigam
BR1	Ortec Maestro-Minigam
BX	Canberra Genie-VMS
CA	Aptec ver. 5.3
CH	Canberra Procount
FG	Aptec ver. 9.0
FL	Canberra Genie-VMS
FM	Canberra Sampo-90
GT	Canberra Procount
IS	Canberra Procount
KO	Aptec ver. 6.31
LA	Ortec GELIGAM
LA1	Ortec Gammavision
LB	Aptec ver. 4.3
ML	Canberra Sampo-90
ML1	Aptec ver. 5.3
NE	Ortec Gammavision
NL	Canberra Nuclear Data Genie ND 9900
NO	Aptec PCMA/Super ver. 6.31
NP	Vertechs Seeker ver. 1.5
OD	Canberra Procount
OT	Canberra Genie-VMS
RE	In House
SA	Canberra Genie-2000
SL	Canberra MicroSampo

TABLE 3 (Cont'd)

Lab Code	Software
TX	Canberra Genie-VMS
UP	Canberra Procount
WA	Canberra Genie-VMS
YA	GDR/P ver. 3.1 (Vertechs Software)

TABLE 4

NUMBER OF REPORTED RESULTS WITHIN 1, 2, 3, OR > 3 σ* FROM EXPECTED VALUE

Sample No.	Nuclide	1 σ	2 σ	3 σ	> 3 σ	Not Reported
1	^{141}Ce	22	1	1	4	1
1	^{134}Cs	22	2	1	4	0
1	^{137}Cs	21	2	0	5	1
1	^{125}Sb	20	3	2	2	2
1	^{65}Zn	25	0	0	4	0
2	^{7}Be	21	3	1	3	1
2	^{141}Ce	13	1	0	0	15
2	^{134}Cs	20	6	1	0	2
2	^{137}Cs	24	3	0	1	1
2	^{95}Nb	16	6	2	0	5
2	^{210}Pb	8	8	0	1	12
2	^{103}Ru	19	4	0	0	6
2	^{125}Sb	22	3	0	0	4
2	^{95}Zr	21	4	1	0	3
3	^{57}Co	16	3	1	6	**
3	^{60}Co	23	0	0	6	0
3	^{137}Cs	15	6	0	7	1
3	^{152}Eu	12	5	0	10	2
3	^{154}Eu	15	2	1	9	2
3	^{155}Eu	15	7	1	2	4

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

** ^{57}Co is not reported due to error in letter accompanying spectra.

TABLE 5

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 6

NUMBER OF LABORATORIES WHO DID NOT REPORT NUCLIDES THAT WERE
PRESENT IN THE SAMPLES

Sample No.	Nuclide	No. of Laboratories not Reporting Nuclides
1	^{141}Ce	1
1	^{125}Sb	2
2	^{141}Ce	14
2	^{134}Cs	2
2	^{137}Cs	1
2	^{95}Nb	5
2	^{210}Pb	10
2	^{103}Ru	6
2	^{125}Sb	4
2	^{95}Zr	3
3	^{137}Cs	1
3	^{152}Eu	1
3	^{154}Eu	2
3	^{155}Eu	3

TABLE 7

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

Nuclide	Sample No. 1	Sample No. 2	Sample No. 3
^{228}Ac	2	5	1
^{243}Am	0	1	0
^{207}Bi	2	0	0
^{214}Bi	0	2	0
^{109}Cd	0	0	1
^{141}Cs	0	1	0
^{125}I	1	0	0
^{40}K	1	4	3
^{22}Na	0	0	5
^{239}Np	0	0	2
^{210}Pb	0	0	2
^{212}Pb	1	1	0
^{226}Ra	2	2	2
^{161}Tb	0	0	1
^{234}Th	1	0	1
^{208}Tl	0	0	1
^{133}Xe	2	0	0
^{95}Zr	0	0	6

Appendix A

RESULTS BY LABORATORY

BR US Army Research Laboratory,   *Software:*   Ortec Maestro-Omnigam
Aberdeen Proving Ground, MD   *Reference(s):* The Gamma Rays of Radionuclides,
(Erdtmann and Soyka, 1979)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Bi-207	1.38	0.43	0.373			False Positive
1	Ce-141	24.1	1.02	0.334	24	1.00	1 sigma
1	Cs-134	13.7	0.98	0.57	14	0.98	1 sigma
1	Cs-137	9.95	0.87	0.319	10	1.00	1 sigma
1	Sb-125	22	2.01	1.07	23	0.96	1 sigma
1	Zn-65	10.8	1.31	0.164	11	0.98	1 sigma
2	Be-7	5.87	0.86	0.317	6	0.98	1 sigma
2	Ce-141	0.173	0.065	0.0505	0.18	0.96	1 sigma
2	Cs-134	0.202	0.054	0.0679	0.21	0.96	1 sigma
2	Cs-137	0.192	0.062	0.0202	0.18	1.07	1 sigma
2	Nb-95	0.17	0.058	0.0196	0.17	1.00	1 sigma
2	Pb-210	4.22	1.12	0.865	5.1	0.83	2 sigma
2	Ru-103	0.126	0.055	0.0381	0.14	0.90	1 sigma
2	Sb-125	0.587	0.15	0.11	0.52	1.13	1 sigma
2	Zr-95	0.36	0.084	0.0354	0.35	1.03	1 sigma
3	Co-57	6.41	0.62	0.518	4	1.60	More than 3 sigma
3	Co-60	2.99	0.41	0.0999	3	1.00	1 sigma
3	Cs-137	12	0.92	0.286	12	1.00	1 sigma
3	Eu-152				8.3		Not Reported
3	Eu-154	12.8	1.39	1.13	13	0.98	1 sigma
3	Eu-155	5.14	0.6	0.426	6	0.86	3 sigma
3	Na-22	118	3.35	0.153			False Positive
3	Np-239	1.8	1.09	0.914			False Positive
3	Zr-95	1.4	0.6	0.425			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

BR1 US Army Research Laboratory, Aberdeen Proving Ground, MD

Software: Ortec Maestro-Minigam

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Bi-207	1.38	0.42	0.373			False Positive
1	Ce-141	23	0.99	0.427	24	0.96	1 sigma
1	Cs-134	13.7	0.96	0.541	14	0.98	1 sigma
1	Cs-137	9.94	0.82	0.299	10	0.99	1 sigma
1	Sb-125	21.8	2.05	1.03	23	0.95	2 sigma
1	Zn-65	10.8	1.34	0.246	11	0.98	1 sigma
2	Be-7	5.87	0.86	0.317	6	0.98	1 sigma
2	Ce-141	0.176	0.072	0.0498	0.18	0.98	1 sigma
2	Cs-134	0.202	0.054	0.0679	0.21	0.96	1 sigma
2	Cs-137	0.192	0.062	0.0202	0.18	1.07	1 sigma
2	Nb-95	0.17	0.058	0.0196	0.17	1.00	1 sigma
2	Pb-210				6		Not Reported
2	Ru-103	0.126	0.056	0.0366	0.14	0.90	1 sigma
2	Sb-125	0.578	0.16	0.107	0.52	1.11	1 sigma
2	Zr-95	0.342	0.088	0.0354	0.35	0.98	1 sigma
3	Co-57	6.43	0.62	0.342	4	1.61	More than 3 sigma
3	Co-60	2.99	0.39	0.0444	3	1.00	1 sigma
3	Cs-137	11.9	0.88	0.172	12	0.99	1 sigma
3	Eu-152				8.3		Not Reported
3	Eu-154	12.2	1.34	0.753	13	0.94	2 sigma
3	Eu-155				6		Not Reported
3	Na-22	118	3.35	0.107			False Positive
3	Np-239	1.63	1.1	0.609			False Positive
3	Zr-95	1.4	0.56	0.26			False Positive

* Expected value is from SYNTH program.

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

RESULTS BY LABORATORY

BX B & W Nuclear Envir. Services, Lynchburg, VA

Software: Canberra Genie-VMS

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.88	0.55	0.48	24	0.99	1 sigma
1	Cs-134	13.87	0.52	0.41	14	0.99	1 sigma
1	Cs-137	9.75	0.48	0.47	10	0.98	1 sigma
1	Sb-125	22.89	1.15	1.5	23	1.00	1 sigma
1	Zn-65	10.71	0.83	0.78	11	0.97	1 sigma
2	Be-7	6.57	0.85	1.32	6	1.10	2 sigma
2	Ce-141	0.15	0.1	0.2	0.18	0.83	1 sigma
2	Cs-134	0.34	0.1	0.19	0.21	1.62	3 sigma
2	Cs-137	0.2	0.088	0.19	0.18	1.11	1 sigma
2	Nb-95	0.23	0.08	0.18	0.17	1.35	2 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.17	0.09	0.16	0.14	1.21	1 sigma
2	Sb-125	0.58	0.25	0.43	0.52	1.12	1 sigma
2	Zr-95	0.53	0.19	0.32	0.35	1.51	2 sigma
3	Co-57	3.21	0.55	0.24	4	0.80	2 sigma
3	Co-60	3.1	0.33	0.39	3	1.03	1 sigma
3	Cs-137	11.73	0.51	0.46	12	0.98	1 sigma
3	Eu-152	10.51	1.33	1.88	8.3	1.27	More than 3 sigma
3	Eu-154	12.39	1.57	2.18	13	0.95	1 sigma
3	Eu-155	5.44	0.59	0.93	6	0.91	2 sigma

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

CA   Atomic Energy Control Board,   *Software:*   Aptec ver. 5.3
      Ottowa, Canada
                                      Reference(s): Radioactive Decay Data Tables, (Kocher,
                                                       1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.26	1.05	0.46	24	1.01	1 sigma
1	Cs-134	13.91	0.92	4.5	14	0.99	1 sigma
1	Cs-137	9.72	0.53	0.37	10	0.97	1 sigma
1	Sb-125	22.26	1.83	1.95	23	0.97	1 sigma
1	Zn-65	11.14	0.9	0.47	11	1.01	1 sigma
2	Be-7	6.12	0.65	0.98	6	1.02	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.18	0.06	0.12	0.21	0.86	1 sigma
2	Cs-137	0.16	0.06	0.12	0.18	0.89	1 sigma
2	Nb-95	0.14	0.06	0.12	0.17	0.82	1 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103				0.14		Not Reported
2	Sb-125	0.56	0.23	0.45	0.52	1.08	1 sigma
2	Zr-95	0.33	0.14	0.26	0.35	0.94	1 sigma
3	Co-57	11.72	0.71	0.8	4	2.93	More than 3 sigma
3	Co-60	3.06	0.34	0.29	3	1.02	1 sigma
3	Cs-137	11.66	0.6	0.37	12	0.97	1 sigma
3	Eu-152	8.56	1.51	2.33	8.3	1.03	1 sigma
3	Eu-154				13		Not Reported
3	Eu-155	6.14	0.56	0.71	6	1.02	1 sigma
3	Zr-95	3.17	0.63	0.55			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

CH California State Dept. Health *Software:* Canberra Procount
Serv., Sanitation and Rad. Lab., *Reference(s):* National Nuclear Data Center, BNL
Berkeley, CA

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	26.69	1.231	0.5415	24	1.11	More than 3 sigma
1	Cs-134	13.15	0.6287	0.4314	14	0.94	2 sigma
1	Cs-137	9.364	0.8917	0.4488	10	0.94	2 sigma
1	Sb-125	23.14	1.571	1.537	23	1.01	1 sigma
1	Zn-65	10.34	1.606	0.7495	11	0.94	1 sigma
2	Be-7	6.357	1.638	1.277	6	1.06	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.1658	0.1405	0.1572	0.21	0.79	1 sigma
2	Cs-137	0.1935	0.1661	0.1779	0.18	1.08	1 sigma
2	Nb-95				0.17		Not Reported
2	Pb-210	4.308	3.103	2.182	5.1	0.84	2 sigma
2	Ru-103	0.1651	0.1684	0.1548	0.14	1.18	1 sigma
2	Sb-125	0.5946	0.5076	0.5572	0.52	1.14	1 sigma
2	Zr-95	0.4491	0.2437	0.304	0.35	1.28	1 sigma
3	Co-57	4.289	2.266	0.2633	4	1.07	1 sigma
3	Co-60	3.006	0.4885	0.3848	3	1.00	1 sigma
3	Cs-137	11.16	0.949	0.4339	12	0.93	2 sigma
3	Eu-152	10.04	2.536	1.796	8.3	1.21	More than 3 sigma
3	Eu-154	12.89	1.025	11.61	13	0.99	1 sigma
3	Eu-155	6.148	0.8388	1.036	6	1.02	1 sigma
3	Na-22	4.638	0.8488	0.379			False Positive
3	Zr-95	1.151	0.8889	0.7488			False Positive

Expected value is from SYNTH program.
*** Comparison is with the expected value using the sigma values calculated by EML.*

RESULTS BY LABORATORY

FG   FGL Environmental, Santa Paula, CA

Software: Aptec ver. 9.0

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.25	1.3	2.8	24	1.01	1 sigma
1	Cs-134	14.43	0.9	2.1	14	1.03	1 sigma
1	Cs-137	9.75	0.8	1.8	10	0.98	1 sigma
1	Sb-125	21.95	0.8	1.8	23	0.95	1 sigma
1	Zn-65	10.89	1.7	4.12	11	0.99	1 sigma
2	Ac-228	6.57	0.29	0.7			False Positive
2	Be-7	6.15	0.79	1.9	6	1.02	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.287	0.09	0.21	0.21	1.37	2 sigma
2	Cs-137	0.437	0.09	0.22	0.18	2.43	More than 3 sigma
2	Nb-95				0.17		Not Reported
2	Pb-210	4.57	1.06	2.51	5.1	0.90	2 sigma
2	Ru-103				0.14		Not Reported
2	Sb-125	0.584	0.15	0.35	0.52	1.12	1 sigma
2	Zr-95				0.35		Not Reported
3	Co-57				4		***
3	Co-60	2.94	0.5	1.2	3	0.98	1 sigma
3	Cs-137	11.63	0.8	1.9	12	0.97	1 sigma
3	Eu-152	8.47	2	4.8	8.3	1.02	1 sigma
3	Eu-154	13.6	0.3	0.8	13	1.05	1 sigma
3	Eu-155	6.37	0.6	1.3	6	1.06	1 sigma

* Expected value is from SYNTH program.

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

*** Co-57 not reported due to error in letter accompanying spectra.

RESULTS BY LABORATORY

FL   Florida Dept. of Health Rehab.   *Software:*   Canberra Genie-VMS
     Services, Orlando, FL

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.6	0.5	0.3	24	0.98	1 sigma
1	Cs-134	13.7	0.4	0.38	14	0.98	1 sigma
1	Cs-137	9.8	0.5	0.32	10	0.98	1 sigma
1	Sb-125	22.7	0.9	0.73	23	0.99	1 sigma
1	Zn-65	10.6	0.8	0.68	11	0.96	1 sigma
2	Be-7	6.3	0.8	1.4	6	1.05	1 sigma
2	Ce-141	0.13	0.09	0.18	0.18	0.72	1 sigma
2	Cs-134	0.23	0.06	0.23	0.21	1.10	1 sigma
2	Cs-137	0.21	0.09	0.2	0.18	1.17	1 sigma
2	Nb-95	0.12	0.07	0.19	0.17	0.71	1 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.16	0.09	0.17	0.14	1.14	1 sigma
2	Sb-125	0.7	0.2	0.44	0.52	1.35	2 sigma
2	Zr-95	0.4	0.1	0.36	0.35	1.14	1 sigma
3	Co-57	4.4	0.2	0.17	4	1.10	1 sigma
3	Co-60	3	0.2	0.33	3	1.00	1 sigma
3	Cs-137	11.8	0.5	0.32	12	0.98	1 sigma
3	Eu-152	8.8	0.6	0.51	8.3	1.06	2 sigma
3	Eu-154	10.8	0.5	0.36	13	0.83	More than 3 sigma
3	Eu-155	5.3	0.3	0.54	6	0.88	2 sigma

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

FM   Florida Mobile Emergency   *Software:*   Canbera Sampo-90
     Radiological Laboratory,
     Orlando, FL   *Reference(s):* Table of Radioactive Isotopes, (Brown and
                                     Firestone, 1986)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.9	1	0.4	24	1.00	1 sigma
1	Cs-134	13.7	0.3	0.4	14	0.98	1 sigma
1	Cs-137	9.7	0.5	0.4	10	0.97	1 sigma
1	Sb-125	22.9	0.7	1.2	23	1.00	1 sigma
1	Zn-65	11	0.75	0.7	11	1.00	1 sigma
2	Ac-228	1.3	0.2	0.6			False Positive
2	Be-7	6.4	0.6	1.1	6	1.07	1 sigma
2	Ce-141	0.2	0.05	0.2	0.18	1.11	1 sigma
2	Cs-134	0.2	0.02	0.1	0.21	0.95	1 sigma
2	Cs-137	0.2	0.05	0.1	0.18	1.11	1 sigma
2	Nb-95	0.2	0.05	0.1	0.17	1.18	1 sigma
2	Pb-210	5.8	1.3	3.3	5.1	1.14	2 sigma
2	Ru-103	0.2	0.04	0.1	0.14	1.43	2 sigma
2	Sb-125	0.6	0.06	0.4	0.52	1.15	1 sigma
2	Zr-95	0.4	0.09	0.3	0.35	1.14	1 sigma
3	Co-57	3.4	0.3	0.2	4	0.85	1 sigma
3	Co-60	3	0.2	0.3	3	1.00	1 sigma
3	Cs-137	11.6	0.5	0.4	12	0.97	1 sigma
3	Eu-152	9	0.5	0.6	8.3	1.08	2 sigma
3	Eu-154	12	0.5	0.4	13	0.92	2 sigma
3	Eu-155	5.5	0.3	0.6	6	0.92	2 sigma

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

GT   Georgia Institute of Technology,   *Software:*   Canberra Procount
      Atlanta, GA
                                          Reference(s): National Nuclear Data Center, BNL

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	25.05	5.658	0.273	24	1.04	3 sigma
1	Cs-134	13.31	2.007	0.213	14	0.95	2 sigma
1	Cs-137	9.372	2.742	0.243	10	0.94	2 sigma
1	Sb-125	21.89	3.265	0.761	23	0.95	2 sigma
1	Zn-65	11	3.019	0.231	11	1.00	1 sigma
2	Be-7	6.033	2.631	0.649	6	1.01	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.219	0.176	0.085	0.21	1.04	1 sigma
2	Cs-137	0.196	0.257	0.099	0.18	1.09	1 sigma
2	Nb-95	0.229	0.252	0.094	0.17	1.35	2 sigma
2	Pb-210	4.88	3.502	0.094	5.1	0.96	1 sigma
2	Ru-103	0.161	0.251	0.079	0.14	1.15	1 sigma
2	Sb-125	0.537	0.602	0.216	0.52	1.03	1 sigma
2	Zr-95	0.463	0.385	0.165	0.35	1.32	1 sigma
3	Co-57	3.945	3.243	0.134	4	0.99	1 sigma
3	Co-60	3.141	0.885	0.202	3	1.05	1 sigma
3	Cs-137	11.27	3.205	0.236	12	0.94	2 sigma
3	Eu-152	8.939	1.76	0.402	8.3	1.08	2 sigma
3	Eu-154	13.13	2.435	0.585	13	1.01	1 sigma
3	Eu-155	6.095	1.534	0.432	6	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 LABORATORY

