ANALYTICAL REPORT

Job Number: 160-18554-1

Job Description: EA and Cabrera - Hill AFB WR111

For:
EA Engineering, Science, and Technology
7995 E. Prentice Ave, Suite 206E
Greenwood Village, CO 80111

Attention: Pamela J Moss

Approved for release.
Jessica H DeHerrera
Project Manager I
9/9/2016 4:15 PM

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09/09/2016

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: EA Engineering, Science, and Technology

Project: EA and Cabrera - Hill AFB WR111

Report Number: 160-18554-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 08/09/2016; the samples arrived in good condition. The temperature of the coolers at receipt was 18.0 C. Thermal preservation is not required for the requested analyses; therefore, corrective action is deemed unnecessary. The client was notified on 8/9/16.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)
Samples SU02-EXW-040-SS-P-00 (160-18554-1), SU02-EXN-041-SS-P-00 (160-18554-2), SU02-EXW-042-SS-P-00 (160-18554-3), SU02-EXB-043-SS-P-00 (160-18554-4), SU02-EXN-044-SS-P-00 (160-18554-5), SU02-EXB-045-SS-P-00 (160-18554-6), SU02-EXW-046-SS-P-00 (160-18554-7), SU02-EXW-047-SS-P-00 (160-18554-8), SU02-EXB-048-SS-P-00 (160-18554-9), SU02-EXB-049-SS-P-00 (160-18554-10), SU02-EXB-050-SS-P-00 (160-18554-11), SU02-EXW-051-SS-P-00 (160-18554-12), SU02-EXB-052-SS-P-00 (160-18554-13), SU02-EXB-053-SS-P-00 (160-18554-14), SU02-EXB-054-SS-P-00 (160-18554-15), SU02-EXS-055-SS-P-00 (160-18554-16), SU02-EXB-056-SS-P-00 (160-18554-17), SU02-EXB-057-SS-P-00 (160-18554-18), SU02-EXW-047-SS-DUP-P-00 (160-18554-19) and SU02-EXB-049-SS-DUP-P-00 (160-18554-20) were analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with EPA 901.1. The samples were leached on 08/09/2016, prepared on 08/11/2016 and analyzed on 09/01/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM
Samples SU02-EXW-040-SS-P-00 (160-18554-1), SU02-EXN-041-SS-P-00 (160-18554-2), SU02-EXW-042-SS-P-00 (160-18554-3), SU02-EXB-043-SS-P-00 (160-18554-4), SU02-EXN-044-SS-P-00 (160-18554-5), SU02-EXB-045-SS-P-00 (160-18554-6), SU02-EXW-046-SS-P-00 (160-18554-7), SU02-EXW-047-SS-P-00 (160-18554-8), SU02-EXB-048-SS-P-00 (160-18554-9), SU02-EXB-049-SS-P-00 (160-18554-10), SU02-EXB-050-SS-P-00 (160-18554-11), SU02-EXW-051-SS-P-00 (160-18554-12), SU02-EXB-052-SS-P-00 (160-18554-13), SU02-EXB-053-SS-P-00 (160-18554-14), SU02-EXB-054-SS-P-00 (160-18554-15), SU02-EXS-055-SS-P-00 (160-18554-16), SU02-EXB-056-SS-P-00 (160-18554-17), SU02-EXB-057-SS-P-00 (160-18554-18), SU02-EXW-047-SS-DUP-P-00 (160-18554-19) and SU02-EXB-049-SS-DUP-P-00 (160-18554-20) were analyzed for Isotopic Thorium accordance with A01R_Th. The samples were leached on 08/09/2016, prepared on 08/25/2016 and analyzed on 08/31/2016, 09/07/2016 and 09/08/2016.

The following sample could not be thoroughly homogenized before sub-sampling was performed due to sample matrix:
SU02-EXB-054-SS-P-00 (160-18554-15). The samples contained rocks.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix:
SU02-EXW-040-SS-P-00 (160-18554-1), SU02-EXN-041-SS-P-00 (160-18554-2), SU02-EXW-042-SS-P-00 (160-18554-3), SU02-EXB-043-SS-P-00 (160-18554-4), SU02-EXN-044-SS-P-00 (160-18554-5), SU02-EXB-045-SS-P-00 (160-18554-6), SU02-EXW-046-SS-P-00 (160-18554-7), SU02-EXW-047-SS-P-00 (160-18554-8), SU02-EXB-048-SS-P-00 (160-18554-9), SU02-EXB-049-SS-P-00 (160-18554-10), SU02-EXB-050-SS-P-00 (160-18554-11), SU02-EXW-051-SS-P-00 (160-18554-12) and SU02-EXB-052-SS-P-00 (160-18554-13). The samples contained rocks.

The resolution (FWHM) for the Thorium-229 tracer peak for the following sample is greater than the 100 keV limit (108.4 keV):
SU02-EXW-051-SS-P-00 (160-18554-12) The resolution of the tracer peak in all other samples associated with the batch are well within the 100 keV limit indicating an anomaly isolated to this sample. The laboratory does not believe this excursion adversely affects the data

The resolution (FWHM) for the Thorium-229 tracer peak for the following sample is greater than the 100 keV limit (117.4 keV):
SU02-EXB-054-SS-P-00 (160-18554-15) The resolution of the tracer peak in all other samples associated with the batch are well within the 100 keV limit indicating an anomaly isolated to this sample. The laboratory does not believe this excursion adversely affects the data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Client Sample ID: SU02-EXW-040-SS-P-00 — Lab Sample ID: 160-18554-1

No Detections.

Client Sample ID: SU02-EXN-041-SS-P-00 — Lab Sample ID: 160-18554-2

No Detections.

Client Sample ID: SU02-EXW-042-SS-P-00 — Lab Sample ID: 160-18554-3

No Detections.

Client Sample ID: SU02-EXB-043-SS-P-00 — Lab Sample ID: 160-18554-4

No Detections.

Client Sample ID: SU02-EXN-044-SS-P-00 — Lab Sample ID: 160-18554-5

No Detections.

Client Sample ID: SU02-EXB-045-SS-P-00 — Lab Sample ID: 160-18554-6

No Detections.

Client Sample ID: SU02-EXW-046-SS-P-00 — Lab Sample ID: 160-18554-7

No Detections.

Client Sample ID: SU02-EXW-047-SS-P-00 — Lab Sample ID: 160-18554-8

No Detections.

Client Sample ID: SU02-EXB-048-SS-P-00 — Lab Sample ID: 160-18554-9

No Detections.

Client Sample ID: SU02-EXB-049-SS-P-00 — Lab Sample ID: 160-18554-10

No Detections.

Client Sample ID: SU02-EXB-050-SS-P-00 — Lab Sample ID: 160-18554-11

No Detections.

Client Sample ID: SU02-EXW-051-SS-P-00 — Lab Sample ID: 160-18554-12

No Detections.

Client Sample ID: SU02-EXB-052-SS-P-00 — Lab Sample ID: 160-18554-13

No Detections.

Client Sample ID: SU02-EXB-053-SS-P-00 — Lab Sample ID: 160-18554-14

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Client Sample ID: SU02-EXB-054-SS-P-00 — Lab Sample ID: 160-18554-15

No Detections.

Client Sample ID: SU02-EXS-055-SS-P-00 — Lab Sample ID: 160-18554-16

No Detections.

Client Sample ID: SU02-EXB-056-SS-P-00 — Lab Sample ID: 160-18554-17

No Detections.

Client Sample ID: SU02-EXB-057-SS-P-00 — Lab Sample ID: 160-18554-18

No Detections.

Client Sample ID: SU02-EXW-047-SS-DUP-P-00 — Lab Sample ID: 160-18554-19

No Detections.

Client Sample ID: SU02-EXB-049-SS-DUP-P-00 — Lab Sample ID: 160-18554-20

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SU02-EXW-040-SS-P-00 — Lab Sample ID: 160-18554-1

Date Collected: 08/08/16 11:41 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.28		0.241	0.276	0.500	0.146	pCi/g	08/11/16 15:20	09/01/16 11:54	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.15		0.153	0.181	0.100	0.0279	pCi/g	08/25/16 15:51	09/07/16 14:24	1
Thorium-232	1.14		0.151	0.179	0.100	0.0151	pCi/g	08/25/16 15:51	09/07/16 14:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.0*		*30 - 110*	*08/25/16 15:51*	*09/07/16 14:24*	*1*

Client Sample ID: SU02-EXN-041-SS-P-00 — Lab Sample ID: 160-18554-2

Date Collected: 08/08/16 11:49 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.02		0.205	0.231	0.500	0.239	pCi/g	08/11/16 15:20	09/01/16 11:52	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.31		0.158	0.192	0.100	0.0263	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.15		0.148	0.176	0.100	0.0142	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.0*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXW-042-SS-P-00 — Lab Sample ID: 160-18554-3

Date Collected: 08/08/16 12:12 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.33		0.292	0.323	0.500	0.247	pCi/g	08/11/16 15:20	09/01/16 11:51	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.14		0.147	0.176	0.100	0.0143	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	0.934		0.133	0.154	0.100	0.0142	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Client Sample ID: SU02-EXW-042-SS-P-00 — Lab Sample ID: 160-18554-3

Date Collected: 08/08/16 12:12 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.3*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXB-043-SS-P-00 — Lab Sample ID: 160-18554-4

Date Collected: 08/08/16 12:08 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.25		0.204	0.241	0.500	0.159	pCi/g	08/11/16 15:20	09/01/16 12:31	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.11		0.143	0.171	0.100	0.0255	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	0.972		0.134	0.157	0.100	0.0138	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*100*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXN-044-SS-P-00 — Lab Sample ID: 160-18554-5

Date Collected: 08/08/16 12:03 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.994		0.204	0.228	0.500	0.152	pCi/g	08/11/16 15:20	09/01/16 12:32	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	2.07		0.201	0.266	0.100	0.0358	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.32		0.160	0.195	0.100	0.0267	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.1*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXB-045-SS-P-00 — Lab Sample ID: 160-18554-6

Date Collected: 08/08/16 11:58 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.08		0.225	0.252	0.500	0.183	pCi/g	08/11/16 15:20	09/01/16 12:33	1

Client Sample ID: SU02-EXB-045-SS-P-00 — Lab Sample ID: 160-18554-6

Date Collected: 08/08/16 11:58 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.63		0.180	0.226	0.100	0.0149	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.34		0.163	0.198	0.100	0.0274	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.1*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXW-046-SS-P-00 — Lab Sample ID: 160-18554-7

Date Collected: 08/08/16 12:24 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.66		0.324	0.367	0.500	0.257	pCi/g	08/11/16 15:20	09/01/16 12:33	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.14		0.147	0.175	0.100	0.0262	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.24		0.153	0.185	0.100	0.0284	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXW-047-SS-P-00 — Lab Sample ID: 160-18554-8

Date Collected: 08/08/16 12:18 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.68		0.230	0.289	0.500	0.152	pCi/g	08/11/16 15:20	09/01/16 12:35	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.30		0.156	0.191	0.100	0.0308	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.16		0.147	0.176	0.100	0.0140	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*100*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXB-048-SS-P-00 — Lab Sample ID: 160-18554-9

Date Collected: 08/08/16 12:44 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.787		0.187	0.205	0.500	0.159	pCi/g	08/11/16 15:20	09/01/16 12:36	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	2.00		0.207	0.267	0.100	0.0162	pCi/g	08/25/16 15:51	09/07/16 14:24	1
Thorium-232	1.25		0.164	0.194	0.100	0.0296	pCi/g	08/25/16 15:51	09/07/16 14:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*08/25/16 15:51*	*09/07/16 14:24*	*1*

Client Sample ID: SU02-EXB-049-SS-P-00 — Lab Sample ID: 160-18554-10

Date Collected: 08/08/16 13:22 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.06		0.243	0.267	0.500	0.183	pCi/g	08/11/16 15:20	09/01/16 12:44	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	2.04		0.211	0.272	0.100	0.0437	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.15		0.158	0.185	0.100	0.0299	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.3*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU02-EXB-050-SS-P-00 — Lab Sample ID: 160-18554-11

Date Collected: 08/08/16 13:33 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.44		0.324	0.357	0.500	0.258	pCi/g	08/11/16 15:20	09/01/16 12:42	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.65		0.183	0.230	0.100	0.0331	pCi/g	08/25/16 15:51	09/07/16 14:24	1
Thorium-232	1.11		0.150	0.177	0.100	0.0349	pCi/g	08/25/16 15:51	09/07/16 14:24	1

Client Sample ID: SU02-EXB-050-SS-P-00 — Lab Sample ID: 160-18554-11

Date Collected: 08/08/16 13:33 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	91.6		30 - 110	08/25/16 15:51	09/07/16 14:24	1

Client Sample ID: SU02-EXW-051-SS-P-00 — Lab Sample ID: 160-18554-12

Date Collected: 08/08/16 12:28 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	2.11		0.266	0.345	0.500	0.175	pCi/g	08/11/16 15:20	09/01/16 13:09	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.31		0.168	0.201	0.100	0.0461	pCi/g	08/25/16 15:51	09/07/16 14:24	1
Thorium-232	1.12		0.154	0.180	0.100	0.0159	pCi/g	08/25/16 15:51	09/07/16 14:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.1		30 - 110	08/25/16 15:51	09/07/16 14:24	1

Client Sample ID: SU02-EXB-052-SS-P-00 — Lab Sample ID: 160-18554-13

Date Collected: 08/08/16 12:40 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.42		0.216	0.262	0.500	0.149	pCi/g	08/11/16 15:20	09/01/16 13:10	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	4.44		0.306	0.482	0.100	0.0291	pCi/g	08/25/16 15:51	09/07/16 14:24	1
Thorium-232	1.66		0.186	0.233	0.100	0.0289	pCi/g	08/25/16 15:51	09/07/16 14:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.0		30 - 110	08/25/16 15:51	09/07/16 14:24	1

Client Sample ID: SU02-EXB-053-SS-P-00 — Lab Sample ID: 160-18554-14

Date Collected: 08/08/16 13:28 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.07		0.211	0.238	0.500	0.164	pCi/g	08/11/16 15:20	09/01/16 13:11	1

Client Sample ID: SU02-EXB-053-SS-P-00 — Lab Sample ID: 160-18554-14

Date Collected: 08/08/16 13:28 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.30		0.156	0.190	0.100	0.0306	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.23		0.151	0.183	0.100	0.0139	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*94.8*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU02-EXB-054-SS-P-00 — Lab Sample ID: 160-18554-15

Date Collected: 08/08/16 13:25 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.06		0.257	0.279	0.500	0.220	pCi/g	08/11/16 15:20	09/01/16 13:12	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.893		0.136	0.156	0.100	0.0340	pCi/g	08/25/16 15:54	09/08/16 15:56	1
Thorium-232	1.10		0.150	0.176	0.100	0.0285	pCi/g	08/25/16 15:54	09/08/16 15:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.3*		*30 - 110*	*08/25/16 15:54*	*09/08/16 15:56*	*1*

Client Sample ID: SU02-EXS-055-SS-P-00 — Lab Sample ID: 160-18554-16

Date Collected: 08/08/16 12:33 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.57		0.255	0.302	0.500	0.190	pCi/g	08/11/16 15:20	09/01/16 13:13	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.15		0.155	0.182	0.100	0.0341	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.07		0.148	0.173	0.100	0.0155	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.0*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU02-EXB-056-SS-P-00 — Lab Sample ID: 160-18554-17

Date Collected: 08/08/16 13:20 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.26		0.211	0.249	0.500	0.193	pCi/g	08/11/16 15:20	09/01/16 13:14	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.993		0.141	0.164	0.100	0.0399	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.24		0.157	0.188	0.100	0.0363	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.6*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU02-EXB-057-SS-P-00 — Lab Sample ID: 160-18554-18

Date Collected: 08/08/16 13:15 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.44		0.268	0.307	0.500	0.192	pCi/g	08/11/16 15:20	09/01/16 13:24	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.20		0.150	0.181	0.100	0.0141	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.23		0.152	0.184	0.100	0.0140	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.7*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU02-EXW-047-SS-DUP-P-00 — Lab Sample ID: 160-18554-19

Date Collected: 08/08/16 12:18 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.61		0.259	0.309	0.500	0.184	pCi/g	08/11/16 15:20	09/01/16 13:25	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.604		0.106	0.117	0.100	0.0336	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	0.694		0.113	0.127	0.100	0.0365	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Client Sample ID: SU02-EXW-047-SS-DUP-P-00 — Lab Sample ID: 160-18554-19

Date Collected: 08/08/16 12:18 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*103*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU02-EXB-049-SS-DUP-P-00 — Lab Sample ID: 160-18554-20

Date Collected: 08/08/16 13:22 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**1.19**		0.230	0.261	0.500	0.152	pCi/g	08/11/16 15:20	09/01/16 13:26	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.671**		0.115	0.128	0.100	0.0148	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	**0.892**		0.133	0.153	0.100	0.0323	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.9*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Tracer/Carrier Summary

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**Th-229 (30-110)**							
160-18554-1	SU02-EXW-040-SS-P-00	91.0							
160-18554-2	SU02-EXN-041-SS-P-00	88.0							
160-18554-3	SU02-EXW-042-SS-P-00	95.3							
160-18554-4	SU02-EXB-043-SS-P-00	100							
160-18554-5	SU02-EXN-044-SS-P-00	89.1							
160-18554-6	SU02-EXB-045-SS-P-00	87.1							
160-18554-7	SU02-EXW-046-SS-P-00	89.7							
160-18554-8	SU02-EXW-047-SS-P-00	100							
160-18554-9	SU02-EXB-048-SS-P-00	83.9							
160-18554-10	SU02-EXB-049-SS-P-00	83.3							
160-18554-11	SU02-EXB-050-SS-P-00	91.6							
160-18554-12	SU02-EXW-051-SS-P-00	88.1							
160-18554-13	SU02-EXB-052-SS-P-00	81.0							
160-18554-14	SU02-EXB-053-SS-P-00	94.8							
160-18554-14 DU	SU02-EXB-053-SS-P-00	82.5							
160-18554-15	SU02-EXB-054-SS-P-00	83.3							
160-18554-16	SU02-EXS-055-SS-P-00	88.0							
160-18554-17	SU02-EXB-056-SS-P-00	86.6							
160-18554-18	SU02-EXB-057-SS-P-00	90.7							
160-18554-19	SU02-EXW-047-SS-DUP-P-00	103							
160-18554-20	SU02-EXB-049-SS-DUP-P-00	89.9							
LCS 160-266564/2-A	Lab Control Sample	92.5							
LCS 160-266565/2-A	Lab Control Sample	97.0							
MB 160-266564/1-A	Method Blank	101							
MB 160-266565/1-A	Method Blank	96.5							

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-264535/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267762 — **Prep Batch: 264535**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.02099	U	0.0211	0.0212	0.500	0.325	pCi/g	08/11/16 15:20	09/01/16 11:46	1

Lab Sample ID: LCS 160-264535/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267763 — **Prep Batch: 264535**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.1	91.28		9.60		1.13	pCi/g	94	87 - 116		
Cesium-137			29.5	28.58		3.05		0.245	pCi/g	97	87 - 120		
Cobalt-60			16.6	16.11		1.67		0.0756	pCi/g	97	87 - 115		

Lab Sample ID: 160-18554-1 DU — **Client Sample ID: SU02-EXW-040-SS-P-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267755 — **Prep Batch: 264535**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Radium-226	1.28			1.206		0.254	0.500	0.162	pCi/g			0.15	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-266564/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267504 — **Prep Batch: 266564**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.05641		0.0338	0.0342	0.100	0.0304	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	0.01380		0.0159	0.0160	0.100	0.0138	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*101*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Lab Sample ID: LCS 160-266564/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267505 — **Prep Batch: 266564**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.71		2.38	0.100	0.0647	pCi/g	105	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*92.5*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-266565/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268478 — **Prep Batch: 266565**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.09373		0.0422	0.0430	0.100	0.0143	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	0.004736	U	0.00947	0.00948	0.100	0.0142	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*96.5*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Lab Sample ID: LCS 160-266565/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268479 — **Prep Batch: 266565**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.18		2.33	0.100	0.0287	pCi/g	103	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*97.0*		*30 - 110*

Lab Sample ID: 160-18554-14 DU — **Client Sample ID: SU02-EXB-053-SS-P-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268481 — **Prep Batch: 266565**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Thorium-230	1.30			1.307		0.198	0.100	0.0383	pCi/g			0.03	1
Thorium-232	1.23			1.056		0.172	0.100	0.0155	pCi/g			0.49	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*82.5*		*30 - 110*

Rad

Leach Batch: 264093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18554-1	SU02-EXW-040-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-2	SU02-EXN-041-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-3	SU02-EXW-042-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-4	SU02-EXB-043-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-5	SU02-EXN-044-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-6	SU02-EXB-045-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-7	SU02-EXW-046-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-8	SU02-EXW-047-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-9	SU02-EXB-048-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-10	SU02-EXB-049-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-11	SU02-EXB-050-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-12	SU02-EXW-051-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-13	SU02-EXB-052-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-14	SU02-EXB-053-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-15	SU02-EXB-054-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-16	SU02-EXS-055-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-17	SU02-EXB-056-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-18	SU02-EXB-057-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-19	SU02-EXW-047-SS-DUP-P-00	Total/NA	Solid	Dry and Grind	
160-18554-20	SU02-EXB-049-SS-DUP-P-00	Total/NA	Solid	Dry and Grind	
160-18554-1 DU	SU02-EXW-040-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18554-14 DU	SU02-EXB-053-SS-P-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 264535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18554-1	SU02-EXW-040-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-2	SU02-EXN-041-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-3	SU02-EXW-042-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-4	SU02-EXB-043-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-5	SU02-EXN-044-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-6	SU02-EXB-045-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-7	SU02-EXW-046-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-8	SU02-EXW-047-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-9	SU02-EXB-048-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-10	SU02-EXB-049-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-11	SU02-EXB-050-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-12	SU02-EXW-051-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-13	SU02-EXB-052-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-14	SU02-EXB-053-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-15	SU02-EXB-054-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-16	SU02-EXS-055-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-17	SU02-EXB-056-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-18	SU02-EXB-057-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-19	SU02-EXW-047-SS-DUP-P-00	Total/NA	Solid	Fill_Geo-21	264093
160-18554-20	SU02-EXB-049-SS-DUP-P-00	Total/NA	Solid	Fill_Geo-21	264093
MB 160-264535/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-264535/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-18554-1 DU	SU02-EXW-040-SS-P-00	Total/NA	Solid	Fill_Geo-21	264093

Rad (Continued)

Prep Batch: 266564

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18554-1	SU02-EXW-040-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-2	SU02-EXN-041-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-3	SU02-EXW-042-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-4	SU02-EXB-043-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-5	SU02-EXN-044-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-6	SU02-EXB-045-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-7	SU02-EXW-046-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-8	SU02-EXW-047-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-9	SU02-EXB-048-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-10	SU02-EXB-049-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-11	SU02-EXB-050-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-12	SU02-EXW-051-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-13	SU02-EXB-052-SS-P-00	Total/NA	Solid	ExtChrom	264093
MB 160-266564/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-266564/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 266565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18554-14	SU02-EXB-053-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-15	SU02-EXB-054-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-16	SU02-EXS-055-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-17	SU02-EXB-056-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-18	SU02-EXB-057-SS-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-19	SU02-EXW-047-SS-DUP-P-00	Total/NA	Solid	ExtChrom	264093
160-18554-20	SU02-EXB-049-SS-DUP-P-00	Total/NA	Solid	ExtChrom	264093
MB 160-266565/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-266565/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-18554-14 DU	SU02-EXB-053-SS-P-00	Total/NA	Solid	ExtChrom	264093

Lab Chronicle

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Client Sample ID: SU02-EXW-040-SS-P-00 — Lab Sample ID: 160-18554-1

Date Collected: 08/08/16 11:41 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267756	09/01/16 11:54	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268510	09/07/16 14:24	ALD	TAL SL

Client Sample ID: SU02-EXN-041-SS-P-00 — Lab Sample ID: 160-18554-2

Date Collected: 08/08/16 11:49 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267755	09/01/16 11:52	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267516	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXW-042-SS-P-00 — Lab Sample ID: 160-18554-3

Date Collected: 08/08/16 12:12 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267754	09/01/16 11:51	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267517	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXB-043-SS-P-00 — Lab Sample ID: 160-18554-4

Date Collected: 08/08/16 12:08 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267757	09/01/16 12:31	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267518	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXN-044-SS-P-00 — Lab Sample ID: 160-18554-5

Date Collected: 08/08/16 12:03 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267758	09/01/16 12:32	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267519	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXB-045-SS-P-00 — Lab Sample ID: 160-18554-6

Date Collected: 08/08/16 11:58 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267760	09/01/16 12:33	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267520	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXW-046-SS-P-00 — Lab Sample ID: 160-18554-7

Date Collected: 08/08/16 12:24 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267761	09/01/16 12:33	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267521	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXW-047-SS-P-00 — Lab Sample ID: 160-18554-8

Date Collected: 08/08/16 12:18 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267762	09/01/16 12:35	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267522	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXB-048-SS-P-00 — Lab Sample ID: 160-18554-9

Date Collected: 08/08/16 12:44 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267763	09/01/16 12:36	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268509	09/07/16 14:24	ALD	TAL SL

Client Sample ID: SU02-EXB-049-SS-P-00 — Lab Sample ID: 160-18554-10

Date Collected: 08/08/16 13:22 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267756	09/01/16 12:44	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267524	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU02-EXB-050-SS-P-00 — Lab Sample ID: 160-18554-11

Date Collected: 08/08/16 13:33 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267754	09/01/16 12:42	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268563	09/07/16 14:24	ALD	TAL SL

Client Sample ID: SU02-EXW-051-SS-P-00 — Lab Sample ID: 160-18554-12

Date Collected: 08/08/16 12:28 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267757	09/01/16 13:09	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268508	09/07/16 14:24	ALD	TAL SL

Client Sample ID: SU02-EXB-052-SS-P-00 — Lab Sample ID: 160-18554-13

Date Collected: 08/08/16 12:40 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267758	09/01/16 13:10	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268507	09/07/16 14:24	ALD	TAL SL

Client Sample ID: SU02-EXB-053-SS-P-00 — Lab Sample ID: 160-18554-14

Date Collected: 08/08/16 13:28 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267760	09/01/16 13:11	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268480	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU02-EXB-054-SS-P-00 — Lab Sample ID: 160-18554-15

Date Collected: 08/08/16 13:25 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267761	09/01/16 13:12	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268649	09/08/16 15:56	ALD	TAL SL

Client Sample ID: SU02-EXS-055-SS-P-00 — Lab Sample ID: 160-18554-16

Date Collected: 08/08/16 12:33 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267762	09/01/16 13:13	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268483	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU02-EXB-056-SS-P-00 — Lab Sample ID: 160-18554-17

Date Collected: 08/08/16 13:20 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267763	09/01/16 13:14	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268484	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU02-EXB-057-SS-P-00 — Lab Sample ID: 160-18554-18

Date Collected: 08/08/16 13:15 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267754	09/01/16 13:24	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268485	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU02-EXW-047-SS-DUP-P-00 — Lab Sample ID: 160-18554-19

Date Collected: 08/08/16 12:18 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267755	09/01/16 13:25	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268486	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU02-EXB-049-SS-DUP-P-00 — Lab Sample ID: 160-18554-20

Date Collected: 08/08/16 13:22 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264535	08/11/16 15:20	R1S	TAL SL
Total/NA	Analysis	901.1		1	267756	09/01/16 13:26	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264093	08/09/16 16:01	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268487	09/07/16 14:38	ALD	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-17
California	State Program	9	2886	03-31-18
Connecticut	State Program	1	PH-0241	03-31-17
Florida	NELAP	4	E87689	06-30-17
Illinois	NELAP	5	003757	11-30-16 *
Iowa	State Program	7	373	12-01-16 *
Kansas	NELAP	7	E-10236	10-31-16 *
Kentucky (DW)	State Program	4	90125	12-31-16
L-A-B	DoD ELAP		L2305	04-06-19
Louisiana	NELAP	6	04080	06-30-17
Louisiana (DW)	NELAP	6	LA160008	12-31-16
Maryland	State Program	3	310	09-30-17
Missouri	State Program	7	780	06-30-17
Nevada	State Program	9	MO000542016-1	07-31-17
New Jersey	NELAP	2	MO002	06-30-17
New York	NELAP	2	11616	03-31-17
North Dakota	State Program	8	R207	06-30-17
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-17
Pennsylvania	NELAP	3	68-00540	02-28-17 *
South Carolina	State Program	4	85002001	06-30-16 *
Texas	NELAP	6	T104704193-15-9	07-31-17
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542016-8	07-31-17
Virginia	NELAP	3	460230	06-14-17
Washington	State Program	10	C592	08-30-17
West Virginia DEP	State Program	3	381	08-31-16 *

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-17
Utah	NELAP	8	CO00026	07-31-16 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Method	Method Description	Protocol	Laboratory
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: EA Engineering, Science, and Technology
Project/Site: EA and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-18554-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-18554-1	SU02-EXW-040-SS-P-00	Solid	08/08/16 11:41	08/09/16 09:20
160-18554-2	SU02-EXN-041-SS-P-00	Solid	08/08/16 11:49	08/09/16 09:20
160-18554-3	SU02-EXW-042-SS-P-00	Solid	08/08/16 12:12	08/09/16 09:20
160-18554-4	SU02-EXB-043-SS-P-00	Solid	08/08/16 12:08	08/09/16 09:20
160-18554-5	SU02-EXN-044-SS-P-00	Solid	08/08/16 12:03	08/09/16 09:20
160-18554-6	SU02-EXB-045-SS-P-00	Solid	08/08/16 11:58	08/09/16 09:20
160-18554-7	SU02-EXW-046-SS-P-00	Solid	08/08/16 12:24	08/09/16 09:20
160-18554-8	SU02-EXW-047-SS-P-00	Solid	08/08/16 12:18	08/09/16 09:20
160-18554-9	SU02-EXB-048-SS-P-00	Solid	08/08/16 12:44	08/09/16 09:20
160-18554-10	SU02-EXB-049-SS-P-00	Solid	08/08/16 13:22	08/09/16 09:20
160-18554-11	SU02-EXB-050-SS-P-00	Solid	08/08/16 13:33	08/09/16 09:20
160-18554-12	SU02-EXW-051-SS-P-00	Solid	08/08/16 12:28	08/09/16 09:20
160-18554-13	SU02-EXB-052-SS-P-00	Solid	08/08/16 12:40	08/09/16 09:20
160-18554-14	SU02-EXB-053-SS-P-00	Solid	08/08/16 13:28	08/09/16 09:20
160-18554-15	SU02-EXB-054-SS-P-00	Solid	08/08/16 13:25	08/09/16 09:20
160-18554-16	SU02-EXS-055-SS-P-00	Solid	08/08/16 12:33	08/09/16 09:20
160-18554-17	SU02-EXB-056-SS-P-00	Solid	08/08/16 13:20	08/09/16 09:20
160-18554-18	SU02-EXB-057-SS-P-00	Solid	08/08/16 13:15	08/09/16 09:20
160-18554-19	SU02-EXW-047-SS-DUP-P-00	Solid	08/08/16 12:18	08/09/16 09:20
160-18554-20	SU02-EXB-049-SS-DUP-P-00	Solid	08/08/16 13:22	08/09/16 09:20

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60	Eckert & Ziegler, Lot 82232-334			(Purchased Reagent)		Americium-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60	Eckert & Zigler, Lot 82233-334			(Purchased Reagent)		Americium-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60	Eckert & Zigler, Lot 82234-334			(Purchased Reagent)		Americium-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60	Eckert & Ziegler, Lot 82235-334			(Purchased Reagent)		Americium-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60	Eckert & Ziegler, Lot 82236-334			(Purchased Reagent)		Americium-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60	Eckert & Ziegler, Lot 82237-334			(Purchased Reagent)		Americium-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60	Eckert & Ziegler, Lot 82240-334			(Purchased Reagent)		Americium-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60	Eckert & Ziegler, Lot 82241-334			(Purchased Reagent)		Americium-241	6.638 Bq
							Pu-239	6.797 Bq
							Pulser	
							Thorium-230	6.629 Bq
							U	
82242-334_00001	06/08/60	Eckert & Ziegler, Lot 82242-334			(Purchased Reagent)		Americium-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60	Eckert & Ziegler, Lot 82243-334			(Purchased Reagent)		Americium-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60	Eckert & Zigler, Lot 82244-334			(Purchased Reagent)		Americium-241	6.897 Bq
							Pu-239	6.717 Bq
							Pulser	
							Thorium-230	7.352 Bq
							U	
82245-334_00001	06/09/60	Eckert & Ziegler, Lot 82245-334			(Purchased Reagent)		Americium-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
82246-334_00001	06/09/60	Eckert & Ziegler, Lot 82246-334			(Purchased Reagent)		Americium-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq
Marn Soil_00002	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	2870 Bq
							Cd-109	39231 Bq
							Ce-139	1302 Bq
							Cesium-137	1087 Bq
							Co-57	849 Bq
							Cobalt-60	1788 Bq
							Hg-203	2820 Bq
							Pb-210	35040 Bq
							Sn-113	2306 Bq
							Y-88	3762 Bq
MarnSolid_00002	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	2797 Bq
							Cd-109	39337 Bq
							Ce-139	1320 Bq
							Cesium-137	1122 Bq
							Co-57	870 Bq
							Hg-203	2814 Bq
							Pb-210	35883 Bq
							Sn-113	2322 Bq
							Y-88	3821 Bq
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 Source	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Y-88	12712 Bq
Source F_00001	01/01/61	02/23/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.0327 mL	Americium-241	1846.42 Bq
							Cd-109	26819.3 Bq
							Ce-139	890.424 Bq
							Cesium-137	743.562 Bq
							Co-57	580.6 Bq
							Cobalt-60	1222.38 Bq
							Hg-203	1926.02 Bq
							Sn-113	1576.93 Bq
							Y-88	2572.87 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source G_00001	01/01/61	01/01/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	1.8639 g	Americium-241	1693.09 Bq
							Cd-109	24592.1 Bq
							Ce-139	816.481 Bq
							Cesium-137	681.815 Bq
							Co-57	532.386 Bq
							Cobalt-60	1120.87 Bq
							Hg-203	1766.08 Bq
							Sn-113	1445.98 Bq
							Y-88	2359.21 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source H_00002	01/01/51	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.1184 g	Americium-241	1924.27 Bq
							Cd-109	27950 Bq
							Ce-139	927.965 Bq
							Cesium-137	774.911 Bq
							Co-57	605.079 Bq
							Cobalt-60	1273.92 Bq
							Hg-203	2007.23 Bq
							Sn-113	1643.41 Bq
							Y-88	2681.34 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source I_00001	01/01/61	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	1.9559 g	Americium-241	1776.66 Bq
							Cd-109	25806 Bq
							Ce-139	856.782 Bq
							Cesium-137	715.468 Bq
							Co-57	558.664 Bq
							Cobalt-60	1176.2 Bq
							Hg-203	1853.25 Bq
							Sn-113	1517.35 Bq
							Y-88	2475.66 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Th-229_00021	08/01/17	07/20/16	0.1M HNO3, Lot n/a	500 mL	Th-229_00017	15 mL	At-217	67.2296 dpm/mL
							Thorium-229	67.2296 dpm/mL
.Th-229_00017	08/01/17	08/20/14	0.1M HNO3, Lot n/a	100 mL	Th-229_00016	5.0464 g	At-217	2240.99 dpm/mL
							Thorium-229	2240.99 dpm/mL
..Th-229_00016	08/06/64		Analytics, Lot 97790		(Purchased Reagent)		At-217	740.127 Bq/g
							Thorium-229	740.127 Bq/g
TRM-2_00001	03/20/50		DOE, Lot TRM-2		(Purchased Reagent)		Pb-210	22.1 pCi/g
							Radium-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g
Tuna Can LCS_00005	10/29/16		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15		Eckert & Ziegler, Lot 81427-334		(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Ce-139	546 Bq
							Cesium-137	465 Bq
							Co-57	357 Bq
							Cobalt-60	742 Bq
							Hg-203	1208 Bq
							Pb-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Pb-210	14936 Bq
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Cesium-137	453 Bq
							Co-57	354 Bq
							Cobalt-60	745 Bq
							Hg-203	1175 Bq
							Pb-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq

Reagent

82232-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.630E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	7.137E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	7.281E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.210E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82233-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	4.950E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.064E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	5.114E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.616E+01	3000-8000		0.1	1.1	2.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82234-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82235-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06·24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82241-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

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Analytics

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Atlanta, Georgia 30318
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Fax 404•352•2837
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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1966

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

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Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06·24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.570E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.353E+00	4950-5240	2.410E+04	1.0	1.1	3.0
Am-241	6.002E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.696E+01	3000-8000		0.7	1.1	2.6

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06·24·2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 10-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.251E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.746E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.291E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.832E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Marn Soil_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

Reagent

MarnSolid_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty*, % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Source A_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source C_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
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Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source F_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Source G_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

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24937 Avenue Tibbitts Valencia, California 91355

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Eckert & Ziegler
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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

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(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Source H_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

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(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Source I_00001

Eckert & Ziegler
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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
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Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
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Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Th-229_00016

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

97790

Th-229 5 mL Liquid in Flame Sealed Vial

430569
ID: Th-229_00016
Exp:08/06/64 Prpd:SCB Opn:08/20/14
Th-229 Ampoule

Customer: TestAmerica - St. Louis
P.O. No.: 2573570, Item 1 Product Code: 8229

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.761E+03	0.5	1.5	3.1	08/06/2014

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities: Th-228 2.83E-01 Bq, Th-230 2.33E+01 Bq, Th-232 1.51E0 Bq; γ-impurities (other than decay products)<0.1%.
5.08156 g 0.5M HNO3 solution. Carrier free.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QC Approved: _____ Date: 06 AUG 14
A. Chen, Spectroscopist

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Single Isotope Certificate Rev 5, 22 May 2014

Page 1 of 1

ANA Form005 Rev. —

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

U.S. DEPARTMENT OF COMMERCE
National Institute of Standards & Technology
Gaithersburg, MD 20899

Certificate of Participation

Eckert & Ziegler Analytics
Atlanta, Georgia

is a participant for the period January 1, 2014, through December 31, 2014, in a radioactivity measurements assurance program conducted by the National Institute of Standards and Technology, in cooperation with NRMAP Incorporated. Continued participation is evidenced by dated Reports of Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value from that measured by the National Institute of Standards and Technology. The significance of these Reports is addressed below.*

For the Director,

Michael P. Unterweger, Leader
Radioactivity Group
Physical Measurement Laboratory

*As guidance for the proper use of Reports of Traceability, it should be emphasized that the National Institute of Standards and Technology is concerned only with fostering good measurements capability and consistency with the national measurements system. The assurance of the proper application of that capability to the ultimate consumer products is the responsibility of each manufacturer of these products and of the Federal regulatory agencies.

A continuing traceability program in radioactivity demonstrates, to the degree established by the periodic assays of calibrated radioactivity samples, a continuing competence to maintain the methods and standards necessary for accurate measurement. Such a program cannot, however, endorse each and every measurement nor the final product, any more than a spot check can vouch for every unchecked item. Care should be taken, therefore, not to imply such endorsement. The proper use of this Report is governed by section 200.114 of Title 15 of the Code of Federal Regulations. These regulations may be met if Reports are quoted only in their entirety. Excerpts out of context may be misleading.

1380 Seaboard Industrial Boulevard
Atlanta, Georgia 30318 USA
Phone (404) 352-8677 • Fax (404) 352-2837
Email: analytics@ezag.com (Tax EIN: 58-1406082)

Eckert & Ziegler
Analytics

Recommended Procedure for Opening the Flame Sealed Vial

1) If the solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the standard.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood.

3) Shake the vial to wet the entire inside surface of the vial. Return the vial to the upright position.

4) Check that all of the liquid has drained out of the neck of the vial. If necessary, gently tap the neck to speed the process.

5) The Wheaton vials we use are pre-scored.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the vial upright and wrap with soft tissue, such as Chem Wipes, around the tip of the vial and secure with tape (see picture). Snap off the top of the vial by pressing the pre-scored part of the neck away towards you while pulling the tip of the vial away from you.

8) Transfer the solution from the vial using a pycnometer or pipet with a dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused solution in a flame sealed glass vial, if possible, to minimize the evaporation loss.

Reagent

Th-229_00021

Standard ID Number: Th-229_00021
True Value = 67.217 Dpm/mL
Date Analyzed: 8/1/2016

Radionuclide: Th-229

	Replicates	
#1	65.43	Dpm/mL
#2	62.76	Dpm/mL
#3	66.9	Dpm/mL

Mean = 65.03

1 sigma = 2.09878536

1.96 sigma = 4.113619

True Value minus 5% = 63.85615 (True Value - 5%)
True Value plus 5% = 70.57785 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: ALD 8/2/16

2nd Reviewed By/Date: RM 8·3·16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 229 _ 00021

Reagent ID: Th-229_00021

		Expiration Date:	12/01/2016
Description:	Th-229 Tracer	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	0.1M HNO3
Reagent Volume:	500.000 mL	Solvent Lot:	n/a
Creation Date:	07/20/2016		
Open Date:			
Container(s):	957642		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
At-217	Th-229_00017	08/05/2016	2240.98600	dpm/mL	67.22958	dpm/mL
Th-229	Th-229_00017	08/05/2016	2240.98600	dpm/mL	67.22958	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00017	Th-229 Parent		08/05/16				15.00000	mL

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	8/6/2014 0:00		
Decayto Date/Time (t):	8/1/16 0:00		
Initial Activity (A_0):	67.23 dpm		
Initial Aliquot:	1 mL		
Initial Conc:	67.229 dpm/mL		
***Soln. Density:**	1 g/mL		
Nuclide:	Th-229		
Half-Life (days):	2897163	decay days	fraction
****Decay Factor:**	0.9998	726.00	0.00025
Decay Corr Activity:	6.7217E+01 dpm		
Decay Corr Conc:	6.7217E+01 dpm/mL		

Conversion/Calculations

Final Activity Unit:	dpm
Activity Unit Factor:	1.00000
Final Volume Unit:	mL
Volume Unit Factor:	1.000
Final Concentration:	6.7217E+01 dpm/mL
Aliquot Volume:	1.0000E+00 mL
Final Activity (A):	6.7217E+01 dpm

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:02AM 8/2/2016

Sample

Sample Name: Verification 1 Type: Sample
Spectrum #1 Analysis #1

Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th-229_00021
AnalysisResultsID: 172960
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

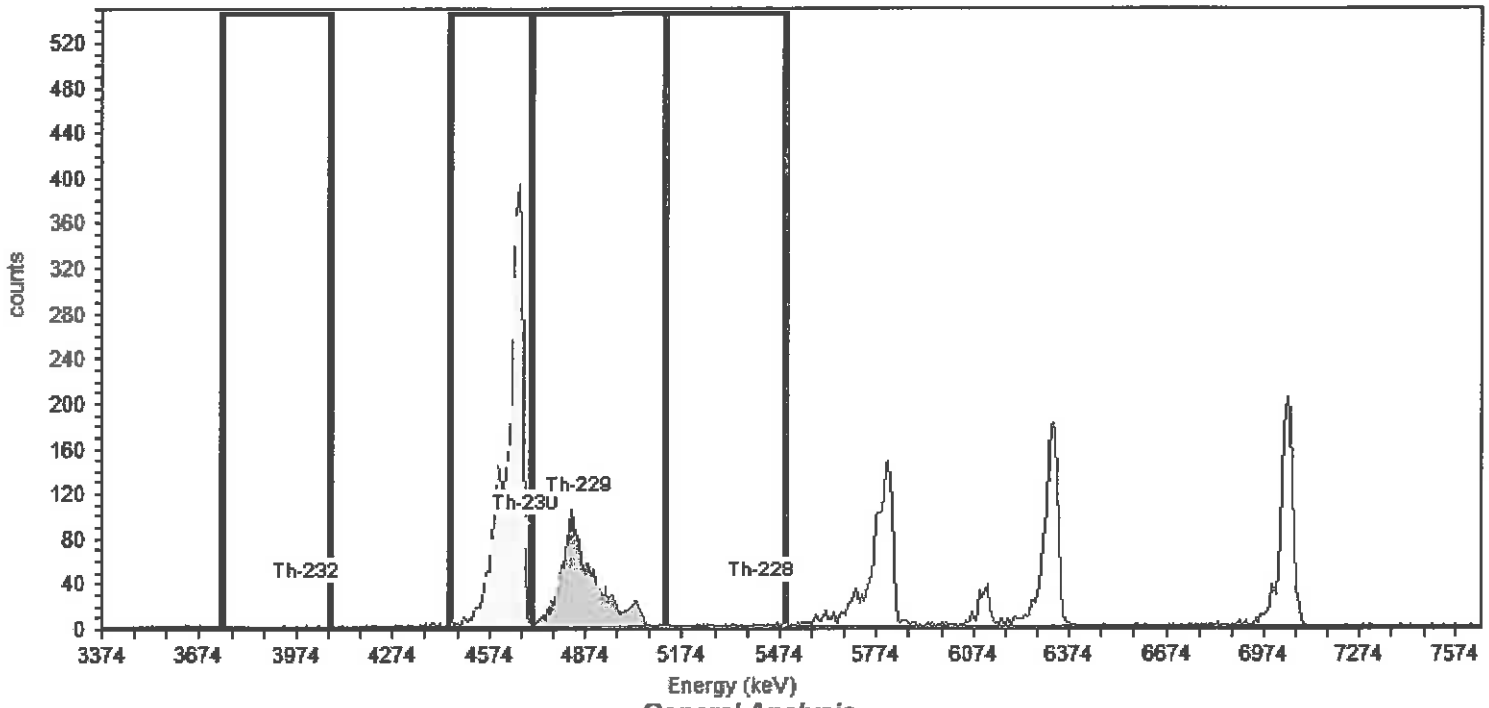
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

Tracer Nuclide: Th-230
Tracer Recovery: 97.09%

Acquisition

Detector: AV170 SN: 50-112 G7
Acquisition Start Date: 8/1/2016 2:01:38PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 7/25/2016 1:14:05PM
Bkgd Info: Sample: ICB;AV170; Det: AV170; Spectrum #1; 7/25/2016 1:14:05 PM

Energy Calibration: IC-9795;AV170-20151016
Efficiency Calibration:IC-9795;AV170-20151016
Calibration Date: 10/17/2015 2:36:50PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.95% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/1/2016 2:00:42PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	9.9	100.2	4	0.0000	4.00	1.650E-001	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4701.9	22.4	99.7	3225	1.0000	3224.00	1.298E+002	DPM/mL
Th-229	4848.0	4,845.3	2.7	4701.9	5119.5	98.2	99.6	1580	3.0000	1577.00	6.543E+001	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	28.8	99.8	30	18.0000	12.00	4.973E-001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:59:33AM 8/2/2016

Sample

Sample Name: Verification 2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th-229_00021
AnalysisResultsID: 172958
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

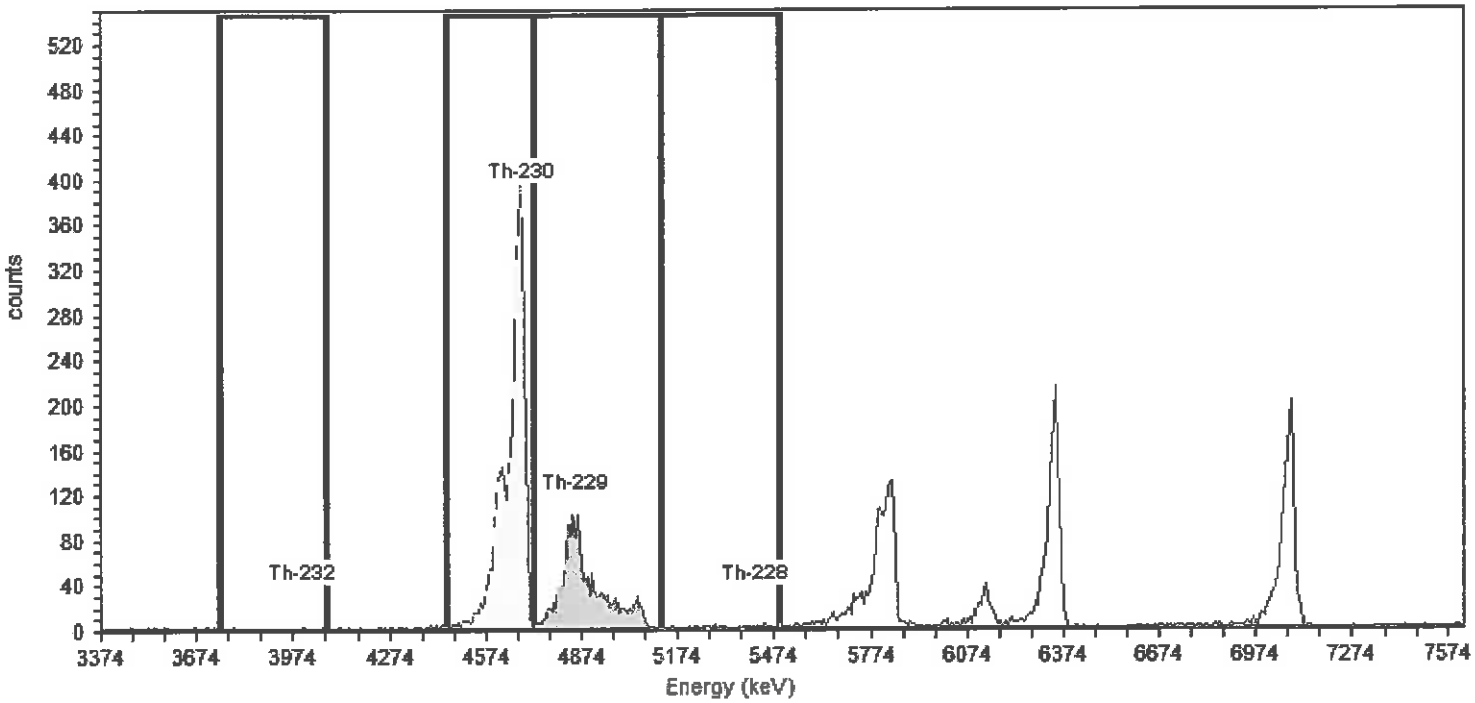
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

Tracer Nuclide: Th-230
Tracer Recovery: 105.76%

Acquisition

Detector: AV171 SN: 50-112 Y2
Acquisition Start Date: 8/1/2016 2:01:38PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 7/22/2016 3:43:34PM
Bkgd Info: Sample: ICB;AV171; Det: AV171; Spectrum #1; 7/22/2016 3:43:34 PM

Energy Calibration: IC-9817;AV171-20151016
Efficiency Calibration:IC-9817;AV171-20151016
Calibration Date: 10/17/2015 2:36:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.59% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/1/2016 2:00:42PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	77.3	99.6	1565	4.0000	1561.00	6.276E+001	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	16.4	99.8	40	19.0866	20.65	8.294E-001	DPM/mL
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	322.3	100.2	4	2.0000	1.85	7.397E-002	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	31.3	99.7	3327	0.0000	3327.00	1.414E+002	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:58:04AM 8/2/2016

Sample

Sample Name: Verification 3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th-229_00021
AnalysisResultsID: 172954
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

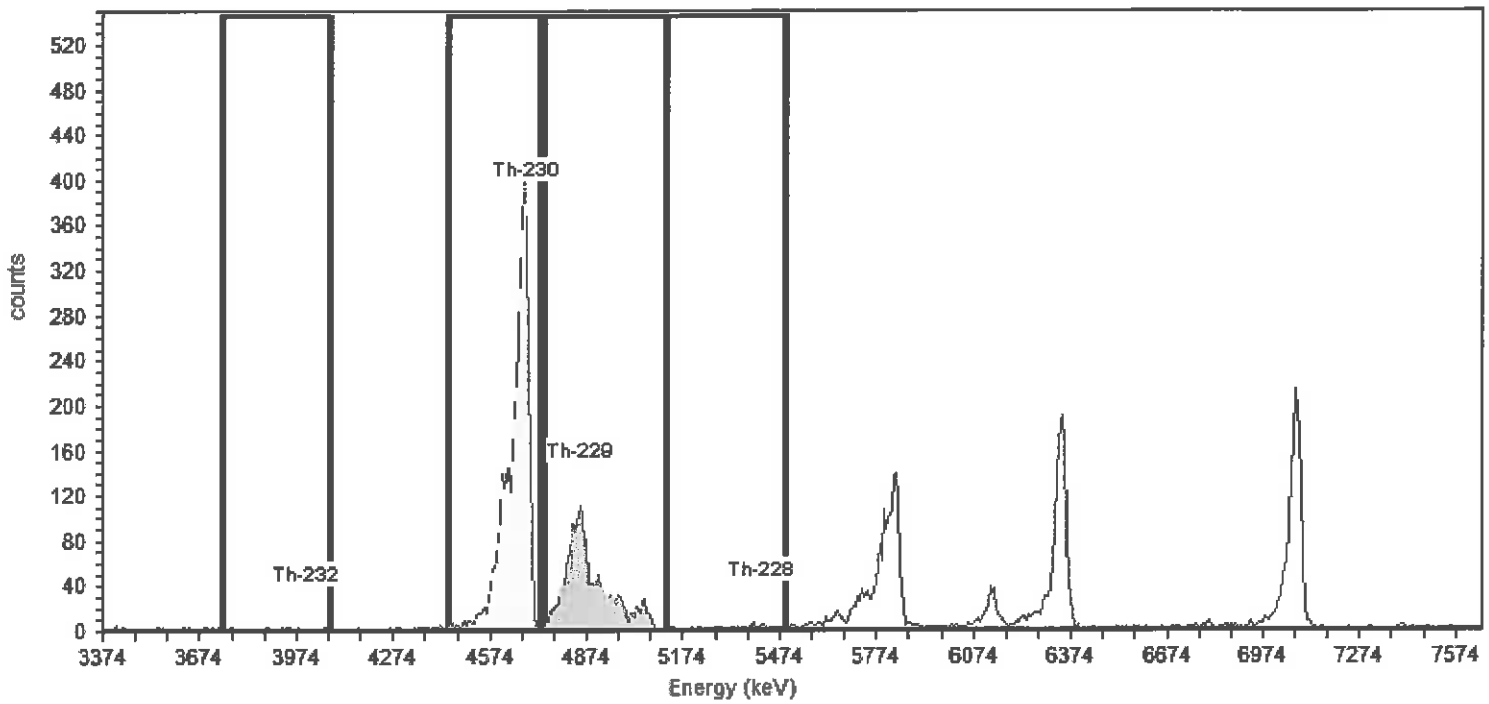
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

Tracer Nuclide: Th-230
Tracer Recovery: 101.01%

Acquisition

Detector: AV173 SN: 50-112 Y4
Acquisition Start Date: 8/1/2016 2:01:39PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 7/25/2016 1:14:05PM
Bkgd Info: Sample: ICB;AV173; Det: AV173; Spectrum #1; 7/25/2016 1:14:05 PM

Energy Calibration: IC-9885;AV173-20151016a
Efficiency Calibration:IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.59% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/1/2016 2:00:42PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.3	100.2	8	2.0000	5.57	2.243E-001	DPM/mL
Th-230	4688.0	4,687.5	0.5	4440.8	4731.7	47.8	99.7	3309	2.0000	3307.00	1.350E+002	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	76.7	99.6	1657	3.0000	1654.00	6.690E+001	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	105.5	99.8	42	12.9361	28.98	1.171E+000	DPM/mL

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Th-229 Tracer (New) by Coppt.

Aliquot Only

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	Ver. 1		170	
2	2		171	
3	3		173	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230-

Vol (mL) : 0.3

Ref Activity (dpm/mL) :

Act Ref Date :

Samples Spiked and Traced By: SLB 7/25/16 (Initials / Date)

Verification Signature & Date: km 7-25-16 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229-00021

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.229

Act Ref Date : 08-06-14

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☑	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ	☐	Iso Pu	☐	Tc-99	☐	Iso Cm	☐
Iso Am	☐	Ra	☐	Iso Th	☑	Pu-241	☐
KPA	☐	Sr	☐	Iso U	☐	Th-229	☐
Np	☐	TAR	☐	C-14	☐	Cl-36	☐

Count Time		Matrix	
Long Count	☑	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Reagent

TRM-2_00001

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

Reagent

Tuna Can LCS_00005

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00005 (776670)
True Value = 30.08 pCi/g
Date Analyzed: 10/25/2015

Radionuclide: Gamma LCS Cs-137

	Replicates	
#1	30	pCi/g
#2	29.42	pCi/g
#3	28.95	pCi/g

Mean = 29.45667

1 sigma = 0.525959

1.96 sigma = 1.030881

True Value minus 5% = 28.576 (True Value - 5%)
True Value plus 5% = 31.584 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 10/29/15

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00005 (776670)
True Value = 97.23 pCi/g
Date Analyzed: 10/25/2015

Radionuclide: Gamma LCS Am-241

	Replicates	
#1	96.82	pCi/g
#2	97.14	pCi/g
#3	97.26	pCi/g

Mean = 97.07333

1 sigma = 0.22745

1.96 sigma = 0.445801

True Value minus 5% = 92.3685 (True Value - 5%)
True Value plus 5% = 102.0915 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 10/29/15

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00005 (776670)
True Value = 18.6 pCi/g
Date Analyzed: 10/25/2015

Radionuclide: Gamma LCS Co-60

	Replicates	
#1	17.74	pCi/g
#2	18.7	pCi/g
#3	17.74	pCi/g

Mean = 18.06

1 sigma = 0.554256

1.96 sigma = 1.086342

True Value minus 5% = 17.67 (True Value - 5%)
True Value plus 5% = 19.53 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 10/29/15

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 217910 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-217910~2-	LCS	341.90g	1.00	GammaVision	GV01	10 / 25 / 15 16:00	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA
AC-228	11136	6.771E-001pCi/g	2.800E-001	2.778E-001	1.003E+000	4.849E-001	0.68
AG-108M	10982	-6.779E-003pCi/g	1.235E-002	1.235E-002	2.560E-001	1.249E-001	-0.03
AG-110M	10973	8.663E-003pCi/g	1.112E-001	1.112E-001	3.788E-001	1.830E-001	0.02
AM-241	10818	9.682E+001pCi/g	5.076E+000	7.243E-001	1.019E+000	5.045E-001	95.00
BA-133	10469	1.494E-002pCi/g	8.071E-002	8.071E-002	2.729E-001	1.325E-001	0.05
BA-140	10463	1.374E-001pCi/g	2.240E-001	2.238E-001	7.542E-001	3.638E-001	0.18
BE-7	10435	0.000E+000pCi/g	3.925E-001	3.925E-001	2.266E+000	1.104E+000	0.00
BI-207	10195	-2.705E-003pCi/g	5.167E-002	5.167E-002	1.770E-001	8.502E-002	-0.02
BI-210M	10173	8.461E-002pCi/g	9.172E-002	9.158E-002	3.052E-001	1.486E-001	0.28
BI-212	10160	5.691E-002pCi/g	6.570E-001	6.570E-001	2.266E+000	1.080E+000	0.03
BI-214	10154	5.973E-001pCi/g	1.858E-001	1.832E-001	3.511E-001	1.678E-001	1.70
CD-109	9254	9.357E+000pCi/g	3.288E+000	3.246E+000	3.163E+000	1.546E+000	2.96
CD-113M	17462	-1.418E+002pCi/g	7.297E+002	7.296E+002	2.462E+003	1.198E+003	-0.06
CE-139	9241	-3.471E-002pCi/g	4.795E-002	4.783E-002	1.596E-001	7.801E-002	-0.22
CE-141	9235	1.101E-001pCi/g	6.681E-002	6.657E-002	2.193E-001	1.068E-001	0.50
CE-144	9221	-1.962E-001pCi/g	3.271E-001	3.269E-001	1.092E+000	5.343E-001	-0.18
CF-249	9215	-9.471E-002pCi/g	9.312E-002	9.299E-002	3.094E-001	1.508E-001	-0.31
CF-251	13690	9.783E-002pCi/g	2.187E-001	2.185E-001	7.329E-001	3.576E-001	0.13
CO-56	8704	-4.255E-002pCi/g	7.343E-002	7.340E-002	2.477E-001	1.193E-001	-0.17
CO-57	13694	3.299E-002pCi/g	4.336E-002	4.333E-002	1.444E-001	7.069E-002	0.23
CO-58	8698	-4.234E-003pCi/g	6.516E-002	6.516E-002	2.232E-001	1.072E-001	-0.02
CO-60	8692	1.774E+001pCi/g	9.138E-001	2.049E-001	6.716E-002	2.728E-002	264.12
CR-51	8604	3.076E-001pCi/g	4.401E-001	4.398E-001	1.475E+000	7.149E-001	0.21
CS-134	8553	2.831E-002pCi/g	5.517E-002	5.515E-002	1.867E-001	8.973E-002	0.15
CS-136	8546	-1.109E-001pCi/g	7.217E-002	7.189E-002	2.373E-001	1.142E-001	-0.47
CS-137	8539	3.000E+001pCi/g	1.596E+000	3.338E-001	2.346E-001	1.129E-001	127.87
EU-152	7145	2.877E-001pCi/g	2.421E-001	2.417E-001	6.269E-001	3.045E-001	0.46
EU-154	7138	1.536E-001pCi/g	1.711E-001	1.709E-001	2.192E+000	1.058E+000	0.07
EU-155	7131	4.023E-002pCi/g	1.795E-001	1.795E-001	6.019E-001	2.949E-001	0.07
FE-59	7073	5.086E-002pCi/g	8.161E-002	8.157E-002	4.958E-001	2.382E-001	0.10
GA-68	18005	-1.209E+000pCi/g	2.759E+000	2.758E+000	9.368E+000	4.493E+000	-0.13
GD-153	6824	-3.997E-003pCi/g	1.316E-001	1.316E-001	4.420E-001	2.167E-001	-0.01
HF-181	6495	9.445E-002pCi/g	6.542E-002	6.524E-002	2.322E-001	1.124E-001	0.41
HG-203	6466	-3.305E-002pCi/g	5.989E-002	5.986E-002	2.006E-001	9.778E-002	-0.16
I-131	6380	6.854E-002pCi/g	6.647E-002	6.638E-002	2.080E-001	1.010E-001	0.33
IR-192	6303	-3.750E-002pCi/g	5.981E-002	5.977E-002	2.001E-001	9.748E-002	-0.19
K-40	6148	-1.766E-002pCi/g	3.281E-001	3.281E-001	1.273E+000	5.734E-001	-0.01
LA-140	6096	5.379E-002pCi/g	4.255E-002	4.246E-002	1.212E-001	5.304E-002	0.44
MN-54	5382	3.726E-002pCi/g	6.608E-002	6.605E-002	2.235E-001	1.073E-001	0.17
NA-22	5201	2.193E-002pCi/g	3.156E-002	3.154E-002	1.109E-001	4.933E-002	0.20
NB-94	5160	-7.036E-002pCi/g	5.947E-002	5.936E-002	1.977E-001	9.485E-002	-0.36
NB-95	5154	3.994E-002pCi/g	5.496E-002	5.493E-002	1.856E-001	8.861E-002	0.22
ND-147	5083	-4.022E-002pCi/g	4.368E-001	4.368E-001	1.486E+000	7.183E-001	-0.03
NP-237	4757	-4.170E-001pCi/g	3.829E-001	3.821E-001	1.266E+000	6.228E-001	-0.33
NP-239	4751	-3.998E-004pCi/g	1.579E-001	1.579E-001	5.314E-001	2.601E-001	0.00
PA-231	4541	1.362E+000pCi/g	8.851E-001	8.820E-001	4.992E+000	2.420E+000	0.27
PA-233	4535	1.538E-001pCi/g	1.053E-001	1.050E-001	4.596E-001	2.236E-001	0.33
PA-234	4528	-1.000E-001pCi/g	2.035E-001	2.034E-001	6.804E-001	3.330E-001	-0.15
PA-234M	19453	-4.676E-001pCi/g	9.603E+000	9.603E+000	3.283E+001	1.580E+001	-0.01
PB-210	4467	8.549E+002pCi/g	5.089E+001	8.359E+000	1.428E+001	7.079E+000	59.88

PB-212	4454	**3.866E-001**pCi/g	1.254E-001	1.229E-001	3.210E-001	1.563E-001	1.20
PB-214	4448	**3.785E-001**pCi/g	1.361E-001	1.347E-001	4.828E-001	2.350E-001	0.78
PM-144	19585	**4.119E-002**pCi/g	3.554E-002	3.548E-002	1.884E-001	9.023E-002	0.22
PM-146	2464	**3.014E-002**pCi/g	1.161E-001	1.161E-001	5.435E-001	2.596E-001	0.06
RH-106	1882	**-2.180E-001**pCi/g	1.994E-001	1.991E-001	2.012E+000	9.694E-001	-0.11
RU-103	1828	**0.000E+000**pCi/g	5.216E-002	5.216E-002	2.468E-001	1.200E-001	0.00
SB-124	1784	**4.494E-003**pCi/g	5.524E-002	5.524E-002	1.889E-001	9.084E-002	0.02
SB-125	1777	**2.356E-001**pCi/g	2.342E-001	2.338E-001	7.180E-001	3.497E-001	0.33
SC-46	1739	**9.344E-002**pCi/g	5.627E-002	5.606E-002	2.546E-001	1.226E-001	0.37
SN-113	1570	**-5.143E-002**pCi/g	9.312E-002	9.309E-002	3.121E-001	1.520E-001	-0.16
SN-126	17459	**5.835E-002**pCi/g	5.783E-001	5.783E-001	1.938E+000	9.517E-001	0.03
TA-182	1301	**1.840E-003**pCi/g	2.175E-001	2.175E-001	7.482E-001	3.582E-001	0.00
TC-99M	17412	**2.645E-002**pCi/g	4.239E-002	4.236E-002	1.415E-001	6.920E-002	0.19
TH-227	1058	**2.617E+000**pCi/g	1.856E+000	1.850E+000	6.105E+000	3.024E+000	0.43
TH-229	1046	**9.577E-002**pCi/g	1.073E-001	1.070E-001	3.470E+000	1.699E+000	0.03
TH-234	1027	**7.930E-002**pCi/g	7.788E-002	7.777E-002	5.067E+000	2.489E+000	0.02
TL-208	929	**1.848E-001**pCi/g	8.785E-002	8.733E-002	2.310E-001	1.114E-001	0.80
U-235	281	**8.439E-002**pCi/g	1.008E-001	1.007E-001	9.972E-001	4.863E-001	0.08
Y-88	74	**-2.520E-002**pCi/g	8.904E-002	8.903E-002	3.017E-001	1.458E-001	-0.08
ZN-65	31	**-9.888E-002**pCi/g	1.701E-001	1.700E-001	5.742E-001	2.762E-001	-0.17
ZR-95	7	**8.948E-002**pCi/g	8.129E-002	8.116E-002	3.492E-001	1.669E-001	0.26

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-217910~2-A	LCS 160-217910~2-A	CS-137	3.000E+001	pCi/g	3.008E+001	99.72%	-0.0379
		CO-60	1.774E+001	pCi/g	1.860E+001	95.37%	-0.6506
		AM-241	9.682E+001	pCi/g	9.723E+001	99.58%	-0.0565

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor
MB 160-217910~1-A	MB	AC-228	4.303E-002	4.671E-002	0.9214
MB 160-217910~1-A	MB	AG-108M	5.251E-003	5.684E-003	0.9238
MB 160-217910~1-A	MB	AG-110M	-1.714E-002	2.621E-002	-0.6542
MB 160-217910~1-A	MB	AM-241	-1.074E-002	2.656E-002	-0.4043
MB 160-217910~1-A	MB	BA-133	8.629E-003	1.742E-002	0.4954
MB 160-217910~1-A	MB	BA-140	1.558E-002	5.153E-002	0.3023
MB 160-217910~1-A	MB	BE-7	2.157E-003	9.785E-002	0.0220
MB 160-217910~1-A	MB	BI-207	1.116E-002	1.404E-002	0.7947
MB 160-217910~1-A	MB	BI-210M	1.161E-002	2.003E-002	0.5795
MB 160-217910~1-A	MB	BI-212	-6.519E-004	1.749E-001	-0.0037
MB 160-217910~1-A	MB	BI-214	-3.620E-002	1.629E-001	-0.2222
MB 160-217910~1-A	MB	CD-109	1.434E-001	1.674E-001	0.8566
MB 160-217910~1-A	MB	CD-113M	0.000E+000	1.045E+002	0.0000
MB 160-217910~1-A	MB	CE-139	1.578E-003	8.340E-003	0.1892
MB 160-217910~1-A	MB	CE-141	1.422E-002	1.284E-002	1.1075
MB 160-217910~1-A	MB	CE-144	4.109E-002	5.187E-002	0.7922
MB 160-217910~1-A	MB	CF-249	-5.027E-003	1.126E-002	-0.4467
MB 160-217910~1-A	MB	CF-251	4.859E-003	5.226E-002	0.0930
MB 160-217910~1-A	MB	CO-56	8.053E-003	1.466E-002	0.5492
MB 160-217910~1-A	MB	CO-57	0.000E+000	3.213E-003	0.0000
MB 160-217910~1-A	MB	CO-58	0.000E+000	1.250E-002	0.0000
MB 160-217910~1-A	MB	CO-60	-1.064E-002	2.053E-002	-0.5180
MB 160-217910~1-A	MB	CR-51	1.172E-001	6.390E-002	1.8350
MB 160-217910~1-A	MB	CS-134	9.570E-003	1.221E-002	0.7837
MB 160-217910~1-A	MB	CS-136	3.486E-003	1.564E-002	0.2228
MB 160-217910~1-A	MB	CS-137	9.350E-003	1.111E-002	0.8412
MB 160-217910~1-A	MB	EU-152	2.175E-002	4.360E-002	0.4989
MB 160-217910~1-A	MB	EU-154	4.973E-002	3.892E-002	1.2779
MB 160-217910~1-A	MB	EU-155	1.249E-002	1.540E-002	0.8106
MB 160-217910~1-A	MB	FE-59	1.620E-002	2.388E-002	0.6781
MB 160-217910~1-A	MB	GA-68	0.000E+000	1.259E-001	0.0000
MB 160-217910~1-A	MB	GD-153	-7.436E-003	2.145E-002	-0.3466
MB 160-217910~1-A	MB	HF-181	3.207E-003	4.689E-003	0.6839
MB 160-217910~1-A	MB	HG-203	-1.192E-003	1.116E-002	-0.1067
MB 160-217910~1-A	MB	I-131	2.131E-002	1.517E-002	1.4047
MB 160-217910~1-A	MB	IR-192	1.091E-003	6.973E-003	0.1565
MB 160-217910~1-A	MB	K-40	-4.508E-001	8.911E+000	-0.0506
MB 160-217910~1-A	MB	LA-140	0.000E+000	5.961E-003	0.0000
MB 160-217910~1-A	MB	MN-54	-1.135E-002	1.784E-002	-0.6362
MB 160-217910~1-A	MB	NA-22	0.000E+000	4.741E-003	0.0000
MB 160-217910~1-A	MB	NB-94	2.773E-004	1.092E-002	0.0254
MB 160-217910~1-A	MB	NB-95	7.816E-004	1.302E-002	0.0600
MB 160-217910~1-A	MB	ND-147	4.997E-002	8.625E-002	0.5794
MB 160-217910~1-A	MB	NP-237	1.411E-002	3.697E-002	0.3816
MB 160-217910~1-A	MB	NP-239	1.903E-002	2.441E-002	0.7798
MB 160-217910~1-A	MB	PA-231	5.945E-002	5.603E-002	1.0610
MB 160-217910~1-A	MB	PA-233	2.561E-002	2.422E-002	1.0574
MB 160-217910~1-A	MB	PA-234	2.390E-002	2.381E-002	1.0038
MB 160-217910~1-A	MB	PA-234M	-1.176E+000	2.117E+000	-0.5557
MB 160-217910~1-A	MB	PB-210	0.000E+000	1.332E-001	0.0000
MB 160-217910~1-A	MB	PB-212	0.000E+000	1.627E-002	0.0000
MB 160-217910~1-A	MB	PB-214	5.054E-002	1.994E-002	2.5345

MB 160-217910~1-A	MB	PM-144	7.657E-003	1.530E-002	0.5006
MB 160-217910~1-A	MB	PM-146	-3.061E-002	4.827E-002	-0.6342
MB 160-217910~1-A	MB	RA-226	-8.578E-002	2.376E-001	-0.3610
MB 160-217910~1-A	MB	RH-106	-3.627E-003	1.343E-001	-0.0270
MB 160-217910~1-A	MB	RU-103	-4.735E-003	1.118E-002	-0.4237
MB 160-217910~1-A	MB	SB-124	4.616E-003	1.522E-002	0.3032
MB 160-217910~1-A	MB	SB-125	1.047E-002	2.186E-002	0.4787
MB 160-217910~1-A	MB	SC-46	0.000E+000	7.139E-003	0.0000
MB 160-217910~1-A	MB	SN-113	6.694E-003	1.727E-002	0.3875
MB 160-217910~1-A	MB	SN-126	9.094E-003	7.322E-002	0.1242
MB 160-217910~1-A	MB	TA-182	9.043E-003	1.445E-002	0.6258
MB 160-217910~1-A	MB	TC-99M	-1.255E-003	8.033E-003	-0.1562
MB 160-217910~1-A	MB	TH-227	5.670E-003	1.499E-001	0.0378
MB 160-217910~1-A	MB	TH-229	-7.369E-002	1.885E-001	-0.3910
MB 160-217910~1-A	MB	TH-234	1.446E-002	1.018E-001	0.1420
MB 160-217910~1-A	MB	TL-208	1.346E-002	1.077E-002	1.2495
MB 160-217910~1-A	MB	U-235	7.507E-002	5.910E-002	1.2704
MB 160-217910~1-A	MB	Y-88	0.000E+000	3.838E-003	0.0000
MB 160-217910~1-A	MB	ZN-65	-1.025E-002	3.666E-002	-0.2797
MB 160-217910~1-A	MB	ZR-95	3.371E-003	1.189E-002	0.2836

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 218441 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-218441~2-	LCS	341.90g	1.00	GammaVision	GV08	10 / 27 / 15 15:25	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA
AC-228	11136	7.359E-002pCi/g	1.183E-001	1.183E-001	1.351E+000	6.534E-001	0.05
AG-108M	10982	-1.250E-001pCi/g	9.830E-002	9.810E-002	3.249E-001	1.586E-001	-0.38
AG-110M	10973	-2.165E-001pCi/g	1.350E-001	1.346E-001	4.435E-001	2.131E-001	-0.49
AM-241	10818	9.714E+001pCi/g	5.131E+000	9.547E-001	1.461E+000	7.246E-001	66.50
BA-133	10469	-1.434E-001pCi/g	1.166E-001	1.163E-001	3.856E-001	1.880E-001	-0.37
BA-140	10463	3.008E-001pCi/g	3.866E-001	3.863E-001	8.898E-001	4.279E-001	0.34
BE-7	10435	1.764E-001pCi/g	8.364E-001	8.364E-001	2.818E+000	1.373E+000	0.06
BI-207	10195	-3.983E-002pCi/g	7.303E-002	7.300E-002	2.465E-001	1.188E-001	-0.16
BI-210M	10173	4.829E-002pCi/g	6.207E-002	6.201E-002	3.950E-001	1.928E-001	0.12
BI-212	10160	1.191E+000pCi/g	9.269E-001	9.248E-001	3.076E+000	1.467E+000	0.39
BI-214	10154	1.600E-001pCi/g	1.464E-001	1.462E-001	4.902E-001	2.351E-001	0.33
CD-109	9254	2.361E+000pCi/g	4.441E+000	4.439E+000	4.063E+000	1.992E+000	0.58
CD-113M	17462	-3.716E+001pCi/g	9.021E+002	9.021E+002	3.049E+003	1.485E+003	-0.01
CE-139	9241	3.182E-002pCi/g	5.820E-002	5.812E-002	1.942E-001	9.506E-002	0.16
CE-141	9235	4.980E-002pCi/g	8.364E-002	8.361E-002	2.795E-001	1.366E-001	0.18
CE-144	9221	2.569E-002pCi/g	4.004E-001	4.004E-001	1.345E+000	6.591E-001	0.02
CF-249	9215	5.942E-002pCi/g	1.163E-001	1.162E-001	3.177E-001	1.540E-001	0.19
CF-251	13690	3.966E-001pCi/g	2.757E-001	2.735E-001	9.033E-001	4.415E-001	0.44
CO-56	8704	8.557E-002pCi/g	8.063E-002	8.051E-002	2.695E-001	1.287E-001	0.32
CO-57	13694	3.076E-002pCi/g	5.134E-002	5.131E-002	1.712E-001	8.393E-002	0.18
CO-58	8698	1.346E-002pCi/g	8.405E-002	8.405E-002	2.875E-001	1.379E-001	0.05
CO-60	8692	1.870E+001pCi/g	1.007E+000	3.639E-001	1.870E-001	8.459E-002	100.02
CR-51	8604	-4.740E-001pCi/g	6.167E-001	6.162E-001	2.059E+000	1.002E+000	-0.23
CS-134	8553	9.391E-002pCi/g	6.368E-002	6.349E-002	1.526E-001	7.164E-002	0.62
CS-136	8546	3.304E-002pCi/g	3.799E-002	3.794E-002	3.085E-001	1.484E-001	0.11
CS-137	8539	2.942E+001pCi/g	1.582E+000	3.998E-001	3.497E-001	1.691E-001	84.15
EU-152	7145	1.912E-001pCi/g	2.554E-001	2.552E-001	8.302E-001	4.042E-001	0.23
EU-154	7138	6.956E-002pCi/g	1.146E-001	1.146E-001	2.351E+000	1.125E+000	0.03
EU-155	7131	2.888E-002pCi/g	2.199E-001	2.199E-001	7.370E-001	3.618E-001	0.04
FE-59	7073	-1.833E-001pCi/g	1.818E-001	1.815E-001	6.083E-001	2.908E-001	-0.30
GA-68	18005	4.764E+000pCi/g	2.454E+000	2.440E+000	7.914E+000	3.694E+000	0.60
GD-153	6824	7.978E-002pCi/g	1.552E-001	1.551E-001	5.177E-001	2.540E-001	0.15
HF-181	6495	2.335E-002pCi/g	1.043E-001	1.043E-001	3.518E-001	1.712E-001	0.07
HG-203	6466	6.698E-003pCi/g	6.497E-002	6.497E-002	2.197E-001	1.068E-001	0.03
I-131	6380	-1.610E-002pCi/g	8.500E-002	8.500E-002	2.866E-001	1.396E-001	-0.06
IR-192	6303	1.018E-001pCi/g	9.042E-002	9.022E-002	2.283E-001	1.111E-001	0.45
K-40	6148	1.623E-001pCi/g	3.950E-001	3.949E-001	1.502E+000	6.607E-001	0.11
LA-140	6096	6.191E-003pCi/g	4.179E-002	4.179E-002	5.946E-002	1.880E-002	0.10
MN-54	5382	1.822E-002pCi/g	9.095E-002	9.094E-002	3.102E-001	1.491E-001	0.06
NA-22	5201	1.507E-002pCi/g	4.555E-002	4.554E-002	1.637E-001	7.329E-002	0.09
NB-94	5160	6.019E-002pCi/g	3.912E-002	3.899E-002	2.572E-001	1.233E-001	0.23
NB-95	5154	2.541E-002pCi/g	7.560E-002	7.559E-002	2.579E-001	1.234E-001	0.10
ND-147	5083	4.071E-001pCi/g	4.877E-001	4.871E-001	1.636E+000	7.863E-001	0.25
NP-237	4757	0.000E+000pCi/g	4.510E-001	4.510E-001	1.509E+000	7.430E-001	0.00
NP-239	4751	-1.622E-002pCi/g	2.061E-001	2.061E-001	6.910E-001	3.393E-001	-0.02
PA-231	4541	-2.797E-001pCi/g	6.016E-001	6.014E-001	7.388E+000	3.603E+000	-0.04
PA-233	4535	1.354E-001pCi/g	2.200E-001	2.199E-001	5.917E-001	2.884E-001	0.23
PA-234	4528	2.370E-002pCi/g	7.301E-002	7.300E-002	8.496E-001	4.166E-001	0.03
PA-234M	19453	2.685E+000pCi/g	3.731E+000	3.729E+000	3.935E+001	1.884E+001	0.07
PB-210	4467	8.385E+002pCi/g	5.067E+001	1.196E+001	2.132E+001	1.059E+001	39.34

PB-212	4454	**2.569E-001**pCi/g	1.484E-001	1.475E-001	4.865E-001	2.382E-001	0.53
PB-214	4448	**-1.187E-001**pCi/g	2.062E-001	2.061E-001	4.941E-001	2.392E-001	-0.24
PM-144	19585	**-1.104E-002**pCi/g	1.584E-002	1.583E-002	2.412E-001	1.154E-001	-0.05
PM-146	2464	**1.016E-001**pCi/g	1.134E-001	1.133E-001	6.877E-001	3.278E-001	0.15
RH-106	1882	**9.849E-001**pCi/g	7.318E-001	7.301E-001	1.785E+000	8.453E-001	0.55
RU-103	1828	**-7.826E-003**pCi/g	8.182E-002	8.182E-002	2.777E-001	1.346E-001	-0.03
SB-124	1784	**1.264E-001**pCi/g	7.595E-002	7.567E-002	1.582E-001	7.445E-002	0.80
SB-125	1777	**2.237E-001**pCi/g	1.965E-001	1.962E-001	9.608E-001	4.688E-001	0.23
SC-46	1739	**6.651E-002**pCi/g	9.525E-002	9.519E-002	3.209E-001	1.541E-001	0.21
SN-113	1570	**2.166E-002**pCi/g	1.160E-001	1.160E-001	3.912E-001	1.906E-001	0.06
SN-126	17459	**-6.991E+000**pCi/g	1.044E+000	9.772E-001	3.085E+000	1.523E+000	-2.27
TA-182	1301	**2.287E-001**pCi/g	2.419E-001	2.416E-001	9.149E-001	4.354E-001	0.25
TC-99M	17412	**-3.499E-002**pCi/g	5.302E-002	5.298E-002	1.767E-001	8.659E-002	-0.20
TH-227	1058	**-3.701E+001**pCi/g	4.063E+000	3.522E+000	1.124E+001	5.589E+000	-3.29
TH-229	1046	**-1.190E+000**pCi/g	1.295E+000	1.291E+000	4.291E+000	2.104E+000	-0.28
TH-234	1027	**-5.199E+001**pCi/g	5.252E+000	4.493E+000	1.365E+001	6.775E+000	-3.81
TL-208	929	**1.496E-001**pCi/g	8.481E-002	8.445E-002	2.772E-001	1.334E-001	0.54
U-235	281	**-6.184E-002**pCi/g	1.918E+001	1.918E+001	1.442E+000	7.072E-001	-0.04
Y-88	74	**-1.169E-001**pCi/g	1.223E-001	1.221E-001	4.080E-001	1.972E-001	-0.29
ZN-65	31	**-6.060E-002**pCi/g	2.169E-001	2.169E-001	7.398E-001	3.548E-001	-0.08
ZR-95	7	**1.074E-001**pCi/g	1.365E-001	1.364E-001	4.600E-001	2.199E-001	0.23

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-218441~2-A	LCS 160-218441~2-A	CS-137	2.942E+001	pCi/g	3.008E+001	97.82%	-0.2899
		CO-60	1.870E+001	pCi/g	1.859E+001	100.64%	0.0836
		AM-241	9.714E+001	pCi/g	9.723E+001	99.92%	-0.0112

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor
MB 160-218441~1-A	MB	AC-228	3.987E-002	4.560E-002	0.8743
MB 160-218441~1-A	MB	AG-108M	5.451E-003	8.527E-003	0.6393
MB 160-218441~1-A	MB	AG-110M	-1.473E-002	2.625E-002	-0.5612
MB 160-218441~1-A	MB	AM-241	-1.477E-002	2.928E-002	-0.5047
MB 160-218441~1-A	MB	BA-133	3.407E-003	1.959E-002	0.1740
MB 160-218441~1-A	MB	BA-140	6.525E-002	6.139E-002	1.0630
MB 160-218441~1-A	MB	BE-7	0.000E+000	6.035E-002	0.0000
MB 160-218441~1-A	MB	BI-207	8.121E-003	1.544E-002	0.5258
MB 160-218441~1-A	MB	BI-210M	1.934E-002	1.581E-002	1.2233
MB 160-218441~1-A	MB	BI-212	0.000E+000	1.856E-001	0.0000
MB 160-218441~1-A	MB	BI-214	-1.133E-002	5.880E-002	-0.1926
MB 160-218441~1-A	MB	CD-109	9.453E-002	2.288E-001	0.4132
MB 160-218441~1-A	MB	CD-113M	-1.366E+002	2.218E+002	-0.6159
MB 160-218441~1-A	MB	CE-139	-3.140E-003	9.986E-003	-0.3145
MB 160-218441~1-A	MB	CE-141	-6.169E-003	1.570E-002	-0.3929
MB 160-218441~1-A	MB	CE-144	4.904E-003	4.662E-002	0.1052
MB 160-218441~1-A	MB	CF-249	8.754E-003	1.572E-002	0.5569
MB 160-218441~1-A	MB	CF-251	-2.594E-002	5.279E-002	-0.4914
MB 160-218441~1-A	MB	CO-56	-6.736E-003	1.135E-002	-0.5936
MB 160-218441~1-A	MB	CO-57	4.406E-003	9.298E-003	0.4738
MB 160-218441~1-A	MB	CO-58	1.276E-002	1.914E-002	0.6662
MB 160-218441~1-A	MB	CO-60	-3.371E-003	2.082E-002	-0.1619
MB 160-218441~1-A	MB	CR-51	6.564E-002	1.182E-001	0.5552
MB 160-218441~1-A	MB	CS-134	-7.518E-004	1.083E-003	-0.6945
MB 160-218441~1-A	MB	CS-136	0.000E+000	5.399E-003	0.0000
MB 160-218441~1-A	MB	CS-137	1.650E-002	1.844E-002	0.8946
MB 160-218441~1-A	MB	EU-152	-8.619E-004	1.441E-003	-0.5979
MB 160-218441~1-A	MB	EU-154	1.149E-001	1.445E-001	0.7954
MB 160-218441~1-A	MB	EU-155	-2.026E-002	3.719E-002	-0.5447
MB 160-218441~1-A	MB	FE-59	9.255E-003	1.826E-002	0.5070
MB 160-218441~1-A	MB	GA-68	0.000E+000	1.430E-001	0.0000
MB 160-218441~1-A	MB	GD-153	-2.088E-002	3.165E-002	-0.6598
MB 160-218441~1-A	MB	HF-181	-1.476E-003	1.865E-003	-0.7914
MB 160-218441~1-A	MB	HG-203	1.656E-002	9.732E-003	1.7013
MB 160-218441~1-A	MB	I-131	6.142E-003	2.344E-002	0.2620
MB 160-218441~1-A	MB	IR-192	3.418E-003	1.317E-002	0.2595
MB 160-218441~1-A	MB	K-40	-6.451E-001	1.290E+001	-0.0500
MB 160-218441~1-A	MB	LA-140	2.528E-003	2.485E-002	0.1017
MB 160-218441~1-A	MB	MN-54	-2.351E-003	1.657E-002	-0.1419
MB 160-218441~1-A	MB	NA-22	0.000E+000	5.287E-003	0.0000
MB 160-218441~1-A	MB	NB-94	1.400E-003	7.442E-003	0.1881
MB 160-218441~1-A	MB	NB-95	-2.221E-003	1.672E-002	-0.1328
MB 160-218441~1-A	MB	ND-147	2.932E-002	2.819E-002	1.0401
MB 160-218441~1-A	MB	NP-237	-1.201E-002	7.433E-002	-0.1615
MB 160-218441~1-A	MB	NP-239	4.366E-002	2.736E-002	1.5962
MB 160-218441~1-A	MB	PA-231	3.079E-001	2.831E-001	1.0876
MB 160-218441~1-A	MB	PA-233	2.077E-002	3.041E-002	0.6831
MB 160-218441~1-A	MB	PA-234	5.537E-002	5.645E-002	0.9808
MB 160-218441~1-A	MB	PA-234M	-7.028E-001	1.816E+000	-0.3870
MB 160-218441~1-A	MB	PB-210	4.463E-001	4.306E-001	1.0364
MB 160-218441~1-A	MB	PB-212	4.711E-003	2.788E-002	0.1690
MB 160-218441~1-A	MB	PB-214	4.377E-002	3.189E-002	1.3727

MB 160-218441~1-A	MB	PM-144	9.554E-004	6.357E-003	0.1503
MB 160-218441~1-A	MB	PM-146	-3.544E-002	4.841E-002	-0.7319
MB 160-218441~1-A	MB	RH-106	4.655E-002	1.634E-001	0.2849
MB 160-218441~1-A	MB	RU-103	6.210E-003	1.531E-002	0.4057
MB 160-218441~1-A	MB	SB-124	-1.006E-002	1.857E-002	-0.5418
MB 160-218441~1-A	MB	SB-125	1.305E-003	4.143E-003	0.3151
MB 160-218441~1-A	MB	SC-46	-1.594E-004	1.758E-002	-0.0091
MB 160-218441~1-A	MB	SN-113	3.684E-002	1.998E-002	1.8437
MB 160-218441~1-A	MB	SN-126	2.933E-001	1.237E-001	2.3710
MB 160-218441~1-A	MB	TA-182	2.383E-002	4.528E-002	0.5262
MB 160-218441~1-A	MB	TC-99M	3.169E-003	8.389E-003	0.3778
MB 160-218441~1-A	MB	TH-227	2.179E-001	1.503E-001	1.4498
MB 160-218441~1-A	MB	TH-229	-9.602E-002	2.482E-001	-0.3868
MB 160-218441~1-A	MB	TH-234	-6.219E-001	8.472E-001	-0.7341
MB 160-218441~1-A	MB	TL-208	1.433E-002	2.289E-002	0.6260
MB 160-218441~1-A	MB	U-235	1.116E-001	8.413E-002	1.3268
MB 160-218441~1-A	MB	Y-88	0.000E+000	6.164E-003	0.0000
MB 160-218441~1-A	MB	ZN-65	0.000E+000	9.463E-003	0.0000
MB 160-218441~1-A	MB	ZR-95	-8.939E-004	1.210E-003	-0.7385

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 218442 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-218442~2-	LCS	341.90g	1.00	GammaVision	GV09	10 / 27 / 15 14:09	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA
AC-228	11136	5.980E-001pCi/g	2.506E-001	2.488E-001	1.014E+000	4.923E-001	0.59
AG-108M	10982	6.362E-006pCi/g	7.135E-002	7.135E-002	2.404E-001	1.175E-001	0.00
AG-110M	10973	-4.015E-003pCi/g	1.009E-001	1.009E-001	3.435E-001	1.661E-001	-0.01
AM-241	10818	9.726E+001pCi/g	5.101E+000	7.368E-001	1.053E+000	5.222E-001	92.32
BA-133	10469	8.644E-004pCi/g	8.695E-002	8.695E-002	2.932E-001	1.432E-001	0.00
BA-140	10463	2.814E-001pCi/g	2.308E-001	2.303E-001	7.647E-001	3.708E-001	0.37
BE-7	10435	5.425E-001pCi/g	6.400E-001	6.394E-001	2.131E+000	1.041E+000	0.25
BI-207	10195	-2.984E-002pCi/g	5.728E-002	5.726E-002	1.928E-001	9.338E-002	-0.15
BI-210M	10173	2.463E-002pCi/g	9.686E-002	9.684E-002	3.249E-001	1.590E-001	0.08
BI-212	10160	4.340E-001pCi/g	7.169E-001	7.165E-001	2.420E+000	1.163E+000	0.18
BI-214	10154	8.273E-001pCi/g	1.845E-001	1.794E-001	3.533E-001	1.700E-001	2.34
CD-109	9254	5.485E+000pCi/g	3.401E+000	3.387E+000	3.143E+000	1.540E+000	1.75
CD-113M	17462	8.114E+000pCi/g	7.905E+002	7.905E+002	2.661E+003	1.302E+003	0.00
CE-139	9241	-3.089E-002pCi/g	5.178E-002	5.170E-002	1.723E-001	8.460E-002	-0.18
CE-141	9235	-3.579E-003pCi/g	6.317E-002	6.317E-002	2.129E-001	1.040E-001	-0.02
CE-144	9221	1.068E-001pCi/g	3.278E-001	3.277E-001	1.096E+000	5.379E-001	0.10
CF-249	9215	1.007E-001pCi/g	1.004E-001	1.002E-001	2.876E-001	1.404E-001	0.35
CF-251	13690	-2.639E-001pCi/g	2.511E-001	2.500E-001	8.293E-001	4.069E-001	-0.32
CO-56	8704	1.134E-001pCi/g	8.881E-002	8.861E-002	2.341E-001	1.131E-001	0.48
CO-57	13694	5.717E-003pCi/g	4.406E-002	4.406E-002	1.476E-001	7.249E-002	0.04
CO-58	8698	5.129E-002pCi/g	6.155E-002	6.150E-002	2.064E-001	9.935E-002	0.25
CO-60	8692	1.774E+001pCi/g	9.122E-001	1.984E-001	9.851E-002	4.359E-002	180.05
CR-51	8604	-2.572E-002pCi/g	5.332E-001	5.332E-001	1.795E+000	8.779E-001	-0.01
CS-134	8553	5.920E-002pCi/g	4.059E-002	4.047E-002	2.764E-001	1.350E-001	0.21
CS-136	8546	4.051E-002pCi/g	4.705E-002	4.700E-002	1.989E-001	9.561E-002	0.20
CS-137	8539	2.895E+001pCi/g	1.537E+000	3.066E-001	2.184E-001	1.053E-001	132.57
EU-152	7145	1.210E-001pCi/g	1.140E-001	1.138E-001	6.662E-001	3.254E-001	0.18
EU-154	7138	1.536E-001pCi/g	2.903E-001	2.902E-001	2.035E+000	9.844E-001	0.08
EU-155	7131	-2.215E-001pCi/g	1.885E-001	1.881E-001	6.227E-001	3.061E-001	-0.36
FE-59	7073	-2.347E-001pCi/g	1.656E-001	1.651E-001	5.463E-001	2.646E-001	-0.43
GA-68	18005	-1.959E+000pCi/g	2.934E+000	2.932E+000	9.861E+000	4.761E+000	-0.20
GD-153	6824	1.074E-001pCi/g	5.604E-002	5.566E-002	4.253E-001	2.089E-001	0.25
HF-181	6495	7.655E-003pCi/g	2.864E-002	2.863E-002	2.832E-001	1.384E-001	0.03
HG-203	6466	-5.635E-002pCi/g	6.273E-002	6.264E-002	2.084E-001	1.020E-001	-0.27
I-131	6380	7.130E-002pCi/g	8.246E-002	8.238E-002	2.211E-001	1.079E-001	0.32
IR-192	6303	6.154E-002pCi/g	5.067E-002	5.054E-002	2.010E-001	9.829E-002	0.31
K-40	6148	-1.447E-001pCi/g	7.481E-001	7.481E-001	1.284E+000	5.849E-001	-0.11
LA-140	6096	1.563E-002pCi/g	2.812E-002	2.811E-002	1.016E-001	4.393E-002	0.15
MN-54	5382	-2.832E-002pCi/g	6.926E-002	6.925E-002	2.341E-001	1.131E-001	-0.12
NA-22	5201	-2.471E-002pCi/g	3.987E-002	3.985E-002	1.381E-001	6.356E-002	-0.18
NB-94	5160	4.992E-002pCi/g	4.304E-002	4.296E-002	1.435E-001	6.826E-002	0.35
NB-95	5154	-8.541E-002pCi/g	6.319E-002	6.303E-002	2.089E-001	1.008E-001	-0.41
ND-147	5083	-5.970E-002pCi/g	4.393E-001	4.392E-001	1.487E+000	7.219E-001	-0.04
NP-237	4757	-4.152E-001pCi/g	3.778E-001	3.771E-001	1.248E+000	6.152E-001	-0.33
NP-239	4751	1.422E-001pCi/g	1.425E-001	1.422E-001	4.725E-001	2.313E-001	0.30
PA-231	4541	7.897E-001pCi/g	5.588E-001	5.571E-001	6.014E+000	2.942E+000	0.13
PA-233	4535	1.659E-001pCi/g	1.174E-001	1.170E-001	4.817E-001	2.355E-001	0.34
PA-234	4528	7.379E-003pCi/g	1.848E-001	1.848E-001	6.212E-001	3.043E-001	0.01
PA-234M	19453	-3.849E+000pCi/g	1.050E+001	1.050E+001	3.544E+001	1.718E+001	-0.11
PB-210	4467	8.556E+002pCi/g	5.093E+001	8.354E+000	1.399E+001	6.939E+000	61.17

PB-212	4454	**4.747E-001**pCi/g	1.198E-001	1.158E-001	2.884E-001	1.405E-001	1.65
PB-214	4448	**2.527E-001**pCi/g	1.397E-001	1.390E-001	4.865E-001	2.377E-001	0.52
PM-144	19585	**5.467E-002**pCi/g	5.088E-002	5.080E-002	1.697E-001	8.140E-002	0.32
PM-146	2464	**-1.121E-001**pCi/g	1.694E-001	1.693E-001	5.705E-001	2.747E-001	-0.20
RH-106	1882	**2.453E-001**pCi/g	5.500E-001	5.499E-001	1.858E+000	8.973E-001	0.13
RU-103	1828	**3.179E-003**pCi/g	6.795E-002	6.795E-002	2.296E-001	1.119E-001	0.01
SB-124	1784	**6.871E-002**pCi/g	5.491E-002	5.479E-002	1.820E-001	8.786E-002	0.38
SB-125	1777	**7.725E-002**pCi/g	1.204E-001	1.203E-001	7.192E-001	3.515E-001	0.11
SC-46	1739	**6.865E-002**pCi/g	3.773E-002	3.756E-002	2.744E-001	1.331E-001	0.25
SN-113	1570	**-5.988E-002**pCi/g	9.283E-002	9.278E-002	3.100E-001	1.515E-001	-0.19
SN-126	17459	**4.728E-001**pCi/g	6.187E-001	6.182E-001	2.053E+000	1.011E+000	0.23
TA-182	1301	**2.190E-001**pCi/g	1.744E-001	1.740E-001	6.078E-001	2.897E-001	0.36
TC-99M	17412	**4.814E-002**pCi/g	4.538E-002	4.530E-002	1.502E-001	7.375E-002	0.32
TH-227	1058	**5.812E-001**pCi/g	8.496E-001	8.490E-001	7.338E+000	3.643E+000	0.08
TH-229	1046	**3.346E-001**pCi/g	9.867E-001	9.864E-001	3.300E+000	1.619E+000	0.10
TH-234	1027	**-3.012E+001**pCi/g	2.825E+000	2.346E+000	7.161E+000	3.541E+000	-4.21
TL-208	929	**1.402E-001**pCi/g	7.085E-002	7.047E-002	2.180E-001	1.055E-001	0.64
U-235	281	**1.225E-001**pCi/g	2.509E-001	2.508E-001	1.165E+000	5.718E-001	0.11
Y-88	74	**-5.977E-002**pCi/g	8.913E-002	8.908E-002	2.987E-001	1.449E-001	-0.20
ZN-65	31	**1.053E-001**pCi/g	9.011E-002	8.995E-002	3.017E-001	1.411E-001	0.35
ZR-95	7	**3.603E-002**pCi/g	1.120E-001	1.120E-001	3.799E-001	1.833E-001	0.09

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-218442~2-A	LCS 160-218442~2-A	CS-137	2.895E+001	pCi/g	3.008E+001	96.24%	-0.5100
		CO-60	1.774E+001	pCi/g	1.859E+001	95.42%	-0.6439
		AM-241	9.726E+001	pCi/g	9.723E+001	100.04%	0.0052

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Blanks Information

SamplID	WRKNO	Analyte	Activity	UncTotal	ZFactor
MB 160-218442~1-A	MB	AC-228	4.629E-002	5.406E-002	0.8562
MB 160-218442~1-A	MB	AG-108M	5.830E-003	1.413E-002	0.4125
MB 160-218442~1-A	MB	AG-110M	1.867E-002	2.797E-002	0.6674
MB 160-218442~1-A	MB	AM-241	4.337E-002	3.562E-002	1.2178
MB 160-218442~1-A	MB	BA-133	3.213E-003	1.707E-002	0.1882
MB 160-218442~1-A	MB	BA-140	7.074E-002	6.022E-002	1.1747
MB 160-218442~1-A	MB	BE-7	2.063E-003	1.089E-001	0.0189
MB 160-218442~1-A	MB	BI-207	-8.550E-003	1.554E-002	-0.5500
MB 160-218442~1-A	MB	BI-210M	-5.240E-005	2.134E-002	-0.0025
MB 160-218442~1-A	MB	BI-212	1.891E-001	2.106E-001	0.8980
MB 160-218442~1-A	MB	BI-214	5.878E-002	4.257E-002	1.3807
MB 160-218442~1-A	MB	CD-109	-3.780E-002	2.773E-001	-0.1363
MB 160-218442~1-A	MB	CD-113M	-1.209E+002	2.006E+002	-0.6023
MB 160-218442~1-A	MB	CE-139	-2.638E-003	1.098E-002	-0.2403
MB 160-218442~1-A	MB	CE-141	0.000E+000	1.549E-002	0.0000
MB 160-218442~1-A	MB	CE-144	2.685E-004	7.314E-002	0.0037
MB 160-218442~1-A	MB	CF-249	1.313E-003	1.950E-002	0.0673
MB 160-218442~1-A	MB	CF-251	-3.857E-003	5.706E-002	-0.0676
MB 160-218442~1-A	MB	CO-56	1.232E-004	1.804E-004	0.6833
MB 160-218442~1-A	MB	CO-57	2.443E-003	8.085E-003	0.3022
MB 160-218442~1-A	MB	CO-58	-1.180E-003	2.037E-002	-0.0579
MB 160-218442~1-A	MB	CO-60	6.900E-003	9.579E-003	0.7203
MB 160-218442~1-A	MB	CR-51	1.599E-003	1.074E-001	0.0149
MB 160-218442~1-A	MB	CS-134	3.207E-002	2.395E-002	1.3391
MB 160-218442~1-A	MB	CS-136	5.803E-003	1.781E-002	0.3257
MB 160-218442~1-A	MB	CS-137	0.000E+000	1.138E-002	0.0000
MB 160-218442~1-A	MB	EU-152	-3.093E-005	4.932E-002	-0.0006
MB 160-218442~1-A	MB	EU-154	-1.070E-001	1.707E-001	-0.6272
MB 160-218442~1-A	MB	EU-155	2.380E-002	1.887E-002	1.2612
MB 160-218442~1-A	MB	FE-59	0.000E+000	8.903E-003	0.0000
MB 160-218442~1-A	MB	GA-68	0.000E+000	1.515E-001	0.0000
MB 160-218442~1-A	MB	GD-153	0.000E+000	1.067E-002	0.0000
MB 160-218442~1-A	MB	HF-181	1.261E-002	1.480E-002	0.8522
MB 160-218442~1-A	MB	HG-203	3.510E-003	1.144E-002	0.3067
MB 160-218442~1-A	MB	I-131	0.000E+000	6.680E-003	0.0000
MB 160-218442~1-A	MB	IR-192	1.578E-003	1.452E-002	0.1086
MB 160-218442~1-A	MB	K-40	-2.137E-001	7.006E-001	-0.3050
MB 160-218442~1-A	MB	LA-140	0.000E+000	7.055E-003	0.0000
MB 160-218442~1-A	MB	MN-54	0.000E+000	5.770E-003	0.0000
MB 160-218442~1-A	MB	NA-22	-2.879E-004	1.602E-002	-0.0180
MB 160-218442~1-A	MB	NB-94	1.568E-003	1.741E-002	0.0901
MB 160-218442~1-A	MB	NB-95	2.922E-003	1.554E-002	0.1880
MB 160-218442~1-A	MB	ND-147	7.112E-002	1.032E-001	0.6894
MB 160-218442~1-A	MB	NP-237	5.092E-003	7.332E-002	0.0695
MB 160-218442~1-A	MB	NP-239	1.565E-002	3.200E-002	0.4890
MB 160-218442~1-A	MB	PA-231	-1.854E-001	3.961E-001	-0.4681
MB 160-218442~1-A	MB	PA-233	7.432E-003	1.916E-002	0.3879
MB 160-218442~1-A	MB	PA-234	1.231E-002	3.411E-002	0.3608
MB 160-218442~1-A	MB	PA-234M	0.000E+000	7.911E-001	0.0000
MB 160-218442~1-A	MB	PB-210	3.880E-001	4.487E-001	0.8648
MB 160-218442~1-A	MB	PB-212	-2.440E-002	9.674E-002	-0.2522
MB 160-218442~1-A	MB	PB-214	-2.424E-002	8.010E-002	-0.3026

MB 160-218442~1-A	MB	PM-144	2.715E-003	1.733E-002	0.1567
MB 160-218442~1-A	MB	PM-146	1.519E-002	1.570E-002	0.9676
MB 160-218442~1-A	MB	RH-106	-2.995E-002	1.833E-001	-0.1634
MB 160-218442~1-A	MB	RU-103	-5.540E-003	1.385E-002	-0.4000
MB 160-218442~1-A	MB	SB-124	3.566E-003	1.681E-002	0.2121
MB 160-218442~1-A	MB	SB-125	-3.271E-002	4.871E-002	-0.6716
MB 160-218442~1-A	MB	SC-46	1.794E-002	1.459E-002	1.2302
MB 160-218442~1-A	MB	SN-113	5.033E-004	1.899E-002	0.0265
MB 160-218442~1-A	MB	SN-126	2.542E-002	1.062E-001	0.2393
MB 160-218442~1-A	MB	TA-182	5.091E-002	6.392E-002	0.7965
MB 160-218442~1-A	MB	TC-99M	4.412E-003	8.994E-003	0.4906
MB 160-218442~1-A	MB	TH-227	0.000E+000	6.308E-002	0.0000
MB 160-218442~1-A	MB	TH-229	1.425E-001	1.928E-001	0.7391
MB 160-218442~1-A	MB	TH-234	-5.703E-002	3.530E-001	-0.1616
MB 160-218442~1-A	MB	TL-208	-2.982E-003	2.496E-002	-0.1195
MB 160-218442~1-A	MB	U-235	-6.134E-003	8.135E-003	-0.7541
MB 160-218442~1-A	MB	Y-88	1.099E-002	2.017E-002	0.5449
MB 160-218442~1-A	MB	ZN-65	0.000E+000	1.005E-002	0.0000
MB 160-218442~1-A	MB	ZR-95	-1.630E-002	3.169E-002	-0.5142

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

74139-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery, QA Manager, for Date: 12-21-06

End of Certificate

Reagent

Tuna Can_00002

Rc'd 2/3/10

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81427-334

1.0 Liter Sand in 1 Liter HDPE Silgan Jar

Customer: TestAmerica/St. Louis, MO
P.O. No.: 2339090, Item 1
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.017570

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.141E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.034E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	2.822E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.471E+04	1.488E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	2.124E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	4.790E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	2.938E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	1.926E+03	0.6	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.077E+05	7.163E+03	0.4	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.055E+05	3.611E+03	0.5	1.9	3.9	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	3.612E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	7.569E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

Comments:
1550 grams of sand.
This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/1/10
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty*, % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

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Tel 404·352·8677
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 266564

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Lab ID: MB 160-266564/1-A
Client ID:
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV191
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.05641	0.0338	0.0342		pCi/g	0.100	0.0304	267504
Thorium-232	0.01380	0.0159	0.0160		pCi/g	0.100	0.0138	267504

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	3.053	0.239	0.351		pCi/g	0.0376	3.03	101	30 - 110

Lab ID: LCS 160-266564/2-A
Client ID:
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV194
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	25.71	1.01	2.38		pCi/g	0.100	0.0647	267505

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.605	0.452	0.653		pCi/g	0.0599	6.06	92.5	30 - 110

Lab ID: 160-18554-1
Client ID: SU02-EXW-040-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:24
Detector: AV222
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.15	0.153	0.181		pCi/g	0.100	0.0279	268510
Thorium-232	1.14	0.151	0.179		pCi/g	0.100	0.0151	268510

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.76	0.225	0.323		pCi/g	0.0138	3.03	91.0	30 - 110

Lab ID: 160-18554-2
Client ID: SU02-EXN-041-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV212
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.31	0.158	0.192		pCi/g	0.100	0.0263	267516
Thorium-232	1.15	0.148	0.176		pCi/g	0.100	0.0142	267516

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.67	0.211	0.308		pCi/g	0.0126	3.03	88.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Lab ID: 160-18554-3 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXW-042-SS-P-00 | Detector: AV213 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.14	0.147	0.176		pCi/g	0.100	0.0143	267517
Thorium-232	0.934	0.133	0.154		pCi/g	0.100	0.0142	267517

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.88	0.229	0.333		pCi/g	0.0298	3.03	95.3	30 - 110

Lab ID: 160-18554-4 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXB-043-SS-P-00 | Detector: AV214 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.11	0.143	0.171		pCi/g	0.100	0.0255	267518
Thorium-232	0.972	0.134	0.157		pCi/g	0.100	0.0138	267518

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	3.02	0.236	0.347		pCi/g	0.0304	3.02	100	30 - 110

Lab ID: 160-18554-5 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXN-044-SS-P-00 | Detector: AV215 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.07	0.201	0.266		pCi/g	0.100	0.0358	267519
Thorium-232	1.32	0.160	0.195		pCi/g	0.100	0.0267	267519

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.70	0.216	0.313		pCi/g	0.0130	3.03	89.1	30 - 110

Lab ID: 160-18554-6 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXB-045-SS-P-00 | Detector: AV217 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.63	0.180	0.226		pCi/g	0.100	0.0149	267520
Thorium-232	1.34	0.163	0.198		pCi/g	0.100	0.0274	267520

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.64	0.214	0.308		pCi/g	0.0130	3.03	87.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Lab ID: 160-18554-7 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXW-046-SS-P-00 | Detector: AV218 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.14	0.147	0.175		pCi/g	0.100	0.0262	267521
Thorium-232	1.24	0.153	0.185		pCi/g	0.100	0.0284	267521

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.72	0.215	0.314		pCi/g	0.0280	3.03	89.7	30 - 110

Lab ID: 160-18554-8 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXW-047-SS-P-00 | Detector: AV219 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.30	0.156	0.191		pCi/g	0.100	0.0308	267522
Thorium-232	1.16	0.147	0.176		pCi/g	0.100	0.0140	267522

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	3.03	0.239	0.349		pCi/g	0.0141	3.03	100	30 - 110

Lab ID: 160-18554-9 | Analyzed: 09/07/16 14:24 | Decay Corrected: No
Client ID: SU02-EXB-048-SS-P-00 | Detector: AV221 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.00	0.207	0.267		pCi/g	0.100	0.0162	268509
Thorium-232	1.25	0.164	0.194		pCi/g	0.100	0.0296	268509

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.54	0.215	0.303		pCi/g	0.0297	3.03	83.9	30 - 110

Lab ID: 160-18554-10 | Analyzed: 08/31/16 19:45 | Decay Corrected: No
Client ID: SU02-EXB-049-SS-P-00 | Detector: AV221 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.04	0.211	0.272		pCi/g	0.100	0.0437	267524
Thorium-232	1.15	0.158	0.185		pCi/g	0.100	0.0299	267524

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.52	0.214	0.301		pCi/g	0.0136	3.03	83.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Lab ID: 160-18554-11 | Analyzed: 09/07/16 14:24 | Decay Corrected: No
Client ID: SU02-EXB-050-SS-P-00 | Detector: AV220 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.65	0.183	0.230		pCi/g	0.100	0.0331	268563
Thorium-232	1.11	0.150	0.177		pCi/g	0.100	0.0349	268563

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.78	0.227	0.325		pCi/g	0.0371	3.03	91.6	30 - 110

Lab ID: 160-18554-12 | Analyzed: 09/07/16 14:24 | Decay Corrected: No
Client ID: SU02-EXW-051-SS-P-00 | Detector: AV219 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.31	0.168	0.201		pCi/g	0.100	0.0461	268508
Thorium-232	1.12	0.154	0.180		pCi/g	0.100	0.0159	268508

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.67	0.224	0.317		pCi/g	0.0162	3.03	88.1	30 - 110

Lab ID: 160-18554-13 | Analyzed: 09/07/16 14:24 | Decay Corrected: No
Client ID: SU02-EXB-052-SS-P-00 | Detector: AV218 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	4.44	0.306	0.482		pCi/g	0.100	0.0291	268507
Thorium-232	1.66	0.186	0.233		pCi/g	0.100	0.0289	268507

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.45	0.205	0.290		pCi/g	0.0314	3.03	81.0	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-266564/1-A	Thorium-230			0.05641		pCi/g							3.30261615
MB 160-266564/1-A	Thorium-232			0.01380		pCi/g							1.72748591

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-266564/2-A	Thorium-230		24.5	25.71		pCi/g	105	81 - 118					.7320772248

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Batch Number: 266564 Batch Start Date: 08/25/16 15:51 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 08/31/16 15:02

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00021	TRM-2 00001	AnalysisComment		
MB 160-266564/1		ExtChrom, A-01-R		1.0 g	0.1 mL				
LCS 160-266564/2		ExtChrom, A-01-R		0.4996 g	0.1 mL	0.4998 g	TRM		
160-18554-A-1-A	SU02-EXW-040-SS-P-00	ExtChrom, A-01-R	T	0.9992 g	0.1 mL				
160-18554-A-2-A	SU02-EXN-041-SS-P-00	ExtChrom, A-01-R	T	0.9988 g	0.1 mL				
160-18554-A-3-A	SU02-EXW-042-SS-P-00	ExtChrom, A-01-R	T	1.0003 g	0.1 mL				
160-18554-A-4-A	SU02-EXB-043-SS-P-00	ExtChrom, A-01-R	T	1.0015 g	0.1 mL				
160-18554-A-5-A	SU02-EXN-044-SS-P-00	ExtChrom, A-01-R	T	0.9995 g	0.1 mL				
160-18554-A-6-A	SU02-EXB-045-SS-P-00	ExtChrom, A-01-R	T	1.0009 g	0.1 mL				
160-18554-A-7-A	SU02-EXW-046-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18554-A-8-A	SU02-EXW-047-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18554-A-9-A	SU02-EXB-048-SS-P-00	ExtChrom, A-01-R	T	0.9998 g	0.1 mL				
160-18554-A-10-A	SU02-EXB-049-SS-P-00	ExtChrom, A-01-R	T	0.9991 g	0.1 mL				
160-18554-A-11-A	SU02-EXB-050-SS-P-00	ExtChrom, A-01-R	T	0.9987 g	0.1 mL				
160-18554-A-12-A	SU02-EXW-051-SS-P-00	ExtChrom, A-01-R	T	1.0003 g	0.1 mL				
160-18554-A-13-A	SU02-EXB-052-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Batch Number: 266564 Batch Start Date: 08/25/16 15:51 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 08/31/16 15:02

Batch Notes	
Balance ID	0034150065
Analyst ID - Column	nmn per scb
Column Date	8/31/16
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	8/31/16
Pipette ID	rad104
Analyst ID - Reagent Drop Witness	rjs
Analyst ID - Reagent Drop	ats
SOP Number	st-rc-0003, st-rc-0004, st-rc-0100, st-rc-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:15AM 9/1/2016

Sample

Sample Name: MB 160-266564/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-266564/1-A
Sample Collection Date: 8/31/2016 11:26:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175976
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

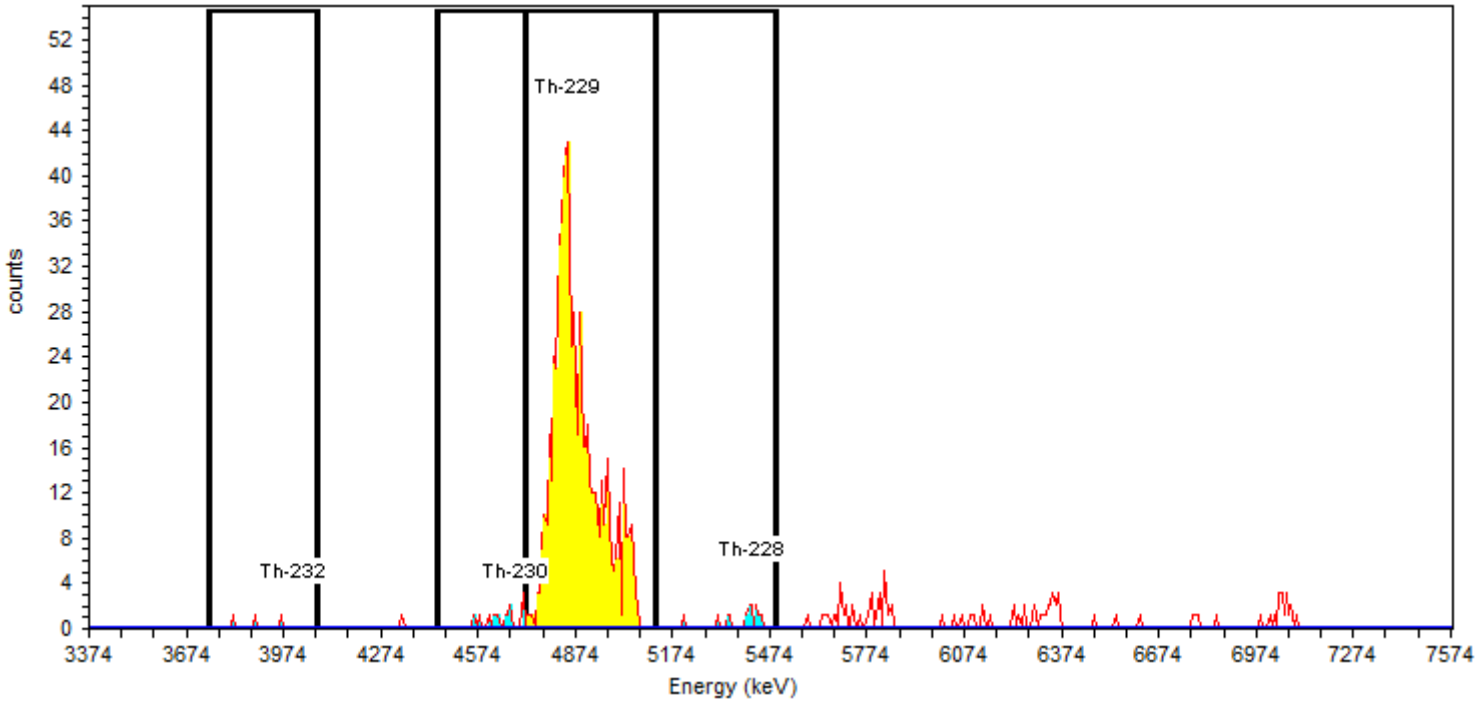
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 100.83%

Acquisition

Detector: AV191 SN: 50-112A2
Acquisition Start Date: 8/31/2016 7:45:24PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:39PM
Bkgd Info: Sample: ICB;AV191; Det: AV191; Spectrum #1; 7/22/2016 3:43:39 PM

Energy Calibration: IC-8875;AV191-20151017
Efficiency Calibration:IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.22% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	3	0.0000	3.00	1.380E-002	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.7	99.7	13	0.8333	12.20	5.641E-002	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.9	99.6	656	1.6667	654.36	3.054E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.7	99.8	13	4.5833	8.42	3.890E-002	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:59AM 9/1/2016

Sample

Sample Name: LCS 160-266564/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-266564/2-A
Sample Collection Date: 8/31/2016 11:26:00AM
Comment:

Sample Weight : 0.50 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175974
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

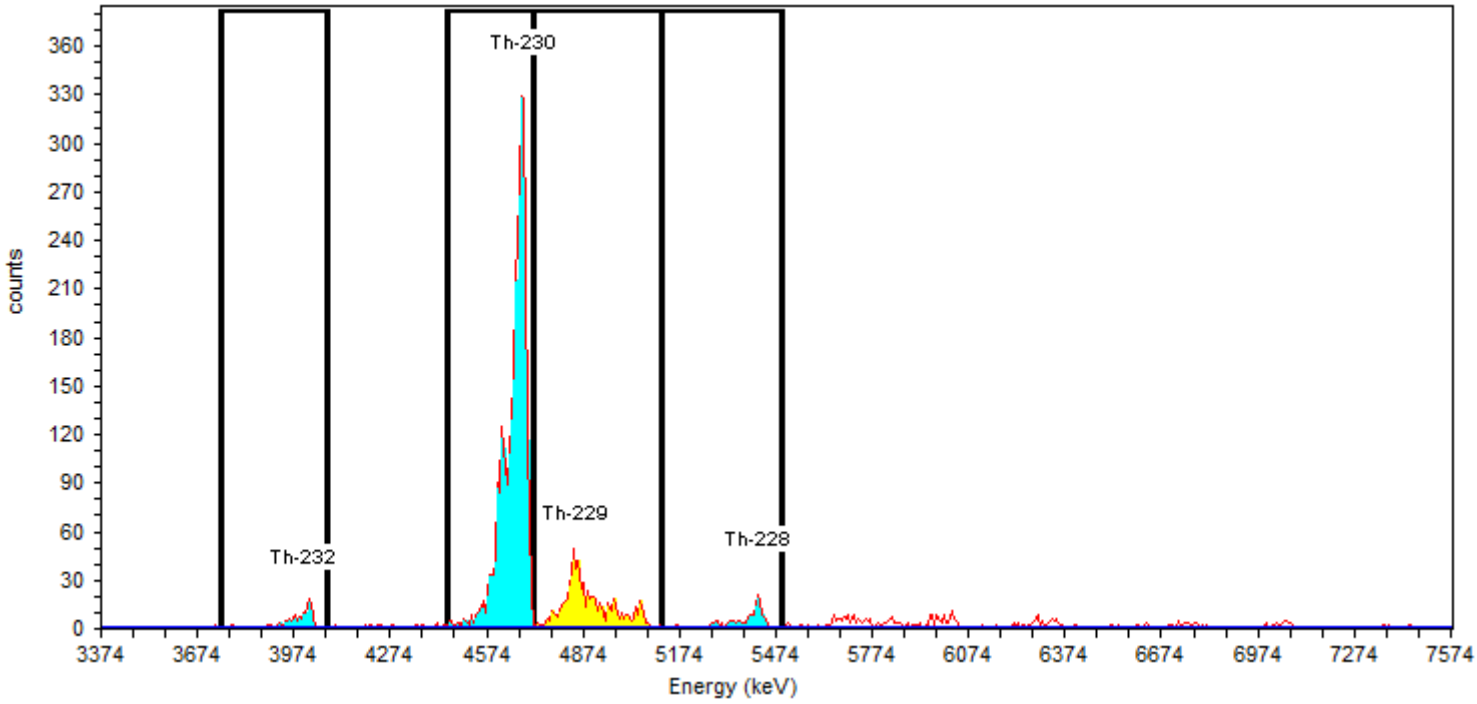
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 92.48%

Acquisition

Detector: AV194 SN: 50-119J2
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:39PM
Bkgd Info: Sample: ICB;AV194; Det: AV194; Spectrum #1; 7/22/2016 3:43:39 PM

Energy Calibration: IC-9520;AV194-20151017
Efficiency Calibration:IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.83% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	42.4	100.2	102	0.0000	102.00	9.992E-001	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.7	99.7	2612	0.8333	2611.47	2.571E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.1	99.6	616	0.8333	615.23	5.606E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.9	99.8	124	6.6667	117.40	1.155E+000	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:28PM 9/7/2016

Sample

Sample Name: 160-18554-A-1-D Type: Sample
Spectrum #2 Analysis #1
: 160-18554-A-1-D
Sample Collection Date: 8/8/2016 11:41:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176236
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

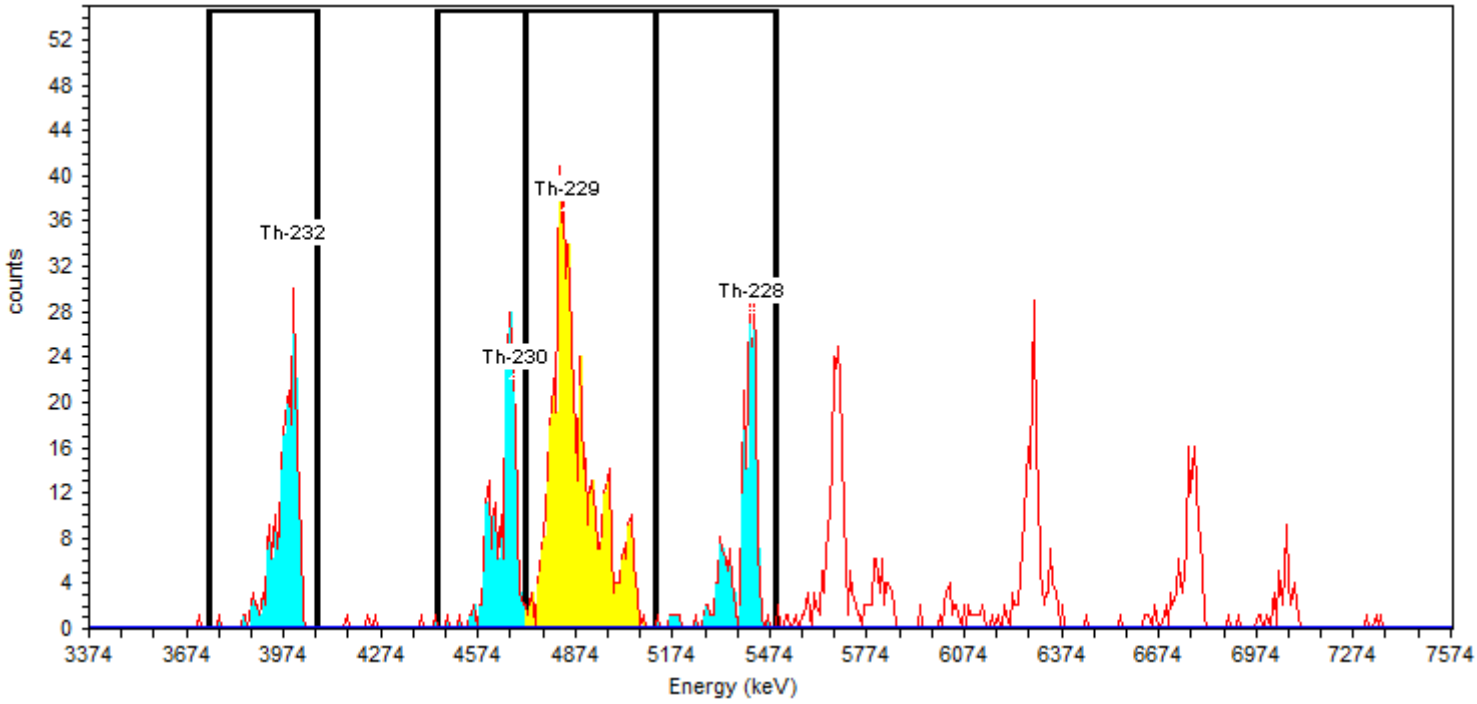
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 92.06%

Acquisition

Detector: AV222 SN: 50-117J2
Acquisition Start Date: 9/7/2016 2:24:09PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:31AM
Bkgd Info: Sample: ICB;AV222; Det: AV222; Spectrum #1; 9/2/2016 10:55:31 AM

Energy Calibration: IC-9520;AV222-20151018
Efficiency Calibration:IC-9520;AV222-20151018
Calibration Date: 10/18/2015 9:20:05PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.61% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.5	100.2	227	0.0000	227.00	1.127E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.6	99.7	223	0.4167	222.86	1.112E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.0	99.6	607	0.0000	606.97	2.790E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.6	99.8	227	7.8806	219.29	1.101E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:14:56AM 9/8/2016

Sample

Sample Name: 160-18554-A-1-D Type: Sample
Spectrum #2 Analysis #1
: 160-18554-A-1-D
Sample Collection Date: 8/8/2016 11:41:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176281
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

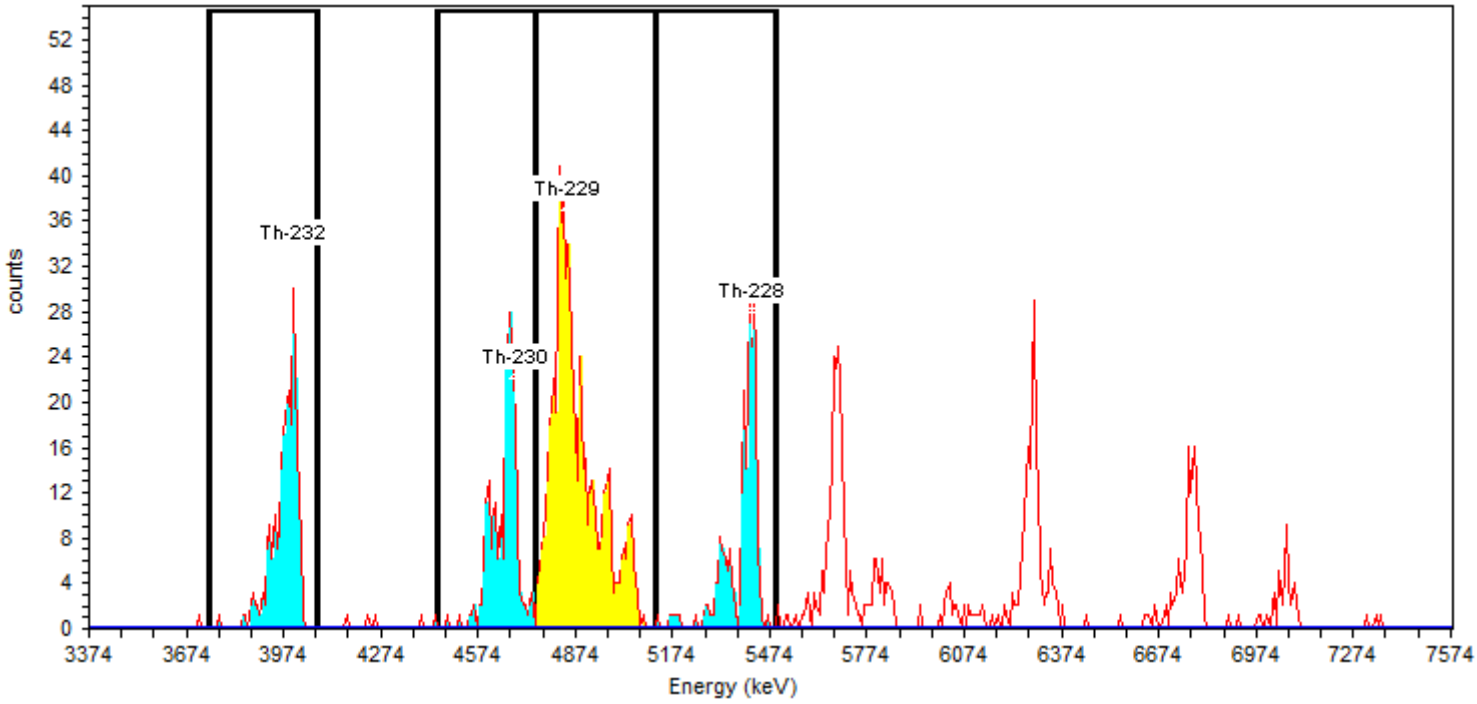
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 91.01%

Acquisition

Detector: AV222 SN: 50-117J2
Acquisition Start Date: 9/7/2016 2:24:09PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:31AM
Bkgd Info: Sample: ICB;AV222; Det: AV222; Spectrum #1; 9/2/2016 10:55:31 AM

Energy Calibration: IC-9520;AV222-20151018
Efficiency Calibration:IC-9520;AV222-20151018
Calibration Date: 10/18/2015 9:20:05PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.61% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/08/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.5	100.2	227	0.0000	227.00	1.140E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	51.8	99.7	229	0.4167	228.58	1.154E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	85.0	99.6	600	0.0000	600.00	2.758E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.6	99.8	227	7.8806	219.29	1.114E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:36AM 9/1/2016

Sample

Sample Name: 160-18554-A-2-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-2-C
Sample Collection Date: 8/8/2016 11:49:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175981
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

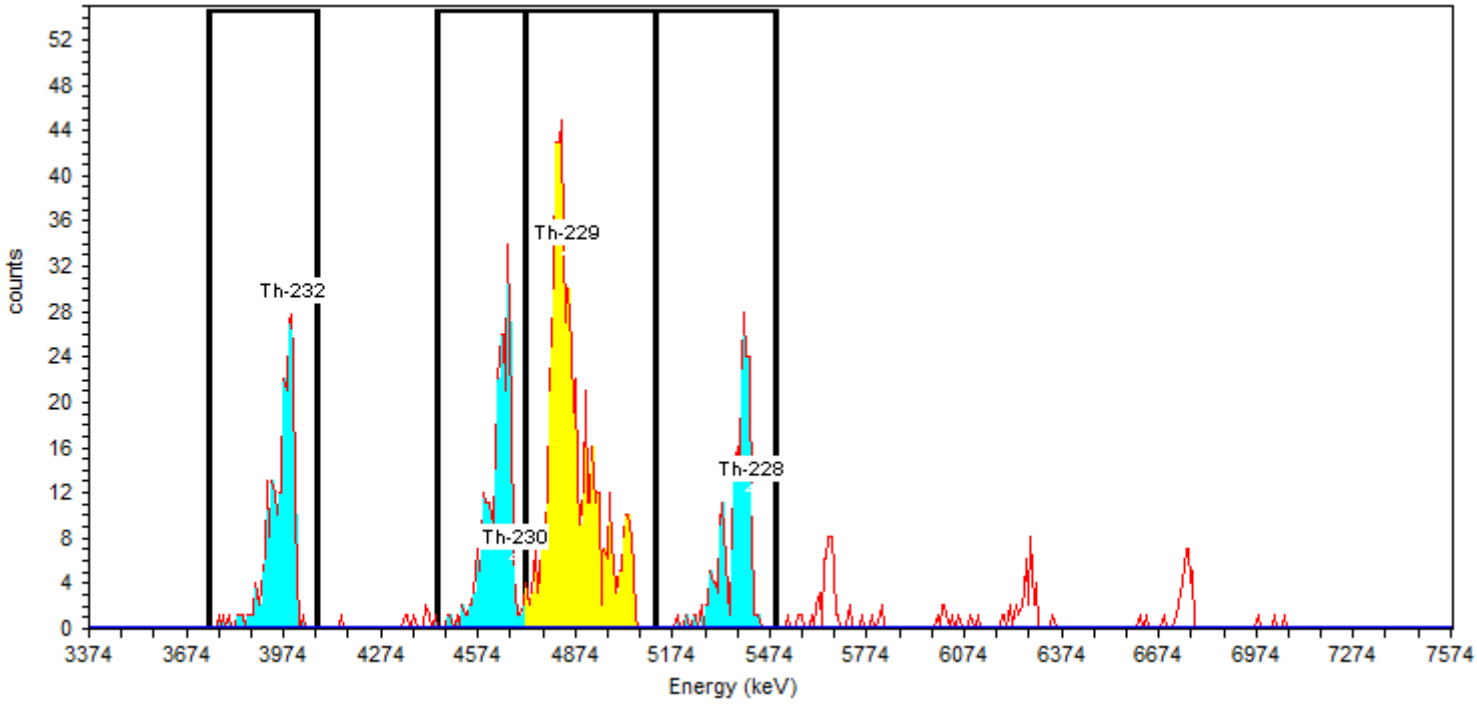
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.04%

Acquisition

Detector: AV212 SN: 49-155m5
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:43PM
Bkgd Info: Sample: ICB;AV212; Det: AV212; Spectrum #1; 7/22/2016 3:43:43 PM

Energy Calibration: IC-9795;AV212-20151018
Efficiency Calibration:IC-9795;AV212-20151018
Calibration Date: 10/18/2015 6:42:05PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.01% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.8	100.2	243	0.0000	243.00	1.150E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	38.4	99.7	275	0.4167	274.86	1.307E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.7	99.6	637	0.0000	636.97	2.669E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.7	99.8	218	2.5000	215.50	1.024E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:25:50AM 9/1/2016

Sample

Sample Name: 160-18554-A-3-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-3-C
Sample Collection Date: 8/8/2016 12:12:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175967
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

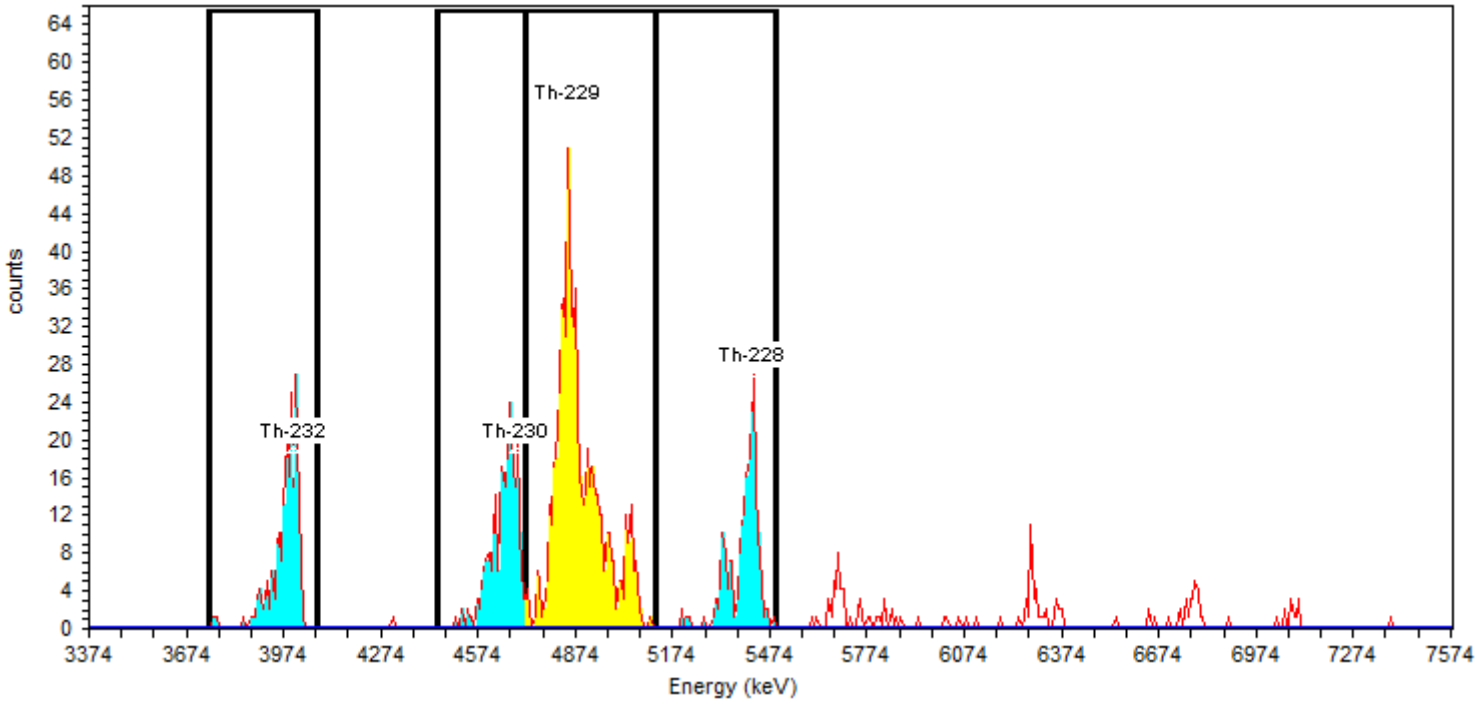
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.02%

Acquisition

Detector: AV213 SN: 54-011 Y1
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:01PM
Bkgd Info: Sample: ICB;AV213; Det: AV213; Spectrum #1; 7/25/2016 1:14:01 PM

Energy Calibration: IC-9817;AV213-20151018
Efficiency Calibration:IC-9817;AV213-20151018
Calibration Date: 10/18/2015 6:42:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.89% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.0	100.2	197	0.0000	197.00	9.263E-001	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.6	99.7	233	0.0000	233.03	1.101E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.9	99.6	641	0.8333	640.20	2.907E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.7	99.8	206	4.6194	201.38	9.511E-001	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:07:34AM 9/1/2016

Sample

Sample Name: 160-18554-A-3-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-3-C
Sample Collection Date: 8/8/2016 12:12:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175992
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

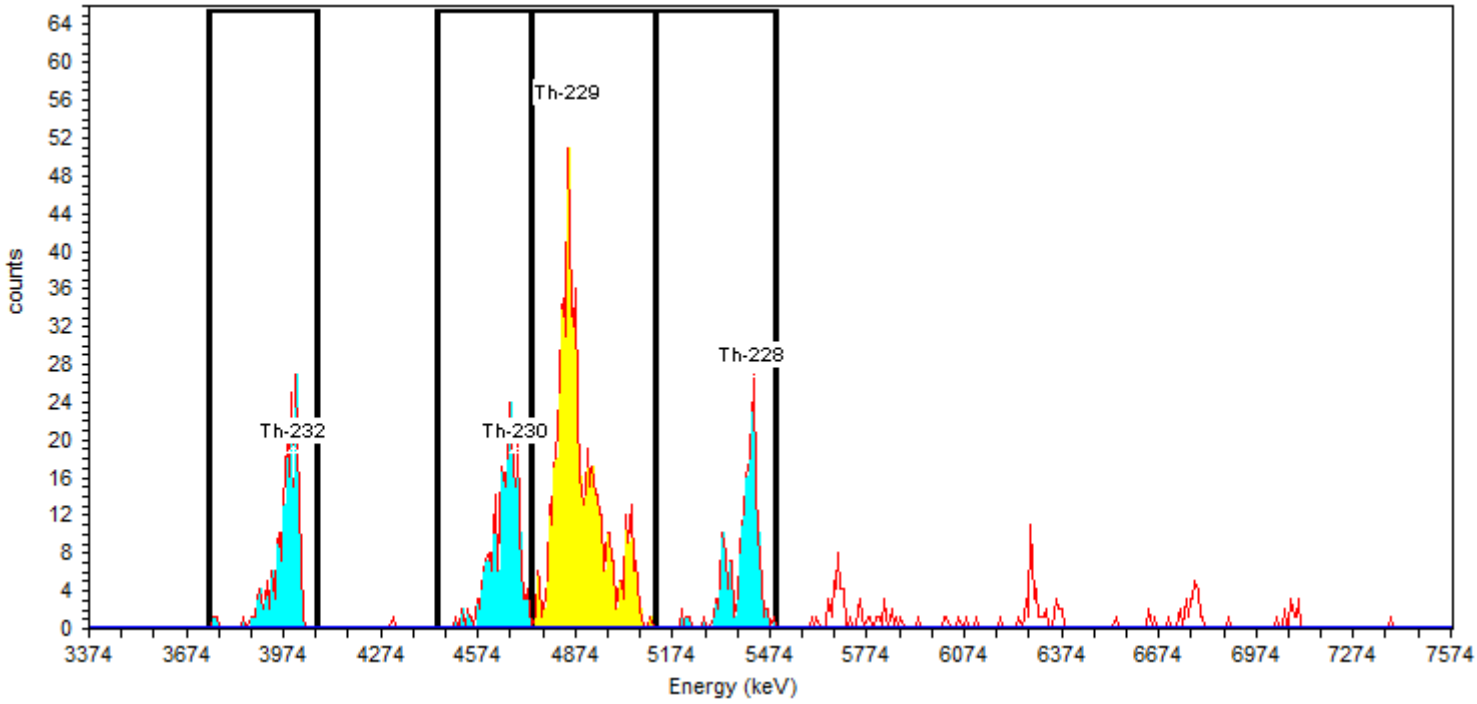
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.26%

Acquisition

Detector: AV213 SN: 54-011 Y1
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:01PM
Bkgd Info: Sample: ICB;AV213; Det: AV213; Spectrum #1; 7/25/2016 1:14:01 PM

Energy Calibration: IC-9817;AV213-20151018
Efficiency Calibration:IC-9817;AV213-20151018
Calibration Date: 10/18/2015 6:42:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.89% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/01/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.0	100.2	197	0.0000	197.00	9.336E-001	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	82.8	99.7	239	0.0000	239.00	1.138E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	74.9	99.6	636	0.8333	635.17	2.884E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.7	99.8	206	4.6194	201.38	9.586E-001	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:25:28AM 9/1/2016

Sample

Sample Name: 160-18554-A-4-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-4-C
Sample Collection Date: 8/8/2016 12:08:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175966
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

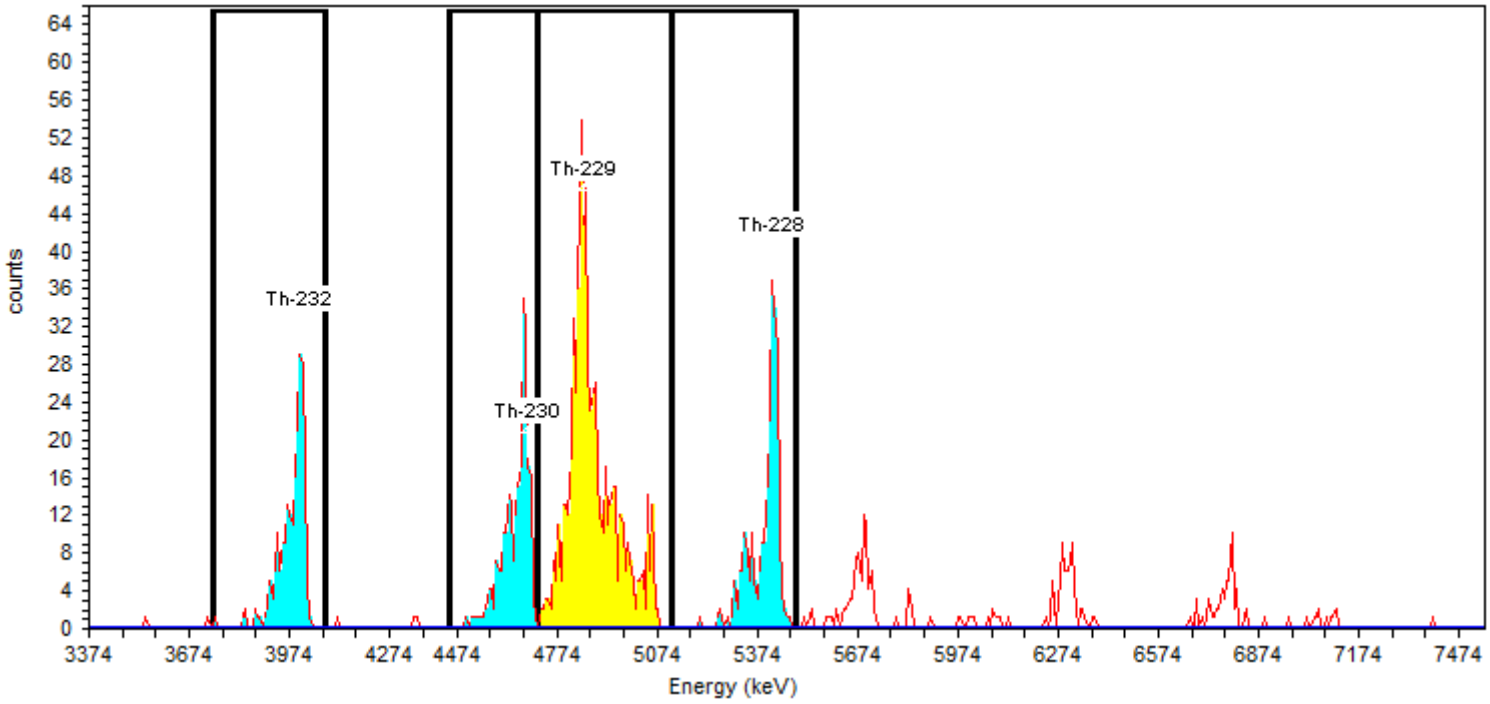
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 99.95%

Acquisition

Detector: AV214 SN: 50-112Z7
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:44PM
Bkgd Info: Sample: ICB;AV214; Det: AV214; Spectrum #1; 7/22/2016 3:43:44 PM

Energy Calibration: IC-9884;AV214-20151018
Efficiency Calibration:IC-9884;AV214-20151018
Calibration Date: 10/18/2015 6:42:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.43% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.5	100.2	211	0.0000	211.43	9.716E-001	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.5	99.7	240	0.4167	239.65	1.107E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.9	99.6	655	0.8333	654.23	3.022E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.9	99.8	247	5.8333	241.17	1.113E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:04AM 9/1/2016

Sample

Sample Name: 160-18554-A-5-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-5-C
Sample Collection Date: 8/8/2016 12:03:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175968
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

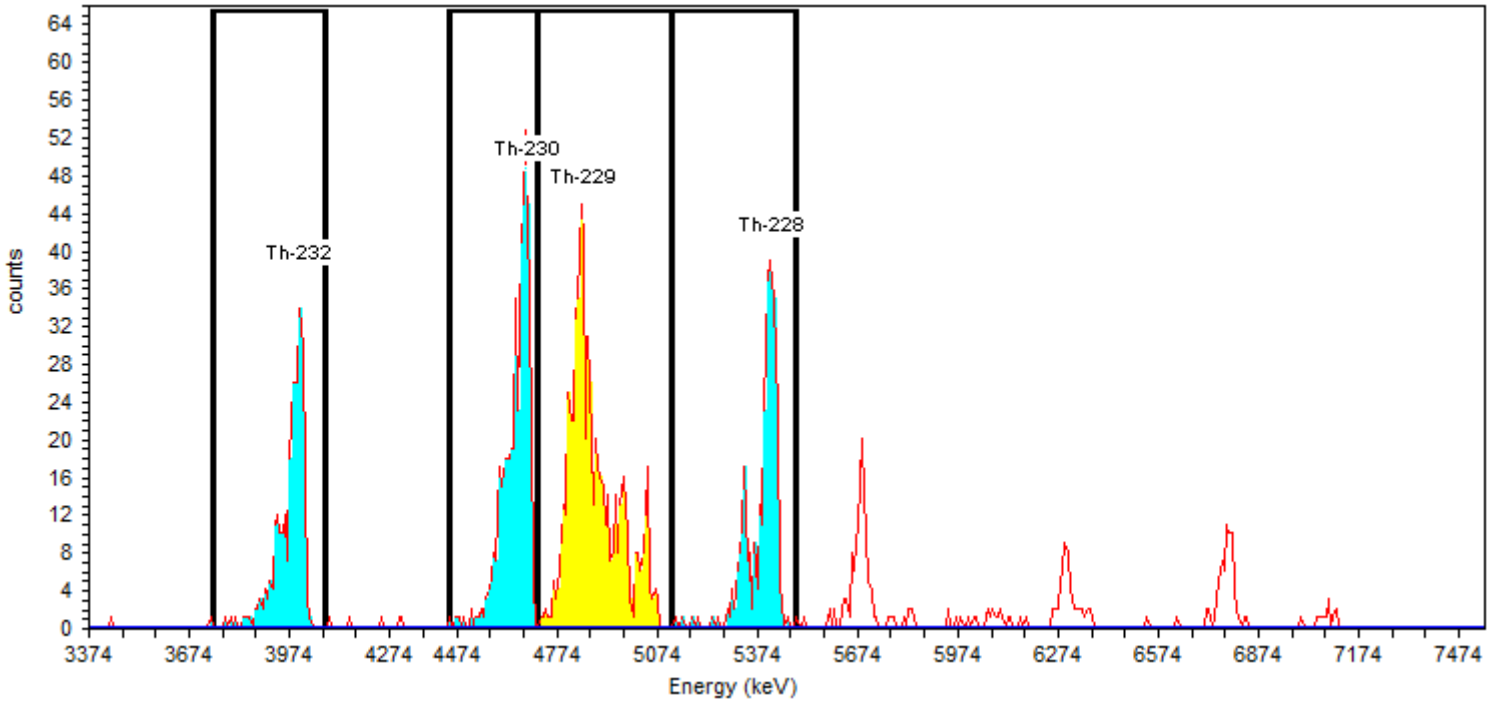
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.06%

Acquisition

Detector: AV215 SN: 50-119J4
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:44PM
Bkgd Info: Sample: ICB;AV215; Det: AV215; Spectrum #1; 7/22/2016 3:43:44 PM

Energy Calibration: IC-9885;AV215-20151018
Efficiency Calibration:IC-9885;AV215-20151018
Calibration Date: 10/18/2015 6:42:24PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.15% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	53.1	100.2	274	0.4167	273.58	1.321E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.1	99.7	429	1.2500	427.47	2.074E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.5	99.6	624	0.0000	624.03	2.699E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.5	99.8	313	8.3333	304.58	1.477E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:22AM 9/1/2016

Sample

Sample Name: 160-18554-A-6-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-6-C
Sample Collection Date: 8/8/2016 11:58:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175970
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

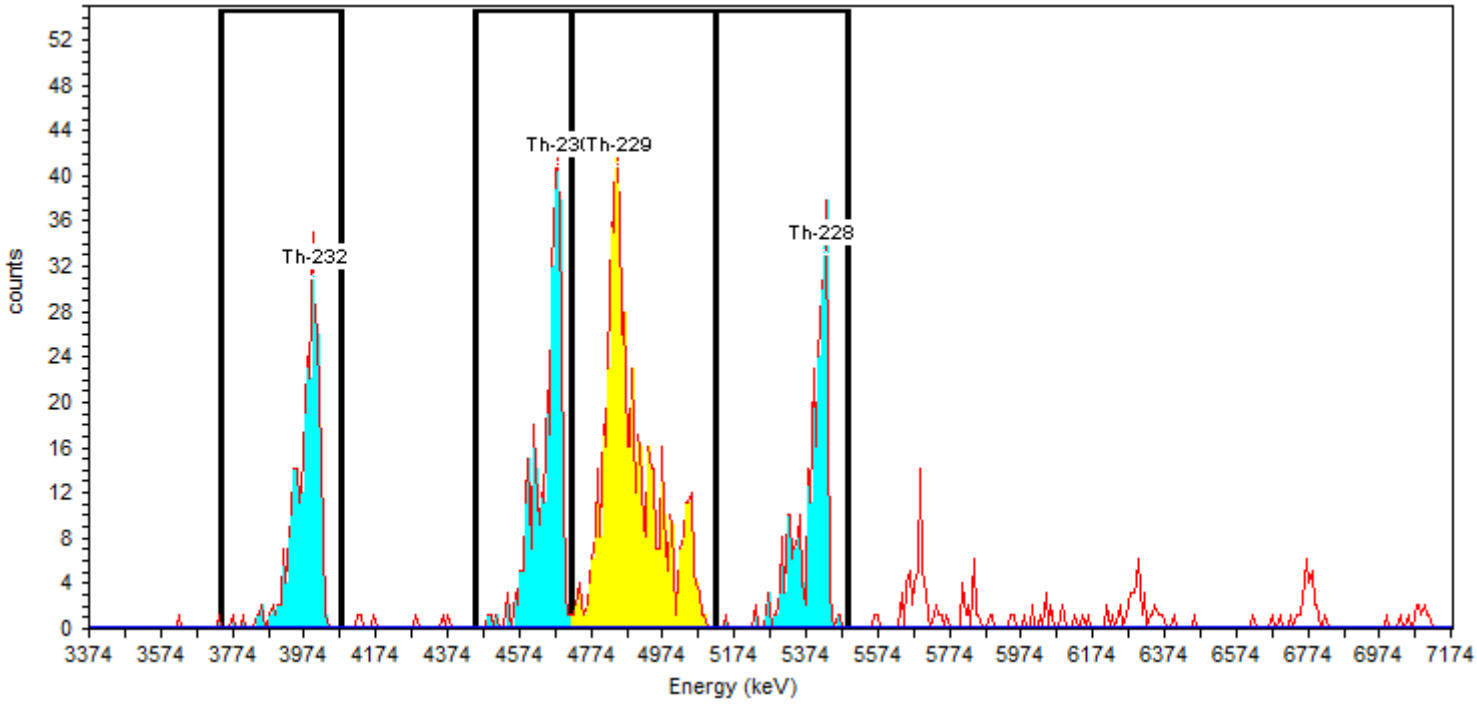
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.14%

Acquisition

Detector: AV217 SN: 50-117I2
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:44PM
Bkgd Info: Sample: ICB;AV217; Det: AV217; Spectrum #1; 7/22/2016 3:43:44 PM

Energy Calibration: IC-7107;AV217-20151018
Efficiency Calibration:IC-7107;AV217-20151018
Calibration Date: 10/18/2015 9:19:45PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.04% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.1	100.2	272	0.4167	271.58	1.344E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.6	99.7	327	0.0000	327.00	1.626E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	70.8	99.6	608	0.0000	608.00	2.637E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.6	99.8	276	5.4167	270.58	1.345E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:31AM 9/1/2016

Sample

Sample Name: 160-18554-A-7-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-7-C
Sample Collection Date: 8/8/2016 12:24:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175971
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

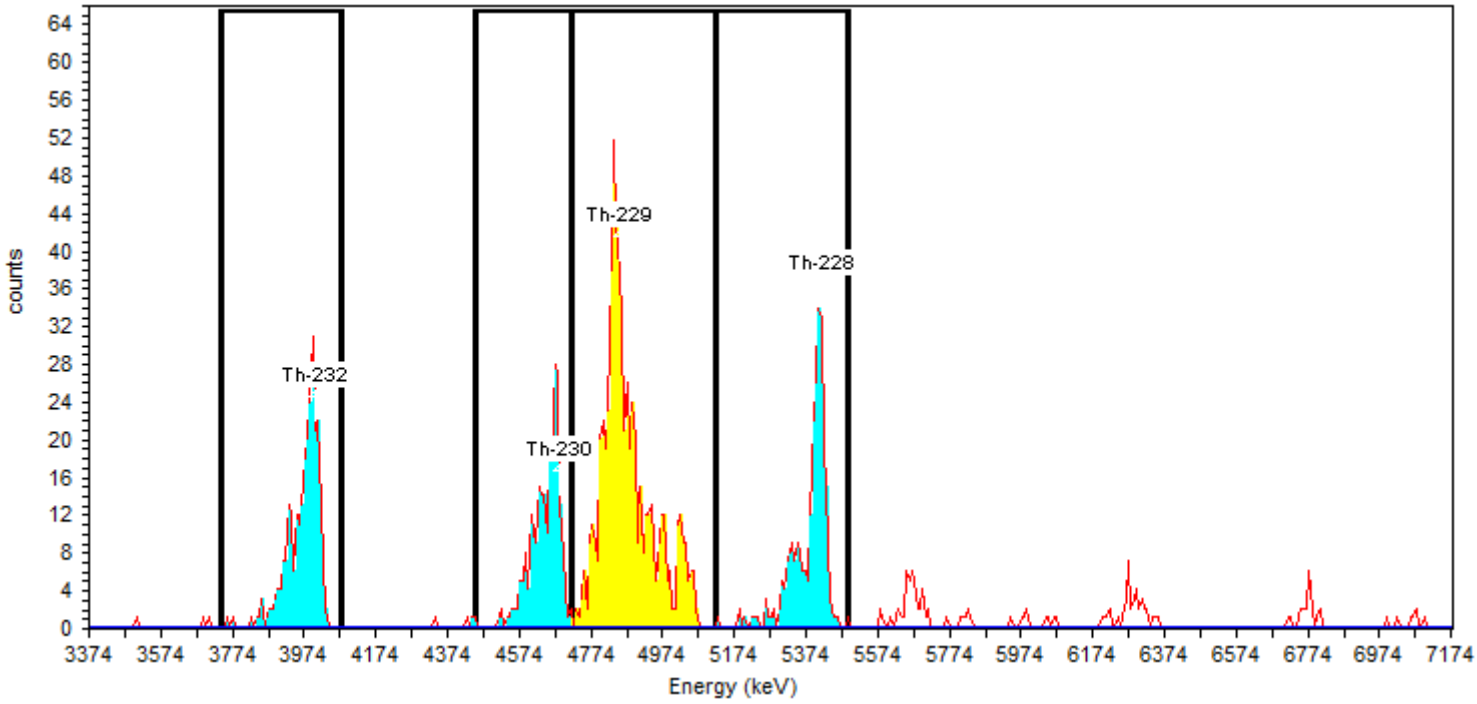
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.01%

Acquisition

Detector: AV218 SN: 50-117Z7
Acquisition Start Date: 8/31/2016 7:45:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:02PM
Bkgd Info: Sample: ICB;AV218; Det: AV218; Spectrum #1; 7/25/2016 1:14:02 PM

Energy Calibration: IC-8874;AV218-20151018
Efficiency Calibration:IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.8	100.2	263	0.5938	262.41	1.235E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.2	99.7	238	0.4167	237.52	1.123E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.1	99.6	641	0.8333	640.10	2.727E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.9	99.8	259	8.3333	250.58	1.184E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:17AM 9/1/2016

Sample

Sample Name: 160-18554-A-7-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-7-C
Sample Collection Date: 8/8/2016 12:24:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175991
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

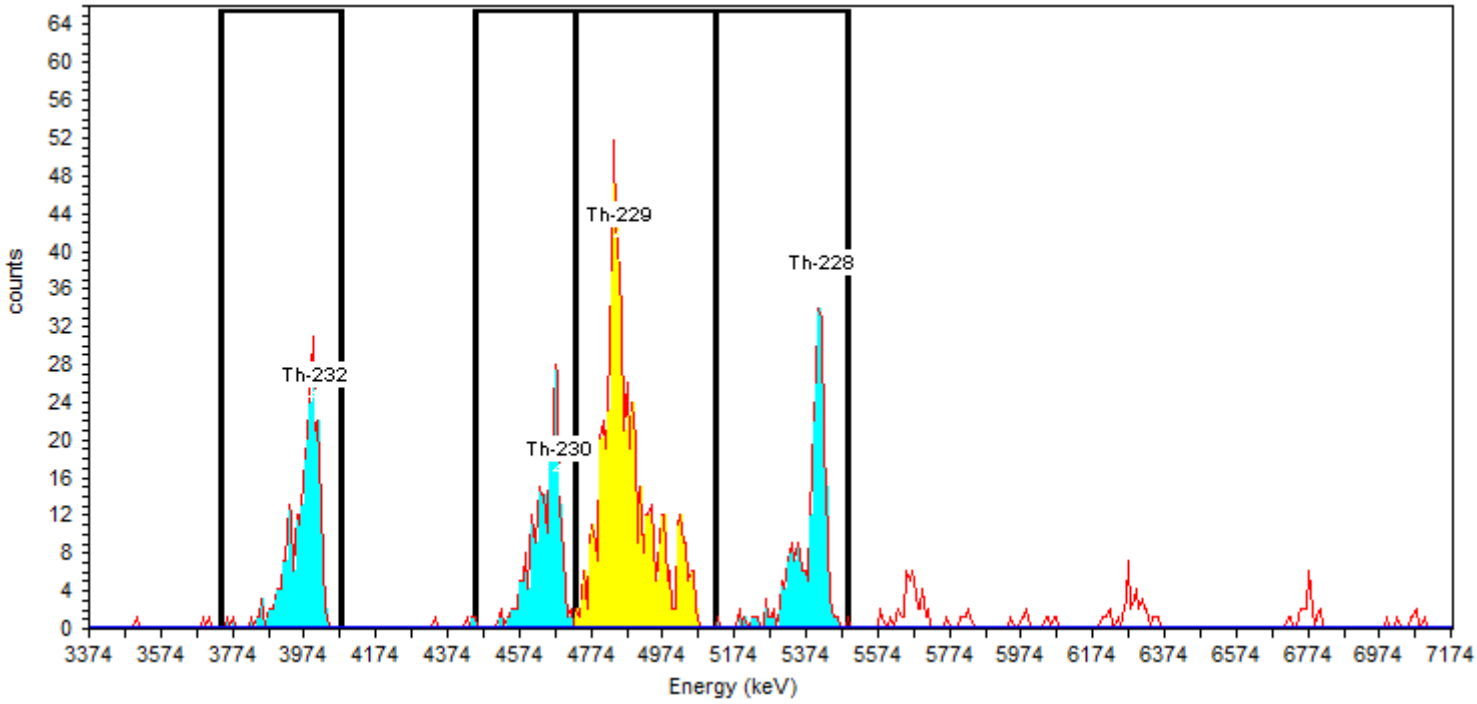
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.74%

Acquisition

Detector: AV218 SN: 50-117Z7
Acquisition Start Date: 8/31/2016 7:45:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:02PM
Bkgd Info: Sample: ICB;AV218; Det: AV218; Spectrum #1; 7/25/2016 1:14:02 PM

Energy Calibration: IC-8874;AV218-20151018
Efficiency Calibration:IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/01/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.8	100.2	263	0.5938	262.41	1.239E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	90.5	99.7	240	0.4167	239.58	1.137E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	77.1	99.6	639	0.8333	638.17	2.719E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.9	99.8	259	8.3333	250.58	1.188E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:13AM 9/1/2016

Sample

Sample Name: 160-18554-A-8-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-8-C
Sample Collection Date: 8/8/2016 12:18:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175969
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

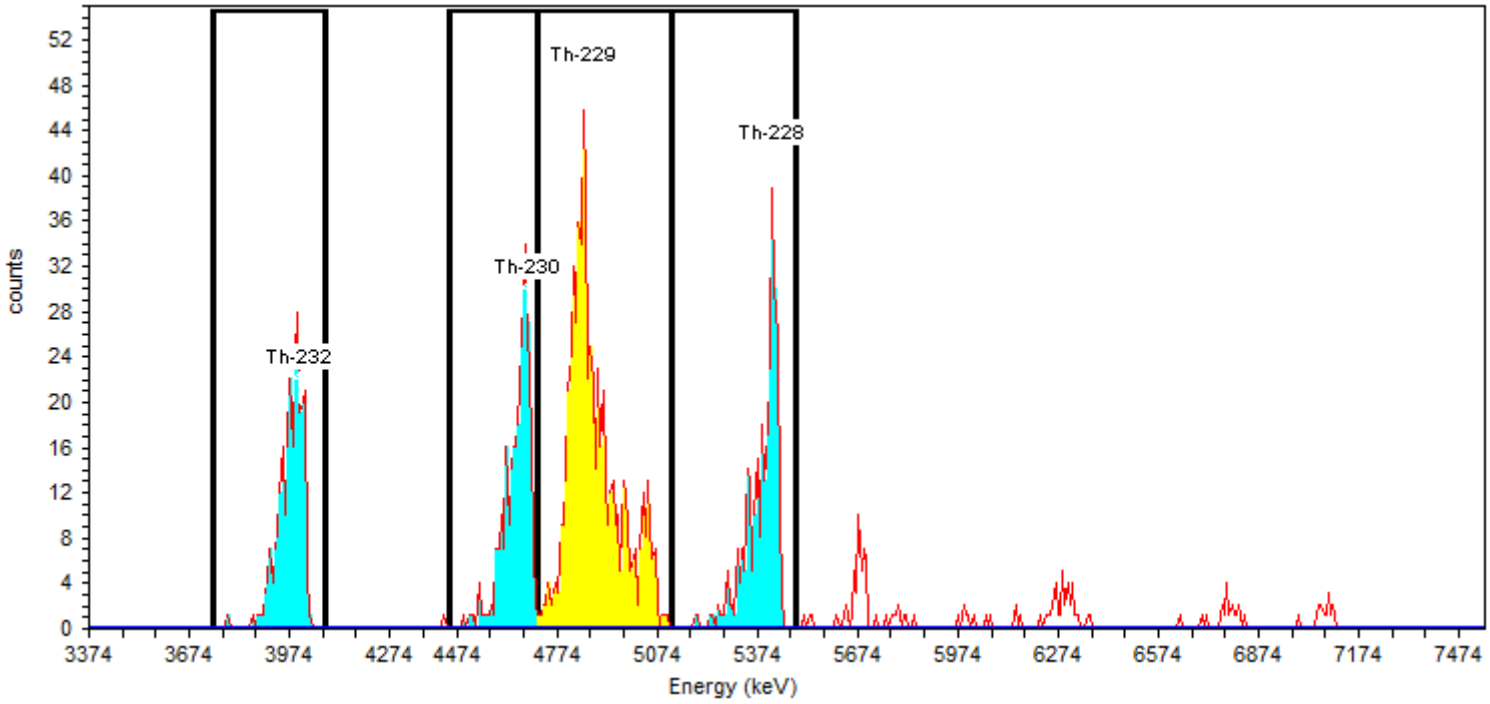
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 100.06%

Acquisition

Detector: AV219 SN: 50-112Z5
Acquisition Start Date: 8/31/2016 7:45:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:45PM
Bkgd Info: Sample: ICB;AV219; Det: AV219; Spectrum #1; 7/22/2016 3:43:45 PM

Energy Calibration: IC-8875;AV219-20151018
Efficiency Calibration:IC-8875;AV219-20151018
Calibration Date: 10/18/2015 9:19:52PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.10% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	72.3	100.2	248	0.0000	248.00	1.156E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.5	99.7	278	0.8333	277.17	1.299E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.6	99.6	646	0.0000	646.00	3.032E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.5	99.8	286	7.5000	278.50	1.304E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:18PM 9/7/2016

Sample

Sample Name: 160-18554-A-9-C Type: Sample
Spectrum #2 Analysis #1
: 160-18554-A-9-C
Sample Collection Date: 8/8/2016 12:44:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176233
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

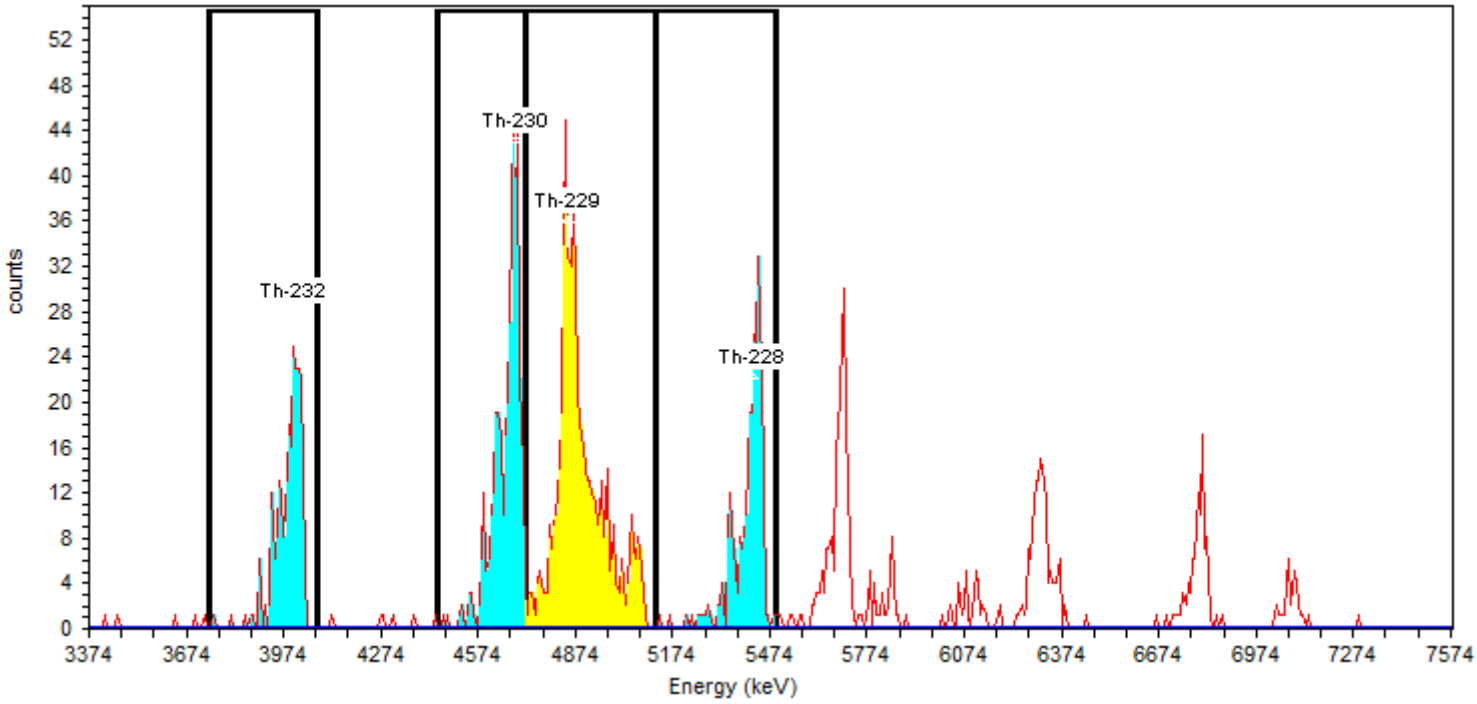
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.50%

Acquisition

Detector: AV221 SN: 50-117H5
Acquisition Start Date: 9/7/2016 2:24:09PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:19PM
Bkgd Info: Sample: ICB;AV221; Det: AV221; Spectrum #1; 9/1/2016 3:17:19 PM

Energy Calibration: IC-8877;AV221-20151018
Efficiency Calibration:IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.01% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.0	100.2	233	0.4167	232.58	1.237E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.3	99.7	367	0.0000	367.22	1.963E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.9	99.6	567	0.8067	566.10	2.559E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	39.3	99.8	253	6.2234	246.78	1.328E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:14:01AM 9/8/2016

Sample

Sample Name: 160-18554-A-9-C Type: Sample
Spectrum #2 Analysis #1
: 160-18554-A-9-C
Sample Collection Date: 8/8/2016 12:44:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176280
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

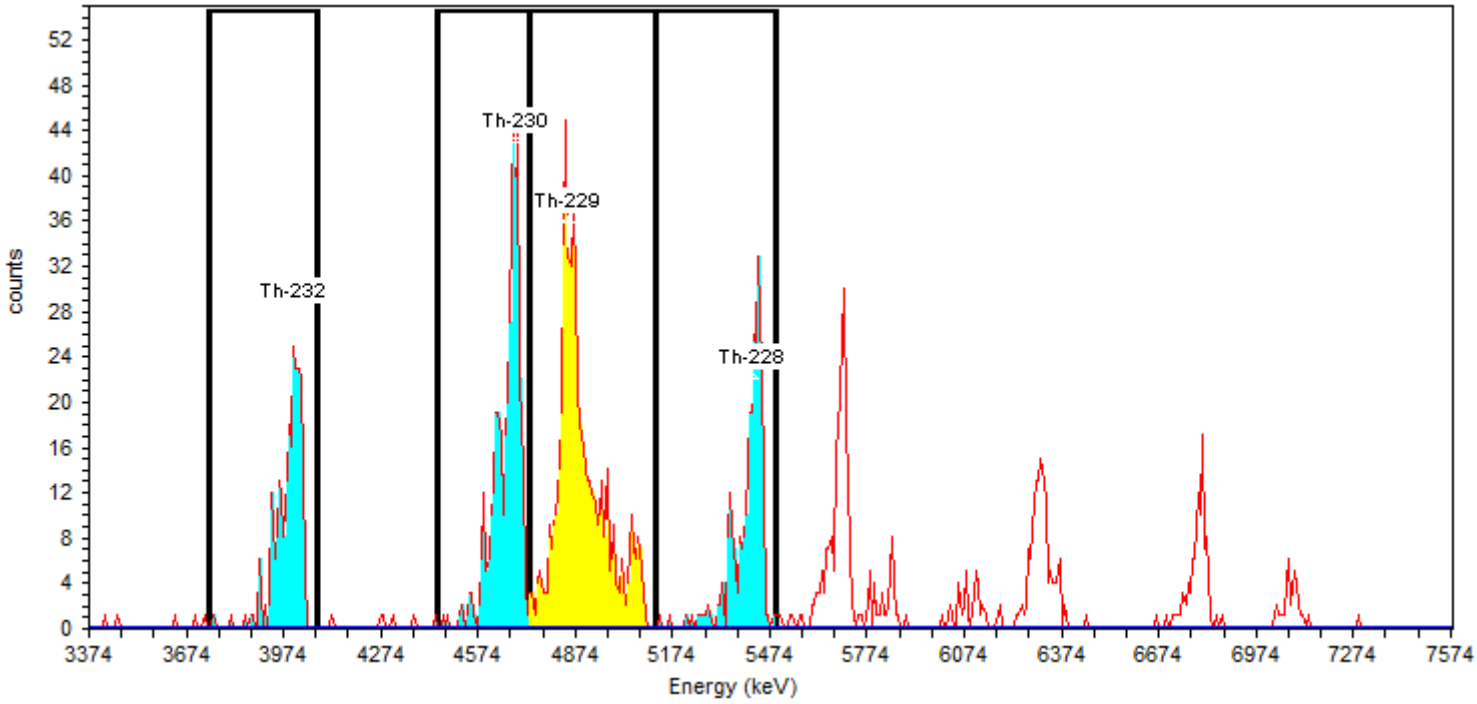
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.91%

Acquisition

Detector: AV221 SN: 50-117H5
Acquisition Start Date: 9/7/2016 2:24:09PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:19PM
Bkgd Info: Sample: ICB;AV221; Det: AV221; Spectrum #1; 9/1/2016 3:17:19 PM

Energy Calibration: IC-8877;AV221-20151018
Efficiency Calibration:IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.01% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:41:35PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/08/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.0	100.2	233	0.4167	232.58	1.246E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	16.7	99.7	371	0.0000	371.00	1.998E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	71.9	99.6	563	0.8333	562.17	2.542E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	39.3	99.8	253	6.2234	246.78	1.337E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:50AM 9/1/2016

Sample

Sample Name: 160-18554-A-10-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-10-C
Sample Collection Date: 8/8/2016 1:22:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175973
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

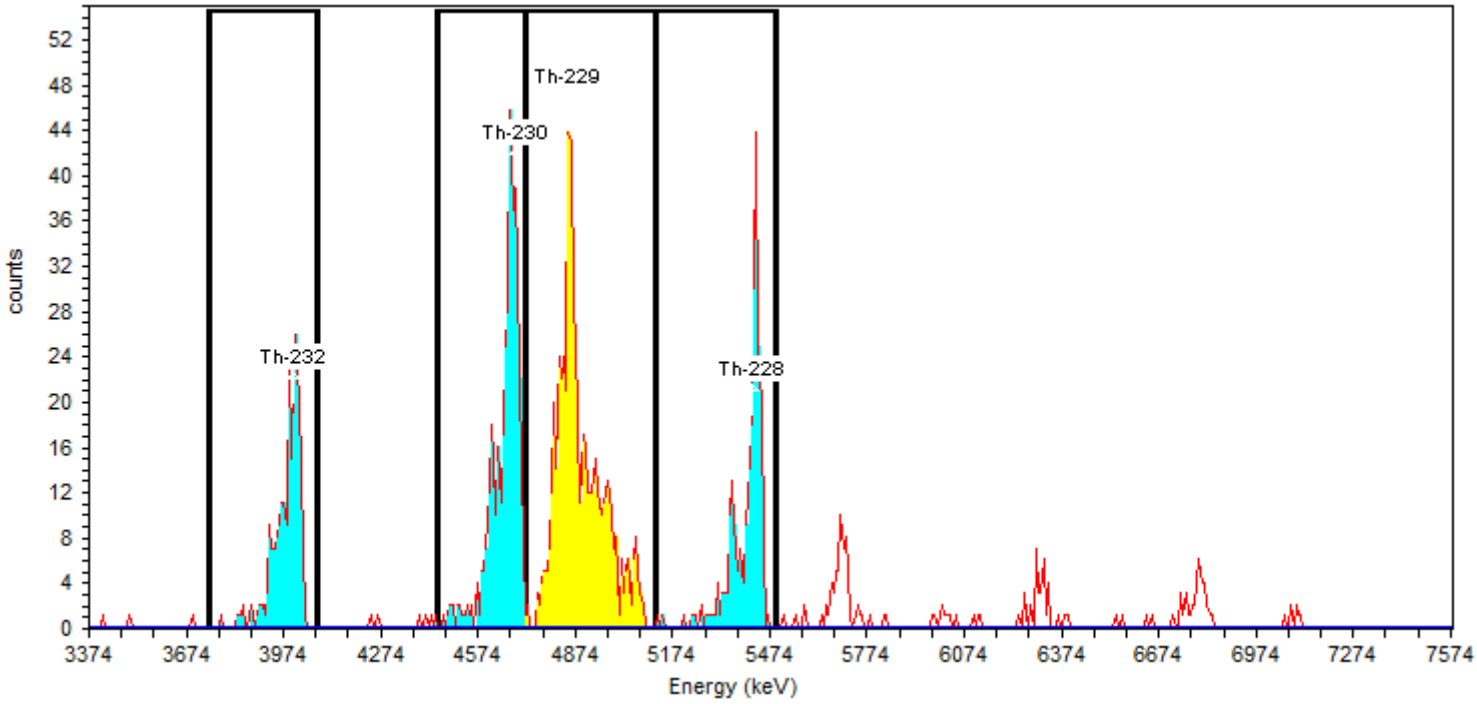
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.44%

Acquisition

Detector: AV221 SN: 50-117H5
Acquisition Start Date: 8/31/2016 7:45:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:45PM
Bkgd Info: Sample: ICB;AV221; Det: AV221; Spectrum #1; 7/22/2016 3:43:45 PM

Energy Calibration: IC-8877;AV221-20151018
Efficiency Calibration:IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.01% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.3	100.2	214	0.4167	213.58	1.151E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.4	99.7	375	1.2629	374.08	2.027E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.9	99.6	559	0.0129	559.02	2.529E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	41.1	99.8	248	7.1194	240.88	1.304E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:09:10AM 9/1/2016

Sample

Sample Name: 160-18554-A-10-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-10-C
Sample Collection Date: 8/8/2016 1:22:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 175993
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

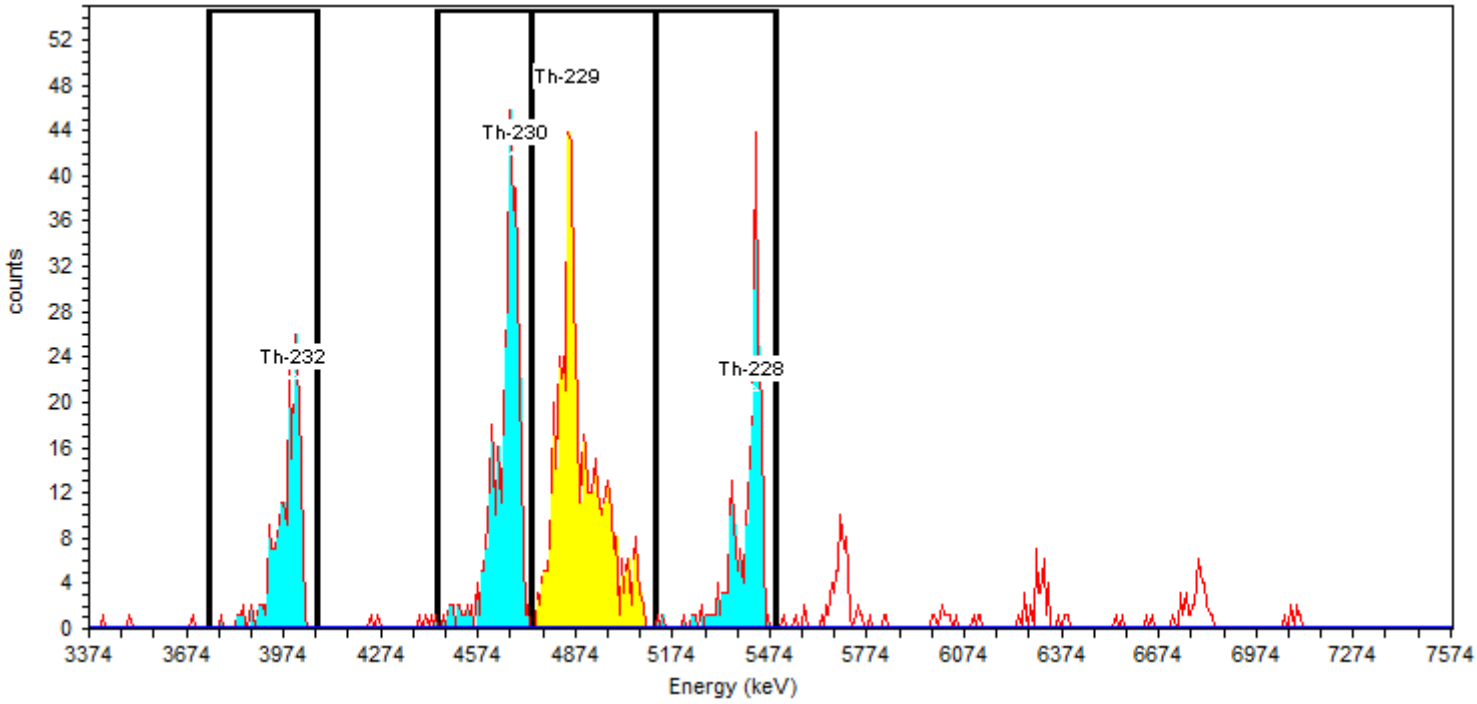
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.29%

Acquisition

Detector: AV221 SN: 50-117H5
Acquisition Start Date: 8/31/2016 7:45:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:45PM
Bkgd Info: Sample: ICB;AV221; Det: AV221; Spectrum #1; 7/22/2016 3:43:45 PM

Energy Calibration: IC-8877;AV221-20151018
Efficiency Calibration:IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.01% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/01/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.3	100.2	214	0.4167	213.58	1.154E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	56.2	99.7	377	1.6667	375.33	2.037E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	72.9	99.6	558	0.0000	558.00	2.525E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	41.1	99.8	248	7.1194	240.88	1.307E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:24PM 9/7/2016

Sample

Sample Name: 160-18554-A-11-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-11-C
Sample Collection Date: 8/8/2016 1:33:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176235
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

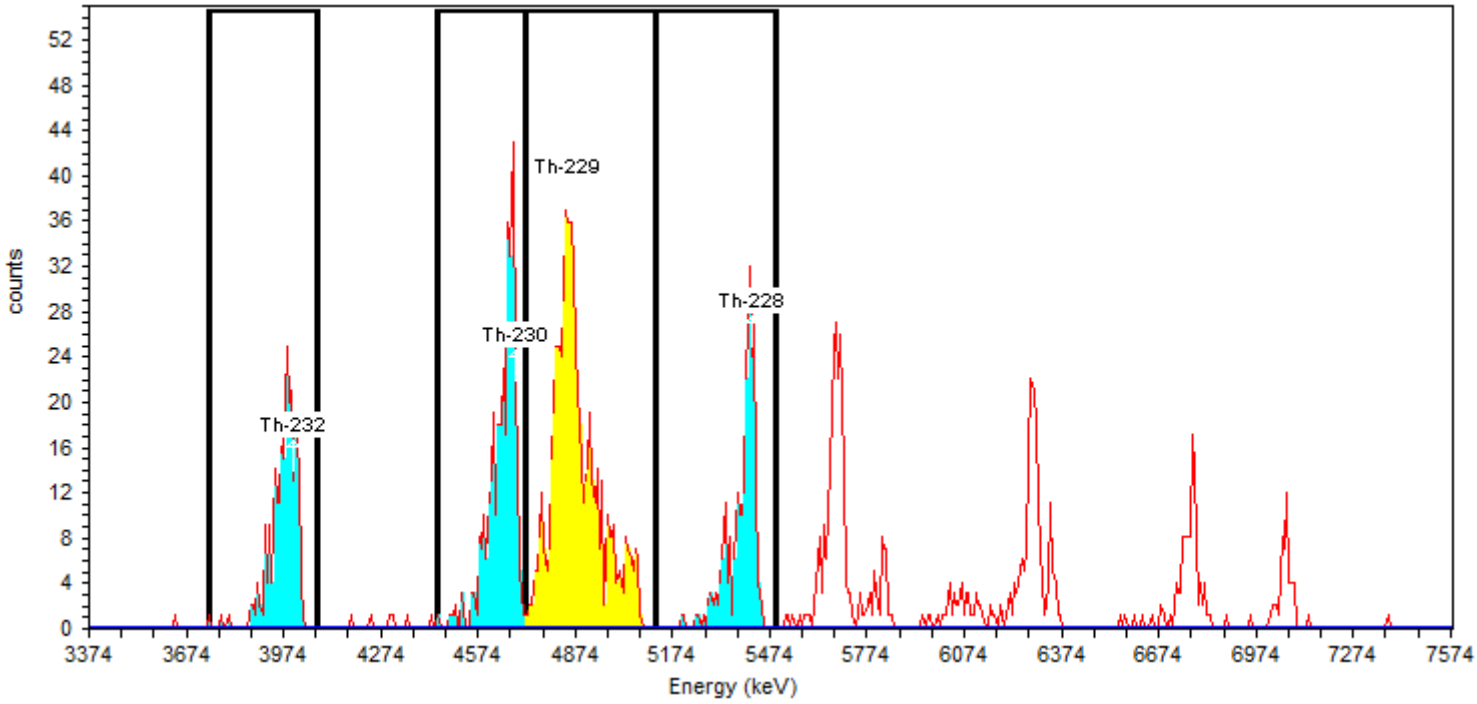
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 91.61%