IS   Quanterra-St. Louis, MO   *Software:*   Canberra Procount

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.26	3.803	0.5159	24	1.01	1 sigma
1	Cs-134	14.28	2.597	0.501	14	1.02	1 sigma
1	Cs-137	9.605	1.914	0.5355	10	0.96	1 sigma
1	Sb-125	23.04	4.799	1.656	23	1.00	1 sigma
1	Zn-65	10.78	2.505	0.9591	11	0.98	1 sigma
2	Be-7	6.319	1.867	1.417	6	1.05	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.193	0.1581	0.185	0.21	0.92	1 sigma
2	Cs-137	0.2009	0.1747	0.2131	0.18	1.12	1 sigma
2	Nb-95	0.2315	0.1696	0.1965	0.17	1.36	2 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.1693	0.1745	0.1774	0.14	1.21	1 sigma
2	Sb-125	0.5831	0.5057	0.475	0.52	1.12	1 sigma
2	Zr-95	0.5251	0.3835	0.3686	0.35	1.50	2 sigma
3	Co-57	2.992	0.5318	0.08527	4	0.75	2 sigma
3	Co-60	1.04	0.2528	0.1647	3	0.35	More than 3 sigma
3	Cs-137	3.851	0.6394	0.1741	12	0.32	More than 3 sigma
3	Eu-152	3.369	0.9459	0.7867	8.3	0.41	More than 3 sigma
3	Eu-154	4.038	1.692	1.502	13	0.31	More than 3 sigma
3	Eu-155	1.962	0.5521	0.3478	6	0.33	More than 3 sigma
3	Na-22	0.1871	0.6945	0.1668			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

KO   Korea Institute of Nuclear   *Software:*   Aptec ver. 6.31
     Safety, Korea
                                     Reference(s): Table of Isotopes, (Firestone and Shirley,
                                                      1996)

                                                      HASL-300, 28th ed. (1997)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.02	1.283	0.463	24	1.00	1 sigma
1	Cs-134	13.72	1.045	0.285	14	0.98	1 sigma
1	Cs-137	9.906	0.955	0.365	10	0.99	1 sigma
1	Sb-125	22.08	2.143	1.265	23	0.96	1 sigma
1	Zn-65	11.15	0.943	0.516	11	1.01	1 sigma
2	Be-7	6.287	0.698	0.947	6	1.05	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.192	0.074	0.153	0.21	0.91	1 sigma
2	Cs-137	0.161	0.064	0.118	0.18	0.89	1 sigma
2	Nb-95	0.165	0.06	0.108	0.17	0.97	1 sigma
2	Pb-210	4.957	1.642	1.764	5.1	0.97	1 sigma
2	Ru-103	0.132	0.058	0.109	0.14	0.94	1 sigma
2	Sb-125	0.593	0.167	0.304	0.52	1.14	1 sigma
2	Zr-95	0.348	0.14	0.253	0.35	0.99	1 sigma
3	Co-57	3.752	0.87	1.559	4	0.94	1 sigma
3	Co-60	3.024	0.353	0.294	3	1.01	1 sigma
3	Cs-137	11.48	1.125	0.39	12	0.96	2 sigma
3	Eu-152	8.531	1.607	0.726	8.3	1.03	1 sigma
3	Eu-154	12.63	1.657	1.571	13	0.97	1 sigma
3	Eu-155	5.946	0.568	0.629	6	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 LABORATORY

LA   Los Alamos National   *Software:*   Ortec GELIGAM
      Laboratory, NM
                                    Reference(s): Radioactive Decay Data Tables, (Kocher,
                                                     1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.5	0.7	0.11	24	1.02	1 sigma
1	Cs-134	13.7	0.6	0.1	14	0.98	1 sigma
1	Cs-137	9.86	0.51	0.11	10	0.99	1 sigma
1	Sb-125	23	1.1	0.28	23	1.00	1 sigma
1	Zn-65	11	0.8	0.25	11	1.00	1 sigma
2	Be-7	6.06	0.51	1.1	6	1.01	1 sigma
2	Ce-141	0.18	0.03	0.11	0.18	1.00	1 sigma
2	Cs-134	0.2	0.03	0.1	0.21	0.95	1 sigma
2	Cs-137	0.19	0.03	0.11	0.18	1.06	1 sigma
2	Nb-95	0.17	0.03	0.11	0.17	1.00	1 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.13	0.03	0.12	0.14	0.93	1 sigma
2	Sb-125	0.53	0.08	0.28	0.52	1.02	1 sigma
2	Zr-95	0.36	0.07	0.24	0.35	1.03	1 sigma
3	Co-57	7.24	0.36	0.08	4	1.81	More than 3 sigma
3	Co-60	3.04	0.23	0.11	3	1.01	1 sigma
3	Cs-137	11.8	0.52	0.11	12	0.98	1 sigma
3	Eu-152	8.53	0.63	0.66	8.3	1.03	1 sigma
3	Eu-154	13.1	0.83	0.36	13	1.01	1 sigma
3	Eu-155	5.98	0.34	0.24	6	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 LABORATORY

LA1 Los Alamos National *Software:* Ortec Gammavision
Laboratory, NM
Reference(s): Atomic Data and Nuclear Data Tables

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.58	2.29	0.19	24	0.98	1 sigma
1	Cs-134	13.48	1.64	0.31	14	0.96	1 sigma
1	Cs-137	9.9	1.53	0.19	10	0.99	1 sigma
1	Sb-125	22.78	3.5	0.61	23	0.99	1 sigma
1	Zn-65	11.35	1.93	0.22	11	1.03	1 sigma
2	Be-7	5.97	1.43	0.16	6	0.99	1 sigma
2	Ce-141	0.17	0.13	0.02	0.18	0.94	1 sigma
2	Cs-134	0.2	0.08	0.03	0.21	0.95	1 sigma
2	Cs-137	0.19	0.09	0.01	0.18	1.06	1 sigma
2	Nb-95	0.17	0.09	0.08	0.17	1.00	1 sigma
2	Pb-210	5.32	0.72	0.07	5.1	1.04	1 sigma
2	Ru-103	0.13	0.09	0.02	0.14	0.93	1 sigma
2	Sb-125	0.6	0.29	0.05	0.52	1.15	1 sigma
2	Zr-95	0.35	0.13	0.01	0.35	1.00	1 sigma
3	Co-57	6.43	0.96	0.31	4	1.61	More than 3 sigma
3	Co-60	3.04	0.74	0.14	3	1.01	1 sigma
3	Cs-137	11.81	1.57	0.17	12	0.98	1 sigma
3	Eu-152	8.59	1.85	1.08	8.3	1.03	1 sigma
3	Eu-154	9.71	2.18	0.72	13	0.75	More than 3 sigma
3	Eu-155	6.02	1.39	0.24	6	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 LABORATORY

LB   Lawrence Berkeley Lab. UCB,   *Software:*   Aptec ver. 4.3
Berkley, CA

                                   Reference(s): Table of Isotopes, (Lederer and Shirley, 1978)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ac-228	2.528	2.447	4.816			False Positive
1	Ce-141	23.79	2.48	0.93	24	0.99	1 sigma
1	Cs-134	14.31	2.01	4.11	14	1.02	1 sigma
1	Cs-137	9.92	1.26	0.87	10	0.99	1 sigma
1	K-40	9.507	3.816	5.004			False Positive
1	Pb-212	1.444	0.823	1.549			False Positive
1	Ra-226	9.721	5.272	9.8			False Positive
1	Sb-125	24.37	5.78	4.04	23	1.06	2 sigma
1	Th-234	15.45	8.04	12.6			False Positive
1	Zn-65	10.81	1.79	1.346	11	0.98	1 sigma
2	Ac-228	8.053	0.7376	4.475			False Positive
2	Be-7	6.376	1.485	1.817	6	1.06	1 sigma
2	Bi-214	42.96	3.93	42.96			False Positive
2	Ce-141	0.0839	0.1176	0.1939	0.18	0.47	2 sigma
2	Cs-134	0.2905	0.169	0.224	0.21	1.38	2 sigma
2	Cs-137	0.1705	0.1434	0.2274	0.18	0.95	1 sigma
2	Nb-95	0.1527	0.1237	0.1941	0.17	0.90	1 sigma
2	Pb-210	4.588	3.161	2.639	5.1	0.90	2 sigma
2	Pb-212	2.37	0.2504	1.117			False Positive
2	Ra-226	3.971	0.43	3.971			False Positive
2	Ru-103	0.1473	0.13	0.2083	0.14	1.05	1 sigma
2	Sb-125	0.6059	0.343	0.7483	0.52	1.17	1 sigma
2	Zr-95	0.3577	0.2739	0.4309	0.35	1.02	1 sigma
3	Ac-228	2.973	3.629	5.603			False Positive
3	Co-57	3.693	1.711	3.146	4	0.92	1 sigma
3	Co-60	2.899	0.6826	0.666	3	0.97	1 sigma
3	Cs-137	11.83	1.429	0.8511	12	0.99	1 sigma
3	Eu-152	8.23	3.757	1.05	8.3	0.99	1 sigma
3	Eu-154	16.73	3.387	1.05	13	1.29	More than 3 sigma
3	Eu-155	5.902	1.129	1.544	6	0.98	1 sigma
3	K-40	9.257	3.842	5.247			False Positive
3	Ra-226	8.618	4.801	8.912			False Positive
3	Th-234	11.2575	6.588	12.525			False Positive
3	Tl-208	98.23	76.65	148			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

EML Gamma Spec. Data Eval. Program   **EML-602**

February 1999

RESULTS BY LABORATORY

ML   EG & G Mound Technologies,   *Software:*   Canberra Sampo-90
Miamisburg, OH

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.28	1.12	0.4	24	1.01	1 sigma
1	Cs-134	13.58	0.1	0.38	14	0.97	1 sigma
1	Cs-137	9.57	0.13	0.4	10	0.96	1 sigma
1	Sb-125	22.58	0.26	2.06	23	0.98	1 sigma
1	Zn-65	11.15	0.75	0.65	11	1.01	1 sigma
2	Be-7	6.15	0.52	1.04	6	1.02	1 sigma
2	Ce-141	0.14	0.05	0.16	0.18	0.78	1 sigma
2	Cs-134	0.19	0.01	0.15	0.21	0.90	1 sigma
2	Cs-137	0.19	0.05	0.15	0.18	1.06	1 sigma
2	Nb-95	0.18	0.02	0.15	0.17	1.06	1 sigma
2	Pb-210	5.52	13.4	3.29	5.1	1.08	1 sigma
2	Ru-103	0.16	0.04	0.13	0.14	1.14	1 sigma
2	Sb-125	0.55	0.06	0.34	0.52	1.06	1 sigma
2	Zr-95	0.38	0.03	0.33	0.35	1.09	1 sigma
3	Co-57	3.65	0.26	1.54	4	0.91	1 sigma
3	Co-60	3.06	0.21	0.44	3	1.02	1 sigma
3	Cs-137	11.47	0.45	0.38	12	0.96	2 sigma
3	Eu-152	8.74	0.13	3.48	8.3	1.05	2 sigma
3	Eu-154	13.14	0.15	2.38	13	1.01	1 sigma
3	Eu-155	5.44	0.3	0.82	6	0.91	2 sigma
3	Pb-210	4.25	0.98	7.87			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

ML1 EG & G Mound Technologies,   *Software:*   Aptec ver. 5.3
Miamisburg, OH

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.19	1.14	0.52	24	1.01	1 sigma
1	Cs-134	14.26	0.81	0.34	14	1.02	1 sigma
1	Cs-137				10		Not Reported
1	Sb-125	22.7	1.97	1.28	23	0.99	1 sigma
1	Zn-65	10.67	0.78	0.63	11	0.97	1 sigma
2	Be-7				6		Not Reported
2	Ce-141	0.22	0.1	0.19	0.18	1.22	1 sigma
2	Cs-134	0.23	0.07	0.11	0.21	1.10	1 sigma
2	Cs-137	0.17	0.07	0.14	0.18	0.94	1 sigma
2	Nb-95	0.16	0.07	0.13	0.17	0.94	1 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.12	0.07	0.13	0.14	0.86	1 sigma
2	Sb-125	0.59	0.17	0.31	0.52	1.13	1 sigma
2	Zr-95	0.32	0.14	0.26	0.35	0.91	1 sigma
3	Co-57	3.83	0.8	1.4	4	0.96	1 sigma
3	Co-60	2.94	0.31	0.29	3	0.98	1 sigma
3	Cs-137	11.84	0.47	0.4	12	0.99	1 sigma
3	Eu-152	8.65	1.49	6.91	8.3	1.04	2 sigma
3	Eu-154	13.03	1.63	0.83	13	1.00	1 sigma
3	Eu-155	5.78	0.61	0.89	6	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 LABORATORY

NE   RIKILT-DLO, Wageningen,   *Software:*   Ortec Gammavision
     The Netherlands
                                      Reference(s):   The Gamma Rays of the Radionuclides,
                                                         (Erdtmann and Soyka, 1979)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.87	0.53	0.2	24	0.99	1 sigma
1	Cs-134	13.59	0.44	0.2	14	0.97	1 sigma
1	Cs-137	9.95	0.45	0.2	10	1.00	1 sigma
1	Sb-125	22.67	1.06	0.6	23	0.99	1 sigma
1	Zn-65	11.64	0.66	0.2	11	1.06	1 sigma
2	Be-7	6.03	0.44	0.1	6	1.00	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.2	0.03	0.01	0.21	0.95	1 sigma
2	Cs-137	0.19	0.03	0.01	0.18	1.06	1 sigma
2	Nb-95	0.17	0.03	0.01	0.17	1.00	1 sigma
2	Pb-210	5.33	0.21	0.08	5.1	1.05	1 sigma
2	Ru-103				0.14		Not Reported
2	Sb-125	0.58	0.08	0.05	0.52	1.12	1 sigma
2	Zr-95	0.36	0.04	0.01	0.35	1.03	1 sigma
3	Co-57	4.23	1.21	0.5	4	1.06	1 sigma
3	Co-60	3.09	0.24	0.1	3	1.03	1 sigma
3	Cs-137	11.86	0.48	0.2	12	0.99	1 sigma
3	Eu-152	8.75	0.6	0.2	8.3	1.05	1 sigma
3	Eu-154	13.39	0.92	0.5	13	1.03	1 sigma
3	Eu-155				6		Not Reported
3	Zr-95	1.27	0.32	0.3			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

NL   FERMCO Fernald Envir.   *Software:*   Canberra Nuclear Data Genie ND 9900
     Restoration, Cincinnati, OH   *Reference(s):* Radioactive Decay Data Tables, (Kocher,
                                                     1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24	0.55	0.73	24	1.00	1 sigma
1	Cs-134	14.13	0.51	0.53	14	1.01	1 sigma
1	Cs-137	9.73	0.48	0.67	10	0.97	1 sigma
1	Sb-125	22.7	2.1	5.9	23	0.99	1 sigma
1	Xe-133	0.49	0.37	1			False Positive
1	Zn-65	10.8	0.9	1.3	11	0.98	1 sigma
2	Am-243	0.13	0.05	0.15			False Positive
2	Be-7	6.42	0.83	1.7	6	1.07	1 sigma
2	Ce-141	0.12	0.09	0.24	0.18	0.67	1 sigma
2	Cs-134	0.21	0.13	0.23	0.21	1.00	1 sigma
2	Cs-137	0.2	0.09	0.22	0.18	1.11	1 sigma
2	Nb-95	0.23	0.08	0.19	0.17	1.35	2 sigma
2	Pb-210	5.85	2.1	3.8	5.1	1.15	2 sigma
2	Ru-103	0.17	0.09	0.2	0.14	1.21	1 sigma
2	Sb-125	0.6	0.48	1.5	0.52	1.15	1 sigma
2	Zr-95	0.47	0.18	0.43	0.35	1.34	1 sigma
3	Co-57				4		***
3	Co-60	3.1	0.5	0.63	3	1.03	1 sigma
3	Cs-137	11.1	1	0.62	12	0.93	2 sigma
3	Eu-152	8.98	0.87	5.5	8.3	1.08	2 sigma
3	Eu-154	13.4	2.9	4.3	13	1.03	1 sigma
3	Eu-155	5.88	0.58	0.45	6	0.98	1 sigma

* Expected value is from SYNTH program.

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

*** Co-57 not reported due to error in letter accompanying spectra.

RESULTS BY LABORATORY

NO   NDL Organization, Inc.,   *Software:*   Aptec PCMA/Super ver. 6.31
Peekskill, NY   *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	Evaluation**
1	Ce-141	26.6	2.1	0.38	24	1.11	More than 3 sigma
1	Cs-134	13.7	3.03	0.31	14	0.98	1 sigma
1	Cs-137	9.58	1.38	0.35	10	0.96	1 sigma
1	Sb-125	24	6.79	1.01	23	1.04	1 sigma
1	Zn-65	10.43	2.15	0.49	11	0.95	1 sigma
2	Be-7	6.69	1.88	0.88	6	1.12	2 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134				0.21		Not Reported
2	Cs-137				0.18		Not Reported
2	K-40	0.25	3.1	1.2			False Positive
2	Nb-95				0.17		Not Reported
2	Pb-210	4.32	2.42	1.31	5.1	0.85	2 sigma
2	Ru-103				0.14		Not Reported
2	Sb-125				0.52		Not Reported
2	Zr-95				0.35		Not Reported
3	Co-57	4.23	1.93	1.76	4	1.06	1 sigma
3	Co-60	2.92	0.63	0.39	3	0.97	1 sigma
3	Cs-137				12		Not Reported
3	Eu-152	8.41	2.86	1.27	8.3	1.01	1 sigma
3	Eu-154	13.3	2.96	0.89	13	1.02	1 sigma
3	Eu-155	6.72	1.15	0.75	6	1.12	2 sigma
3	Tb-161	2.63	2.2	2.08			False Positive

* Expected value is from SYNTH program.