Acquisition

Detector: AV220 SN: 50-119AA3
Acquisition Start Date: 9/7/2016 2:24:08PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:30AM
Bkgd Info: Sample: ICB;AV220; Det: AV220; Spectrum #1; 9/2/2016 10:55:30 AM

Energy Calibration: IC-8876;AV220-20151018
Efficiency Calibration:IC-8876;AV220-20151018
Calibration Date: 10/18/2015 9:19:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.54% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.2	100.2	224	1.0244	222.55	1.114E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	23.9	99.7	330	0.8333	328.86	1.654E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.7	99.6	604	1.6667	602.33	2.778E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.5	99.8	225	5.4167	219.58	1.111E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:14PM 9/7/2016

Sample

Sample Name: 160-18554-A-12-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-12-C
Sample Collection Date: 8/8/2016 12:28:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176232
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

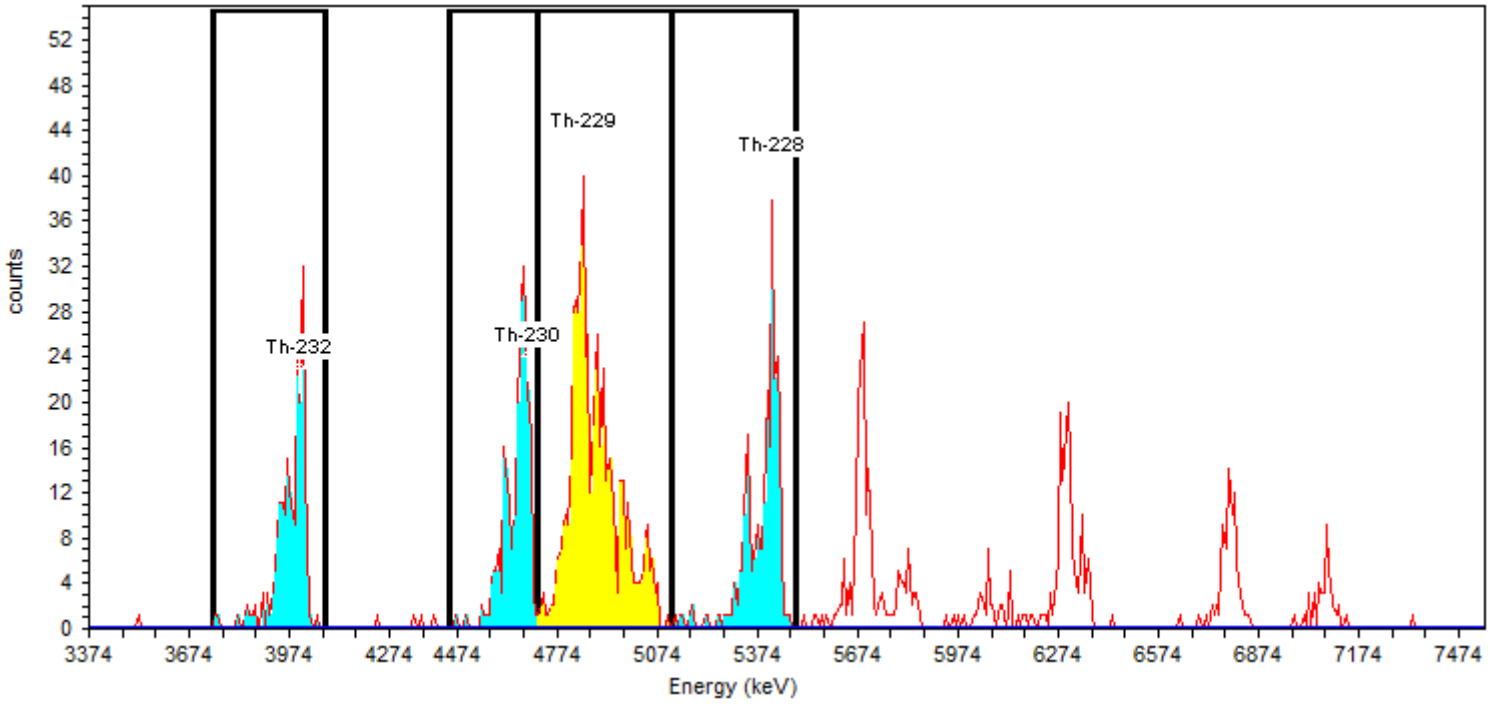
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.14%

Acquisition

Detector: AV219 SN: 50-112Z5
Acquisition Start Date: 9/7/2016 2:24:08PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:30AM
Bkgd Info: Sample: ICB;AV219; Det: AV219; Spectrum #1; 9/2/2016 10:55:30 AM

Energy Calibration: IC-8875;AV219-20151018
Efficiency Calibration:IC-8875;AV219-20151018
Calibration Date: 10/18/2015 9:19:52PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.10% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	82.6	100.2	211	0.0000	211.43	1.118E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.4	99.7	249	2.0962	246.93	1.313E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	108.4	99.6	569	0.0129	569.02	2.668E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.2	99.8	261	6.2500	254.75	1.363E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:21PM 9/7/2016

Sample

Sample Name: 160-18554-A-13-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-13-C
Sample Collection Date: 8/8/2016 12:40:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176234
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

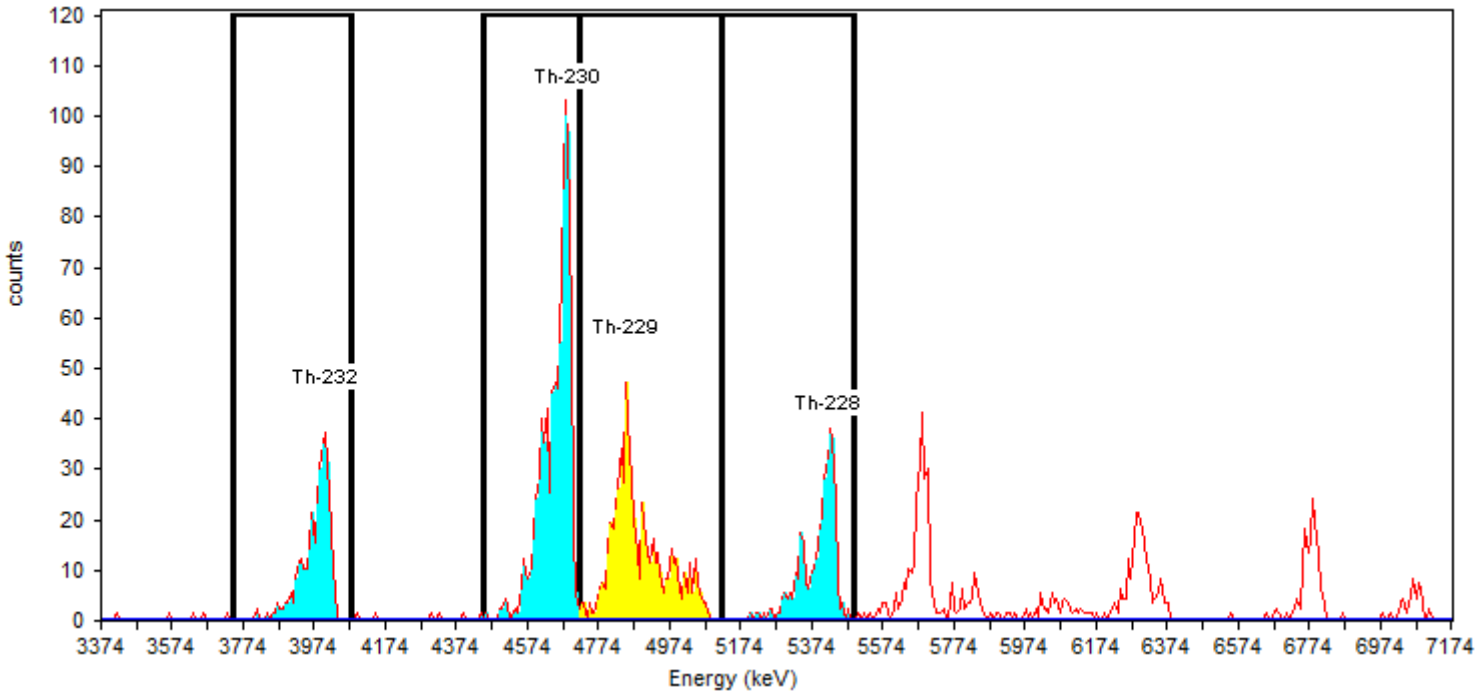
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.67%

Acquisition

Detector: AV218 SN: 50-117Z7
Acquisition Start Date: 9/7/2016 2:24:08PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:18PM
Bkgd Info: Sample: ICB;AV218; Det: AV218; Spectrum #1; 9/1/2016 3:17:18 PM

Energy Calibration: IC-8874;AV218-20151018
Efficiency Calibration:IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	58.4	100.2	317	0.4167	316.58	1.642E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.3	99.7	835	0.4167	834.92	4.352E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.4	99.6	582	1.2500	580.78	2.474E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.7	99.8	335	7.9167	327.08	1.715E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:15:32AM 9/8/2016

Sample

Sample Name: 160-18554-A-13-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-13-C
Sample Collection Date: 8/8/2016 12:40:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266564
AnalysisResultsID: 176282
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

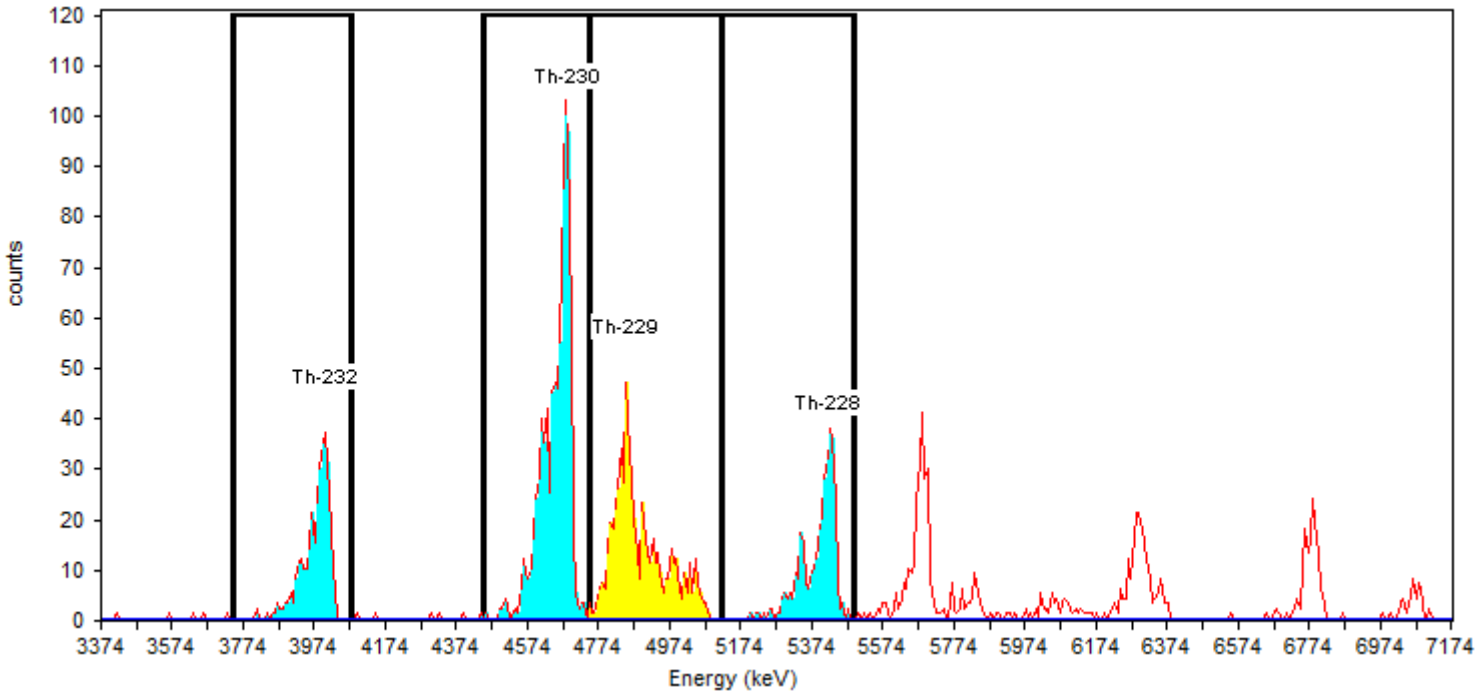
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.96%

Acquisition

Detector: AV218 SN: 50-117Z7
Acquisition Start Date: 9/7/2016 2:24:08PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:18PM
Bkgd Info: Sample: ICB;AV218; Det: AV218; Spectrum #1; 9/1/2016 3:17:18 PM

Energy Calibration: IC-8874;AV218-20151018
Efficiency Calibration:IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:41:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/08/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	58.4	100.2	317	0.4167	316.58	1.656E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	55.4	99.7	844	0.4167	843.58	4.436E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	72.4	99.6	577	1.2500	575.75	2.453E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.7	99.8	335	7.9167	327.08	1.730E+000	pCi/g

Prep Batch: 266565

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: MB 160-266565/1-A
Client ID:
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV171
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.09373	0.0422	0.0430		pCi/g	0.100	0.0143	268478
Thorium-232	0.004736	0.00947	0.00948	U	pCi/g	0.100	0.0142	268478

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.922	0.232	0.338		pCi/g	0.0339	3.03	96.5	30 - 110

Lab ID: LCS 160-266565/2-A
Client ID:
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV172
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	25.18	0.982	2.33		pCi/g	0.100	0.0287	268479

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.865	0.467	0.679		pCi/g	0.0685	6.05	97.0	30 - 110

Lab ID: 160-18554-14
Client ID: SU02-EXB-053-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV173
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.30	0.156	0.190		pCi/g	0.100	0.0306	268480
Thorium-232	1.23	0.151	0.183		pCi/g	0.100	0.0139	268480

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.87	0.226	0.330		pCi/g	0.0291	3.03	94.8	30 - 110

Lab ID: 160-18554-14 DU
Client ID: SU02-EXB-053-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV175
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.307	0.165	0.198		pCi/g	0.100	0.0383	268481
Thorium-232	1.056	0.148	0.172		pCi/g	0.100	0.0155	268481

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.496	0.207	0.295		pCi/g	0.0316	3.03	82.5	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: 160-18554-15
Client ID: SU02-EXB-054-SS-P-00
Sigma: 2

Analyzed: 09/08/16 15:56
Detector: AV147
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.893	0.136	0.156		pCi/g	0.100	0.0340	268649
Thorium-232	1.10	0.150	0.176		pCi/g	0.100	0.0285	268649

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.52	0.210	0.299		pCi/g	0.0552	3.03	83.3	30 - 110

Lab ID: 160-18554-16
Client ID: SU02-EXS-055-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV188
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.15	0.155	0.182		pCi/g	0.100	0.0341	268483
Thorium-232	1.07	0.148	0.173		pCi/g	0.100	0.0155	268483

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.67	0.221	0.315		pCi/g	0.0300	3.03	88.0	30 - 110

Lab ID: 160-18554-17
Client ID: SU02-EXB-056-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV189
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.993	0.141	0.164		pCi/g	0.100	0.0399	268484
Thorium-232	1.24	0.157	0.188		pCi/g	0.100	0.0363	268484

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.63	0.212	0.306		pCi/g	0.0156	3.03	86.6	30 - 110

Lab ID: 160-18554-18
Client ID: SU02-EXB-057-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV190
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.20	0.150	0.181		pCi/g	0.100	0.0141	268485
Thorium-232	1.23	0.152	0.184		pCi/g	0.100	0.0140	268485

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.74	0.217	0.316		pCi/g	0.0368	3.03	90.7	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: 160-18554-19
Client ID: SU02-EXW-047-SS-DUP-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV191
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.604	0.106	0.117		pCi/g	0.100	0.0336	268486
Thorium-232	0.694	0.113	0.127		pCi/g	0.100	0.0365	268486

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	3.10	0.241	0.355		pCi/g	0.0307	3.03	103	30 - 110

Lab ID: 160-18554-20
Client ID: SU02-EXB-049-SS-DUP-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV193
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.671	0.115	0.128		pCi/g	0.100	0.0148	268487
Thorium-232	0.892	0.133	0.153		pCi/g	0.100	0.0323	268487

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.72	0.220	0.317		pCi/g	0.0292	3.02	89.9	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-266565/1-A	Thorium-230			0.09373		pCi/g							4.36243907
MB 160-266565/1-A	Thorium-232			0.004736	U	pCi/g							.99911917

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-266565/2-A	Thorium-230		24.5	25.18		pCi/g	103	81 - 118					.4226744371

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-18554-14	Thorium-230	1.30		1.307		pCi/g			0.9	0.03	0.08	1	
160-18554-14	Thorium-232	1.23		1.056		pCi/g			15	0.49	1.37	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Batch Number: 266565 Batch Start Date: 08/25/16 15:54 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 08/31/16 11:14

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00021	TRM-2 00001	AnalysisComment		
MB 160-266565/1		ExtChrom, A-01-R		1.0 g	0.1 mL				
LCS 160-266565/2		ExtChrom, A-01-R		0.5006 g	0.1 mL	0.5006 g	TRM		
160-18554-A-14-A	SU02-EXB-053-SS-P-00	ExtChrom, A-01-R	T	0.9994 g	0.1 mL				
160-18554-A-14-A DU	SU02-EXB-053-SS-P-00	ExtChrom, A-01-R	T	1.0006 g	0.1 mL				
160-18554-A-15-A	SU02-EXB-054-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18554-A-16-A	SU02-EXS-055-SS-P-00	ExtChrom, A-01-R	T	0.9990 g	0.1 mL				
160-18554-A-17-A	SU02-EXB-056-SS-P-00	ExtChrom, A-01-R	T	0.9988 g	0.1 mL				
160-18554-A-18-A	SU02-EXB-057-SS-P-00	ExtChrom, A-01-R	T	1.0007 g	0.1 mL				
160-18554-A-19-A	SU02-EXW-047-SS-DUP-P-00	ExtChrom, A-01-R	T	1.0002 g	0.1 mL				
160-18554-A-20-A	SU02-EXB-049-SS-DUP-P-00	ExtChrom, A-01-R	T	1.0012 g	0.1 mL				

Batch Notes	
Balance ID	0034150065
Analyst ID - Column	nmn per scb
Column Date	8/30/16
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	8/31/16
Pipette ID	rad104
Analyst ID - Reagent Drop Witness	rjs
Analyst ID - Reagent Drop	ats
SOP Number	st-rc-0003, st-rc-0004, st-rc-0100, st-rc-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:27PM 9/7/2016

Sample

Sample Name: MB 160-266565/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-266565/1-A
Sample Collection Date: 8/31/2016 11:21:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176260
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

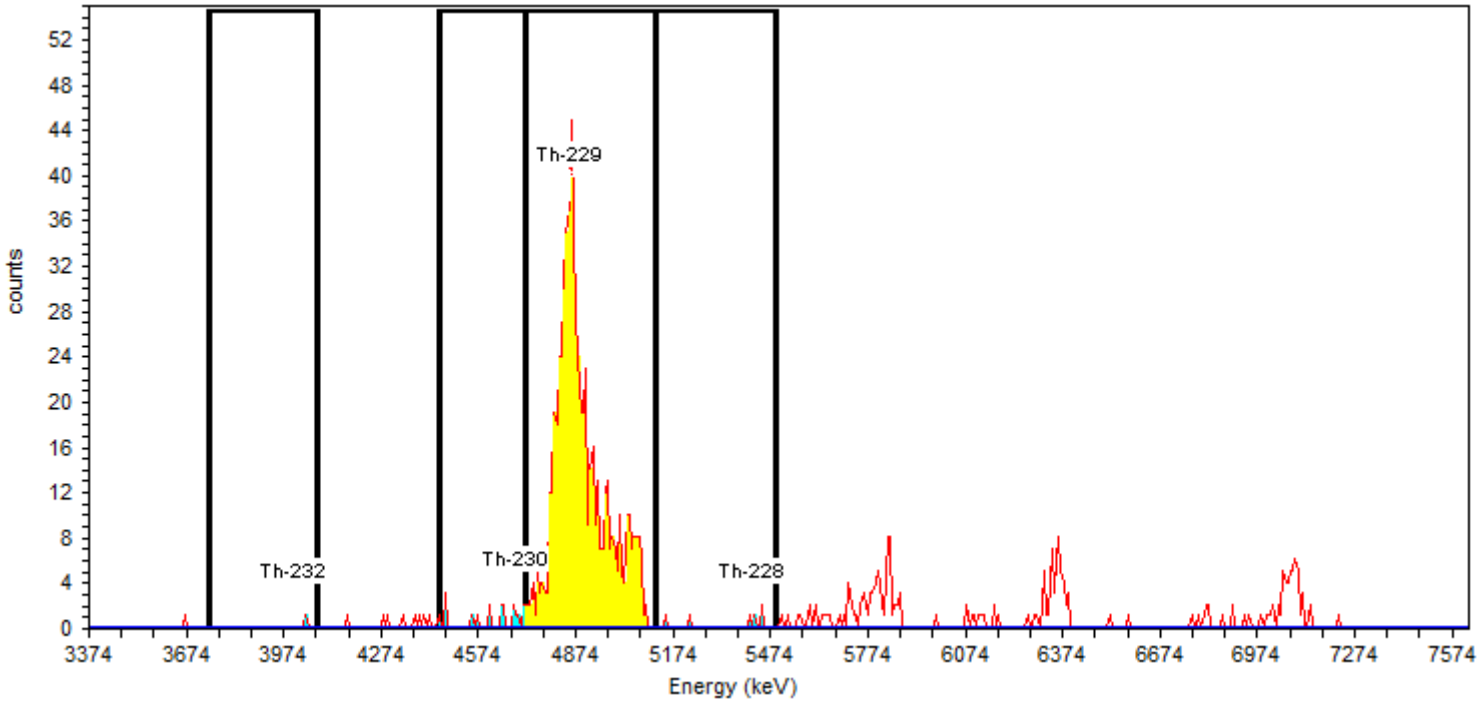
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.52%

Acquisition

Detector: AV171 SN: 50-112 Y2
Acquisition Start Date: 9/7/2016 2:38:43PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV171; Det: AV171; Spectrum #1; 9/1/2016 3:17:13 PM

Energy Calibration: IC-9817;AV171-20151016
Efficiency Calibration:IC-9817;AV171-20151016
Calibration Date: 10/17/2015 2:36:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.59% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	9.8	100.2	1	0.0000	1.00	4.736E-003	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.3	99.7	20	0.0000	19.69	9.373E-002	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.6	99.6	637	1.2500	635.75	2.923E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	10.0	99.8	6	5.8333	0.17	7.929E-004	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:57PM 9/7/2016

Sample

Sample Name: LCS 160-266565/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-266565/2-A
Sample Collection Date: 8/31/2016 11:21:00AM
Comment:

Sample Weight : 0.50 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176264
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

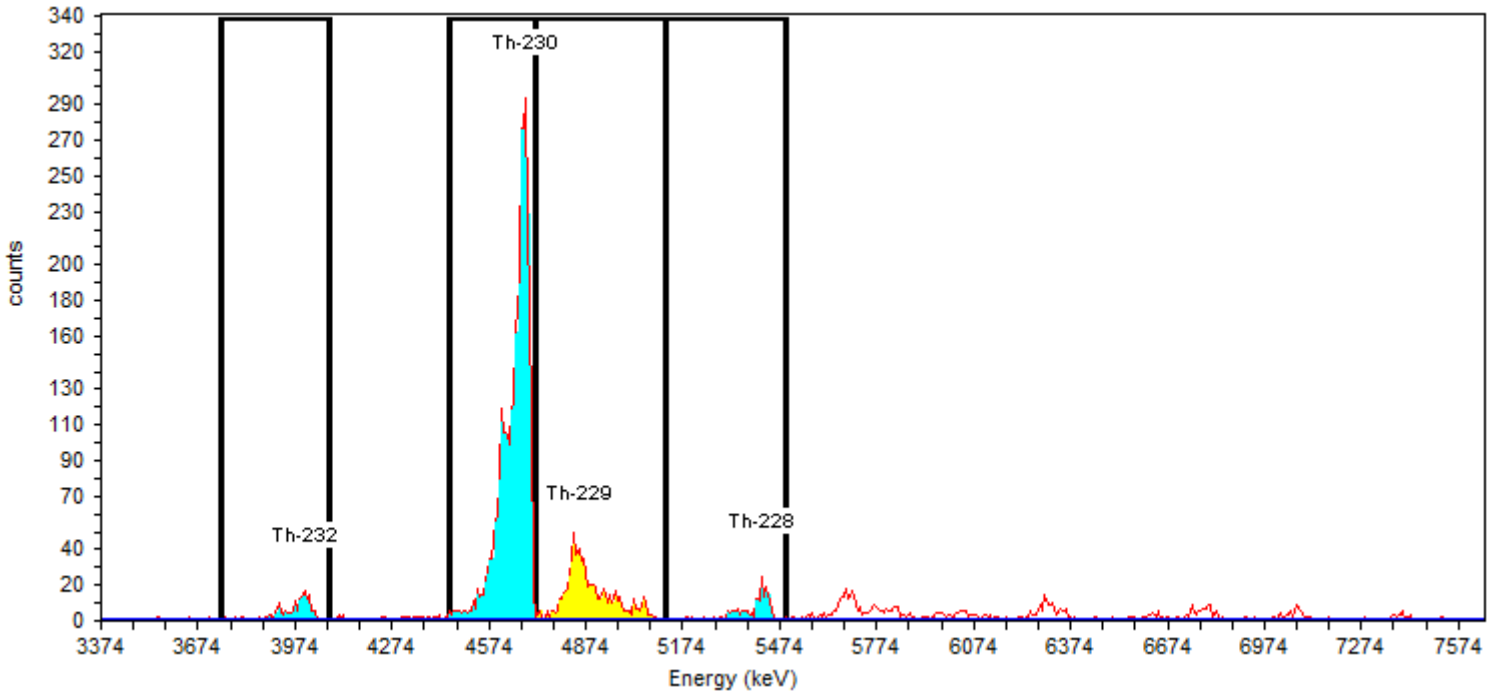
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.96%

Acquisition

Detector: AV172 SN: 50-112 Y3
Acquisition Start Date: 9/7/2016 2:38:44PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV172; Det: AV172; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-9884;AV172-20151016
Efficiency Calibration:IC-9884;AV172-20151016
Calibration Date: 10/17/2015 2:36:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	65.5	100.2	133	0.4167	132.58	1.262E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.2	99.7	2632	0.0000	2632.14	2.518E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.6	99.6	633	1.2500	631.81	5.866E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	145	5.0000	139.91	1.338E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:49PM 9/7/2016

Sample

Sample Name: 160-18554-A-14-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-14-C
Sample Collection Date: 8/8/2016 1:28:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176263
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

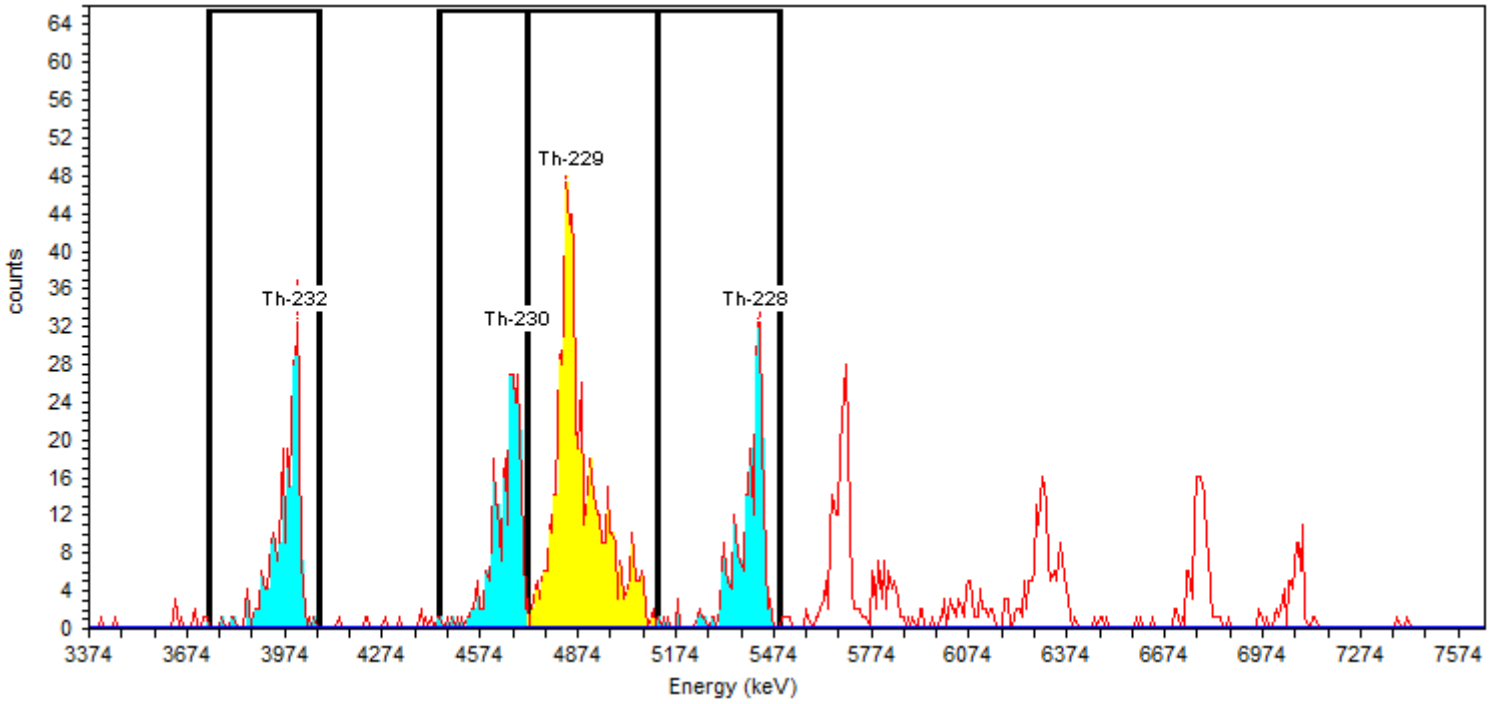
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.32%

Acquisition

Detector: AV173 SN: 50-112 Y4
Acquisition Start Date: 9/7/2016 2:38:44PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:27AM
Bkgd Info: Sample: ICB;AV173; Det: AV173; Spectrum #1; 9/2/2016 10:55:27 AM

Energy Calibration: IC-9885;AV173-20151016a
Efficiency Calibration:IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.59% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.5	100.2	265	0.0000	265.00	1.222E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.7	99.7	277	0.8333	276.07	1.280E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.0	99.6	654	0.4433	653.40	2.888E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.9	99.8	275	7.9433	267.08	2.746E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:30AM 9/8/2016

Sample

Sample Name: 160-18554-A-14-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-14-C
Sample Collection Date: 8/8/2016 1:28:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176278
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

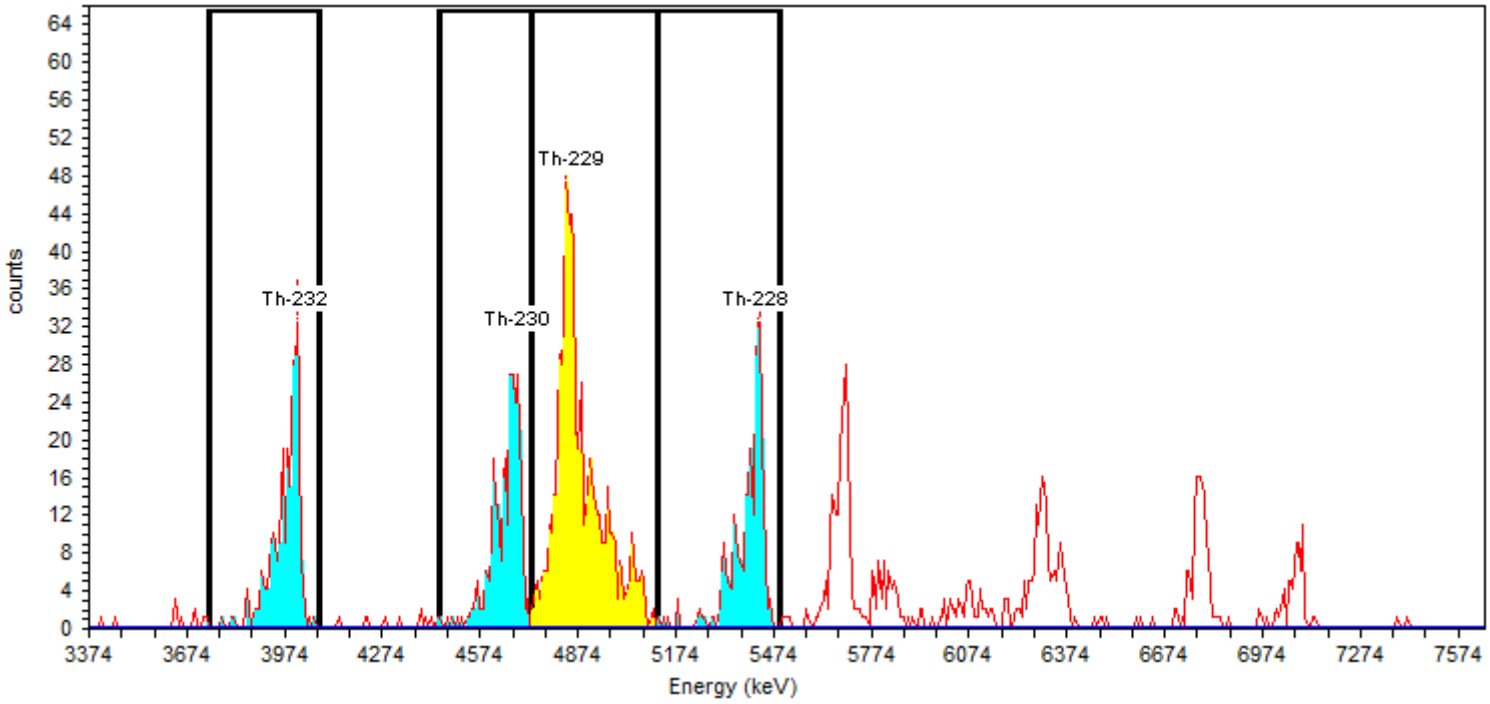
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 94.85%

Acquisition

Detector: AV173 SN: 50-112 Y4
Acquisition Start Date: 9/7/2016 2:38:44PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:27AM
Bkgd Info: Sample: ICB;AV173; Det: AV173; Spectrum #1; 9/2/2016 10:55:27 AM

Energy Calibration: IC-9885;AV173-20151016a
Efficiency Calibration:IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.59% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/08/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.5	100.2	265	0.0000	265.00	1.228E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	44.2	99.7	279	0.8333	278.17	1.296E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	68.0	99.6	651	0.8333	650.17	2.874E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.9	99.8	275	7.9433	267.08	2.760E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:42PM 9/7/2016

Sample

Sample Name: 160-18554-A-14-D DU Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-14-D DU
Sample Collection Date: 8/8/2016 1:28:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176262
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

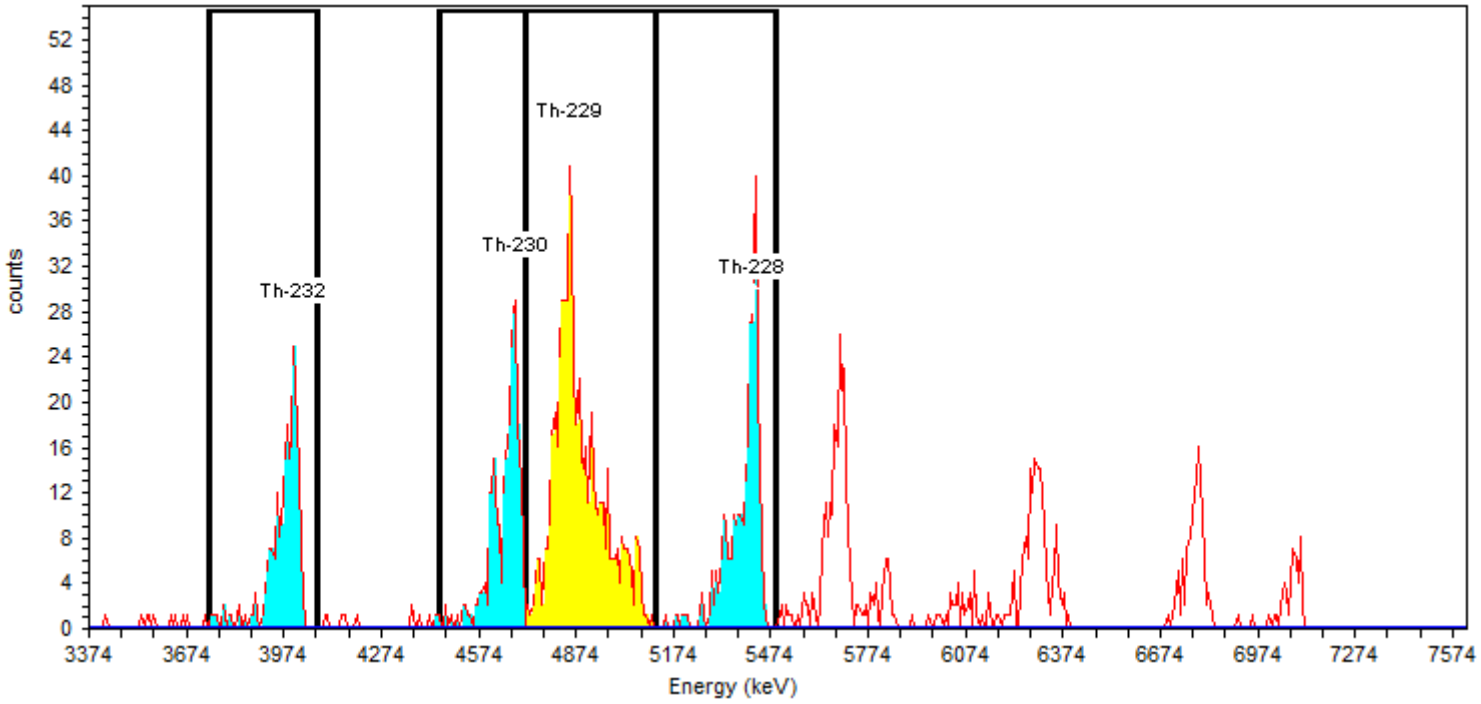
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.47%

Acquisition

Detector: AV175 SN: 50-117H1
Acquisition Start Date: 9/7/2016 2:38:44PM
Live Time: 400.00 min.
Real Time: 400.07 min.
Background Date: 9/1/2016 3:17:07PM
Bkgd Info: Sample: ICB;AV175; Det: AV175; Spectrum #1; 9/1/2016 3:17:07 PM

Energy Calibration: IC-7107;AV175-20151017
Efficiency Calibration:IC-7107;AV175-20151017
Calibration Date: 10/17/2015 6:01:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.38% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.1	100.2	204	0.0000	204.43	1.056E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.1	99.7	253	1.2500	251.81	1.307E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	82.5	99.6	584	1.2500	582.81	2.496E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.8	99.8	281	3.7500	277.34	3.193E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:37:15PM 9/8/2016

Sample

Sample Name: 160-18554-A-15-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-15-C
Sample Collection Date: 8/8/2016 1:25:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176427
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

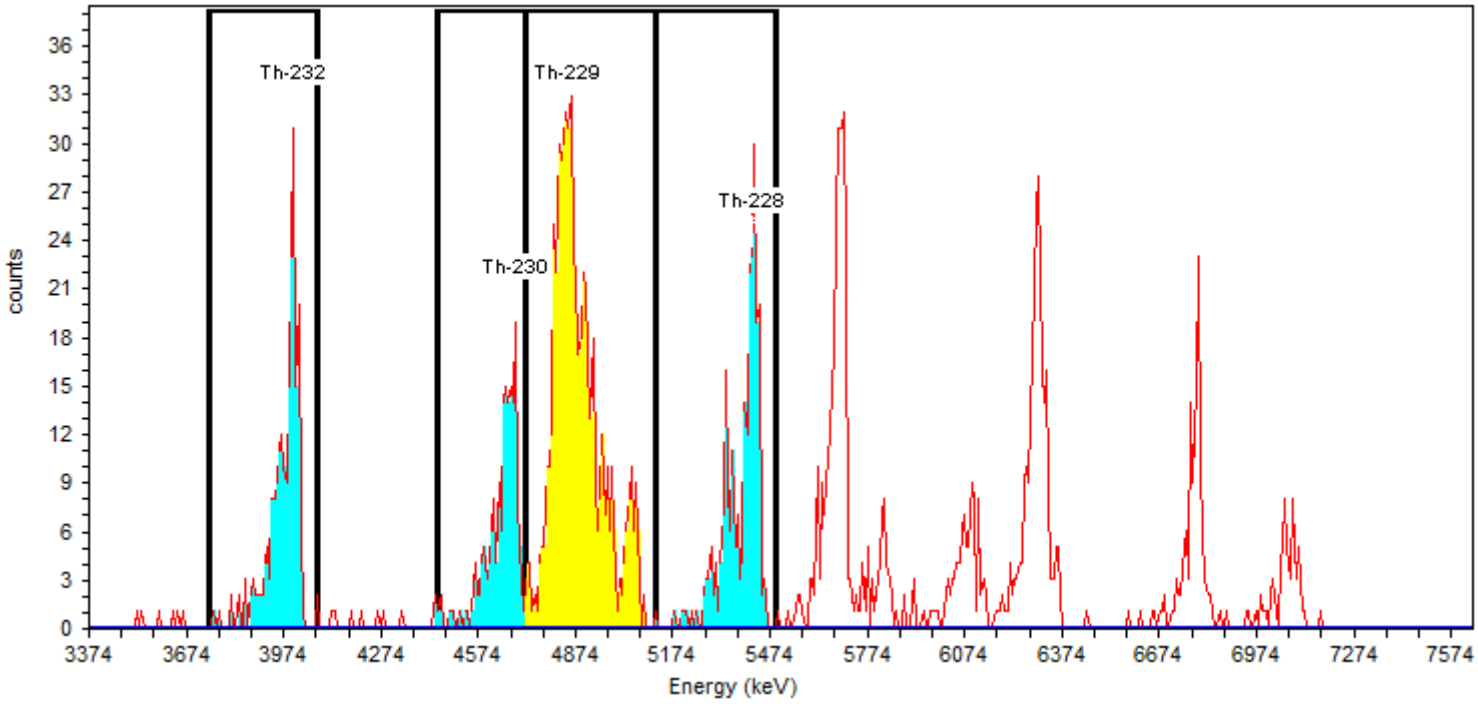
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.32%

Acquisition

Detector: AV147 SN: 50-05/R1
Acquisition Start Date: 9/8/2016 3:56:56PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:26PM
Bkgd Info: Sample: ICB;AV147; Det: AV147; Spectrum #1; 9/1/2016 3:17:26 PM

Energy Calibration: IC-7107;AV147-20151016
Efficiency Calibration:IC-7107;AV147-20151016
Calibration Date: 10/16/2015 6:46:39PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.20% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	57.9	100.2	213	0.4167	212.67	1.096E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.9	99.7	173	0.8333	172.54	8.933E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	117.4	99.6	591	6.2500	584.75	2.524E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.5	99.8	246	2.9167	243.11	1.259E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:03PM 9/7/2016

Sample

Sample Name: 160-18554-A-16-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-16-C
Sample Collection Date: 8/8/2016 12:33:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176245
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

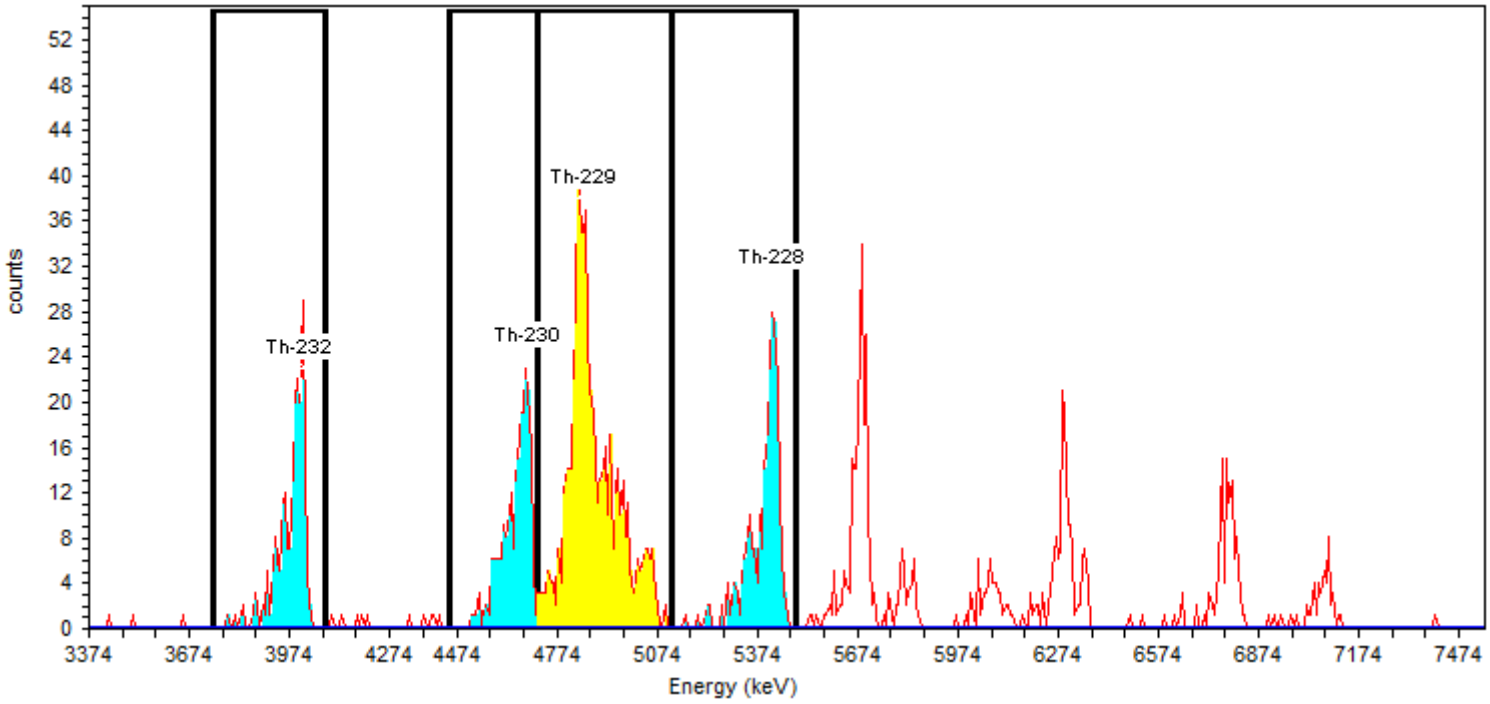
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.03%

Acquisition

Detector: AV188 SN: 50-110X4
Acquisition Start Date: 9/7/2016 2:38:44PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV188; Det: AV188; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-9886;AV188-20151017
Efficiency Calibration:IC-9886;AV188-20151017
Calibration Date: 10/17/2015 6:02:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.77% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.0	100.2	207	0.0000	207.00	1.068E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.4	99.7	222	0.8333	221.17	1.147E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.7	99.6	585	0.8333	584.17	2.669E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.7	99.8	240	5.8333	234.17	2.694E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:15PM 9/7/2016

Sample

Sample Name: 160-18554-A-17-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-17-C
Sample Collection Date: 8/8/2016 1:20:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176248
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

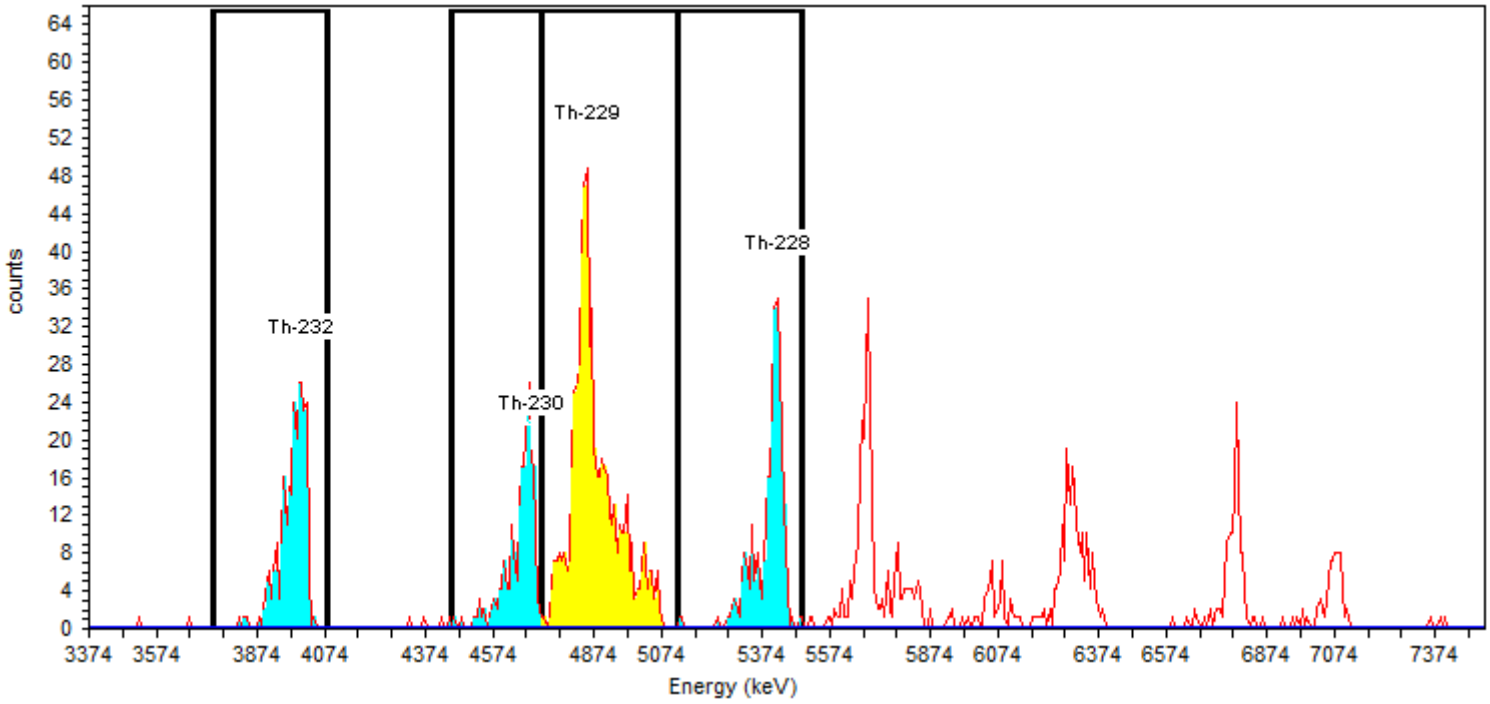
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.62%

Acquisition

Detector: AV189 SN: 50-112A3
Acquisition Start Date: 9/7/2016 2:38:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV189; Det: AV189; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-7107;AV189-20151017a
Efficiency Calibration:IC-7107;AV189-20151017a
Calibration Date: 10/18/2015 3:55:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.37% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	65.3	100.2	253	1.2500	251.75	1.240E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.3	99.7	202	1.6667	200.64	9.938E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.0	99.6	612	0.0266	611.97	2.626E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.9	99.8	266	6.6933	259.22	2.848E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:05PM 9/7/2016

Sample

Sample Name: 160-18554-A-18-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-18-C
Sample Collection Date: 8/8/2016 1:15:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176246
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

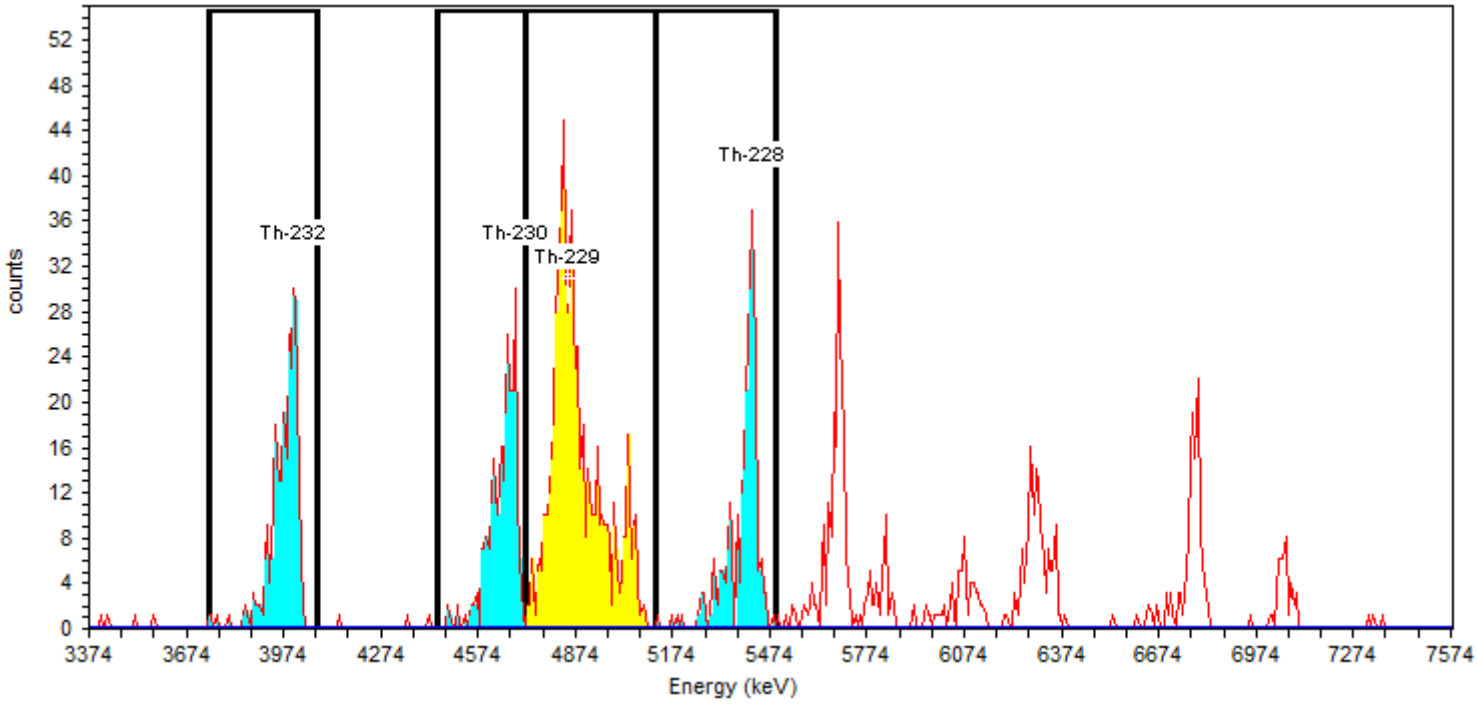
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.71%

Acquisition

Detector: AV190 SN: 50-119I7
Acquisition Start Date: 9/7/2016 2:38:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV190; Det: AV190; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-8874;AV190-20151017
Efficiency Calibration:IC-8874;AV190-20151017
Calibration Date: 10/18/2015 3:54:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.1	100.2	264	0.0000	264.00	1.232E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.5	99.7	256	0.0000	256.06	1.201E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.4	99.6	647	2.0833	644.98	2.745E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.2	99.8	265	6.6667	258.42	2.688E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:00PM 9/7/2016

Sample

Sample Name: 160-18554-A-19-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-19-C
Sample Collection Date: 8/8/2016 12:18:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176256
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

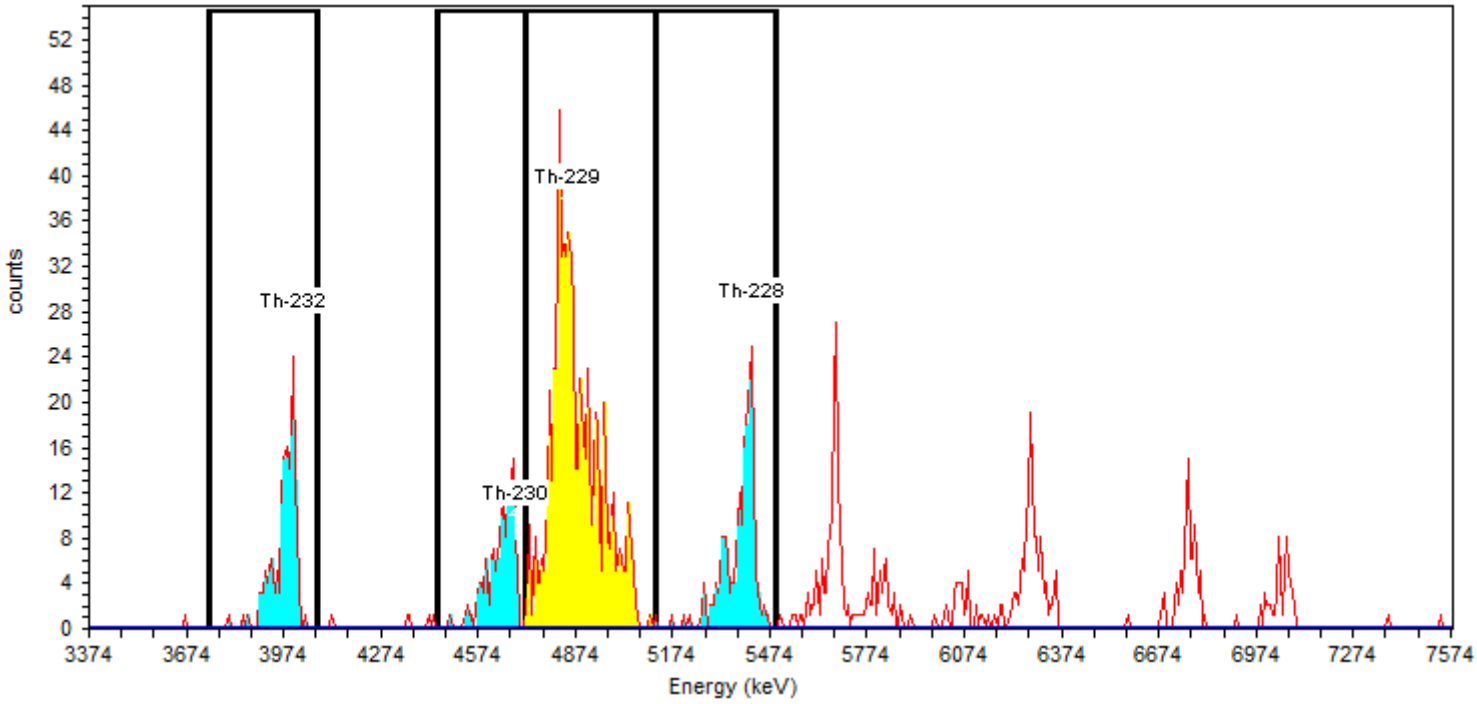
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 102.50%

Acquisition

Detector: AV191 SN: 50-112A2
Acquisition Start Date: 9/7/2016 2:38:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV191; Det: AV191; Spectrum #1; 9/1/2016 3:17:13 PM

Energy Calibration: IC-8875;AV191-20151017
Efficiency Calibration:IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.22% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	50.0	100.2	155	1.6667	153.33	6.939E-001	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.0	99.7	134	1.2500	132.84	6.045E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.4	99.6	666	0.8333	665.20	3.104E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.6	99.8	197	7.9167	189.02	1.908E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:46PM 9/7/2016

Sample

Sample Name: 160-18554-A-20-C Type: Sample
Spectrum #1 Analysis #1
: 160-18554-A-20-C
Sample Collection Date: 8/8/2016 1:22:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 266565
AnalysisResultsID: 176254
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

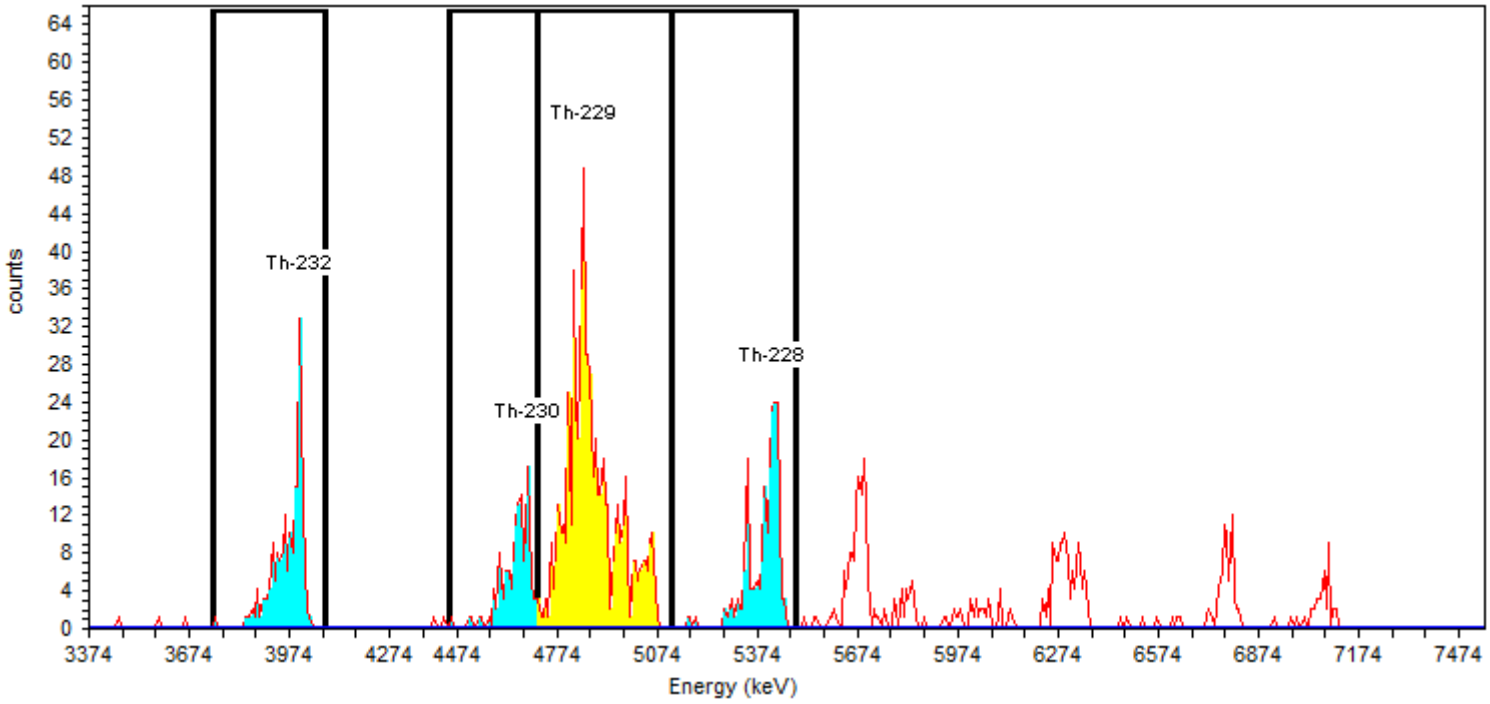
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.86%

Acquisition

Detector: AV193 SN: 50-119I5
Acquisition Start Date: 9/7/2016 2:38:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV193; Det: AV193; Spectrum #1; 9/1/2016 3:17:13 PM

Energy Calibration: IC-8877;AV193-20151017
Efficiency Calibration:IC-8877;AV193-20151017
Calibration Date: 10/18/2015 3:55:11PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.42% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	53.6	100.2	182	0.8333	181.59	8.922E-001	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.2	99.7	136	0.0000	135.94	6.715E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.8	99.6	613	0.8333	612.10	2.718E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.3	99.8	202	5.8333	196.17	2.149E+007	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 08/31/16

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV191	08/31/16 09:07	6012	5518.8-6099.7	Pass	14.7	10-20	Pass	220.8	217.0-227.0	Pass	5014	4982.9-5062.9	Pass
AV194	08/31/16 09:07	6007	5662.9-6259.0	Pass	15.6	10-20	Pass	221.9	217.3-227.3	Pass	5021	4984.8-5064.8	Pass
AV196	08/31/16 09:07	6006	5726.6-6329.4	Pass	15.5	10-20	Pass	223.1	217.5-227.5	Pass	5031	4986.6-5066.6	Pass
AV212	08/31/16 08:34	5992	5725.1-6327.8	Pass	16.0	10-20	Pass	219.0	214.1-224.1	Pass	5000	4961.1-5041.1	Pass
AV213	08/31/16 08:34	6002	5676.6-6274.2	Pass	15.8	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.3-5070.3	Pass
AV214	08/31/16 08:34	5933	5703.2-6303.5	Pass	12.3	10-20	Pass	224.0	218.0-228.0	Pass	5037	4989.8-5069.8	Pass
AV215	08/31/16 08:34	6011	5699.9-6299.9	Pass	14.7	10-20	Pass	224.0	219.0-229.0	Pass	5037	4997.8-5077.8	Pass
AV217	08/31/16 08:34	5831	5714.3-6315.8	Pass	12.4	10-20	Pass	216.9	212.0-222.0	Pass	4985	4945.0-5025.0	Pass
AV218	08/31/16 08:34	5994	5698.0-6297.8	Pass	15.7	10-20	Pass	222.9	218.5-228.5	Pass	5030	4993.7-5073.7	Pass
AV219	08/31/16 08:34	6026	5575.2-6162.1	Pass	13.3	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.1-5070.1	Pass
AV221	08/31/16 08:34	5670	5547.6-6131.6	Pass	13.5	10-20	Pass	224.1	218.4-228.4	Pass	5038	4993.3-5073.3	Pass

Analysis Date: 09/07/16

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV171	09/07/16 12:23	6021	5540.8-6124.1	Pass	14.1	10-20	Pass	222.9	219.0-229.0	Pass	5030	4997.8-5077.8	Pass
AV172	09/07/16 12:23	6021	5722.6-6324.9	Pass	14.3	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.0-5070.0	Pass
AV173	09/07/16 12:23	6023	5721.2-6323.5	Pass	15.0	10-20	Pass	219.8	216.0-226.0	Pass	5006	4975.4-5055.4	Pass
AV175	09/07/16 12:23	6011	5634.8-6228.0	Pass	14.3	10-20	Pass	221.0	216.0-226.0	Pass	5015	4975.4-5055.4	Pass
AV188	09/07/16 12:23	6022	5548.7-6132.8	Pass	13.7	10-20	Pass	221.0	216.0-226.0	Pass	5015	4974.8-5054.8	Pass
AV189	09/07/16 12:23	6023	5679.0-6276.8	Pass	14.3	10-20	Pass	224.0	219.0-229.0	Pass	5038	4997.2-5077.2	Pass
AV190	09/07/16 12:23	6011	5670.8-6267.7	Pass	14.4	10-20	Pass	223.0	218.3-228.3	Pass	5030	4992.2-5072.2	Pass
AV191	09/07/16 12:23	6005	5518.8-6099.7	Pass	15.5	10-20	Pass	221.0	217.0-227.0	Pass	5015	4982.9-5062.9	Pass
AV193	09/07/16 12:23	6016	5571.4-6157.9	Pass	14.4	10-20	Pass	222.0	217.1-227.1	Pass	5023	4983.4-5063.4	Pass
AV218	09/07/16 12:53	6002	5698.0-6297.8	Pass	19.5	10-20	Pass	221.9	218.5-228.5	Pass	5022	4993.7-5073.7	Pass
AV219	09/07/16 12:28	6021	5575.2-6162.1	Pass	14.6	10-20	Pass	223.1	218.0-228.0	Pass	5031	4990.1-5070.1	Pass
AV220	09/07/16 12:29	6010	5700.1-6300.1	Pass	19.5	10-20	Pass	220.9	216.5-226.5	Pass	5014	4978.7-5058.7	Pass
AV221	09/07/16 12:29	5867	5547.6-6131.6	Pass	13.0	10-20	Pass	223.0	218.4-228.4	Pass	5030	4993.3-5073.3	Pass
AV222	09/07/16 12:29	6024	5709.0-6309.9	Pass	14.3	10-20	Pass	223.1	219.0-229.0	Pass	5030	4997.7-5077.7	Pass

Analysis Date: 09/08/16

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV147	09/08/16 10:49	6017	5615.2-6206.3	Pass	14.8	10-20	Pass	217.1	213.0-223.0	Pass	4986	4952.9-5032.9	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:41:12AM 9/9/2016

Sample

Sample Name: Pulser;AV147
Comment:

Spectrum #2 Analysis #1

Batch

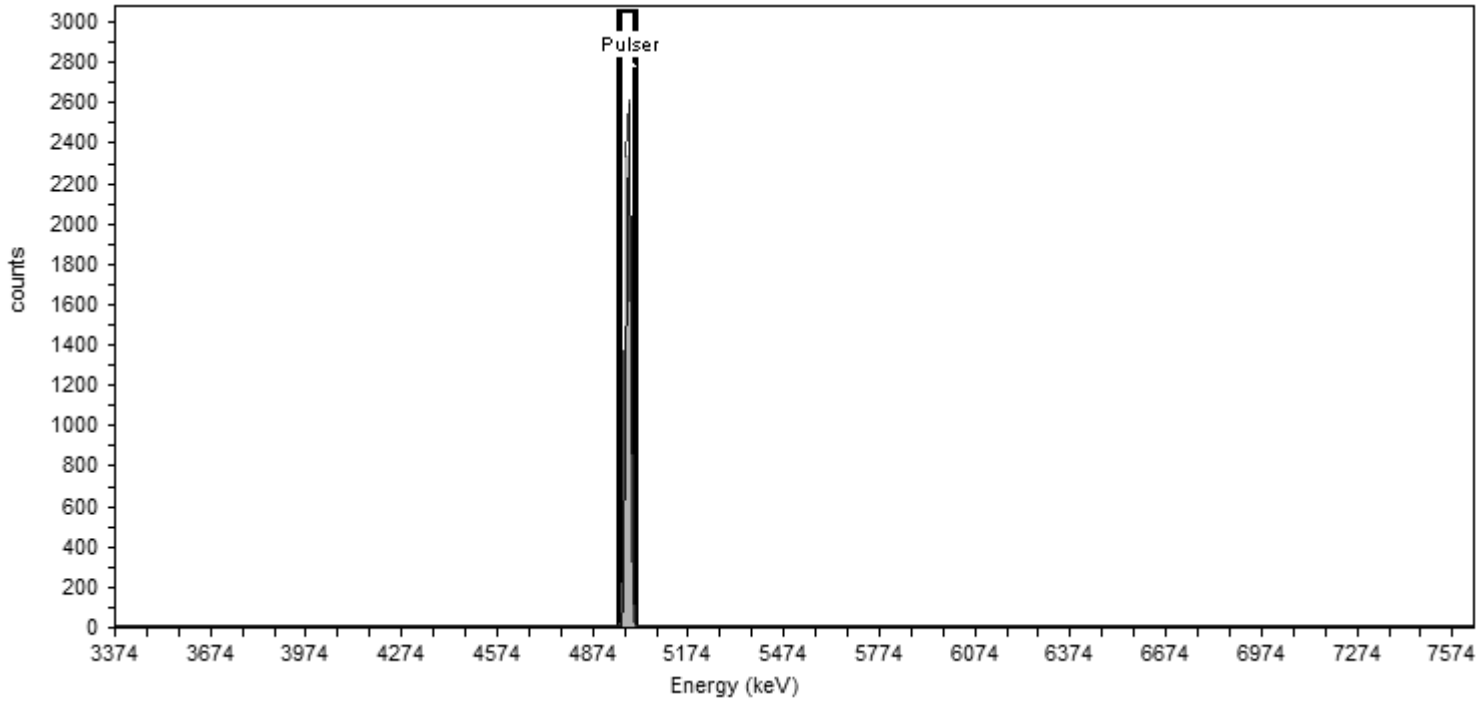
Batch Name: August2016a
Description:

Acquisition

Detector: AV147 , SN: 50-05/R1
Acquisition Start Date: 9/8/2016 10:49:46AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV147-20151016
Calibration Date: 10/16/2015 6:46:39PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4986.030	4960.795	5011.265	14.83	5,561.20	6,016.78

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:35PM 9/7/2016

Sample

Sample Name: Pulser;AV171
Comment:

Spectrum #1 Analysis #1

Batch

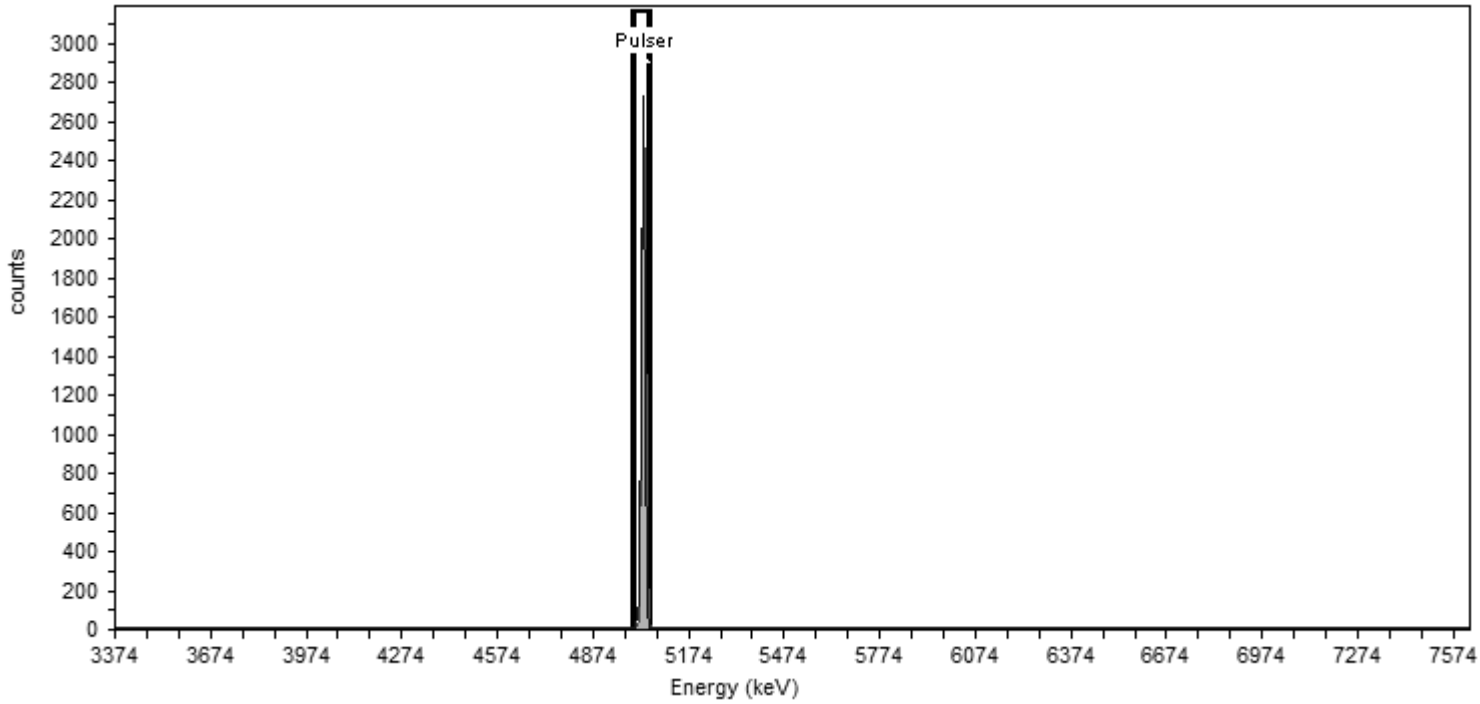
Batch Name: August2016a
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 9/7/2016 12:23:11PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV171-20151016
Calibration Date: 10/17/2015 2:36:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.579	5005.617	5053.541	14.08	5,516.13	6,020.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:36PM 9/7/2016

Sample

Sample Name: Pulser;AV172
Comment:

Spectrum #1 Analysis #1

Batch

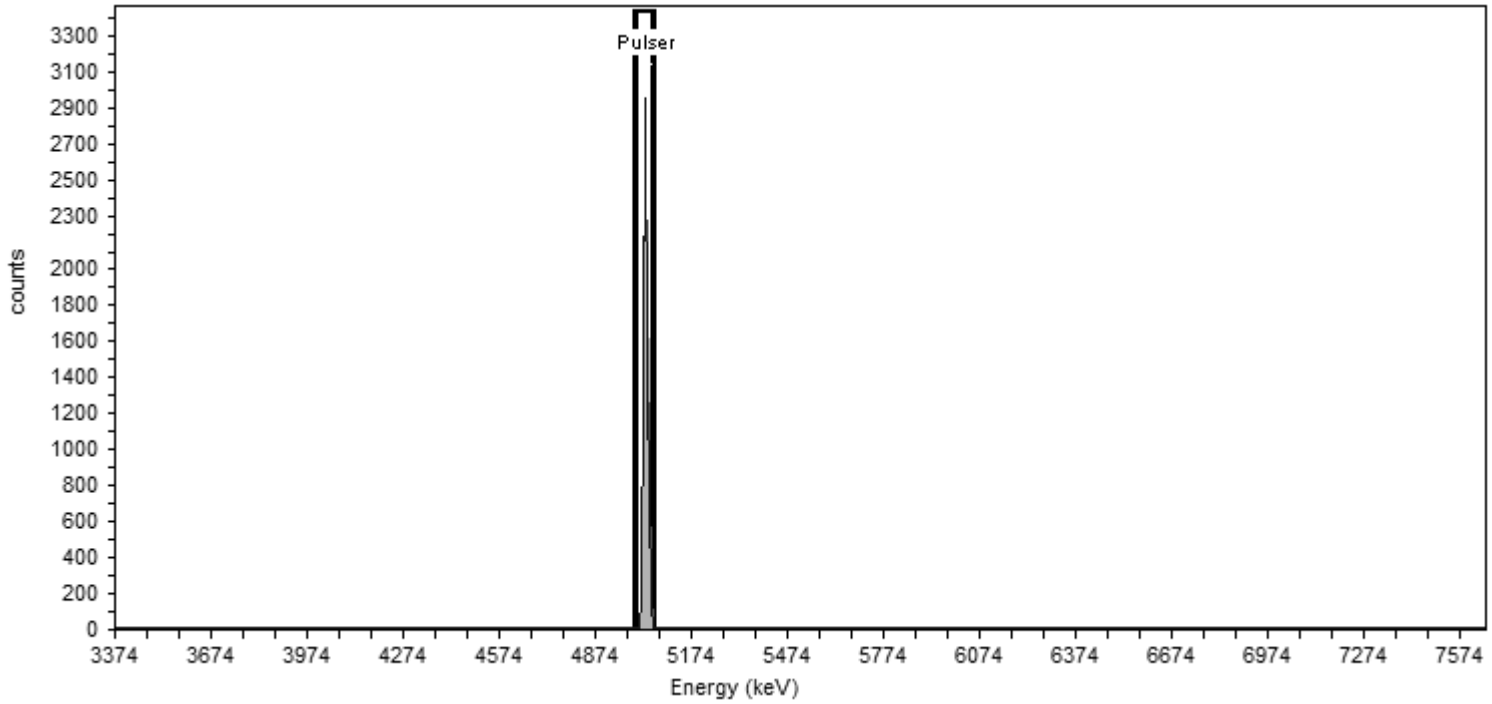
Batch Name: August2016a
Description:

Acquisition

Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 9/7/2016 12:23:11PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV172-20151016
Calibration Date: 10/17/2015 2:36:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.860	5005.553	5054.168	14.28	6,040.91	6,021.17

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:38PM 9/7/2016

Sample

Sample Name: Pulser;AV173
Comment:

Spectrum #1 Analysis #1

Batch

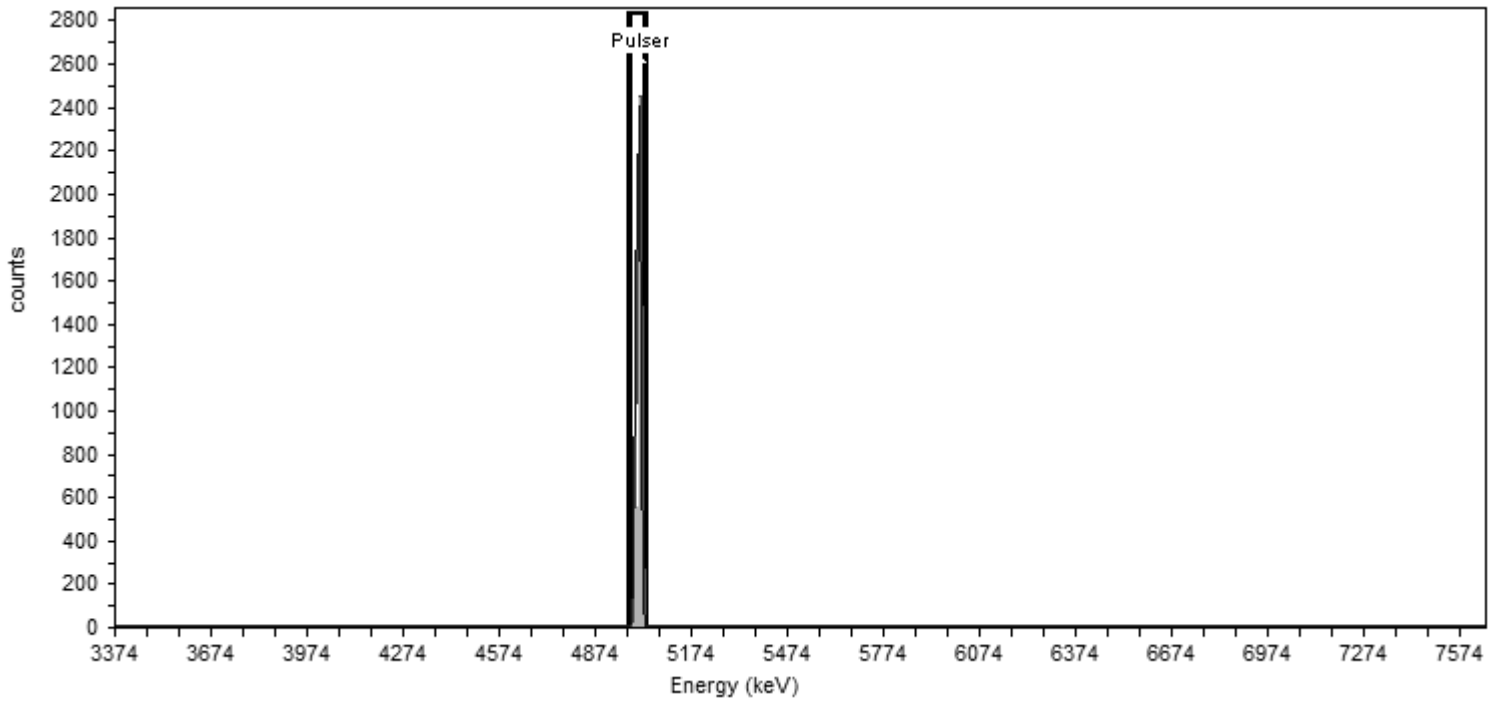
Batch Name: August2016a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 9/7/2016 12:23:11PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5006.411	4980.922	5031.899	14.97	5,268.01	6,022.61

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:40PM 9/7/2016

Sample

Sample Name: Pulser;AV175
Comment:

Spectrum #1 Analysis #1

Batch

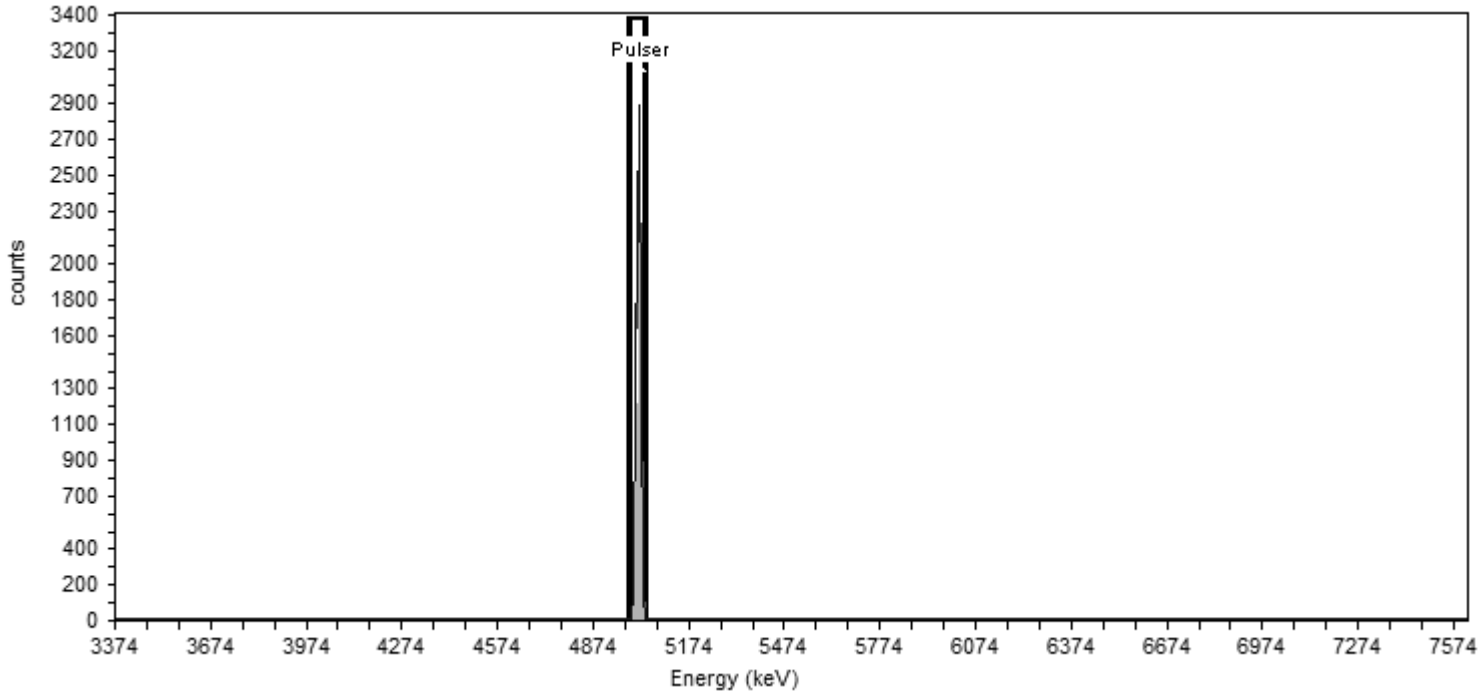
Batch Name: August2016a
Description:

Acquisition

Detector: AV175 , SN: 50-117H1
Acquisition Start Date: 9/7/2016 12:23:12PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV175-20151017
Calibration Date: 10/17/2015 6:01:46PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.979	4990.556	5039.401	14.35	5,958.79	6,011.25

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:58PM 9/7/2016

Sample

Sample Name: Pulser;AV188
Comment:

Spectrum #1 Analysis #1

Batch

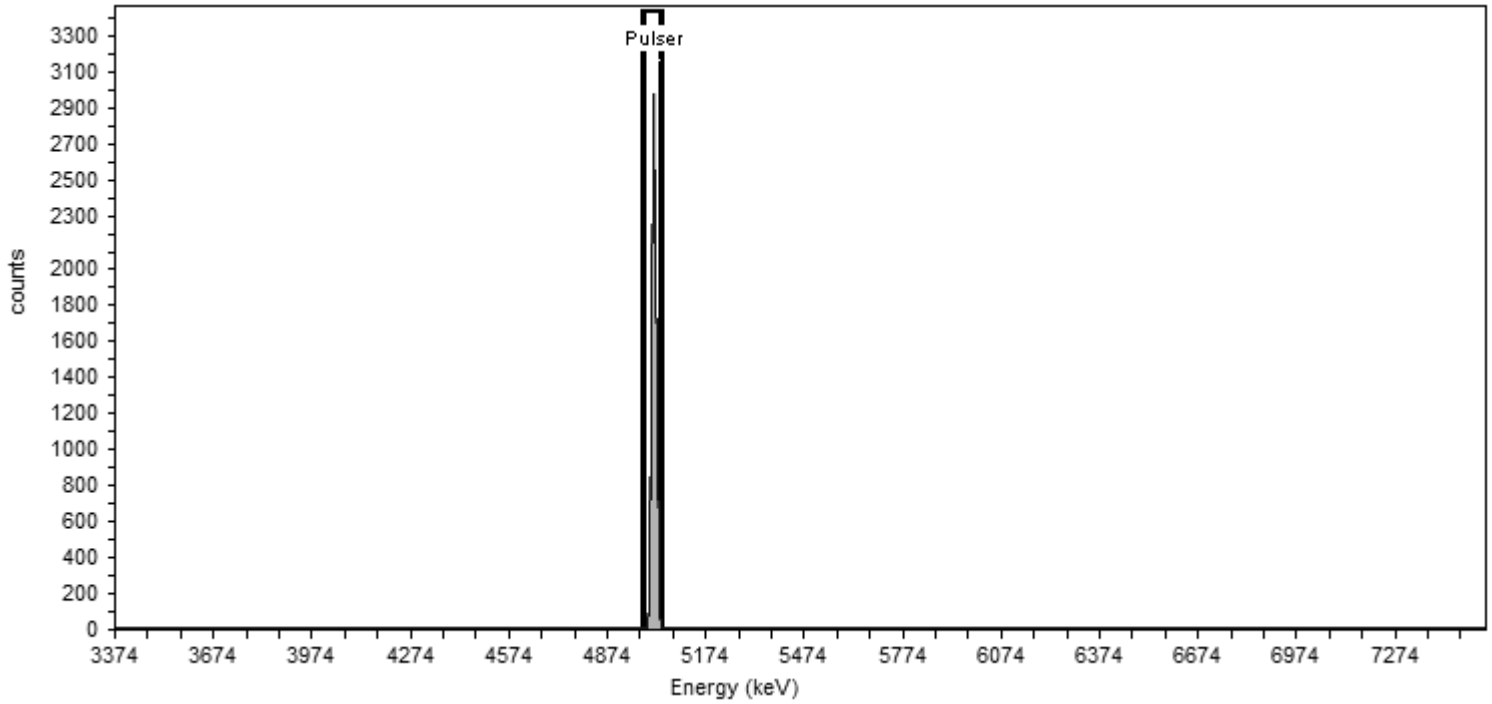
Batch Name: August2016b
Description:

Acquisition

Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 9/7/2016 12:23:17PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV188-20151017
Calibration Date: 10/17/2015 6:02:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.108	4991.780	5038.437	13.71	5,850.54	6,021.62

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:26:00PM 9/7/2016

Sample

Sample Name: Pulser;AV189
Comment:

Spectrum #1 Analysis #1

Batch

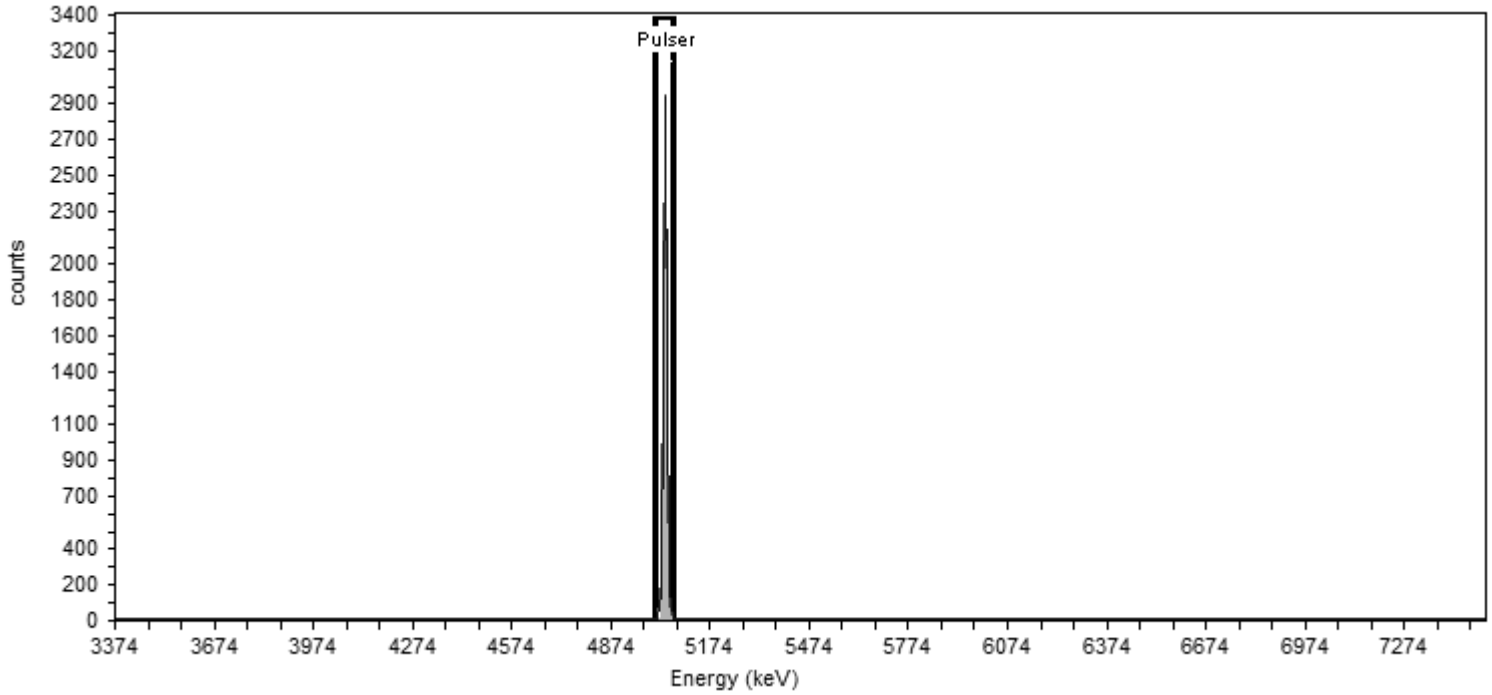
Batch Name: August2016b
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 9/7/2016 12:23:18PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV189-20151017a
Calibration Date: 10/18/2015 3:55:37PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.680	5013.348	5062.012	14.30	6,038.84	6,023.49

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:26:01PM 9/7/2016

Sample

Sample Name: Pulser;AV190
Comment:

Spectrum #1 Analysis #1

Batch

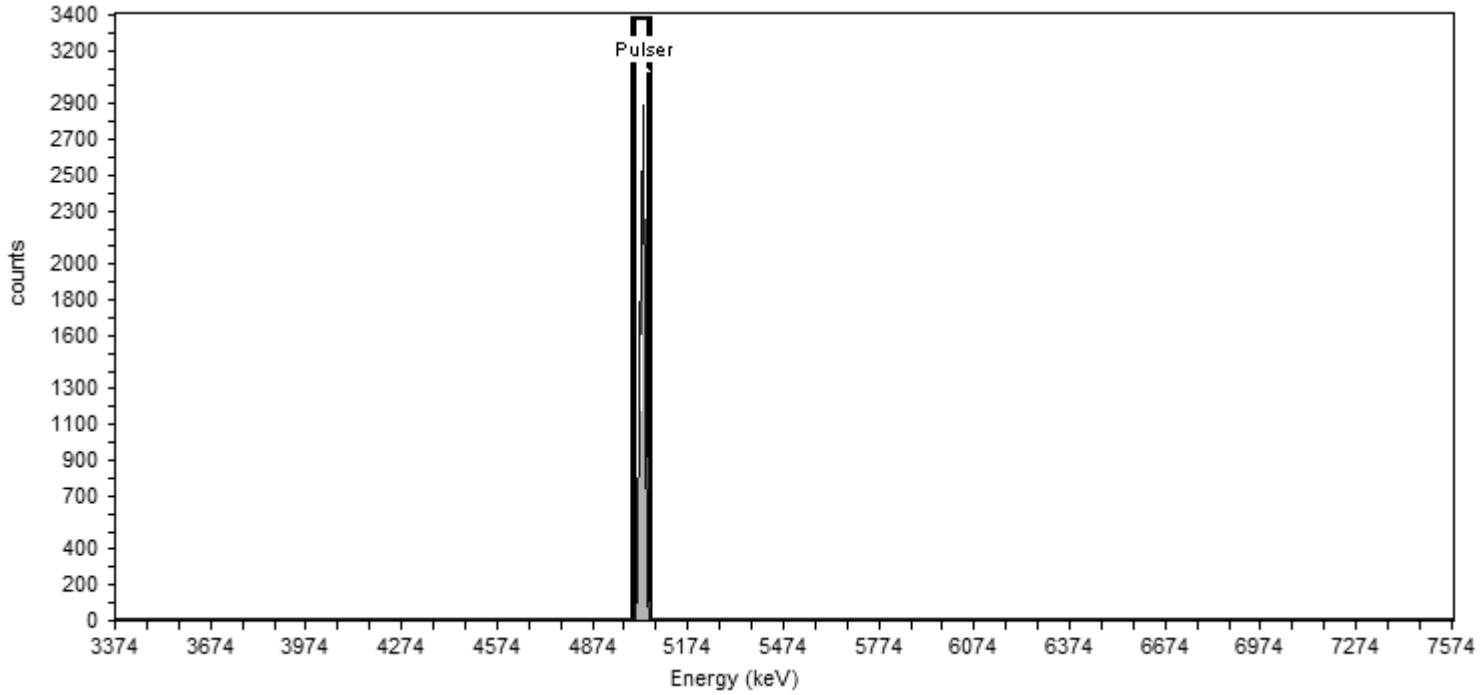
Batch Name: August2016b
Description:

Acquisition

Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 9/7/2016 12:23:18PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV190-20151017
Calibration Date: 10/18/2015 3:54:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.815	5005.304	5054.327	14.40	5,976.31	6,011.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:46AM 8/31/2016

Sample

Sample Name: Pulser;AV191
Comment:

Spectrum #28 Analysis #1

Batch

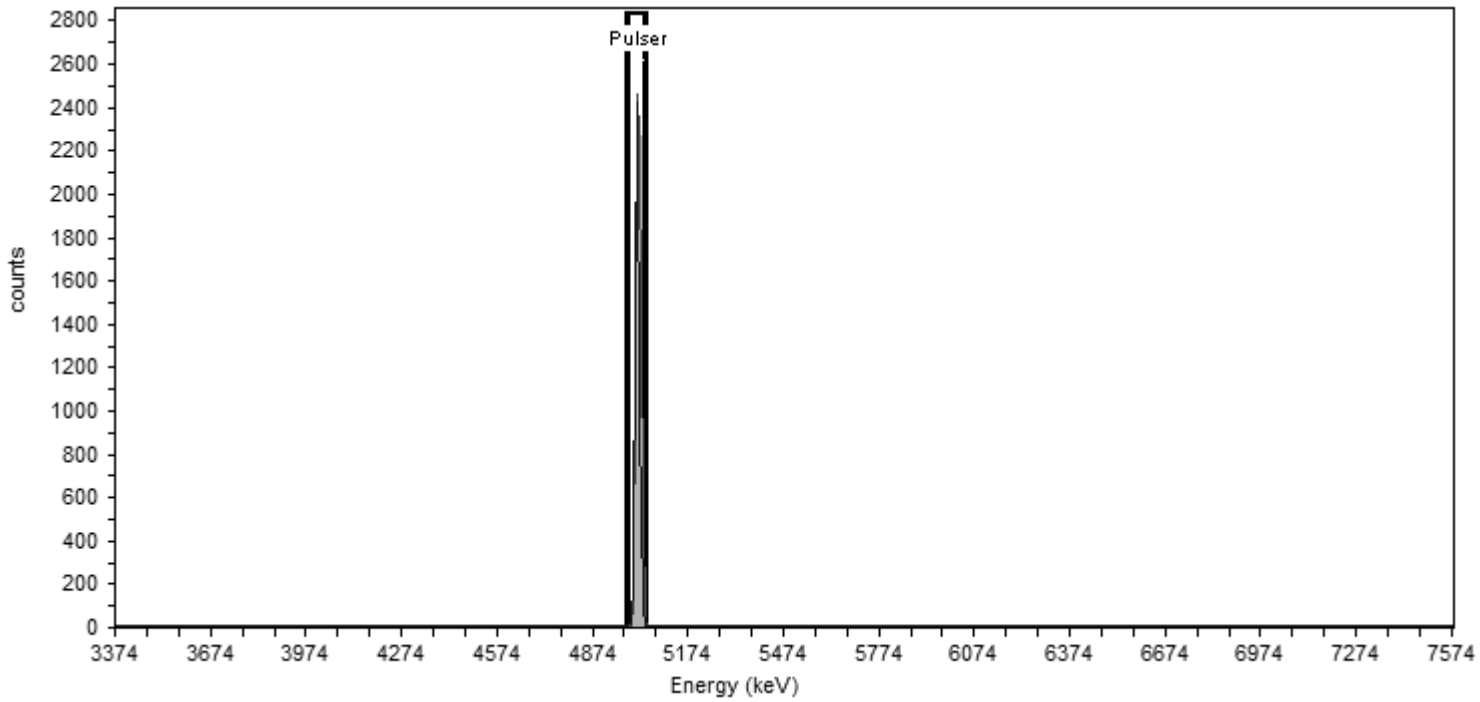
Batch Name: July2016b
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 8/31/2016 9:07:08AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5013.901	4988.816	5038.985	14.74	5,209.85	6,011.83

TestAmerica
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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:43PM 9/7/2016

Sample

Sample Name: Pulser;AV191
Comment:

Spectrum #1 Analysis #1

Batch

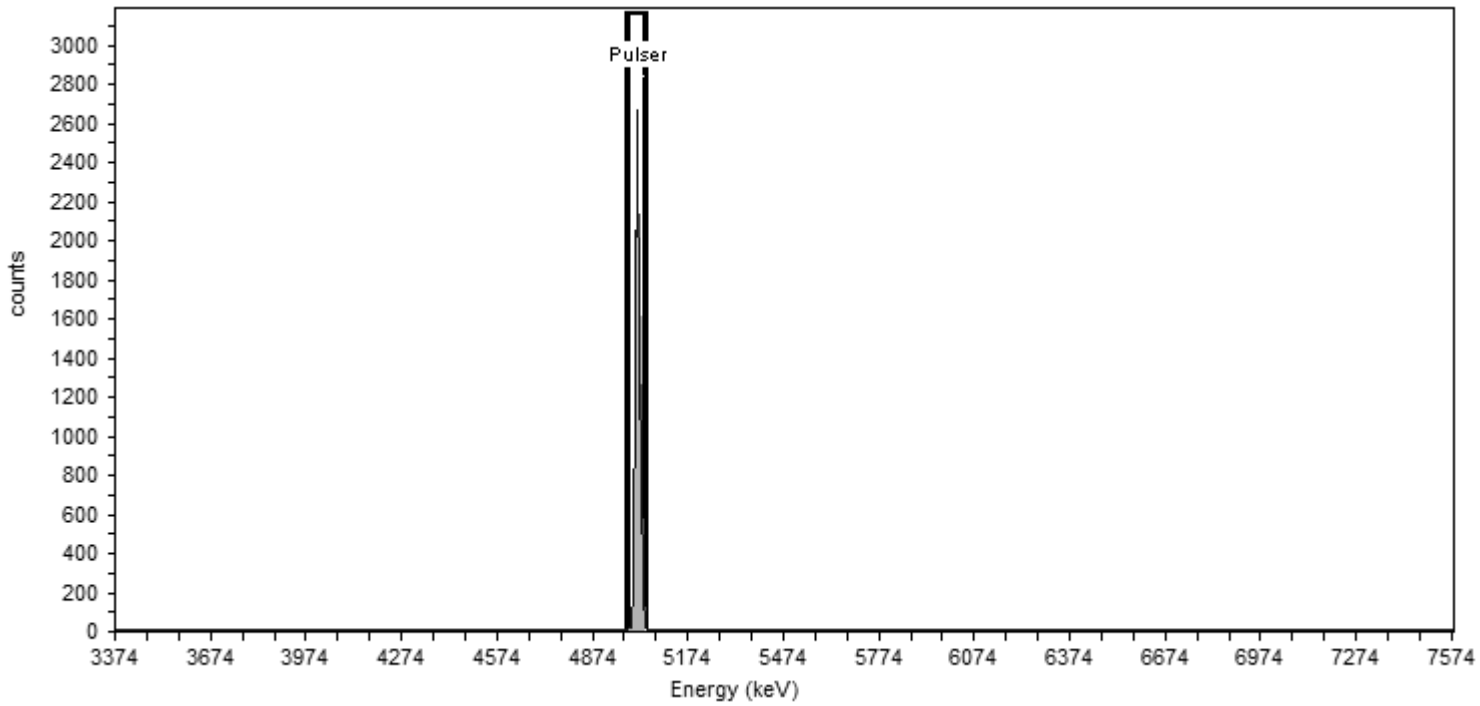
Batch Name: August2016b
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 9/7/2016 12:23:18PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.910	4988.542	5041.278	15.49	5,919.46	6,004.51

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:42PM 9/7/2016

Sample

Sample Name: Pulser;AV193
Comment:

Spectrum #1 Analysis #1

Batch

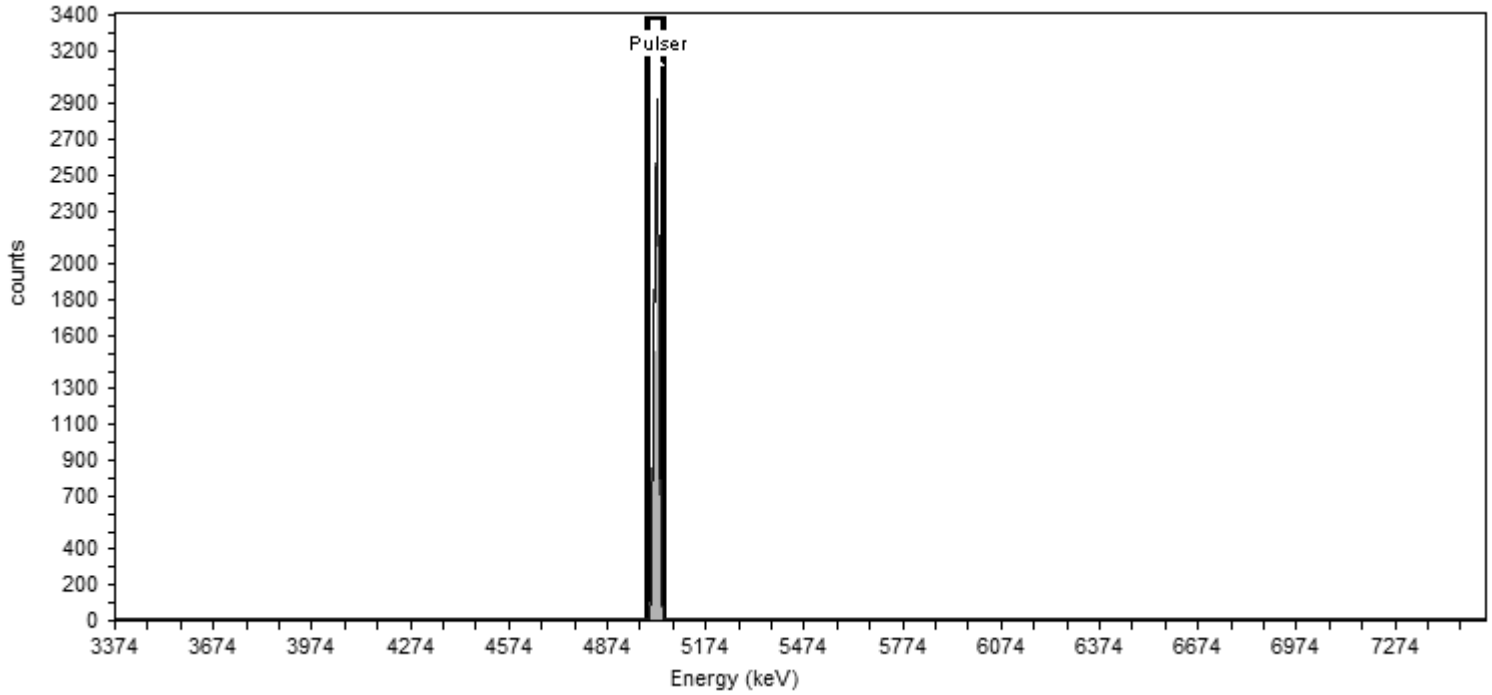
Batch Name: August2016b
Description:

Acquisition

Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 9/7/2016 12:23:18PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV193-20151017
Calibration Date: 10/18/2015 3:55:11PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.585	4997.990	5047.179	14.45	6,052.34	6,016.30

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:48AM 8/31/2016

Sample

Sample Name: Pulser;AV194
Comment:

Spectrum #29 Analysis #1

Batch

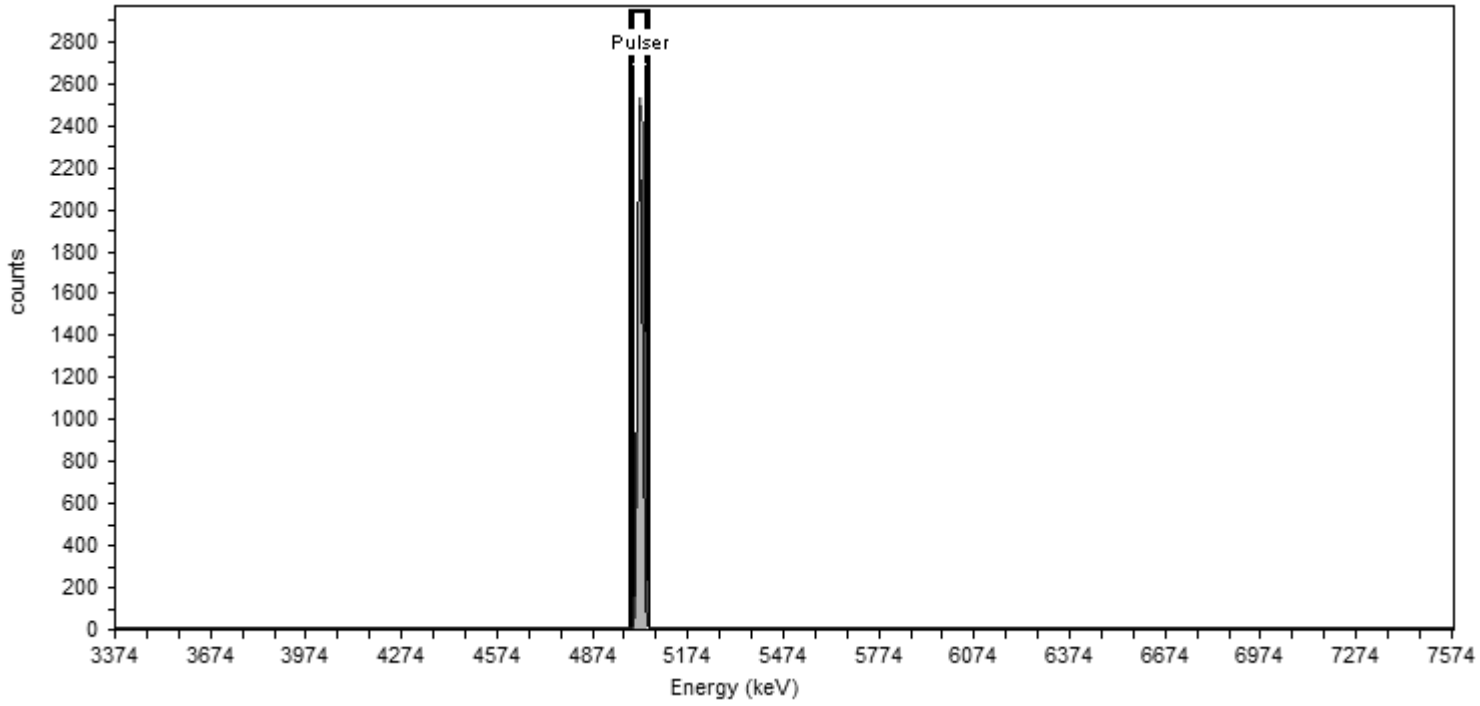
Batch Name: July2016b
Description:

Acquisition

Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 8/31/2016 9:07:08AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.467	4994.979	5047.955	15.56	5,643.74	6,006.94

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:50AM 8/31/2016

Sample

Sample Name: Pulser;AV196
Comment:

Spectrum #28 Analysis #1

Batch

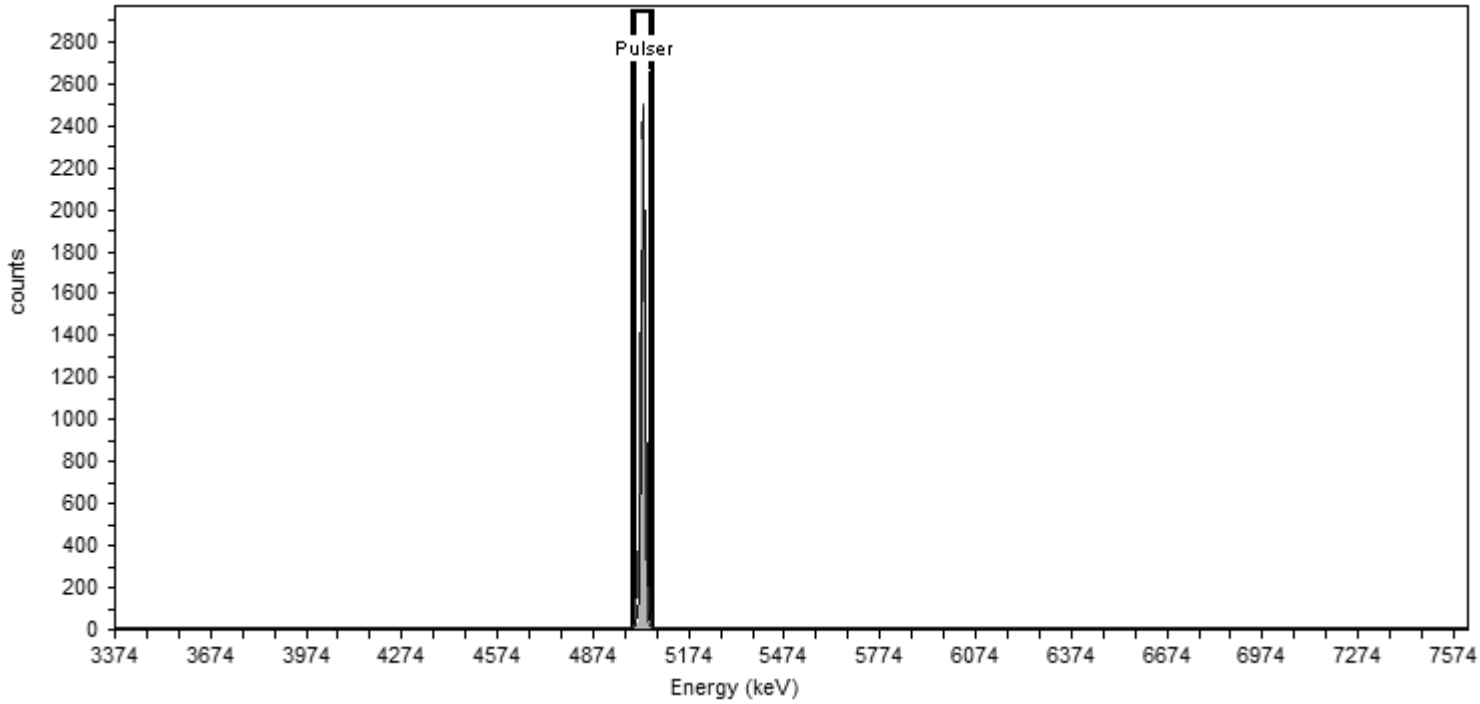
Batch Name: July2016b
Description:

Acquisition

Detector: AV196 , SN: 50-117AA5
Acquisition Start Date: 8/31/2016 9:07:09AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9793;AV196-20151017
Calibration Date: 10/18/2015 3:55:18PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.859	5004.490	5057.228	15.49	5,565.16	6,005.95

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:47AM 8/31/2016

Sample

Sample Name: Pulser;AV212
Comment:

Spectrum #31 Analysis #1

Batch

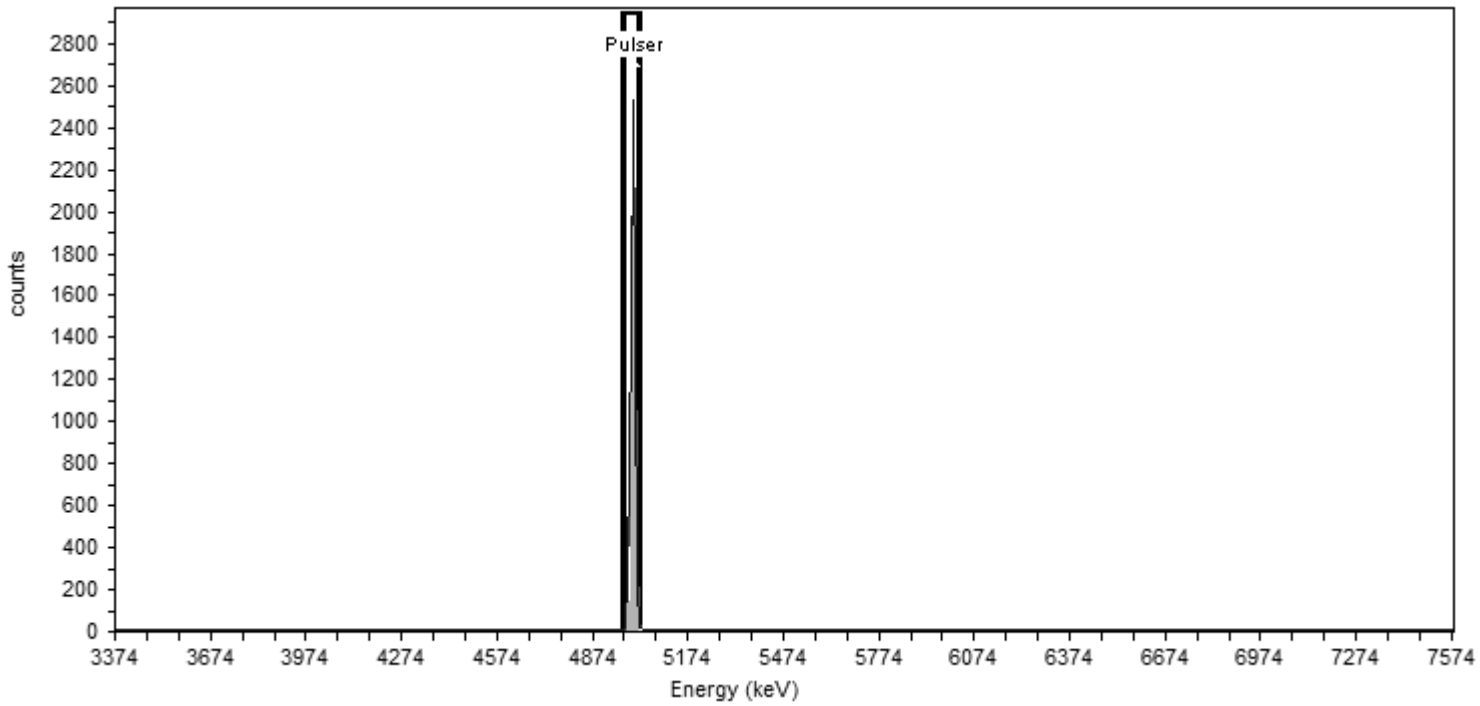
Batch Name: July2016c
Description:

Acquisition

Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 8/31/2016 8:34:31AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9795;AV212-20151018
Calibration Date: 10/18/2015 6:42:05PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4999.964	4972.698	5027.230	16.02	5,804.94	5,992.36

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:49AM 8/31/2016

Sample

Sample Name: Pulser;AV213
Comment:

Spectrum #29 Analysis #1

Batch

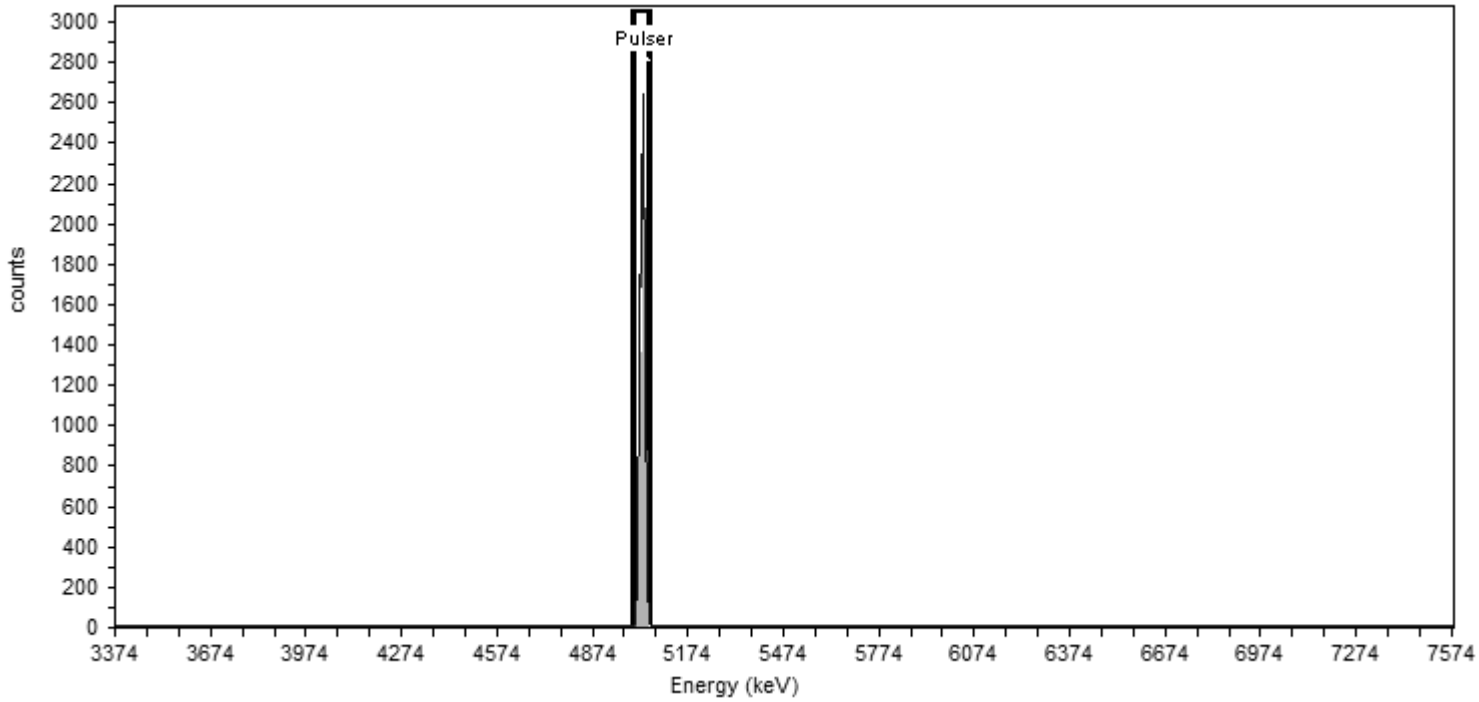
Batch Name: July2016c
Description:

Acquisition

Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 8/31/2016 8:34:22AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV213-20151018
Calibration Date: 10/18/2015 6:42:09PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.880	5002.986	5056.774	15.80	5,996.90	6,002.38

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:50AM 8/31/2016

Sample

Sample Name: Pulser;AV214
Comment:

Spectrum #29 Analysis #1

Batch

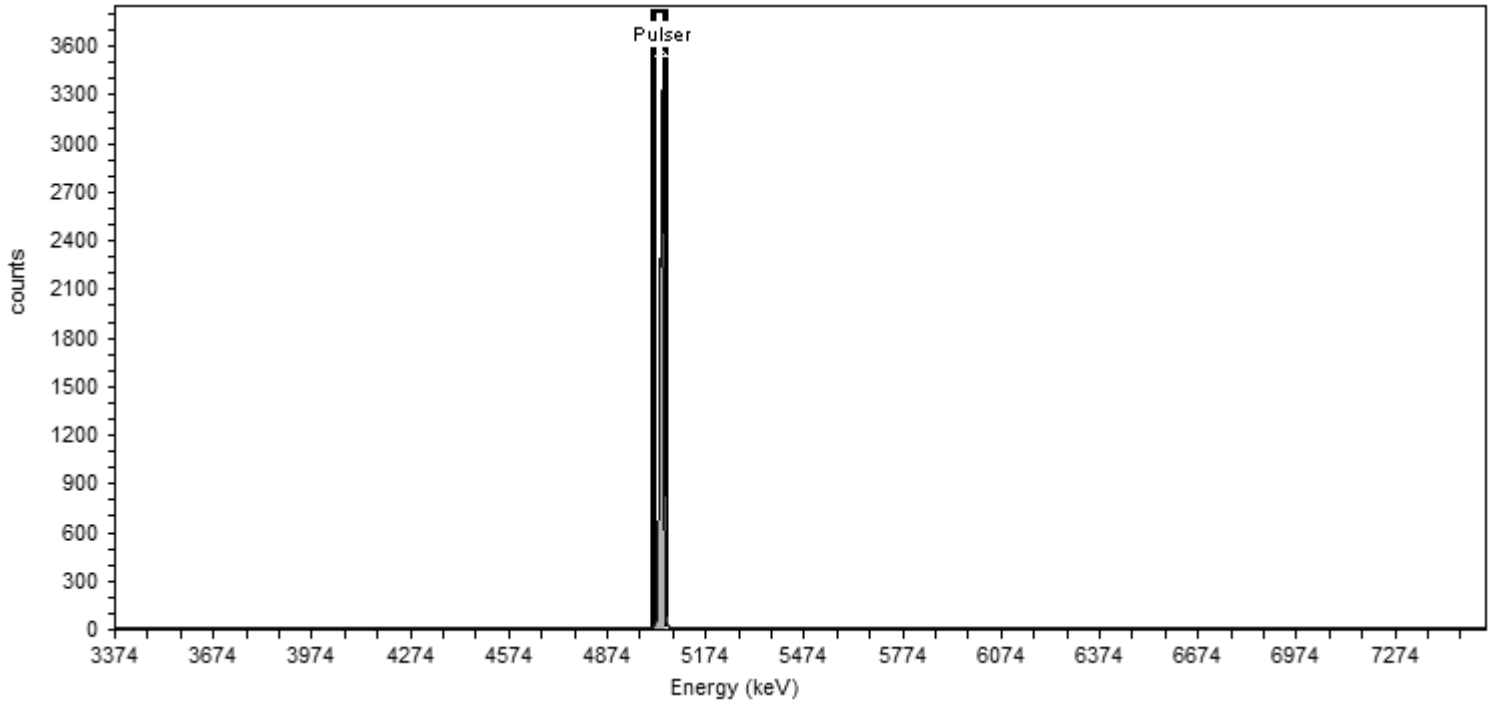
Batch Name: July2016c
Description:

Acquisition

Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 8/31/2016 8:34:24AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9884;AV214-20151018
Calibration Date: 10/18/2015 6:42:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.277	5016.286	5058.269	12.33	5,878.22	5,933.16

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:51AM 8/31/2016

Sample

Sample Name: Pulser;AV215
Comment:

Spectrum #29 Analysis #1

Batch

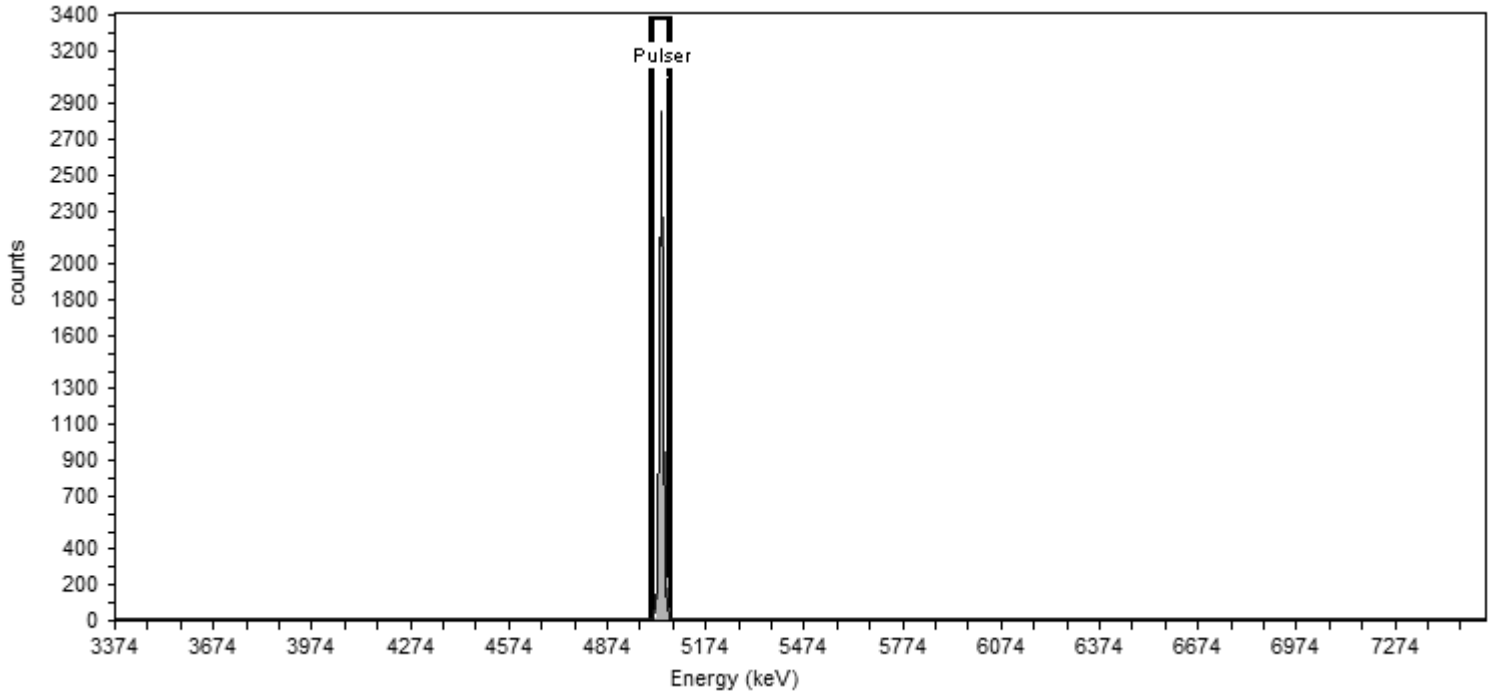
Batch Name: July2016c
Description:

Acquisition

Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 8/31/2016 8:34:23AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9885;AV215-20151018
Calibration Date: 10/18/2015 6:42:24PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.245	5012.147	5062.343	14.74	6,032.82	6,011.29

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:52AM 8/31/2016

Sample

Sample Name: Pulser;AV217
Comment:

Spectrum #31 Analysis #1

Batch

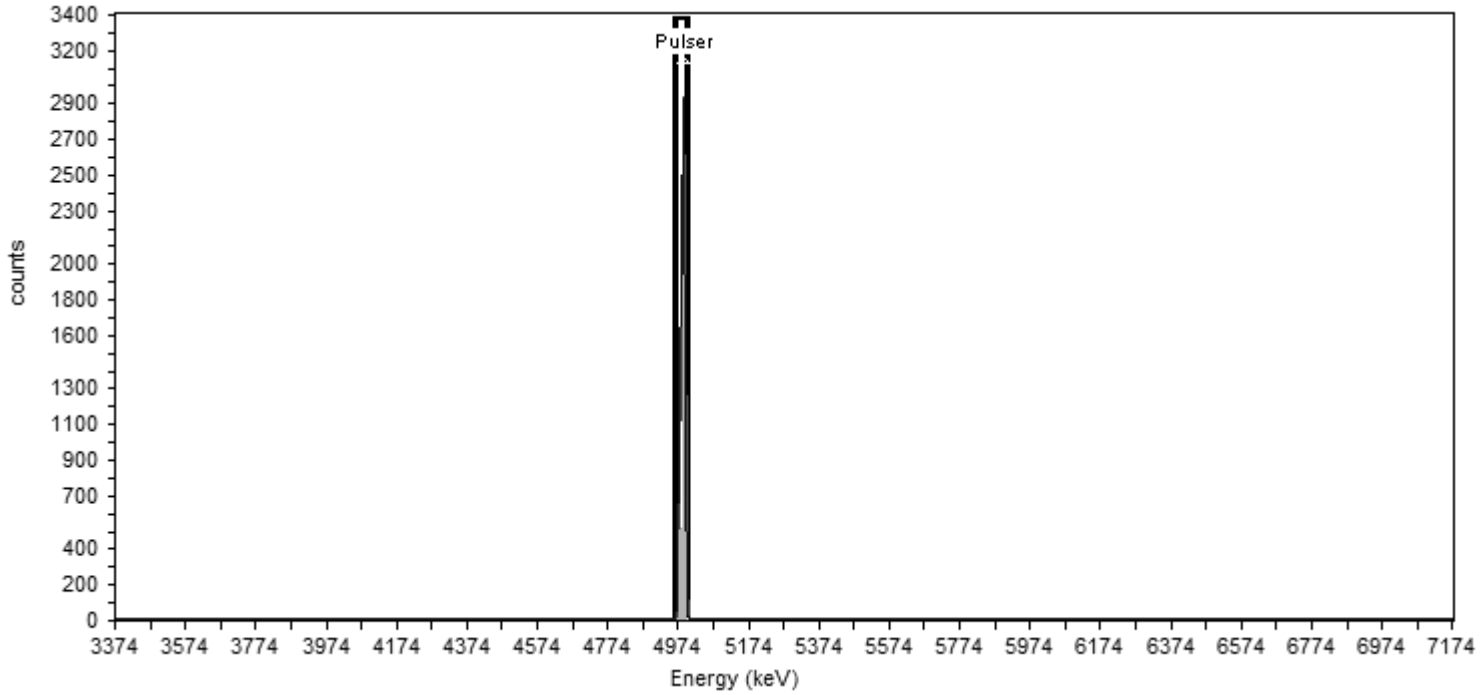
Batch Name: July2016c
Description:

Acquisition

Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 8/31/2016 8:34:23AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV217-20151018
Calibration Date: 10/18/2015 9:19:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4984.762	4963.702	5005.822	12.37	5,221.54	5,831.19

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:54AM 8/31/2016

Sample

Sample Name: Pulser;AV218
Comment:

Spectrum #29 Analysis #1

Batch

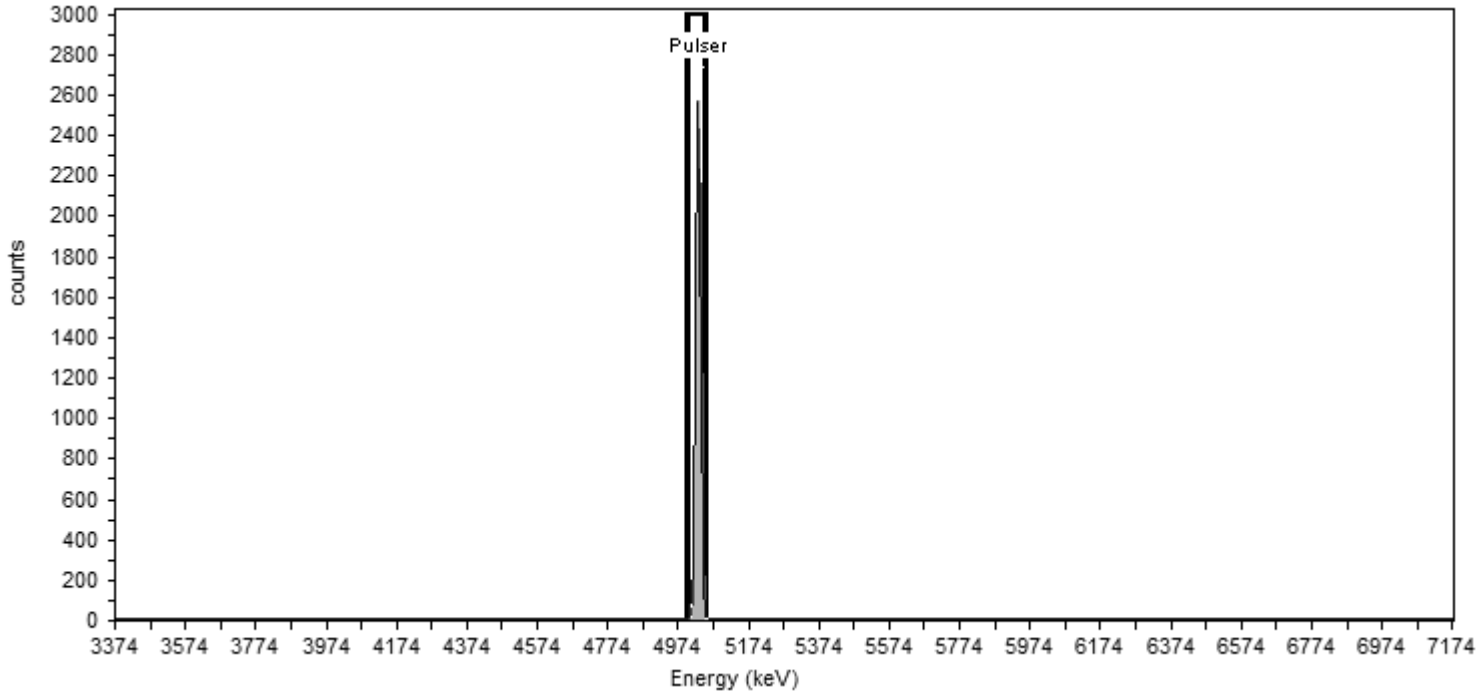
Batch Name: July2016c
Description:

Acquisition

Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 8/31/2016 8:34:24AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.537	5002.862	5056.212	15.67	5,770.94	5,994.33

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:54:54PM 9/7/2016

Sample

Sample Name: Pulser;AV218
Comment:

Spectrum #2 Analysis #1

Batch

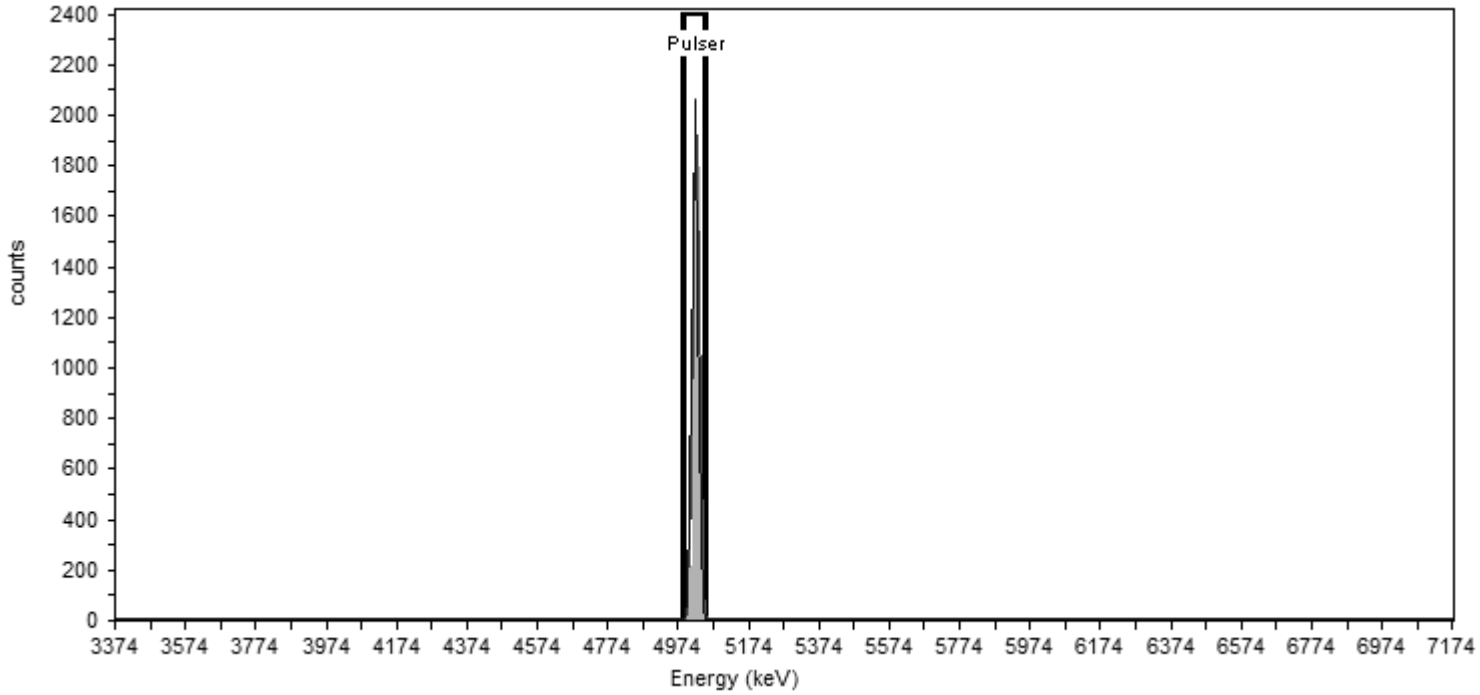
Batch Name: August2016c
Description:

Acquisition

Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 9/7/2016 12:53:51PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.824	4988.583	5055.065	19.53	5,783.85	6,002.01

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:53AM 8/31/2016

Sample

Sample Name: Pulser;AV219
Comment:

Spectrum #29 Analysis #1

Batch

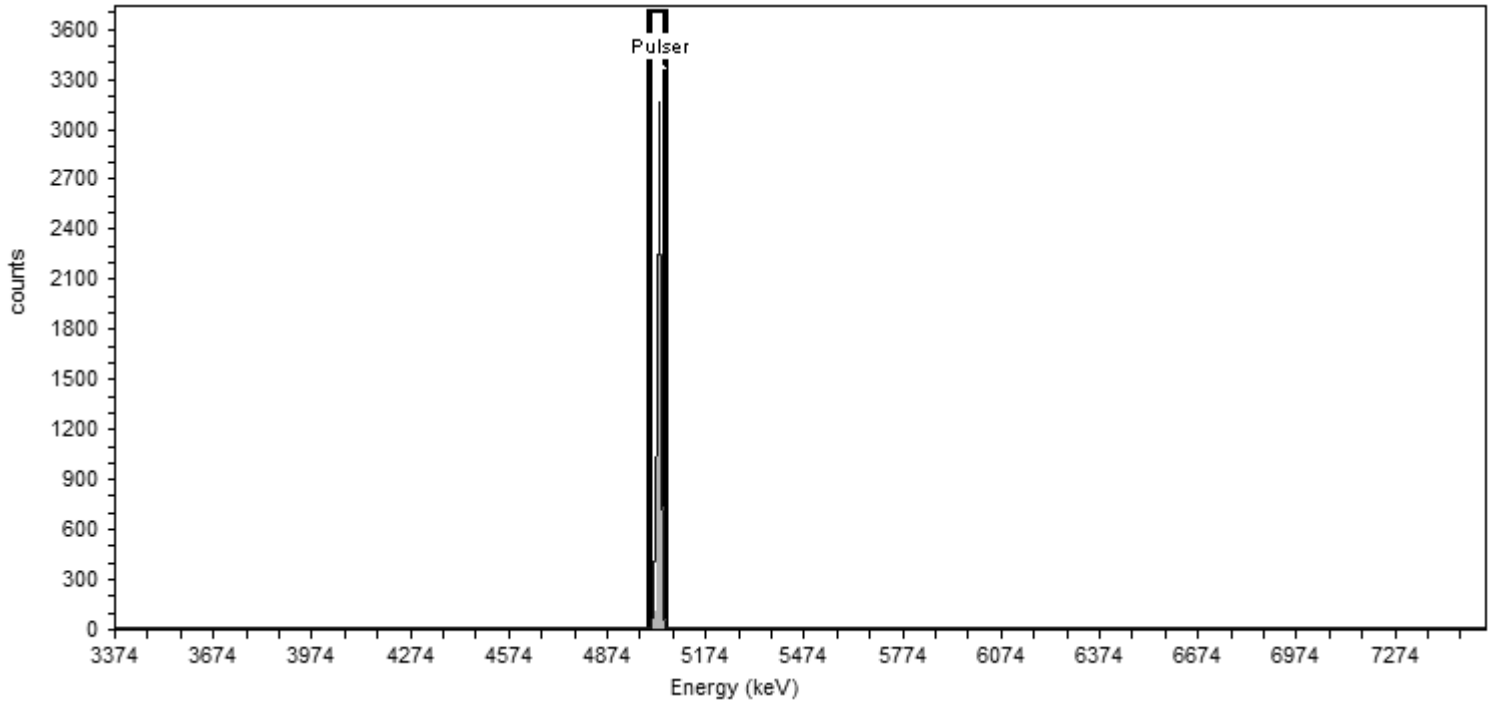
Batch Name: July2016c
Description:

Acquisition

Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 8/31/2016 8:34:24AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV219-20151018
Calibration Date: 10/18/2015 9:19:52PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.972	5007.315	5052.628	13.31	6,041.77	6,025.92

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:06PM 9/7/2016

Sample

Sample Name: Pulser;AV219
Comment:

Spectrum #1 Analysis #1

Batch

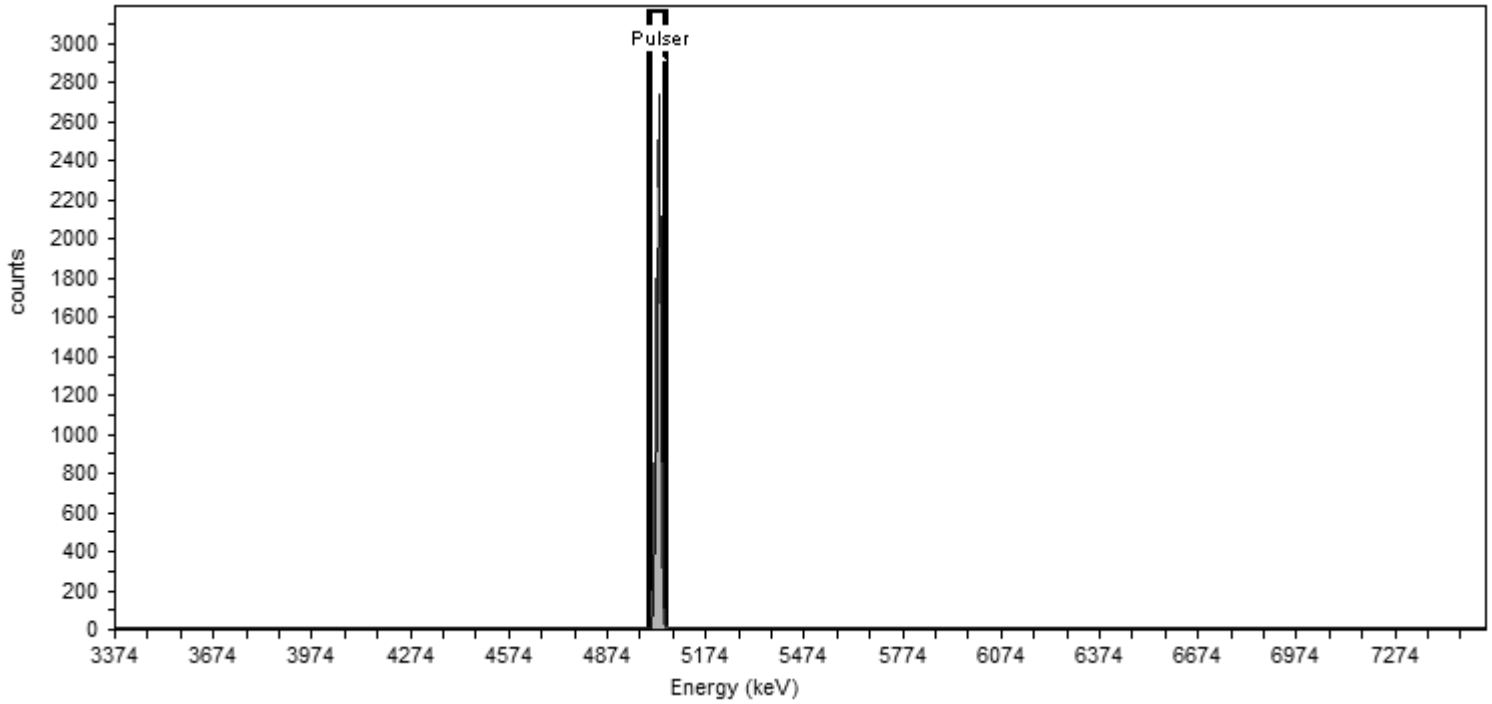
Batch Name: August2016c
Description:

Acquisition

Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 9/7/2016 12:28:59PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV219-20151018
Calibration Date: 10/18/2015 9:19:52PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.665	5005.826	5055.503	14.59	5,732.65	6,021.12

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:10PM 9/7/2016

Sample

Sample Name: Pulser;AV220
Comment:

Spectrum #1 Analysis #1

Batch

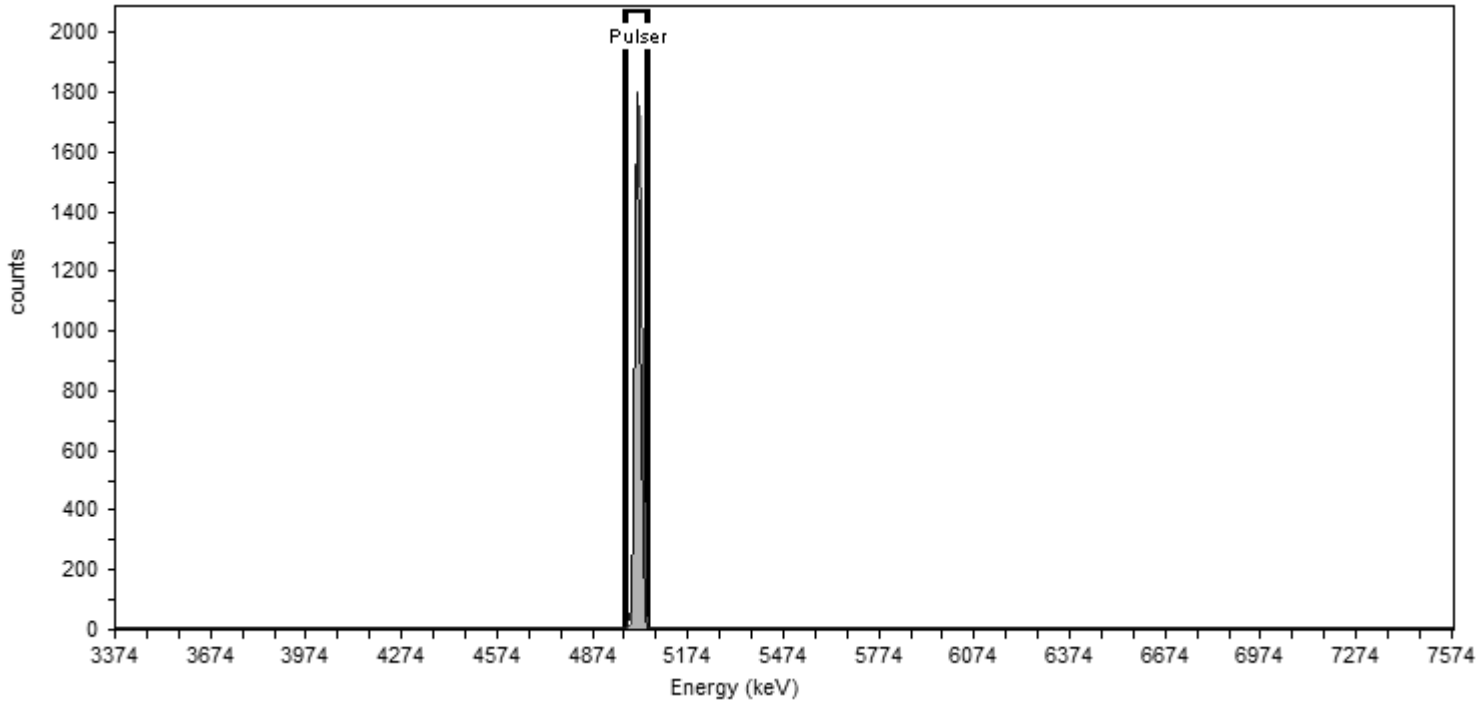
Batch Name: August2016c
Description:

Acquisition

Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 9/7/2016 12:29:00PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV220-20151018
Calibration Date: 10/18/2015 9:19:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.192	4981.003	5047.381	19.50	5,038.66	6,009.67

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:56AM 8/31/2016

Sample

Sample Name: Pulser;AV221
Comment:

Spectrum #29 Analysis #1

Batch

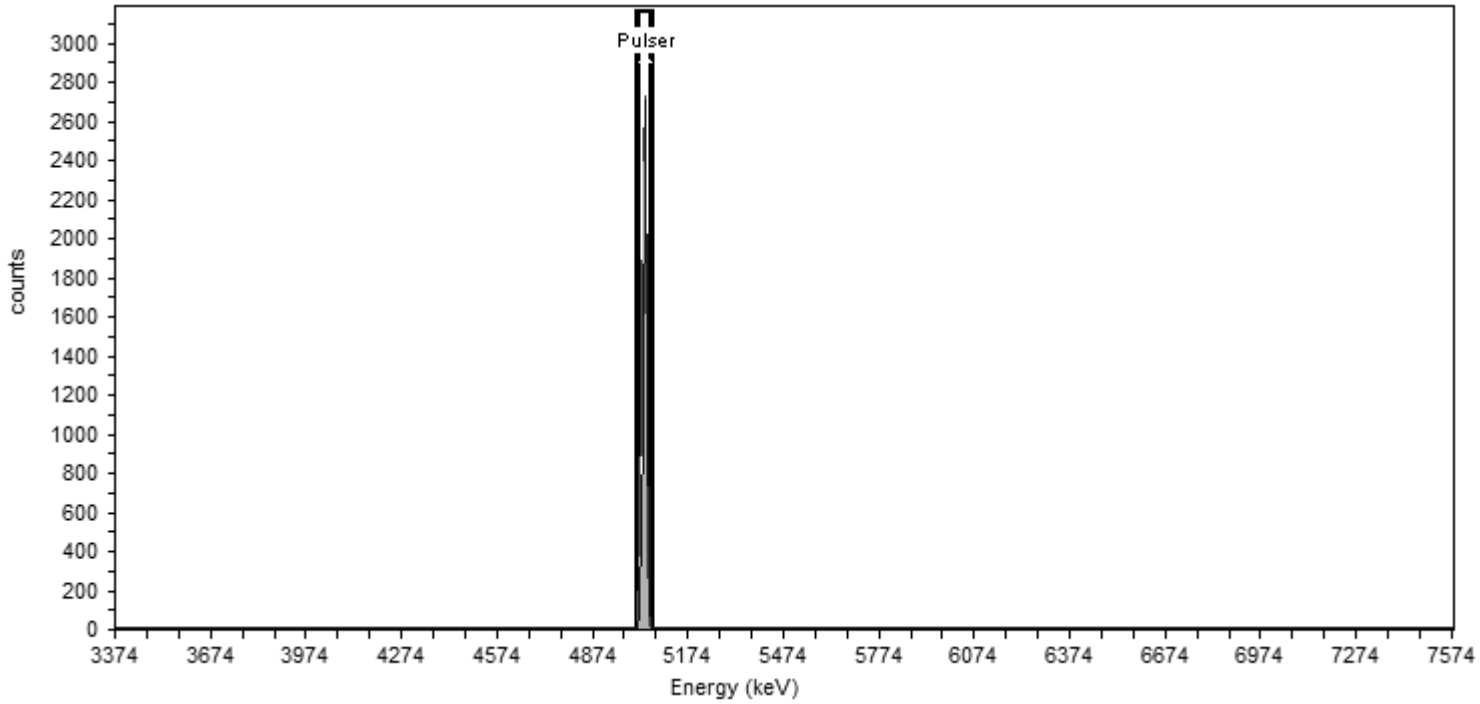
Batch Name: July2016c
Description:

Acquisition

Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 8/31/2016 8:34:25AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.062	5015.083	5061.041	13.50	5,280.28	5,669.54

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:08PM 9/7/2016

Sample

Sample Name: Pulser;AV221
Comment:

Spectrum #1 Analysis #1

Batch

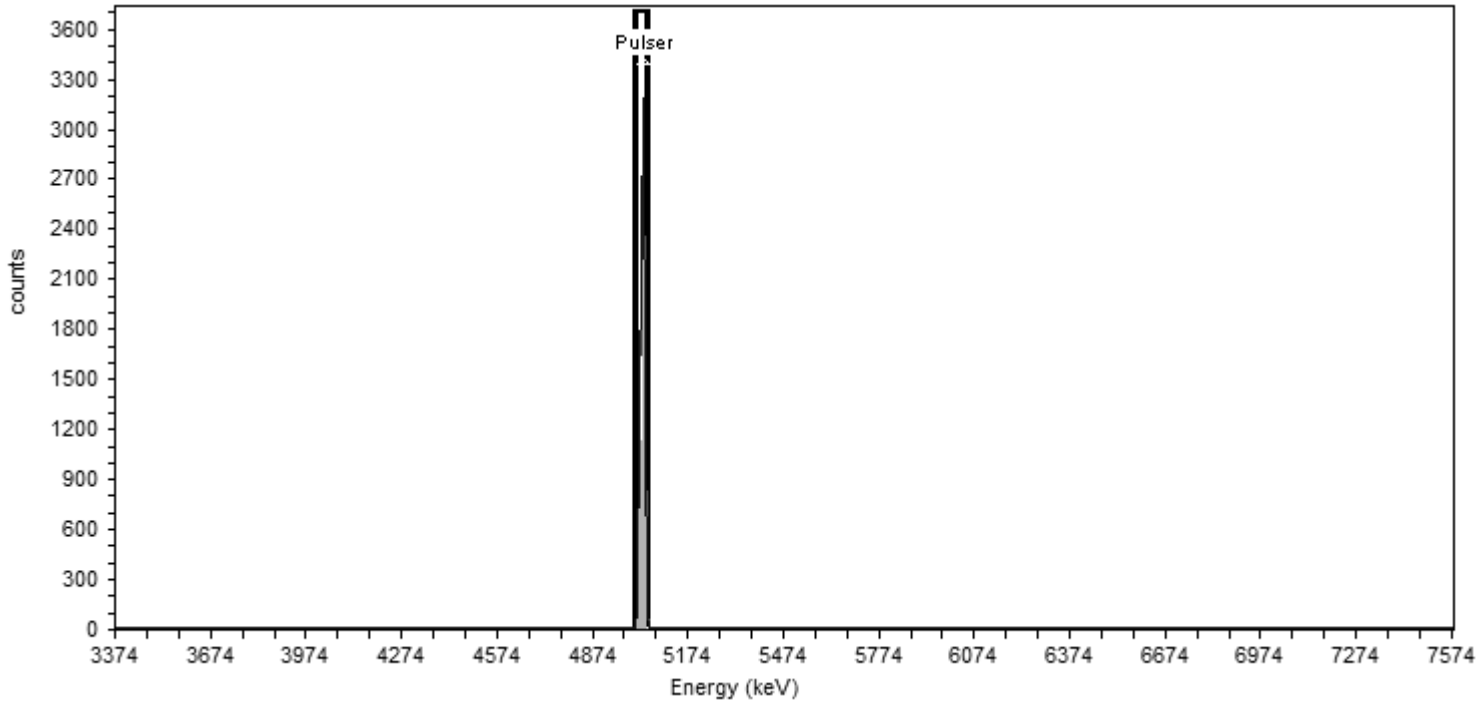
Batch Name: August2016c
Description:

Acquisition

Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 9/7/2016 12:29:00PM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.880	5007.682	5052.078	13.04	5,969.90	5,866.89

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:11PM 9/7/2016

Sample

Sample Name: Pulser;AV222
Comment:

Spectrum #1 Analysis #1

Batch

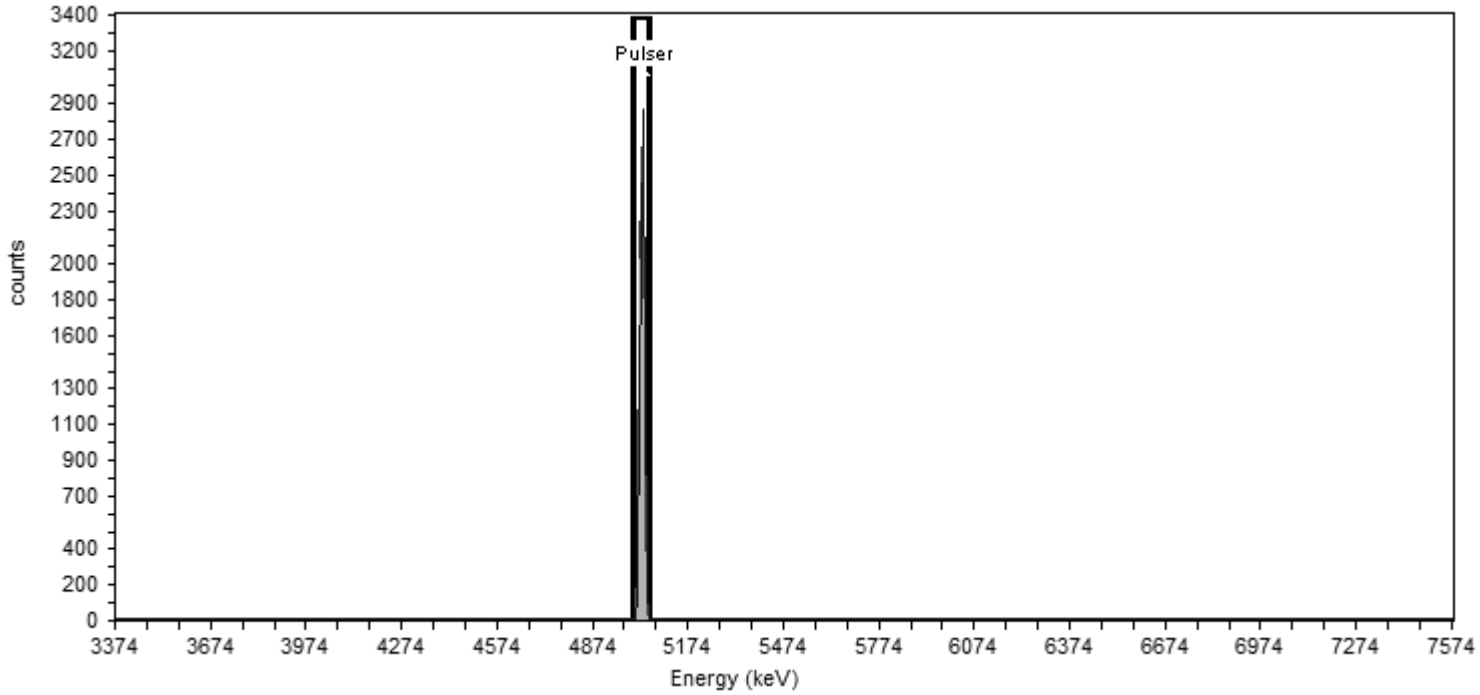
Batch Name: August2016c
Description:

Acquisition

Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 9/7/2016 12:29:00PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV222-20151018
Calibration Date: 10/18/2015 9:20:05PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.376	5006.001	5054.751	14.32	5,885.67	6,023.70

Initial Calibrations

TestAmerica
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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:46:40PM 10/16/2015

Calibration

Sample Name: IC-7107;AV147-20151016
Description:
Detector: AV147

Analyst: 60040
Analysis Date: 10/16/2015 6:46:39PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

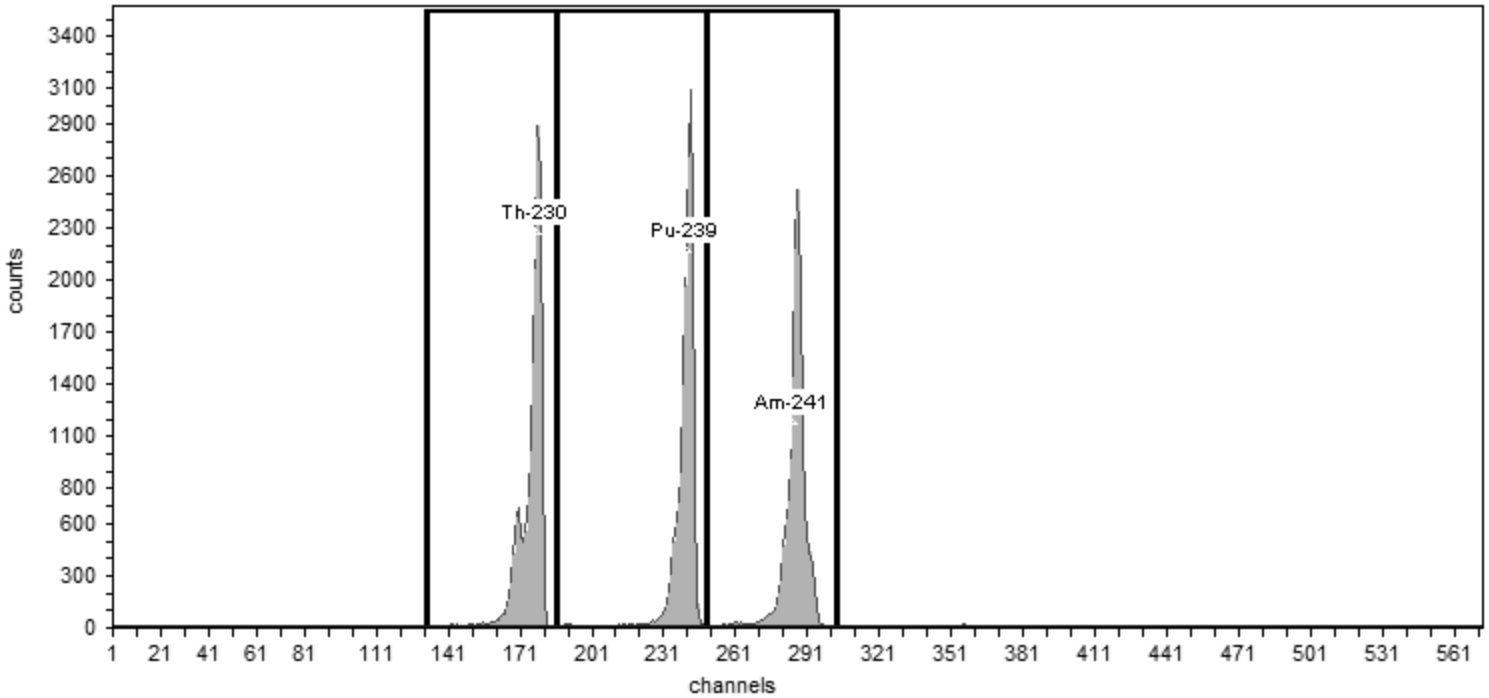
Detector: AV147 , SN: 50-05/R1
Acquisition Start Date: 10/16/2015 3:47:38PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV147-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.20% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.37	16,447.00	117.48
Pu-239	240	5,155.40	186	249	31.93	16,371.00	116.94
Am-241	284	5,485.70	249	303	31.66	15,642.00	111.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:54PM 10/17/2015

Calibration

Sample Name: IC-9817;AV171-20151016
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 10/17/2015 2:36:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

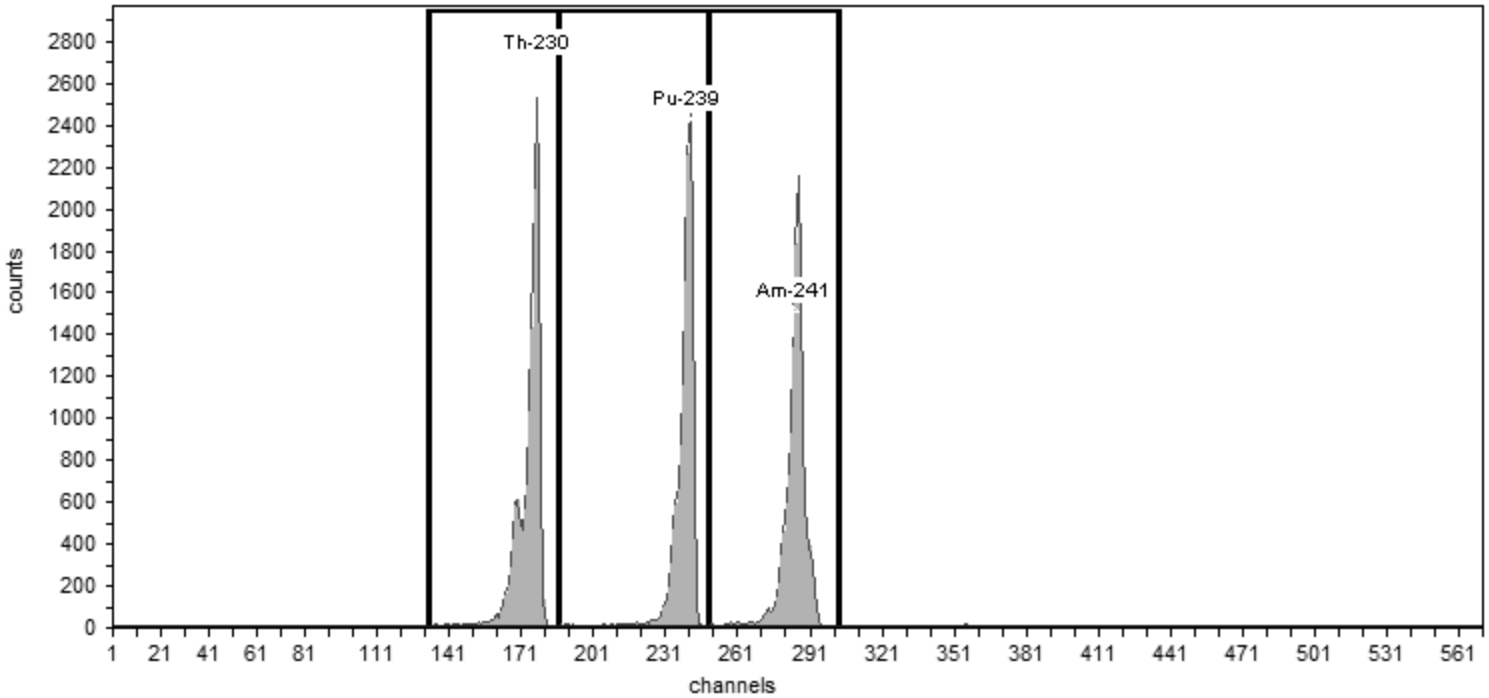
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 10/16/2015 6:59:39PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9817;AV171-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.59% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.27	15,154.00	108.24
Pu-239	240	5,155.40	186	249	32.91	13,964.00	99.74
Am-241	284	5,485.70	249	303	33.24	14,078.00	100.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:38PM 11/23/2015

Calibration

Sample Name: IC-9884;AV172-20151016
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 10/17/2015 2:36:56PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

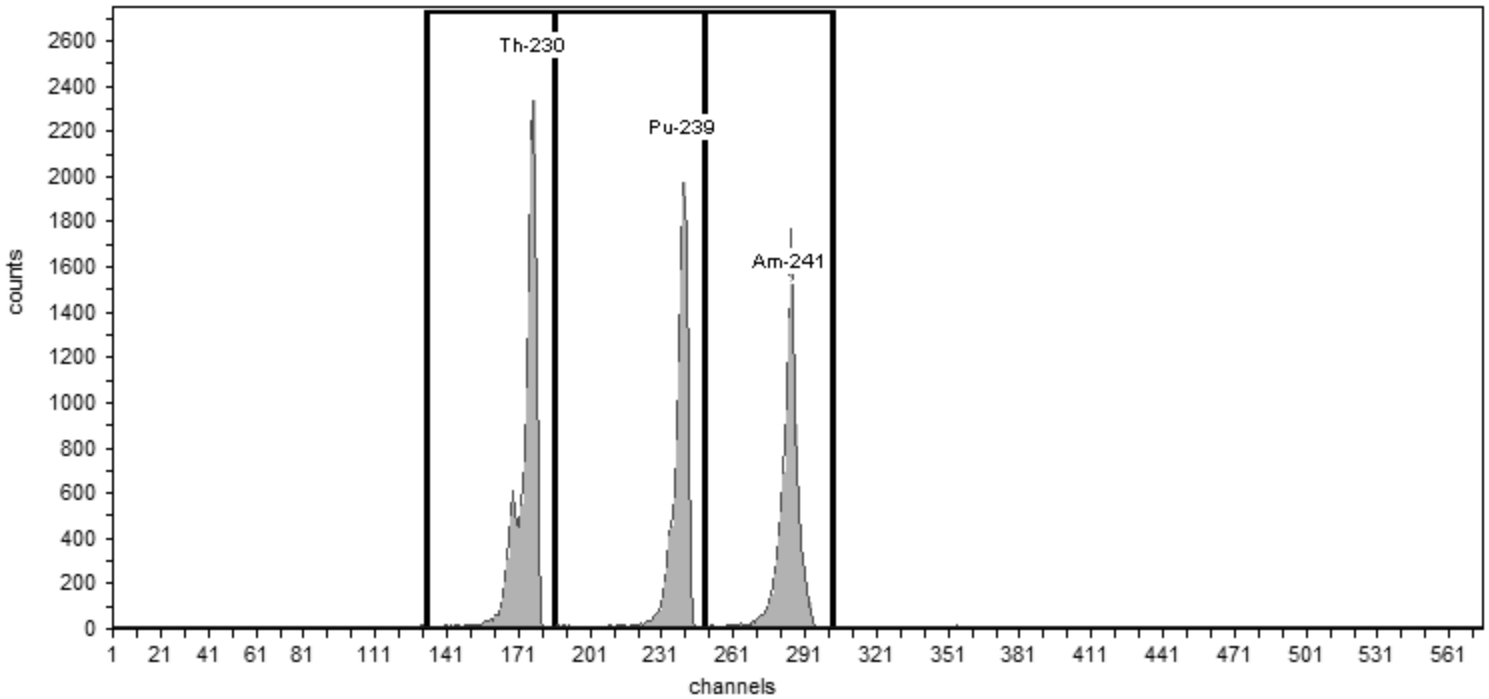
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 10/16/2015 6:59:52PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9884;AV172-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.32% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	13,870.00	99.07
Pu-239	240	5,155.40	186	249	33.22	10,984.00	78.46
Am-241	284	5,485.70	249	303	32.36	11,196.00	79.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:47PM 11/23/2015

Calibration

Sample Name: IC-9885;AV173-20151016a
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 10/17/2015 2:37:06PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

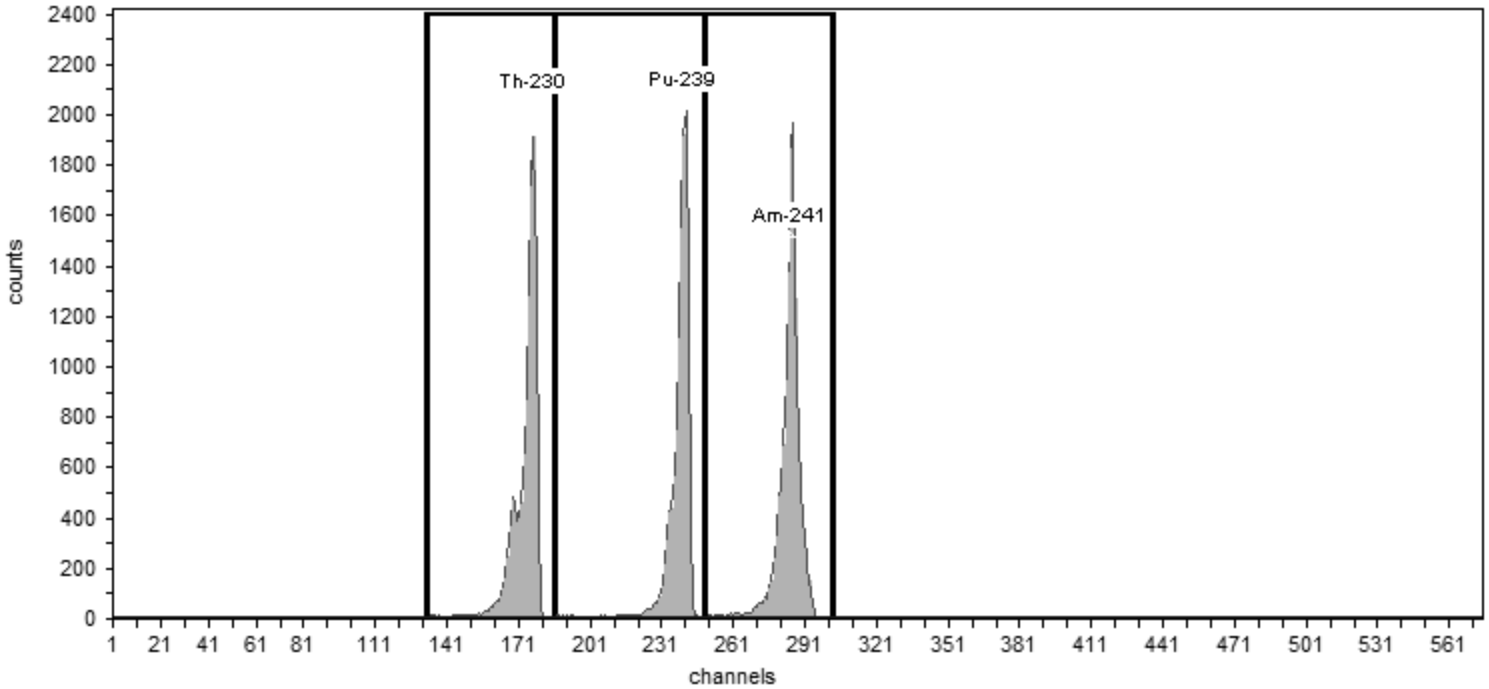
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 10/16/2015 7:04:44PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9885;AV173-20151016a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.59% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.41	11,828.00	84.49
Pu-239	240	5,155.40	186	249	33.98	11,588.00	82.77
Am-241	284	5,485.70	249	303	32.98	12,863.00	91.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:47PM 10/17/2015

Calibration

Sample Name: IC-7107;AV175-20151017
Description:
Detector: AV175

Analyst: 60040
Analysis Date: 10/17/2015 6:01:46PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

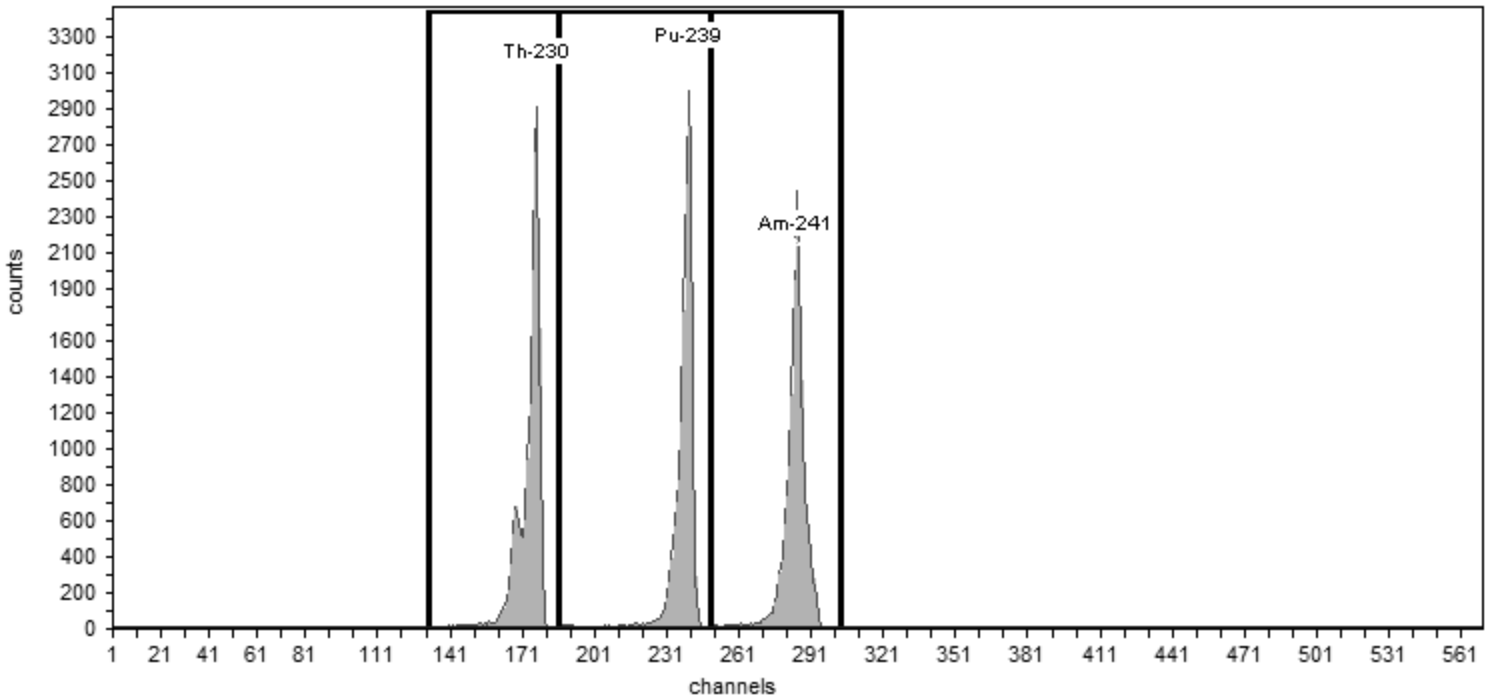
Detector: AV175 , SN: 50-117H1
Acquisition Start Date: 10/17/2015 2:48:30PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV175-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.38% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.12	16,621.00	118.72
Pu-239	240	5,155.40	186	249	31.81	16,209.00	115.78
Am-241	284	5,485.70	249	303	33.28	15,927.00	113.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:30PM 10/17/2015

Calibration

Sample Name: IC-9886;AV188-20151017
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 10/17/2015 6:02:29PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

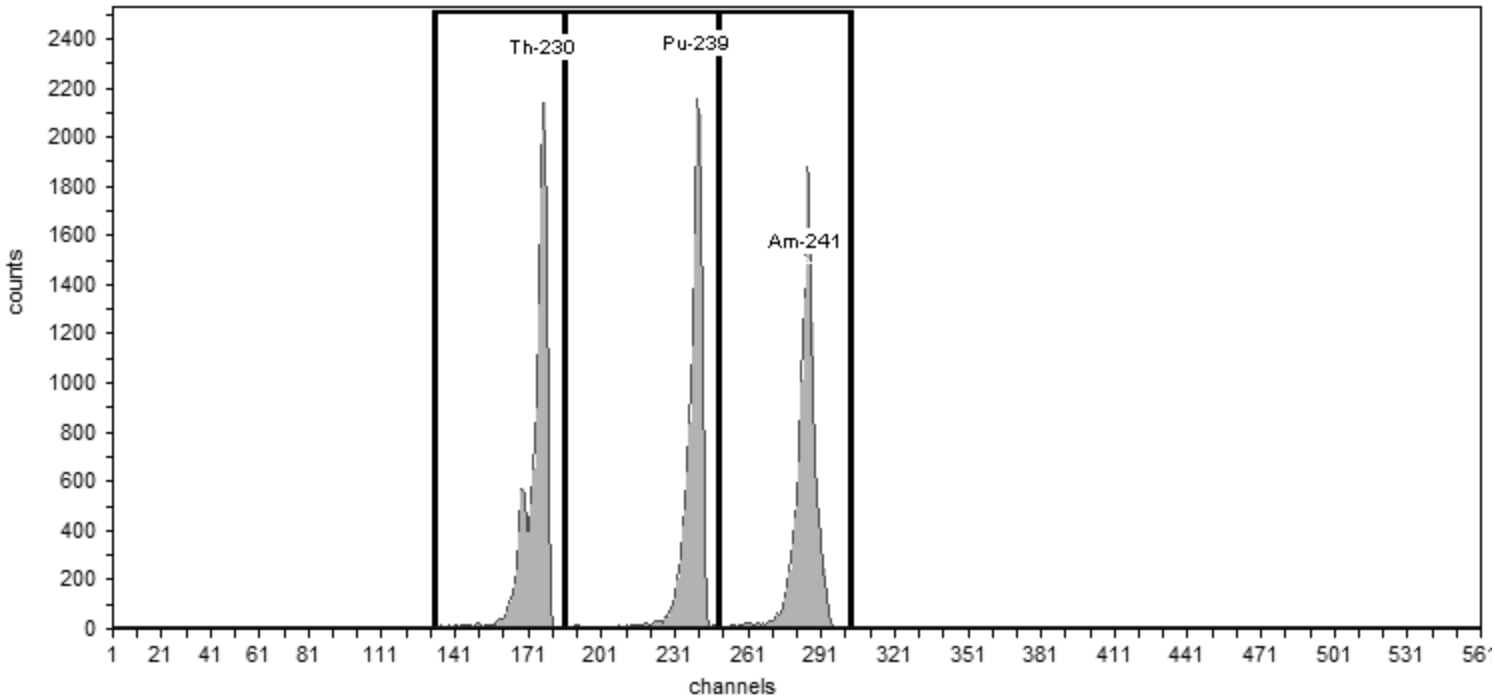
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 10/17/2015 2:51:09PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9886;AV188-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.77% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.00	13,002.00	92.87
Pu-239	240	5,155.40	186	249	33.19	12,201.00	87.15
Am-241	284	5,485.70	249	303	35.49	12,768.00	91.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:38PM 10/18/2015

Calibration

Sample Name: IC-7107;AV189-20151017a
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 10/18/2015 3:55:37PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

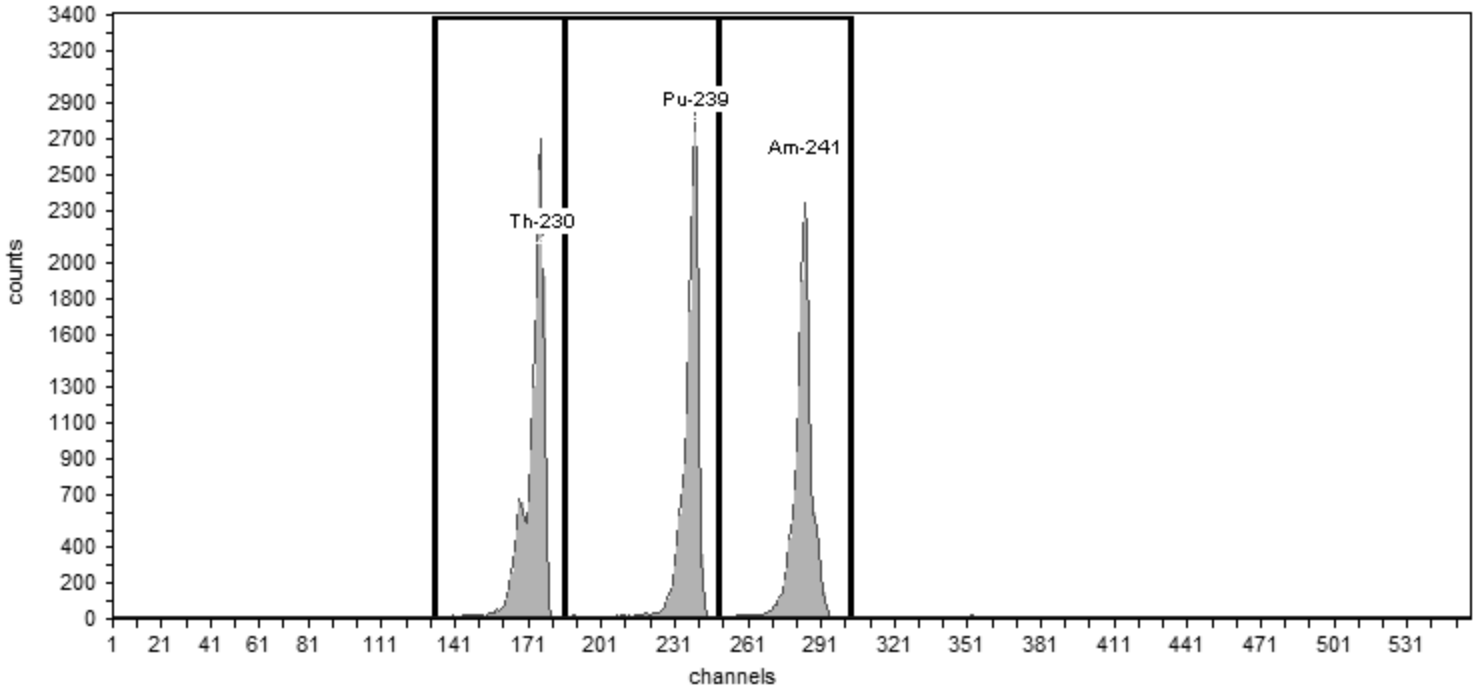
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 10/17/2015 6:19:19PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV189-20151017a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.37% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.17	16,725.00	119.46
Pu-239	240	5,155.40	186	249	33.04	16,324.00	116.60
Am-241	284	5,485.70	249	303	35.31	15,710.00	112.21

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:00PM 10/18/2015

Calibration

Sample Name: IC-8874;AV190-20151017
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 10/18/2015 3:54:59PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