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

RESULTS BY LABORATORY

NP   JAF Environmental Laboratory,   *Software:*   Vertechs Seeker ver. 1.5
         New York Power Authority,   *Reference(s):* Radioactive Decay Data Tables, (Kocher,
         Fulton, NY   1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ac-228	1.11	0.55	1.74			False Positive
1	Ce-141	17.8	0.4	0.398	24	0.74	More than 3 sigma
1	Cs-134	12.8	0.3	0.485	14	0.91	3 sigma
1	Cs-137	8.59	0.36	0.498	10	0.86	More than 3 sigma
1	Ra-226	7.17	1.99	6.2			False Positive
1	Sb-125						Not Reported
1	Zn-65	10.7	0.7	0.935	11	0.97	1 sigma
2	Ac-228	1.2	0.28	0.799			False Positive
2	Be-7	5.41	0.51	1.22	6	0.90	2 sigma
2	Bi-214	43.1	14.1	44			False Positive
2	Ce-141				0.18		Not Reported
2	Cs-134	0.149	0.04	0.146	0.21	0.71	2 sigma
2	Cs-137	0.16	0.057	0.178	0.18	0.89	1 sigma
2	K-40	9.57	1.08	2.31			False Positive
2	Nb-95	0.158	0.06	0.19	0.17	0.93	1 sigma
2	Pb-210				5.1		Not Reported
2	Ra-226	7.13	0.86	2.41			False Positive
2	Ru-103	0.134	0.049	0.155	0.14	0.96	1 sigma
2	Sb-125				0.52		Not Reported
2	Zr-95	0.351	0.116	0.359	0.35	1.00	1 sigma
3	Cd-109	50.6	3.2	7.23			False Positive
3	Co-57	2.91	0.25	0.903	4	0.73	2 sigma
3	Co-60	2.92	0.21	0.471	3	0.97	1 sigma
3	Cs-137	10.3	0.4	0.478	12	0.86	More than 3 sigma
3	Eu-152	6.83	0.45	0.884	8.3	0.82	3 sigma
3	Eu-154				13		Not Reported
3	Eu-155				6		Not Reported
3	K-40	9.16	1.9	4.58			False Positive
3	Ra-226	6.55	1.66	5.04			False Positive
3	Zr-95	0.972	0.291	0.879			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

OD   ORNL, Radiobioassay   *Software:*   Canberra Procount
      Laboratory, Oak Ridge,TN   *Reference(s):* Radioactive Decay Data Tables, (Kocher,
                                                          1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.56	1.5	0.5	24	1.02	2 sigma
1	Cs-134	18.35	1.07	0.59	14	1.31	More than 3 sigma
1	Cs-137	12.97	1.54	0.63	10	1.30	More than 3 sigma
1	I-125	29.1	1.38	1.76			False Positive
1	Sb-125						Not Reported
1	Zn-65	16	1.76	1.2	11	1.45	More than 3 sigma
2	Be-7	7.9	1.16	1.59	6	1.32	More than 3 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.3	0.08	0.21	0.21	1.43	2 sigma
2	Cs-137	0.27	0.12	0.25	0.18	1.50	2 sigma
2	Nb-95	0.32	0.12	0.23	0.17	1.88	3 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.21	0.11	0.2	0.14	1.50	2 sigma
2	Sb-125				0.52		Not Reported
2	Zr-95	0.65	0.18	0.43	0.35	1.86	3 sigma
3	Co-57	2.53	0.74	0.26	4	0.63	3 sigma
3	Co-60	4.76	0.45	0.7	3	1.59	More than 3 sigma
3	Cs-137	15.6	1.82	0.61	12	1.30	More than 3 sigma
3	Eu-152	10.97	0.76	1.13	8.3	1.32	More than 3 sigma
3	Eu-154	15.75	1.16	2.89	13	1.21	More than 3 sigma
3	Eu-155	6.42	0.53	0.85	6	1.07	2 sigma
3	Na-22	6.45	0.83	0.6			False Positive

* Expected value is from SYNTH program.

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

RESULTS BY LABORATORY

OT   ORNL, Radioactive Materials   *Software:*   Canberra Genie-VMS
     Analysis Lab., Oak Ridge, TN   *Reference(s):* Table of Radioactive Isotopes, (Brown and
                                                           Firestone, 1986)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	26	1	0	24	1.08	More than 3 sigma
1	Cs-134	9.5	0.9	0	14	0.68	More than 3 sigma
1	Cs-137	6.5	0.8	0	10	0.65	More than 3 sigma
1	Sb-125	20	2	0	23	0.87	3 sigma
1	Zn-65	7.1	1.6	0	11	0.65	More than 3 sigma
2	Ac-228	0.61	0.44	0			False Positive
2	Be-7	4.9	1.2	0	6	0.82	3 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.14	0.1	0	0.21	0.67	2 sigma
2	Cs-137	0.14	0.11	0	0.18	0.78	1 sigma
2	K-40	2.2	3.5	0			False Positive
2	Nb-95	0.11	0.11	0	0.17	0.65	2 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.12	0.1	0	0.14	0.86	1 sigma
2	Sb-125	0.46	0.29	0	0.52	0.88	2 sigma
2	Zr-95	0.21	0.09	0	0.35	0.60	2 sigma
3	Co-57	4.1	1.7	0	4	1.02	1 sigma
3	Co-60	1.3	0.6	0	3	0.43	More than 3 sigma
3	Cs-137	7.8	0.9	0	12	0.65	More than 3 sigma
3	Eu-152	4	3	0	8.3	0.48	More than 3 sigma
3	Eu-154	7.1	3.1	0	13	0.55	More than 3 sigma
3	Eu-155	5.4	0.7	0	6	0.90	2 sigma

* Expected value is from SYNTH program.

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

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	Evaluation**
1	Ce-141	24	2.7	0.5	24	1.00	1 sigma
1	Cs-134	13.8	1.8	0.3	14	0.99	1 sigma
1	Cs-137	9.86	1.6	0.4	10	0.99	1 sigma
1	Sb-125	20.5	3.3	0.8	23	0.89	3 sigma
1	Zn-65	10.8	2.2	1	11	0.98	1 sigma
2	Be-7	6	1.7	1.5	6	1.00	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134				0.21		Not Reported
2	Cs-137	0.186	0.17	0.2	0.18	1.03	1 sigma
2	Nb-95	0.162	0.16	0.2	0.17	0.95	1 sigma
2	Pb-210	5.09	3.5	4	5.1	1.00	1 sigma
2	Ru-103				0.14		Not Reported
2	Sb-125	0.582	0.36	0.5	0.52	1.12	1 sigma
2	Zr-95	0.436	0.31	0.5	0.35	1.25	1 sigma
3	Co-57	1.28	0.69	1.1	4	0.32	More than 3 sigma
3	Co-60	0.945	0.26	0.3	3	0.31	More than 3 sigma
3	Cs-137	3.95	0.59	0.3	12	0.33	More than 3 sigma
3	Eu-152	2.68	1	1.4	8.3	0.32	More than 3 sigma
3	Eu-154	4.12	0.94	0.7	13	0.32	More than 3 sigma
3	Eu-155	1.96	0.51	0.6	6	0.33	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 LABORATORY

SA   Sandia Labs. Radioactive   *Software:*   Canberra Genie-2000
     Sample Diag. Prog., NM   *Reference(s):* Radioactive Decay Data Tables, (Kocher,
                                                        1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	24.2	4.7	0.56	24	1.01	1 sigma
1	Cs-134	14.1	2.6	0.55	14	1.01	1 sigma
1	Cs-137	9.56	2	0.55	10	0.96	1 sigma
1	Sb-125	23.2	4.8	0.89	23	1.01	1 sigma
1	Zn-65	11	3.2	0.89	11	1.00	1 sigma
2	Be-7	6.25	1.35	1.58	6	1.04	1 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.19	0.14	0.2	0.21	0.90	1 sigma
2	Cs-137	0.2	0.27	0.23	0.18	1.11	1 sigma
2	Cs-141	0.2	0.06	0.26			False Positive***
2	Nb-95				0.17		Not Reported
2	Pb-210	5.26	9.26	5.67	5.1	1.03	1 sigma
2	Ru-103	0.15	0.11	0.19	0.14	1.07	1 sigma
2	Sb-125	0.59	0.43	0.48	0.52	1.13	1 sigma
2	Zr-95	0.38	0.31	0.37	0.35	1.09	1 sigma
3	Co-57	3.83	1.75	0.4	4	0.96	1 sigma
3	Co-60	2.97	1.07	0.48	3	0.99	1 sigma
3	Cs-137	11.4	2.33	0.53	12	0.95	2 sigma
3	Eu-152	7.85	1.77	1.21	8.3	0.95	1 sigma
3	Eu-154	12.8	4.43	2.75	13	0.98	1 sigma
3	Eu-155	6.27	2.06	1.26	6	1.04	1 sigma

* Expected value is from SYNTH program.

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

*** The entry for Cs-141 is probably a data entry error by this laboratory.

RESULTS BY LABORATORY

SL   Stanford Linear Accelerator   *Software:*   Canberra Microsampo
Center, Menlow Park, CA

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

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.6	0.5	0.5	24	0.98	1 sigma
1	Cs-134	13.9	0.5	0.5	14	0.99	1 sigma
1	Cs-137	9.9	0.5	0.5	10	0.99	1 sigma
1	Sb-125	23.3	0.7	1.1	23	1.01	1 sigma
1	Zn-65	11.1	0.7	0.7	11	1.01	1 sigma
2	Be-7	6.5	0.6	0.9	6	1.08	1 sigma
2	Ce-141	0.2	0.1	0.1	0.18	1.11	1 sigma
2	Cs-134	0.2	0.1	0.1	0.21	0.95	1 sigma
2	Cs-137	0.2	0.1	0.1	0.18	1.11	1 sigma
2	Nb-95	0.2	0.1	0.1	0.17	1.18	1 sigma
2	Pb-210				5.1		Not Reported
2	Ru-103	0.2	0.1	0.1	0.14	1.43	2 sigma
2	Sb-125	0.5	0.1	0.3	0.52	0.96	1 sigma
2	Zr-95	0.4	0.1	0.3	0.35	1.14	1 sigma
3	Co-57	3.7	0.5	1.5	4	0.93	1 sigma
3	Co-60	3	0.2	0.3	3	1.00	1 sigma
3	Cs-137	11.8	0.4	0.4	12	0.98	1 sigma
3	Eu-152	9.7	0.2	0.7	8.3	1.17	More than 3 sigma
3	Eu-154	14.8	0.2	1	13	1.14	3 sigma
3	Eu-155	5.7	0.3	0.6	6	0.95	1 sigma

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

TX Texas Dept. of   *Software:*   Canberra Genie-VMS
        Health/Laboratories, Austin, TX *Reference(s):* Radioactive Decay Data Tables (Kocher, 1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141	23.86	0.55	0.73	24	0.99	1 sigma
1	Cs-134	14.05	0.35	0.52	14	1.00	1 sigma
1	Cs-137	9.63	0.47	0.67	10	0.96	1 sigma
1	Sb-125	22.99	0.78	2.02	23	1.00	1 sigma
1	Zn-65	10.71	0.9	1.25	11	0.97	1 sigma
2	Be-7	6.4	0.82	1.71	6	1.07	1 sigma
2	Ce-141	0.12	0.09	0.24	0.18	0.67	1 sigma
2	Cs-134	0.2	0.08	0.19	0.21	0.95	1 sigma
2	Cs-137	0.2	0.09	0.21	0.18	1.11	1 sigma
2	Nb-95	0.23	0.09	0.2	0.17	1.35	2 sigma
2	Pb-210	5.89	2.12	3.85	5.1	1.15	2 sigma
2	Ru-103	0.17	0.09	0.2	0.14	1.21	1 sigma
2	Sb-125	0.64	0.2	0.64	0.52	1.23	1 sigma
2	Zr-95	0.47	0.13	0.37	0.35	1.34	1 sigma
3	Co-57	3.76	1	2.45	4	0.94	1 sigma
3	Co-60	3.04	0.25	0.45	3	1.01	1 sigma
3	Cs-137	11.58	0.51	0.65	12	0.96	1 sigma
3	Eu-152	9.15	0.52	1.45	8.3	1.10	2 sigma
3	Eu-154	13.46	1.07	1.6	13	1.04	1 sigma
3	Eu-155	5.76	0.4	1.07	6	0.96	1 sigma
3	Pb-210	29.36	5.76	12.55			False Positive

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

RESULTS BY LABORATORY

UP   Lockheed Martin Energy   *Software:*   Canberra Procount
      Systems, Y-12, Oak Ridge, TN
                                    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	Evaluation**
1	Ce-141	24.5	3.04	0.522	24	1.02	1 sigma
1	Cs-134	18	3.45	0.629	14	1.29	More than 3 sigma
1	Cs-137	13	3.08	0.683	10	1.30	More than 3 sigma
1	Sb-125	27.9	5.1	1.92	23	1.21	More than 3 sigma
1	Zn-65	16	3.51	1.33	11	1.45	More than 3 sigma
2	Be-7	7.9	2.34	1.69	6	1.32	More than 3 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.226	0.196	0.228	0.21	1.08	1 sigma
2	Cs-137	0.271	0.24	0.265	0.18	1.51	2 sigma
2	Nb-95	0.32	0.239	0.252	0.17	1.88	3 sigma
2	Pb-210	3.9	2.84	2.06	5.1	0.76	More than 3 sigma
2	Ru-103	0.213	0.221	0.212	0.14	1.52	2 sigma
2	Sb-125	0.705	0.612	0.692	0.52	1.36	2 sigma
2	Zr-95	0.588	0.497	0.596	0.35	1.68	2 sigma
3	Co-57				4		***
3	Co-60	4.81	1.37	0.73	3	1.60	More than 3 sigma
3	Cs-137	15.6	3.63	0.66	12	1.30	More than 3 sigma
3	Eu-152	16	5.6	3.44	8.3	1.93	More than 3 sigma
3	Eu-154	20.8	4.92	1.99	13	1.60	More than 3 sigma
3	Eu-155	6.34	1.77	1.14	6	1.06	1 sigma

* Expected value is from SYNTH program.

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

*** Co-57 not reported due to error in letter accompanying spectra.

RESULTS BY LABORATORY

WA Environmental Radiation Lab.,   *Software:*   Canberra Genie-VMS
     Office of Public Health Labs.,   *Reference(s):* Radioactive Decay Data Tables, (Kocher,
     Seattle, WA   1981)

Sample ID	Analyte	Activity	Error	MDA	Exp. Value*	Lab Value / Exp. Value	Evaluation**
1	Ce-141						Not Reported
1	Cs-134	18.5	0.9	0.1	14	1.32	More than 3 sigma
1	Cs-137	13.2	1.3	0.1	10	1.32	More than 3 sigma
1	Sb-125	28.5	2.1	0.2	23	1.24	More than 3 sigma
1	Zn-65	15.9	2.4	0.2	11	1.45	More than 3 sigma
2	Be-7	8	2	0.8	6	1.33	More than 3 sigma
2	Ce-141				0.18		Not Reported
2	Cs-134	0.31	0.17	0.09	0.21	1.48	2 sigma
2	Cs-137	0.27	0.24	0.1	0.18	1.50	2 sigma
2	K-40	10.9	6.6	1.6			False Positive
2	Nb-95				0.17		Not Reported
2	Pb-210				5.1		Not Reported
2	Ru-103				0.14		Not Reported
2	Sb-125				0.52		Not Reported
2	Zr-95				0.35		Not Reported
3	Co-57	3.8	2	0.08	4	0.95	1 sigma
3	Co-60	4.7	0.8	0.1	3	1.57	More than 3 sigma
3	Cs-137	15.8	1.3	0.1	12	1.32	More than 3 sigma
3	Eu-152	9.9	1.6	0.3	8.3	1.19	More than 3 sigma
3	Eu-154	25.5	1.2	0.2	13	1.96	More than 3 sigma
3	Eu-155				6		Not Reported
3	K-40	10.1	9	5			False Positive

* Expected value is from SYNTH program.

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

RESULTS BY LABORATORY

YA   Duke Engineering Services,   *Software:*   Vertechs Software Solutions, GDR/P ver. 3.1
Bolton, MA

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	Evaluation**
1	Ce-141	24.12	0.503	0.707	24	1.00	1 sigma
1	Cs-134	13.73	0.31	0.365	14	0.98	1 sigma
1	Cs-137	9.738	0.416	0.694	10	0.97	1 sigma
1	Sb-125	22.91	0.642	1.986	23	1.00	1 sigma
1	Xe-133	0.641	0.254	0.71			False Positive
1	Zn-65	10.72	0.706	1.109	11	0.97	1 sigma
2	Be-7	6.314	0.649	1.732	6	1.05	1 sigma
2	Ce-141	0.12	0.054	0.158	0.18	0.67	1 sigma
2	Cs-134	0.236	0.046	0.177	0.21	1.12	1 sigma
2	Cs-137	0.169	0.074	0.251	0.18	0.94	1 sigma
2	Nb-95	0.137	0.073	0.247	0.17	0.81	1 sigma
2	Pb-210	5.242	1.223	3.521	5.1	1.03	1 sigma
2	Ru-103	0.14	0.068	0.232	0.14	1.00	1 sigma
2	Sb-125	0.629	0.14	0.592	0.52	1.21	1 sigma
2	Zr-95	0.338	0.101	0.406	0.35	0.97	1 sigma
3	Co-57	3.94	0.863	2.828	4	0.99	1 sigma
3	Co-60	2.964	0.216	0.57	3	0.99	1 sigma
3	Cs-137	11.69	0.446	0.665	12	0.97	1 sigma
3	Eu-152	8.514	0.426	1.447	8.3	1.03	1 sigma
3	Eu-154	12.98	0.56	0.504	13	1.00	1 sigma
3	Eu-155	6.084	0.346	0.868	6	1.01	1 sigma

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.

Appendix B

RESULTS BY ISOTOPE - sorted by lab

Be-7

Sample 2

Expected Value* = 6.0

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 6.2 +/- 0.4

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	5.87	0.86	0.317	Ortec Maestro-Omnigam	0.98	1 sigma
BR1	5.87	0.86	0.317	Ortec Maestro-Minigam	0.98	1 sigma
BX	6.57	0.85	1.32	Canberra Genie-VMS	1.10	2 sigma
CA	6.12	0.65	0.98	Aptec ver. 5.3	1.02	1 sigma
CH	6.357	1.638	1.277	Canberra ProCount	1.06	1 sigma
FG	6.15	0.79	1.9	Aptec ver. 9.0	1.02	1 sigma
FL	6.3	0.8	1.4	Canberra Genie-VMS	1.05	1 sigma
FM	6.4	0.6	1.1	Canberra Sampo-90	1.07	1 sigma
GT	6.033	2.631	0.649	Canberra ProCount	1.01	1 sigma
IS	6.319	1.867	1.417	Canberra ProCount	1.05	1 sigma
KO	6.287	0.698	0.947	Aptec ver. 6.31	1.05	1 sigma
LA	6.06	0.51	1.1	Ortec GELIGAM	1.01	1 sigma
LA1	5.97	1.43	0.16	Ortec Gammavision	0.99	1 sigma
LB	6.376	1.485	1.817	Aptec ver. 4.3	1.06	1 sigma
ML	6.15	0.52	1.04	Canberra Sampo-90	1.02	1 sigma
ML1				Aptec ver. 5.3		Not Reported
NE	6.03	0.44	0.1	Ortec Gammavision	1.00	1 sigma
NL	6.42	0.83	1.7	Canberra/ND Genie 9900	1.07	1 sigma
NO	6.69	1.88	0.88	Aptec ver. 6.31	1.12	2 sigma
NP	5.41	0.51	1.22	Vertechs Seeker ver 1.5	0.90	2 sigma
OD	7.9	1.16	1.59	Canberra ProCount	1.32	More than 3 sigma
OT	4.9	1.2	0	Canberra Genie-VMS	0.82	3 sigma
RE	6	1.7	1.5	In House	1.00	1 sigma
SA	6.25	1.35	1.58	Canberra Genie-2000	1.04	1 sigma
SL	6.5	0.6	0.9	Canberra Micro Sampo	1.08	1 sigma
TX	6.4	0.82	1.71	Canberra Genie-VMS	1.07	1 sigma
UP	7.9	2.34	1.69	Canberra ProCount	1.32	More than 3 sigma
WA	8	2	0.8	Canberra Genie-VMS	1.33	More than 3 sigma
YA	6.314	0.649	1.732	Vertechs GDR/P ver 3.1	1.05	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-141