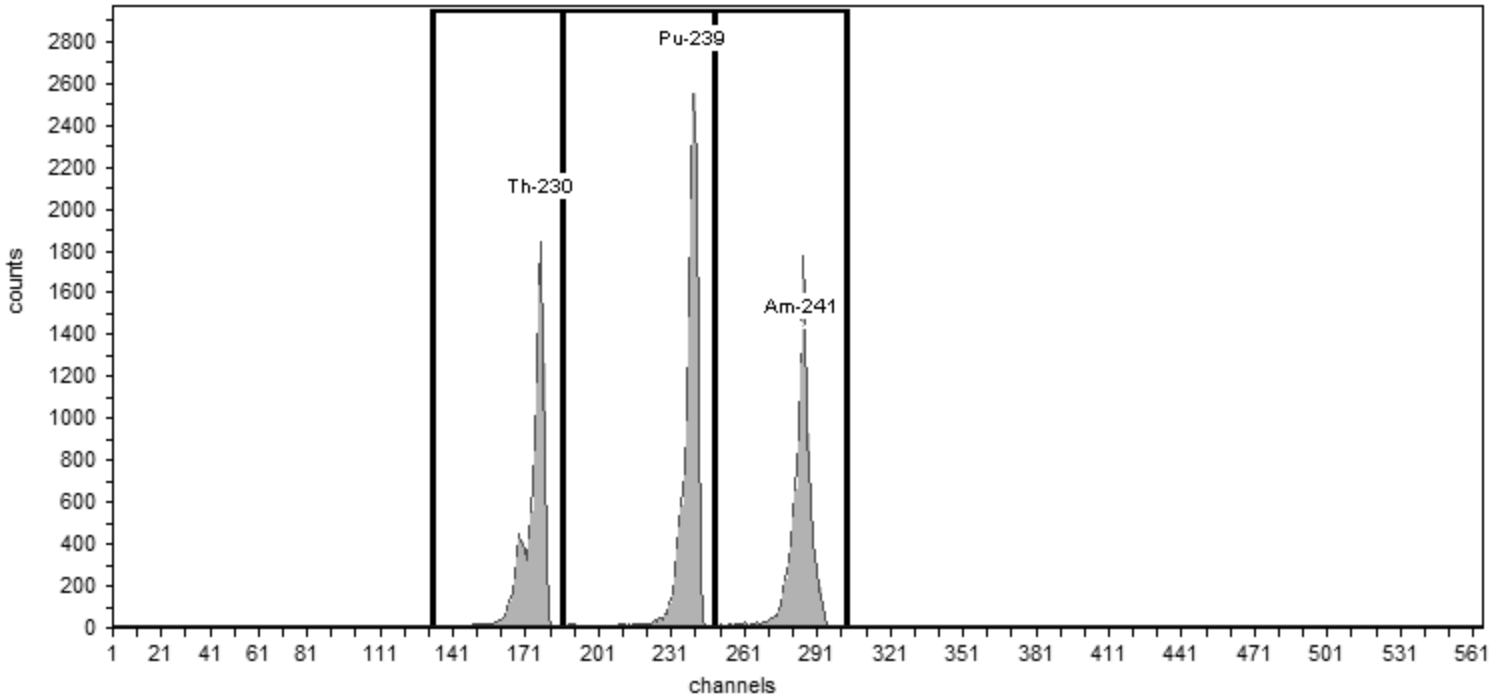
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 10/17/2015 6:13:15PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV190-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.86	10,865.00	77.61
Pu-239	240	5,155.40	186	249	31.92	13,830.00	98.79
Am-241	284	5,485.70	249	303	30.54	11,151.00	79.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:05PM 10/18/2015

Calibration

Sample Name: IC-8875;AV191-20151017
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 10/18/2015 3:55:04PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

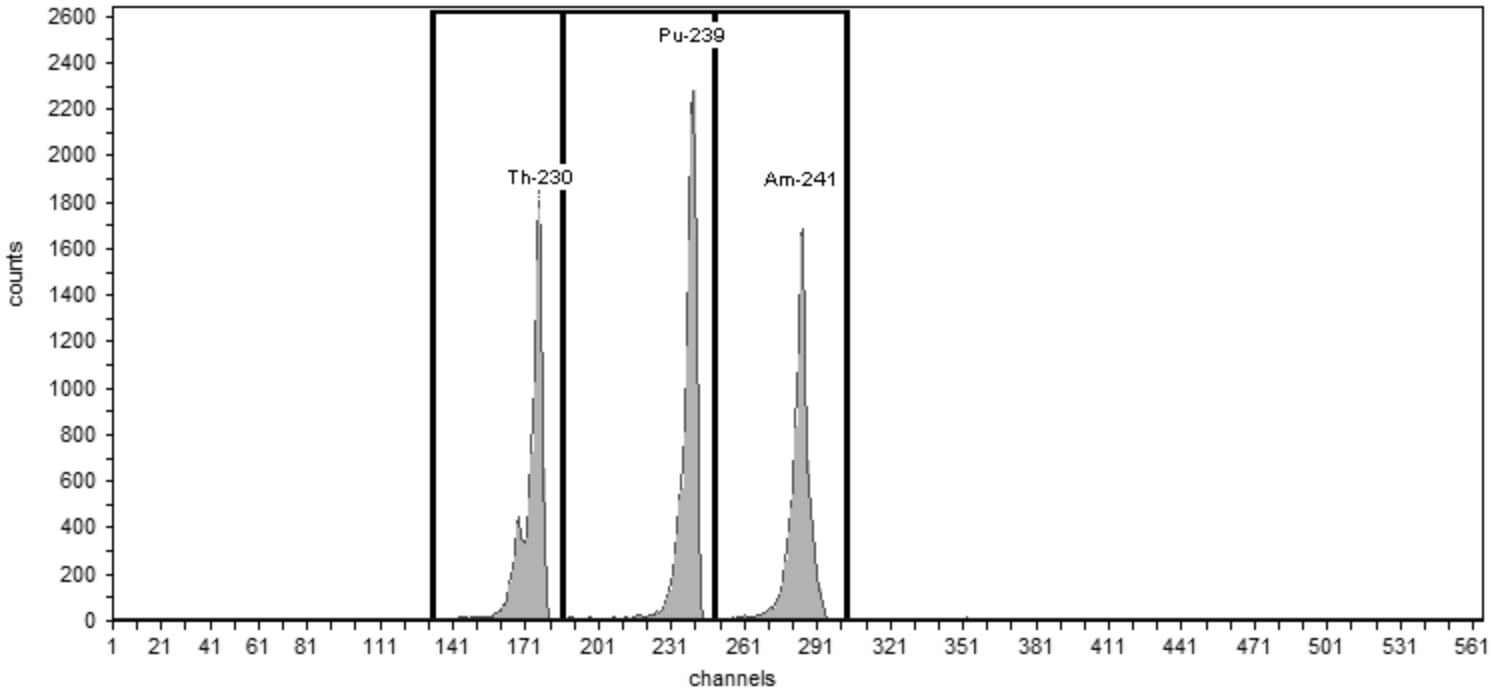
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 10/17/2015 6:13:26PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV191-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.22% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.72	11,130.00	79.50
Pu-239	240	5,155.40	186	249	33.56	12,810.00	91.50
Am-241	284	5,485.70	249	303	34.44	11,195.00	79.96

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:28:25PM 11/23/2015

Calibration

Sample Name: IC-8877;AV193-20151017
Description:
Detector: AV193

Analyst: 60040
Analysis Date: 10/18/2015 3:55:11PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

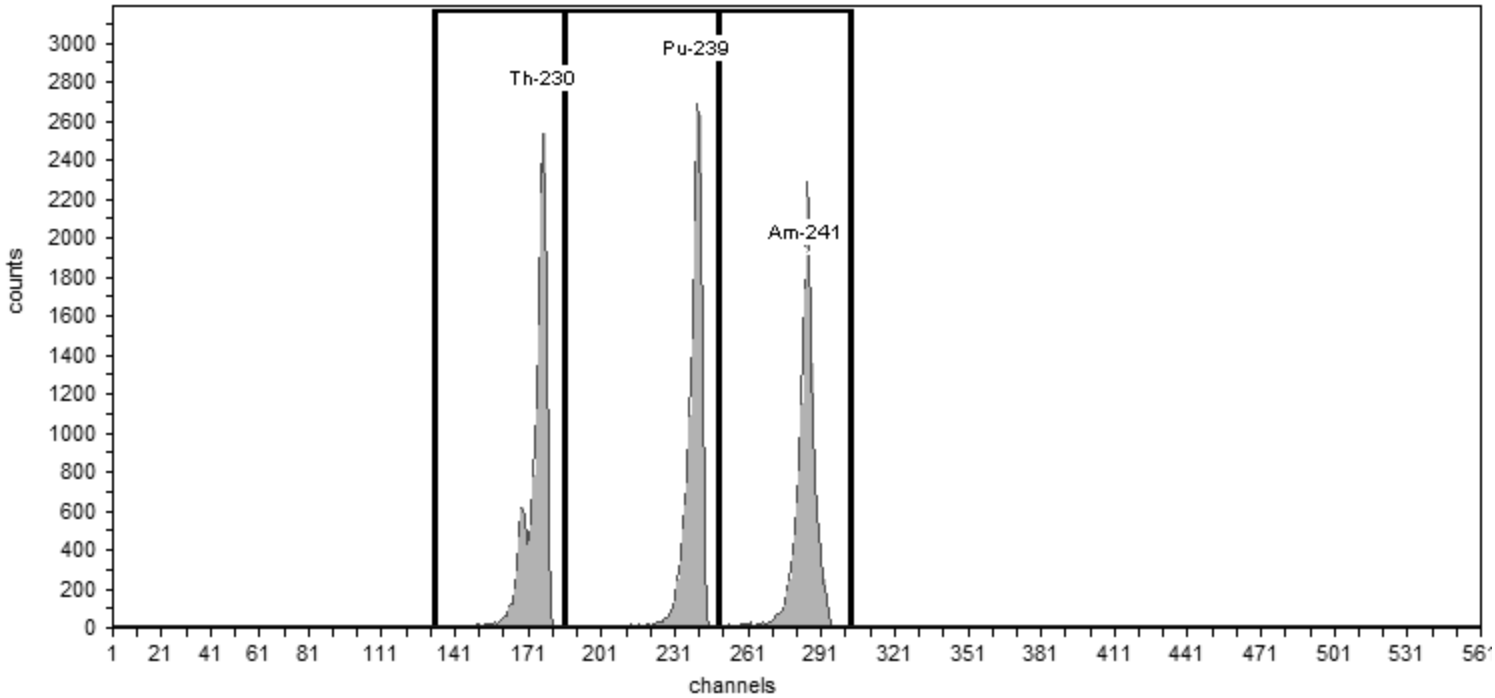
Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 10/17/2015 6:13:48PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV193-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.42% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.15	14,591.00	104.22
Pu-239	240	5,155.40	186	249	33.33	14,933.00	106.66
Am-241	284	5,485.70	249	303	32.55	14,605.00	104.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:15PM 10/18/2015

Calibration

Sample Name: IC-9520;AV194-20151017
Description:
Detector: AV194

Analyst: 60040
Analysis Date: 10/18/2015 3:55:14PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

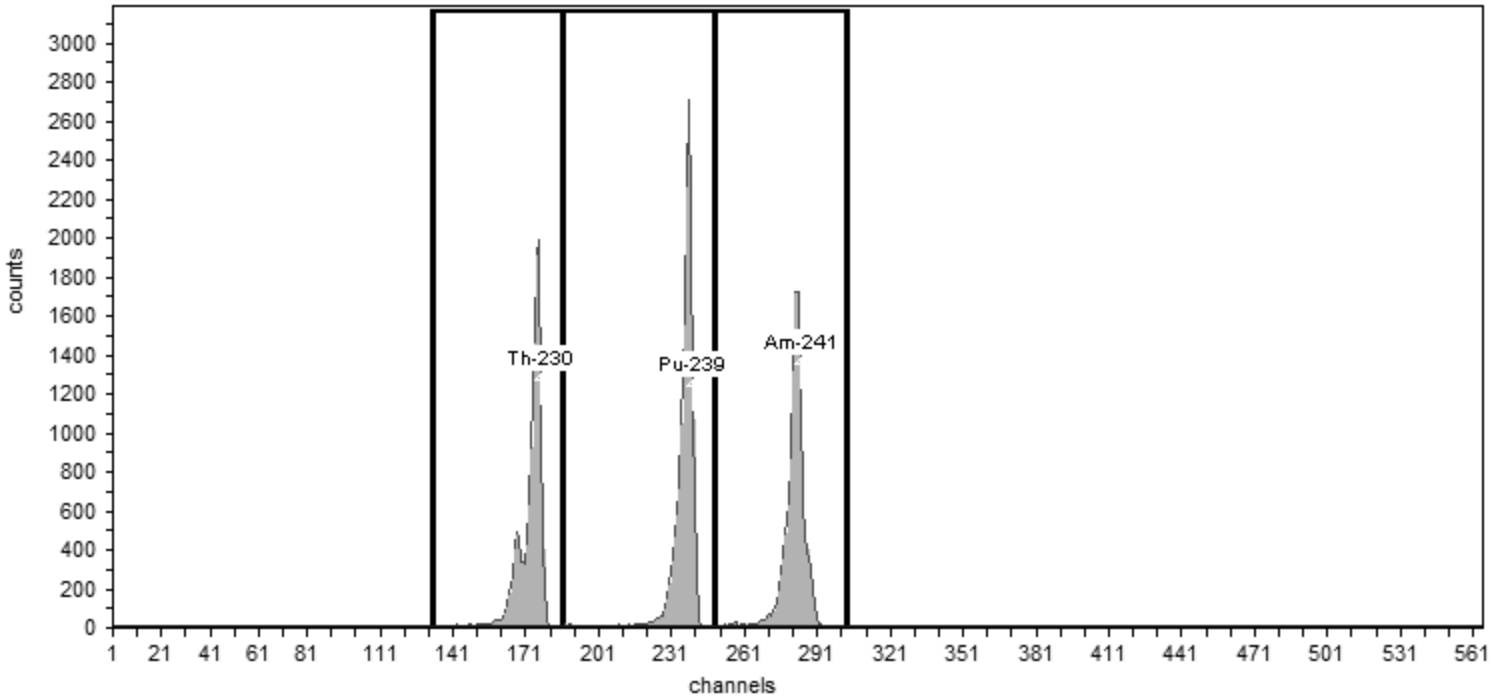
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 10/17/2015 6:13:59PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV194-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.83% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	11,745.00	83.89
Pu-239	240	5,155.40	186	249	30.76	14,033.00	100.24
Am-241	284	5,485.70	249	303	34.44	11,450.00	81.79

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:06PM 10/18/2015

Calibration

Sample Name: IC-9795;AV212-20151018
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 10/18/2015 6:42:05PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

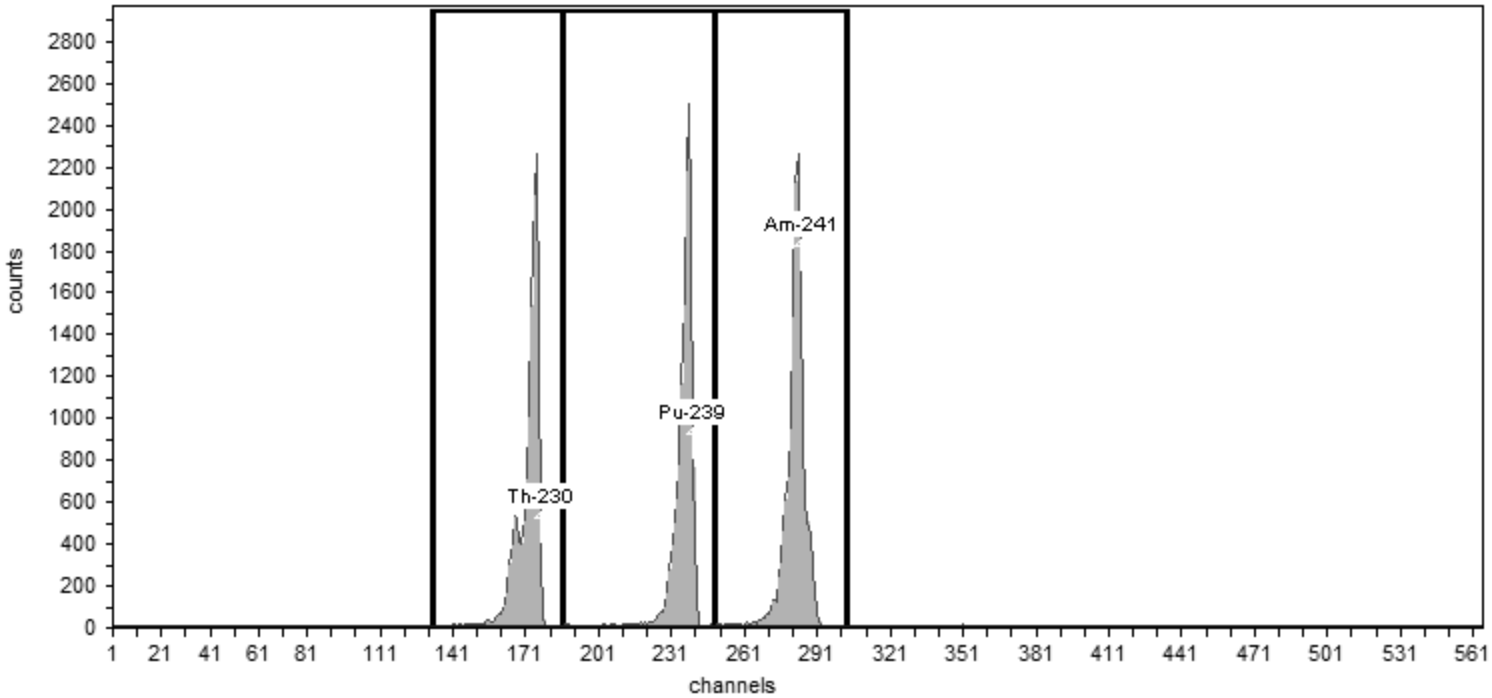
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 10/18/2015 4:12:14PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9795;AV212-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.01% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.21	13,168.00	94.06
Pu-239	240	5,155.40	186	249	32.49	13,563.00	96.88
Am-241	284	5,485.70	249	303	32.42	14,498.00	103.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:10PM 10/18/2015

Calibration

Sample Name: IC-9817;AV213-20151018
Description:
Detector: AV213

Analyst: 60040
Analysis Date: 10/18/2015 6:42:09PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

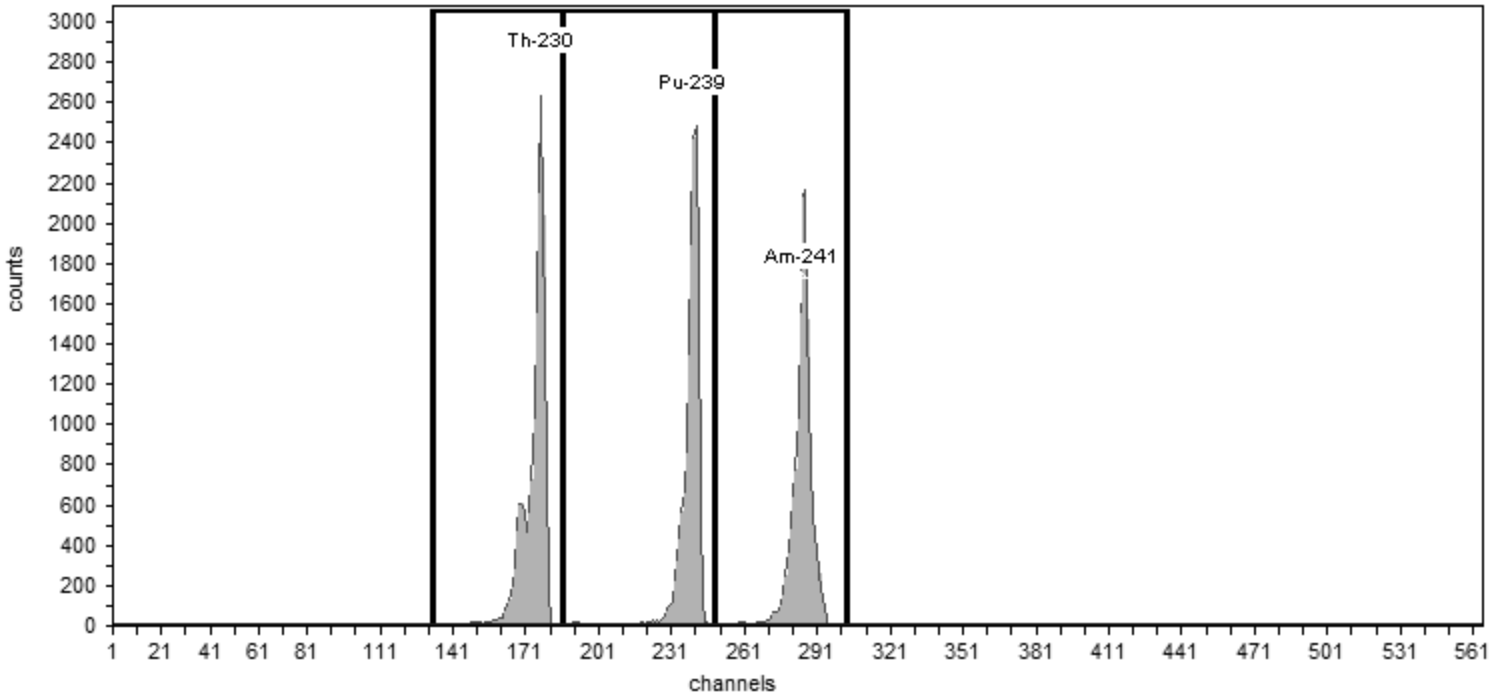
Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 10/18/2015 4:12:30PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9817;AV213-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.89% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.14	15,375.00	109.82
Pu-239	240	5,155.40	186	249	34.34	14,147.00	101.05
Am-241	284	5,485.70	249	303	33.46	14,203.00	101.45

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:17PM 10/18/2015

Calibration

Sample Name: IC-9884;AV214-20151018
Description:
Detector: AV214

Analyst: 60040
Analysis Date: 10/18/2015 6:42:16PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

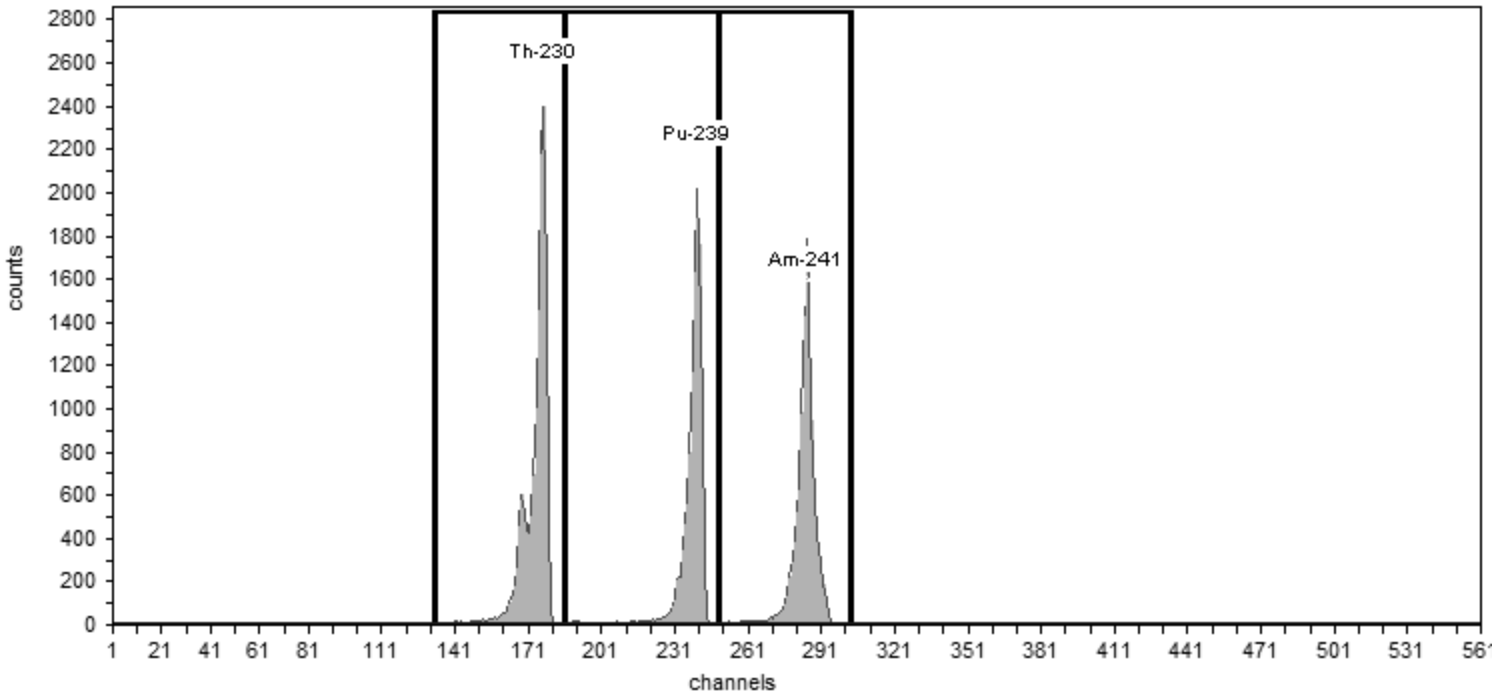
Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 10/18/2015 4:12:42PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9884;AV214-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.43% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.44	13,924.00	99.46
Pu-239	240	5,155.40	186	249	32.89	11,046.00	78.90
Am-241	284	5,485.70	249	303	32.65	11,243.00	80.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:25PM 10/18/2015

Calibration

Sample Name: IC-9885;AV215-20151018
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 10/18/2015 6:42:24PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

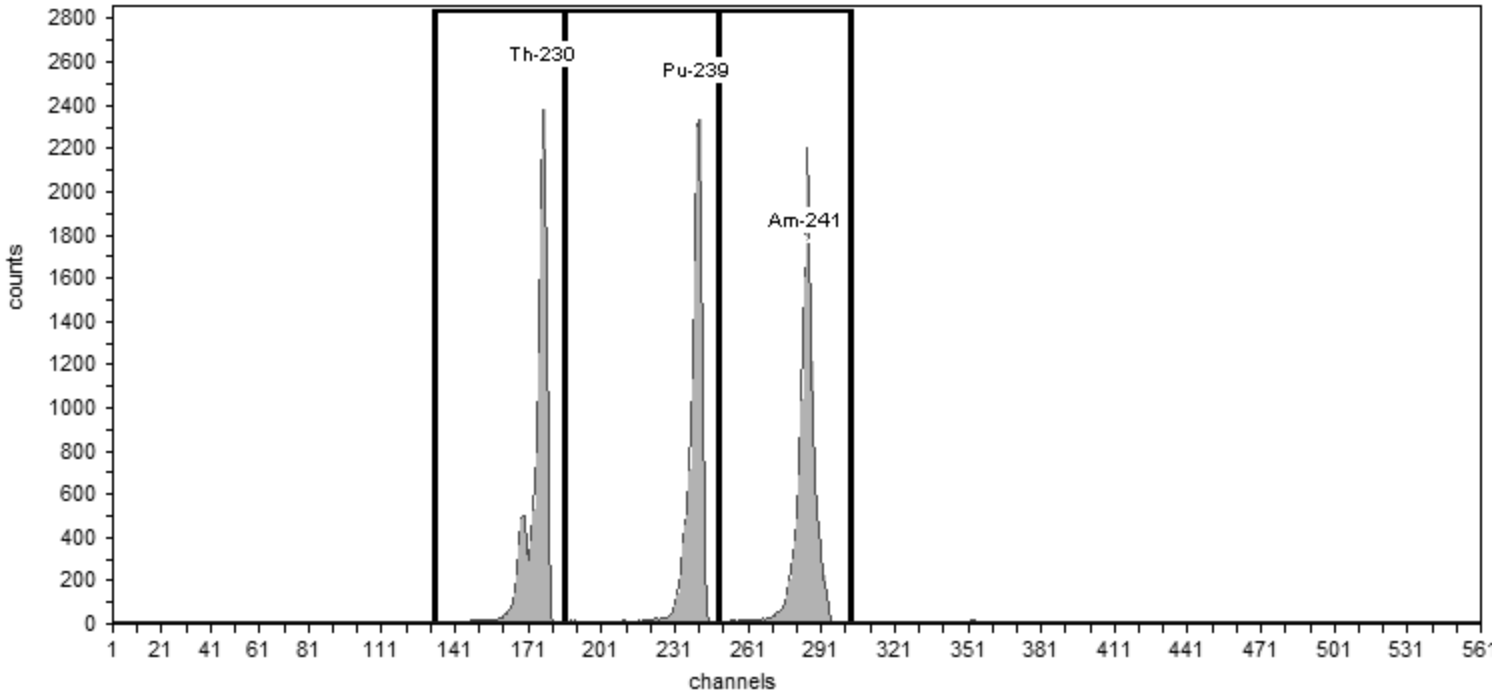
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 10/18/2015 4:12:53PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9885;AV215-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.15% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	26.33	12,187.00	87.05
Pu-239	240	5,155.40	186	249	29.62	11,820.00	84.43
Am-241	284	5,485.70	249	303	30.39	13,074.00	93.39

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:46PM 10/18/2015

Calibration

Sample Name: IC-7107;AV217-20151018
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 10/18/2015 9:19:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

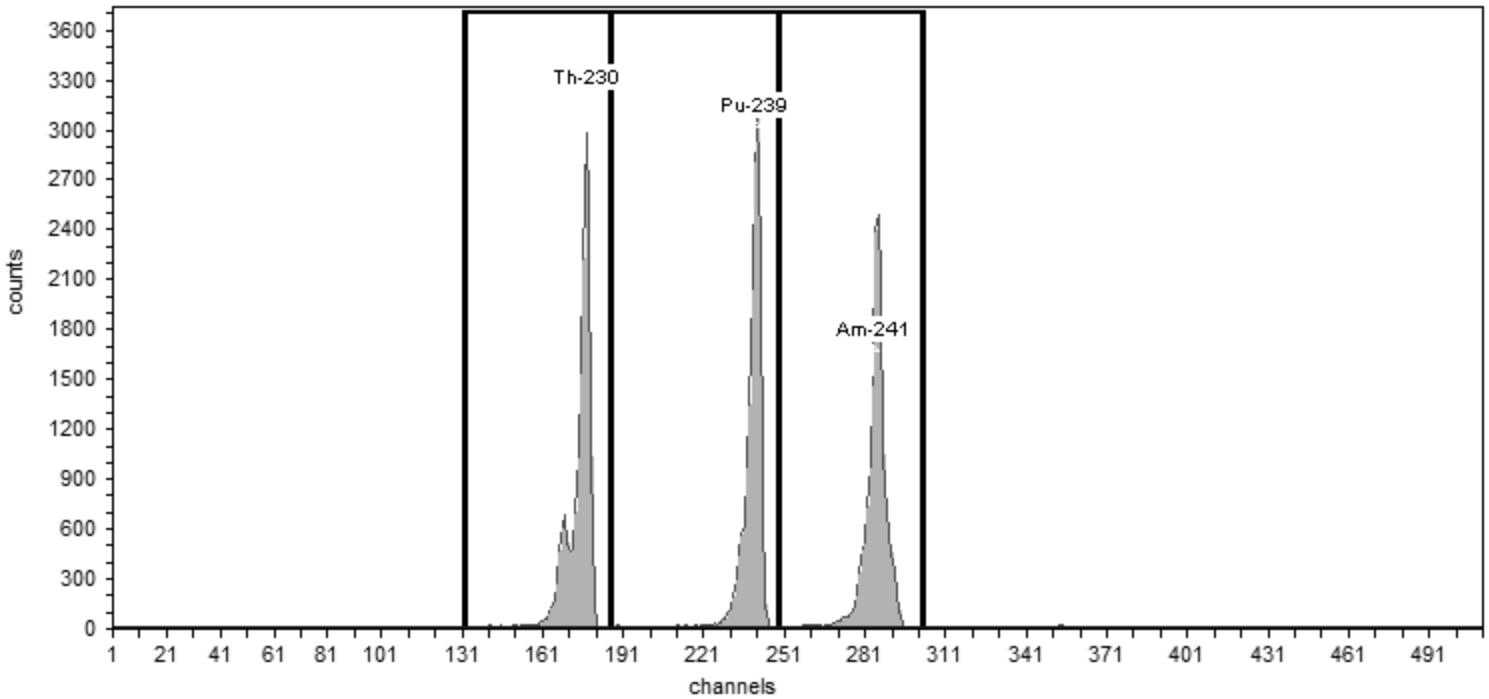
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 10/18/2015 6:57:34PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV217-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.04% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.15	16,300.00	116.43
Pu-239	240	5,155.40	186	249	30.74	16,137.00	115.26
Am-241	284	5,485.70	249	303	31.60	15,722.00	112.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:29:16PM 11/23/2015

Calibration

Sample Name: IC-8874;AV218-20151018
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 10/18/2015 9:19:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

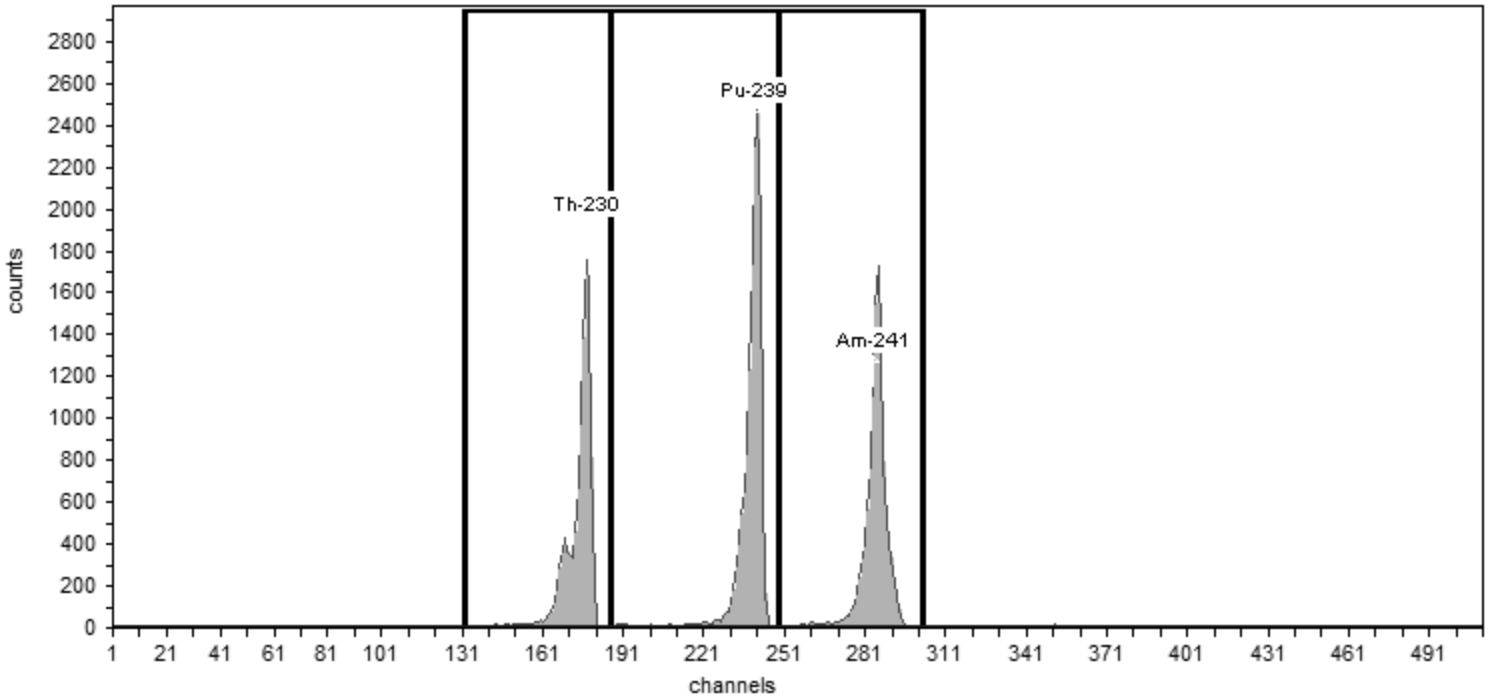
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 10/18/2015 6:57:48PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV218-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.45	10,627.00	75.91
Pu-239	240	5,155.40	186	249	34.06	14,027.00	100.19
Am-241	284	5,485.70	249	303	34.09	11,208.00	80.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:53PM 10/18/2015

Calibration

Sample Name: IC-8875;AV219-20151018
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 10/18/2015 9:19:52PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

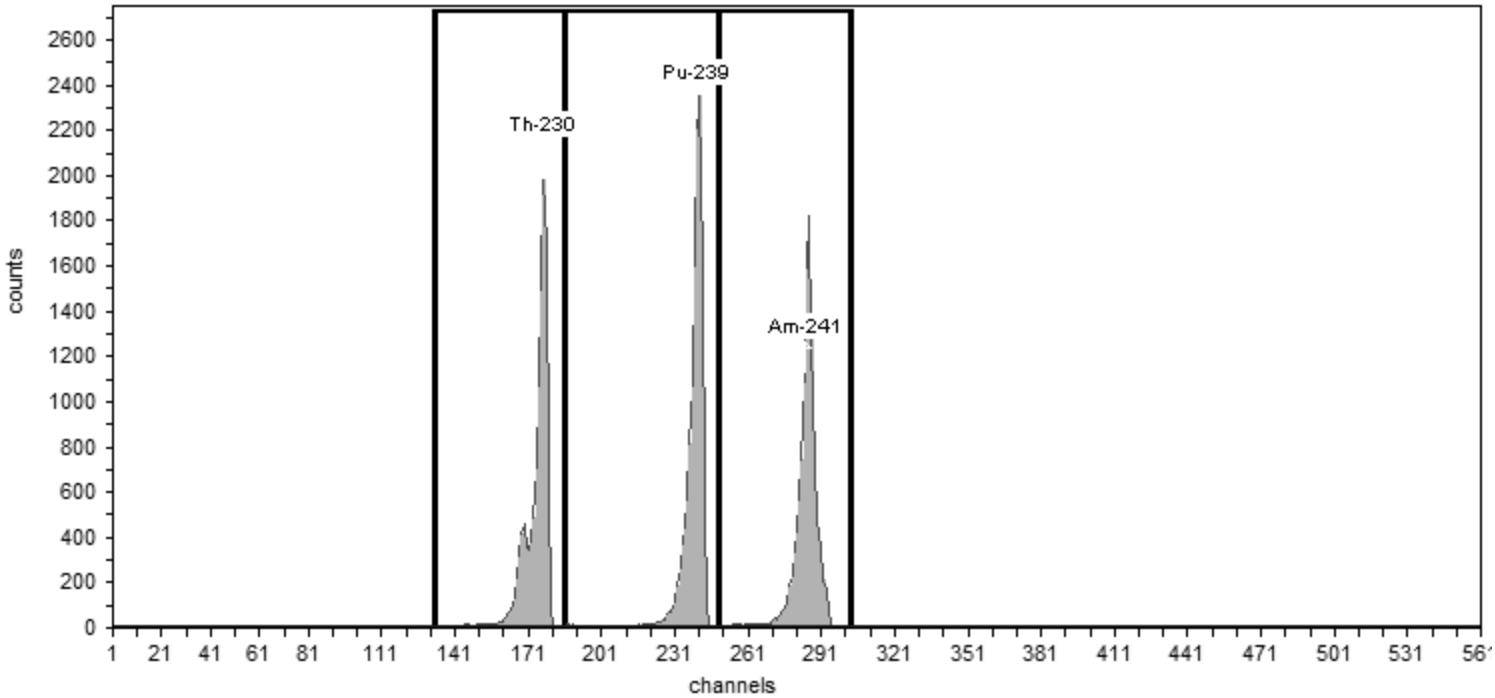
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 10/18/2015 6:57:58PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV219-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.10% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.83	11,140.00	79.57
Pu-239	240	5,155.40	186	249	31.22	12,625.00	90.18
Am-241	284	5,485.70	249	303	31.13	11,164.00	79.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:57PM 10/18/2015

Calibration

Sample Name: IC-8876;AV220-20151018
Description:
Detector: AV220

Analyst: 60040
Analysis Date: 10/18/2015 9:19:56PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

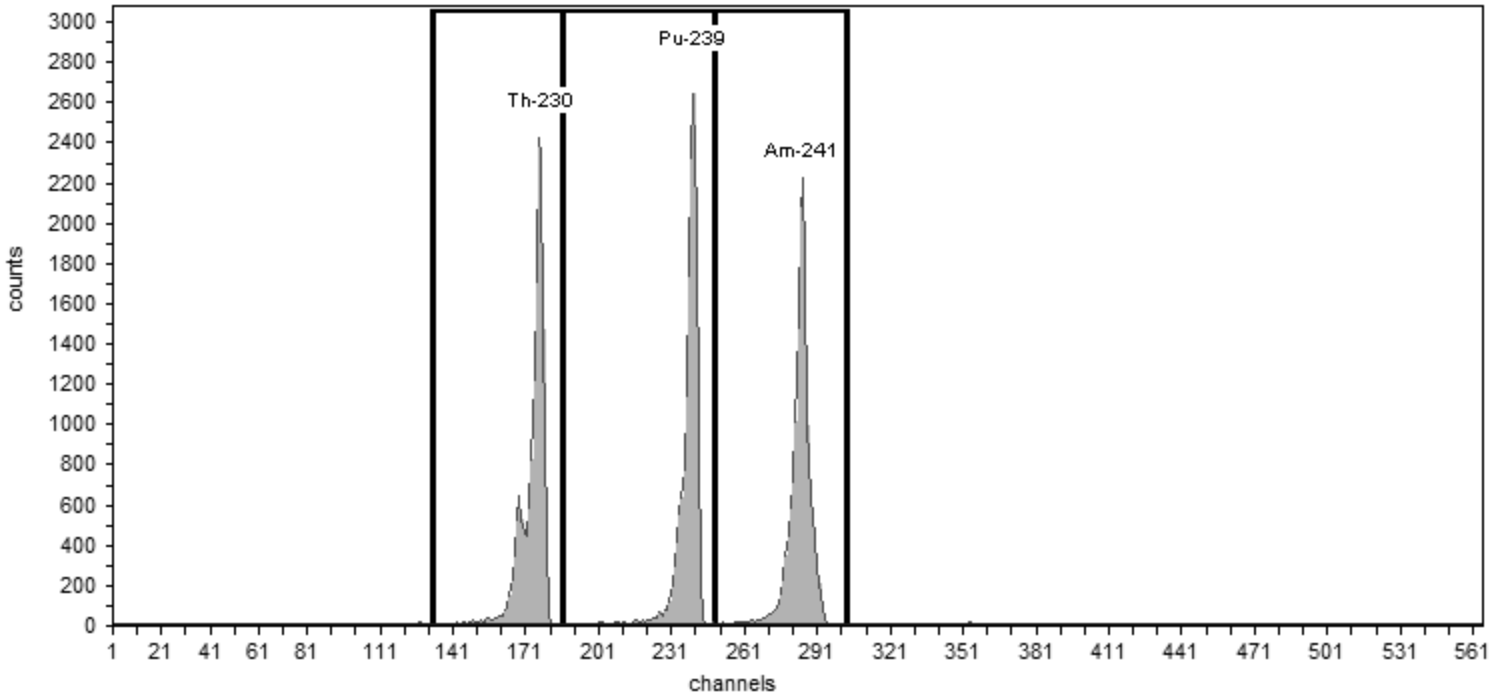
Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 10/18/2015 6:58:09PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8876;AV220-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.54% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.67	14,856.00	106.11
Pu-239	240	5,155.40	186	249	32.32	14,598.00	104.27
Am-241	284	5,485.70	249	303	34.48	14,851.00	106.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:03PM 10/18/2015

Calibration

Sample Name: IC-8877;AV221-20151018
Description:
Detector: AV221

Analyst: 60040
Analysis Date: 10/18/2015 9:20:01PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

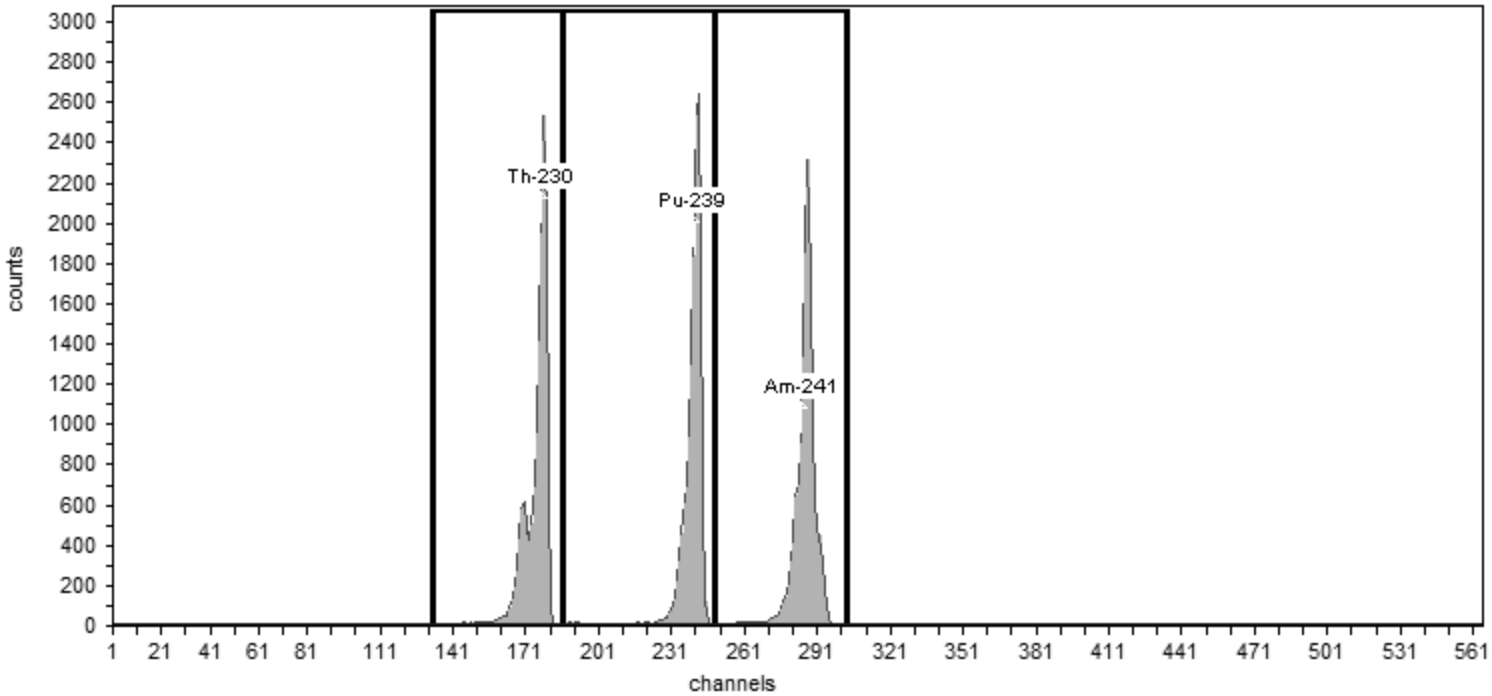
Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 10/18/2015 6:58:18PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV221-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.01% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.07	14,382.00	102.73
Pu-239	240	5,155.40	186	249	32.73	14,724.00	105.17
Am-241	284	5,485.70	249	303	31.22	14,298.00	102.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:07PM 10/18/2015

Calibration

Sample Name: IC-9520;AV222-20151018
Description:
Detector: AV222

Analyst: 60040
Analysis Date: 10/18/2015 9:20:05PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

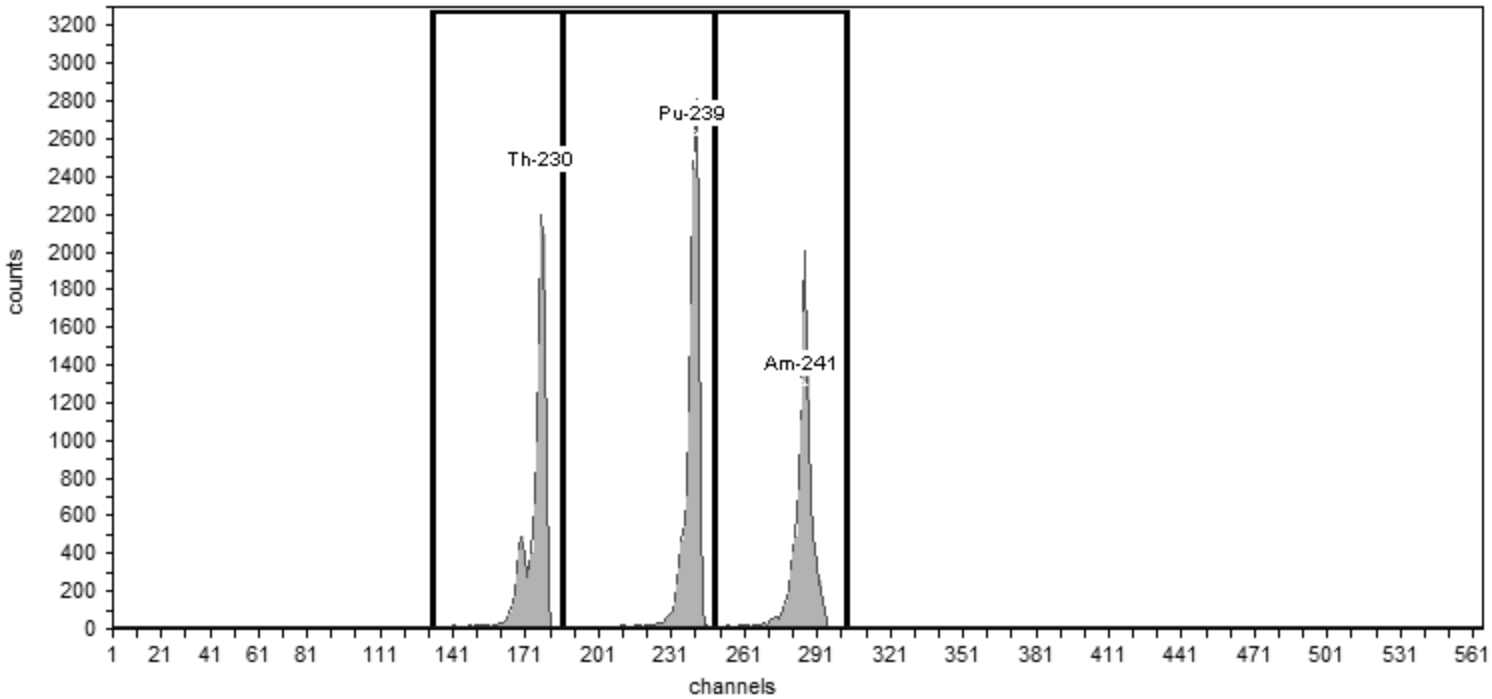
Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 10/18/2015 6:58:28PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV222-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.61% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.18	11,747.00	83.91
Pu-239	240	5,155.40	186	249	29.69	13,755.00	98.25
Am-241	284	5,485.70	249	303	28.65	11,378.00	81.27

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV147

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223444/1	10/16/15 15:47	82232-334_00001	0.2620	0.20-0.32		
ICV 160-223562/1	10/26/15 19:10	82233-334_00001	0.2656	0.20-0.32	101.4	95-105
CCV 160-268312/1	09/06/16 15:28	82232-334_00001	0.2566	0.20-0.32	98.0	95-105

Detector: AV171

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223468/1	10/16/15 18:59	82244-334_00001	0.2459	0.20-0.32		
ICV 160-223586/1	10/26/15 20:28	82241-334_00001	0.2539	0.20-0.32	103.3	95-105
CCV 160-268329/1	09/06/16 13:58	82244-334_00001	0.2413	0.20-0.32	98.2	95-105

Detector: AV172

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223469/1	10/16/15 18:59	82245-334_00001	0.2432	0.20-0.32		
ICV 160-223587/1	10/26/15 20:29	82234-334_00001	0.2387	0.20-0.32	98.2	95-105
CCV 160-268330/1	09/06/16 13:58	82245-334_00001	0.2381	0.20-0.32	97.9	95-105

Detector: AV173

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223470/1	10/16/15 19:04	82246-334_00001	0.2559	0.20-0.32		
ICV 160-223588/1	10/26/15 20:29	82236-334_00001	0.2533	0.20-0.32	99.0	95-105
CCV 160-268331/1	09/06/16 16:42	82246-334_00001	0.2508	0.20-0.32	98.0	95-105

Detector: AV175

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223472/1	10/17/15 14:48	82232-334_00001	0.2638	0.20-0.32		
ICV 160-223590/2	10/31/15 17:26	82233-334_00001	0.2671	0.20-0.32	101.3	95-105
CCV 160-268386/1	09/07/16 08:37	82232-334_00001	0.2582	0.20-0.32	97.9	95-105

Detector: AV188

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223485/1	10/17/15 14:51	82247-334_00001	0.2477	0.20-0.32		
ICV 160-223603/1	10/31/15 14:17	82235-334_00001	0.2452	0.20-0.32	99.0	95-105
CCV 160-268333/2	09/06/16 16:43	82247-334_00001	0.2361	0.20-0.32	95.3	95-105

Detector: AV189

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223486/1	10/17/15 18:19	82232-334_00001	0.2637	0.20-0.32		
ICV 160-223604/1	11/01/15 14:23	82233-334_00001	0.2658	0.20-0.32	100.8	95-105
CCV 160-268334/1	09/06/16 14:01	82232-334_00001	0.2630	0.20-0.32	99.7	95-105

Detector: AV190

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223487/1	10/17/15 18:13	82233-334_00001	0.2654	0.20-0.32		
ICV 160-223605/1	11/01/15 14:23	82232-334_00001	0.2608	0.20-0.32	98.3	95-105
CCV 160-268335/1	09/06/16 14:01	82233-334_00001	0.2682	0.20-0.32	101.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV191

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223488/1	10/17/15 18:13	82234-334_00001	0.2422	0.20-0.32		
ICV 160-223606/2	11/01/15 18:11	82245-334_00001	0.2464	0.20-0.32	101.7	95-105
CCV 160-262173/1	07/26/16 17:46	82234-334_00001	0.2342	0.20-0.32	96.7	95-105
CCV 160-268336/1	09/06/16 14:00	82234-334_00001	0.2371	0.20-0.32	97.9	95-105

Detector: AV193

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223490/1	10/17/15 18:13	82236-334_00001	0.2542	0.20-0.32		
ICV 160-223608/1	11/01/15 14:24	82246-334_00001	0.2559	0.20-0.32	100.6	95-105
CCV 160-268338/1	09/06/16 14:00	82236-334_00001	0.2486	0.20-0.32	97.8	95-105

Detector: AV194

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223491/1	10/17/15 18:13	82237-334_00003	0.2483	0.20-0.32		
ICV 160-223609/1	11/01/15 14:24	82242-334_00001	0.2443	0.20-0.32	98.4	95-105
CCV 160-262175/1	07/26/16 11:01	82237-334_00003	0.2462	0.20-0.32	99.2	95-105

Detector: AV212

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223509/1	10/18/15 16:12	82243-334_00001	0.2701	0.20-0.32		
ICV 160-223627/2	11/01/15 18:11	82240-334_00001	0.2703	0.20-0.32	100.1	95-105
CCV 160-262186/1	07/26/16 15:09	82243-334_00001	0.2698	0.20-0.32	99.9	95-105

Detector: AV213

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223878/1	10/18/15 16:12	82244-334_00001	0.2489	0.20-0.32		
ICV 160-223628/1	11/01/15 16:04	82241-334_00001	0.2572	0.20-0.32	103.3	95-105
CCV 160-262224/1	07/27/16 06:18	82244-334_00001	0.2462	0.20-0.32	98.9	95-105

Detector: AV214

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223510/1	10/18/15 16:12	82245-334_00001	0.2443	0.20-0.32		
ICV 160-223629/1	11/01/15 16:04	82234-334_00001	0.2417	0.20-0.32	98.9	95-105
CCV 160-262187/1	07/26/16 16:33	82245-334_00001	0.2384	0.20-0.32	97.6	95-105

Detector: AV215

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223511/1	10/18/15 16:12	82246-334_00001	0.2615	0.20-0.32		
ICV 160-223630/1	11/01/15 16:04	82236-334_00001	0.2579	0.20-0.32	98.6	95-105
CCV 160-262188/1	07/26/16 16:34	82246-334_00001	0.2546	0.20-0.32	97.4	95-105

Detector: AV217

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223513/1	10/18/15 18:57	82232-334_00001	0.2604	0.20-0.32		
ICV 160-223632/1	11/01/15 19:16	82233-334_00001	0.2629	0.20-0.32	101.0	95-105
CCV 160-262189/1	07/26/16 16:34	82232-334_00001	0.2555	0.20-0.32	98.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV218

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223514/1	10/18/15 18:57	82233-334_00001	0.2654	0.20-0.32		
ICV 160-223633/1	11/01/15 19:17	82232-334_00001	0.2638	0.20-0.32	99.4	95-105
CCV 160-262225/1	07/27/16 06:19	82233-334_00001	0.2703	0.20-0.32	101.8	95-105
CCV 160-268358/1	09/06/16 11:25	82233-334_00001	0.2677	0.20-0.32	100.8	95-105

Detector: AV219

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223515/1	10/18/15 18:57	82234-334_00001	0.2410	0.20-0.32		
ICV 160-223634/1	11/01/15 19:17	82245-334_00001	0.2457	0.20-0.32	102.0	95-105
CCV 160-262190/1	07/26/16 16:34	82234-334_00001	0.2307	0.20-0.32	95.7	95-105
CCV 160-268359/1	09/06/16 11:25	82234-334_00001	0.2290	0.20-0.32	95.0	95-105

Detector: AV220

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223516/1	10/18/15 18:58	82235-334_00001	0.2454	0.20-0.32		
ICV 160-223635/1	11/01/15 19:17	82247-334_00001	0.2459	0.20-0.32	100.2	95-105
CCV 160-268360/1	09/06/16 11:26	82235-334_00001	0.2363	0.20-0.32	96.3	95-105

Detector: AV221

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223517/1	10/18/15 18:58	82236-334_00001	0.2501	0.20-0.32		
ICV 160-223636/1	11/01/15 19:17	82246-334_00001	0.2527	0.20-0.32	101.1	95-105
CCV 160-262192/1	07/26/16 16:34	82236-334_00001	0.2478	0.20-0.32	99.1	95-105
CCV 160-268361/1	09/06/16 11:26	82236-334_00001	0.2498	0.20-0.32	99.9	95-105

Detector: AV222

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223518/1	10/18/15 18:58	82237-334_00003	0.2461	0.20-0.32		
ICV 160-223637/1	11/01/15 19:18	82242-334_00001	0.2452	0.20-0.32	99.6	95-105
CCV 160-268362/1	09/06/16 10:08	82237-334_00003	0.2424	0.20-0.32	98.5	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:20:48PM 10/26/2015

Calibration

Sample Name: ICV-8874;AV147-20151026
Description:
Detector: AV147

Analyst: 60040
Analysis Date: 10/26/2015 8:20:47PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

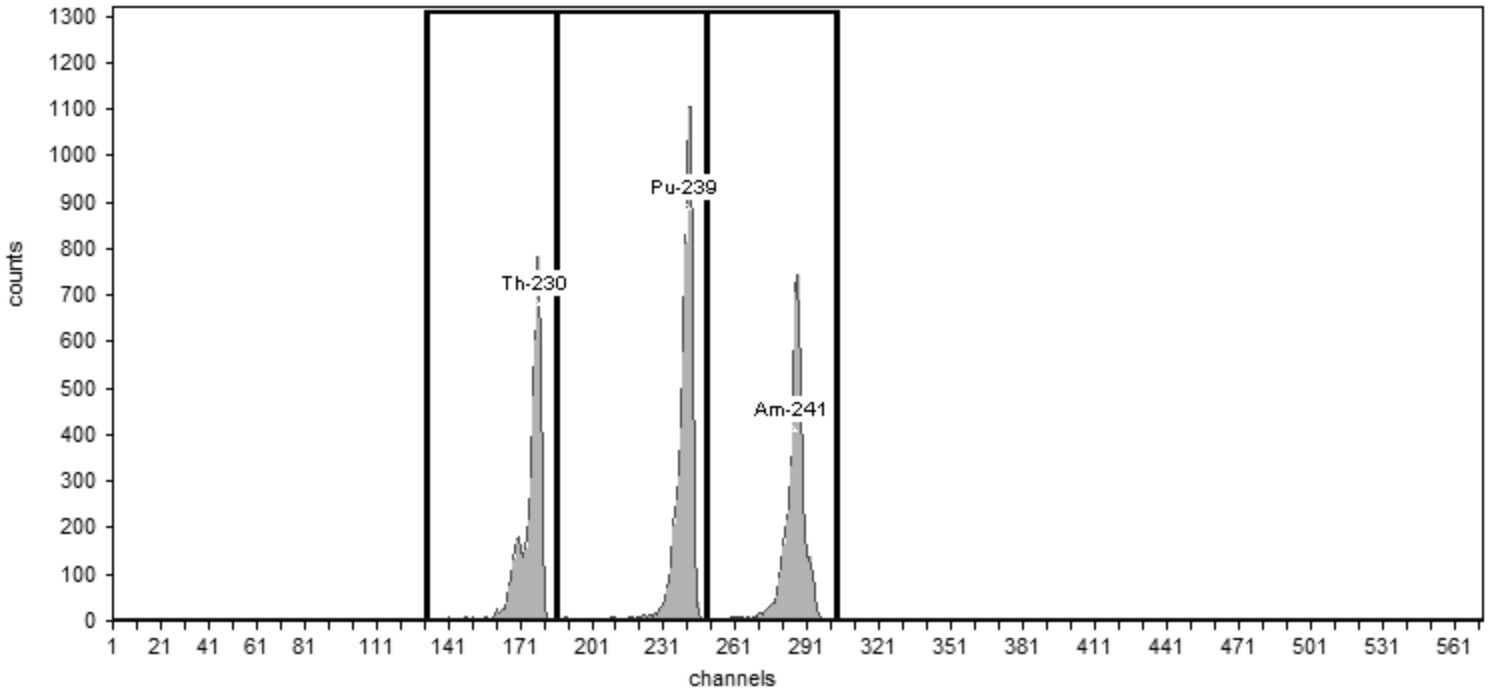
Detector: AV147 , SN: 50-05/R1
Acquisition Start Date: 10/26/2015 7:10:15PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8874;AV147-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.32	4,467.00	74.45
Pu-239	240	5,155.40	186	249	32.83	6,174.00	102.90
Am-241	284	5,485.70	249	303	32.02	4,766.00	79.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:07PM 11/23/2015

Calibration

Sample Name: ICV-9793;AV171-20151026
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 10/27/2015 2:14:25PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

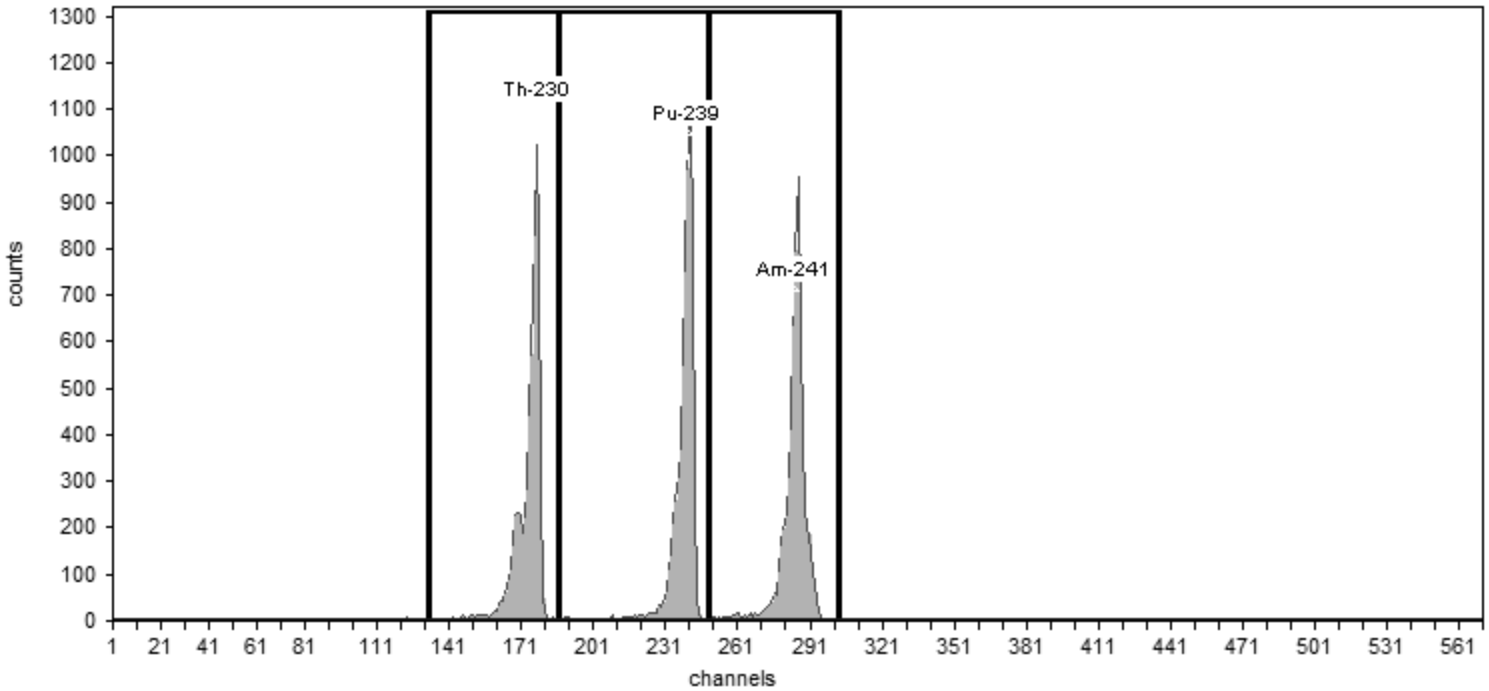
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 10/26/2015 8:28:50PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9793;AV171-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.39% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.10	6,053.00	100.88
Pu-239	240	5,155.40	186	249	33.57	6,203.00	103.38
Am-241	284	5,485.70	249	303	32.46	6,038.00	100.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:29PM 10/27/2015

Calibration

Sample Name: ICV-8875;AV172-20151026
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 10/27/2015 2:14:28PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

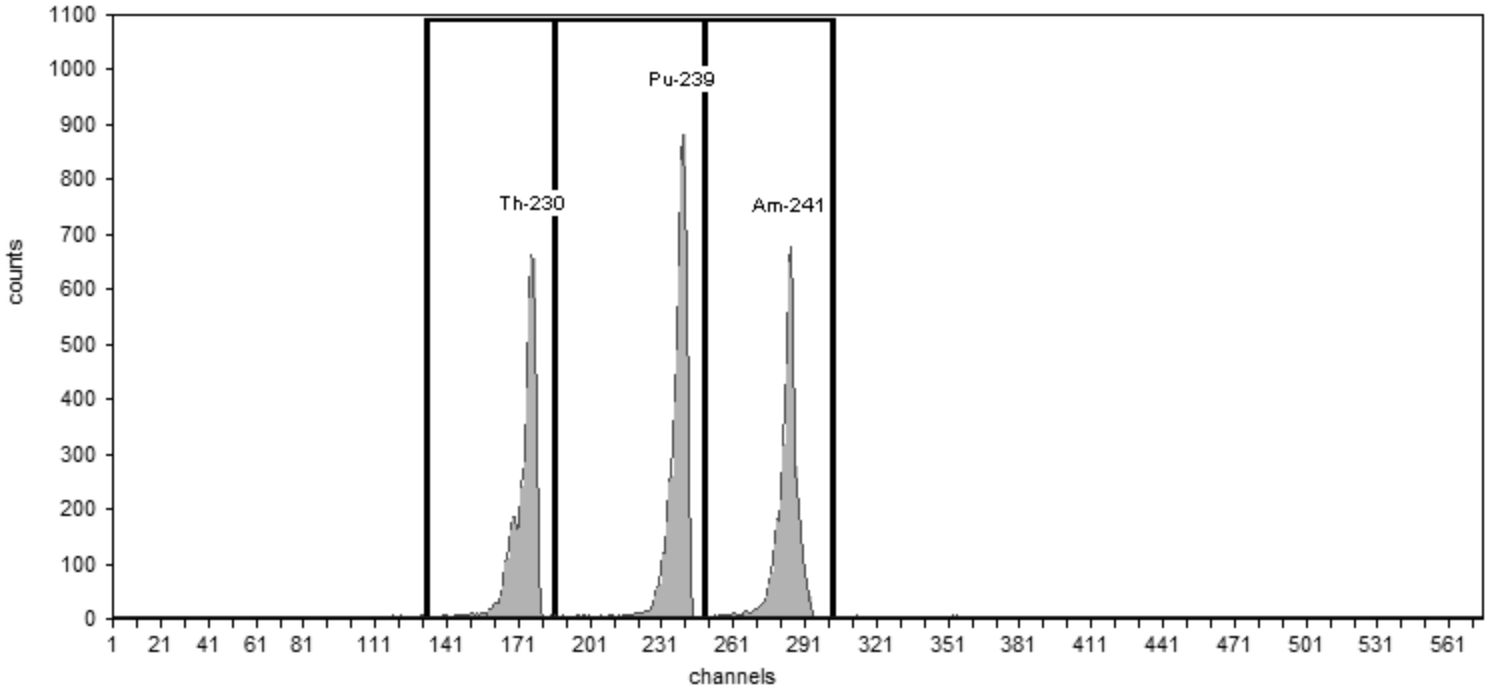
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 10/26/2015 8:29:08PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8875;AV172-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.87% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.98	4,676.00	77.93
Pu-239	240	5,155.40	186	249	38.38	5,497.00	91.62
Am-241	284	5,485.70	249	303	34.35	4,683.00	78.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:37PM 10/27/2015

Calibration

Sample Name: ICV-8877;AV173-20151026
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 10/27/2015 2:14:36PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

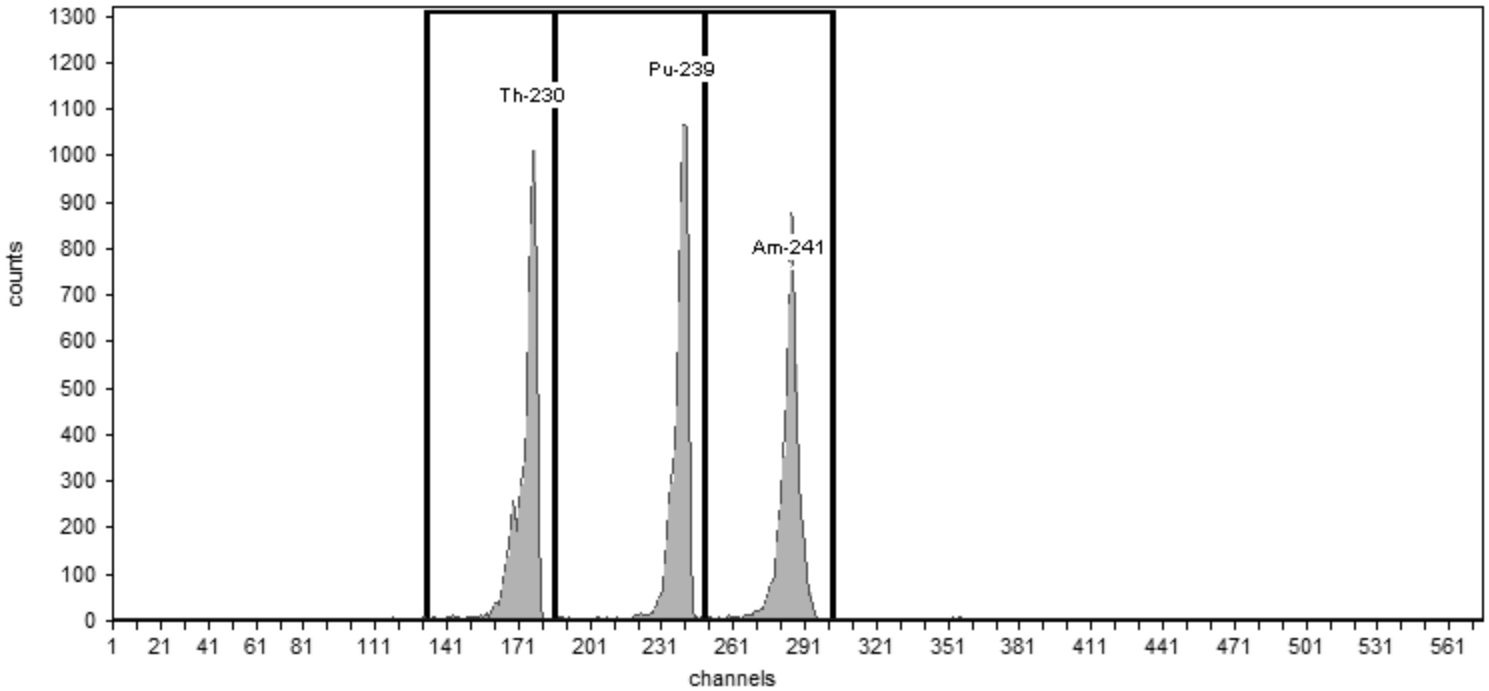
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 10/26/2015 8:29:21PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8877;AV173-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.33% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.52	6,350.00	105.83
Pu-239	240	5,155.40	186	249	36.04	6,502.00	108.37
Am-241	284	5,485.70	249	303	35.83	6,001.00	100.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:49:57PM 11/1/2015

Calibration

Sample Name: ICV-8874;AV175-20151031a
Description:
Detector: AV175

Analyst: 60040
Analysis Date: 11/1/2015 1:49:56PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

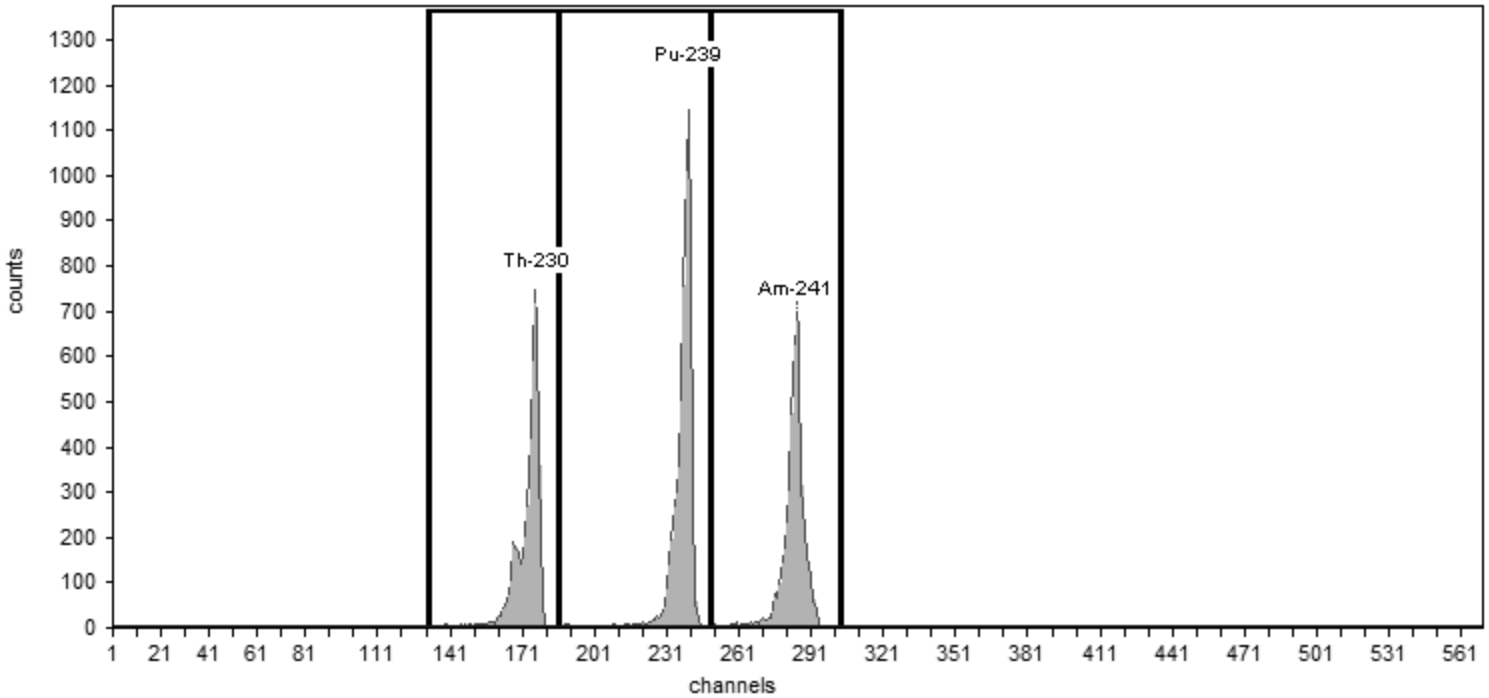
Detector: AV175 , SN: 50-117H1
Acquisition Start Date: 10/31/2015 5:26:50PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8874;AV175-2015103

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.71% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.68	4,549.00	75.82
Pu-239	240	5,155.40	186	249	31.45	6,204.00	103.40
Am-241	284	5,485.70	249	303	31.89	4,741.00	79.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:41PM 11/23/2015

Calibration

Sample Name: ICV-8876;AV188-20151031
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 10/31/2015 3:51:35PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

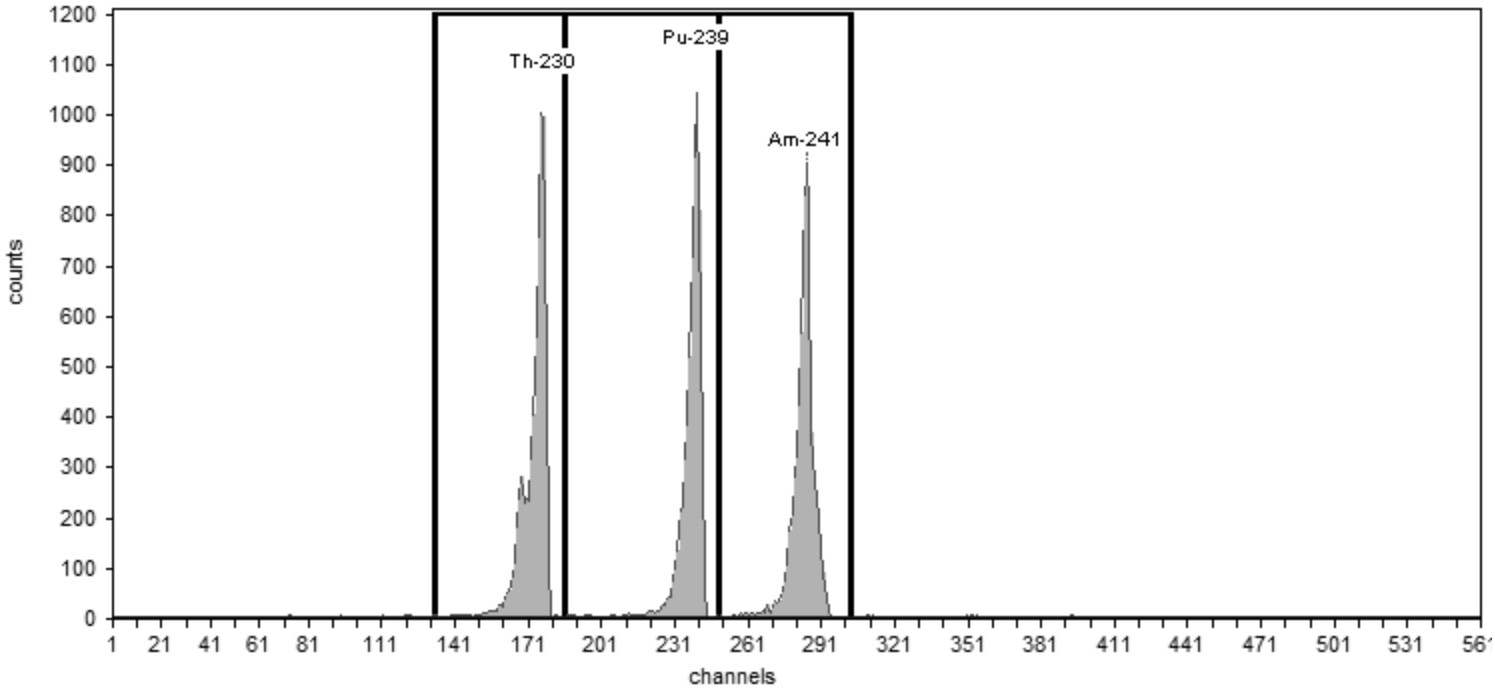
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 10/31/2015 2:17:22PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8876;AV188-2015103

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.52% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.48	6,534.00	108.90
Pu-239	240	5,155.40	186	249	34.12	6,102.00	101.70
Am-241	284	5,485.70	249	303	31.55	6,334.00	105.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:42PM 11/1/2015

Calibration

Sample Name: ICV-8874;AV189-20151101
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 11/1/2015 3:55:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

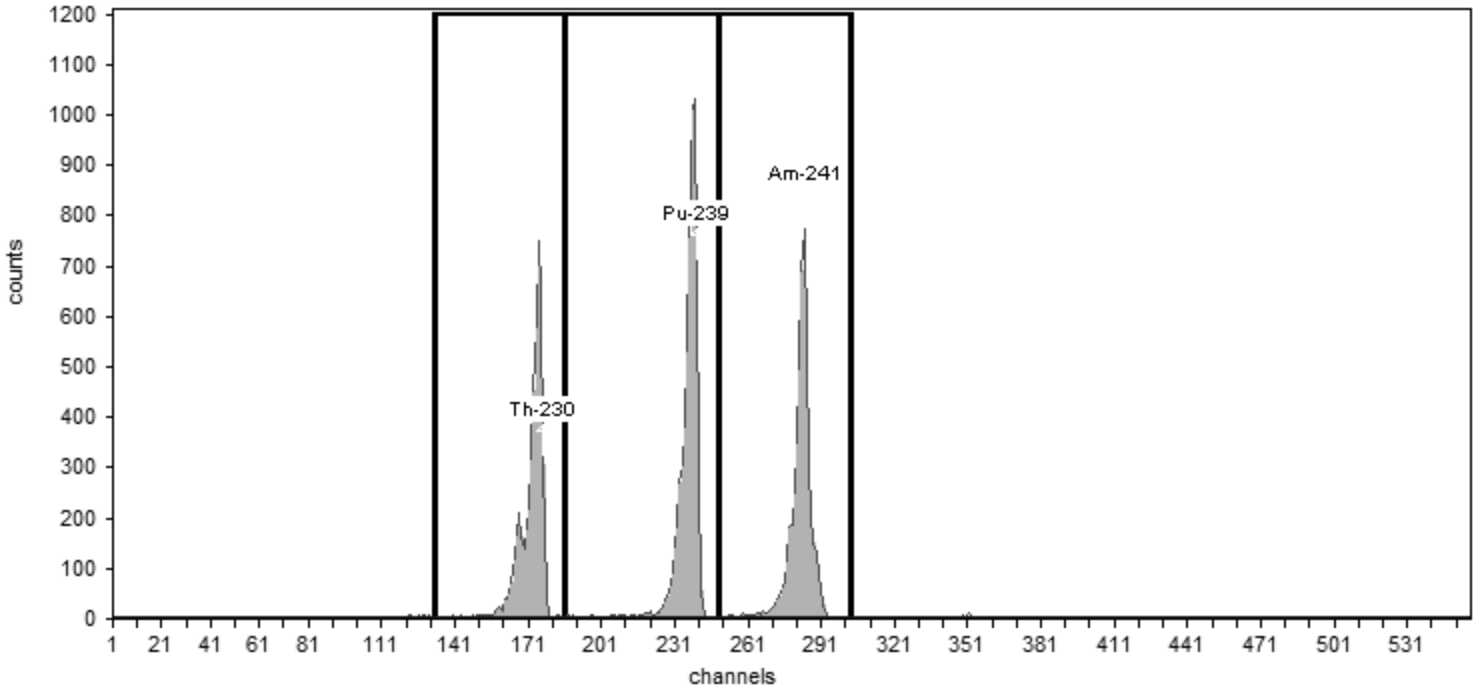
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 11/1/2015 2:23:08PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8874;AV189-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.58% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.61	4,557.00	75.95
Pu-239	240	5,155.40	186	249	33.80	5,981.00	99.68
Am-241	284	5,485.70	249	303	32.61	4,859.00	80.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:45PM 11/1/2015

Calibration

Sample Name: ICV-7107;AV190-20151101
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 11/1/2015 3:55:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

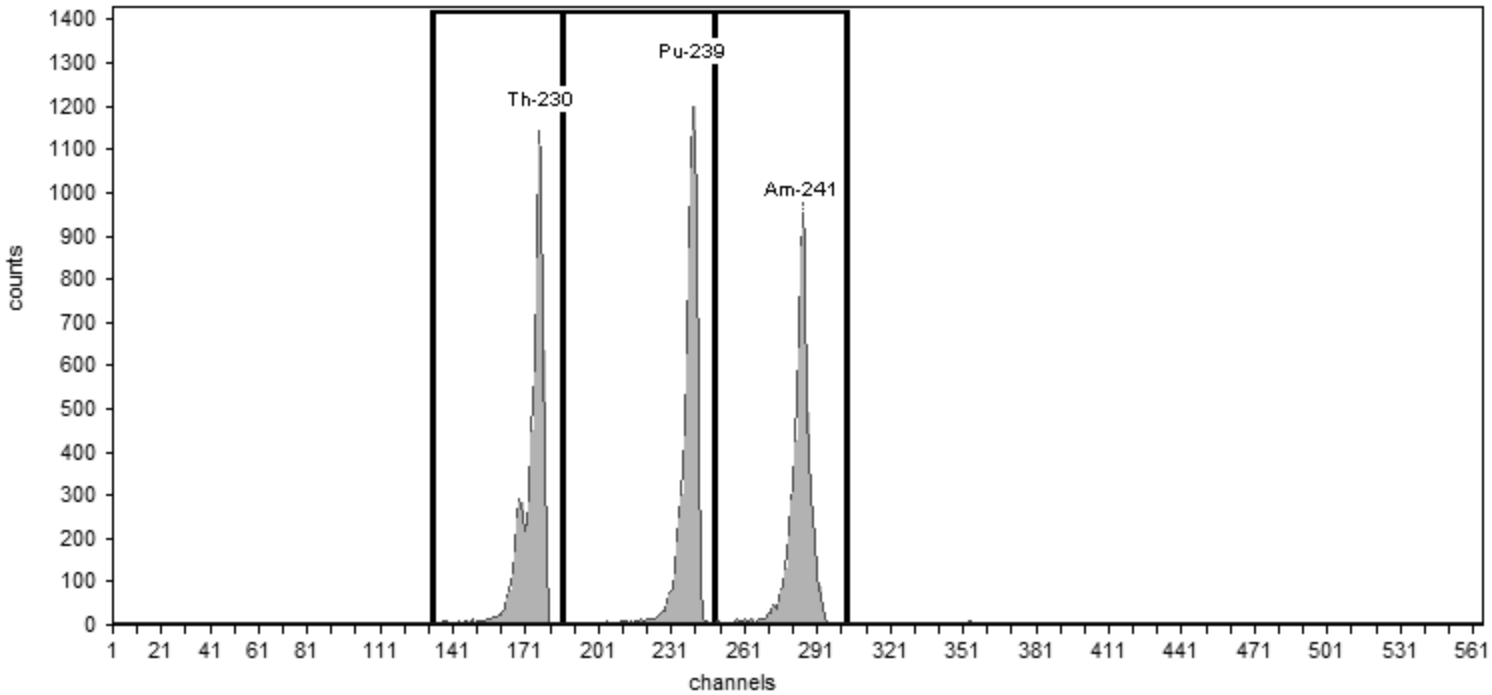
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 11/1/2015 2:23:19PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV190-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.08% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.46	7,072.00	117.87
Pu-239	240	5,155.40	186	249	36.05	6,965.00	116.08
Am-241	284	5,485.70	249	303	33.49	6,633.00	110.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:12:43PM 11/1/2015

Calibration

Sample Name: ICV-9884;AV191-20151101a
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 11/1/2015 7:12:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

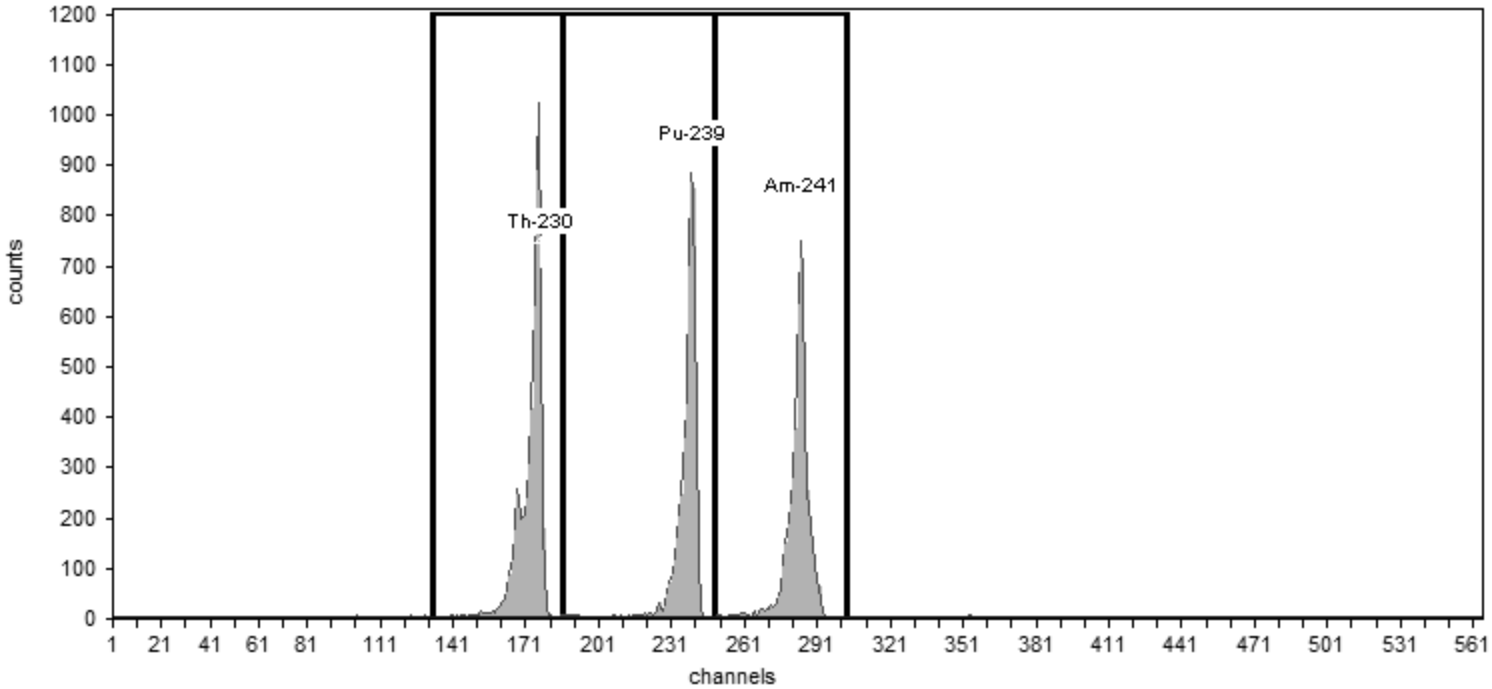
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 11/1/2015 6:11:24PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9884;AV191-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.64% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.76	5,906.00	98.43
Pu-239	240	5,155.40	186	249	28.60	4,838.00	80.63
Am-241	284	5,485.70	249	303	31.58	4,920.00	82.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:48PM 11/23/2015

Calibration

Sample Name: ICV-9885;AV193-20151101
Description:
Detector: AV193

Analyst: 60040
Analysis Date: 11/1/2015 3:55:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

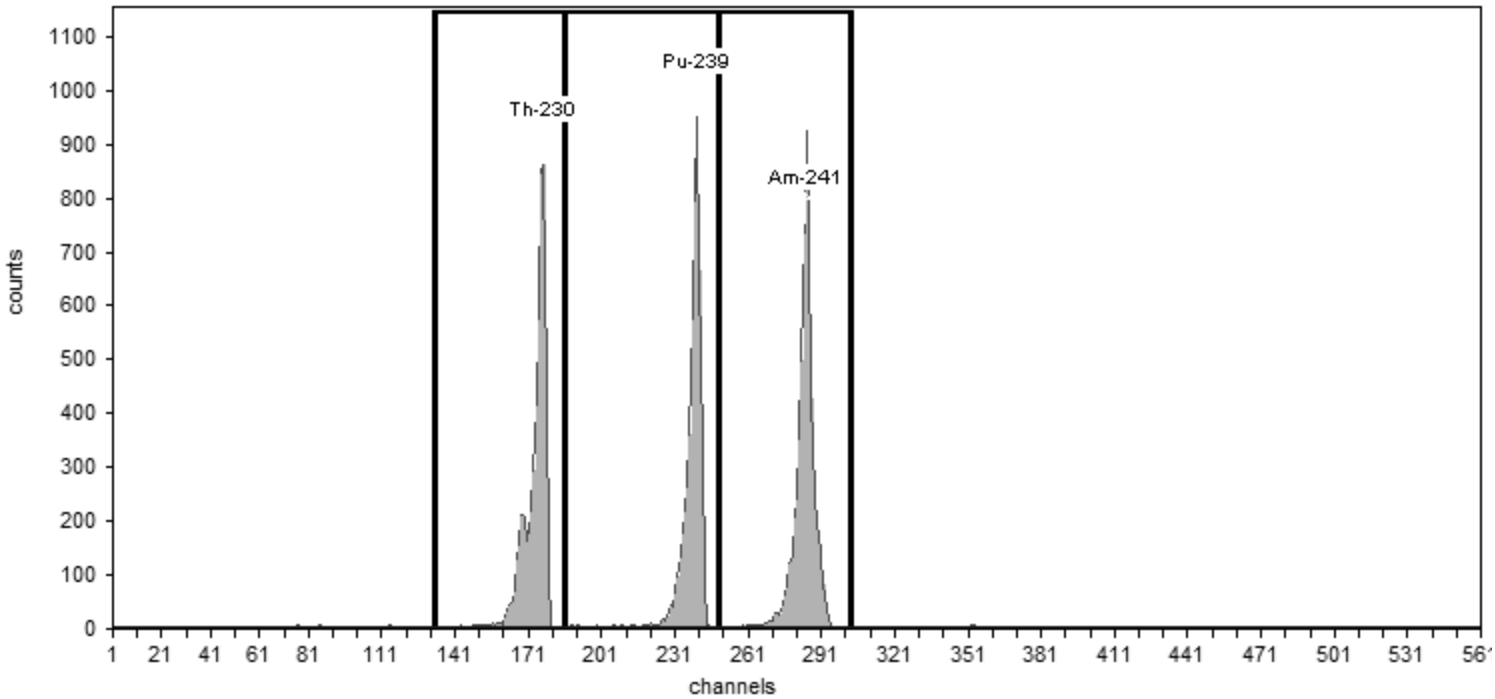
Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 11/1/2015 2:24:16PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV193-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.59% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.65	5,075.00	84.58
Pu-239	240	5,155.40	186	249	29.99	4,901.00	81.68
Am-241	284	5,485.70	249	303	30.60	5,573.00	92.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:57PM 11/1/2015

Calibration

Sample Name: ICV-9794;AV194-20151101
Description:
Detector: AV194

Analyst: 60040
Analysis Date: 11/1/2015 3:55:56PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

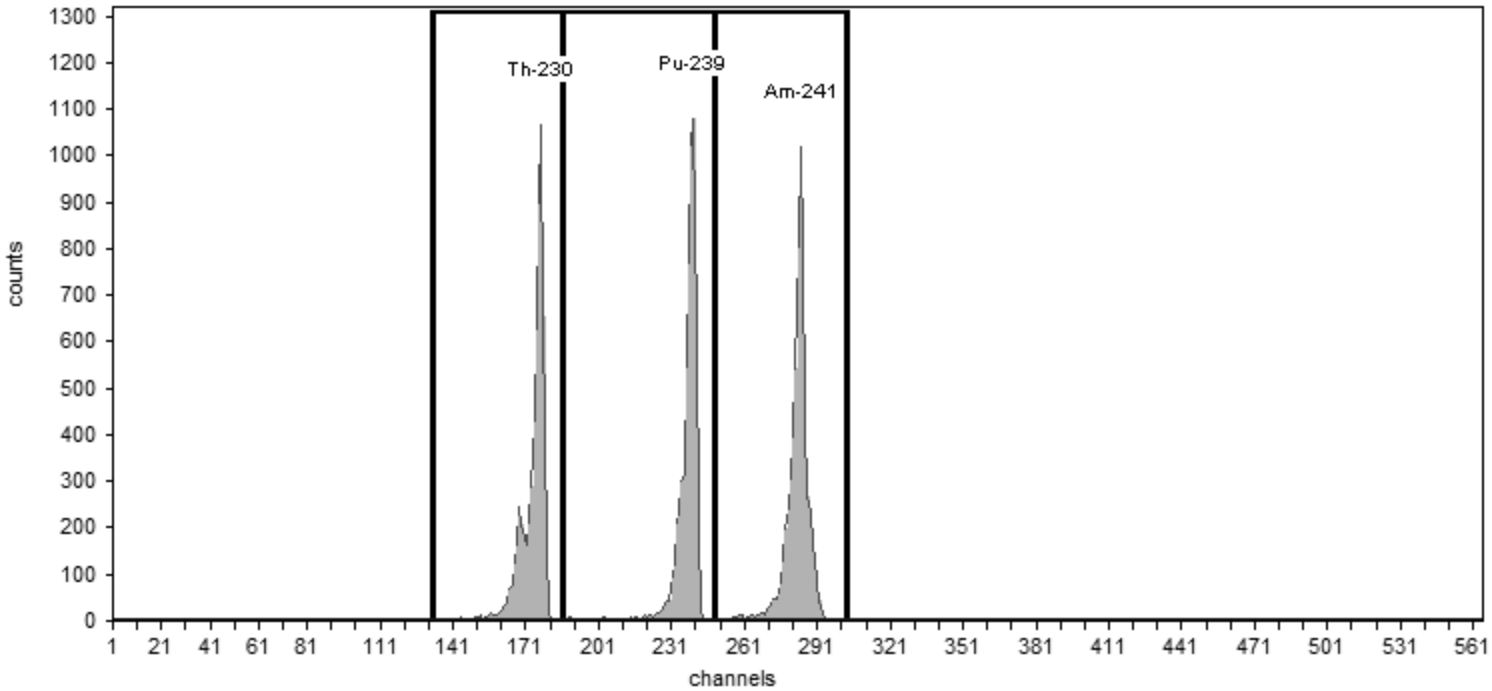
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 11/1/2015 2:24:38PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9794;AV194-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.43% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.71	5,730.00	95.50
Pu-239	240	5,155.40	186	249	31.56	5,754.00	95.90
Am-241	284	5,485.70	249	303	29.93	6,187.00	103.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:12:57PM 11/1/2015

Calibration

Sample Name: ICV-9792;AV212-20151101a
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 11/1/2015 7:12:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

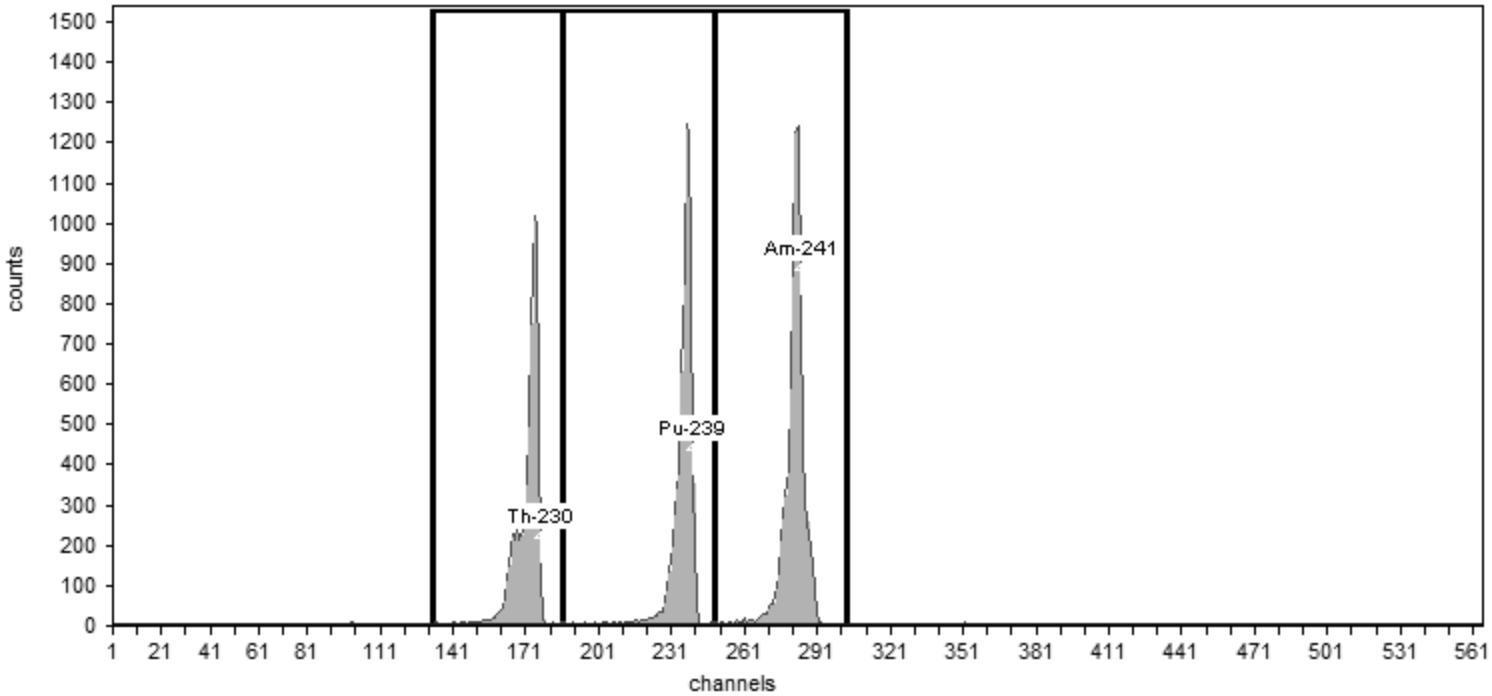
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 11/1/2015 6:11:55PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9792;AV212-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.03% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.44	6,188.00	103.13
Pu-239	240	5,155.40	186	249	33.67	6,990.00	116.50
Am-241	284	5,485.70	249	303	32.70	7,942.00	132.37

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:06:59PM 11/1/2015

Calibration

Sample Name: ICV-9793;AV213-20151101
Description:
Detector: AV213

Analyst: 60040
Analysis Date: 11/1/2015 6:06:58PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

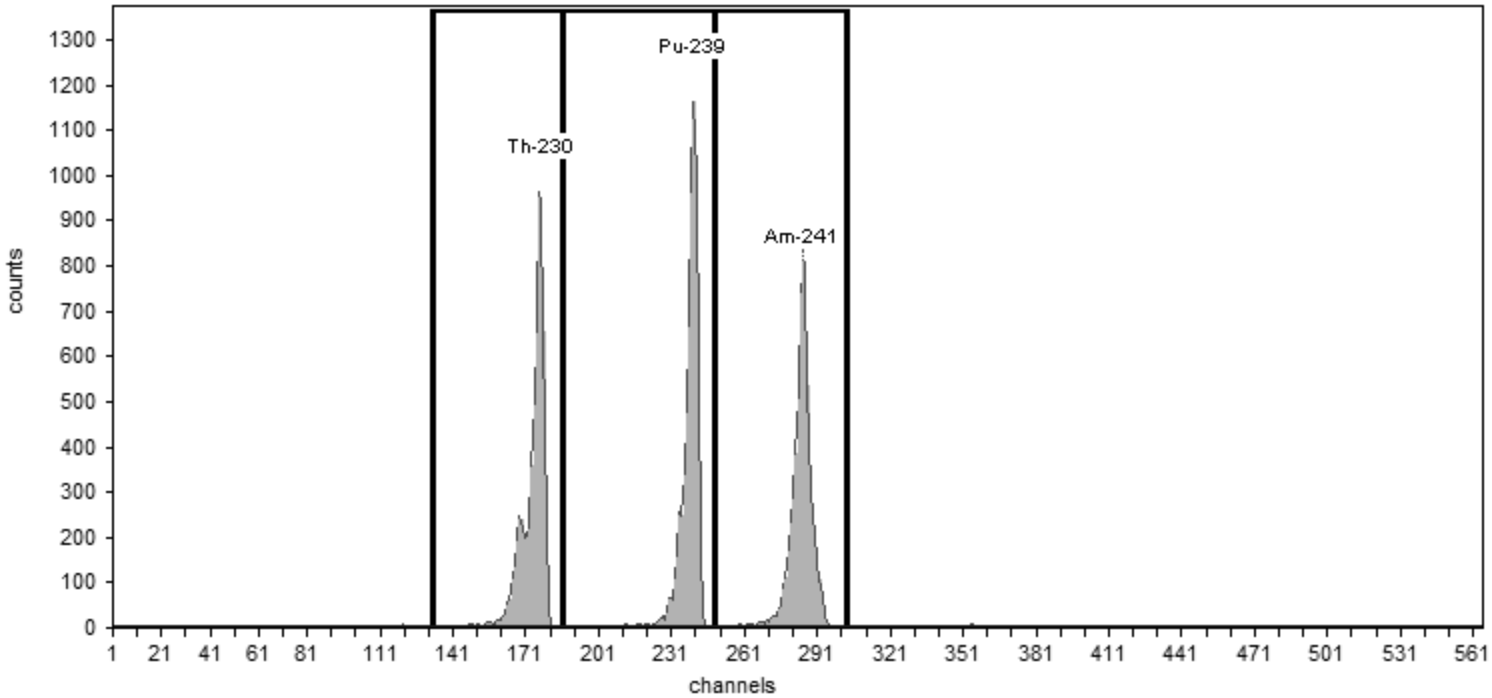
Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 11/1/2015 4:04:09PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9793;AV213-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.72% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.58	6,116.00	101.93
Pu-239	240	5,155.40	186	249	32.86	6,409.00	106.82
Am-241	284	5,485.70	249	303	38.21	6,006.00	100.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:50PM 11/23/2015

Calibration

Sample Name: ICV-8875;AV214-20151101
Description:
Detector: AV214

Analyst: 60040
Analysis Date: 11/1/2015 6:07:05PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

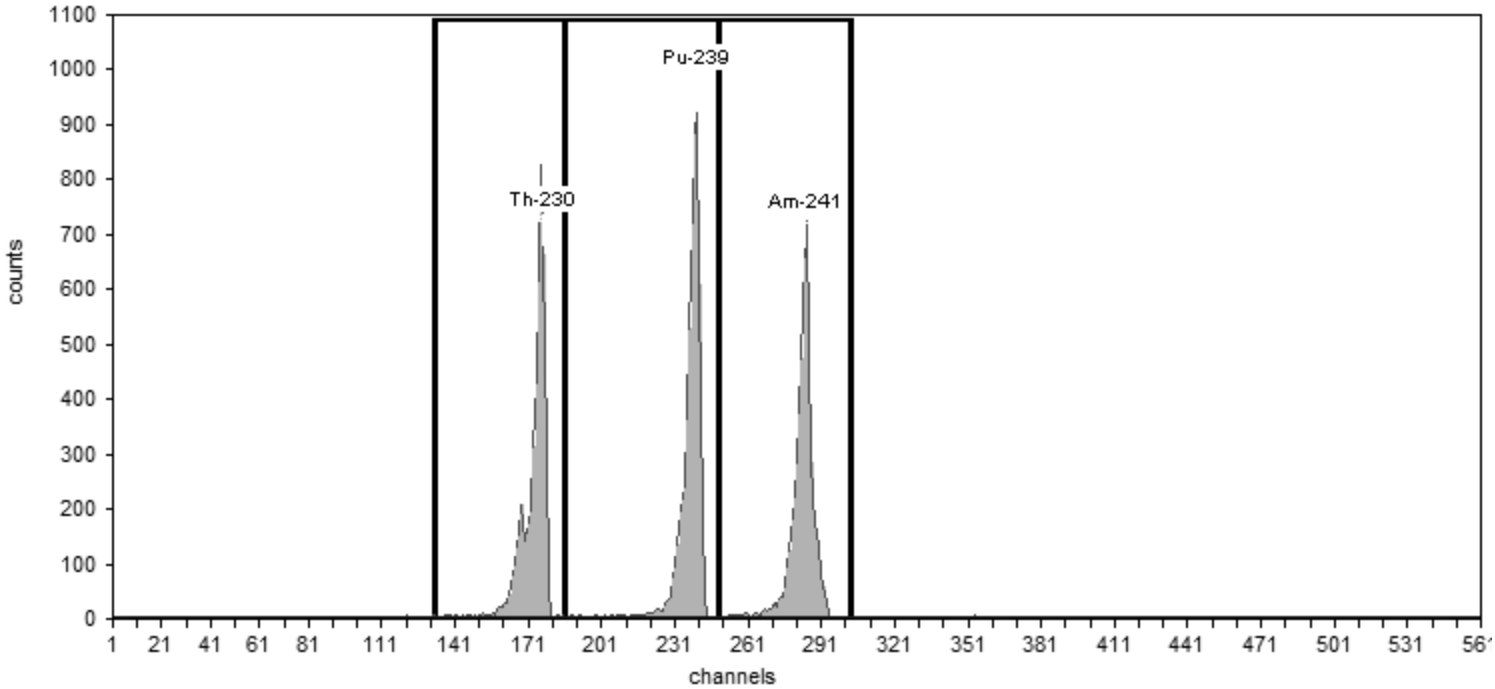
Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 11/1/2015 4:04:26PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8875;AV214-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.17% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.65	4,746.00	79.10
Pu-239	240	5,155.40	186	249	35.35	5,432.00	90.53
Am-241	284	5,485.70	249	303	35.57	4,836.00	80.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:10PM 11/1/2015

Calibration

Sample Name: ICV-8877;AV215-20151101
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 11/1/2015 6:07:08PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

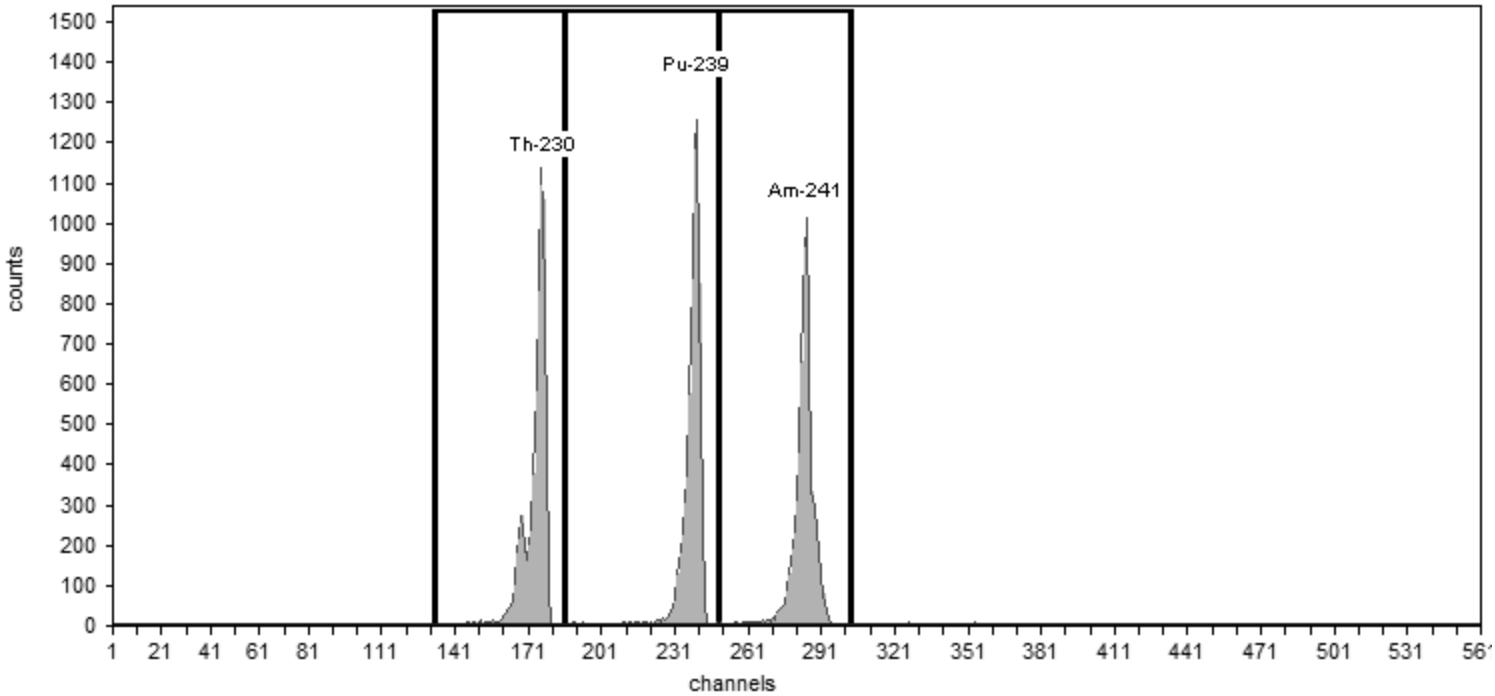
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 11/1/2015 4:04:37PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8877;AV215-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.79% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.23	6,371.00	106.18
Pu-239	240	5,155.40	186	249	31.25	6,534.00	108.90
Am-241	284	5,485.70	249	303	31.37	6,275.00	104.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:31PM 11/1/2015

Calibration

Sample Name: ICV-8874;AV217-20151101
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 11/1/2015 8:23:30PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

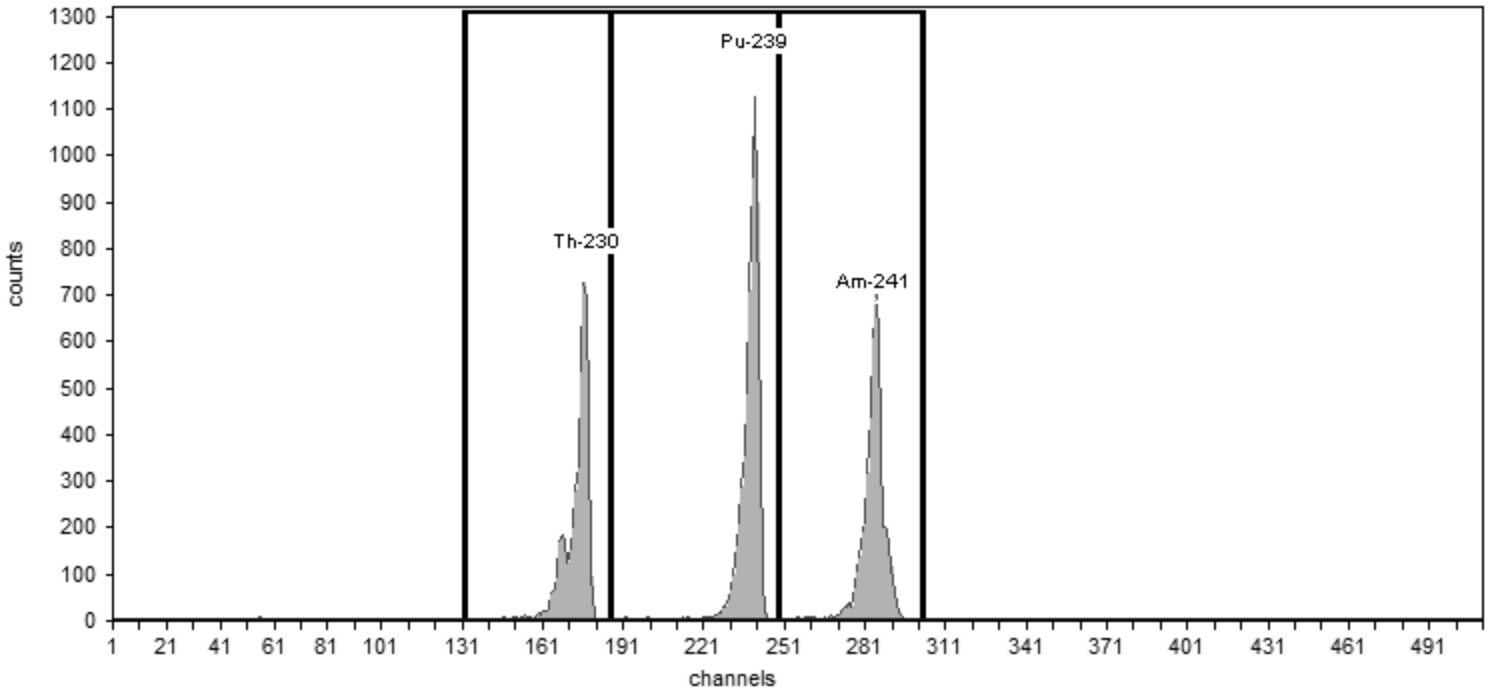
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 11/1/2015 7:16:52PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-8874;AV217-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.29% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.96	4,431.00	73.85
Pu-239	240	5,155.40	186	249	32.16	6,033.00	100.55
Am-241	284	5,485.70	249	303	34.28	4,782.00	79.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:35PM 11/1/2015

Calibration

Sample Name: ICV-7107;AV218-20151101
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 11/1/2015 8:23:34PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

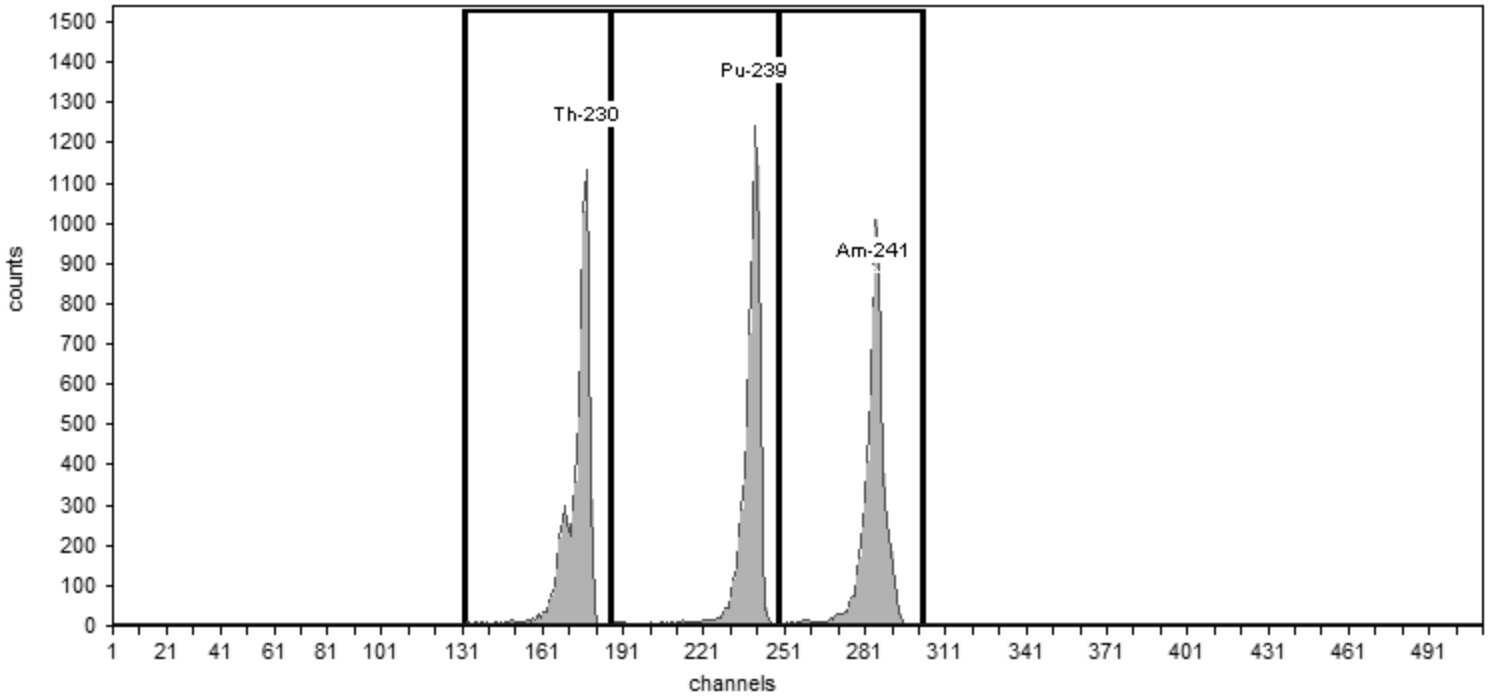
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 11/1/2015 7:17:01PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV218-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.38% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.97	7,076.00	117.93
Pu-239	240	5,155.40	186	249	34.10	6,986.00	116.43
Am-241	284	5,485.70	249	303	36.49	6,843.00	114.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:57PM 11/23/2015

Calibration

Sample Name: ICV-9884;AV219-20151101
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 11/1/2015 8:23:37PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

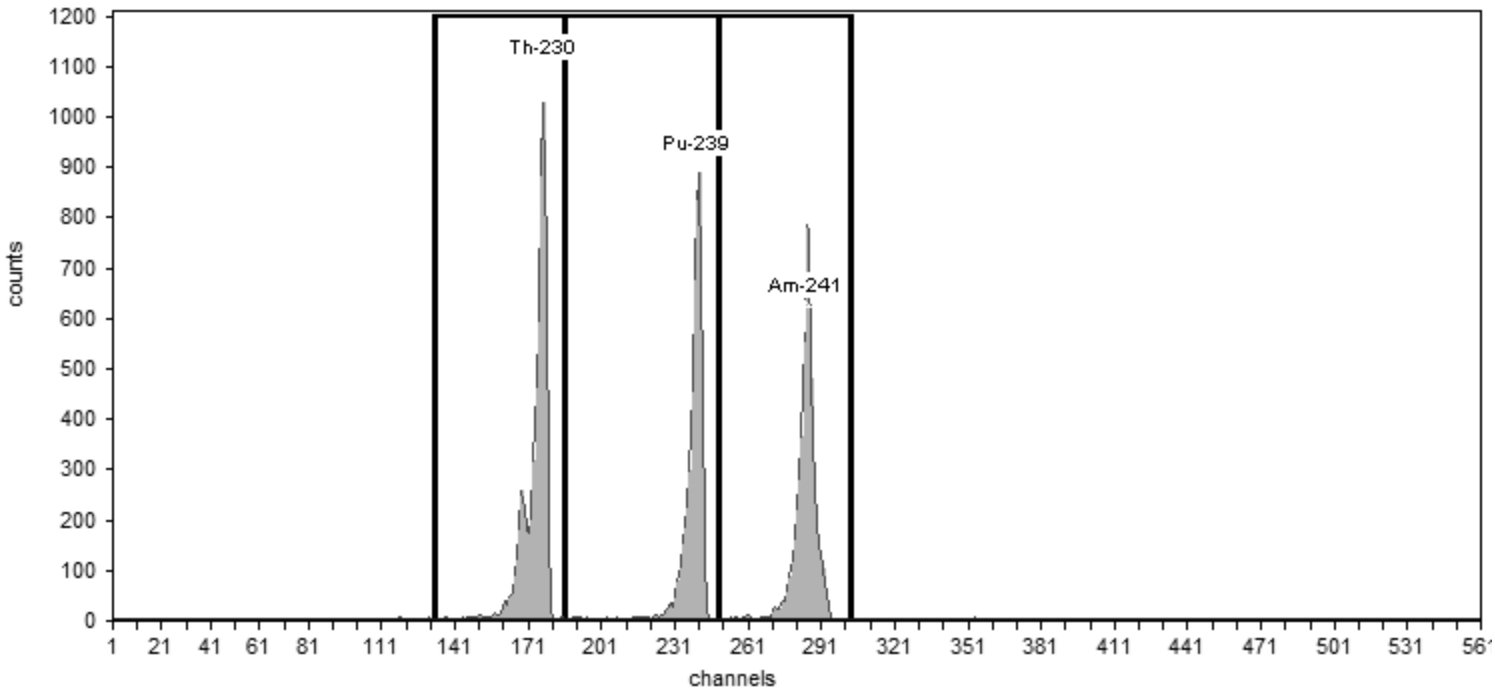
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 11/1/2015 7:17:16PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9884;AV219-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.57% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.89	5,897.00	98.28
Pu-239	240	5,155.40	186	249	30.97	4,744.00	79.07
Am-241	284	5,485.70	249	303	31.69	4,980.00	83.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:42PM 11/1/2015

Calibration

Sample Name: ICV-9886;AV220-20151101
Description:
Detector: AV220

Analyst: 60040
Analysis Date: 11/1/2015 8:23:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

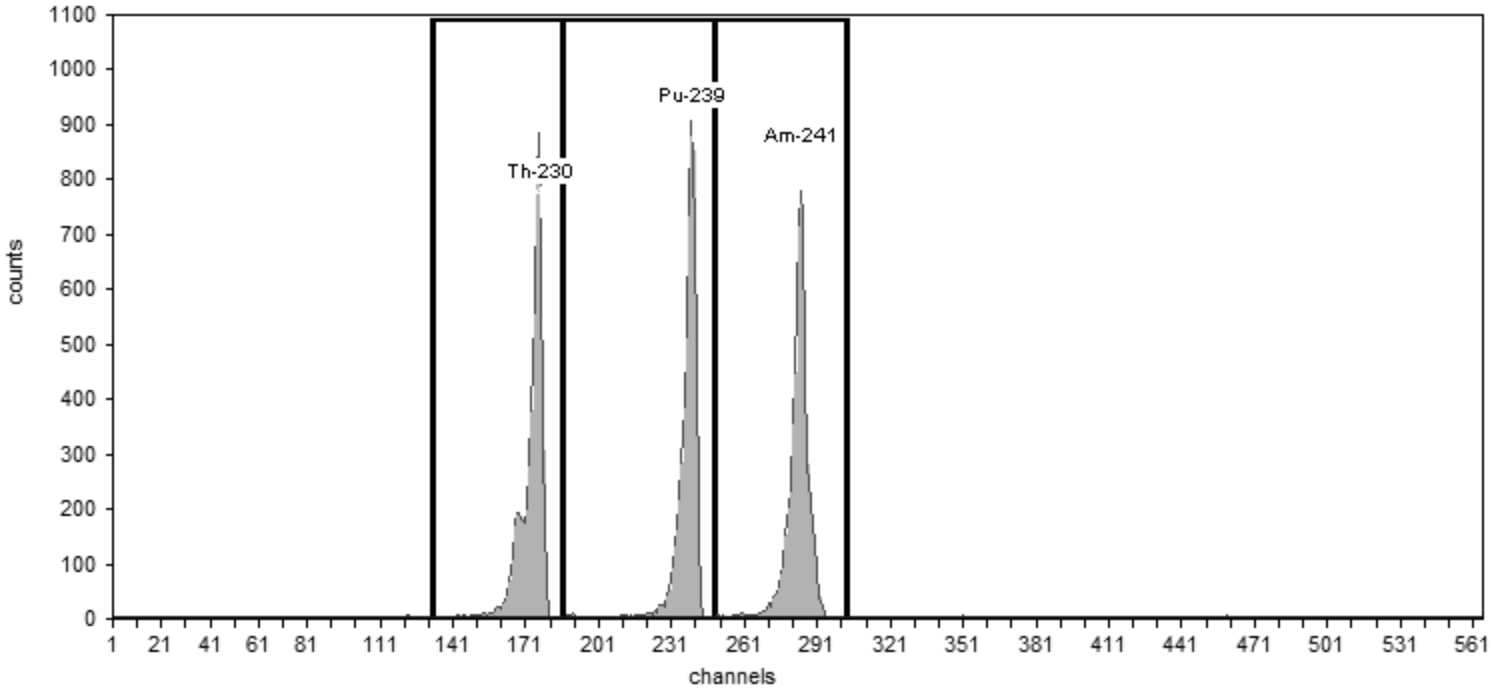
Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 11/1/2015 7:17:37PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9886;AV220-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.59% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.03	5,459.00	90.98
Pu-239	240	5,155.40	186	249	34.34	5,223.00	87.05
Am-241	284	5,485.70	249	303	37.36	5,475.00	91.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:46PM 11/1/2015

Calibration

Sample Name: ICV-9885;AV221-20151101
Description:
Detector: AV221

Analyst: 60040
Analysis Date: 11/1/2015 8:23:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

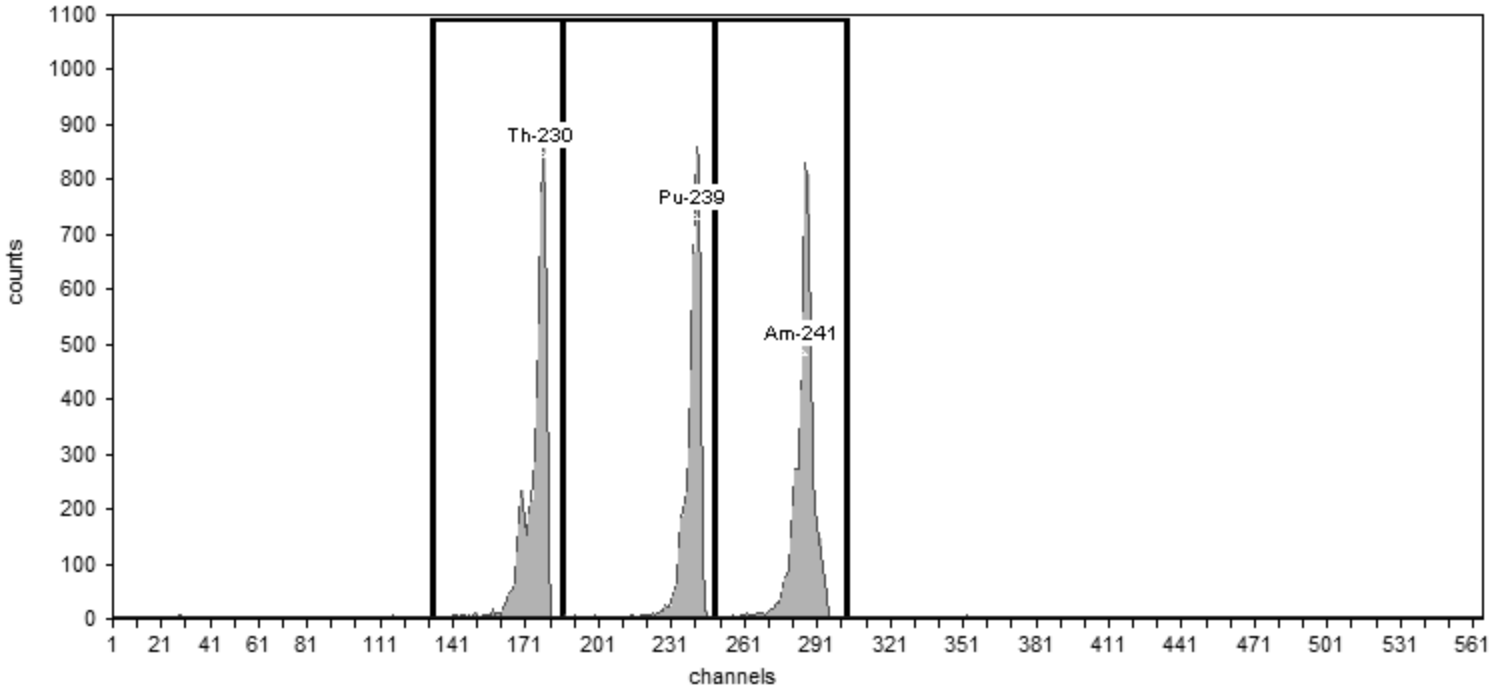
Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 11/1/2015 7:17:49PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV221-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.27% +/- 0.48% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.05	5,130.00	85.50
Pu-239	240	5,155.40	186	249	32.50	4,814.00	80.23
Am-241	284	5,485.70	249	303	32.87	5,414.00	90.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:50PM 11/1/2015

Calibration

Sample Name: ICV-9794;AV222-20151101
Description:
Detector: AV222

Analyst: 60040
Analysis Date: 11/1/2015 8:23:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

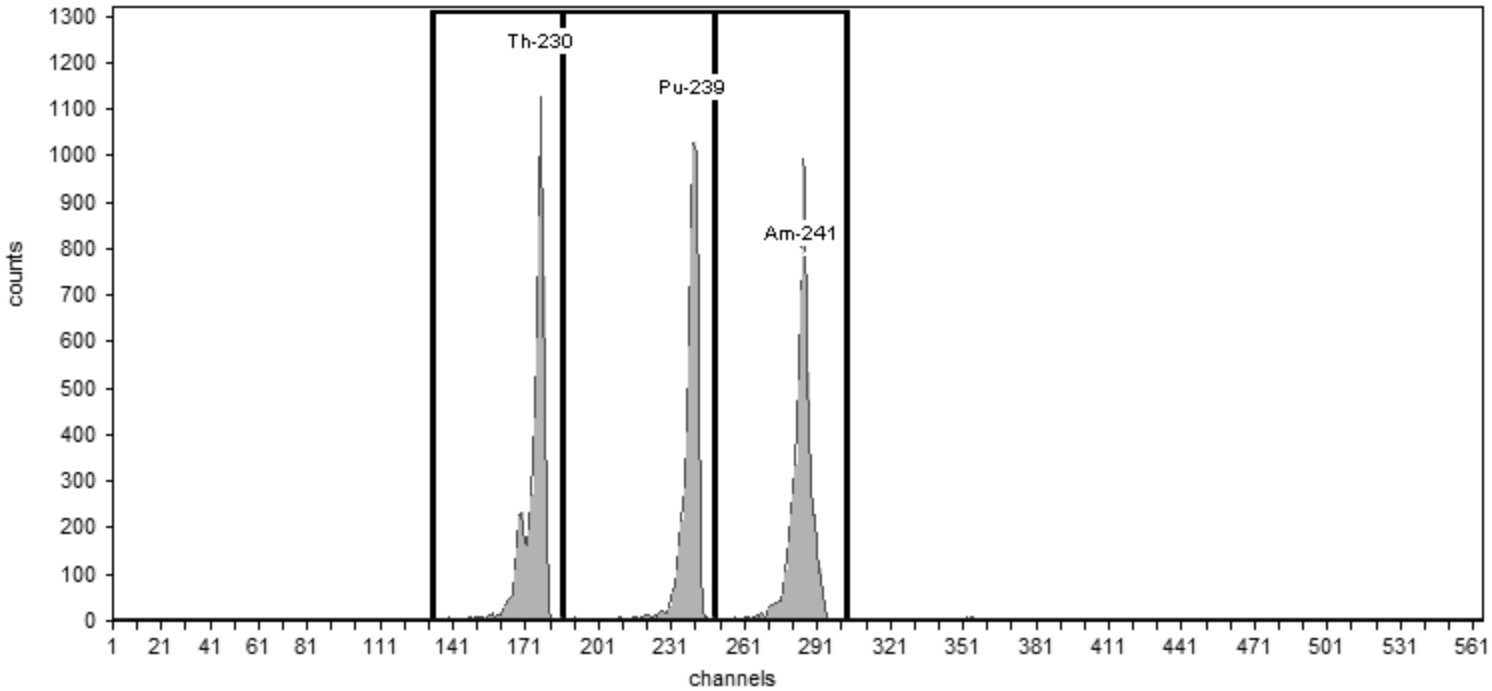
Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 11/1/2015 7:18:03PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9794;AV222-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.52% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	26.79	5,816.00	96.93
Pu-239	240	5,155.40	186	249	33.87	5,666.00	94.43
Am-241	284	5,485.70	249	303	31.78	6,248.00	104.13

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:26PM 9/6/2016

Calibration

Sample Name: CCV-7107;AV147-20160906a
Description:
Detector: AV147

Analyst: 60040
Analysis Date: 9/6/2016 4:33:24PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

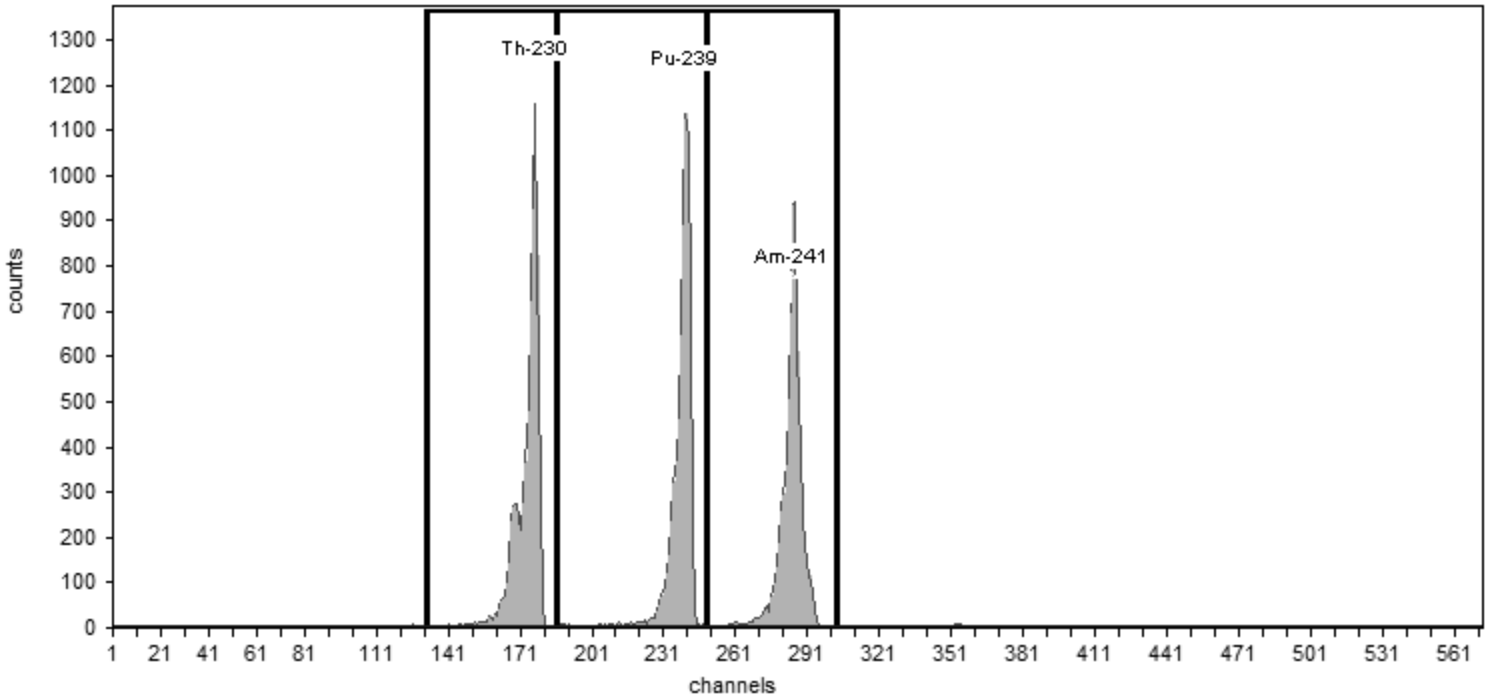
Detector: AV147 , SN: 50-05/R1
Acquisition Start Date: 9/6/2016 3:28:58PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV147-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.66% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.20	6,917.00	115.28
Pu-239	240	5,155.40	186	249	35.15	6,832.00	113.87
Am-241	284	5,485.70	249	303	36.47	6,575.00	109.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:03PM 9/6/2016

Calibration

Sample Name: CCV-9817;AV171-20160906
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 9/6/2016 3:08:02PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

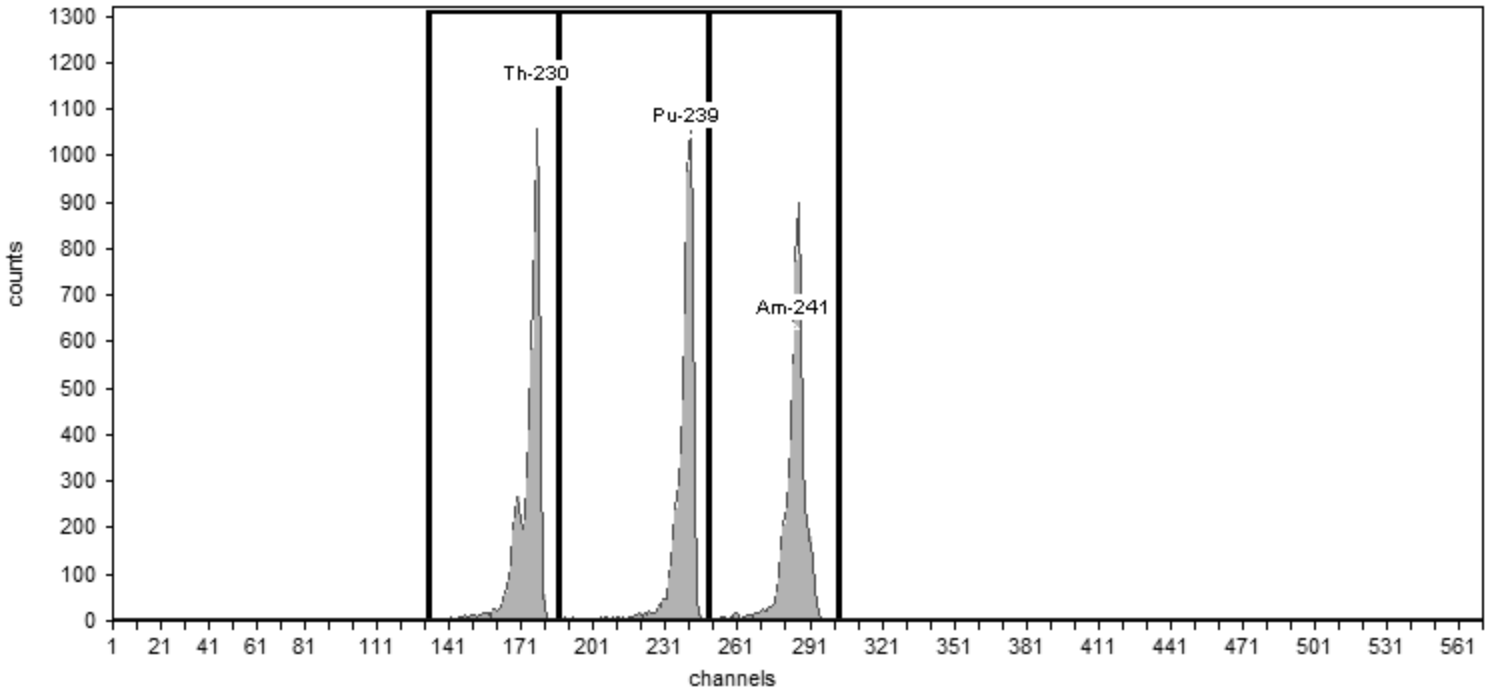
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 9/6/2016 1:58:39PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9817;AV171-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.13% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.34	6,385.00	106.42
Pu-239	240	5,155.40	186	249	32.02	5,919.00	98.65
Am-241	284	5,485.70	249	303	32.53	5,859.00	97.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:07:57PM 9/6/2016

Calibration

Sample Name: CCV-9884;AV172-20160906
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 9/6/2016 3:07:55PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

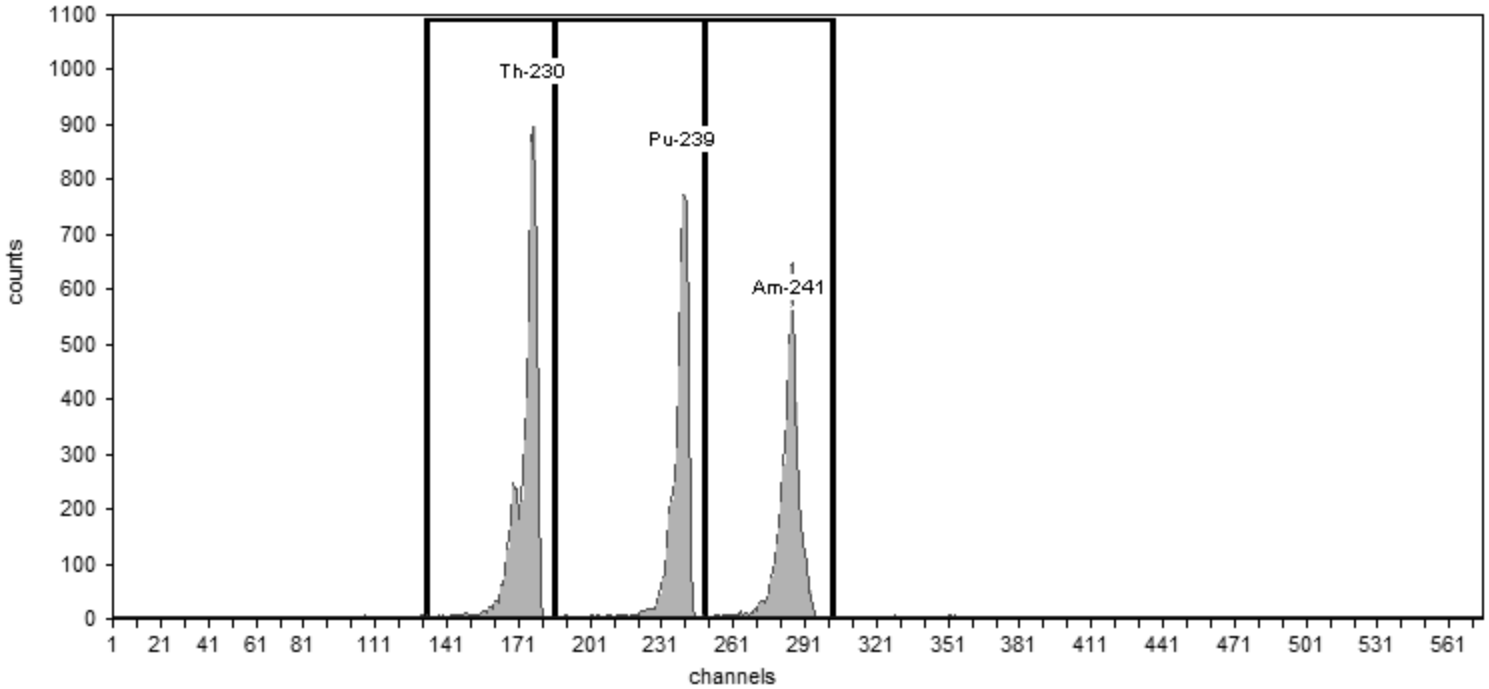
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 9/6/2016 1:58:23PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9884;AV172-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.81% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.22	5,799.00	96.65
Pu-239	240	5,155.40	186	249	35.29	4,725.00	78.75
Am-241	284	5,485.70	249	303	36.44	4,603.00	76.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:26:19AM 9/7/2016

Calibration

Sample Name: CCV-9885;AV173-20160906
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 9/7/2016 8:26:18AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

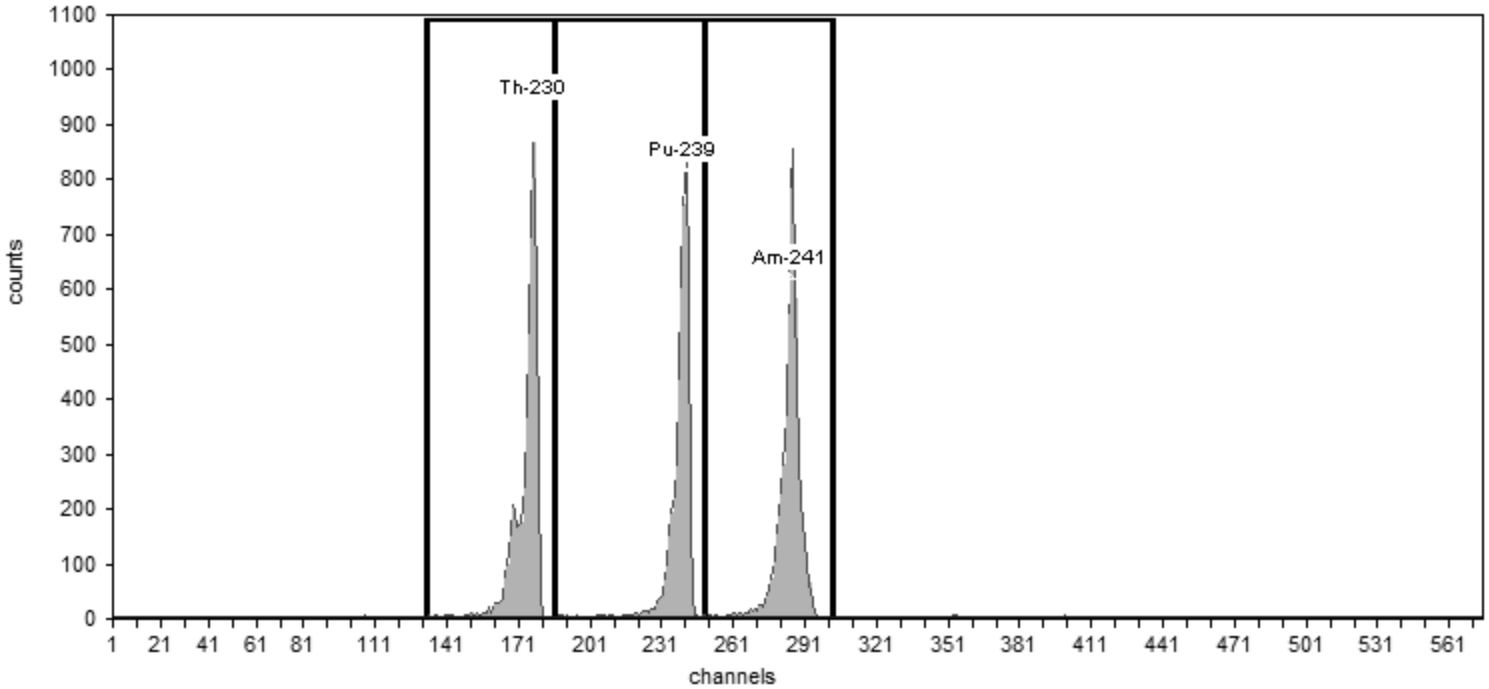
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 9/6/2016 4:42:37PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9885;AV173-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.08% +/- 0.48% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.46	5,069.00	84.48
Pu-239	240	5,155.40	186	249	33.96	4,708.00	78.47
Am-241	284	5,485.70	249	303	31.41	5,456.00	90.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:53:39AM 9/7/2016

Calibration

Sample Name: CCV-7107;AV175-20160907
Description:
Detector: AV175

Analyst: 60040
Analysis Date: 9/7/2016 9:53:36AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

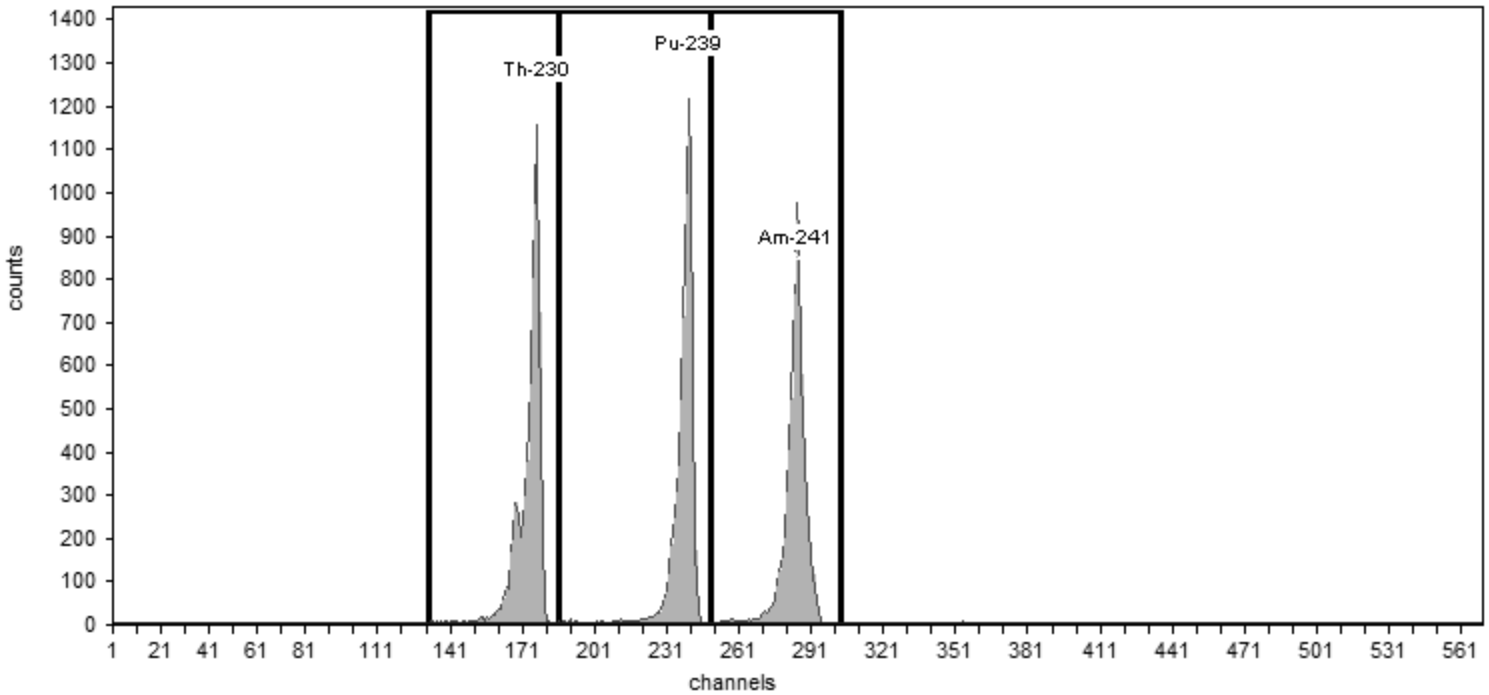
Detector: AV175 , SN: 50-117H1
Acquisition Start Date: 9/7/2016 8:37:47AM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-7107;AV175-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.82% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.22	6,949.00	115.82
Pu-239	240	5,155.40	186	249	33.45	6,914.00	115.23
Am-241	284	5,485.70	249	303	35.27	6,594.00	109.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:26:26AM 9/7/2016

Calibration

Sample Name: CCV-9886;AV188-20160906a
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 9/7/2016 8:26:24AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

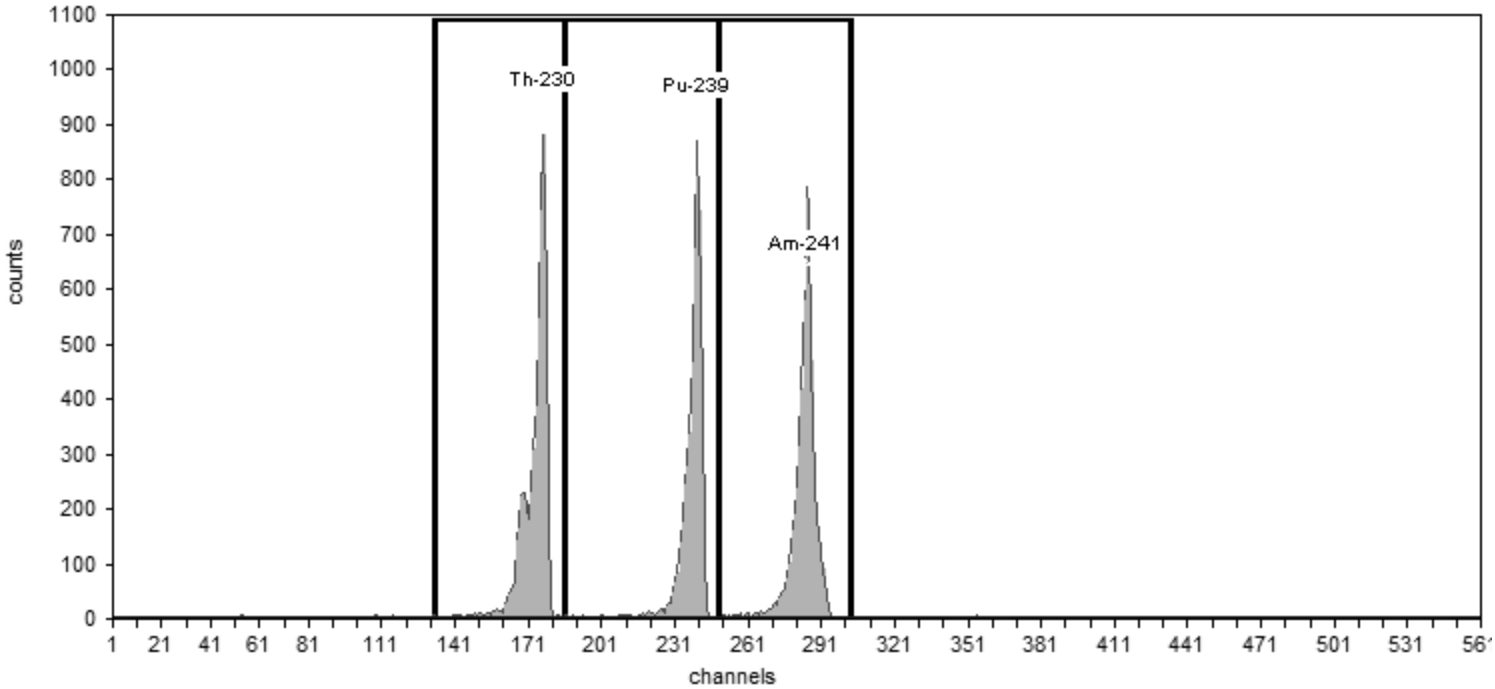
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 9/6/2016 4:43:03PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9886;AV188-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.61% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.18	5,400.00	90.00
Pu-239	240	5,155.40	186	249	31.08	4,858.00	80.97
Am-241	284	5,485.70	249	303	34.02	5,239.00	87.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:09:11PM 9/6/2016

Calibration

Sample Name: CCV-7107;AV189-20160906
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 9/6/2016 3:09:09PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

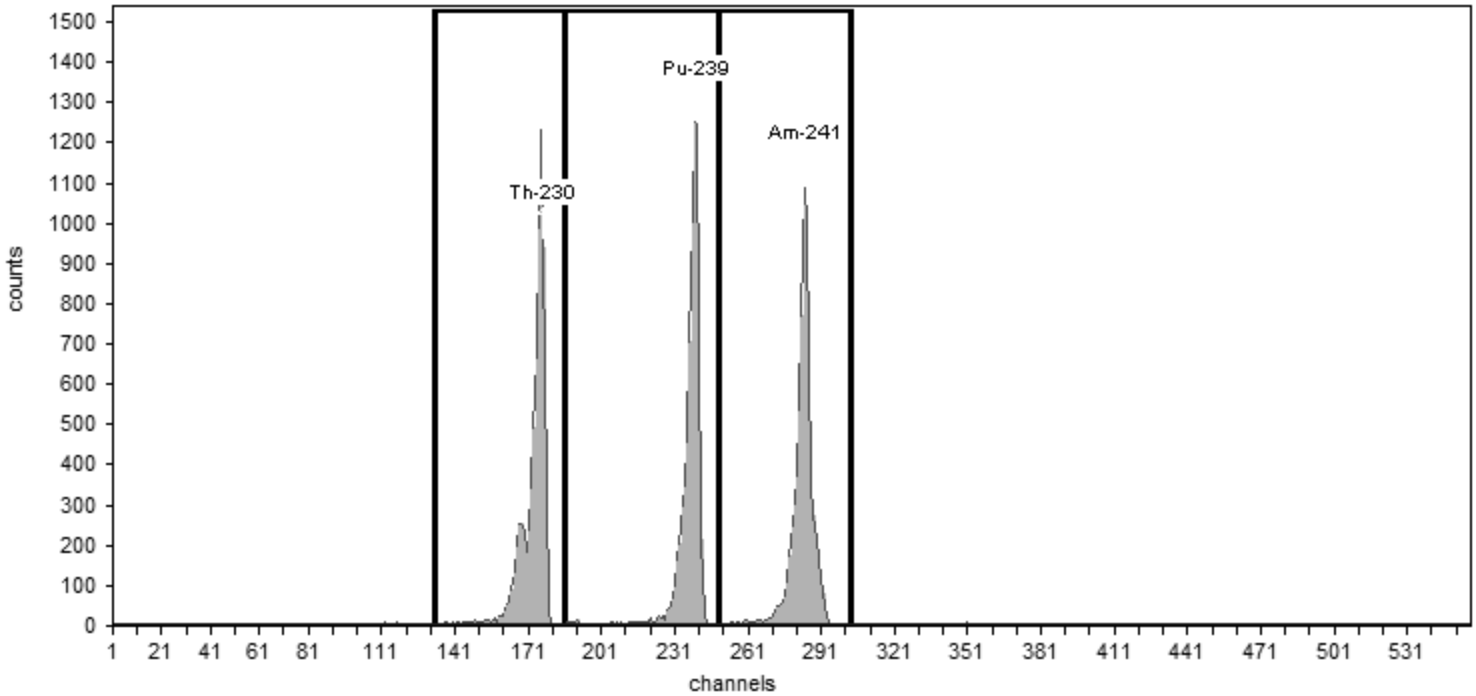
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 9/6/2016 2:01:25PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV189-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.32	6,906.00	115.10
Pu-239	240	5,155.40	186	249	33.93	7,095.00	118.25
Am-241	284	5,485.70	249	303	32.43	6,855.00	114.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:09:04PM 9/6/2016

Calibration

Sample Name: CCV-8874;AV190-20160906
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 9/6/2016 3:09:03PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

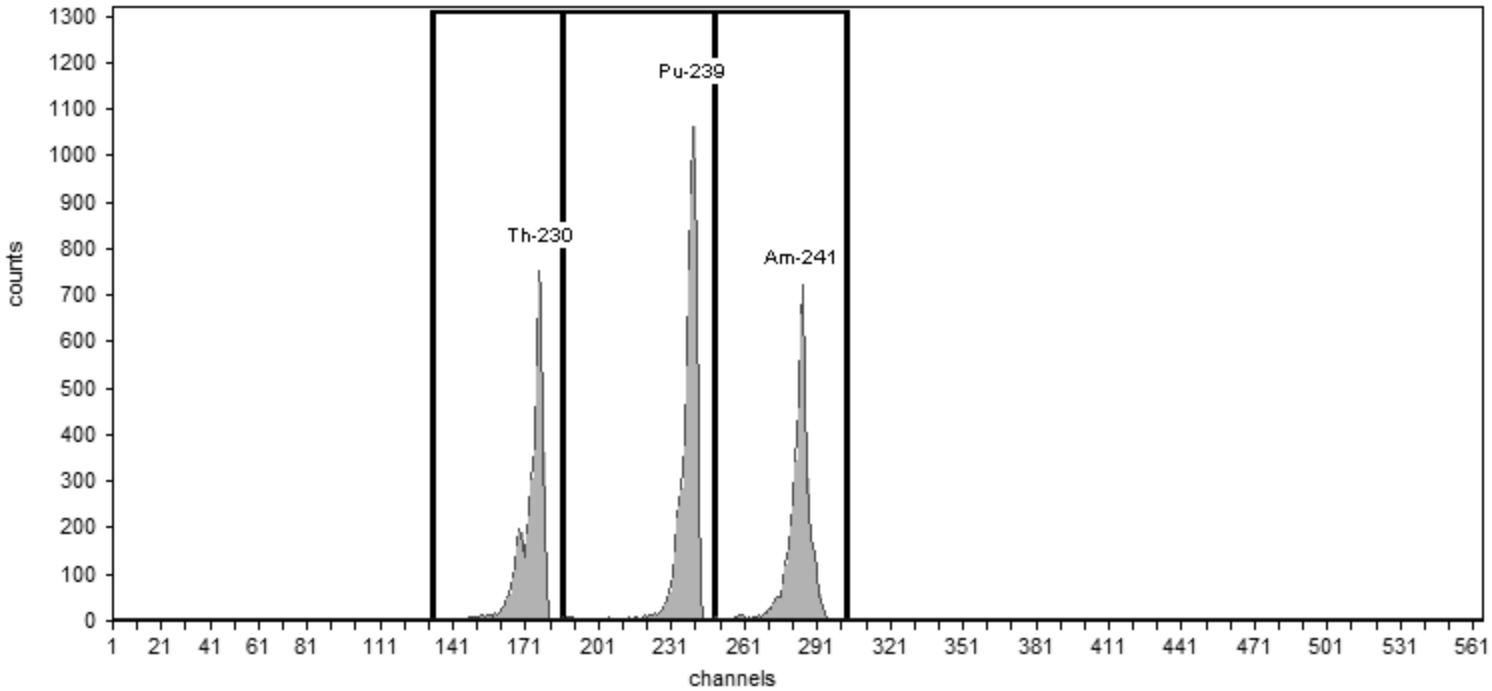
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 9/6/2016 2:01:07PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV190-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.82% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.02	4,680.00	78.00
Pu-239	240	5,155.40	186	249	34.66	6,081.00	101.35
Am-241	284	5,485.70	249	303	33.67	4,768.00	79.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:00:22PM 7/26/2016

Calibration

Sample Name: CCV-8875;AV191-20160726
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 7/26/2016 7:00:21PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

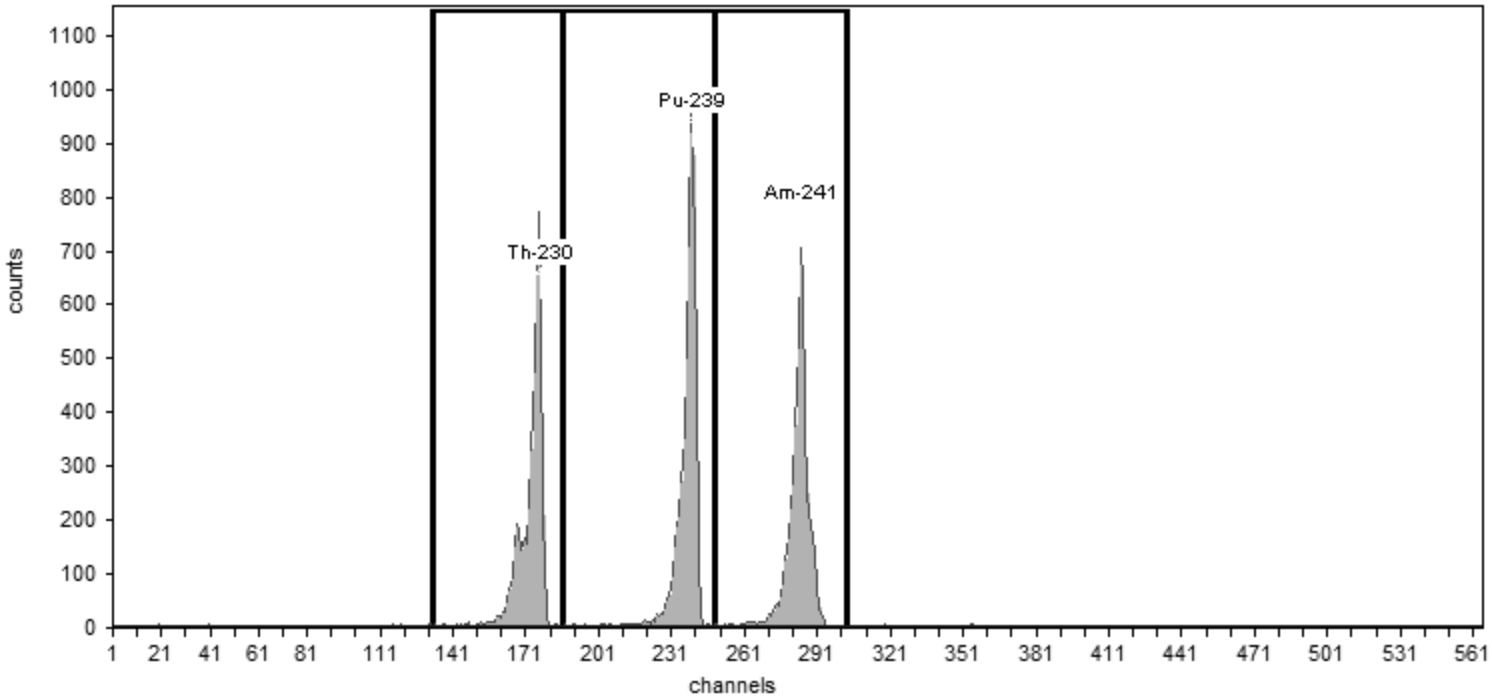
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 7/26/2016 5:46:47PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV191-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.42% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.81	4,624.00	77.07
Pu-239	240	5,155.40	186	249	31.05	5,265.00	87.75
Am-241	284	5,485.70	249	303	33.14	4,652.00	77.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:58PM 9/6/2016

Calibration

Sample Name: CCV-8875;AV191-20160906
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 9/6/2016 3:08:57PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

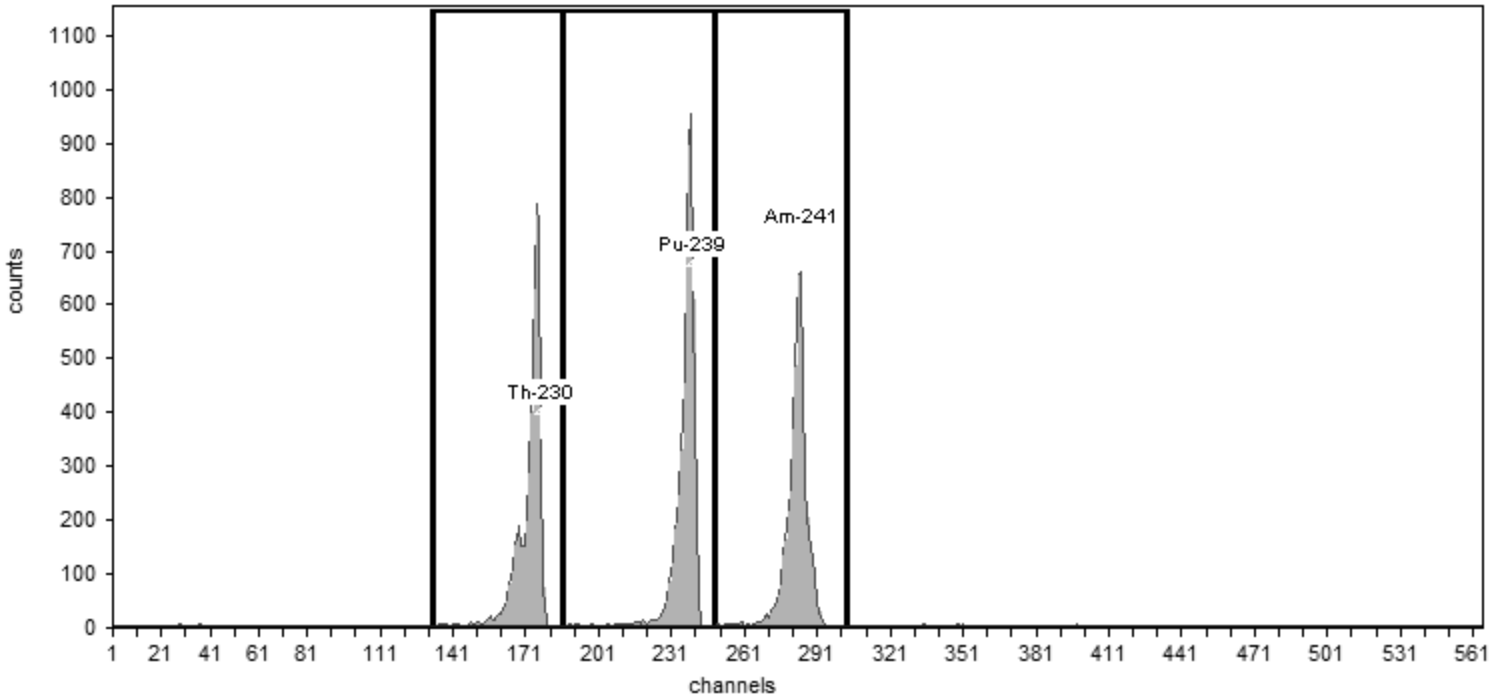
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 9/6/2016 2:00:53PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV191-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.71% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.15	4,714.00	78.57
Pu-239	240	5,155.40	186	249	31.68	5,316.00	88.60
Am-241	284	5,485.70	249	303	37.38	4,688.00	78.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:46PM 9/6/2016

Calibration

Sample Name: CCV-8877;AV193-20160906
Description:
Detector: AV193

Analyst: 60040
Analysis Date: 9/6/2016 3:08:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

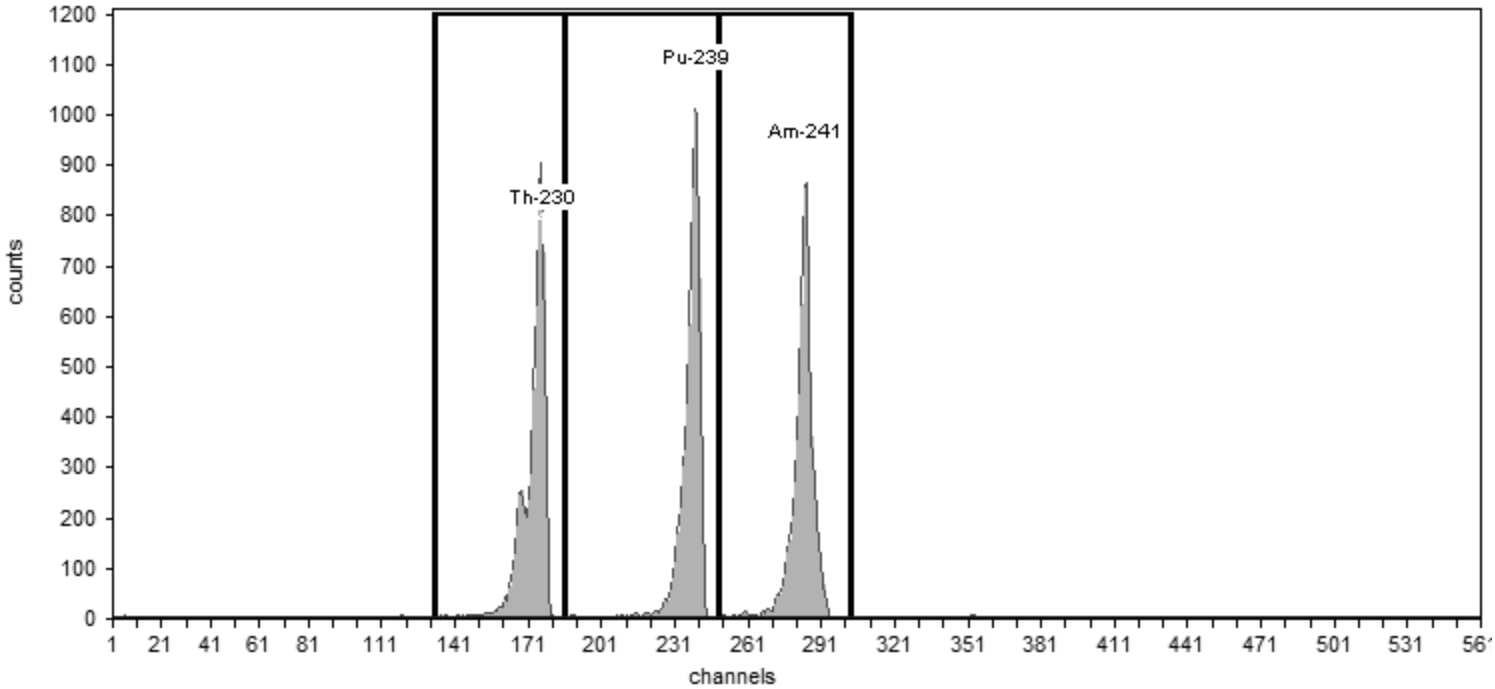
Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 9/6/2016 2:00:23PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV193-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.86% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.25	6,069.00	101.15
Pu-239	240	5,155.40	186	249	36.50	6,329.00	105.48
Am-241	284	5,485.70	249	303	36.32	6,087.00	101.45

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:01:19PM 7/26/2016

Calibration

Sample Name: CCV-9520;AV194-20160726
Description:
Detector: AV194

Analyst: 60040
Analysis Date: 7/26/2016 12:01:18PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

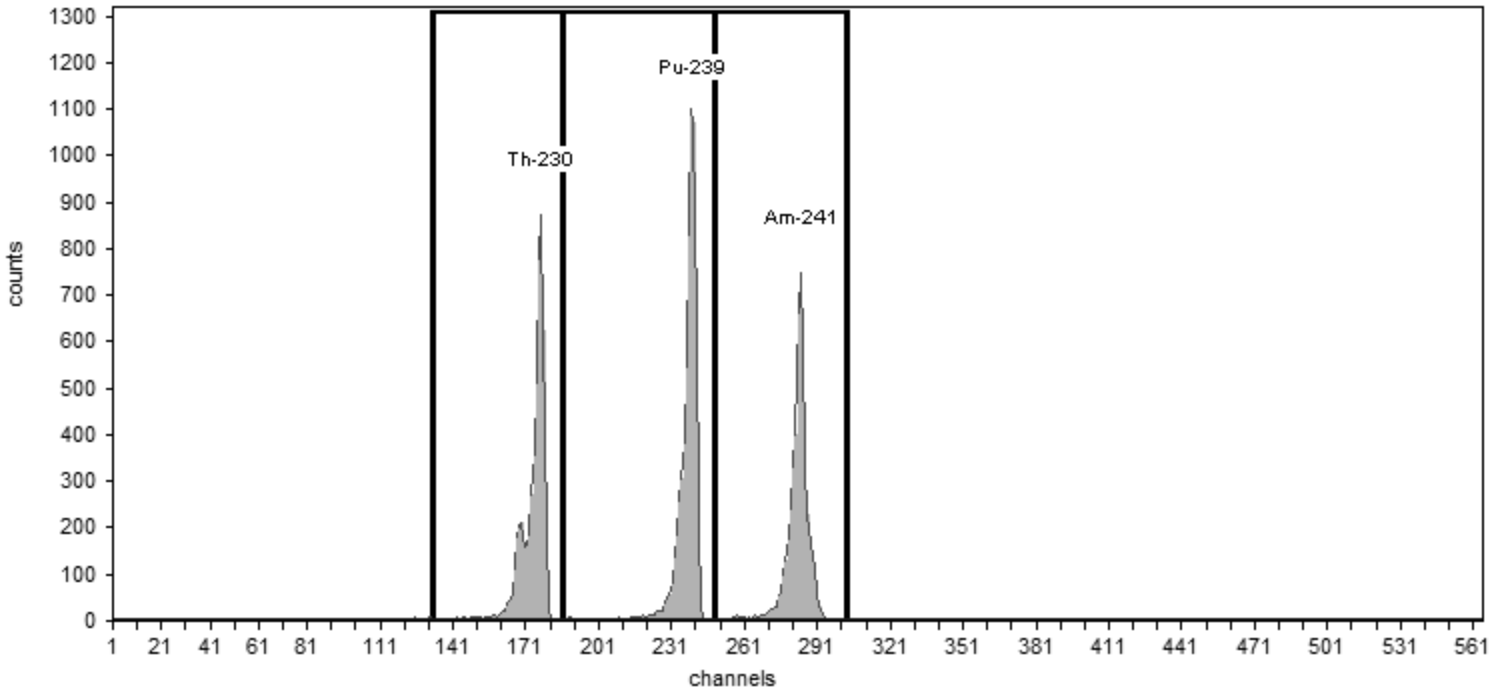
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 7/26/2016 11:01:13AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV194-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.62% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.01	5,062.00	84.37
Pu-239	240	5,155.40	186	249	31.28	6,046.00	100.77
Am-241	284	5,485.70	249	303	31.42	4,724.00	78.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:19:00PM 7/26/2016

Calibration

Sample Name: CCV-9795;AV212-20160726a
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 7/26/2016 4:18:59PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

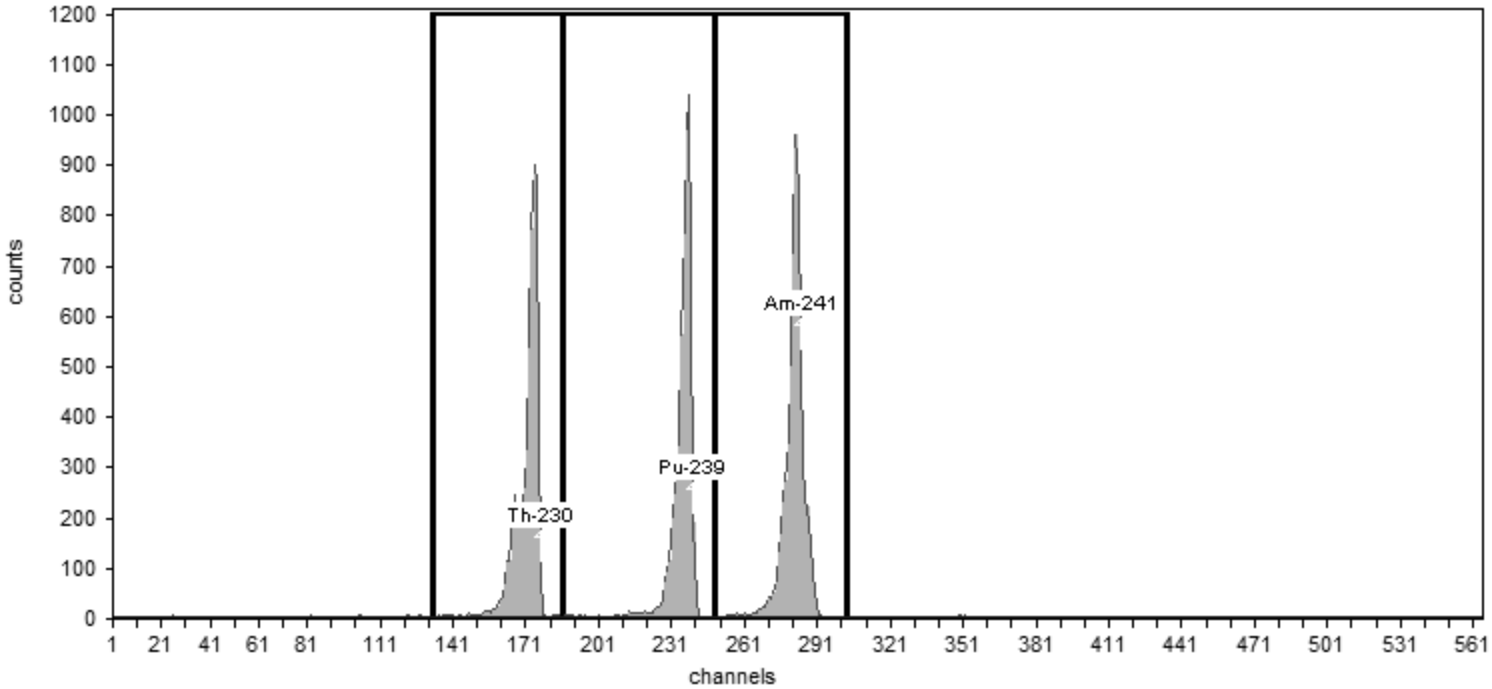
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 7/26/2016 3:09:34PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9795;AV212-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.98% +/- 0.47% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.11	5,700.00	95.00
Pu-239	240	5,155.40	186	249	33.82	5,829.00	97.15
Am-241	284	5,485.70	249	303	32.12	6,119.00	101.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:27AM 7/27/2016

Calibration

Sample Name: CCV-9817;AV213-20160727
Description:
Detector: AV213

Analyst: 60040
Analysis Date: 7/27/2016 7:18:26AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

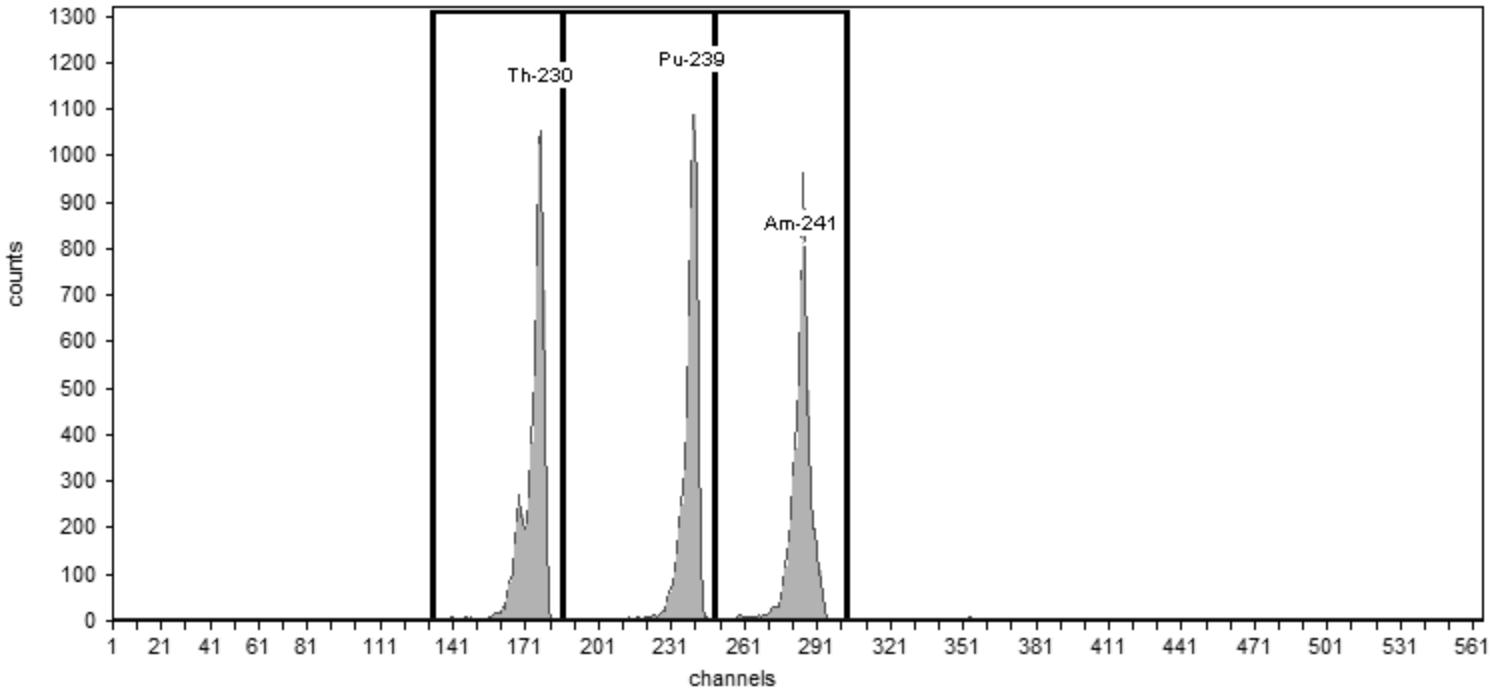
Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 7/27/2016 6:18:22AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9817;AV213-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.62% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.55	6,599.00	109.98
Pu-239	240	5,155.40	186	249	31.95	5,933.00	98.88
Am-241	284	5,485.70	249	303	31.51	5,994.00	99.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:15PM 7/26/2016

Calibration

Sample Name: CCV-9884;AV214-20160726
Description:
Detector: AV214

Analyst: 60040
Analysis Date: 7/26/2016 5:36:13PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