Sample 1

Expected Value* = 24.0

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 24.0 +/- 0.4

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	24.1	1.02	0.334	Ortec Maestro-Omnigam	1.00	1 sigma
BR1	23	0.99	0.427	Ortec Maestro-Minigam	0.96	1 sigma
BX	23.88	0.55	0.48	Canberra Genie-VMS	0.99	1 sigma
CA	24.26	1.05	0.46	Aptec ver. 5.3	1.01	1 sigma
CH	26.69	1.231	0.5415	Canberra ProCount	1.11	More than 3 sigma
FG	24.25	1.3	2.8	Aptec ver. 9.0	1.01	1 sigma
FL	23.6	0.5	0.3	Canberra Genie-VMS	0.98	1 sigma
FM	23.9	1	0.4	Canberra Sampo-90	1.00	1 sigma
GT	25.05	5.658	0.273	Canberra ProCount	1.04	3 sigma
IS	24.26	3.803	0.5159	Canberra ProCount	1.01	1 sigma
KO	24.02	1.283	0.463	Aptec ver. 6.31	1.00	1 sigma
LA	24.5	0.7	0.11	Ortec GELIGAM	1.02	1 sigma
LA1	23.58	2.29	0.19	Ortec Gammavision	0.98	1 sigma
LB	23.79	2.48	0.93	Aptec ver. 4.3	0.99	1 sigma
ML	24.28	1.12	0.4	Canberra Sampo-90	1.01	1 sigma
ML1	24.19	1.14	0.52	Aptec ver. 5.3	1.01	1 sigma
NE	23.87	0.53	0.2	Ortec Gammavision	0.99	1 sigma
NL	24	0.55	0.73	Canberra/ND Genie 9900	1.00	1 sigma
NO	26.6	2.1	0.38	Aptec ver. 6.31	1.11	More than 3 sigma
NP	17.8	0.4	0.398	Vertechs Seeker ver 1.5	0.74	More than 3 sigma
OD	24.56	1.5	0.5	Canberra ProCount	1.02	2 sigma
OT	26	1	0	Canberra Genie-VMS	1.08	More than 3 sigma
RE	24	2.7	0.5	In House	1.00	1 sigma
SA	24.2	4.7	0.56	Canberra Genie-2000	1.01	1 sigma
SL	23.6	0.5	0.5	Canberra Micro Sampo	0.98	1 sigma
TX	23.86	0.55	0.73	Canberra Genie-VMS	0.99	1 sigma
UP	24.5	3.04	0.522	Canberra ProCount	1.02	1 sigma
WA				Canberra Genie-VMS		Not Reported
YA	24.12	0.503	0.707	Vertechs GDR/P ver 3.1	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

Ce-141

	Expected Value* =	0.18
Sample 2	*Calculated 1 sigma uncertainty =*	0.06
	Mean +/- SD of Reported Value =	0.16 +/- 0.03

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.173	0.065	0.0505	Ortec Maestro-Omnigam	0.96	1 sigma
BR1	0.176	0.072	0.0498	Ortec Maestro-Minigam	0.98	1 sigma
BX	0.15	0.1	0.2	Canberra Genie-VMS	0.83	1 sigma
CA				Aptec ver. 5.3		Not Reported
CH				Canberra ProCount		Not Reported
FG				Aptec ver. 9.0		Not Reported
FL	0.13	0.09	0.18	Canberra Genie-VMS	0.72	1 sigma
FM	0.2	0.05	0.2	Canberra Sampo-90	1.11	1 sigma
GT				Canberra ProCount		Not Reported
IS				Canberra ProCount		Not Reported
KO				Aptec ver. 6.31		Not Reported
LA	0.18	0.03	0.11	Ortec GELIGAM	1.00	1 sigma
LA1	0.17	0.13	0.02	Ortec Gammavision	0.94	1 sigma
LB	0.0839	0.1176	0.1939	Aptec ver. 4.3	0.47	2 sigma
ML	0.14	0.05	0.16	Canberra Sampo-90	0.78	1 sigma
ML1	0.22	0.1	0.19	Aptec ver. 5.3	1.22	1 sigma
NE				Ortec Gammavision		Not Reported
NL	0.12	0.09	0.24	Canberra/ND Genie 9900	0.67	1 sigma
NO				Aptec ver. 6.31		Not Reported
NP				Vertechs Seeker ver 1.5		Not Reported
OD				Canberra ProCount		Not Reported
OT				Canberra Genie-VMS		Not Reported
RE				In House		Not Reported
SA				Canberra Genie-2000		Not Reported
SL	0.2	0.1	0.1	Canberra Micro Sampo	1.11	1 sigma
TX	0.12	0.09	0.24	Canberra Genie-VMS	0.67	1 sigma
UP				Canberra ProCount		Not Reported
WA				Canberra Genie-VMS		Not Reported
YA	0.12	0.054	0.158	Vertechs GDR/P ver 3.1	0.67	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* =   4.0

Sample 3

Calculated 1 sigma uncertainty = 0.7

Mean +/- SD of Reported Value = 3.7 +/- 0.5

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	6.41	0.62	0.518	Ortec Maestro-Omnigam	1.60	More than 3 sigma
BR1	6.43	0.62	0.342	Ortec Maestro-Minigam	1.61	More than 3 sigma
BX	3.21	0.55	0.24	Canberra Genie-VMS	0.80	2 sigma
CA	11.72	0.71	0.8	Aptec ver. 5.3	2.93	More than 3 sigma
CH	4.289	2.266	0.2633	Canberra ProCount	1.07	1 sigma
FG				Aptec ver. 9.0		***
FL	4.4	0.2	0.17	Canberra Genie-VMS	1.10	1 sigma
FM	3.4	0.3	0.2	Canberra Sampo-90	0.85	1 sigma
GT	3.945	3.243	0.134	Canberra ProCount	0.99	1 sigma
IS	2.992	0.5318	0.08527	Canberra ProCount	0.75	2 sigma
KO	3.752	0.87	1.559	Aptec ver. 6.31	0.94	1 sigma
LA	7.24	0.36	0.08	Ortec GELIGAM	1.81	More than 3 sigma
LA1	6.43	0.96	0.31	Ortec Gammavision	1.61	More than 3 sigma
LB	3.693	1.711	3.146	Aptec ver. 4.3	0.92	1 sigma
ML	3.65	0.26	1.54	Canberra Sampo-90	0.91	1 sigma
ML1	3.83	0.8	1.4	Aptec ver. 5.3	0.96	1 sigma
NE	4.23	1.21	0.5	Ortec Gammavision	1.06	1 sigma
NL				Canberra/ND Genie 9900		***
NO	4.23	1.93	1.76	Aptec ver. 6.31	1.06	1 sigma
NP	2.91	0.25	0.903	Vertechs Seeker ver 1.5	0.73	2 sigma
OD	2.53	0.74	0.26	Canberra ProCount	0.63	3 sigma
OT	4.1	1.7	0	Canberra Genie-VMS	1.02	1 sigma
RE	1.28	0.69	1.1	In House	0.32	More than 3 sigma
SA	3.83	1.75	0.4	Canberra Genie-2000	0.96	1 sigma
SL	3.7	0.5	1.5	Canberra Micro Sampo	0.93	1 sigma
TX	3.76	1	2.45	Canberra Genie-VMS	0.94	1 sigma
UP				Canberra ProCount		***
WA	3.8	2	0.08	Canberra Genie-VMS	0.95	1 sigma
YA	3.94	0.863	2.828	Vertechs GDR/P ver 3.1	0.99	1 sigma

* Expected value is from SYNTH program.
** Comparison is with the expected value using the sigma values calculated by EML.
*** Co-57 not reported due to error in letter accompanying spectra.

RESULTS BY ISOTOPE - sorted by lab

Co-60

Sample 3

Expected Value* = 3.0

Calculated 1 sigma uncertainty = 0.3

Mean +/- SD of Reported Value = 3.0 **+/-** 0.06

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	2.99	0.41	0.0999	Ortec Maestro-Omnigam	1.00	1 sigma
BR1	2.99	0.39	0.0444	Ortec Maestro-Minigam	1.00	1 sigma
BX	3.1	0.33	0.39	Canberra Genie-VMS	1.03	1 sigma
CA	3.06	0.34	0.29	Aptec ver. 5.3	1.02	1 sigma
CH	3.006	0.4885	0.3848	Canberra ProCount	1.00	1 sigma
FG	2.94	0.5	1.2	Aptec ver. 9.0	0.98	1 sigma
FL	3	0.2	0.33	Canberra Genie-VMS	1.00	1 sigma
FM	3	0.2	0.3	Canberra Sampo-90	1.00	1 sigma
GT	3.141	0.885	0.202	Canberra ProCount	1.05	1 sigma
IS	1.04	0.2528	0.1647	Canberra ProCount	0.35	More than 3 sigma
KO	3.024	0.353	0.294	Aptec ver. 6.31	1.01	1 sigma
LA	3.04	0.23	0.11	Ortec GELIGAM	1.01	1 sigma
LA1	3.04	0.74	0.14	Ortec Gammavision	1.01	1 sigma
LB	2.899	0.6826	0.666	Aptec ver. 4.3	0.97	1 sigma
ML	3.06	0.21	0.44	Canberra Sampo-90	1.02	1 sigma
ML1	2.94	0.31	0.29	Aptec ver. 5.3	0.98	1 sigma
NE	3.09	0.24	0.1	Ortec Gammavision	1.03	1 sigma
NL	3.1	0.5	0.63	Canberra/ND Genie 9900	1.03	1 sigma
NO	2.92	0.63	0.39	Aptec ver. 6.31	0.97	1 sigma
NP	2.92	0.21	0.471	Vertechs Seeker ver 1.5	0.97	1 sigma
OD	4.76	0.45	0.7	Canberra ProCount	1.59	More than 3 sigma
OT	1.3	0.6	0	Canberra Genie-VMS	0.43	More than 3 sigma
RE	0.945	0.26	0.3	In House	0.31	More than 3 sigma
SA	2.97	1.07	0.48	Canberra Genie-2000	0.99	1 sigma
SL	3	0.2	0.3	Canberra Micro Sampo	1.00	1 sigma
TX	3.04	0.25	0.45	Canberra Genie-VMS	1.01	1 sigma
UP	4.81	1.37	0.73	Canberra ProCount	1.60	More than 3 sigma
WA	4.7	0.8	0.1	Canberra Genie-VMS	1.57	More than 3 sigma
YA	2.964	0.216	0.57	Vertechs GDR/P ver 3.1	0.99	1 sigma

* Expected value is from SYNTH program.

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

EML Gamma Spec. Data Eval. Program   **EML-602**

February 1999

RESULTS BY ISOTOPE - sorted by lab

Cs-134

Sample 1

Expected Value* = 14.0

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 13.8 +/- 0.4

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	13.7	0.98	0.57	Ortec Maestro-Omnigam	0.98	1 sigma
BR1	13.7	0.96	0.541	Ortec Maestro-Minigam	0.98	1 sigma
BX	13.87	0.52	0.41	Canberra Genie-VMS	0.99	1 sigma
CA	13.91	0.92	4.5	Aptec ver. 5.3	0.99	1 sigma
CH	13.15	0.6287	0.4314	Canberra ProCount	0.94	2 sigma
FG	14.43	0.9	2.1	Aptec ver. 9.0	1.03	1 sigma
FL	13.7	0.4	0.38	Canberra Genie-VMS	0.98	1 sigma
FM	13.7	0.3	0.4	Canberra Sampo-90	0.98	1 sigma
GT	13.31	2.007	0.213	Canberra ProCount	0.95	2 sigma
IS	14.28	2.597	0.501	Canberra ProCount	1.02	1 sigma
KO	13.72	1.045	0.285	Aptec ver. 6.31	0.98	1 sigma
LA	13.7	0.6	0.1	Ortec GELIGAM	0.98	1 sigma
LA1	13.48	1.64	0.31	Ortec Gammavision	0.96	1 sigma
LB	14.31	2.01	4.11	Aptec ver. 4.3	1.02	1 sigma
ML	13.58	0.1	0.38	Canberra Sampo-90	0.97	1 sigma
ML1	14.26	0.81	0.34	Aptec ver. 5.3	1.02	1 sigma
NE	13.59	0.44	0.2	Ortec Gammavision	0.97	1 sigma
NL	14.13	0.51	0.53	Canberra/ND Genie 9900	1.01	1 sigma
NO	13.7	3.03	0.31	Aptec ver. 6.31	0.98	1 sigma
NP	12.8	0.3	0.485	Vertechs Seeker ver 1.5	0.91	3 sigma
OD	18.35	1.07	0.59	Canberra ProCount	1.31	More than 3 sigma
OT	9.5	0.9	0	Canberra Genie-VMS	0.68	More than 3 sigma
RE	13.8	1.8	0.3	In House	0.99	1 sigma
SA	14.1	2.6	0.55	Canberra Genie-2000	1.01	1 sigma
SL	13.9	0.5	0.5	Canberra Micro Sampo	0.99	1 sigma
TX	14.05	0.35	0.52	Canberra Genie-VMS	1.00	1 sigma
UP	18	3.45	0.629	Canberra ProCount	1.29	More than 3 sigma
WA	18.5	0.9	0.1	Canberra Genie-VMS	1.32	More than 3 sigma
YA	13.73	0.31	0.365	Vertechs GDR/P ver 3.1	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-134

Sample 2

Expected Value* =   0.21

Calculated 1 sigma uncertainty = 0.05

Mean +/- SD of Reported Value = 0.22 +/- 0.05

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.202	0.054	0.0679	Ortec Maestro-Omnigam	0.96	1 sigma
BR1	0.202	0.054	0.0679	Ortec Maestro-Minigam	0.96	1 sigma
BX	0.34	0.1	0.19	Canberra Genie-VMS	1.62	3 sigma
CA	0.18	0.06	0.12	Aptec ver. 5.3	0.86	1 sigma
CH	0.1658	0.1405	0.1572	Canberra ProCount	0.79	1 sigma
FG	0.287	0.09	0.21	Aptec ver. 9.0	1.37	2 sigma
FL	0.23	0.06	0.23	Canberra Genie-VMS	1.10	1 sigma
FM	0.2	0.02	0.1	Canberra Sampo-90	0.95	1 sigma
GT	0.219	0.176	0.085	Canberra ProCount	1.04	1 sigma
IS	0.193	0.1581	0.185	Canberra ProCount	0.92	1 sigma
KO	0.192	0.074	0.153	Aptec ver. 6.31	0.91	1 sigma
LA	0.2	0.03	0.1	Ortec GELIGAM	0.95	1 sigma
LA1	0.2	0.08	0.03	Ortec Gammavision	0.95	1 sigma
LB	0.2905	0.169	0.224	Aptec ver. 4.3	1.38	2 sigma
ML	0.19	0.01	0.15	Canberra Sampo-90	0.90	1 sigma
ML1	0.23	0.07	0.11	Aptec ver. 5.3	1.10	1 sigma
NE	0.2	0.03	0.01	Ortec Gammavision	0.95	1 sigma
NL	0.21	0.13	0.23	Canberra/ND Genie 9900	1.00	1 sigma
NO				Aptec ver. 6.31		Not Reported
NP	0.149	0.04	0.146	Vertechs Seeker ver 1.5	0.71	2 sigma
OD	0.3	0.08	0.21	Canberra ProCount	1.43	2 sigma
OT	0.14	0.1	0	Canberra Genie-VMS	0.67	2 sigma
RE				In House		Not Reported
SA	0.19	0.14	0.2	Canberra Genie-2000	0.90	1 sigma
SL	0.2	0.1	0.1	Canberra Micro Sampo	0.95	1 sigma
TX	0.2	0.08	0.19	Canberra Genie-VMS	0.95	1 sigma
UP	0.226	0.196	0.228	Canberra ProCount	1.08	1 sigma
WA	0.31	0.17	0.09	Canberra Genie-VMS	1.48	2 sigma
YA	0.236	0.046	0.177	Vertechs GDR/P ver 3.1	1.12	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* =*   10.0

                          Calculated 1 sigma uncertainty = 0.5

Sample 1

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

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	9.94	0.82	0.299	Ortec Maestro-Omnigam	0.99	1 sigma
BR1	9.95	0.87	0.319	Ortec Maestro-Minigam	1.00	1 sigma
BX	9.75	0.48	0.47	Canberra Genie-VMS	0.98	1 sigma
CA	9.72	0.53	0.37	Aptec ver. 5.3	0.97	1 sigma
CH	9.364	0.8917	0.4488	Canberra ProCount	0.94	2 sigma
FG	9.75	0.8	1.8	Aptec ver. 9.0	0.98	1 sigma
FL	9.8	0.5	0.32	Canberra Genie-VMS	0.98	1 sigma
FM	9.7	0.5	0.4	Canberra Sampo-90	0.97	1 sigma
GT	9.372	2.742	0.243	Canberra ProCount	0.94	2 sigma
IS	9.605	1.914	0.5355	Canberra ProCount	0.96	1 sigma
KO	9.906	0.955	0.365	Aptec ver. 6.31	0.99	1 sigma
LA	9.86	0.51	0.11	Ortec GELIGAM	0.99	1 sigma
LA1	9.9	1.53	0.19	Ortec Gammavision	0.99	1 sigma
LB	9.92	1.26	0.87	Aptec ver. 4.3	0.99	1 sigma
ML	9.57	0.13	0.4	Canberra Sampo-90	0.96	1 sigma
ML1				Aptec ver. 5.3		Not Reported
NE	9.95	0.45	0.2	Ortec Gammavision	1.00	1 sigma
NL	9.73	0.48	0.67	Canberra/ND Genie 9900	0.97	1 sigma
NO	9.58	1.38	0.35	Aptec ver. 6.31	0.96	1 sigma
NP	8.59	0.36	0.498	Vertechs Seeker ver 1.5	0.86	More than 3 sigma
OD	12.97	1.54	0.63	Canberra ProCount	1.30	More than 3 sigma
OT	6.5	0.8	0	Canberra Genie-VMS	0.65	More than 3 sigma
RE	9.86	1.6	0.4	In House	0.99	1 sigma
SA	9.56	2	0.55	Canberra Genie-2000	0.96	1 sigma
SL	9.9	0.5	0.5	Canberra Micro Sampo	0.99	1 sigma
TX	9.63	0.47	0.67	Canberra Genie-VMS	0.96	1 sigma
UP	13	3.08	0.683	Canberra ProCount	1.30	More than 3 sigma
WA	13.2	1.3	0.1	Canberra Genie-VMS	1.32	More than 3 sigma
YA	9.738	0.416	0.694	Vertechs GDR/P ver 3.1	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

Cs-137

Sample 2

Expected Value* = 0.18

Calculated 1 sigma uncertainty = 0.05

Mean +/- SD of Reported Value = 0.19 +/- 0.02

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.192	0.062	0.0202	Ortec Maestro-Omnigam	0.91	1 sigma
BR1	0.192	0.062	0.0202	Ortec Maestro-Minigam	0.91	1 sigma
BX	0.2	0.088	0.19	Canberra Genie-VMS	0.95	1 sigma
CA	0.16	0.06	0.12	Aptec ver. 5.3	0.76	1 sigma
CH	0.1935	0.1661	0.1779	Canberra ProCount	0.92	1 sigma
FG	0.437	0.09	0.22	Aptec ver. 9.0	2.08	More than 3 sigma
FL	0.21	0.09	0.2	Canberra Genie-VMS	1.00	1 sigma
FM	0.2	0.05	0.1	Canberra Sampo-90	0.95	1 sigma
GT	0.196	0.257	0.099	Canberra ProCount	0.93	1 sigma
IS	0.2009	0.1747	0.2131	Canberra ProCount	0.96	1 sigma
KO	0.161	0.064	0.118	Aptec ver. 6.31	0.77	1 sigma
LA	0.19	0.03	0.11	Ortec GELIGAM	0.90	1 sigma
LA1	0.19	0.09	0.01	Ortec Gammavision	0.90	1 sigma
LB	0.1705	0.1434	0.2274	Aptec ver. 4.3	0.81	1 sigma
ML	0.19	0.05	0.15	Canberra Sampo-90	0.90	1 sigma
ML1	0.17	0.07	0.14	Aptec ver. 5.3	0.81	1 sigma
NE	0.19	0.03	0.01	Ortec Gammavision	0.90	1 sigma
NL	0.2	0.09	0.22	Canberra/ND Genie 9900	0.95	1 sigma
NO				Aptec ver. 6.31		Not Reported
NP	0.16	0.057	0.178	Vertechs Seeker ver 1.5	0.76	1 sigma
OD	0.27	0.12	0.25	Canberra ProCount	1.29	2 sigma
OT	0.14	0.11	0	Canberra Genie-VMS	0.67	1 sigma
RE	0.186	0.17	0.2	In House	0.89	1 sigma
SA	0.2	0.27	0.23	Canberra Genie-2000	0.95	1 sigma
SL	0.2	0.1	0.1	Canberra Micro Sampo	0.95	1 sigma
TX	0.2	0.09	0.21	Canberra Genie-VMS	0.95	1 sigma
UP	0.271	0.24	0.265	Canberra ProCount	1.29	2 sigma
WA	0.27	0.24	0.1	Canberra Genie-VMS	1.29	2 sigma
YA	0.169	0.074	0.251	Vertechs GDR/P ver 3.1	0.80	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

Sample 3

Expected Value* = 12.0

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 11.6 +/- 0.4

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	12	0.92	0.286	Ortec Maestro-Omnigam	1.00	1 sigma
BR1	11.9	0.88	0.172	Ortec Maestro-Minigam	0.99	1 sigma
BX	11.73	0.51	0.46	Canberra Genie-VMS	0.98	1 sigma
CA	11.66	0.6	0.37	Aptec ver. 5.3	0.97	1 sigma
CH	11.16	0.949	0.4339	Canberra ProCount	0.93	2 sigma
FG	11.63	0.8	1.9	Aptec ver. 9.0	0.97	1 sigma
FL	11.8	0.5	0.32	Canberra Genie-VMS	0.98	1 sigma
FM	11.6	0.5	0.4	Canberra Sampo-90	0.97	1 sigma
GT	11.27	3.205	0.236	Canberra ProCount	0.94	2 sigma
IS	3.851	0.6394	0.1741	Canberra ProCount	0.32	More than 3 sigma
KO	11.48	1.125	0.39	Aptec ver. 6.31	0.96	2 sigma
LA	11.8	0.52	0.11	Ortec GELIGAM	0.98	1 sigma
LA1	11.81	1.57	0.17	Ortec Gammavision	0.98	1 sigma
LB	11.83	1.429	0.8511	Aptec ver. 4.3	0.99	1 sigma
ML	11.47	0.45	0.38	Canberra Sampo-90	0.96	2 sigma
ML1	11.84	0.47	0.4	Aptec ver. 5.3	0.99	1 sigma
NE	11.86	0.48	0.2	Ortec Gammavision	0.99	1 sigma
NL	11.1	1	0.62	Canberra/ND Genie 9900	0.93	2 sigma
NO				Aptec ver. 6.31		Not Reported
NP	10.3	0.4	0.478	Vertechs Seeker ver 1.5	0.86	More than 3 sigma
OD	15.6	1.82	0.61	Canberra ProCount	1.30	More than 3 sigma
OT	7.8	0.9	0	Canberra Genie-VMS	0.65	More than 3 sigma
RE	3.95	0.59	0.3	In House	0.33	More than 3 sigma
SA	11.4	2.33	0.53	Canberra Genie-2000	0.95	2 sigma
SL	11.8	0.4	0.4	Canberra Micro Sampo	0.98	1 sigma
TX	11.58	0.51	0.65	Canberra Genie-VMS	0.96	1 sigma
UP	15.6	3.63	0.66	Canberra ProCount	1.30	More than 3 sigma
WA	15.8	1.3	0.1	Canberra Genie-VMS	1.32	More than 3 sigma
YA	11.69	0.446	0.665	Vertechs GDR/P ver 3.1	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

Eu-152

Expected Value* = 8.3

Calculated 1 sigma uncertainty = 0.5

Sample 3

Mean +/- SD of Reported Value = 8.9 +/- 0.9

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR				Ortec Maestro-Omnigam		Not Reported
BR1				Ortec Maestro-Minigam		Not Reported
BX	10.51	1.33	1.88	Canberra Genie-VMS	1.27	More than 3 sigma
CA	8.56	1.51	2.33	Aptec ver. 5.3	1.03	1 sigma
CH	10.04	2.536	1.796	Canberra ProCount	1.21	More than 3 sigma
FG	8.47	2	4.8	Aptec ver. 9.0	1.02	1 sigma
FL	8.8	0.6	0.51	Canberra Genie-VMS	1.06	2 sigma
FM	9	0.5	0.6	Canberra Sampo-90	1.08	2 sigma
GT	8.939	1.76	0.402	Canberra ProCount	1.08	2 sigma
IS	3.369	0.9459	0.7867	Canberra ProCount	0.41	More than 3 sigma
KO	8.531	1.607	0.726	Aptec ver. 6.31	1.03	1 sigma
LA	8.53	0.63	0.66	Ortec GELIGAM	1.03	1 sigma
LA1	8.59	1.85	1.08	Ortec Gammavision	1.03	1 sigma
LB	8.23	3.757	1.05	Aptec ver. 4.3	0.99	1 sigma
ML	8.74	0.13	3.48	Canberra Sampo-90	1.05	1 sigma
ML1	8.65	1.49	6.91	Aptec ver. 5.3	1.04	1 sigma
NE	8.75	0.6	0.2	Ortec Gammavision	1.05	1 sigma
NL	8.98	0.87	5.5	Canberra/ND Genie 9900	1.08	2 sigma
NO	8.41	2.86	1.27	Aptec ver. 6.31	1.01	1 sigma
NP	6.83	0.45	0.884	Vertechs Seeker ver 1.5	0.82	More than 3 sigma
OD	10.97	0.76	1.13	Canberra ProCount	1.32	More than 3 sigma
OT	4	3	0	Canberra Genie-VMS	0.48	More than 3 sigma
RE	2.68	1	1.4	In House	0.32	More than 3 sigma
SA	7.85	1.77	1.21	Canberra Genie-2000	0.95	1 sigma
SL	9.7	0.2	0.7	Canberra Micro Sampo	1.17	More than 3 sigma
TX	9.15	0.52	1.45	Canberra Genie-VMS	1.10	2 sigma
UP	16	5.6	3.44	Canberra ProCount	1.93	More than 3 sigma
WA	9.9	1.6	0.3	Canberra Genie-VMS	1.19	More than 3 sigma
YA	8.514	0.426	1.447	Vertechs GDR/P ver 3.1	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 lab

Eu-154

Expected Value* = 13.0

Sample 3

Calculated 1 sigma uncertainty = 0.7

Mean +/- SD of Reported Value = 13.1 *+/-* 1.4

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	12.8	1.39	1.13	Ortec Maestro-Omnigam	0.98	1 sigma
BR1	12.2	1.34	0.753	Ortec Maestro-Minigam	0.94	2 sigma
BX	12.39	1.57	2.18	Canberra Genie-VMS	0.95	1 sigma
CA				Aptec ver. 5.3		Not Reported
CH	12.89	1.025	11.61	Canberra ProCount	0.99	1 sigma
FG	13.6	0.3	0.8	Aptec ver. 6.31	1.05	1 sigma
FL	10.8	0.5	0.36	Canberra Genie-VMS	0.83	More than 3 sigma
FM	12	0.5	0.4	Canberra Sampo-90	0.92	2 sigma
GT	13.13	2.435	0.585	Canberra ProCount	1.01	1 sigma
IS	4.038	1.692	1.502	Canberra ProCount	0.31	More than 3 sigma
KO	12.63	1.657	1.571	Aptec ver. 6.31	0.97	1 sigma
LA	13.1	0.83	0.36	Ortec GELIGAM	1.01	1 sigma
LA1	9.71	2.18	0.72	Ortec Gammavision	0.75	More than 3 sigma
LB	16.73	3.387	1.05	Aptec ver. 4.3	1.29	More than 3 sigma
ML	13.14	0.15	2.38	Canberra Sampo-90	1.01	1 sigma
ML1	13.03	1.63	0.83	Aptec ver. 9.0	1.00	1 sigma
NE	13.39	0.92	0.5	Ortec Gammavision	1.03	1 sigma
NL	13.4	2.9	4.3	Canberra/ND Genie 9900	1.03	1 sigma
NO	13.3	2.96	0.89	Aptec ver. 5.3	1.02	1 sigma
NP				Vertechs Seeker ver 1.5		Not Reported
OD	15.75	1.16	2.89	Canberra ProCount	1.21	More than 3 sigma
OT	7.1	3.1	0	Canberra Genie-VMS	0.55	More than 3 sigma
RE	4.12	0.94	0.7	In House	0.32	More than 3 sigma
SA	12.8	4.43	2.75	Canberra Genie-2000	0.98	1 sigma
SL	14.8	0.2	1	Canberra Micro Sampo	1.14	3 sigma
TX	13.46	1.07	1.6	Canberra Genie-VMS	1.04	1 sigma
UP	20.8	4.92	1.99	Canberra ProCount	1.60	More than 3 sigma
WA	25.5	1.2	0.2	Canberra Genie-VMS	1.96	More than 3 sigma
YA	12.98	0.56	0.504	Vertechs GDR/P ver 3.1	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-155

Expected Value* =   6.0

Sample 3

Calculated 1 sigma uncertainty = 0.4

Mean +/- SD of Reported Value = 5.9   +/- 0.4

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	5.14	0.6	0.426	Ortec Maestro-Omnigam	0.86	3 sigma
BR1				Ortec Maestro-Minigam		Not Reported
BX	5.44	0.59	0.93	Canberra Genie-VMS	0.91	2 sigma
CA	6.14	0.56	0.71	Aptec ver. 5.3	1.02	1 sigma
CH	6.148	0.8388	1.036	Canberra ProCount	1.02	1 sigma
FG	6.37	0.6	1.3	Aptec ver. 9.0	1.06	1 sigma
FL	5.3	0.3	0.54	Canberra Genie-VMS	0.88	2 sigma
FM	5.5	0.3	0.6	Canberra Sampo-90	0.92	2 sigma
GT	6.095	1.534	0.432	Canberra ProCount	1.02	1 sigma
IS	1.962	0.5521	0.3478	Canberra ProCount	0.33	More than 3 sigma
KO	5.946	0.568	0.629	Aptec ver. 6.31	0.99	1 sigma
LA	5.98	0.34	0.24	Ortec GELIGAM	1.00	1 sigma
LA1	6.02	1.39	0.24	Ortec Gammavision	1.00	1 sigma
LB	5.902	1.129	1.544	Aptec ver. 4.3	0.98	1 sigma
ML	5.44	0.3	0.82	Canberra Sampo-90	0.91	2 sigma
ML1	5.78	0.61	0.89	Aptec ver. 5.3	0.96	1 sigma
NE				Ortec Gammavision		Not Reported
NL	5.88	0.58	0.45	Canberra/ND Genie 9900	0.98	1 sigma
NO	6.72	1.15	0.75	Aptec ver. 6.31	1.12	2 sigma
NP				Vertechs Seeker ver 1.5		Not Reported
OD	6.42	0.53	0.85	Canberra ProCount	1.07	2 sigma
OT	5.4	0.7	0	Canberra Genie-VMS	0.90	2 sigma
RE	1.96	0.51	0.6	In House	0.33	More than 3 sigma
SA	6.27	2.06	1.26	Canberra Genie-2000	1.04	1 sigma
SL	5.7	0.3	0.6	Canberra Micro Sampo	0.95	1 sigma
TX	5.76	0.4	1.07	Canberra Genie-VMS	0.96	1 sigma
UP	6.34	1.77	1.14	Canberra ProCount	1.06	1 sigma
WA				Canberra Genie-VMS		Not Reported
YA	6.084	0.346	0.868	Vertechs GDR/P ver 3.1	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

Nb-95

Sample 2

	Expected Value* =		0.17			
	Calculated 1 sigma uncertainty =		0.05			
	Mean +/- SD of Reported Value =		0.19 +/- 0.05			

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.17	0.058	0.0196	Ortec Maestro-Omnigam	1.00	1 sigma
BR1	0.17	0.058	0.0196	Ortec Maestro-Minigam	1.00	1 sigma
BX	0.23	0.08	0.18	Canberra Genie-VMS	1.35	2 sigma
CA	0.14	0.06	0.12	Aptec ver. 5.3	0.82	1 sigma
CH				Canberra ProCount		Not Reported
FG				Aptec ver. 9.0		Not Reported
FL	0.12	0.07	0.19	Canberra Genie-VMS	0.71	1 sigma
FM	0.2	0.05	0.1	Canberra Sampo-90	1.18	1 sigma
GT	0.229	0.252	0.094	Canberra ProCount	1.35	2 sigma
IS	0.2315	0.1696	0.1965	Canberra ProCount	1.36	2 sigma
KO	0.165	0.06	0.108	Aptec ver. 6.31	0.97	1 sigma
LA	0.17	0.03	0.11	Ortec GELIGAM	1.00	1 sigma
LA1	0.17	0.09	0.08	Ortec Gammavision	1.00	1 sigma
LB	0.1527	0.1237	0.1941	Aptec ver. 4.3	0.90	1 sigma
ML	0.18	0.02	0.15	Canberra Sampo-90	1.06	1 sigma
ML1	0.16	0.07	0.13	Aptec ver. 5.3	0.94	1 sigma
NE	0.17	0.03	0.01	Ortec Gammavision	1.00	1 sigma
NL	0.23	0.08	0.19	Canberra/ND Genie 9900	1.35	2 sigma
NO				Aptec ver. 6.31		Not Reported
NP	0.158	0.06	0.19	Vertechs Seeker ver 1.5	0.93	1 sigma
OD	0.32	0.12	0.23	Canberra ProCount	1.88	3 sigma
OT	0.11	0.11	0	Canberra Genie-VMS	0.65	2 sigma
RE	0.162	0.16	0.2	In House	0.95	1 sigma
SA				Canberra Genie-2000		Not Reported
SL	0.2	0.1	0.1	Canberra Micro Sampo	1.18	1 sigma
TX	0.23	0.09	0.2	Canberra Genie-VMS	1.35	2 sigma
UP	0.32	0.239	0.252	Canberra ProCount	1.88	3 sigma
WA				Canberra Genie-VMS		Not Reported
YA	0.137	0.073	0.247	Vertechs GDR/P ver 3.1	0.81	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

Pb-210   *Expected Value* =*   5.1

                    Calculated 1 sigma uncertainty = 0.5

Sample 2   *Mean +/- SD of Reported Value =* 5.0   +/- 0.6

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	4.22	1.12	0.865	Ortec Maestro-Omnigam	0.83	2 sigma
BR1				Canberra Genie-VMS		Not Reported
BX				Ortec Maestro-Minigam		Not Reported
CA				Canberra Genie-VMS		Not Reported
CH	4.308	3.103	2.182	Aptec ver. 5.3	0.84	2 sigma
FG	4.57	1.06	2.51	Canberra ProCount	0.90	2 sigma
FL				Aptec ver. 9.0		Not Reported
FM	5.8	1.3	3.3	Canberra Genie-VMS	1.14	2 sigma
GT	4.88	3.502	0.094	Canberra Sampo-90	0.96	1 sigma
IS				Canberra ProCount		Not Reported
KO	4.957	1.642	1.764	Canberra ProCount	0.97	1 sigma
LA				Aptec ver. 6.31		Not Reported
LA1	5.32	0.72	0.07	Ortec GELIGAM	1.04	1 sigma
LB	4.588	3.161	2.639	Ortec Gammavision	0.90	2 sigma
ML	5.52	13.4	3.29	Aptec ver. 4.3	1.08	1 sigma
ML1				Vertechs GDR/P ver 3.1		Not Reported
NE	5.33	0.21	0.08	Canberra Sampo-90	1.05	1 sigma
NL	5.85	2.1	3.8	Aptec ver. 5.3	1.15	2 sigma
NO	4.32	2.42	1.31	Ortec Gammavision	0.85	2 sigma
NP				Canberra/ND Genie 9900		Not Reported
OD				Aptec ver. 6.31		Not Reported
OT				Vertechs Seeker ver 1.5		Not Reported
RE	5.09	3.5	4	Canberra ProCount	1.00	1 sigma
SA	5.26	9.26	5.67	Canberra Genie-VMS	1.03	1 sigma
SL				In House		Not Reported
TX	5.89	2.12	3.85	Canberra Genie-2000	1.15	2 sigma
UP	3.9	2.84	2.06	Canberra Micro Sampo	0.76	More than 3 sigma
WA				Canberra Genie-VMS		Not Reported
YA	5.242	1.223	3.521	Canberra ProCount	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 lab

Ru-103

Sample 2

Expected Value* = 0.14

Calculated 1 sigma uncertainty = 0.04

Mean +/- SD of Reported Value = 0.16 +/- 0.03

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.126	0.055	0.0381	Ortec Maestro-Omnigam	0.90	1 sigma
BR1	0.126	0.056	0.0366	Ortec Maestro-Minigam	0.90	1 sigma
BX	0.17	0.09	0.16	Canberra Genie-VMS	1.21	1 sigma
CA				Aptec ver. 5.3		Not Reported
CH	0.1651	0.1684	0.1548	Canberra ProCount	1.18	1 sigma
FG				Aptec ver. 9.0		Not Reported
FL	0.16	0.09	0.17	Canberra Genie-VMS	1.14	1 sigma
FM	0.2	0.04	0.1	Canberra Sampo-90	1.43	2 sigma
GT	0.161	0.251	0.079	Canberra ProCount	1.15	1 sigma
IS	0.1693	0.1745	0.1774	Canberra ProCount	1.21	1 sigma
KO	0.132	0.058	0.109	Aptec ver. 6.31	0.94	1 sigma
LA	0.13	0.03	0.12	Ortec GELIGAM	0.93	1 sigma
LA1	0.13	0.09	0.02	Ortec Gammavision	0.93	1 sigma
LB	0.1473	0.13	0.2083	Aptec ver. 4.3	1.05	1 sigma
ML	0.16	0.04	0.13	Canberra Sampo-90	1.14	1 sigma
ML1	0.12	0.07	0.13	Aptec ver. 5.3	0.86	1 sigma
NE				Ortec Gammavision		Not Reported
NL	0.17	0.09	0.2	Canberra/ND Genie 9900	1.21	1 sigma
NO				Aptec ver. 6.31		Not Reported
NP	0.134	0.049	0.155	Vertechs Seeker ver 1.5	0.96	1 sigma
OD	0.21	0.11	0.2	Canberra ProCount	1.50	2 sigma
OT	0.12	0.1	0	Canberra Genie-VMS	0.86	1 sigma
RE				In House		Not Reported
SA	0.15	0.11	0.19	Canberra Genie-2000	1.07	1 sigma
SL	0.2	0.1	0.1	Canberra Micro Sampo	1.43	2 sigma
TX	0.17	0.09	0.2	Canberra Genie-VMS	1.21	1 sigma
UP	0.213	0.221	0.212	Canberra ProCount	1.52	2 sigma
WA				Canberra Genie-VMS		Not Reported
YA	0.14	0.068	0.232	Vertechs GDR/P ver 3.1	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