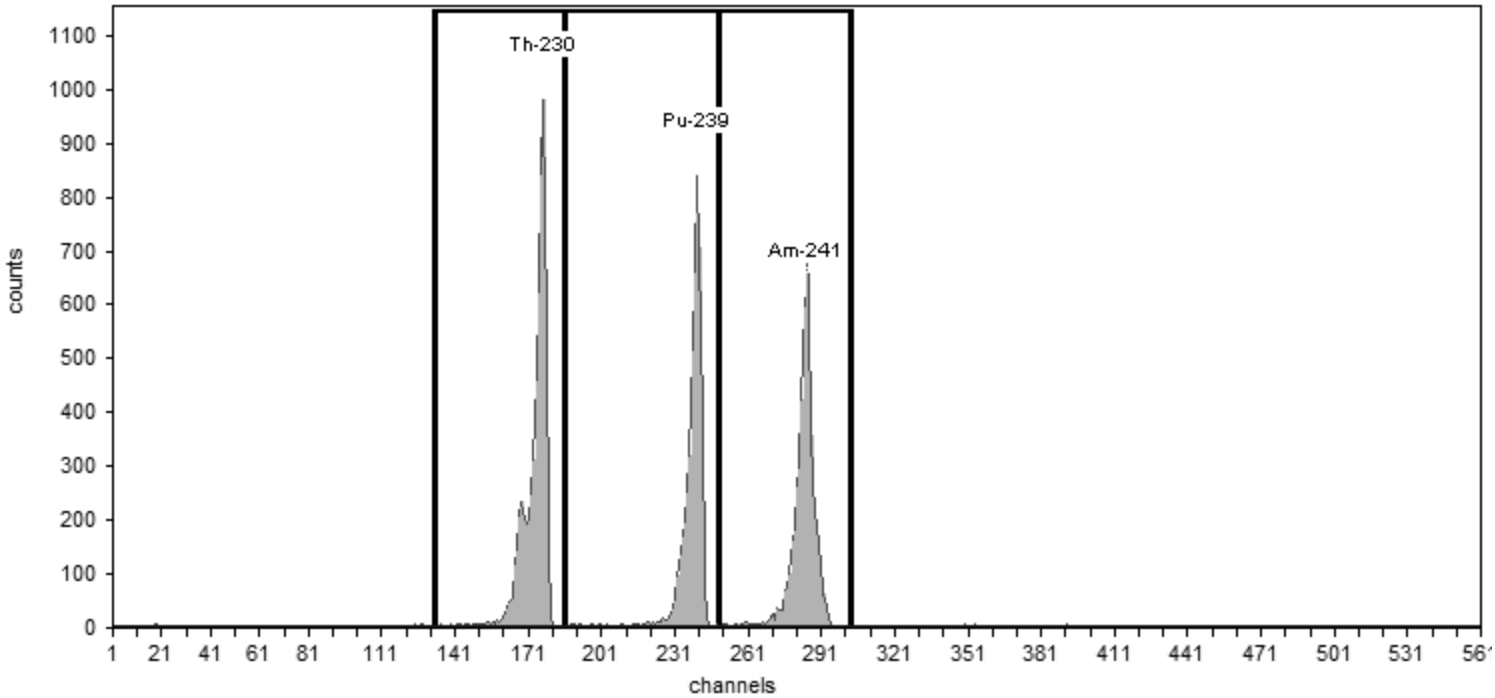
Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 7/26/2016 4:33:54PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9884;AV214-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.84% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.65	5,738.00	95.63
Pu-239	240	5,155.40	186	249	32.70	4,597.00	76.62
Am-241	284	5,485.70	249	303	33.09	4,814.00	80.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:19PM 7/26/2016

Calibration

Sample Name: CCV-9885;AV215-20160726
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 7/26/2016 5:36:18PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

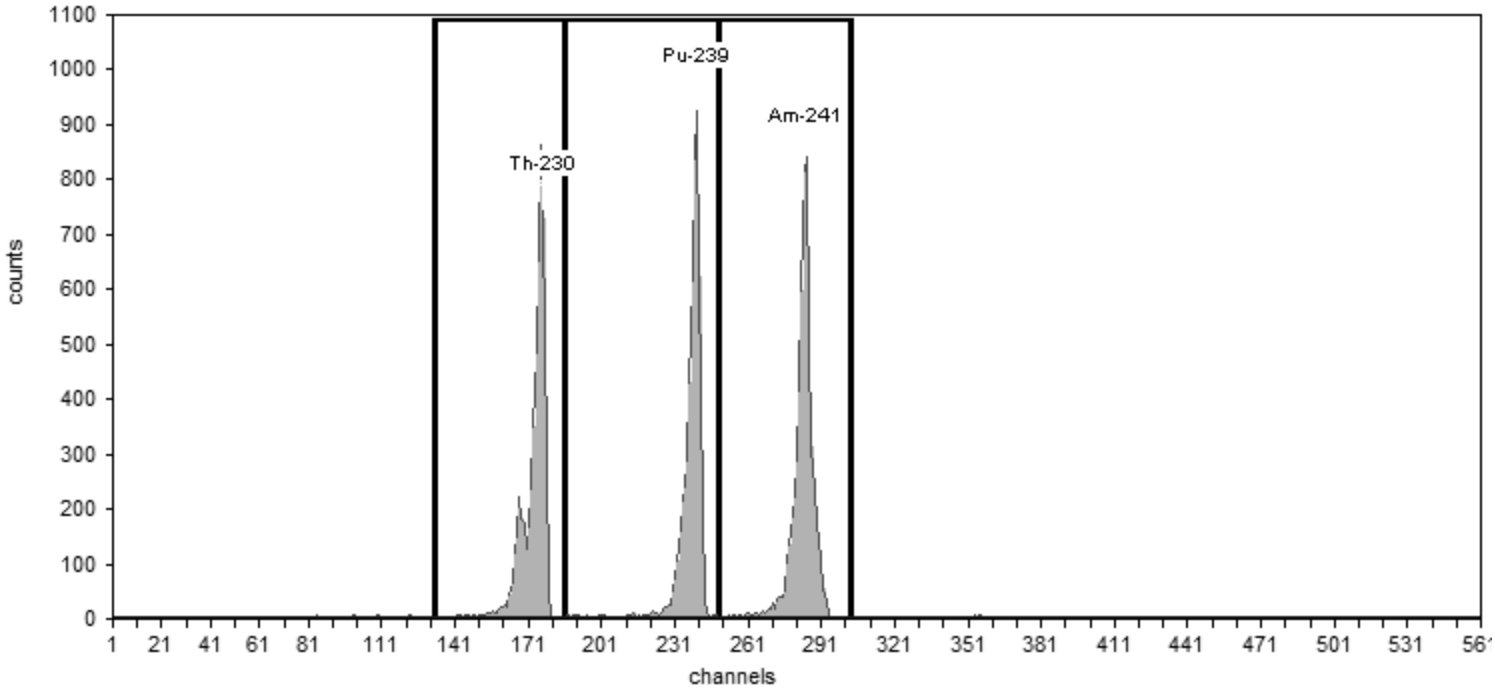
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 7/26/2016 4:34:04PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9885;AV215-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.46% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.41	5,039.00	83.98
Pu-239	240	5,155.40	186	249	31.30	4,969.00	82.82
Am-241	284	5,485.70	249	303	32.98	5,458.00	90.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:24PM 7/26/2016

Calibration

Sample Name: CCV-7107;AV217-20160726
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 7/26/2016 5:36:23PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

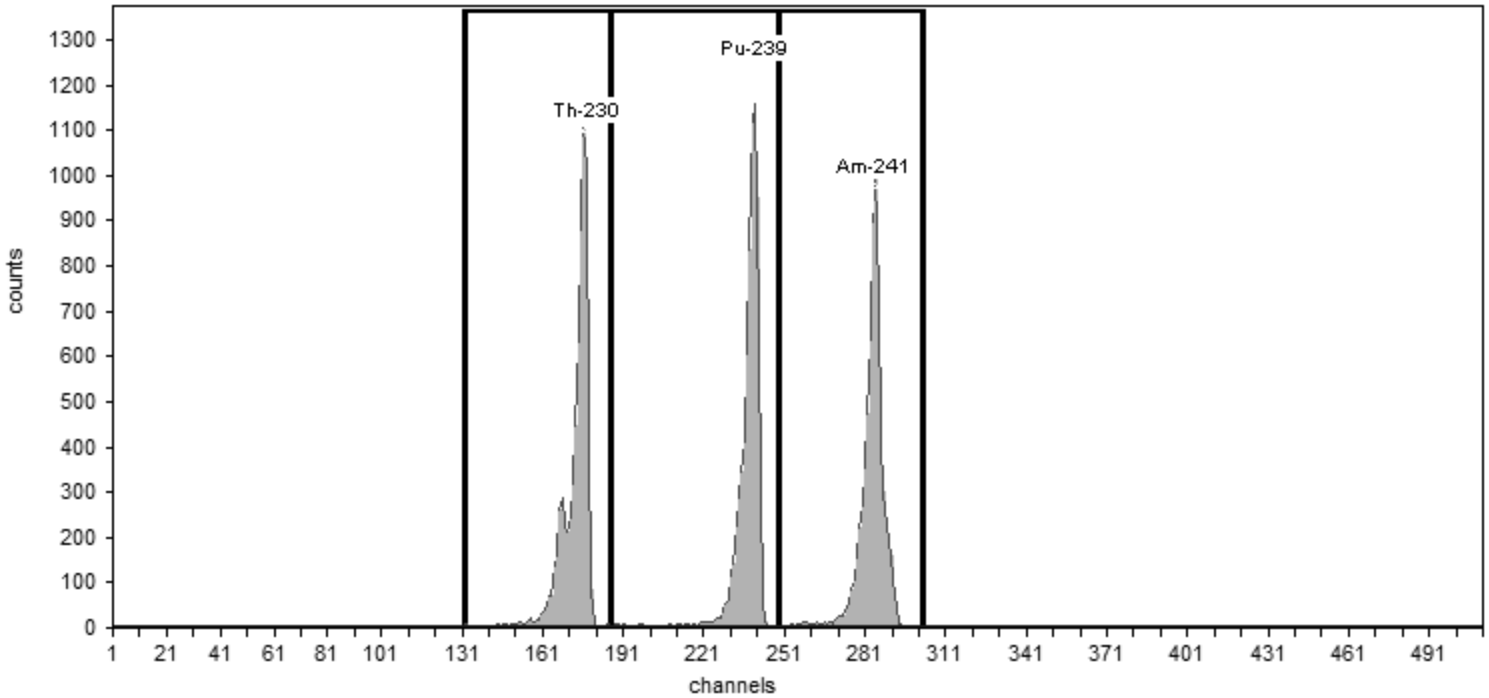
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 7/26/2016 4:34:17PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV217-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.55% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.35	6,790.00	113.17
Pu-239	240	5,155.40	186	249	35.15	6,863.00	114.38
Am-241	284	5,485.70	249	303	33.63	6,596.00	109.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:07AM 7/27/2016

Calibration

Sample Name: CCV-8874;AV218-20160727
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 7/27/2016 7:19:06AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

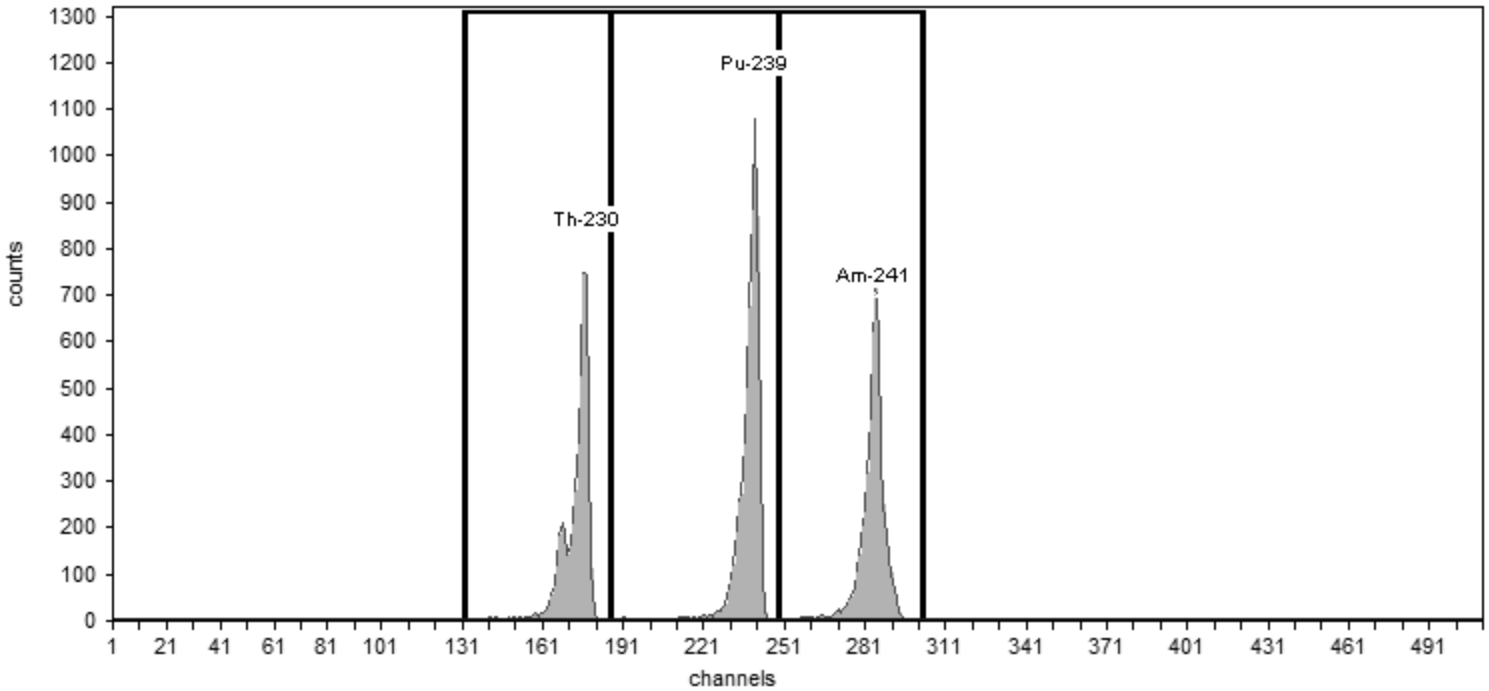
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 7/27/2016 6:19:00AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV218-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 27.03% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.17	4,680.00	78.00
Pu-239	240	5,155.40	186	249	33.40	6,092.00	101.53
Am-241	284	5,485.70	249	303	33.41	4,878.00	81.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:31PM 9/6/2016

Calibration

Sample Name: CCV-8874;AV218-20160906
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 9/6/2016 12:30:30PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

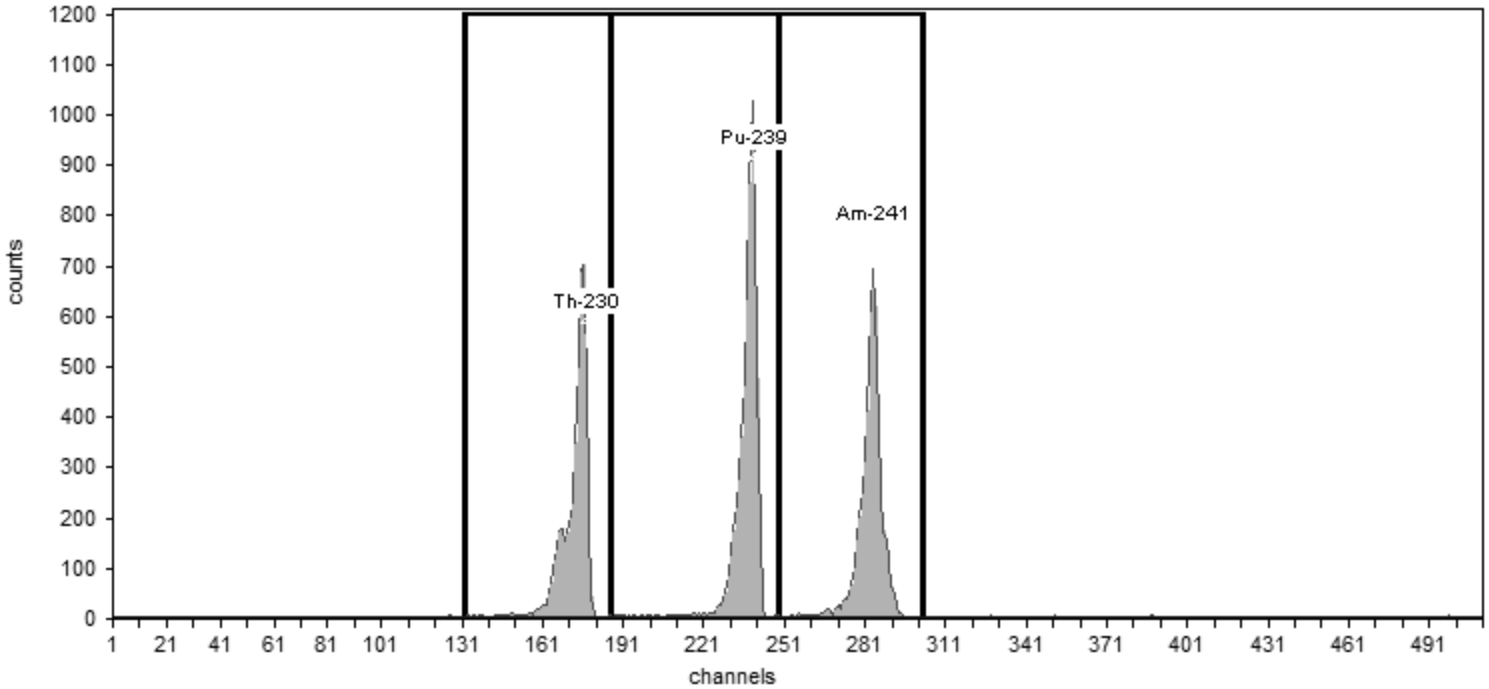
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 9/6/2016 11:25:38AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV218-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.77% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.57	4,630.00	77.17
Pu-239	240	5,155.40	186	249	34.21	5,990.00	99.83
Am-241	284	5,485.70	249	303	36.78	4,876.00	81.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:29PM 7/26/2016

Calibration

Sample Name: CCV-8875;AV219-20160726
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 7/26/2016 5:36:28PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

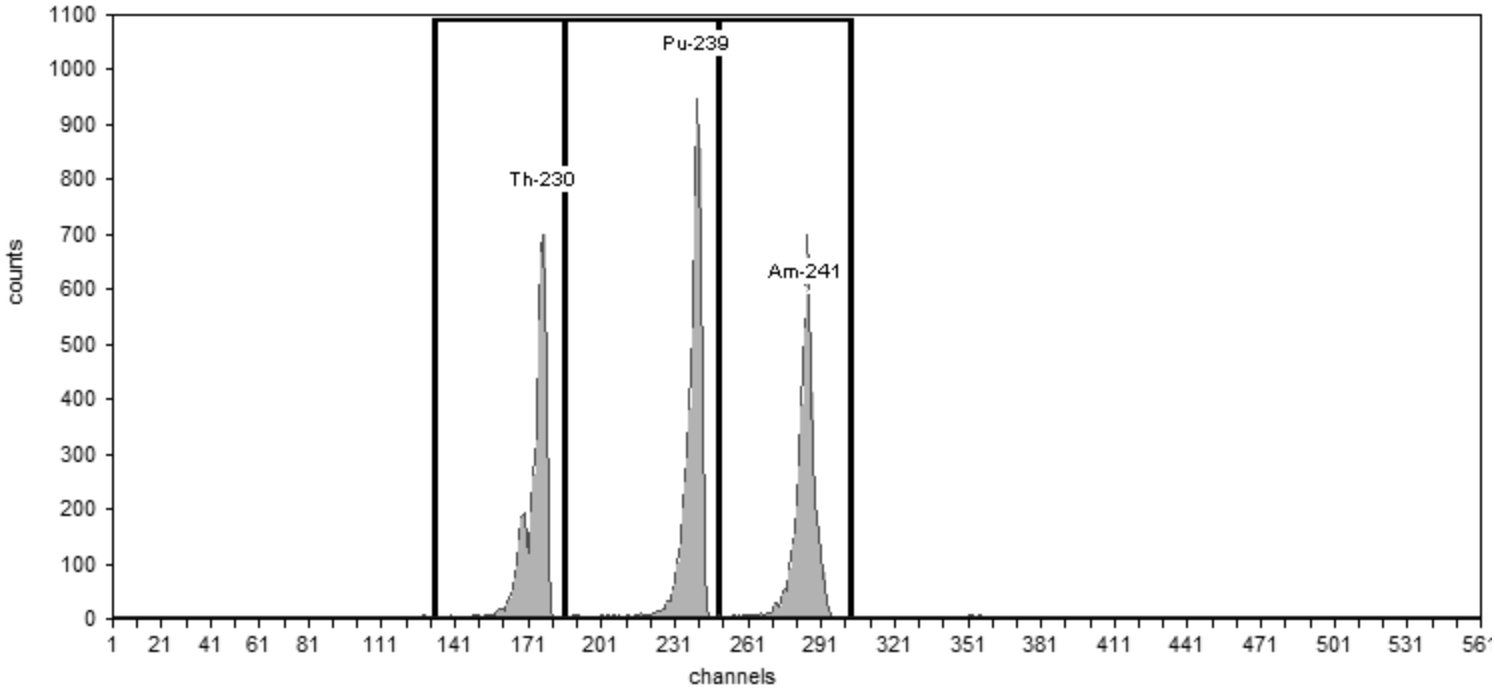
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 7/26/2016 4:34:30PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV219-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.07% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.46	4,438.00	73.97
Pu-239	240	5,155.40	186	249	31.79	5,308.00	88.47
Am-241	284	5,485.70	249	303	34.64	4,609.00	76.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:37PM 9/6/2016

Calibration

Sample Name: CCV-8875;AV219-20160906
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 9/6/2016 12:30:36PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

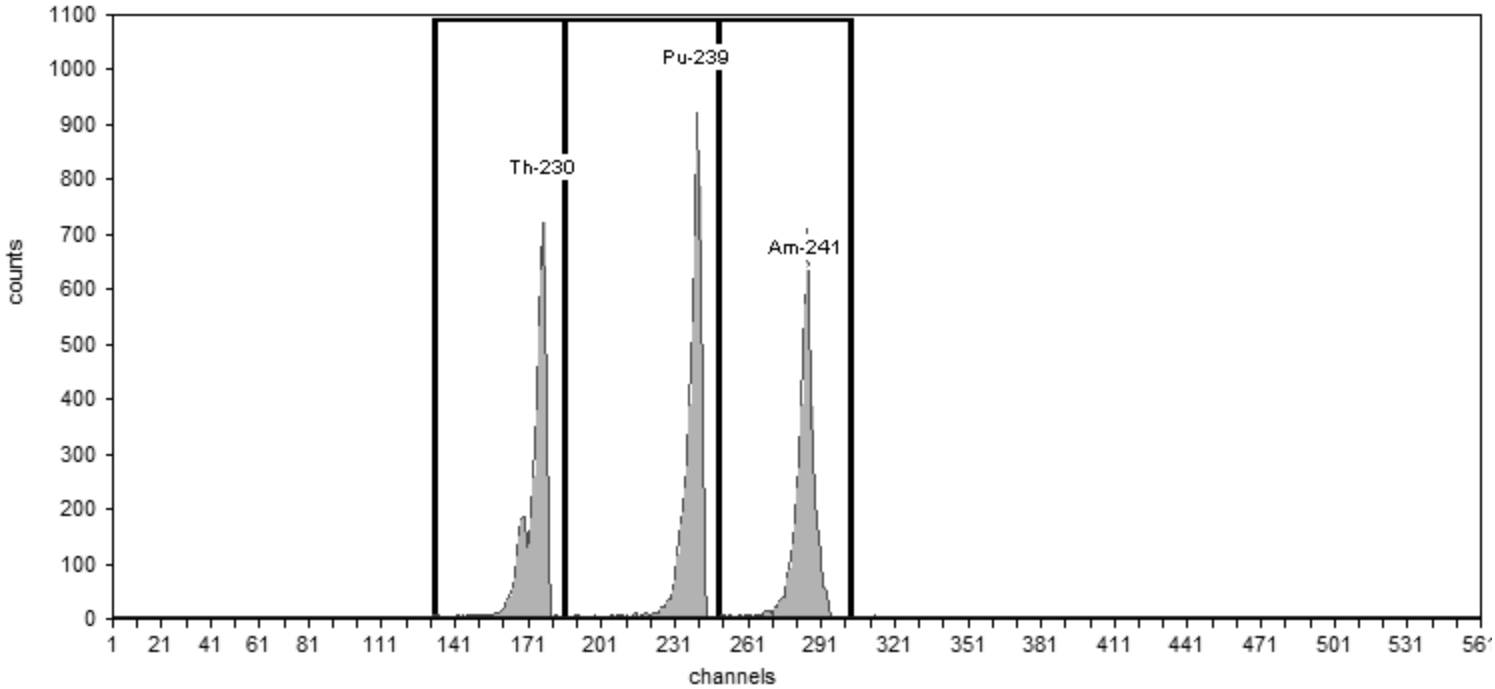
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 9/6/2016 11:25:54AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV219-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.90% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.25	4,446.00	74.10
Pu-239	240	5,155.40	186	249	32.56	5,147.00	85.78
Am-241	284	5,485.70	249	303	33.37	4,634.00	77.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:42PM 9/6/2016

Calibration

Sample Name: CCV-8876;AV220-20160906
Description:
Detector: AV220

Analyst: 60040
Analysis Date: 9/6/2016 12:30:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

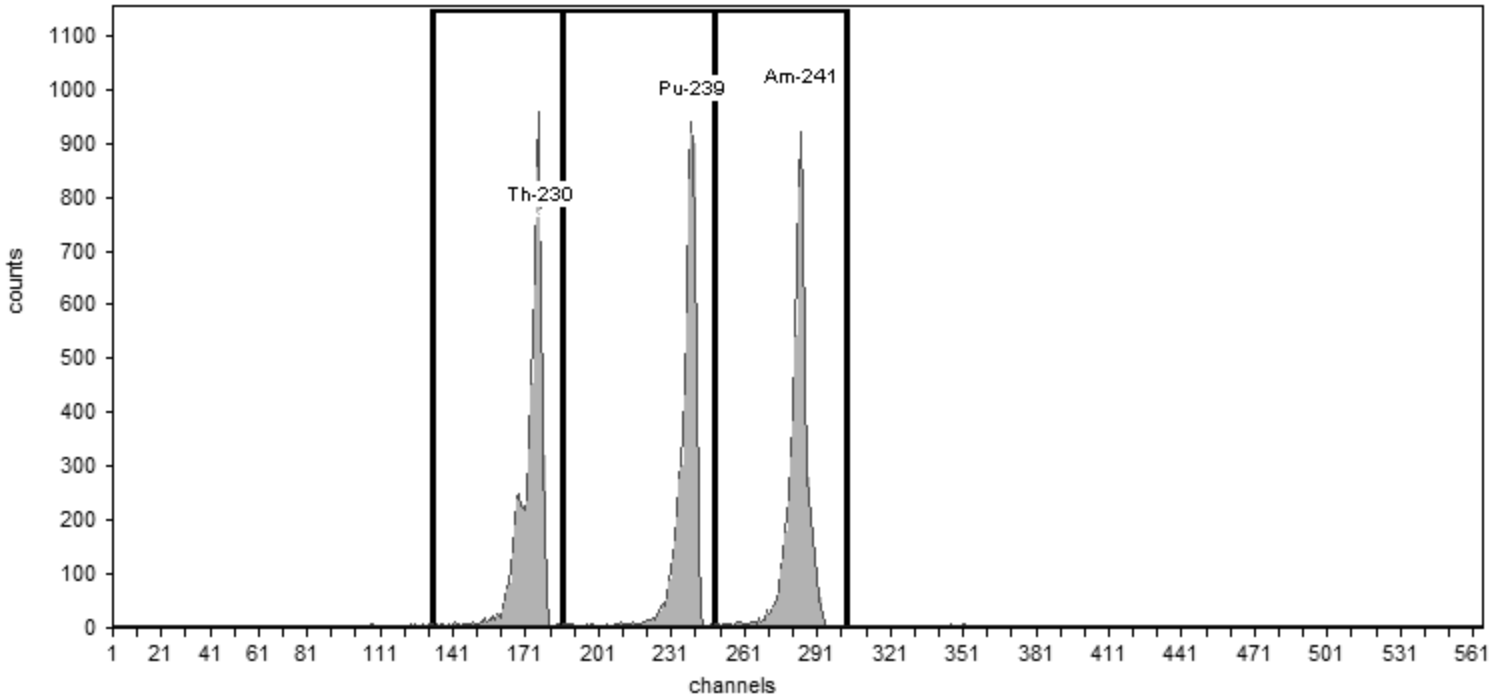
Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 9/6/2016 11:26:10AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8876;AV220-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.63% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.07	6,231.00	103.85
Pu-239	240	5,155.40	186	249	36.22	5,857.00	97.62
Am-241	284	5,485.70	249	303	34.36	6,179.00	102.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:48AM 7/27/2016

Calibration

Sample Name: CCV-8877;AV221-20160726
Description:
Detector: AV221

Analyst: 60040
Analysis Date: 7/26/2016 5:36:36PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

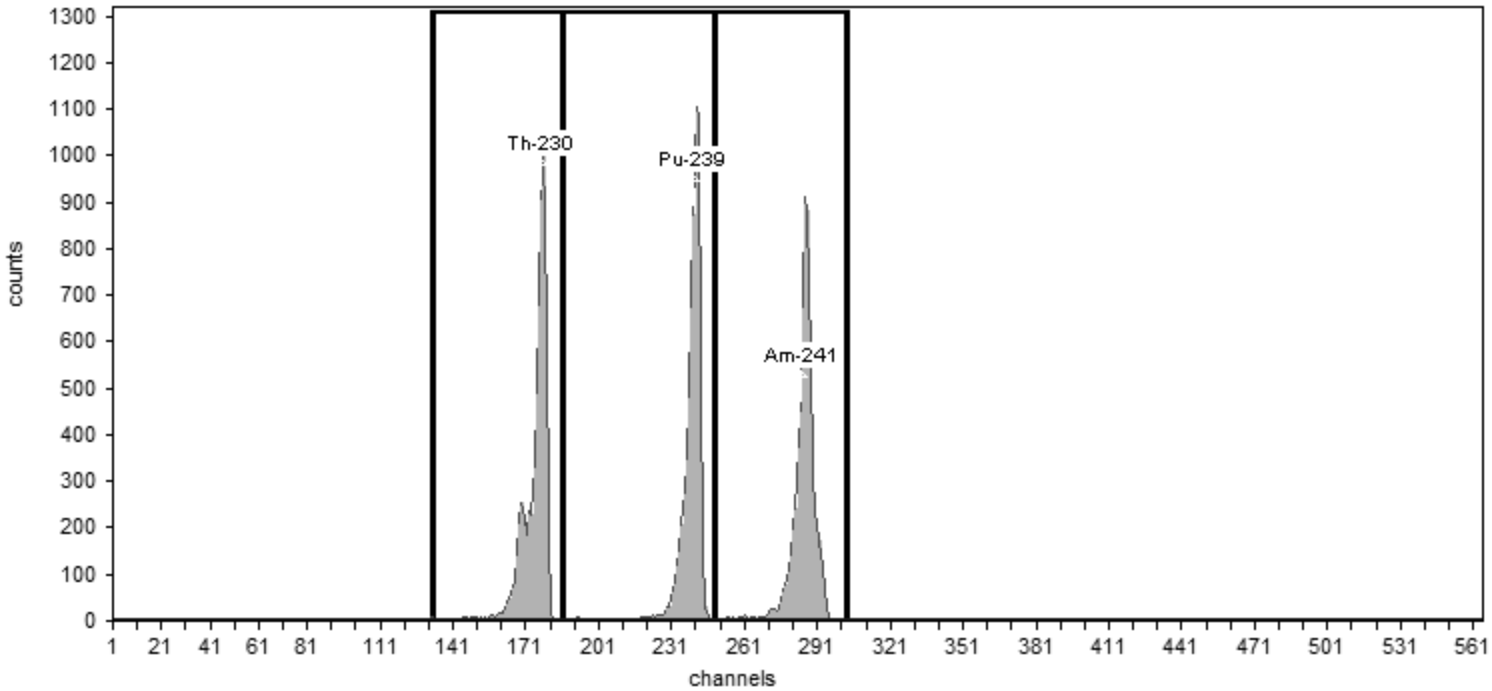
Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 7/26/2016 4:34:52PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV221-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.78% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.86	6,100.00	101.67
Pu-239	240	5,155.40	186	249	34.13	6,306.00	105.10
Am-241	284	5,485.70	249	303	32.97	6,019.00	100.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:48PM 9/6/2016

Calibration

Sample Name: CCV-8877;AV221-20160906
Description:
Detector: AV221

Analyst: 60040
Analysis Date: 9/6/2016 12:30:47PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

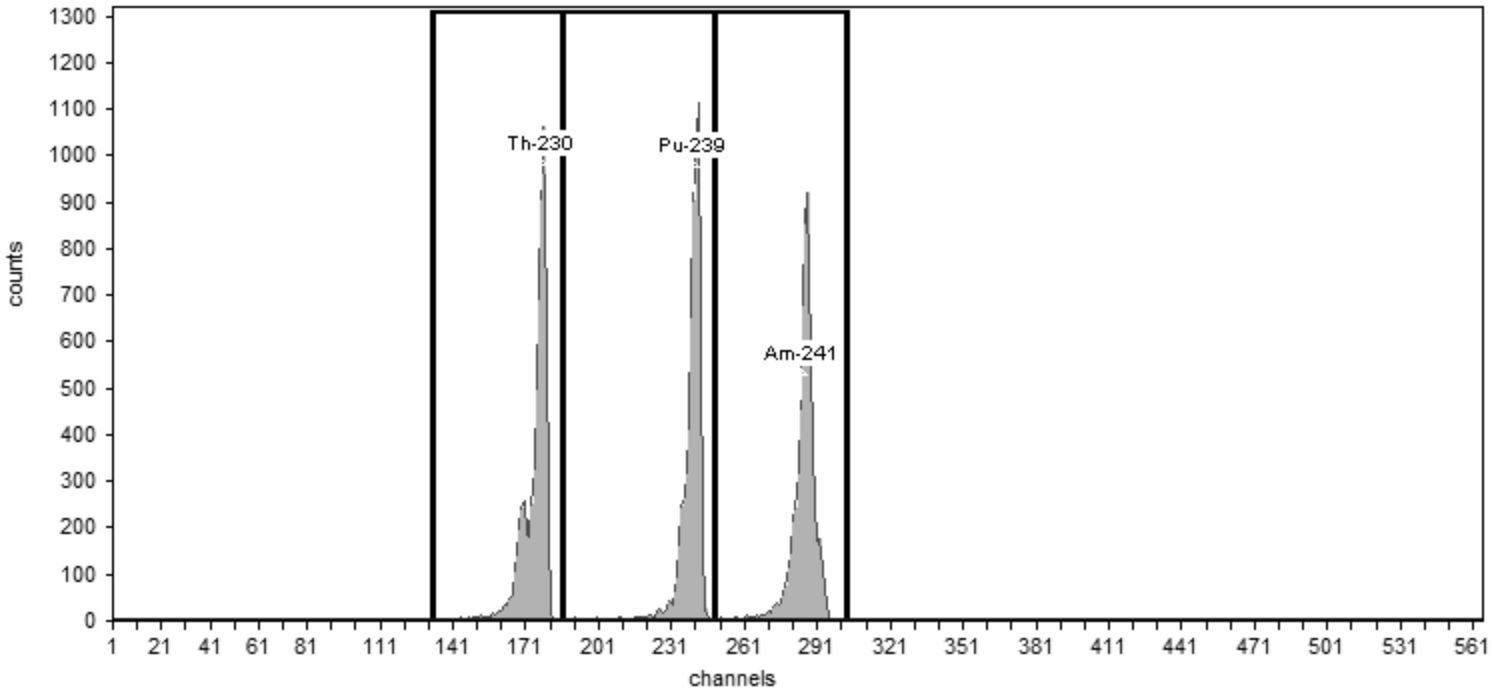
Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 9/6/2016 11:26:26AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV221-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.98% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.50	6,181.00	103.02
Pu-239	240	5,155.40	186	249	33.93	6,318.00	105.30
Am-241	284	5,485.70	249	303	33.67	6,065.00	101.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:12:06AM 9/6/2016

Calibration

Sample Name: CCV-9520;AV22-20160906
Description:
Detector: AV222

Analyst: 60040
Analysis Date: 9/6/2016 11:12:05AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

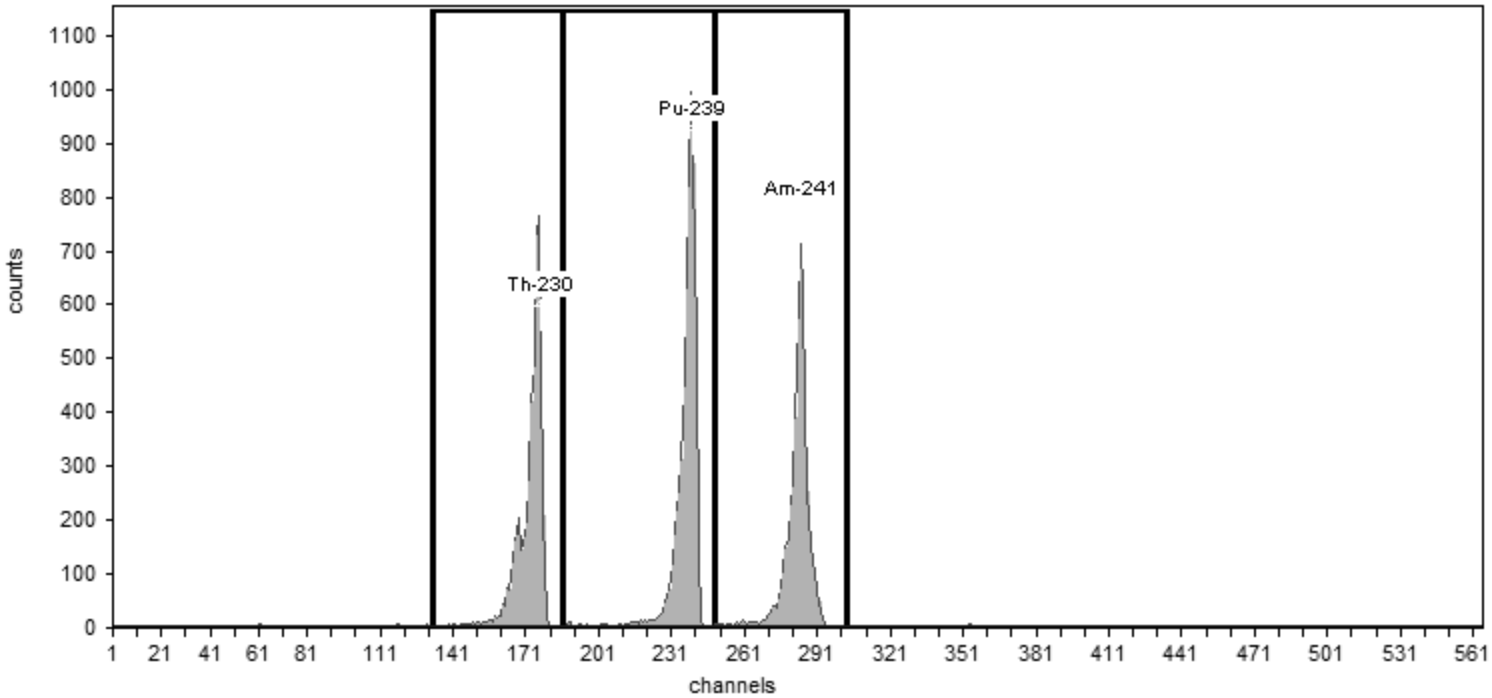
Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 9/6/2016 10:08:19AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV22-20160906

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.24% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.11	4,957.00	82.62
Pu-239	240	5,155.40	186	249	35.83	5,880.00	98.00
Am-241	284	5,485.70	249	303	34.48	4,736.00	78.93

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:28AM 9/2/2016

Sample

Sample Name: ICB;AV147
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

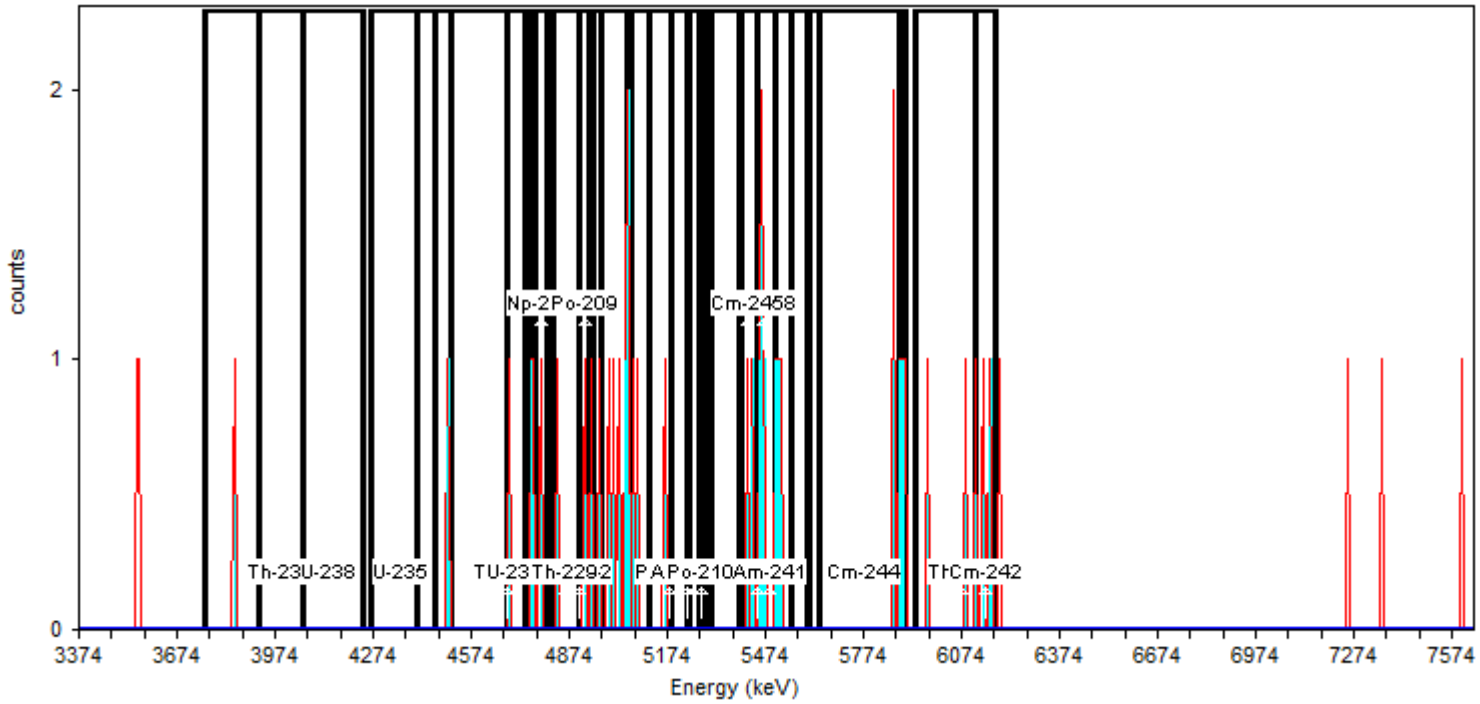
Batch Name: August2016
Description:

Acquisition

Detector: AV147 , SN: 50-05/R1
Acquisition Start Date: 9/1/2016 3:17:26PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-7107;AV147-20151016
Calibration Date: 10/16/2015 6:46:39PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 44.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	7.00	7.292E-003	2.946E-003
Th-229	4,858.46	4,739.14	5,119.48	15.00	1.563E-002	4.167E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	9.00	9.375E-003	3.294E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	7.00	7.292E-003	2.946E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	9.00	9.375E-003	3.294E-003
Cm-245	5,417.78	5,395.41	5,447.61	2.00	2.083E-003	1.804E-003
Pu-236	5,760.83	5,611.67	5,887.60	3.00	3.125E-003	2.083E-003
Cm-244	5,775.74	5,641.51	5,902.52	5.00	5.208E-003	2.552E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:20AM 9/2/2016

Sample

Sample Name: ICB;AV171
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

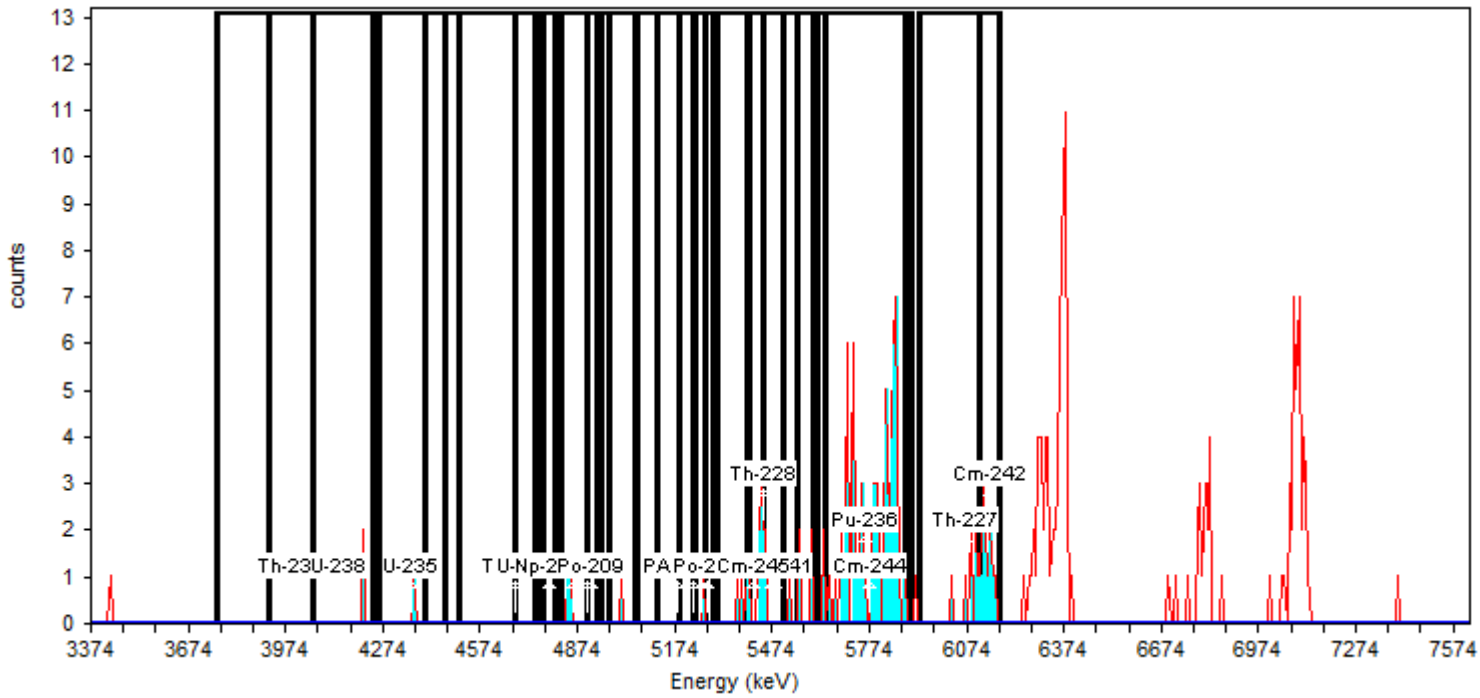
Batch Name: August2016
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 9/1/2016 3:17:13PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV171-20151016
Calibration Date: 10/17/2015 2:36:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 228.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	5.00	5.208E-003	2.552E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	65.00	6.771E-002	8.463E-003
Cm-244	5,775.74	5,641.51	5,902.52	63.00	6.563E-002	8.333E-003
Th-227	6,074.04	5,932.35	6,178.45	18.00	1.875E-002	4.541E-003
Cm-242	6,148.62	6,118.79	6,178.45	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:21AM 9/2/2016

Sample

Sample Name: ICB;AV172
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

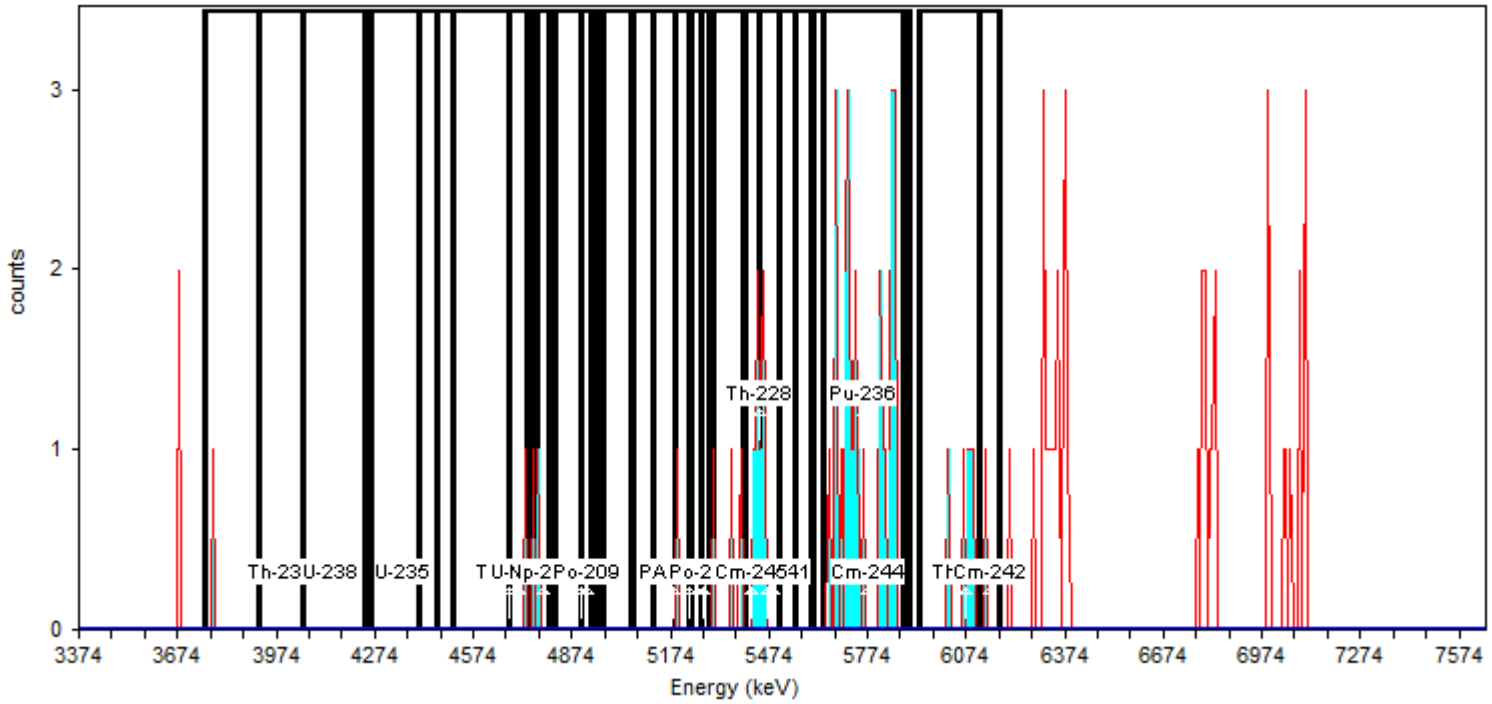
Batch Name: August2016
Description:

Acquisition

Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9884;AV172-20151016
Calibration Date: 10/17/2015 2:36:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 89.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	5.00	5.208E-003	2.552E-003
Pu-236	5,760.83	5,611.67	5,887.60	27.00	2.812E-002	5.512E-003
Cm-244	5,775.74	5,641.51	5,902.52	27.00	2.812E-002	5.512E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:57:05AM 9/3/2016

Sample

Sample Name: ICB;AV173
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

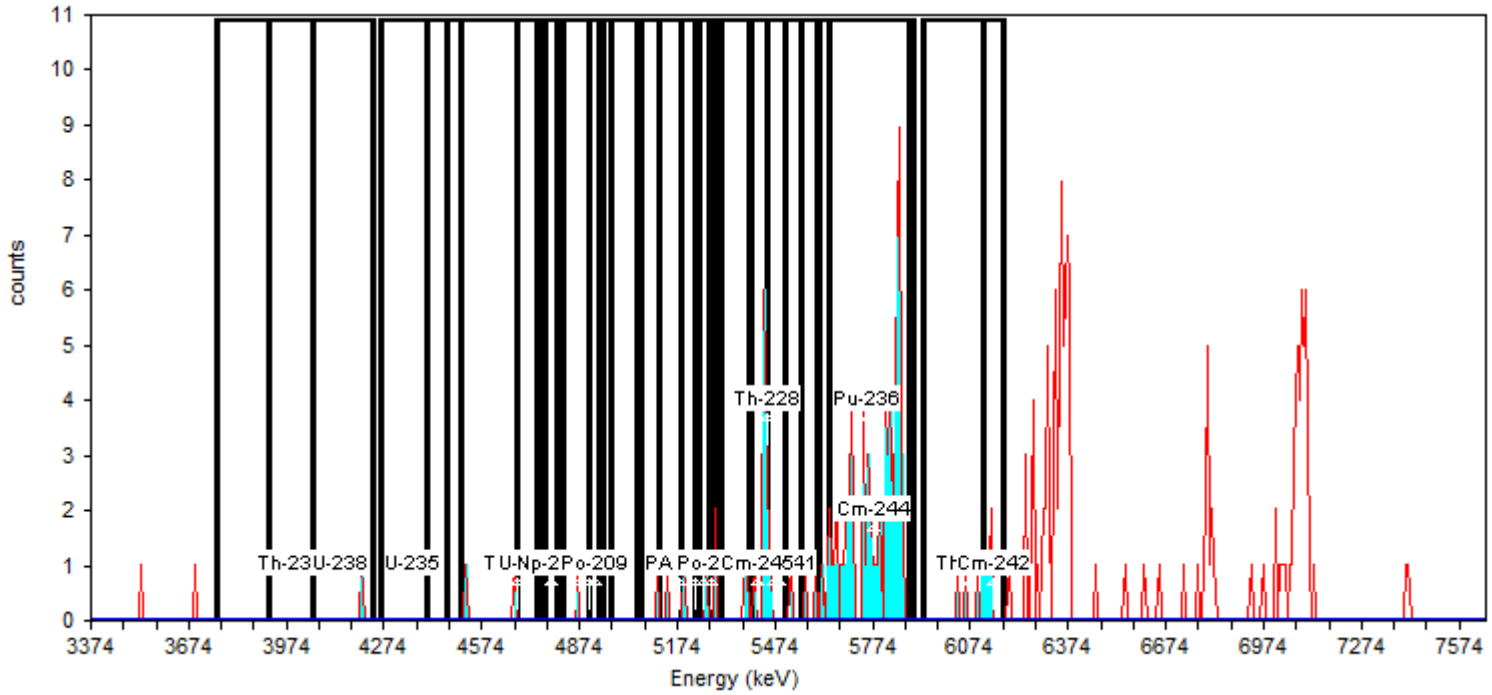
Batch Name: August2016a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 9/2/2016 10:55:27AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 227.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	6.00	6.250E-003	2.756E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	3.00	3.125E-003	2.083E-003
Pu-238	5,469.98	5,268.63	5,552.01	17.00	1.771E-002	4.419E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	71.00	7.396E-002	8.839E-003
Cm-244	5,775.74	5,641.51	5,902.52	69.00	7.188E-002	8.715E-003
Th-227	6,074.04	5,932.35	6,178.45	9.00	9.375E-003	3.294E-003
Cm-242	6,148.62	6,118.79	6,178.45	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:24AM 9/2/2016

Sample

Sample Name: ICB;AV175
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

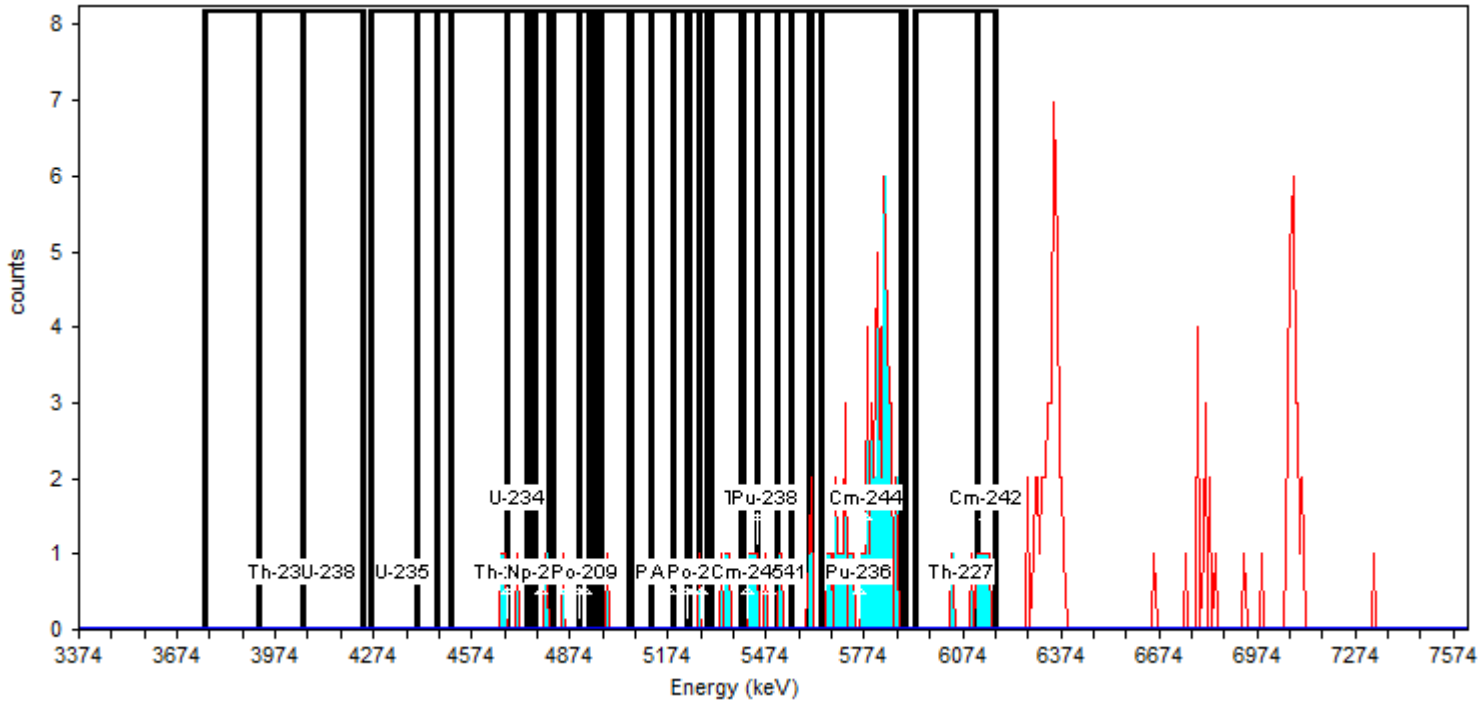
Batch Name: August2016
Description:

Acquisition

Detector: AV175 , SN: 50-117H1
Acquisition Start Date: 9/1/2016 3:17:07PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-7107;AV175-20151017
Calibration Date: 10/17/2015 6:01:46PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 158.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	9.00	9.375E-003	3.294E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	54.00	5.625E-002	7.725E-003
Cm-244	5,775.74	5,641.51	5,902.52	52.00	5.417E-002	7.583E-003
Th-227	6,074.04	5,932.35	6,178.45	8.00	8.333E-003	3.125E-003
Cm-242	6,148.62	6,118.79	6,178.45	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:52AM 9/2/2016

Sample

Sample Name: ICB;AV188
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

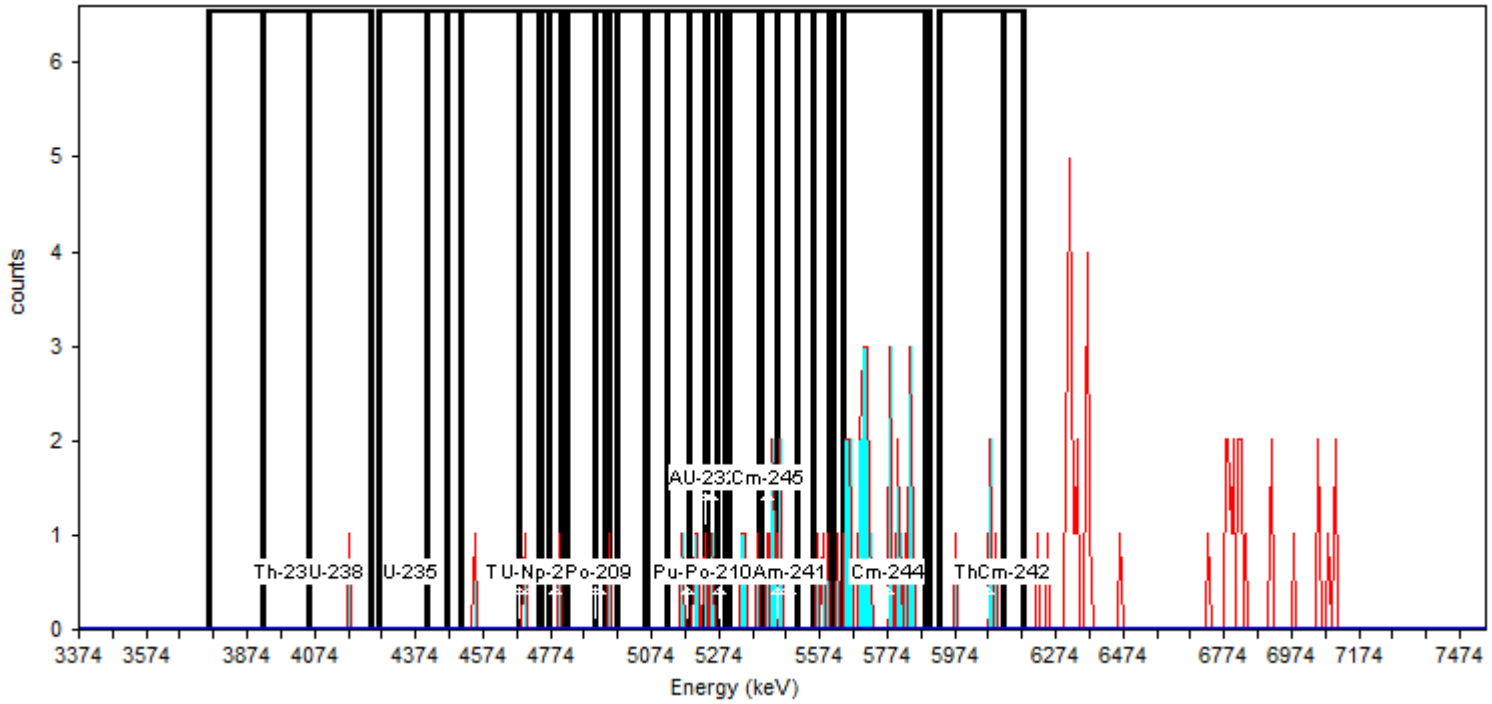
Batch Name: August2016
Description:

Acquisition

Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.06 min.
Calibration Name: IC-9886;AV188-20151017
Calibration Date: 10/17/2015 6:02:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 102.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	12.00	1.250E-002	3.756E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	30.00	3.125E-002	5.800E-003
Cm-244	5,775.74	5,641.51	5,902.52	29.00	3.021E-002	5.705E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:47AM 9/2/2016

Sample

Sample Name: ICB;AV189
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

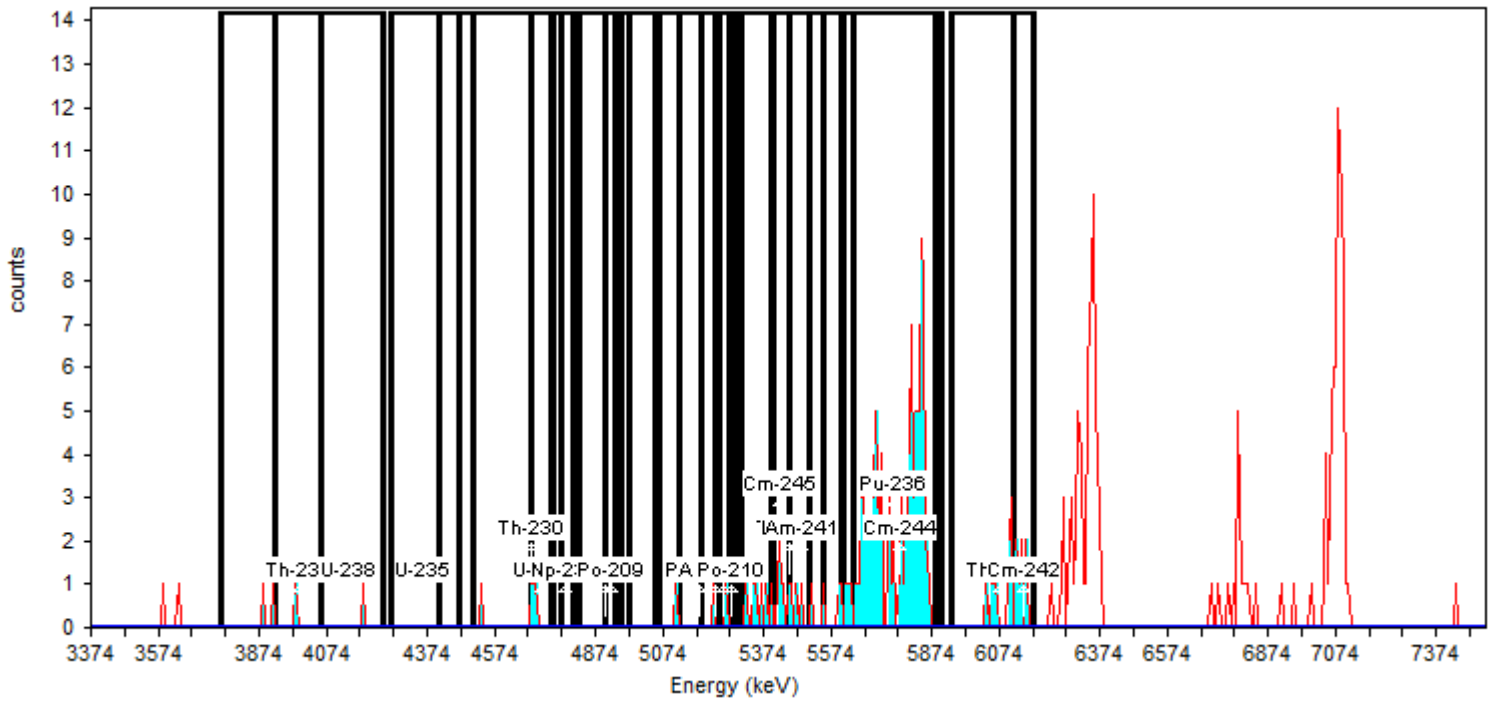
Batch Name: August2016
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-7107;AV189-20151017a
Calibration Date: 10/18/2015 3:55:37PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 265.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	3.00	3.125E-003	2.083E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	88.00	9.167E-002	9.827E-003
Cm-244	5,775.74	5,641.51	5,902.52	85.00	8.854E-002	9.660E-003
Th-227	6,074.04	5,932.35	6,178.45	16.00	1.667E-002	4.295E-003
Cm-242	6,148.62	6,118.79	6,178.45	7.00	7.292E-003	2.946E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:51AM 9/2/2016

Sample

Sample Name: ICB;AV190
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

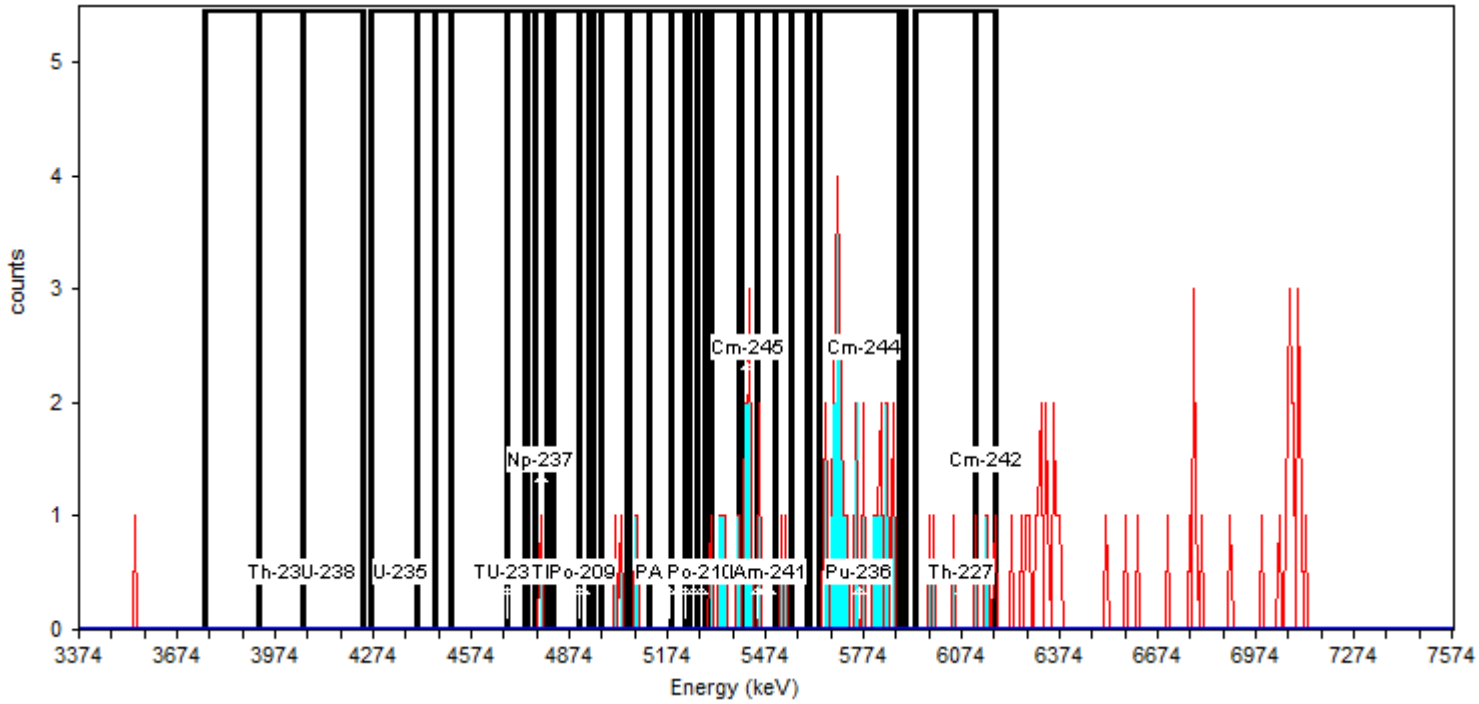
Batch Name: August2016
Description:

Acquisition

Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV190-20151017
Calibration Date: 10/18/2015 3:54:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 105.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	5.00	5.208E-003	2.552E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	18.00	1.875E-002	4.541E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	32.00	3.333E-002	5.984E-003
Cm-244	5,775.74	5,641.51	5,902.52	32.00	3.333E-002	5.984E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:49AM 7/23/2016

Sample

Sample Name: ICB;AV191
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

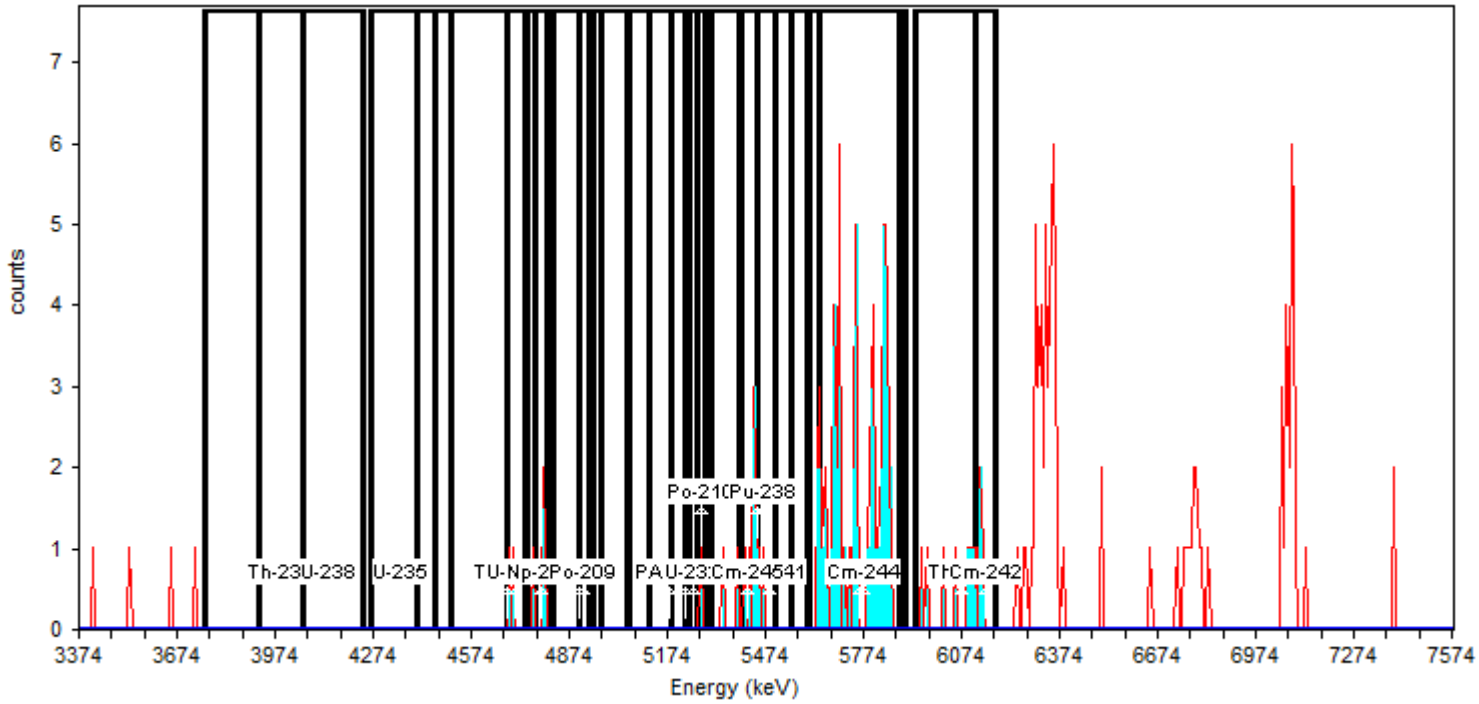
Batch Name: July2016
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 7/22/2016 3:43:39PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 175.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	6.00	6.250E-003	2.756E-003
Pu-242	4,903.21	4,679.48	4,947.95	6.00	6.250E-003	2.756E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	3.00	3.125E-003	2.083E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	10.00	1.042E-002	3.455E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	59.00	6.146E-002	8.069E-003
Cm-244	5,775.74	5,641.51	5,902.52	57.00	5.937E-002	7.933E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:50AM 9/2/2016

Sample

Sample Name: ICB;AV191
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

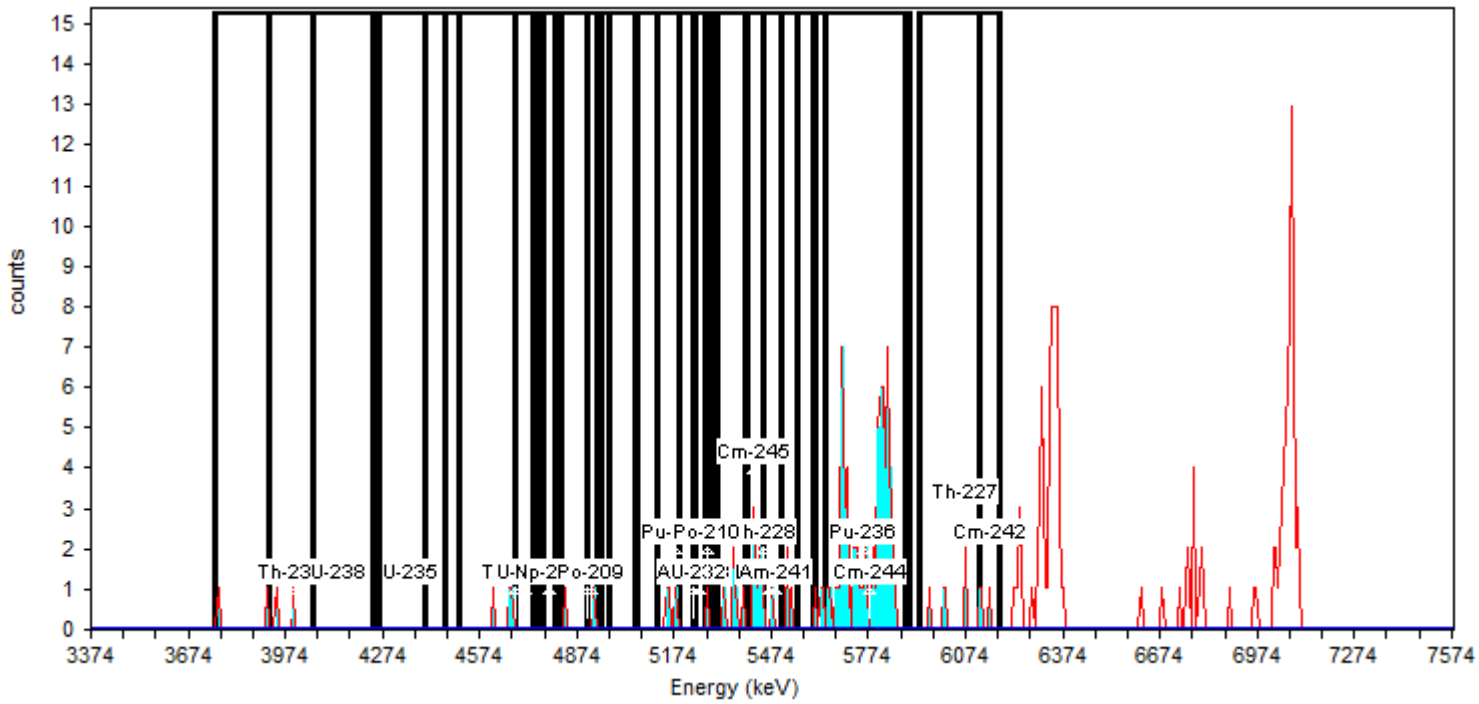
Batch Name: August2016
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 9/1/2016 3:17:13PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 231.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	4.00	4.167E-003	2.329E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	71.00	7.396E-002	8.839E-003
Cm-244	5,775.74	5,641.51	5,902.52	68.00	7.083E-002	8.653E-003
Th-227	6,074.04	5,932.35	6,178.45	8.00	8.333E-003	3.125E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:02AM 9/2/2016

Sample

Sample Name: ICB;AV193
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

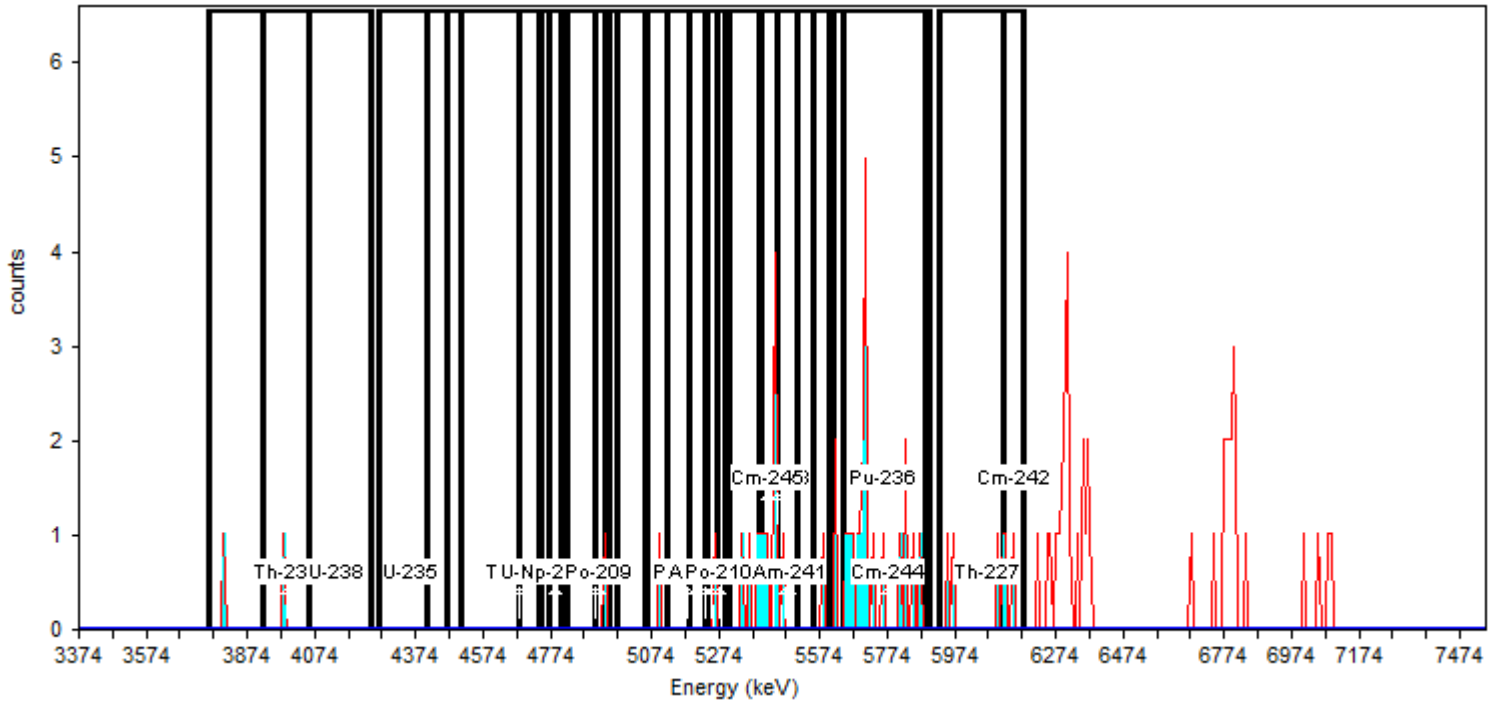
Batch Name: August2016
Description:

Acquisition

Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 9/1/2016 3:17:13PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV193-20151017
Calibration Date: 10/18/2015 3:55:11PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 91.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	23.00	2.396E-002	5.103E-003
Cm-244	5,775.74	5,641.51	5,902.52	21.00	2.188E-002	4.886E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:43:40AM 7/23/2016

Sample

Sample Name: ICB;AV194
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

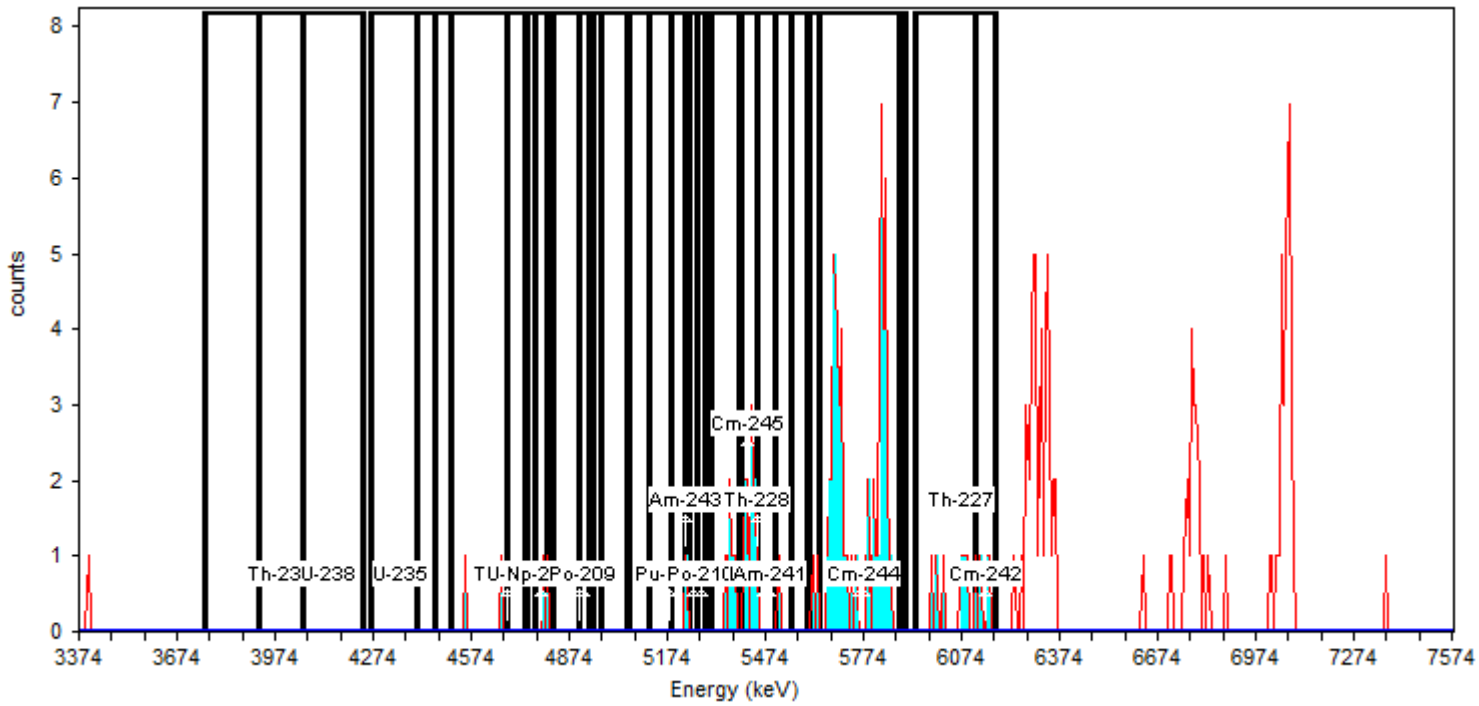
Batch Name: July2016
Description:

Acquisition

Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 7/22/2016 3:43:39PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 178.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	2.00	2.083E-003	1.804E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	16.00	1.667E-002	4.295E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	53.00	5.521E-002	7.655E-003
Cm-244	5,775.74	5,641.51	5,902.52	51.00	5.313E-002	7.512E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:06AM 7/23/2016

Sample

Sample Name: ICB;AV212
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

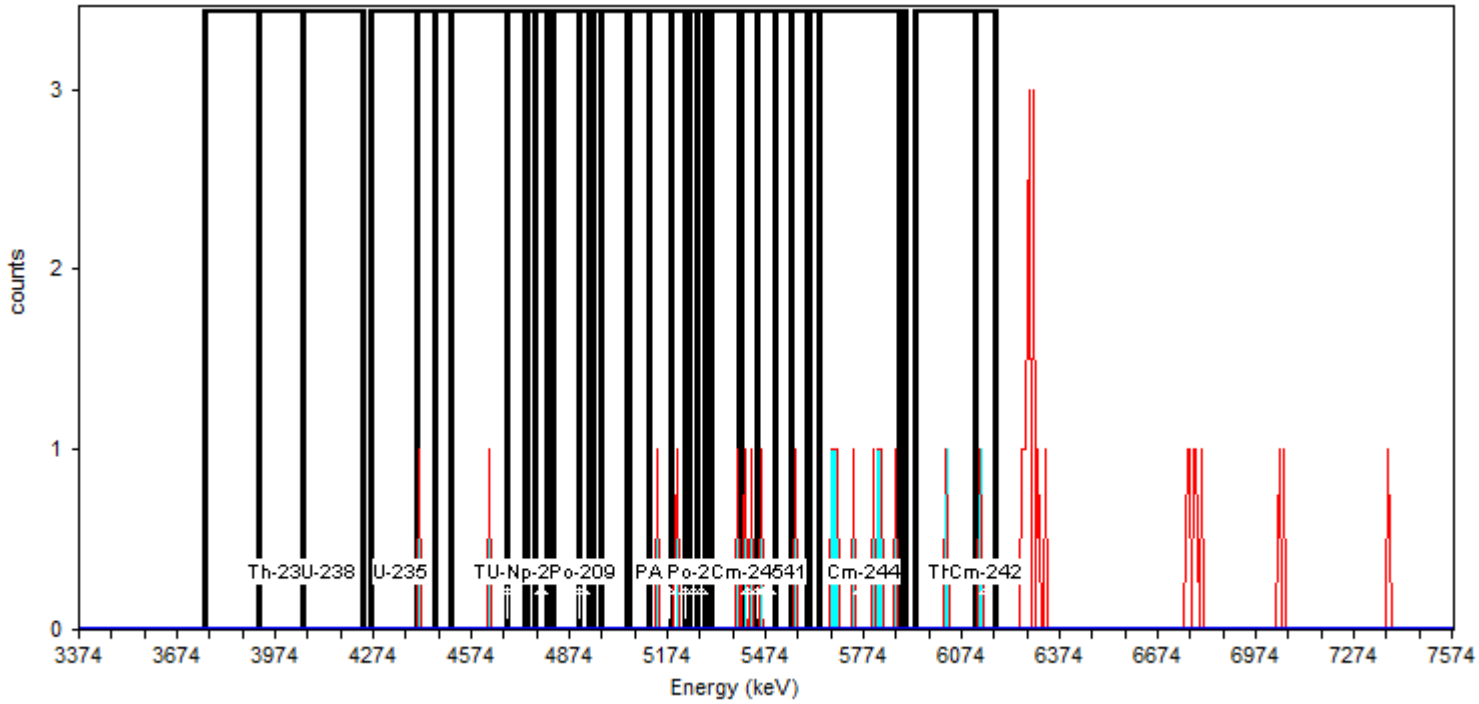
Batch Name: July2016
Description:

Acquisition

Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 7/22/2016 3:43:43PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9795;AV212-20151018
Calibration Date: 10/18/2015 6:42:05PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 38.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	5.00	5.208E-003	2.552E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	4.00	4.167E-003	2.329E-003
Am-241	5,484.90	5,298.46	5,604.22	5.00	5.208E-003	2.552E-003
Cm-245	5,417.78	5,395.41	5,447.61	2.00	2.083E-003	1.804E-003
Pu-236	5,760.83	5,611.67	5,887.60	8.00	8.333E-003	3.125E-003
Cm-244	5,775.74	5,641.51	5,902.52	8.00	8.333E-003	3.125E-003
Th-227	6,074.04	5,932.35	6,178.45	2.00	2.083E-003	1.804E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:48AM 7/27/2016

Sample

Sample Name: ICB;AV213
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

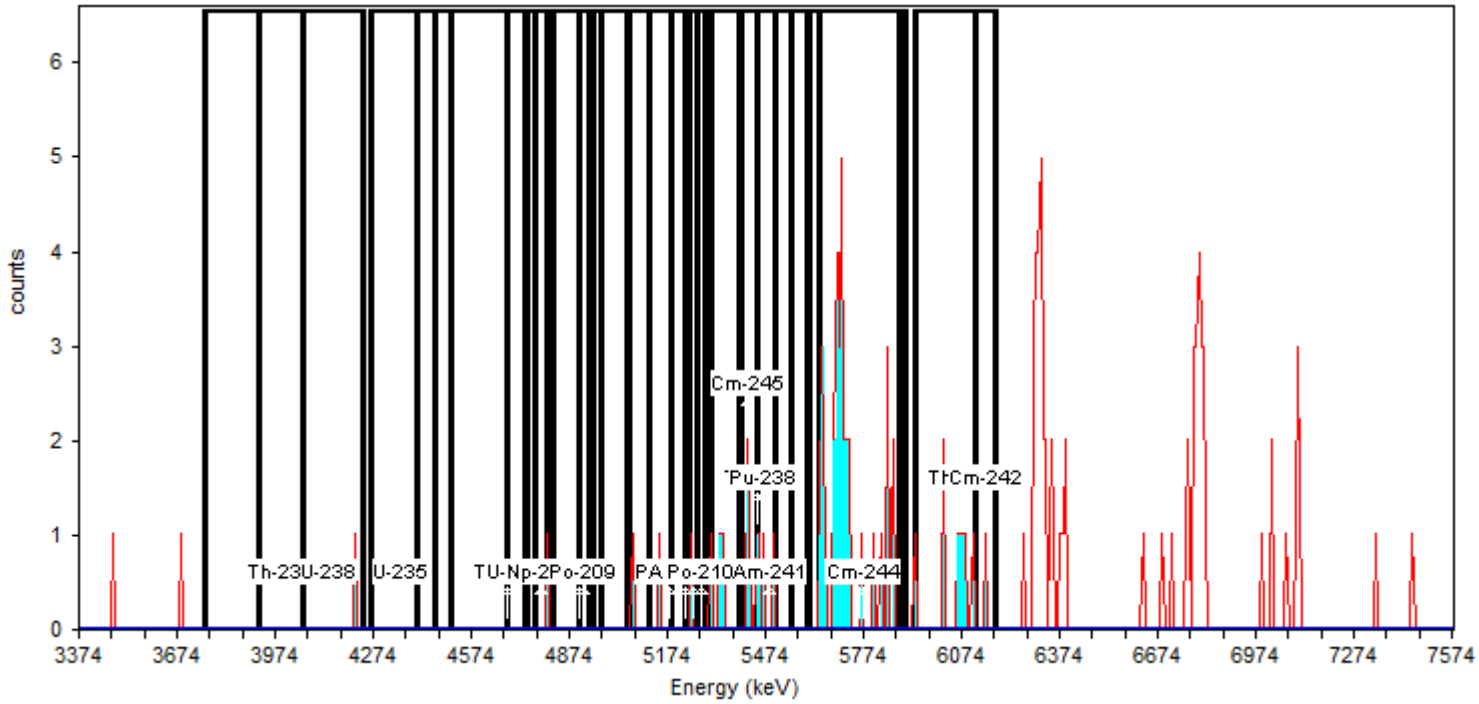
Batch Name: July2016a
Description:

Acquisition

Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 7/25/2016 1:14:01PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV213-20151018
Calibration Date: 10/18/2015 6:42:09PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 120.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	10.00	1.042E-002	3.455E-003
Am-241	5,484.90	5,298.46	5,604.22	10.00	1.042E-002	3.455E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	33.00	3.437E-002	6.074E-003
Cm-244	5,775.74	5,641.51	5,902.52	33.00	3.437E-002	6.074E-003
Th-227	6,074.04	5,932.35	6,178.45	9.00	9.375E-003	3.294E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:14AM 7/23/2016