Sb-125

Sample 1

Expected Value* = 23.0

Calculated 1 sigma uncertainty = 1.13

Mean +/- SD of Reported Value = 22.6 **+/-** 0.9

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	22	2.01	1.07	Ortec Maestro-Omnigam	0.96	1 sigma
BR1	21.8	2.05	1.03	Ortec Maestro-Minigam	0.95	2 sigma
BX	22.89	1.15	1.5	Canberra Genie-VMS	1.00	1 sigma
CA	22.26	1.83	1.95	Aptec ver. 5.3	0.97	1 sigma
CH	23.14	1.571	1.537	Canberra ProCount	1.01	1 sigma
FG	21.95	0.8	1.8	Aptec ver. 9.0	0.95	1 sigma
FL	22.7	0.9	0.73	Canberra Genie-VMS	0.99	1 sigma
FM	22.9	0.7	1.2	Canberra Sampo-90	1.00	1 sigma
GT	21.89	3.265	0.761	Canberra ProCount	0.95	2 sigma
IS	23.04	4.799	1.656	Canberra ProCount	1.00	1 sigma
KO	22.08	2.143	1.265	Aptec ver. 6.31	0.96	1 sigma
LA	23	1.1	0.28	Ortec GELIGAM	1.00	1 sigma
LA1	22.78	3.5	0.61	Ortec Gammavision	0.99	1 sigma
LB	24.37	5.78	4.04	Aptec ver. 4.3	1.06	2 sigma
ML	22.58	0.26	2.06	Canberra Sampo-90	0.98	1 sigma
ML1	22.7	1.97	1.28	Aptec ver. 5.3	0.99	1 sigma
NE	22.67	1.06	0.6	Ortec Gammavision	0.99	1 sigma
NL	22.7	2.1	5.9	Canberra/ND Genie 9900	0.99	1 sigma
NO	24	6.79	1.01	Aptec ver. 6.31	1.04	1 sigma
NP				Vertechs Seeker ver 1.5		Not Reported
OD				Canberra ProCount		Not Reported
OT	20	2	0	Canberra Genie-VMS	0.87	3 sigma
RE	20.5	3.3	0.8	In House	0.89	3 sigma
SA	23.2	4.8	0.89	Canberra Genie-2000	1.01	1 sigma
SL	23.3	0.7	1.1	Canberra Micro Sampo	1.01	1 sigma
TX	22.99	0.78	2.02	Canberra Genie-VMS	1.00	1 sigma
UP	27.9	5.1	1.92	Canberra ProCount	1.21	More than 3 sigma
WA	28.5	2.1	0.2	Canberra Genie-VMS	1.24	More than 3 sigma
YA	22.91	0.642	1.986	Vertechs GDR/P ver 3.1	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

Sb-125

Expected Value* =   0.52

Calculated 1 sigma uncertainty =   0.15

Sample 2

Mean +/- SD of Reported Value = 0.58 *+/-* 0.03

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.587	0.15	0.11	Ortec Maestro-Minigam	1.13	1 sigma
BR1	0.578	0.16	0.107	Ortec Maestro-Omnigam	1.11	1 sigma
BX	0.58	0.25	0.43	Canberra Genie-VMS	1.12	1 sigma
CA	0.56	0.23	0.45	Aptec ver. 5.3	1.08	1 sigma
CH	0.5946	0.5076	0.5572	Canberra ProCount	1.14	1 sigma
FG	0.584	0.15	0.35	Aptec ver. 9.0	1.12	1 sigma
FL	0.7	0.2	0.44	Canberra Genie-VMS	1.35	2 sigma
FM	0.6	0.06	0.4	Canberra Sampo-90	1.15	1 sigma
GT	0.537	0.602	0.216	Canberra ProCount	1.03	1 sigma
IS	0.5831	0.5057	0.475	Canberra ProCount	1.12	1 sigma
KO	0.593	0.167	0.304	Aptec ver. 6.31	1.14	1 sigma
LA	0.53	0.08	0.28	Ortec GELIGAM	1.02	1 sigma
LA1	0.6	0.29	0.05	Ortec Gammavision	1.15	1 sigma
LB	0.6059	0.343	0.7483	Aptec ver. 4.3	1.17	1 sigma
ML	0.55	0.06	0.34	Canberra Sampo-90	1.06	1 sigma
ML1	0.59	0.17	0.31	Aptec ver. 5.3	1.13	1 sigma
NE	0.58	0.08	0.05	Ortec Gammavision	1.12	1 sigma
NL	0.6	0.48	1.5	Canberra/ND Genie 9900	1.15	1 sigma
NO				Aptec ver. 6.31		Not Reported
NP				Vertechs Seeker ver 1.5		Not Reported
OD				Canberra ProCount		Not Reported
OT	0.46	0.29	0	Canberra Genie-VMS	0.88	2 sigma
RE	0.582	0.36	0.5	In House	1.12	1 sigma
SA	0.59	0.43	0.48	Canberra Genie-2000	1.13	1 sigma
SL	0.5	0.1	0.3	Canberra Micro Sampo	0.96	1 sigma
TX	0.64	0.2	0.64	Canberra Genie-VMS	1.23	1 sigma
UP	0.705	0.612	0.692	Canberra ProCount	1.36	2 sigma
WA				Canberra Genie-VMS		Not Reported
YA	0.629	0.14	0.592	Vertechs GDR/P ver 3.1	1.21	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

Zn-65
Expected Value* =   11.0

Sample 1
Calculated 1 sigma uncertainty = 0.7

Mean +/- SD of Reported Value = 10.9 *+/-* 0.3

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	10.8	1.31	0.164	Ortec Maestro-Minigam	0.98	1 sigma
BR1	10.8	1.34	0.246	Ortec Maestro-Omnigam	0.98	1 sigma
BX	10.71	0.83	0.78	Canberra Genie-VMS	0.97	1 sigma
CA	11.14	0.9	0.47	Aptec ver. 5.3	1.01	1 sigma
CH	10.34	1.606	0.7495	Canberra ProCount	0.94	1 sigma
FG	10.89	1.7	4.12	Aptec ver. 9.0	0.99	1 sigma
FL	10.6	0.8	0.68	Canberra Genie-VMS	0.96	1 sigma
FM	11	0.75	0.7	Canberra Sampo-90	1.00	1 sigma
GT	11	3.019	0.231	Canberra ProCount	1.00	1 sigma
IS	10.78	2.505	0.9591	Canberra ProCount	0.98	1 sigma
KO	11.15	0.943	0.516	Aptec ver. 6.31	1.01	1 sigma
LA	11	0.8	0.25	Ortec GELIGAM	1.00	1 sigma
LA1	11.35	1.93	0.22	Ortec Gammavision	1.03	1 sigma
LB	10.81	1.79	1.346	Aptec ver. 4.3	0.98	1 sigma
ML	11.15	0.75	0.65	Canberra Sampo-90	1.01	1 sigma
ML1	10.67	0.78	0.63	Aptec ver. 5.3	0.97	1 sigma
NE	11.64	0.66	0.2	Ortec Gammavision	1.06	1 sigma
NL	10.8	0.9	1.3	Canberra/ND Genie 9900	0.98	1 sigma
NO	10.43	2.15	0.49	Aptec ver. 6.31	0.95	1 sigma
NP	10.7	0.7	0.935	Vertechs Seeker ver 1.5	0.97	1 sigma
OD	16	1.76	1.2	Canberra ProCount	1.45	More than 3 sigma
OT	7.1	1.6	0	Canberra Genie-VMS	0.65	More than 3 sigma
RE	10.8	2.2	1	In House	0.98	1 sigma
SA	11	3.2	0.89	Canberra Genie-2000	1.00	1 sigma
SL	11.1	0.7	0.7	Canberra Micro Sampo	1.01	1 sigma
TX	10.71	0.9	1.25	Canberra Genie-VMS	0.97	1 sigma
UP	16	3.51	1.33	Canberra ProCount	1.45	More than 3 sigma
WA	15.9	2.4	0.2	Canberra Genie-VMS	1.45	More than 3 sigma
YA	10.72	0.706	1.109	Vertechs GDR/P ver 3.1	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

Zr-95

Sample 2

Expected Value* = 0.35

Calculated 1 sigma uncertainty = 0.12

Mean +/- SD of Reported Value = 0.41 *+/-* 0.09

Lab Code	Activity	Error	MDA	Software	Lab Value / Exp. Value	Comparison**
BR	0.36	0.084	0.0354	Ortec Maestro-Omnigam	1.03	1 sigma
BR1	0.342	0.088	0.0354	Ortec Maestro-Minigam	0.98	1 sigma
BX	0.53	0.19	0.32	Canberra Genie-VMS	1.51	2 sigma
CA	0.33	0.14	0.26	Aptec ver. 5.3	0.94	1 sigma
CH	0.4491	0.2437	0.304	Canberra ProCount	1.28	1 sigma
FG				Aptec ver. 9.0		Not Reported
FL	0.4	0.1	0.36	Canberra Genie-VMS	1.14	1 sigma
FM	0.4	0.09	0.3	Canberra Sampo-90	1.14	1 sigma
GT	0.463	0.385	0.165	Canberra ProCount	1.32	1 sigma
IS	0.5251	0.3835	0.3686	Canberra ProCount	1.50	2 sigma
KO	0.348	0.14	0.253	Aptec ver. 6.31	0.99	1 sigma
LA	0.36	0.07	0.24	Ortec GELIGAM	1.03	1 sigma
LA1	0.35	0.13	0.01	Ortec Gammavision	1.00	1 sigma
LB	0.3577	0.2739	0.4309	Aptec ver. 4.3	1.02	1 sigma
ML	0.38	0.03	0.33	Canberra Sampo-90	1.09	1 sigma
ML1	0.32	0.14	0.26	Aptec ver. 5.3	0.91	1 sigma
NE	0.36	0.04	0.01	Ortec Gammavision	1.03	1 sigma
NL	0.47	0.18	0.43	Canberra/ND Genie 9900	1.34	1 sigma
NO				Aptec ver. 6.31		Not Reported
NP	0.351	0.116	0.359	Vertechs Seeker ver 1.5	1.00	1 sigma
OD	0.65	0.18	0.43	Canberra ProCount	1.86	3 sigma
OT	0.21	0.09	0	Canberra Genie-VMS	0.60	2 sigma
RE	0.436	0.31	0.5	In House	1.25	1 sigma
SA	0.38	0.31	0.37	Canberra Genie-2000	1.09	1 sigma
SL	0.4	0.1	0.3	Canberra Micro Sampo	1.14	1 sigma
TX	0.47	0.13	0.37	Canberra Genie-VMS	1.34	1 sigma
UP	0.588	0.497	0.596	Canberra ProCount	1.68	2 sigma
WA				Canberra Genie-VMS		Not Reported
YA	0.338	0.101	0.406	Vertechs GDR/P ver 3.1	0.97	1 sigma

* Expected value is from SYNTH program.

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

Appendix C

RESULTS BY ISOTOPE - sorted by software and evaluation

Be-7

Sample 2

Expected Value* = 6.0

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 6.2   +/- 0.4

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	6.376	1.485	1.817	1.06
Aptec ver. 5.3	1 sigma	6.12	0.65	0.98	1.02
Aptec ver. 5.3	Not Reported				
Aptec ver. 6.31	1 sigma	6.287	0.698	0.947	1.05
Aptec ver. 6.31	2 sigma	6.69	1.88	0.88	1.12
Aptec ver. 9.0	1 sigma	6.15	0.79	1.9	1.02
Canberra Genie-2000	1 sigma	6.25	1.35	1.58	1.04
Canberra Genie-VMS	1 sigma	6.3	0.8	1.4	1.05
Canberra Genie-VMS	1 sigma	6.4	0.82	1.71	1.07
Canberra Genie-VMS	2 sigma	6.57	0.85	1.32	1.10
Canberra Genie-VMS	3 sigma	4.9	1.2	0	0.82
Canberra Genie-VMS	More than 3 sigma	8	2	0.8	1.33
Canberra Micro Sampo	1 sigma	6.5	0.6	0.9	1.08
Canberra ProCount	1 sigma	6.033	2.631	0.649	1.01
Canberra ProCount	1 sigma	6.319	1.867	1.417	1.05
Canberra ProCount	1 sigma	6.357	1.638	1.277	1.06
Canberra ProCount	More than 3 sigma	7.9	2.34	1.69	1.32
Canberra ProCount	More than 3 sigma	7.9	1.16	1.59	1.32
Canberra Sampo-90	1 sigma	6.15	0.52	1.04	1.02
Canberra Sampo-90	1 sigma	6.4	0.6	1.1	1.07
Canberra/ND Genie 9900	1 sigma	6.42	0.83	1.7	1.07
In House	1 sigma	6	1.7	1.5	1.00
Ortec Gammavision	1 sigma	5.97	1.43	0.16	0.99
Ortec Gammavision	1 sigma	6.03	0.44	0.1	1.00
Ortec GELIGAM	1 sigma	6.06	0.51	1.1	1.01
Ortec Maestro-Minigam	1 sigma	5.87	0.86	0.317	0.98
Ortec Maestro-Omnigam	1 sigma	5.87	0.86	0.317	0.98
Vertechs GDR/P ver 3.1	1 sigma	6.314	0.649	1.732	1.05
Vertechs Seeker ver 1.5	2 sigma	5.41	0.51	1.22	0.90

* 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 =	24.0

Sample 1

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 24.0 +/- 0.4

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	23.79	2.48	0.93	0.99
Aptec ver. 5.3	1 sigma	24.19	1.14	0.52	1.01
Aptec ver. 5.3	1 sigma	24.26	1.05	0.46	1.01
Aptec ver. 6.31	1 sigma	24.02	1.283	0.463	1.00
Aptec ver. 6.31	More than 3 sigma	26.6	2.1	0.38	1.11
Aptec ver. 9.0	1 sigma	24.25	1.3	2.8	1.01
Canberra Genie-2000	1 sigma	24.2	4.7	0.56	1.01
Canberra Genie-VMS	1 sigma	23.6	0.5	0.3	0.98
Canberra Genie-VMS	1 sigma	23.86	0.55	0.73	0.99
Canberra Genie-VMS	1 sigma	23.88	0.55	0.48	0.99
Canberra Genie-VMS	More than 3 sigma	26	1	0	1.08
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	1 sigma	23.6	0.5	0.5	0.98
Canberra ProCount	1 sigma	24.26	3.803	0.5159	1.01
Canberra ProCount	1 sigma	24.5	3.04	0.522	1.02
Canberra ProCount	2 sigma	24.56	1.5	0.5	1.02
Canberra ProCount	3 sigma	25.05	5.658	0.273	1.04
Canberra ProCount	More than 3 sigma	26.69	1.231	0.5415	1.11
Canberra Sampo-90	1 sigma	23.9	1	0.4	1.00
Canberra Sampo-90	1 sigma	24.28	1.12	0.4	1.01
Canberra/ND Genie 9900	1 sigma	24	0.55	0.73	1.00
In House	1 sigma	24	2.7	0.5	1.00
Ortec Gammavision	1 sigma	23.58	2.29	0.19	0.98
Ortec Gammavision	1 sigma	23.87	0.53	0.2	0.99
Ortec GELIGAM	1 sigma	24.5	0.7	0.11	1.02
Ortec Maestro-Minigam	1 sigma	23	0.99	0.427	0.96
Ortec Maestro-Omnigam	1 sigma	24.1	1.02	0.334	1.00
Vertechs GDR/P ver 3.1	1 sigma	24.12	0.503	0.707	1.00
Vertechs Seeker ver 1.5	More than 3 sigma	17.8	0.4	0.398	0.74

* 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* =*   0.18

                     Calculated 1 sigma uncertainty = 0.06

Sample 2   *Mean +/- SD of Reported Value =* 0.16 *+/-* 0.03

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	2 sigma	0.0839	0.1176	0.1939	0.47
Aptec ver. 5.3	1 sigma	0.22	0.1	0.19	1.22
Aptec ver. 5.3	Not Reported				
Aptec ver. 6.31	Not Reported				
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-VMS	1 sigma	0.12	0.09	0.24	0.67
Canberra Genie-VMS	1 sigma	0.13	0.09	0.18	0.72
Canberra Genie-VMS	1 sigma	0.15	0.1	0.2	0.83
Canberra Genie-VMS	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	1 sigma	0.2	0.1	0.1	1.11
Canberra ProCount	Not Reported				
Canberra ProCount	Not Reported				
Canberra ProCount	Not Reported				
Canberra ProCount	Not Reported				
Canberra ProCount	Not Reported				
Canberra Sampo-90	1 sigma	0.14	0.05	0.16	0.78
Canberra Sampo-90	1 sigma	0.2	0.05	0.2	1.11
Canberra/ND Genie 9900	1 sigma	0.12	0.09	0.24	0.67
In House	Not Reported				
Ortec Gammavision	1 sigma	0.17	0.13	0.02	0.94
Ortec Gammavision	Not Reported				
Ortec GELIGAM	1 sigma	0.18	0.03	0.11	1.00
Ortec Maestro-Minigam	1 sigma	0.176	0.072	0.0498	0.98
Ortec Maestro-Omnigam	1 sigma	0.173	0.065	0.0505	0.96
Vertechs GDR/P ver 3.1	1 sigma	0.12	0.054	0.158	0.67
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

Co-57

Sample 3

Expected Value =	4.0
Calculated 1 sigma uncertainty =	0.7
Mean +/- SD of Reported Value =	3.7 +/- 0.5

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	3.693	1.711	3.146	0.92
Aptec ver. 5.3	1 sigma	3.83	0.8	1.4	0.96
Aptec ver. 5.3	More than 3 sigma	11.72	0.71	0.8	2.93
Aptec ver. 6.31	1 sigma	3.752	0.87	1.559	0.94
Aptec ver. 6.31	1 sigma	4.23	1.93	1.76	1.06
Aptec ver. 9.0	***				
Canberra Genie-2000	1 sigma	3.83	1.75	0.4	0.96
Canberra Genie-VMS	1 sigma	3.76	1	2.45	0.94
Canberra Genie-VMS	1 sigma	3.8	2	0.08	0.95
Canberra Genie-VMS	1 sigma	4.1	1.7	0	1.02
Canberra Genie-VMS	1 sigma	4.4	0.2	0.17	1.10
Canberra Genie-VMS	2 sigma	3.21	0.55	0.24	0.80
Canberra Micro Sampo	1 sigma	3.7	0.5	1.5	0.93
Canberra ProCount	***				
Canberra ProCount	1 sigma	3.945	3.243	0.134	0.99
Canberra ProCount	1 sigma	4.289	2.266	0.2633	1.07
Canberra ProCount	2 sigma	2.992	0.5318	0.08527	0.75
Canberra ProCount	3 sigma	2.53	0.74	0.26	0.63
Canberra Sampo-90	1 sigma	3.4	0.3	0.2	0.85
Canberra Sampo-90	1 sigma	3.65	0.26	1.54	0.91
Canberra/ND Genie 9900	***				
In House	More than 3 sigma	1.28	0.69	1.1	0.32
Ortec Gammavision	1 sigma	4.23	1.21	0.5	1.06
Ortec Gammavision	More than 3 sigma	6.43	0.96	0.31	1.61
Ortec GELIGAM	More than 3 sigma	7.24	0.36	0.08	1.81
Ortec Maestro-Minigam	More than 3 sigma	6.43	0.62	0.342	1.61
Ortec Maestro-Omnigam	More than 3 sigma	6.41	0.62	0.518	1.60
Vertechs GDR/P ver 3.1	1 sigma	3.94	0.863	2.828	0.99
Vertechs Seeker ver 1.5	2 sigma	2.91	0.25	0.903	0.73

* Expected value is from SYNTH program.

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

*** Co-57 not reported due to error in letter accompanying spectra.

RESULTS BY ISOTOPE - sorted by software and evaluation

Co-60

Expected Value* =   3.0

Sample 3

Calculated 1 sigma uncertainty = 0.3

Mean +/- SD of Reported Value = 3.0   +/- 0.06

Software	*Comparison***	*Activity*	*Error*	*MDA*	*Lab Value / Exp. Value*
Aptec ver. 4.3	1 sigma	2.899	0.6826	0.666	0.97
Aptec ver. 5.3	1 sigma	2.94	0.31	0.29	0.98
Aptec ver. 5.3	1 sigma	3.06	0.34	0.29	1.02
Aptec ver. 6.31	1 sigma	2.92	0.63	0.39	0.97
Aptec ver. 6.31	1 sigma	3.024	0.353	0.294	1.01
Aptec ver. 9.0	1 sigma	2.94	0.5	1.2	0.98
Canberra Genie-2000	1 sigma	2.97	1.07	0.48	0.99
Canberra Genie-VMS	1 sigma	3	0.2	0.33	1.00
Canberra Genie-VMS	1 sigma	3.04	0.25	0.45	1.01
Canberra Genie-VMS	1 sigma	3.1	0.33	0.39	1.03
Canberra Genie-VMS	More than 3 sigma	1.3	0.6	0	0.43
Canberra Genie-VMS	More than 3 sigma	4.7	0.8	0.1	1.57
Canberra Micro Sampo	1 sigma	3	0.2	0.3	1.00
Canberra ProCount	1 sigma	3.006	0.4885	0.3848	1.00
Canberra ProCount	1 sigma	3.141	0.885	0.202	1.05
Canberra ProCount	More than 3 sigma	1.04	0.2528	0.1647	0.35
Canberra ProCount	More than 3 sigma	4.76	0.45	0.7	1.59
Canberra ProCount	More than 3 sigma	4.81	1.37	0.73	1.60
Canberra Sampo-90	1 sigma	3	0.2	0.3	1.00
Canberra Sampo-90	1 sigma	3.06	0.21	0.44	1.02
Canberra/ND Genie 9900	1 sigma	3.1	0.5	0.63	1.03
In House	More than 3 sigma	0.945	0.26	0.3	0.31
Ortec Gammavision	1 sigma	3.04	0.74	0.14	1.01
Ortec Gammavision	1 sigma	3.09	0.24	0.1	1.03
Ortec GELIGAM	1 sigma	3.04	0.23	0.11	1.01
Ortec Maestro-Minigam	1 sigma	2.99	0.39	0.0444	1.00
Ortec Maestro-Omnigam	1 sigma	2.99	0.41	0.0999	1.00
Vertechs GDR/P ver 3.1	1 sigma	2.964	0.216	0.57	0.99
Vertechs Seeker ver 1.5	1 sigma	2.92	0.21	0.471	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

Cs-134

Expected Value* =	14.0
Calculated 1 sigma uncertainty =	0.5
Mean +/- SD of Reported Value =	13.8 +/- 0.4

Sample 1

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	14.31	2.01	4.11	1.02
Aptec ver. 5.3	1 sigma	13.91	0.92	4.5	0.99
Aptec ver. 5.3	1 sigma	14.26	0.81	0.34	1.02
Aptec ver. 6.31	1 sigma	13.7	3.03	0.31	0.98
Aptec ver. 6.31	1 sigma	13.72	1.045	0.285	0.98
Aptec ver. 9.0	1 sigma	14.43	0.9	2.1	1.03
Canberra Genie-2000	1 sigma	14.1	2.6	0.55	1.01
Canberra Genie-VMS	1 sigma	13.7	0.4	0.38	0.98
Canberra Genie-VMS	1 sigma	13.87	0.52	0.41	0.99
Canberra Genie-VMS	1 sigma	14.05	0.35	0.52	1.00
Canberra Genie-VMS	More than 3 sigma	9.5	0.9	0	0.68
Canberra Genie-VMS	More than 3 sigma	18.5	0.9	0.1	1.32
Canberra Micro Sampo	1 sigma	13.9	0.5	0.5	0.99
Canberra ProCount	1 sigma	14.28	2.597	0.501	1.02
Canberra ProCount	2 sigma	13.15	0.6287	0.4314	0.94
Canberra ProCount	2 sigma	13.31	2.007	0.213	0.95
Canberra ProCount	More than 3 sigma	18	3.45	0.629	1.29
Canberra ProCount	More than 3 sigma	18.35	1.07	0.59	1.31
Canberra Sampo-90	1 sigma	13.58	0.1	0.38	0.97
Canberra Sampo-90	1 sigma	13.7	0.3	0.4	0.98
Canberra/ND Genie 9900	1 sigma	14.13	0.51	0.53	1.01
In House	1 sigma	13.8	1.8	0.3	0.99
Ortec Gammavision	1 sigma	13.48	1.64	0.31	0.96
Ortec Gammavision	1 sigma	13.59	0.44	0.2	0.97
Ortec GELIGAM	1 sigma	13.7	0.6	0.1	0.98
Ortec Maestro-Minigam	1 sigma	13.7	0.96	0.541	0.98
Ortec Maestro-Omnigam	1 sigma	13.7	0.98	0.57	0.98
Vertechs GDR/P ver 3.1	1 sigma	13.73	0.31	0.365	0.98
Vertechs Seeker ver 1.5	3 sigma	12.8	0.3	0.485	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

Cs-134

Sample 2

Expected Value* =   0.21

Calculated 1 sigma uncertainty = 0.05

Mean +/- SD of Reported Value = 0.22 *+/-* 0.05

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	2 sigma	0.2905	0.169	0.224	1.38
Aptec ver. 5.3	1 sigma	0.18	0.06	0.12	0.86
Aptec ver. 5.3	1 sigma	0.23	0.07	0.11	1.10
Aptec ver. 6.31	1 sigma	0.192	0.074	0.153	0.91
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	2 sigma	0.287	0.09	0.21	1.37
Canberra Genie-2000	1 sigma	0.19	0.14	0.2	0.90
Canberra Genie-VMS	1 sigma	0.2	0.08	0.19	0.95
Canberra Genie-VMS	1 sigma	0.23	0.06	0.23	1.10
Canberra Genie-VMS	2 sigma	0.14	0.1	0	0.67
Canberra Genie-VMS	2 sigma	0.31	0.17	0.09	1.48
Canberra Genie-VMS	3 sigma	0.34	0.1	0.19	1.62
Canberra Micro Sampo	1 sigma	0.2	0.1	0.1	0.95
Canberra ProCount	1 sigma	0.1658	0.1405	0.1572	0.79
Canberra ProCount	1 sigma	0.193	0.1581	0.185	0.92
Canberra ProCount	1 sigma	0.219	0.176	0.085	1.04
Canberra ProCount	1 sigma	0.226	0.196	0.228	1.08
Canberra ProCount	2 sigma	0.3	0.08	0.21	1.43
Canberra Sampo-90	1 sigma	0.19	0.01	0.15	0.90
Canberra Sampo-90	1 sigma	0.2	0.02	0.1	0.95
Canberra/ND Genie 9900	1 sigma	0.21	0.13	0.23	1.00
In House	Not Reported				
Ortec Gammavision	1 sigma	0.2	0.08	0.03	0.95
Ortec Gammavision	1 sigma	0.2	0.03	0.01	0.95
Ortec GELIGAM	1 sigma	0.2	0.03	0.1	0.95
Ortec Maestro-Minigam	1 sigma	0.202	0.054	0.0679	0.96
Ortec Maestro-Omnigam	1 sigma	0.202	0.054	0.0679	0.96
Vertechs GDR/P ver 3.1	1 sigma	0.236	0.046	0.177	1.12
Vertechs Seeker ver 1.5	2 sigma	0.149	0.04	0.146	0.71

* 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* =   10.0

Sample 1

Calculated 1 sigma uncertainty = 0.5

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

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	9.92	1.26	0.87	0.99
Aptec ver. 5.3	1 sigma	9.72	0.53	0.37	0.97
Aptec ver. 5.3	Not Reported				
Aptec ver. 6.31	1 sigma	9.58	1.38	0.35	0.96
Aptec ver. 6.31	1 sigma	9.906	0.955	0.365	0.99
Aptec ver. 9.0	1 sigma	9.75	0.8	1.8	0.98
Canberra Genie-2000	1 sigma	9.56	2	0.55	0.96
Canberra Genie-VMS	1 sigma	9.63	0.47	0.67	0.96
Canberra Genie-VMS	1 sigma	9.75	0.48	0.47	0.98
Canberra Genie-VMS	1 sigma	9.8	0.5	0.32	0.98
Canberra Genie-VMS	More than 3 sigma	6.5	0.8	0	0.65
Canberra Genie-VMS	More than 3 sigma	13.2	1.3	0.1	1.32
Canberra Micro Sampo	1 sigma	9.9	0.5	0.5	0.99
Canberra ProCount	1 sigma	9.605	1.914	0.5355	0.96
Canberra ProCount	2 sigma	9.364	0.8917	0.4488	0.94
Canberra ProCount	2 sigma	9.372	2.742	0.243	0.94
Canberra ProCount	More than 3 sigma	12.97	1.54	0.63	1.30
Canberra ProCount	More than 3 sigma	13	3.08	0.683	1.30
Canberra Sampo-90	1 sigma	9.57	0.13	0.4	0.96
Canberra Sampo-90	1 sigma	9.7	0.5	0.4	0.97
Canberra/ND Genie 9900	1 sigma	9.73	0.48	0.67	0.97
In House	1 sigma	9.86	1.6	0.4	0.99
Ortec Gammavision	1 sigma	9.9	1.53	0.19	0.99
Ortec Gammavision	1 sigma	9.95	0.45	0.2	1.00
Ortec GELIGAM	1 sigma	9.86	0.51	0.11	0.99
Ortec Maestro-Minigam	1 sigma	9.95	0.87	0.319	1.00
Ortec Maestro-Omnigam	1 sigma	9.94	0.82	0.299	0.99
Vertechs GDR/P ver 3.1	1 sigma	9.738	0.416	0.694	0.97
Vertechs Seeker ver 1.5	More than 3 sigma	8.59	0.36	0.498	0.86

* 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* =   0.18

Sample 2

Calculated 1 sigma uncertainty = 0.05

Mean +/- SD of Reported Value = 0.19 **+/-** 0.02

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	0.1705	0.1434	0.2274	0.81
Aptec ver. 5.3	1 sigma	0.16	0.06	0.12	0.76
Aptec ver. 5.3	1 sigma	0.17	0.07	0.14	0.81
Aptec ver. 6.31	1 sigma	0.161	0.064	0.118	0.77
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	More than 3 sigma	0.437	0.09	0.22	2.08
Canberra Genie-2000	1 sigma	0.2	0.27	0.23	0.95
Canberra Genie-VMS	1 sigma	0.14	0.11	0	0.67
Canberra Genie-VMS	1 sigma	0.2	0.09	0.21	0.95
Canberra Genie-VMS	1 sigma	0.2	0.088	0.19	0.95
Canberra Genie-VMS	1 sigma	0.21	0.09	0.2	1.00
Canberra Genie-VMS	2 sigma	0.27	0.24	0.1	1.29
Canberra Micro Sampo	1 sigma	0.2	0.1	0.1	0.95
Canberra ProCount	1 sigma	0.1935	0.1661	0.1779	0.92
Canberra ProCount	1 sigma	0.196	0.257	0.099	0.93
Canberra ProCount	1 sigma	0.2009	0.1747	0.2131	0.96
Canberra ProCount	2 sigma	0.27	0.12	0.25	1.29
Canberra ProCount	2 sigma	0.271	0.24	0.265	1.29
Canberra Sampo-90	1 sigma	0.19	0.05	0.15	0.90
Canberra Sampo-90	1 sigma	0.2	0.05	0.1	0.95
Canberra/ND Genie 9900	1 sigma	0.2	0.09	0.22	0.95
In House	1 sigma	0.186	0.17	0.2	0.89
Ortec Gammavision	1 sigma	0.19	0.09	0.01	0.90
Ortec Gammavision	1 sigma	0.19	0.03	0.01	0.90
Ortec GELIGAM	1 sigma	0.19	0.03	0.11	0.90
Ortec Maestro-Minigam	1 sigma	0.192	0.062	0.0202	0.91
Ortec Maestro-Omnigam	1 sigma	0.192	0.062	0.0202	0.91
Vertechs GDR/P ver 3.1	1 sigma	0.169	0.074	0.251	0.80
Vertechs Seeker ver 1.5	1 sigma	0.16	0.057	0.178	0.76

* 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* =   12.0

Calculated 1 sigma uncertainty = 0.5

Sample 3

Mean +/- SD of Reported Value = 11.6 *+/-* 0.4

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	11.83	1.429	0.8511	0.99
Aptec ver. 5.3	1 sigma	11.66	0.6	0.37	0.97
Aptec ver. 5.3	1 sigma	11.84	0.47	0.4	0.99
Aptec ver. 6.31	2 sigma	11.48	1.125	0.39	0.96
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	1 sigma	11.63	0.8	1.9	0.97
Canberra Genie-2000	2 sigma	11.4	2.33	0.53	0.95
Canberra Genie-VMS	1 sigma	11.58	0.51	0.65	0.96
Canberra Genie-VMS	1 sigma	11.73	0.51	0.46	0.98
Canberra Genie-VMS	1 sigma	11.8	0.5	0.32	0.98
Canberra Genie-VMS	More than 3 sigma	7.8	0.9	0	0.65
Canberra Genie-VMS	More than 3 sigma	15.8	1.3	0.1	1.32
Canberra Micro Sampo	1 sigma	11.8	0.4	0.4	0.98
Canberra ProCount	2 sigma	11.16	0.949	0.4339	0.93
Canberra ProCount	2 sigma	11.27	3.205	0.236	0.94
Canberra ProCount	More than 3 sigma	3.851	0.6394	0.1741	0.32
Canberra ProCount	More than 3 sigma	15.6	1.82	0.61	1.30
Canberra ProCount	More than 3 sigma	15.6	3.63	0.66	1.30
Canberra Sampo-90	1 sigma	11.6	0.5	0.4	0.97
Canberra Sampo-90	2 sigma	11.47	0.45	0.38	0.96
Canberra/ND Genie 9900	2 sigma	11.1	1	0.62	0.93
In House	More than 3 sigma	3.95	0.59	0.3	0.33
Ortec Gammavision	1 sigma	11.81	1.57	0.17	0.98
Ortec Gammavision	1 sigma	11.86	0.48	0.2	0.99
Ortec GELIGAM	1 sigma	11.8	0.52	0.11	0.98
Ortec Maestro-Minigam	1 sigma	11.9	0.88	0.172	0.99
Ortec Maestro-Omnigam	1 sigma	12	0.92	0.286	1.00
Vertechs GDR/P ver 3.1	1 sigma	11.69	0.446	0.665	0.97
Vertechs Seeker ver 1.5	More than 3 sigma	10.3	0.4	0.478	0.86

* 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* = 8.3

Calculated 1 sigma uncertainty = 0.5

Sample 3

Mean +/- SD of Reported Value = 8.9 *+/-* 0.9

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	8.23	3.757	1.05	0.99
Aptec ver. 5.3	1 sigma	8.56	1.51	2.33	1.03
Aptec ver. 5.3	1 sigma	8.65	1.49	6.91	1.04
Aptec ver. 6.31	1 sigma	8.41	2.86	1.27	1.01
Aptec ver. 6.31	1 sigma	8.531	1.607	0.726	1.03
Aptec ver. 9.0	1 sigma	8.47	2	4.8	1.02
Canberra Genie-2000	1 sigma	7.85	1.77	1.21	0.95
Canberra Genie-VMS	2 sigma	8.8	0.6	0.51	1.06
Canberra Genie-VMS	2 sigma	9.15	0.52	1.45	1.10
Canberra Genie-VMS	More than 3 sigma	4	3	0	0.48
Canberra Genie-VMS	More than 3 sigma	9.9	1.6	0.3	1.19
Canberra Genie-VMS	More than 3 sigma	10.51	1.33	1.88	1.27
Canberra Micro Sampo	More than 3 sigma	9.7	0.2	0.7	1.17
Canberra ProCount	2 sigma	8.939	1.76	0.402	1.08
Canberra ProCount	More than 3 sigma	3.369	0.9459	0.7867	0.41
Canberra ProCount	More than 3 sigma	10.04	2.536	1.796	1.21
Canberra ProCount	More than 3 sigma	10.97	0.76	1.13	1.32
Canberra ProCount	More than 3 sigma	16	5.6	3.44	1.93
Canberra Sampo-90	1 sigma	8.74	0.13	3.48	1.05
Canberra Sampo-90	2 sigma	9	0.5	0.6	1.08
Canberra/ND Genie 9900	2 sigma	8.98	0.87	5.5	1.08
In House	More than 3 sigma	2.68	1	1.4	0.32
Ortec Gammavision	1 sigma	8.59	1.85	1.08	1.03
Ortec Gammavision	1 sigma	8.75	0.6	0.2	1.05
Ortec GELIGAM	1 sigma	8.53	0.63	0.66	1.03
Ortec Maestro-Minigam	Not Reported				
Ortec Maestro-Omnigam	Not Reported				
Vertechs GDR/P ver 3.1	1 sigma	8.514	0.426	1.447	1.03
Vertechs Seeker ver 1.5	More than 3 sigma	6.83	0.45	0.884	0.82

* 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

Sample 3

Expected Value* =   13.0

Calculated 1 sigma uncertainty = 0.7

Mean +/- SD of Reported Value = 13.1 +/- 1.4

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	More than 3 sigma	16.73	3.387	1.05	1.29
Aptec ver. 5.3	1 sigma	13.3	2.96	0.89	1.02
Aptec ver. 5.3	Not Reported				
Aptec ver. 6.31	1 sigma	12.63	1.657	1.571	0.97
Aptec ver. 6.31	1 sigma	13.6	0.3	0.8	1.05
Aptec ver. 9.0	1 sigma	13.03	1.63	0.83	1.00
Canberra Genie-2000	1 sigma	12.8	4.43	2.75	0.98
Canberra Genie-VMS	1 sigma	12.39	1.57	2.18	0.95
Canberra Genie-VMS	1 sigma	13.46	1.07	1.6	1.04
Canberra Genie-VMS	More than 3 sigma	7.1	3.1	0	0.55
Canberra Genie-VMS	More than 3 sigma	10.8	0.5	0.36	0.83
Canberra Genie-VMS	More than 3 sigma	25.5	1.2	0.2	1.96
Canberra Micro Sampo	3 sigma	14.8	0.2	1	1.14
Canberra ProCount	1 sigma	12.89	1.025	11.61	0.99
Canberra ProCount	1 sigma	13.13	2.435	0.585	1.01
Canberra ProCount	More than 3 sigma	4.038	1.692	1.502	0.31
Canberra ProCount	More than 3 sigma	15.75	1.16	2.89	1.21
Canberra ProCount	More than 3 sigma	20.8	4.92	1.99	1.60
Canberra Sampo-90	1 sigma	13.14	0.15	2.38	1.01
Canberra Sampo-90	2 sigma	12	0.5	0.4	0.92
Canberra/ND Genie 9900	1 sigma	13.4	2.9	4.3	1.03
In House	More than 3 sigma	4.12	0.94	0.7	0.32
Ortec Gammavision	1 sigma	13.39	0.92	0.5	1.03
Ortec Gammavision	More than 3 sigma	9.71	2.18	0.72	0.75
Ortec GELIGAM	1 sigma	13.1	0.83	0.36	1.01
Ortec Maestro-Minigam	2 sigma	12.2	1.34	0.753	0.94
Ortec Maestro-Omnigam	1 sigma	12.8	1.39	1.13	0.98
Vertechs GDR/P ver 3.1	1 sigma	12.98	0.56	0.504	1.00
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

Sample 3

Expected Value* = 6.0

Calculated 1 sigma uncertainty = 0.4

Mean +/- SD of Reported Value = 5.9 **+/-** 0.4

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	5.902	1.129	1.544	0.98
Aptec ver. 5.3	1 sigma	5.78	0.61	0.89	0.96
Aptec ver. 5.3	1 sigma	6.14	0.56	0.71	1.02
Aptec ver. 6.31	1 sigma	5.946	0.568	0.629	0.99
Aptec ver. 6.31	2 sigma	6.72	1.15	0.75	1.12
Aptec ver. 9.0	1 sigma	6.37	0.6	1.3	1.06
Canberra Genie-2000	1 sigma	6.27	2.06	1.26	1.04
Canberra Genie-VMS	1 sigma	5.76	0.4	1.07	0.96
Canberra Genie-VMS	2 sigma	5.3	0.3	0.54	0.88
Canberra Genie-VMS	2 sigma	5.4	0.7	0	0.90
Canberra Genie-VMS	2 sigma	5.44	0.59	0.93	0.91
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	1 sigma	5.7	0.3	0.6	0.95
Canberra ProCount	1 sigma	6.095	1.534	0.432	1.02
Canberra ProCount	1 sigma	6.148	0.8388	1.036	1.02
Canberra ProCount	1 sigma	6.34	1.77	1.14	1.06
Canberra ProCount	2 sigma	6.42	0.53	0.85	1.07
Canberra ProCount	More than 3 sigma	1.962	0.5521	0.3478	0.33
Canberra Sampo-90	2 sigma	5.44	0.3	0.82	0.91
Canberra Sampo-90	2 sigma	5.5	0.3	0.6	0.92
Canberra/ND Genie 9900	1 sigma	5.88	0.58	0.45	0.98
In House	More than 3 sigma	1.96	0.51	0.6	0.33
Ortec Gammavision	1 sigma	6.02	1.39	0.24	1.00
Ortec Gammavision	Not Reported				
Ortec GELIGAM	1 sigma	5.98	0.34	0.24	1.00
Ortec Maestro-Minigam	Not Reported				
Ortec Maestro-Omnigam	3 sigma	5.14	0.6	0.426	0.86
Vertechs GDR/P ver 3.1	1 sigma	6.084	0.346	0.868	1.01
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

Nb-95

Sample 2

Expected Value* =   0.17

Calculated 1 sigma uncertainty = 0.05

Mean +/- SD of Reported Value = 0.19 *+/-* 0.05

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	0.1527	0.1237	0.1941	0.90
Aptec ver. 5.3	1 sigma	0.14	0.06	0.12	0.82
Aptec ver. 5.3	1 sigma	0.16	0.07	0.13	0.94
Aptec ver. 6.31	1 sigma	0.165	0.06	0.108	0.97
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	Not Reported				
Canberra Genie-2000	Not Reported				
Canberra Genie-VMS	1 sigma	0.12	0.07	0.19	0.71
Canberra Genie-VMS	2 sigma	0.11	0.11	0	0.65
Canberra Genie-VMS	2 sigma	0.23	0.09	0.2	1.35
Canberra Genie-VMS	2 sigma	0.23	0.08	0.18	1.35
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	1 sigma	0.2	0.1	0.1	1.18
Canberra ProCount	2 sigma	0.229	0.252	0.094	1.35
Canberra ProCount	2 sigma	0.2315	0.1696	0.1965	1.36
Canberra ProCount	3 sigma	0.32	0.239	0.252	1.88
Canberra ProCount	3 sigma	0.32	0.12	0.23	1.88
Canberra ProCount	Not Reported				
Canberra Sampo-90	1 sigma	0.18	0.02	0.15	1.06
Canberra Sampo-90	1 sigma	0.2	0.05	0.1	1.18
Canberra/ND Genie 9900	2 sigma	0.23	0.08	0.19	1.35
In House	1 sigma	0.162	0.16	0.2	0.95
Ortec Gammavision	1 sigma	0.17	0.09	0.08	1.00
Ortec Gammavision	1 sigma	0.17	0.03	0.01	1.00
Ortec GELIGAM	1 sigma	0.17	0.03	0.11	1.00
Ortec Maestro-Minigam	1 sigma	0.17	0.058	0.0196	1.00
Ortec Maestro-Omnigam	1 sigma	0.17	0.058	0.0196	1.00
Vertechs GDR/P ver 3.1	1 sigma	0.137	0.073	0.247	0.81
Vertechs Seeker ver 1.5	1 sigma	0.158	0.06	0.19	0.93

* 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

Pb-210

Sample 2

Expected Value* =   5.1

Calculated 1 sigma uncertainty = 0.5

Mean +/- SD of Reported Value = 5.0   +/- 0.6

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	5.52	13.4	3.29	1.08
Aptec ver. 5.3	2 sigma	4.308	3.103	2.182	0.84
Aptec ver. 5.3	2 sigma	5.85	2.1	3.8	1.15
Aptec ver. 6.31	Not Reported				
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	Not Reported				
Canberra Genie-2000	2 sigma	5.89	2.12	3.85	1.15
Canberra Genie-VMS	1 sigma	5.26	9.26	5.67	1.03
Canberra Genie-VMS	2 sigma	5.8	1.3	3.3	1.14
Canberra Genie-VMS	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	More than 3 sigma	3.9	2.84	2.06	0.76
Canberra ProCount	1 sigma	4.957	1.642	1.764	0.97
Canberra ProCount	1 sigma	5.09	3.5	4	1.00
Canberra ProCount	1 sigma	5.242	1.223	3.521	1.03
Canberra ProCount	2 sigma	4.57	1.06	2.51	0.90
Canberra ProCount	Not Reported				
Canberra Sampo-90	1 sigma	4.88	3.502	0.094	0.96
Canberra Sampo-90	1 sigma	5.33	0.21	0.08	1.05
Canberra/ND Genie 9900	Not Reported				
In House	Not Reported				
Ortec Gammavision	2 sigma	4.32	2.42	1.31	0.85
Ortec Gammavision	2 sigma	4.588	3.161	2.639	0.90
Ortec GELIGAM	1 sigma	5.32	0.72	0.07	1.04
Ortec Maestro-Minigam	Not Reported				
Ortec Maestro-Omnigam	2 sigma	4.22	1.12	0.865	0.83
Vertechs GDR/P ver 3.1	Not Reported				
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

Ru-103

Sample 2

Expected Value* = 0.14

Calculated 1 sigma uncertainty = 0.04

Mean +/- SD of Reported Value = 0.16 *+/-* 0.03

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	0.1473	0.13	0.2083	1.05
Aptec ver. 5.3	1 sigma	0.12	0.07	0.13	0.86
Aptec ver. 5.3	Not Reported				
Aptec ver. 6.31	1 sigma	0.132	0.058	0.109	0.94
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	Not Reported				
Canberra Genie-2000	1 sigma	0.15	0.11	0.19	1.07
Canberra Genie-VMS	1 sigma	0.12	0.1	0	0.86
Canberra Genie-VMS	1 sigma	0.16	0.09	0.17	1.14
Canberra Genie-VMS	1 sigma	0.17	0.09	0.2	1.21
Canberra Genie-VMS	1 sigma	0.17	0.09	0.16	1.21
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	2 sigma	0.2	0.1	0.1	1.43
Canberra ProCount	1 sigma	0.161	0.251	0.079	1.15
Canberra ProCount	1 sigma	0.1651	0.1684	0.1548	1.18
Canberra ProCount	1 sigma	0.1693	0.1745	0.1774	1.21
Canberra ProCount	2 sigma	0.21	0.11	0.2	1.50
Canberra ProCount	2 sigma	0.213	0.221	0.212	1.52
Canberra Sampo-90	1 sigma	0.16	0.04	0.13	1.14
Canberra Sampo-90	2 sigma	0.2	0.04	0.1	1.43
Canberra/ND Genie 9900	1 sigma	0.17	0.09	0.2	1.21
In House	Not Reported				
Ortec Gammavision	1 sigma	0.13	0.09	0.02	0.93
Ortec Gammavision	Not Reported				
Ortec GELIGAM	1 sigma	0.13	0.03	0.12	0.93
Ortec Maestro-Minigam	1 sigma	0.126	0.056	0.0366	0.90
Ortec Maestro-Omnigam	1 sigma	0.126	0.055	0.0381	0.90
Vertechs GDR/P ver 3.1	1 sigma	0.14	0.068	0.232	1.00
Vertechs Seeker ver 1.5	1 sigma	0.134	0.049	0.155	0.96

* 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

Sample 1

Expected Value* =   23.0

Calculated 1 sigma uncertainty = 1.13

Mean +/- SD of Reported Value = 22.6 **+/-** 0.9

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	2 sigma	24.37	5.78	4.04	1.06
Aptec ver. 5.3	1 sigma	22.26	1.83	1.95	0.97
Aptec ver. 5.3	1 sigma	22.7	1.97	1.28	0.99
Aptec ver. 6.31	1 sigma	22.08	2.143	1.265	0.96
Aptec ver. 6.31	1 sigma	24	6.79	1.01	1.04
Aptec ver. 9.0	1 sigma	21.95	0.8	1.8	0.95
Canberra Genie-2000	1 sigma	23.2	4.8	0.89	1.01
Canberra Genie-VMS	1 sigma	22.7	0.9	0.73	0.99
Canberra Genie-VMS	1 sigma	22.89	1.15	1.5	1.00
Canberra Genie-VMS	1 sigma	22.99	0.78	2.02	1.00
Canberra Genie-VMS	3 sigma	20	2	0	0.87
Canberra Genie-VMS	More than 3 sigma	28.5	2.1	0.2	1.24
Canberra Micro Sampo	1 sigma	23.3	0.7	1.1	1.01
Canberra ProCount	1 sigma	23.04	4.799	1.656	1.00
Canberra ProCount	1 sigma	23.14	1.571	1.537	1.01
Canberra ProCount	2 sigma	21.89	3.265	0.761	0.95
Canberra ProCount	More than 3 sigma	27.9	5.1	1.92	1.21
Canberra ProCount	Not Reported				
Canberra Sampo-90	1 sigma	22.58	0.26	2.06	0.98
Canberra Sampo-90	1 sigma	22.9	0.7	1.2	1.00
Canberra/ND Genie 9900	1 sigma	22.7	2.1	5.9	0.99
In House	3 sigma	20.5	3.3	0.8	0.89
Ortec Gammavision	1 sigma	22.67	1.06	0.6	0.99
Ortec Gammavision	1 sigma	22.78	3.5	0.61	0.99
Ortec GELIGAM	1 sigma	23	1.1	0.28	1.00
Ortec Maestro-Minigam	2 sigma	21.8	2.05	1.03	0.95
Ortec Maestro-Omnigam	1 sigma	22	2.01	1.07	0.96
Vertechs GDR/P ver 3.1	1 sigma	22.91	0.642	1.986	1.00
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

Sample 2

Expected Value =	0.52
Calculated 1 sigma uncertainty =	0.15
Mean +/- SD of Reported Value =	0.58 +/- 0.03

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	0.6059	0.343	0.7483	1.17
Aptec ver. 5.3	1 sigma	0.56	0.23	0.45	1.08
Aptec ver. 5.3	1 sigma	0.59	0.17	0.31	1.13
Aptec ver. 6.31	1 sigma	0.593	0.167	0.304	1.14
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	1 sigma	0.584	0.15	0.35	1.12
Canberra Genie-2000	1 sigma	0.59	0.43	0.48	1.13
Canberra Genie-VMS	1 sigma	0.58	0.25	0.43	1.12
Canberra Genie-VMS	1 sigma	0.64	0.2	0.64	1.23
Canberra Genie-VMS	2 sigma	0.46	0.29	0	0.88
Canberra Genie-VMS	2 sigma	0.7	0.2	0.44	1.35
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	1 sigma	0.5	0.1	0.3	0.96
Canberra ProCount	1 sigma	0.537	0.602	0.216	1.03
Canberra ProCount	1 sigma	0.5831	0.5057	0.475	1.12
Canberra ProCount	1 sigma	0.5946	0.5076	0.5572	1.14
Canberra ProCount	2 sigma	0.705	0.612	0.692	1.36
Canberra ProCount	Not Reported				
Canberra Sampo-90	1 sigma	0.55	0.06	0.34	1.06
Canberra Sampo-90	1 sigma	0.6	0.06	0.4	1.15
Canberra/ND Genie 9900	1 sigma	0.6	0.48	1.5	1.15
In House	1 sigma	0.582	0.36	0.5	1.12
Ortec Gammavision	1 sigma	0.58	0.08	0.05	1.12
Ortec Gammavision	1 sigma	0.6	0.29	0.05	1.15
Ortec GELIGAM	1 sigma	0.53	0.08	0.28	1.02
Ortec Maestro-Minigam	1 sigma	0.587	0.15	0.11	1.13
Ortec Maestro-Omnigam	1 sigma	0.578	0.16	0.107	1.11
Vertechs GDR/P ver 3.1	1 sigma	0.629	0.14	0.592	1.21
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

Zn-65

Expected Value* =   11.0

Calculated 1 sigma uncertainty = 0.7

Sample 1

Mean +/- SD of Reported Value = 10.9 *+/-* 0.3

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	10.81	1.79	1.346	0.98
Aptec ver. 5.3	1 sigma	10.67	0.78	0.63	0.97
Aptec ver. 5.3	1 sigma	11.14	0.9	0.47	1.01
Aptec ver. 6.31	1 sigma	10.43	2.15	0.49	0.95
Aptec ver. 6.31	1 sigma	11.15	0.943	0.516	1.01
Aptec ver. 9.0	1 sigma	10.89	1.7	4.12	0.99
Canberra Genie-2000	1 sigma	11	3.2	0.89	1.00
Canberra Genie-VMS	1 sigma	10.6	0.8	0.68	0.96
Canberra Genie-VMS	1 sigma	10.71	0.9	1.25	0.97
Canberra Genie-VMS	1 sigma	10.71	0.83	0.78	0.97
Canberra Genie-VMS	More than 3 sigma	7.1	1.6	0	0.65
Canberra Genie-VMS	More than 3 sigma	15.9	2.4	0.2	1.45
Canberra Micro Sampo	1 sigma	11.1	0.7	0.7	1.01
Canberra ProCount	1 sigma	10.34	1.606	0.7495	0.94
Canberra ProCount	1 sigma	10.78	2.505	0.9591	0.98
Canberra ProCount	1 sigma	11	3.019	0.231	1.00
Canberra ProCount	More than 3 sigma	16	1.76	1.2	1.45
Canberra ProCount	More than 3 sigma	16	3.51	1.33	1.45
Canberra Sampo-90	1 sigma	11	0.75	0.7	1.00
Canberra Sampo-90	1 sigma	11.15	0.75	0.65	1.01
Canberra/ND Genie 9900	1 sigma	10.8	0.9	1.3	0.98
In House	1 sigma	10.8	2.2	1	0.98
Ortec Gammavision	1 sigma	11.35	1.93	0.22	1.03
Ortec Gammavision	1 sigma	11.64	0.66	0.2	1.06
Ortec GELIGAM	1 sigma	11	0.8	0.25	1.00
Ortec Maestro-Minigam	1 sigma	10.8	1.31	0.164	0.98
Ortec Maestro-Omnigam	1 sigma	10.8	1.34	0.246	0.98
Vertechs GDR/P ver 3.1	1 sigma	10.72	0.706	1.109	0.97
Vertechs Seeker ver 1.5	1 sigma	10.7	0.7	0.935	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* =   0.35

Sample   2

Calculated 1 sigma uncertainty =   0.12

Mean +/- SD of Reported Value =   0.41 *+/-* 0.09

Software	Comparison**	Activity	Error	MDA	Lab Value / Exp. Value
Aptec ver. 4.3	1 sigma	0.3577	0.2739	0.4309	1.02
Aptec ver. 5.3	1 sigma	0.32	0.14	0.26	0.91
Aptec ver. 5.3	1 sigma	0.33	0.14	0.26	0.94
Aptec ver. 6.31	1 sigma	0.348	0.14	0.253	0.99
Aptec ver. 6.31	Not Reported				
Aptec ver. 9.0	Not Reported				
Canberra Genie-2000	1 sigma	0.38	0.31	0.37	1.09
Canberra Genie-VMS	1 sigma	0.4	0.1	0.36	1.14
Canberra Genie-VMS	1 sigma	0.47	0.13	0.37	1.34
Canberra Genie-VMS	2 sigma	0.21	0.09	0	0.60
Canberra Genie-VMS	2 sigma	0.53	0.19	0.32	1.51
Canberra Genie-VMS	Not Reported				
Canberra Micro Sampo	1 sigma	0.4	0.1	0.3	1.14
Canberra ProCount	1 sigma	0.4491	0.2437	0.304	1.28
Canberra ProCount	1 sigma	0.463	0.385	0.165	1.32
Canberra ProCount	2 sigma	0.5251	0.3835	0.3686	1.50
Canberra ProCount	2 sigma	0.588	0.497	0.596	1.68
Canberra ProCount	3 sigma	0.65	0.18	0.43	1.86
Canberra Sampo-90	1 sigma	0.38	0.03	0.33	1.09
Canberra Sampo-90	1 sigma	0.4	0.09	0.3	1.14
Canberra/ND Genie 9900	1 sigma	0.47	0.18	0.43	1.34
In House	1 sigma	0.436	0.31	0.5	1.25
Ortec Gammavision	1 sigma	0.35	0.13	0.01	1.00
Ortec Gammavision	1 sigma	0.36	0.04	0.01	1.03
Ortec GELIGAM	1 sigma	0.36	0.07	0.24	1.03
Ortec Maestro-Minigam	1 sigma	0.342	0.088	0.0354	0.98
Ortec Maestro-Omnigam	1 sigma	0.36	0.084	0.0354	1.03
Vertechs GDR/P ver 3.1	1 sigma	0.338	0.101	0.406	0.97
Vertechs Seeker ver 1.5	1 sigma	0.351	0.116	0.359	1.00

* Expected value is from SYNTH program.

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