Sample

Sample Name: ICB;AV214
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

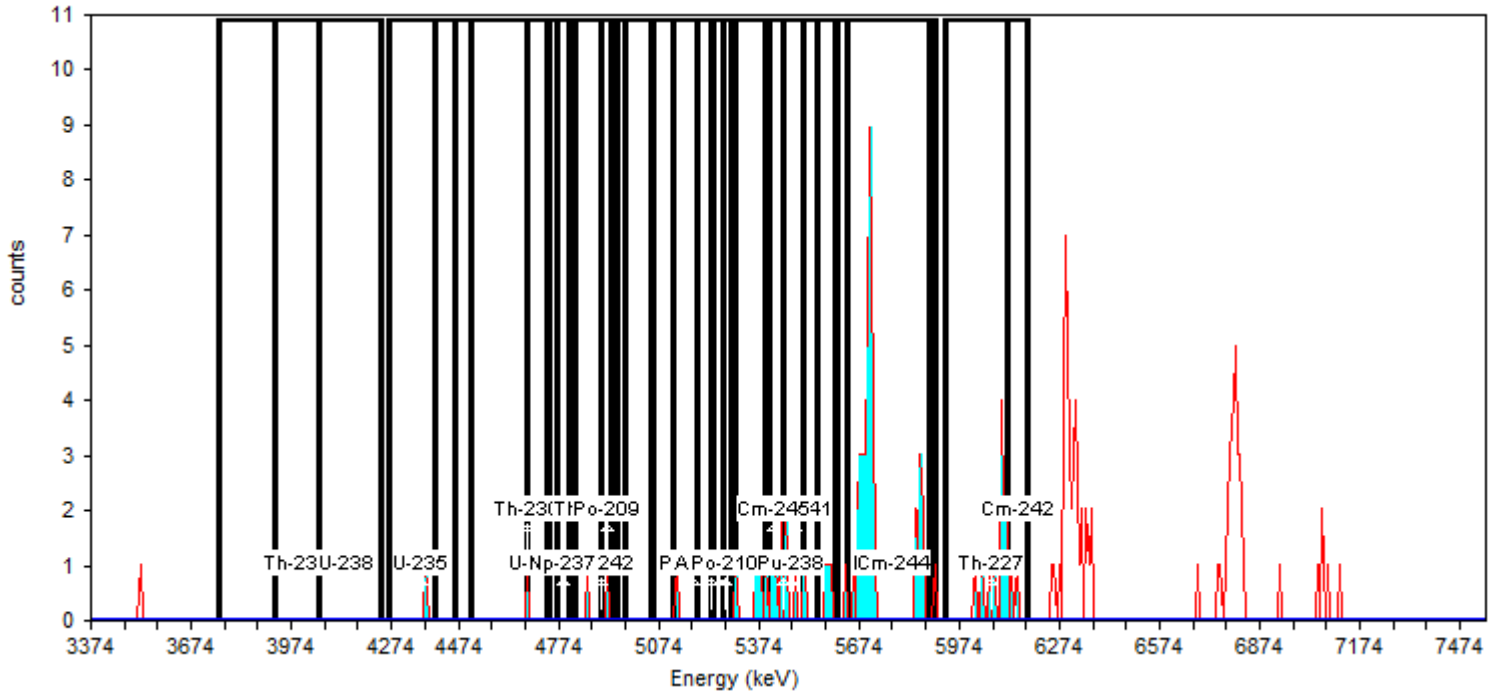
Batch Name: July2016
Description:

Acquisition

Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 7/22/2016 3:43:44PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9884;AV214-20151018
Calibration Date: 10/18/2015 6:42:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 144.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	15.00	1.563E-002	4.167E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	40.00	4.167E-002	6.670E-003
Cm-244	5,775.74	5,641.51	5,902.52	40.00	4.167E-002	6.670E-003
Th-227	6,074.04	5,932.35	6,178.45	14.00	1.458E-002	4.034E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:20AM 7/23/2016

Sample

Sample Name: ICB;AV215
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

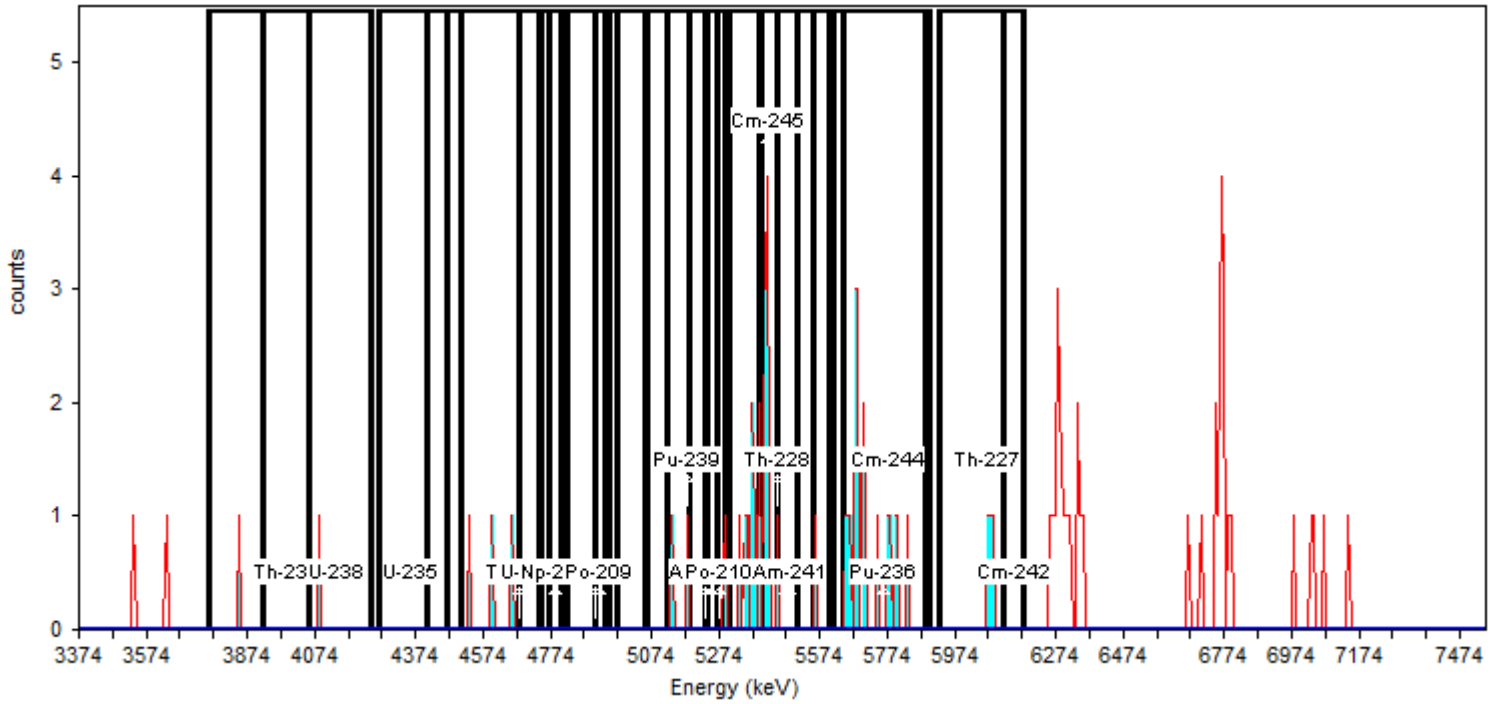
Batch Name: July2016
Description:

Acquisition

Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 7/22/2016 3:43:44PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9885;AV215-20151018
Calibration Date: 10/18/2015 6:42:24PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	11.00	1.146E-002	3.608E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	18.00	1.875E-002	4.541E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	18.00	1.875E-002	4.541E-003
Cm-244	5,775.74	5,641.51	5,902.52	18.00	1.875E-002	4.541E-003
Th-227	6,074.04	5,932.35	6,178.45	3.00	3.125E-003	2.083E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:22AM 7/23/2016

Sample

Sample Name: ICB;AV217
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

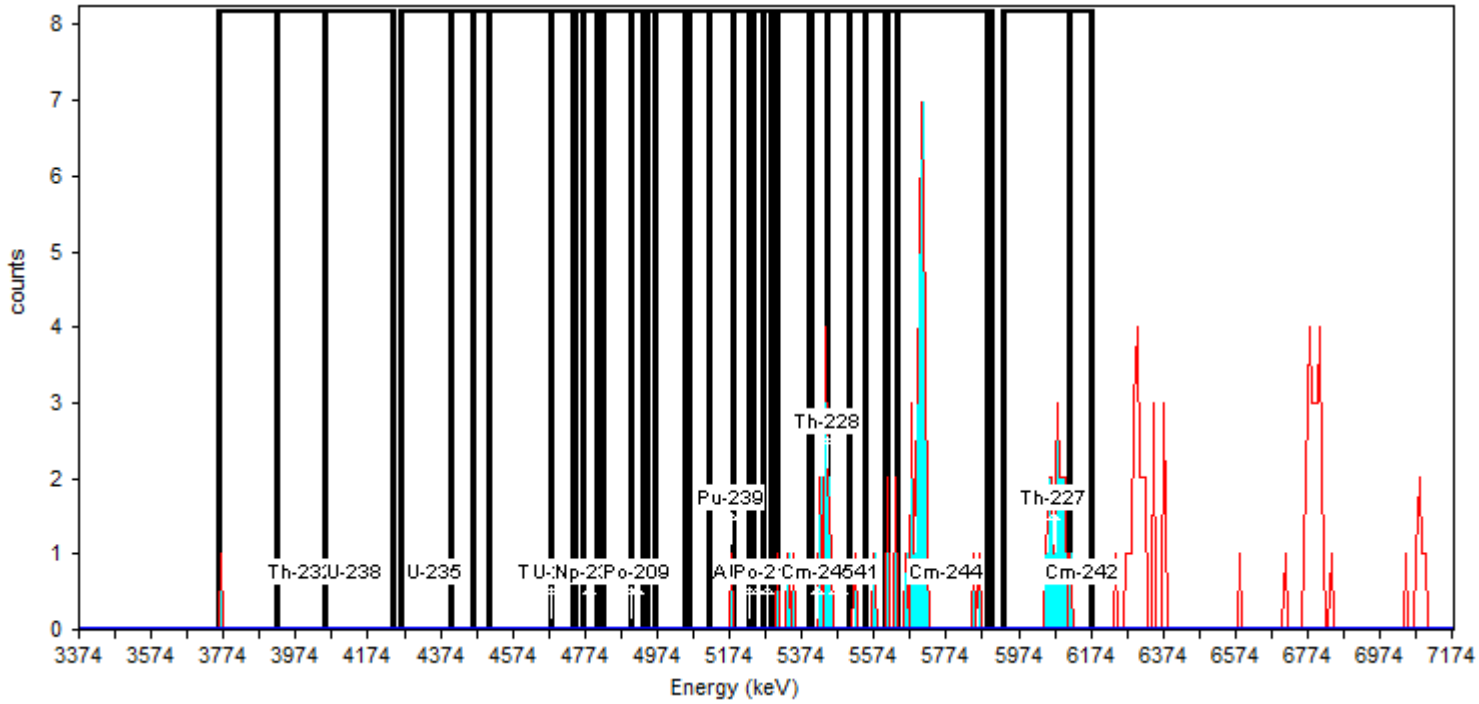
Batch Name: July2016
Description:

Acquisition

Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 7/22/2016 3:43:44PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-7107;AV217-20151018
Calibration Date: 10/18/2015 9:19:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 117.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	31.00	3.229E-002	5.893E-003
Cm-244	5,775.74	5,641.51	5,902.52	27.00	2.812E-002	5.512E-003
Th-227	6,074.04	5,932.35	6,178.45	16.00	1.667E-002	4.295E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:50AM 7/27/2016

Sample

Sample Name: ICB;AV218
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

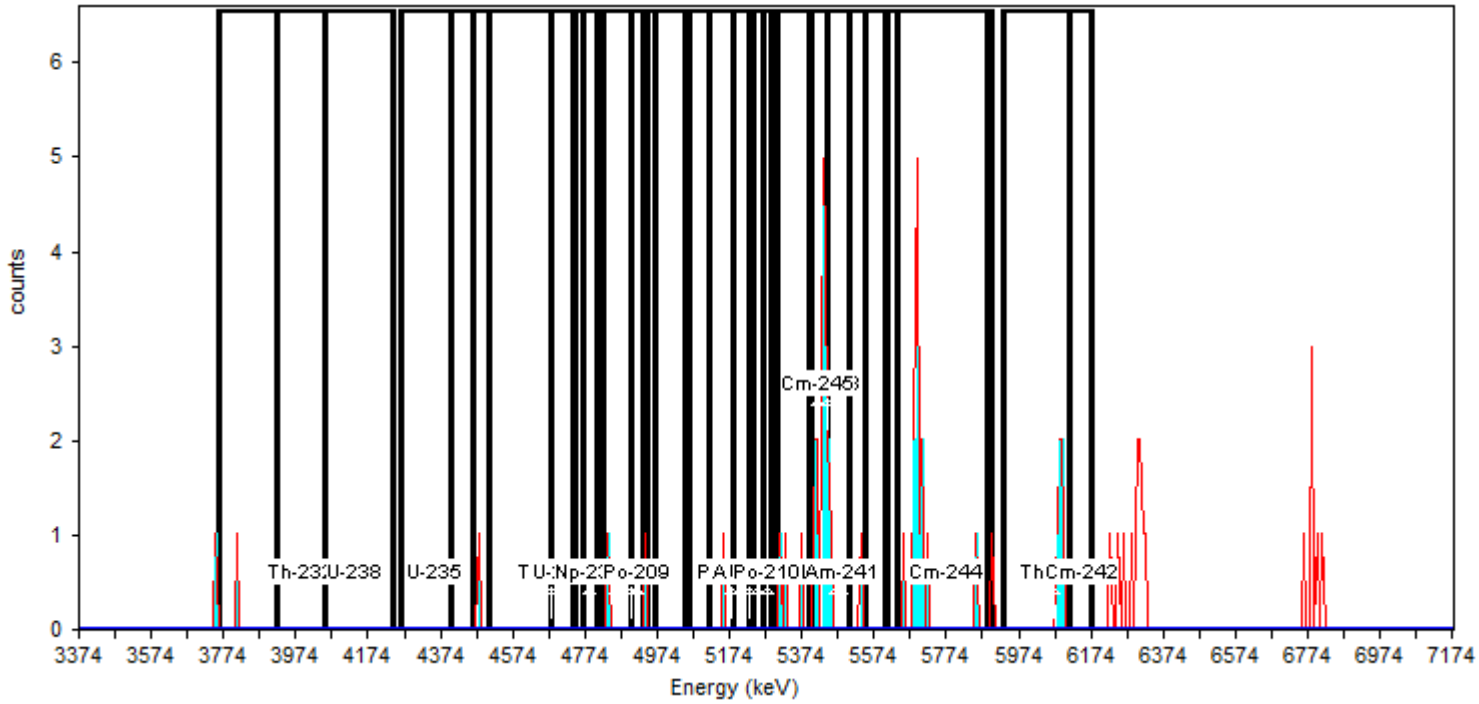
Batch Name: July2016a
Description:

Acquisition

Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 7/25/2016 1:14:02PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 61.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	19.00	1.979E-002	4.658E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	20.00	2.083E-002	4.774E-003
Am-241	5,484.90	5,298.46	5,604.22	20.00	2.083E-002	4.774E-003
Cm-245	5,417.78	5,395.41	5,447.61	15.00	1.563E-002	4.167E-003
Pu-236	5,760.83	5,611.67	5,887.60	13.00	1.354E-002	3.898E-003
Cm-244	5,775.74	5,641.51	5,902.52	14.00	1.458E-002	4.034E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:06AM 9/2/2016

Sample

Sample Name: ICB;AV218
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

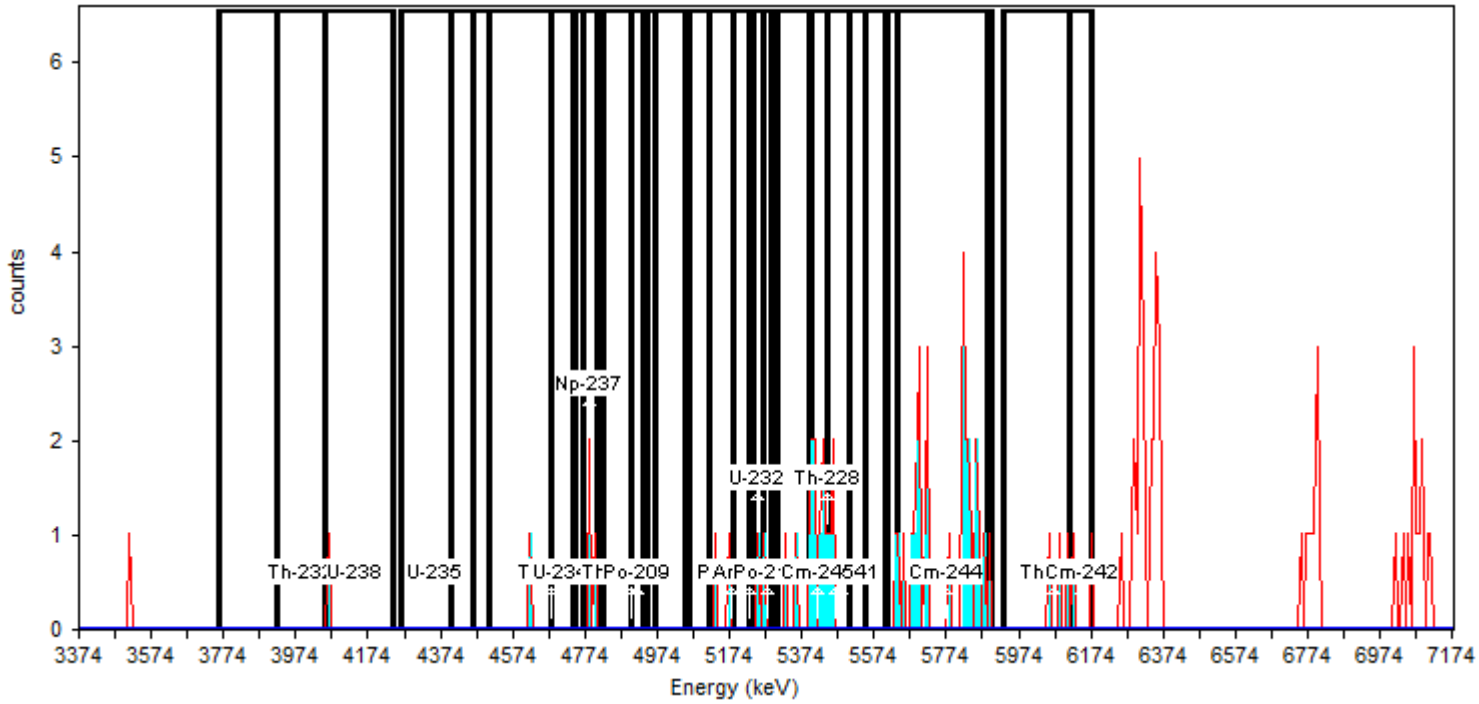
Batch Name: August2016
Description:

Acquisition

Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 9/1/2016 3:17:18PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV218-20151018
Calibration Date: 10/18/2015 9:19:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 106.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	3.00	3.125E-003	2.083E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	15.00	1.563E-002	4.167E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	28.00	2.917E-002	5.610E-003
Cm-244	5,775.74	5,641.51	5,902.52	28.00	2.917E-002	5.610E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:34AM 7/23/2016

Sample

Sample Name: ICB;AV219
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

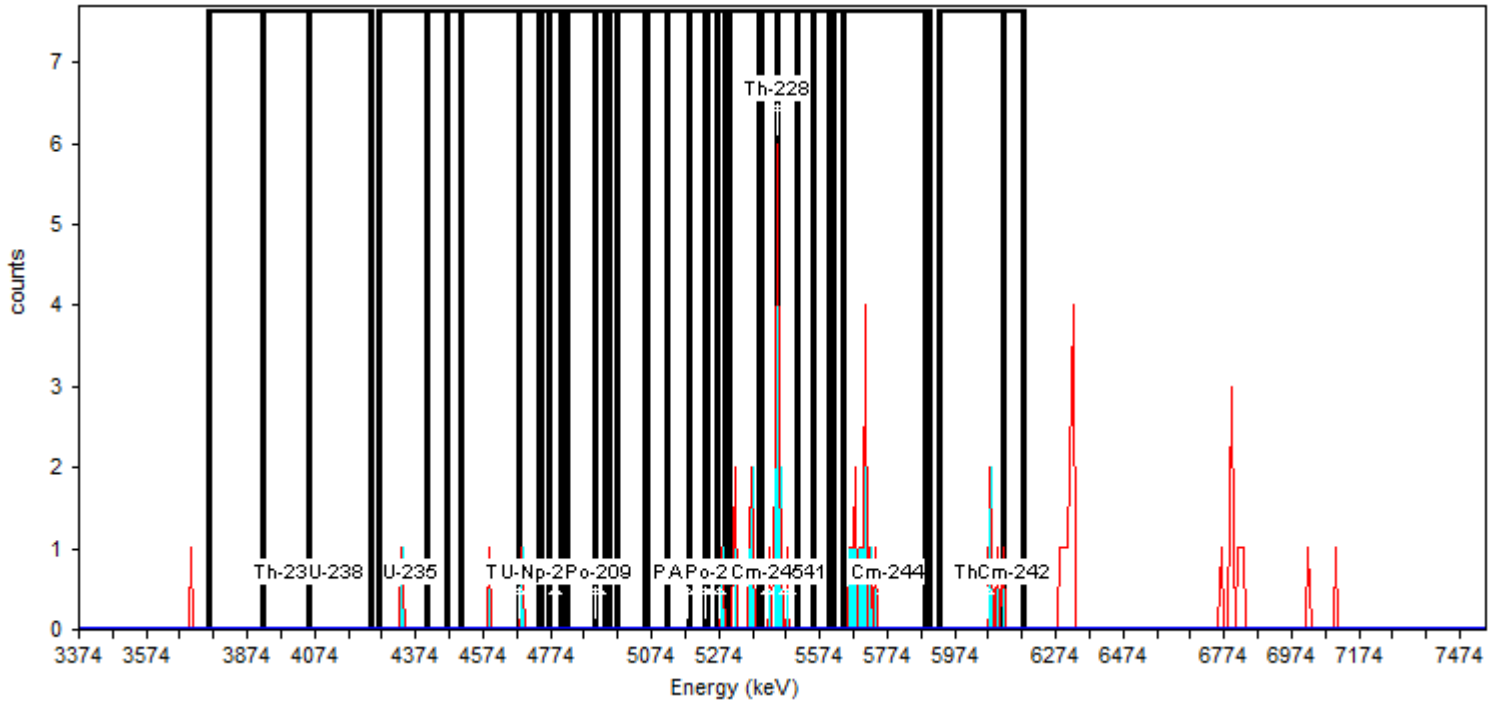
Batch Name: July2016
Description:

Acquisition

Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 7/22/2016 3:43:45PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV219-20151018
Calibration Date: 10/18/2015 9:19:52PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 58.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	18.00	1.875E-002	4.541E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	12.00	1.250E-002	3.756E-003
Cm-244	5,775.74	5,641.51	5,902.52	12.00	1.250E-002	3.756E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:57:59AM 9/3/2016

Sample

Sample Name: ICB;AV219
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

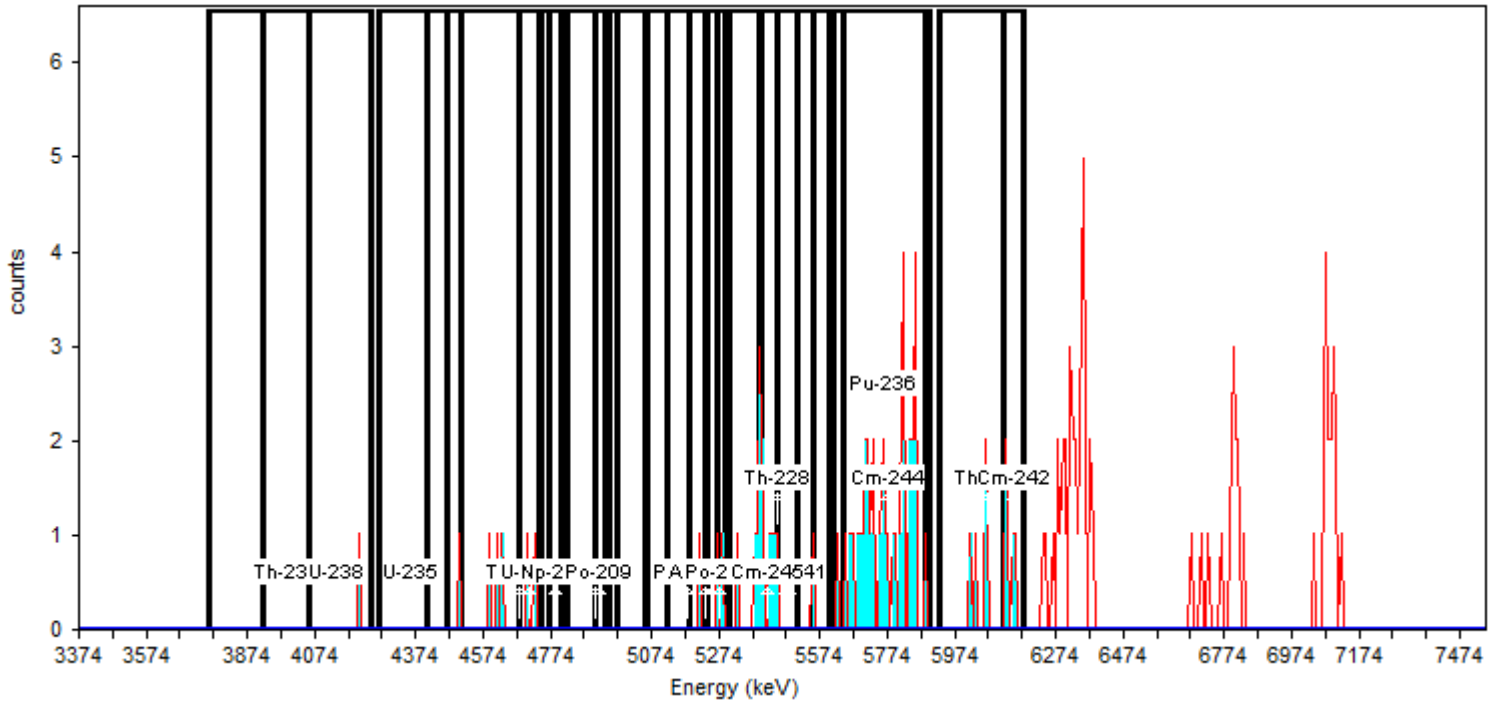
Batch Name: August2016a
Description:

Acquisition

Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 9/2/2016 10:55:30AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV219-20151018
Calibration Date: 10/18/2015 9:19:52PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 129.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	6.00	6.250E-003	2.756E-003
U-234	4,709.31	4,507.96	4,821.17	5.00	5.208E-003	2.552E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	11.00	1.146E-002	3.608E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	15.00	1.563E-002	4.167E-003
Am-241	5,484.90	5,298.46	5,604.22	13.00	1.354E-002	3.898E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	35.00	3.646E-002	6.250E-003
Cm-244	5,775.74	5,641.51	5,902.52	34.00	3.542E-002	6.163E-003
Th-227	6,074.04	5,932.35	6,178.45	10.00	1.042E-002	3.455E-003
Cm-242	6,148.62	6,118.79	6,178.45	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:58:04AM 9/3/2016

Sample

Sample Name: ICB;AV220
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

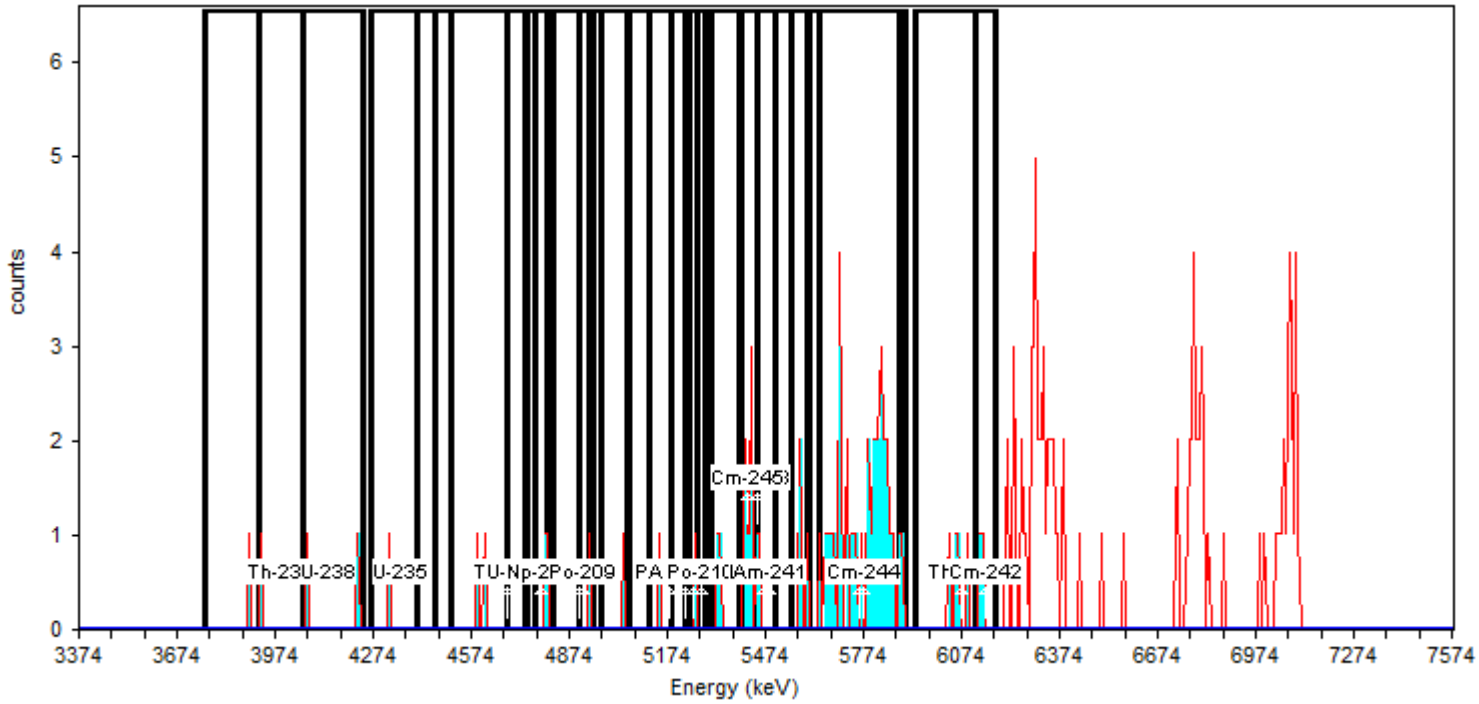
Batch Name: August2016a
Description:

Acquisition

Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 9/2/2016 10:55:30AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8876;AV220-20151018
Calibration Date: 10/18/2015 9:19:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 157.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	3.00	3.125E-003	2.083E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	2.00	2.083E-003	1.804E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	39.00	4.062E-002	6.588E-003
Cm-244	5,775.74	5,641.51	5,902.52	40.00	4.167E-002	6.670E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:29AM 7/23/2016

Sample

Sample Name: ICB;AV221
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

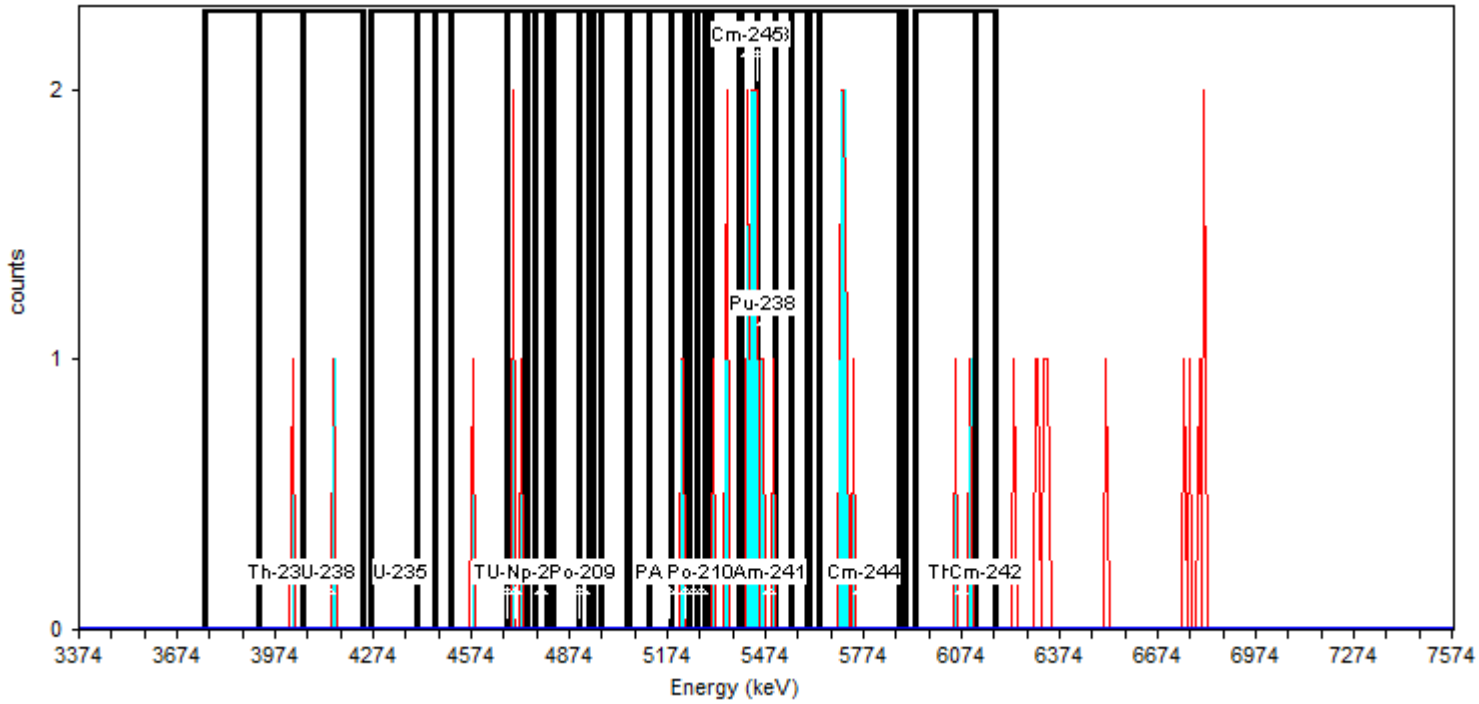
Batch Name: July2016
Description:

Acquisition

Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 7/22/2016 3:43:45PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 46.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	16.00	1.667E-002	4.295E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	7.00	7.292E-003	2.946E-003
Cm-244	5,775.74	5,641.51	5,902.52	7.00	7.292E-003	2.946E-003
Th-227	6,074.04	5,932.35	6,178.45	2.00	2.083E-003	1.804E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:17:38AM 9/2/2016

Sample

Sample Name: ICB;AV221
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

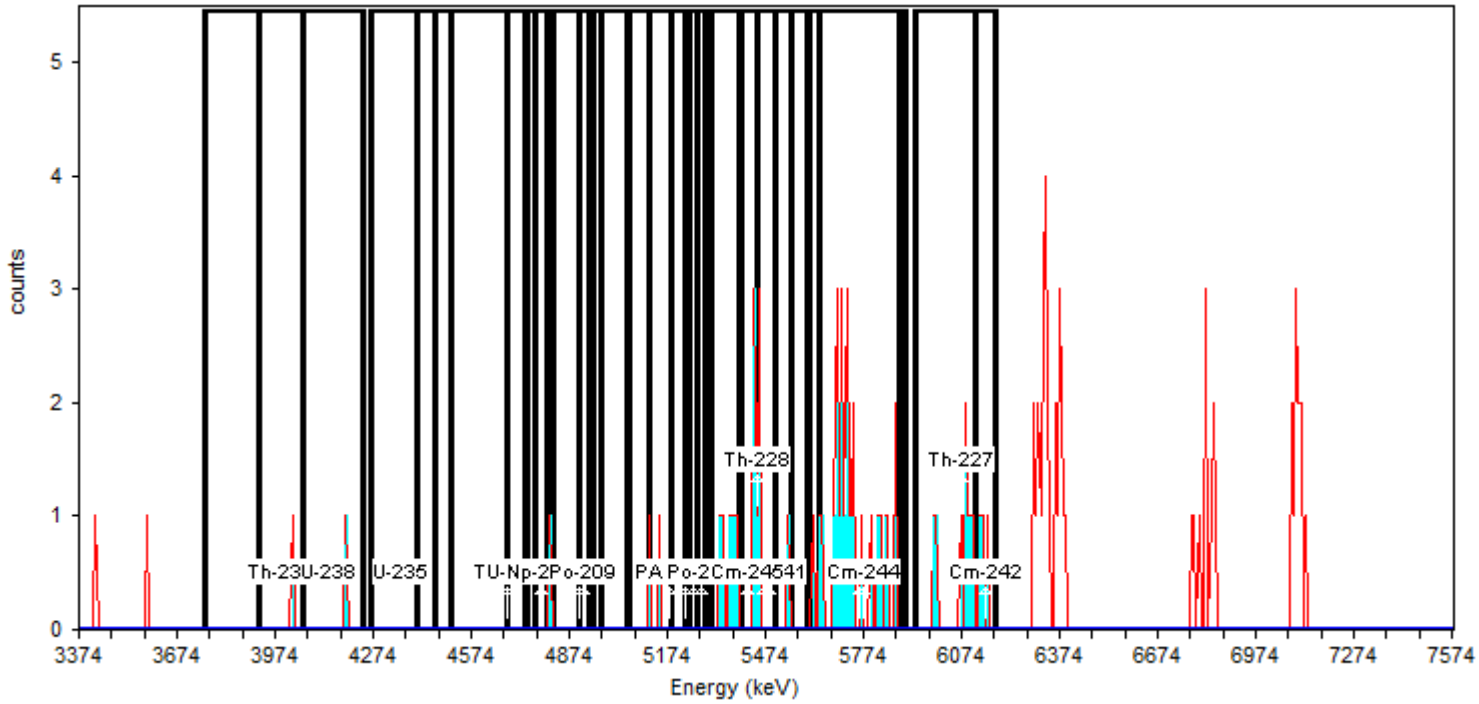
Batch Name: August2016
Description:

Acquisition

Detector: AV221 , SN: 50-117H5
Acquisition Start Date: 9/1/2016 3:17:19PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8877;AV221-20151018
Calibration Date: 10/18/2015 9:20:01PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 103.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	27.00	2.812E-002	5.512E-003
Cm-244	5,775.74	5,641.51	5,902.52	26.00	2.708E-002	5.413E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:55:38AM 9/3/2016

Sample

Sample Name: ICB;AV222
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

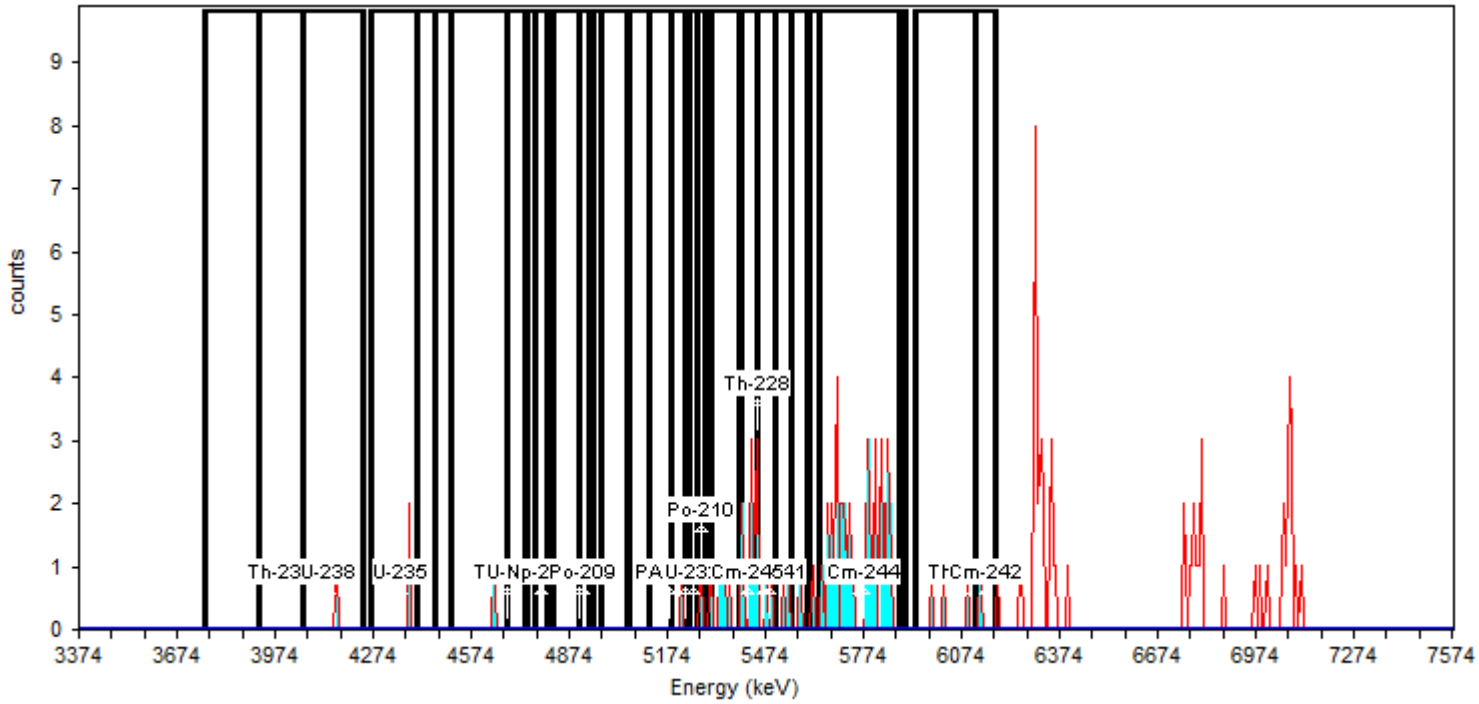
Batch Name: August2016a
Description:

Acquisition

Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 9/2/2016 10:55:31AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9520;AV222-20151018
Calibration Date: 10/18/2015 9:20:05PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 125.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	19.00	1.979E-002	4.658E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	20.00	2.083E-002	4.774E-003
Am-241	5,484.90	5,298.46	5,604.22	20.00	2.083E-002	4.774E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	40.00	4.167E-002	6.670E-003
Cm-244	5,775.74	5,641.51	5,902.52	39.00	4.062E-002	6.588E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV147

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:47	140	IC 160-223444/1		223444			PS
10/26/15 19:10	60	ICV 160-223562/1		223562			PS
09/01/16 15:17	960	ICB 160-268019/1		268019			PS
09/06/16 15:28	60	CCV 160-268312/1		268312			PS
09/08/16 10:49	1	PULSER 160-268649/1		268649			ALD
09/08/16 15:56	400	160-18554-15	SU02-EXB-054-SS-P-00	268649	266565	A-01-R	ALD

Detector: AV171

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223468/1		223468			PS
10/26/15 20:28	60	ICV 160-223586/1		223586			PS
09/01/16 15:17	960	ICB 160-268043/1		268043			PS
09/06/16 13:58	60	CCV 160-268329/1		268329			PS
09/07/16 12:23	1	PULSER 160-268478/1		268478			ALD
09/07/16 14:38	400	MB 160-266565/1-A		268478	266565	A-01-R	ALD

Detector: AV172

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223469/1		223469			PS
10/26/15 20:29	60	ICV 160-223587/1		223587			PS
09/01/16 15:17	960	ICB 160-268044/1		268044			PS
09/06/16 13:58	60	CCV 160-268330/1		268330			PS
09/07/16 12:23	1	PULSER 160-268479/1		268479			ALD
09/07/16 14:38	400	LCS 160-266565/2-A		268479	266565	A-01-R	ALD

Detector: AV173

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 19:04	140	IC 160-223470/1		223470			PS
10/26/15 20:29	60	ICV 160-223588/1		223588			PS
09/02/16 10:55	960	ICB 160-268125/1		268125			PS
09/06/16 16:42	60	CCV 160-268331/1		268331			PS
09/07/16 12:23	1	PULSER 160-268480/1		268480			ALD
09/07/16 14:38	400	160-18554-14	SU02-EXB-053-SS-P-00	268480	266565	A-01-R	ALD

Detector: AV175

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 14:48	140	IC 160-223472/1		223472			PS
10/31/15 14:14	60	ICV 160-223590/1		223590			
10/31/15 17:26	60	ICV 160-223590/2		223590			PS
09/01/16 15:17	960	ICB 160-268047/1		268047			PS
09/07/16 08:37	60	CCV 160-268386/1		268386			PS
09/07/16 12:23	1	PULSER 160-268481/1		268481			ALD
09/07/16 14:38	400	160-18554-14 DU	SU02-EXB-053-SS-P-00 DU	268481	266565	A-01-R	ALD

Alpha Spectroscopy Run Log

Detector: AV188

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 14:51	140	IC 160-223485/1		223485			PS
10/31/15 14:17	60	ICV 160-223603/1		223603			PS
09/01/16 15:17	960	ICB 160-268052/1		268052			PS
09/06/16 13:58	60	CCV 160-268333/1		268333			
09/06/16 16:43	60	CCV 160-268333/2		268333			PS
09/07/16 12:23	1	PULSER 160-268483/1		268483			ALD
09/07/16 14:38	400	160-18554-16	SU02-EXS-055-SS-P-00	268483	266565	A-01-R	ALD

Detector: AV189

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:19	140	IC 160-223486/1		223486			PS
11/01/15 14:23	60	ICV 160-223604/1		223604			PS
09/01/16 15:17	960	ICB 160-268053/1		268053			PS
09/06/16 14:01	60	CCV 160-268334/1		268334			PS
09/07/16 12:23	1	PULSER 160-268484/1		268484			ALD
09/07/16 14:38	400	160-18554-17	SU02-EXB-056-SS-P-00	268484	266565	A-01-R	ALD

Detector: AV190

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223487/1		223487			PS
11/01/15 14:23	60	ICV 160-223605/1		223605			PS
09/01/16 15:17	960	ICB 160-268054/1		268054			PS
09/06/16 14:01	60	CCV 160-268335/1		268335			PS
09/07/16 12:23	1	PULSER 160-268485/1		268485			ALD
09/07/16 14:38	400	160-18554-18	SU02-EXB-057-SS-P-00	268485	266565	A-01-R	ALD

Detector: AV191

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223488/1		223488			PS
11/01/15 14:23	60	ICV 160-223606/1		223606			
11/01/15 18:11	60	ICV 160-223606/2		223606			PS
07/22/16 15:43	960	ICB 160-261937/1		261937			PS
07/26/16 17:46	60	CCV 160-262173/1		262173			PS
08/31/16 09:07	1	PULSER 160-267504/1		267504			ALD
08/31/16 14:07	180	ZZZZZ		267504			
08/31/16 19:45	400	MB 160-266564/1-A		267504	266564	A-01-R	ALD
09/01/16 15:17	960	ICB 160-268055/1		268055			PS
09/06/16 14:00	60	CCV 160-268336/1		268336			PS
09/07/16 12:23	1	PULSER 160-268486/1		268486			ALD
09/07/16 14:38	400	160-18554-19	SU02-EXW-047-SS-DUP-P-00	268486	266565	A-01-R	ALD

Detector: AV193

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223490/1		223490			PS
11/01/15 14:24	60	ICV 160-223608/1		223608			PS
09/01/16 15:17	960	ICB 160-268057/1		268057			PS
09/06/16 14:00	60	CCV 160-268338/1		268338			PS
09/07/16 12:23	1	PULSER 160-268487/1		268487			ALD

Alpha Spectroscopy Run Log

Detector: AV193 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/07/16 14:38	400	160-18554-20	SU02-EXB-049-SS-DUP-I -00	268487	266565	A-01-R	ALD

Detector: AV194

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223491/1		223491			PS
11/01/15 14:24	60	ICV 160-223609/1		223609			PS
07/22/16 15:43	960	ICB 160-261940/1		261940			PS
07/26/16 11:01	60	CCV 160-262175/1		262175			PS
08/31/16 09:07	1	PULSER 160-267505/1		267505			ALD
08/31/16 14:07	180	ZZZZZ		267505			
08/31/16 19:45	400	LCS 160-266564/2-A		267505	266564	A-01-R	ALD

Detector: AV196

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:14	140	IC 160-223493/1		223493			PS
11/01/15 14:25	60	ICV 160-223611/1		223611			PS
07/22/16 15:43	960	ICB 160-261942/1		261942			PS
07/26/16 09:35	60	CCV 160-262333/1		262333			PS
08/31/16 09:07	1	PULSER 160-267507/1		267507			ALD
08/31/16 14:15	180	ZZZZZ		267507			
08/31/16 19:45	400	ZZZZZ		267507			

Detector: AV212

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:12	140	IC 160-223509/1		223509			PS
11/01/15 16:03	60	ICV 160-223627/1		223627			
11/01/15 18:11	60	ICV 160-223627/2		223627			PS
07/22/16 15:43	960	ICB 160-261957/1		261957			PS
07/26/16 15:09	60	CCV 160-262186/1		262186			PS
08/31/16 08:34	1	PULSER 160-267516/1		267516			ALD
08/31/16 14:15	180	ZZZZZ		267516			
08/31/16 19:45	400	160-18554-2	SU02-EXN-041-SS-P-00	267516	266564	A-01-R	ALD

Detector: AV213

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:12	140	IC 160-223878/1		223878			PS
11/01/15 16:04	60	ICV 160-223628/1		223628			PS
07/25/16 13:14	960	ICB 160-262228/1		262228			PS
07/27/16 06:18	60	CCV 160-262224/1		262224			PS
08/31/16 08:34	1	PULSER 160-267517/1		267517			ALD
08/31/16 14:15	180	ZZZZZ		267517			
08/31/16 19:45	400	160-18554-3	SU02-EXW-042-SS-P-00	267517	266564	A-01-R	ALD

Detector: AV214

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:12	140	IC 160-223510/1		223510			PS

Alpha Spectroscopy Run Log

Detector: AV214 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/01/15 16:04	60	ICV 160-223629/1		223629			PS
07/22/16 15:43	960	ICB 160-261959/1		261959			PS
07/26/16 16:33	60	CCV 160-262187/1		262187			PS
08/31/16 08:34	1	PULSER 160-267518/1		267518			ALD
08/31/16 14:15	180	ZZZZZ		267518			
08/31/16 19:45	400	160-18554-4	SU02-EXB-043-SS-P-00	267518	266564	A-01-R	ALD

Detector: AV215

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:12	140	IC 160-223511/1		223511			PS
11/01/15 16:04	60	ICV 160-223630/1		223630			PS
07/22/16 15:43	960	ICB 160-261960/1		261960			PS
07/26/16 16:34	60	CCV 160-262188/1		262188			PS
08/31/16 08:34	1	PULSER 160-267519/1		267519			ALD
08/31/16 14:15	180	ZZZZZ		267519			
08/31/16 19:45	400	160-18554-5	SU02-EXN-044-SS-P-00	267519	266564	A-01-R	ALD

Detector: AV217

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 18:57	140	IC 160-223513/1		223513			PS
11/01/15 19:16	60	ICV 160-223632/1		223632			PS
07/22/16 15:43	960	ICB 160-261962/1		261962			PS
07/26/16 16:34	60	CCV 160-262189/1		262189			PS
08/31/16 08:34	1	PULSER 160-267520/1		267520			ALD
08/31/16 14:15	180	ZZZZZ		267520			
08/31/16 19:45	400	160-18554-6	SU02-EXB-045-SS-P-00	267520	266564	A-01-R	ALD

Detector: AV218

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 18:57	140	IC 160-223514/1		223514			PS
11/01/15 19:17	60	ICV 160-223633/1		223633			PS
07/25/16 13:14	960	ICB 160-262230/1		262230			PS
07/27/16 06:19	60	CCV 160-262225/1		262225			PS
08/31/16 08:34	1	PULSER 160-267521/1		267521			ALD
08/31/16 14:15	180	ZZZZZ		267521			
08/31/16 19:45	400	160-18554-7	SU02-EXW-046-SS-P-00	267521	266564	A-01-R	ALD
09/01/16 15:17	960	ICB 160-268081/1		268081			PS
09/06/16 11:25	60	CCV 160-268358/1		268358			PS
09/07/16 12:28	1	PULSER 160-268507/1		268507			
09/07/16 12:53	1	PULSER 160-268507/2		268507			ALD
09/07/16 14:24	400	160-18554-13	SU02-EXB-052-SS-P-00	268507	266564	A-01-R	ALD

Detector: AV219

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 18:57	140	IC 160-223515/1		223515			PS
11/01/15 19:17	60	ICV 160-223634/1		223634			PS
07/22/16 15:43	960	ICB 160-261964/1		261964			PS
07/26/16 16:34	60	CCV 160-262190/1		262190			PS
08/31/16 08:34	1	PULSER 160-267522/1		267522			ALD

Alpha Spectroscopy Run Log

Detector: AV219 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/31/16 14:15	180	ZZZZZ		267522			
08/31/16 19:45	400	160-18554-8	SU02-EXW-047-SS-P-00	267522	266564	A-01-R	ALD
09/02/16 10:55	960	ICB 160-268141/1		268141			PS
09/06/16 11:25	60	CCV 160-268359/1		268359			PS
09/07/16 12:28	1	PULSER 160-268508/1		268508			ALD
09/07/16 14:24	400	160-18554-12	SU02-EXW-051-SS-P-00	268508	266564	A-01-R	ALD

Detector: AV220

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 18:58	140	IC 160-223516/1		223516			PS
11/01/15 19:17	60	ICV 160-223635/1		223635			PS
09/02/16 10:55	960	ICB 160-268142/1		268142			PS
09/06/16 11:26	60	CCV 160-268360/1		268360			PS
09/07/16 12:29	1	PULSER 160-268563/1		268563			ALD
09/07/16 14:24	400	160-18554-11	SU02-EXB-050-SS-P-00	268563	266564	A-01-R	ALD

Detector: AV221

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 18:58	140	IC 160-223517/1		223517			PS
11/01/15 19:17	60	ICV 160-223636/1		223636			PS
07/22/16 15:43	960	ICB 160-261966/1		261966			PS
07/26/16 16:34	60	CCV 160-262192/1		262192			PS
08/31/16 08:34	1	PULSER 160-267524/1		267524			ALD
08/31/16 14:15	180	ZZZZZ		267524			
08/31/16 19:45	400	160-18554-10	SU02-EXB-049-SS-P-00	267524	266564	A-01-R	ALD
09/01/16 15:17	960	ICB 160-268084/1		268084			PS
09/06/16 11:26	60	CCV 160-268361/1		268361			PS
09/07/16 12:29	1	PULSER 160-268509/1		268509			ALD
09/07/16 14:24	400	160-18554-9	SU02-EXB-048-SS-P-00	268509	266564	A-01-R	ALD

Detector: AV222

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 18:58	140	IC 160-223518/1		223518			PS
11/01/15 19:18	60	ICV 160-223637/1		223637			PS
09/02/16 10:55	960	ICB 160-268143/1		268143			PS
09/06/16 10:08	60	CCV 160-268362/1		268362			PS
09/07/16 12:29	1	PULSER 160-268510/1		268510			ALD
09/07/16 14:24	400	160-18554-1	SU02-EXW-040-SS-P-00	268510	266564	A-01-R	ALD

GAMMA SPECTROSCOPY

Method 901.1
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method 901.1

Prep Batch: 264535

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264535

Lab ID: MB 160-264535/1-A Analyzed: 09/01/16 11:46 Ts: 30 Sigma: 2
Client ID: Detector: GV16 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	0.02099	0.0211	0.0212	U	pCi/g	0.500	0.325	267762

Lab ID: LCS 160-264535/2-A Analyzed: 09/01/16 11:51 Ts: 30 Sigma: 2
Client ID: Detector: GV17 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Americium-241	91.28	1.55	9.60		pCi/g		1.13	267763
Cesium-137	28.58	0.676	3.05		pCi/g		0.245	267763
Cobalt-60	16.11	0.418	1.67		pCi/g		0.0756	267763

Lab ID: 160-18554-1 Analyzed: 09/01/16 11:54 Ts: 30 Sigma: 2
Client ID: SU02-EXW-040-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.28	0.241	0.276		pCi/g	0.500	0.146	267756

Lab ID: 160-18554-1 DU Analyzed: 09/01/16 12:39 Ts: 30 Sigma: 2
Client ID: SU02-EXW-040-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.206	0.221	0.254		pCi/g	0.500	0.162	267755

Lab ID: 160-18554-2 Analyzed: 09/01/16 11:52 Ts: 30 Sigma: 2
Client ID: SU02-EXN-041-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.02	0.205	0.231		pCi/g	0.500	0.239	267755

Lab ID: 160-18554-3 Analyzed: 09/01/16 11:51 Ts: 30 Sigma: 2
Client ID: SU02-EXW-042-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.33	0.292	0.323		pCi/g	0.500	0.247	267754

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264535

Lab ID: 160-18554-4 Analyzed: 09/01/16 12:31 Ts: 30 Sigma: 2
Client ID: SU02-EXB-043-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.25	0.204	0.241		pCi/g	0.500	0.159	267757

Lab ID: 160-18554-5 Analyzed: 09/01/16 12:32 Ts: 30 Sigma: 2
Client ID: SU02-EXN-044-SS-P-00 Detector: GV13 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	0.994	0.204	0.228		pCi/g	0.500	0.152	267758

Lab ID: 160-18554-6 Analyzed: 09/01/16 12:33 Ts: 30 Sigma: 2
Client ID: SU02-EXB-045-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.08	0.225	0.252		pCi/g	0.500	0.183	267760

Lab ID: 160-18554-7 Analyzed: 09/01/16 12:33 Ts: 30 Sigma: 2
Client ID: SU02-EXW-046-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.66	0.324	0.367		pCi/g	0.500	0.257	267761

Lab ID: 160-18554-8 Analyzed: 09/01/16 12:35 Ts: 30 Sigma: 2
Client ID: SU02-EXW-047-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.68	0.230	0.289		pCi/g	0.500	0.152	267762

Lab ID: 160-18554-9 Analyzed: 09/01/16 12:36 Ts: 30 Sigma: 2
Client ID: SU02-EXB-048-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	0.787	0.187	0.205		pCi/g	0.500	0.159	267763

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264535

Lab ID: 160-18554-10 Analyzed: 09/01/16 12:44 Ts: 30 Sigma: 2
Client ID: SU02-EXB-049-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.06	0.243	0.267		pCi/g	0.500	0.183	267756

Lab ID: 160-18554-11 Analyzed: 09/01/16 12:42 Ts: 30 Sigma: 2
Client ID: SU02-EXB-050-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.44	0.324	0.357		pCi/g	0.500	0.258	267754

Lab ID: 160-18554-12 Analyzed: 09/01/16 13:09 Ts: 30 Sigma: 2
Client ID: SU02-EXW-051-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	2.11	0.266	0.345		pCi/g	0.500	0.175	267757

Lab ID: 160-18554-13 Analyzed: 09/01/16 13:10 Ts: 30 Sigma: 2
Client ID: SU02-EXB-052-SS-P-00 Detector: GV13 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.42	0.216	0.262		pCi/g	0.500	0.149	267758

Lab ID: 160-18554-14 Analyzed: 09/01/16 13:11 Ts: 30 Sigma: 2
Client ID: SU02-EXB-053-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.07	0.211	0.238		pCi/g	0.500	0.164	267760

Lab ID: 160-18554-15 Analyzed: 09/01/16 13:12 Ts: 30 Sigma: 2
Client ID: SU02-EXB-054-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.06	0.257	0.279		pCi/g	0.500	0.220	267761

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264535

Lab ID: 160-18554-16 Analyzed: 09/01/16 13:13 Ts: 30 Sigma: 2
Client ID: SU02-EXS-055-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.57	0.255	0.302		pCi/g	0.500	0.190	267762

Lab ID: 160-18554-17 Analyzed: 09/01/16 13:14 Ts: 30 Sigma: 2
Client ID: SU02-EXB-056-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.26	0.211	0.249		pCi/g	0.500	0.193	267763

Lab ID: 160-18554-18 Analyzed: 09/01/16 13:24 Ts: 30 Sigma: 2
Client ID: SU02-EXB-057-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.44	0.268	0.307		pCi/g	0.500	0.192	267754

Lab ID: 160-18554-19 Analyzed: 09/01/16 13:25 Ts: 30 Sigma: 2
Client ID: SU02-EXW-047-SS-DUP-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.61	0.259	0.309		pCi/g	0.500	0.184	267755

Lab ID: 160-18554-20 Analyzed: 09/01/16 13:26 Ts: 30 Sigma: 2
Client ID: SU02-EXB-049-SS-DUP-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.19	0.230	0.261		pCi/g	0.500	0.152	267756

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264535

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-264535/1-A	Radium-226			0.02099	U	pCi/g							1.97778537

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-264535/2-A	Americium-241		97.1	91.28		pCi/g	94	87 - 116					-.8297516231
LCS 160-264535/2-A	Cesium-137		29.5	28.58		pCi/g	97	87 - 120					-.4200020897
LCS 160-264535/2-A	Cobalt-60		16.6	16.11		pCi/g	97	87 - 115					-.432264886

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-18554-1	Radium-226	1.28		1.206		pCi/g			6	0.15	0.42	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Batch Number: 264535 Batch Start Date: 08/11/16 15:20 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/11/16 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-264535/1		Fill_Geo-21, 901.1				291.18 g	8/11/2016	9/1/2016	Tuna Can
LCS 160-264535/2		Fill_Geo-21, 901.1				341.9 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-1-A	SU02-EXW-040-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	367.6 g	321.3 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-1-A DU	SU02-EXW-040-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	367.6 g	321.3 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-2-A	SU02-EXN-041-SS-P-00	Fill_Geo-21, 901.1	T	46.2 g	396.5 g	350.3 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-3-A	SU02-EXW-042-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	371.6 g	325.2 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-4-A	SU02-EXB-043-SS-P-00	Fill_Geo-21, 901.1	T	46.2 g	418.9 g	372.7 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-5-A	SU02-EXN-044-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	378.3 g	331.6 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-6-A	SU02-EXB-045-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	379.5 g	333.2 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-7-A	SU02-EXW-046-SS-P-00	Fill_Geo-21, 901.1	T	46.8 g	349.6 g	302.8 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-8-A	SU02-EXW-047-SS-P-00	Fill_Geo-21, 901.1	T	46.0 g	371.4 g	325.4 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-9-A	SU02-EXB-048-SS-P-00	Fill_Geo-21, 901.1	T	45.5 g	347.1 g	301.6 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-10-A	SU02-EXB-049-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	365.0 g	318.4 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-11-A	SU02-EXB-050-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	346.3 g	299.6 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-12-A	SU02-EXW-051-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	363.6 g	316.9 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-13-A	SU02-EXB-052-SS-P-00	Fill_Geo-21, 901.1	T	45.7 g	348.1 g	302.4 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-14-A	SU02-EXB-053-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	398.8 g	352.7 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-15-A	SU02-EXB-054-SS-P-00	Fill_Geo-21, 901.1	T	46.0 g	325.0 g	279 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-16-A	SU02-EXS-055-SS-P-00	Fill_Geo-21, 901.1	T	45.7 g	330.1 g	284.4 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-17-A	SU02-EXB-056-SS-P-00	Fill_Geo-21, 901.1	T	46.5 g	370.3 g	323.8 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-18-A	SU02-EXB-057-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	361.9 g	315.3 g	8/11/2016	9/1/2016	Tuna Can

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Batch Number: 264535 Batch Start Date: 08/11/16 15:20 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/11/16 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
160-18554-A-19-A	SU02-EXW-047-SS-DUP-P-00	Fill_Geo-21, 901.1	T	45.6 g	334.0 g	288.4 g	8/11/2016	9/1/2016	Tuna Can
160-18554-A-20-A	SU02-EXB-049-SS-DUP-P-00	Fill_Geo-21, 901.1	T	46.1 g	351.3 g	305.2 g	8/11/2016	9/1/2016	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
MB 160-264535/1		Fill_Geo-21, 901.1							
LCS 160-264535/2		Fill_Geo-21, 901.1		# g					
160-18554-A-1-A	SU02-EXW-040-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-1-A DU	SU02-EXW-040-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-2-A	SU02-EXN-041-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-3-A	SU02-EXW-042-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-4-A	SU02-EXB-043-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-5-A	SU02-EXN-044-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-6-A	SU02-EXB-045-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-7-A	SU02-EXW-046-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-8-A	SU02-EXW-047-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-9-A	SU02-EXB-048-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-10-A	SU02-EXB-049-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-11-A	SU02-EXB-050-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-12-A	SU02-EXW-051-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-13-A	SU02-EXB-052-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-14-A	SU02-EXB-053-SS-P-00	Fill_Geo-21, 901.1	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18554-1

SDG No.:

Batch Number: 264535 Batch Start Date: 08/11/16 15:20 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/11/16 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
160-18554-A-15-A	SU02-EXB-054-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-16-A	SU02-EXS-055-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-17-A	SU02-EXB-056-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-18-A	SU02-EXB-057-SS-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-19-A	SU02-EXW-047-SS-DUP-P-00	Fill_Geo-21, 901.1	T						
160-18554-A-20-A	SU02-EXB-049-SS-DUP-P-00	Fill_Geo-21, 901.1	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 16_Gamma_20162106

Sample Description: 264535_Gamma_MB 160-264535~1-A
Detector: Detector #16
Batch ID: 264535
Work Order Number: Gamma
Lot Number: MB 160-264535~1-A

Decay to Time: 9/1/2016 11:46 Live Time: 1800 sec
Acquisition Time: 9/1/2016 11:46:44 Real Time: 1813 sec
Analysis Time: 9/1/2016 12:17 Dead Time: 0.71 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Soil_TunaCan.Clb
Efficiency Cal Desc: 16_TunaCan_90099_071012
Efficiency Cal Date: 7/13/2012 09:47
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 16_2016-08-07_0542.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.929E+00	121.1	2.335E+00	2.338E+00	8.029E+00
NA-22	-5.317E-01	72.9	3.874E-01	3.883E-01	1.295E+00
K-40	-2.033E+00	129.6	2.635E+00	2.637E+00	1.085E+01
Sc-46	0.000E+00	1.#INF	1.103E-01	1.103E-01	1.013E+00
CR-51	1.560E+00	204.3	3.188E+00	3.189E+00	1.091E+01
MN-54	8.594E-02	255.8	2.198E-01	2.198E-01	5.642E-01
FE-59	4.278E-01	51.9	2.220E-01	2.230E-01	6.888E-01
Co-56	8.689E-02	431.6	3.750E-01	3.750E-01	9.019E-01
CO-57	1.371E-01	172.1	2.359E-01	2.360E-01	5.996E-01
CO-58	2.956E-01	37.8	1.118E-01	1.128E-01	3.115E-01
CO-60	-7.660E-01	82.1	6.290E-01	6.302E-01	1.339E+00
ZN-65	0.000E+00	1.#INF	3.337E-01	3.337E-01	1.841E+00
NB-94	2.217E-01	130.6	2.896E-01	2.898E-01	1.009E+00
ZR-95	-7.332E-02	800.0	5.866E-01	5.866E-01	1.477E+00
NB-95	0.000E+00	1.#INF	4.037E-02	4.037E-02	8.133E-01
RU-103	1.581E-02	1746.7	2.762E-01	2.762E-01	7.158E-01
RH-106	5.340E+00	79.7	4.258E+00	4.267E+00	1.406E+01
AG-108M	1.955E-02	1280.6	2.504E-01	2.504E-01	6.485E-01
AG-110M	3.198E-01	44.7	1.430E-01	1.440E-01	1.388E+00
SN-113	-4.923E-01	81.1	3.991E-01	3.999E-01	1.690E+00
SB-124	1.533E-01	102.3	1.569E-01	1.571E-01	1.551E+00
SB-125	9.058E-01	106.0	9.605E-01	9.616E-01	1.741E+00
I-131	3.145E-01	83.5	2.626E-01	2.631E-01	7.915E-01
Gd-153	4.282E-01	129.0	5.522E-01	5.528E-01	2.081E+00
Ga-68	-3.076E+00	452.1	1.391E+01	1.391E+01	3.309E+01
Tc-99m	1.247E-01	218.8	2.728E-01	2.729E-01	9.267E-01
BA-133	4.502E-01	90.3	4.066E-01	4.073E-01	8.823E-01
CS-134	3.158E-01	35.0	1.105E-01	1.117E-01	1.565E+00
CS-137	-6.041E-01	54.7	3.302E-01	3.317E-01	1.703E+00
CE-139	2.154E-01	105.1	2.263E-01	2.272E-01	7.642E-01
Ba-140	2.272E-01	192.0	4.361E-01	4.363E-01	2.537E+00
La-140	-7.101E-01	96.9	6.882E-01	6.893E-01	1.417E+00
CE-141	-3.670E-01	162.9	5.977E-01	5.980E-01	2.014E+00

CE-144	1.177E+00	161.4	1.901E+00	1.902E+00	6.445E+00
PM-144	2.879E-01	86.3	2.485E-01	2.490E-01	8.457E-01
EU-152	-1.530E+00	60.8	9.298E-01	9.332E-01	7.316E+00
EU-154	8.545E-01	102.6	8.766E-01	8.777E-01	9.480E+00
EU-155	-1.049E-07	898966715.5	9.428E-01	9.428E-01	3.256E+00
HF-181	3.825E-01	85.3	3.262E-01	3.268E-01	1.154E+00
Ta-182	0.000E+00	1.#INF	1.536E-01	1.536E-01	2.679E+00
Hg-203	-2.845E-01	97.4	2.772E-01	2.777E-01	9.366E-01
TL-208	-8.041E-02	277.8	2.234E-01	2.234E-01	7.193E-01
pm-146	5.664E-01	93.8	5.314E-01	5.322E-01	1.972E+00
y-88	6.594E-01	28.2	1.857E-01	1.887E-01	3.568E-01
Cd-113m	0.000E+00	1.#INF	1.748E+03	1.748E+03	8.039E+03
Cd-109	-2.233E+00	365.7	8.167E+00	8.168E+00	2.764E+01
Cf-251	1.096E-01	854.0	9.357E-01	9.358E-01	2.541E+00
Cf-249	-4.912E-01	103.9	5.104E-01	5.111E-01	1.723E+00
Sn-126	1.055E+00	225.2	2.375E+00	2.376E+00	8.140E+00
PB-210	1.659E+01	45.5	7.539E+00	7.602E+00	2.142E+01
PB-212	1.165E+00	41.5	4.833E-01	4.891E-01	1.509E+00
PB-214	-6.819E-01	109.0	7.432E-01	7.440E-01	2.148E+00
BI-207	1.104E-02	1841.2	2.033E-01	2.033E-01	7.567E-01
BI-212	-1.893E+00	227.4	4.305E+00	4.306E+00	8.168E+00
BI-214	2.261E-01	50.3	1.137E-01	1.143E-01	3.502E+00
BI-210M	3.364E-01	88.7	2.985E-01	2.991E-01	1.013E+00
AC-228	-6.325E-01	218.7	1.383E+00	1.383E+00	3.282E+00
TH-227	-3.287E+00	144.2	4.741E+00	4.744E+00	1.603E+01
TH-229	5.257E-01	468.4	2.462E+00	2.462E+00	6.959E+00
TH-234	1.581E+00	175.5	2.774E+00	2.776E+00	1.314E+01
PA-231	2.231E+00	257.8	5.752E+00	5.754E+00	3.774E+01
PA-233	2.132E-01	295.7	6.305E-01	6.306E-01	2.198E+00
PA-234	9.954E-01	101.8	1.013E+00	1.015E+00	3.660E+00
PA-234M	-2.335E+01	157.1	3.670E+01	3.672E+01	1.709E+02
U-235	-1.455E-01	895.1	1.303E+00	1.303E+00	7.603E+00
AM-241	-1.017E+00	66.4	6.751E-01	6.772E-01	2.762E+00
Np-237	6.576E-01	359.4	2.363E+00	2.364E+00	7.999E+00
Ir-192	1.473E-01	182.8	2.694E-01	2.695E-01	9.457E-01
Cs-136	0.000E+00	1.#INF	1.466E-01	1.466E-01	6.365E-01
Np-239	4.277E-01	199.2	8.522E-01	8.526E-01	2.905E+00
Nd-147	6.308E-01	170.7	1.077E+00	1.077E+00	2.936E+00
Total	4.440E+01				

Analyst: kody Saulters

Sample description
264535_Gamma_MB 160-264535~1-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162106.An1

Acquisition information
Start time: 9/1/2016 11:46:44 AM
Live time: 1800
Real time: 1813
Dead time: 0.71 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Soil_TunaCan.Clb
16_TunaCan_90099_071012

Energy Calibration
Created: 2/28/2012 9:35:31 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: -2.285E-08 keV/channel^2

Efficiency Calibration
Created: 7/13/2012 9:47:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.17 %
Log(Eff): -2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.64keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 11:46:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-08-07_0542.PBC 8/7/2016 5:42:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0263

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.32	70.	16.75	0.85	2.334E-02	46.54	4.250	PBC<MDA	PB210
63.31	2.	437.96	0.38	3.561E-02	63.29	3.810	PBC<MDA	TH234
64.28	7.	225.17	0.98	3.619E-02	64.28	9.700	PBC<MDA	Sn126
86.49	7.	359.42	1.00	4.514E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.805E-01	EU155
					86.94	9.040	9.506E-01	Sn126
92.79	9.	175.52	1.04	4.638E-02	92.59	5.584	PBC<MDA	TH234
97.50	12.	128.95	1.01	4.707E-02	97.50	30.000	PBC<MDA	Gd153
99.50	12.	134.96	1.01	4.728E-02	99.50	15.000	PBC<MDA	Np239
103.20	7.	251.25	1.01	4.755E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	3.282E-01	Np239
106.13	8.	199.24	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
123.10	10.	109.11	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154
131.29	11.	149.87	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	11.	155.68	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.177E+00	CE144
133.54	11.	161.43	1.04	4.612E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.177E+00	CE144
136.30	11.	166.65	1.04	4.576E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.236E+00	CO57
136.47	11.	172.08	1.04	4.573E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.236E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
140.51	9.	218.84	1.05	4.516E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	13.	105.06	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
176.60	1.	854.04	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
193.51	2.	468.35	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
238.63	29.	41.48	1.14	3.216E-02	238.63	43.300	PBC<MDA	PB212
244.69	6.	197.15	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
265.83	9.	88.72	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
300.03	10.	145.07	1.19	2.732E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	6.	257.84	1.19	2.732E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.843E+00	PA231
					300.18	6.200	1.922E+00	PA233
302.85	9.	154.78	1.19	2.714E-02	302.65	2.880	6.593E+00	PA231
					302.85	18.330	1.036E+00	BA133
304.85	7.	206.71	1.20	2.701E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	5.305E-01	BI210M
308.44	4.	249.96	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
312.01	4.	295.69	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
316.49	4.	266.91	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
320.08	7.	204.32	1.21	2.608E-02	320.08	9.940	PBC<MDA	CR51
356.00	7.	93.13	1.24	2.416E-02	356.00	62.050	PBC<MDA	BA133
383.84	9.	118.95	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
427.88	5.	159.96	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
477.60	7.	121.08	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
482.00	8.	115.94	1.35	1.939E-02	482.00	80.500	PBC<MDA	HF181
487.02	5.	192.67	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
511.86	79.	16.73	2.63	1.856E-02	511.86	20.000	1.182E+01	RH106
531.00	3.	170.71	1.40	1.807E-02	531.00	13.000	PBC<MDA	Nd147
563.24	3.	195.77	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
569.32	14.	34.99	1.43	1.717E-02	569.32	15.380	2.946E+00	CS134
					569.47	8.200	5.526E+00	PA234
					569.70	97.740	4.638E-01	BI207
583.02	-2.	277.81	1.44	1.687E-02	583.02	84.500	PBC<MDA	TL208
600.50	9.	139.22	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
609.31	-9.	81.49	1.47	1.633E-02	609.31	46.090	PBC<MDA	BI214
621.92	9.	132.87	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106
636.97	10.	83.53	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
696.54	8.	86.32	1.54	1.479E-02	696.54	99.000	PBC<MDA	PM144
702.63	6.	130.58	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
722.79	4.	102.34	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.841E-01	AG108M
					723.36	20.220	8.276E-01	EU154
727.17	-4.	227.37	1.57	1.433E-02	727.17	7.550	PBC<MDA	BI212
735.72	5.	93.82	1.58	1.421E-02	735.72	22.500	PBC<MDA	pm146
747.16	3.	250.62	1.59	1.404E-02	747.16	34.000	PBC<MDA	pm146
763.94	2.	307.90	1.60	1.381E-02	763.94	22.280	PBC<MDA	AG110M
778.92	2.	207.02	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.42	4.	165.53	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
795.87	2.	263.03	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
810.78	7.	37.81	1.64	1.322E-02	810.78	99.460	PBC<MDA	CO58
834.85	2.	255.77	1.66	1.293E-02	834.85	99.980	PBC<MDA	MN54
846.77	2.	431.57	1.67	1.280E-02	846.77	99.935	PBC<MDA	Co56
880.53	18.	23.57	1.70	1.243E-02	880.53	6.000	1.341E+01	PA234
898.04	14.	28.16	1.72	1.225E-02	898.04	93.700	6.594E-01	y88
946.02	4.	137.83	1.76	1.178E-02	946.02	13.400	PBC<MDA	PA234
964.11	5.	90.58	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152
996.33	7.	105.36	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1004.77	6.	102.59	1.81	1.126E-02	1004.77	18.010	PBC<MDA	EU154
1050.36	6.	88.19	1.85	1.089E-02	1050.36	1.560	PBC<MDA	RH106
1099.25	5.	51.88	1.89	1.052E-02	1099.25	56.500	PBC<MDA	FE59
1112.07	10.	31.62	1.90	1.043E-02	1112.07	13.644	3.904E+00	EU152
1173.24	4.	63.17	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1384.30	5.	44.72	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1460.83	-3.	129.58	2.19	8.482E-03	1460.83	10.670	PBC<MDA	K40
1764.49	6.	58.97	2.43	7.342E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	184.99	46.32	59.	30.	0.017	45.45	0.845s
TH-227	200.26	50.14	157.	-13.	-0.007	144.23	0.963s
AM-241	237.83	59.54	148.	-22.	-0.012	66.35	0.971s
TH-234	252.93	63.31	40.	2.	0.001	437.96	0.376s
Sn-126	256.79	64.28	109.	7.	0.004	225.17	0.976s
BA-133	323.60	80.99	77.	-7.	-0.004	237.55	0.991s
Np-237	345.59	86.49	313.	7.	0.004	359.42	0.996s
EU-155	345.80	86.54	320.	0.	0.000	1000.00	0.996s
Sn-126	347.39	86.94	346.	-14.	-0.008	186.25	0.997s
Sn-126	349.91	87.57	332.	-14.	-0.008	182.33	0.997s
Cd-109	351.79	88.04	318.	-7.	-0.004	365.71	0.998s
Nd-147	364.02	91.10	311.	0.	0.000	1000.00	1.001s
TH-234	370.77	92.79	80.	9.	0.005	175.52	1.035s
Gd-153	389.61	97.50	116.	12.	0.007	128.95	1.007s
Np-239	397.61	99.50	128.	12.	0.007	134.96	1.008s
Gd-153	412.40	103.20	140.	7.	0.004	251.25	1.012s
Np-239	424.11	106.13	134.	8.	0.005	199.24	1.014s
EU-152	486.67	121.78	75.	-3.	-0.001	462.33	1.029s
CO-57	487.81	122.06	77.	0.	0.000	1000.00	1.029s
EU-154	491.96	123.10	58.	10.	0.006	109.11	1.030s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	524.73	131.29	126.	11.	0.006	149.87	1.038s
HF-181	531.64	133.02	137.	11.	0.006	155.68	1.039s
CE-144	533.70	133.54	148.	11.	0.006	161.43	1.040s
HF-181	544.74	136.30	158.	11.	0.006	166.65	1.042s
CO-57	545.43	136.47	169.	11.	0.006	172.08	1.042s
Tc-99m	561.57	140.51	180.	9.	0.005	218.84	1.046s
U-235	574.67	143.79	190.	-1.	-0.001	895.13	1.049s
CE-141	581.29	145.44	258.	-14.	-0.008	162.86	1.050s
Ba-140	650.14	162.66	91.	-14.	-0.008	100.94	1.066s
CE-139	662.90	165.85	85.	13.	0.007	105.06	1.069s
Cf-251	705.88	176.60	37.	1.	0.001	854.04	1.079s
TH-229	773.49	193.51	15.	2.	0.001	468.35	1.094s
U-235	820.76	205.33	44.	-4.	-0.002	314.25	1.105s
TH-229	842.82	210.85	52.	-1.	-0.001	846.92	1.110s
Cf-251	907.40	227.00	37.	-9.	-0.005	135.05	1.125s
PB-212	953.91	238.63	57.	29.	0.016	41.48	1.136s
PB-214	967.37	242.00	86.	0.	0.000	1000.00	1.139s
EU-152	978.14	244.69	58.	6.	0.003	197.15	1.141s
TH-227	1024.32	256.24	36.	-3.	-0.002	349.80	1.152s
Cd-113m	1054.15	263.70	25.	0.	0.000	1000.00	1.158s
BI-210M	1062.67	265.83	28.	9.	0.005	88.72	1.160s
TL-208	1108.46	277.28	47.	-4.	-0.002	268.61	1.171s
Hg-203	1116.13	279.20	62.	-12.	-0.007	97.42	1.173s
I-131	1136.52	284.30	56.	-16.	-0.009	78.24	1.177s
PB-214	1179.67	295.09	28.	0.	0.000	1000.00	1.187s
PB-212	1199.42	300.03	101.	10.	0.006	145.07	1.191
PA-231	1199.58	300.07	111.	6.	0.003	257.84	1.192
PA-233	1200.02	300.18	117.	0.	0.000	1000.00	1.192
PA-231	1209.90	302.65	117.	0.	0.000	1000.00	1.194
BA-133	1210.70	302.85	98.	9.	0.005	154.78	1.194s
Ba-140	1218.69	304.85	108.	7.	0.004	206.71	1.196s
BI-210M	1218.88	304.90	115.	0.	0.000	1000.00	1.196s
Ir-192	1233.05	308.44	52.	4.	0.002	249.96	1.199s
PA-233	1247.34	312.01	57.	4.	0.002	295.69	1.202
Ir-192	1265.24	316.49	61.	4.	0.002	266.91	1.206s
CR-51	1279.62	320.08	107.	7.	0.004	204.32	1.210s
La-140	1314.31	328.76	253.	-17.	-0.009	135.21	1.217s
Cf-249	1333.02	333.44	270.	-17.	-0.009	139.03	1.222s
AC-228	1352.54	338.32	287.	-17.	-0.009	142.68	1.226s
Cs-136	1361.54	340.57	304.	-17.	-0.009	146.50	1.228s
EU-152	1376.40	344.29	322.	-18.	-0.010	60.78	1.231s
HF-181	1382.56	345.83	303.	-17.	-0.009	66.99	1.233s
PB-214	1406.97	351.93	49.	-11.	-0.006	108.98	1.238s
BA-133	1423.24	356.00	20.	7.	0.004	93.13	1.242s
I-131	1457.16	364.48	29.	-4.	-0.002	339.05	1.250
BA-133	1534.57	383.84	48.	9.	0.005	118.95	1.267s
Cf-249	1551.01	387.95	88.	-13.	-0.007	103.92	1.271s
SN-113	1565.96	391.69	78.	-13.	-0.007	81.06	1.274s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1710.67	427.88	13.	5.	0.003	159.96	1.307s
pm-146	1814.67	453.88	26.	-11.	-0.006	99.31	1.330s
SB-125	1852.61	463.37	54.	-13.	-0.007	62.55	1.338s
Ir-192	1871.38	468.06	64.	-3.	-0.002	377.17	1.342s
BE-7	1909.51	477.60	34.	7.	0.004	121.08	1.351s
HF-181	1927.12	482.00	41.	8.	0.005	115.94	1.355
La-140	1947.21	487.02	48.	5.	0.003	192.67	1.359s
RH-106	2046.57	511.86	14.	79.	0.044	16.73	2.631s
Nd-147	2123.10	531.00	4.	3.	0.001	170.71	1.398s
Ba-140	2148.14	537.26	14.	-3.	-0.001	323.60	1.404s
CS-134	2252.03	563.24	9.	3.	0.002	195.77	1.427s
CS-134	2276.36	569.32	5.	14.	0.008	34.99	1.432s
PA-234	2276.96	569.47	19.	0.	0.000	1000.00	1.432s
TL-208	2331.16	583.02	11.	-2.	-0.001	277.81	1.444s
SB-125	2401.07	600.50	74.	9.	0.005	139.22	1.460s
SB-124	2409.99	602.73	83.	0.	0.000	1000.00	1.462s
CS-134	2417.91	604.71	83.	0.	0.000	1000.00	1.463s
BI-214	2436.31	609.31	92.	-9.	-0.005	81.49	1.467s
RU-103	2440.26	610.30	83.	0.	0.000	1000.00	1.468s
AG-108M	2456.19	614.28	83.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	79.	0.	0.000	1000.00	1.475s
RH-106	2486.73	621.92	66.	9.	0.005	132.87	1.479s
SB-125	2542.62	635.89	34.	-12.	-0.007	62.44	1.491s
I-131	2546.96	636.97	32.	10.	0.006	83.53	1.492s
AG-110M	2630.10	657.76	44.	-13.	-0.007	78.11	1.510s
CS-137	2645.69	661.66	65.	-14.	-0.008	54.67	1.513s
PM-144	2785.22	696.54	18.	8.	0.004	86.32	1.544s
NB-94	2809.57	702.63	25.	6.	0.003	130.58	1.549s
SB-124	2890.19	722.79	8.	4.	0.002	102.34	1.567s
AG-108M	2890.80	722.94	12.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	12.	0.	0.000	1000.00	1.567s
ZR-95	2895.84	724.20	12.	0.	0.000	1000.00	1.568s
BI-212	2907.73	727.17	8.	-4.	-0.002	227.37	1.570s
pm-146	2941.93	735.72	5.	5.	0.003	93.82	1.578s
pm-146	2987.69	747.16	9.	3.	0.001	250.62	1.588s
ZR-95	3025.97	756.73	14.	-1.	-0.001	800.00	1.596s
AG-110M	3054.82	763.94	12.	2.	0.001	307.90	1.602s
NB-95	3062.21	765.79	14.	0.	0.000	1000.00	1.604s
EU-152	3114.73	778.92	5.	2.	0.001	207.02	1.615s
BI-212	3140.74	785.42	10.	4.	0.002	165.53	1.621s
CS-134	3182.53	795.87	18.	2.	0.001	263.03	1.630s
CO-58	3242.16	810.78	0.	7.	0.004	37.81	1.643s
La-140	3262.14	815.77	7.	0.	0.000	1000.00	1.647s
Cs-136	3273.06	818.50	7.	0.	0.000	1000.00	1.649s
MN-54	3338.46	834.85	5.	2.	0.001	255.77	1.663s
Co-56	3386.15	846.77	15.	2.	0.001	431.57	1.674s
TL-208	3441.33	860.56	26.	-9.	-0.005	75.40	1.685
NB-94	3483.47	871.10	19.	-5.	-0.003	131.15	1.695s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3492.00	873.23	25.	-1.	-0.001	532.45	1.696s
PA-234	3521.21	880.53	0.	18.	0.010	23.57	1.703s
PA-234	3532.05	883.24	18.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	18.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	18.	0.	0.000	1000.00	1.710s
y-88	3591.26	898.04	0.	14.	0.008	28.16	1.718s
AC-228	3643.38	911.07	15.	-4.	-0.002	218.66	1.729s
AG-110M	3749.09	937.49	5.	-4.	-0.002	132.68	1.751s
PA-234	3783.21	946.02	5.	4.	0.002	137.83	1.759s
EU-152	3855.58	964.11	7.	5.	0.003	90.58	1.774s
AC-228	3875.02	968.97	13.	-1.	-0.001	519.62	1.778s
EU-154	3984.48	996.33	21.	7.	0.004	105.36	1.801s
PA-234M	4003.15	1001.00	32.	-4.	-0.002	157.14	1.805s
EU-154	4018.27	1004.77	18.	6.	0.003	102.59	1.808s
Co-56	4150.56	1037.84	6.	-2.	-0.001	283.83	1.836s
Cs-136	4191.49	1048.07	13.	-4.	-0.002	136.93	1.845s
RH-106	4200.65	1050.36	11.	6.	0.003	88.19	1.847s
Ga-68	4308.84	1077.40	11.	-2.	-0.001	452.11	1.870s
FE-59	4396.27	1099.25	0.	5.	0.003	51.88	1.888s
EU-152	4447.58	1112.07	0.	10.	0.006	31.62	1.899s
ZN-65	4461.46	1115.55	10.	0.	0.000	1000.00	1.901s
BI-214	4480.43	1120.29	13.	-3.	-0.002	117.07	1.906s
Sc-46	4481.49	1120.55	10.	0.	0.000	1000.00	1.906s
Ta-182	4484.49	1121.30	10.	0.	0.000	1000.00	1.906s
CO-60	4692.30	1173.24	2.	4.	0.002	63.17	1.950s
Ta-182	4755.57	1189.05	11.	-4.	-0.002	188.42	1.963s
Co-56	4952.57	1238.28	13.	-4.	-0.002	90.35	2.004s
NA-22	5097.62	1274.53	17.	-9.	-0.005	72.86	2.034s
EU-154	5097.68	1274.54	26.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	17.	-8.	-0.005	41.83	2.048s
CO-60	5329.61	1332.50	17.	-13.	-0.007	82.12	2.081s
AG-110M	5536.89	1384.30	0.	5.	0.003	44.72	2.124s
EU-152	5631.75	1408.00	12.	-7.	-0.004	48.97	2.143s
K-40	5843.19	1460.83	10.	-3.	-0.002	129.58	2.186
La-140	6385.02	1596.21	13.	-10.	-0.005	96.92	2.294s
SB-124	6764.37	1690.98	6.	-2.	-0.001	275.72	2.369s
BI-214	7058.61	1764.49	3.	6.	0.003	58.97	2.427s
Co-56	7086.08	1771.35	9.	0.	0.000	1000.00	2.433s
y-88	7345.12	1836.06	7.	-3.	-0.001	254.34	2.483s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.9289E+00				5.31E+01	
			477.60	1.929E+00	?(P	8.029E+00 1.21E+01 1.05E+01	G
NA-22	C	-5.3174E-01				9.50E+02	
			1274.53	-5.317E-01	?(	1.295E+00 7.29E+01 9.99E+01	G
K-40	N	-2.0333E+00				4.66E+11	
			1460.83	-2.033E+00	?(P	1.085E+01 1.30E+02 1.07E+01	G
CR-51	F	1.5605E+00				2.77E+01	
			320.08	1.560E+00	?(	1.091E+01 2.04E+02 9.94E+00	G
MN-54	C	8.5939E-02				3.12E+02	
			834.85	8.594E-02	?(	5.642E-01 2.56E+02 1.00E+02	G
FE-59	F	4.2783E-01				4.45E+01	
			1099.25	4.278E-01	?(P	6.888E-01 5.19E+01 5.65E+01	G
			1291.60	-1.119E+00	- P	3.035E+00 4.18E+01 4.32E+01	G
Co-56	C	8.6892E-02				7.73E+01	
			846.77	8.689E-02	&(	9.019E-01 4.32E+02 9.99E+01	G
			1238.28	-3.204E-01	+ P	1.687E+00 9.04E+01 6.61E+01	G
			1037.84	-8.101E-01	+ P	5.143E+00 2.84E+02 1.41E+01	G
			1771.35	0.000E+00	-	8.183E+00 1.00E+03 1.55E+01	A
CO-57	C	1.3708E-01				2.72E+02	
			122.06	0.000E+00	&(	5.996E-01 1.00E+03 8.56E+01	G
			136.47	1.236E+00	?(	7.206E+00 1.72E+02 1.07E+01	G
CO-58	C	2.9563E-01				7.09E+01	
			810.78	2.956E-01	?(	3.115E-01 3.78E+01 9.95E+01	G
CO-60	F	-7.6595E-01				1.93E+03	
			1332.50	-7.660E-01	?(	1.339E+00 8.21E+01 1.00E+02	G
			1173.24	2.462E-01	+ P	4.740E-01 6.32E+01 9.99E+01	G
NB-94	I	2.2174E-01				7.41E+06	
			702.63	2.217E-01	?(	1.009E+00 1.31E+02 9.79E+01	G
			871.10	-2.220E-01	+	1.022E+00 1.31E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	-7.3323E-02					6.40E+01	
			756.73	-7.332E-02	?(	1.477E+00	8.00E+02	5.45E+01 G
			724.20	0.000E+00	+	1.650E+00	1.00E+03	4.42E+01 G
RU-103	I	1.5814E-02					3.93E+01	
			497.05	1.581E-02	&(P	7.158E-01	1.75E+03	9.09E+01 G
			610.30	0.000E+00	-	2.675E+01	1.00E+03	5.75E+00 GA
RH-106	I	5.3401E+00					3.74E+02	
			621.92	3.096E+00	?(	1.406E+01	1.33E+02	9.93E+00 G
			1050.36	1.962E+01	?(	5.941E+01	8.82E+01	1.56E+00 G
			511.86	1.182E+01	?	3.015E+00	1.67E+01	2.00E+01 GA
AG-108M	C	1.9553E-02					1.53E+05	
			433.94	1.955E-02	%(	6.485E-01	1.28E+03	9.05E+01 G
			722.94	0.000E+00	-	8.011E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	&	1.720E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.1980E-01					2.50E+02	
			884.68	0.000E+00	?(	1.388E+00	1.00E+03	7.27E+01 G
			657.76	-4.890E-01	+	1.279E+00	7.81E+01	9.46E+01 G
			937.49	-5.454E-01	+	1.790E+00	1.33E+02	3.44E+01 G
			1384.30	1.294E+00	?(	1.908E+00	4.47E+01	2.43E+01 G
			763.94	3.008E-01	?(	3.443E+00	3.08E+02	2.23E+01 G
SN-113	F	-4.9232E-01					1.15E+02	
			391.69	-4.923E-01	*(P	1.690E+00	8.11E+01	6.40E+01 G
SB-124	F	1.5334E-01					6.02E+01	
			602.73	0.000E+00	(	1.551E+00	1.00E+03	9.83E+01 G
			1690.98	-3.576E-01	+	2.213E+00	2.76E+02	4.78E+01 G
			722.79	1.547E+00	?(	5.574E+00	1.02E+02	1.08E+01 G
SB-125	I	9.0584E-01					1.01E+03	
			427.88	4.291E-01	&(P	1.741E+00	1.60E+02	2.96E+01 G
			600.50	1.696E+00	?(	8.065E+00	1.39E+02	1.79E+01 G
			635.89	-3.823E+00	+ P	9.315E+00	6.24E+01	1.13E+01 G
			463.37	-3.325E+00	+ P	9.813E+00	6.25E+01	1.05E+01 G
I-131	I	3.1445E-01					8.02E+00	
			364.48	-1.042E-01	?(P	7.915E-01	3.39E+02	8.17E+01 G
			284.30	-4.997E+00	+ P	1.201E+01	7.82E+01	6.14E+00 G
			636.97	5.084E+00	?(	1.432E+01	8.35E+01	7.17E+00 G
Gd-153	F	4.2821E-01					2.42E+02	
			97.50	4.767E-01	?(	2.081E+00	1.29E+02	3.00E+01 G
			103.20	3.615E-01	?(	3.103E+00	2.51E+02	2.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	-3.0762E+00					4.71E-02	
			1077.40	-3.076E+00	?(	3.309E+01	4.52E+02	3.30E+00 G
Tc-99m	I	1.2467E-01					2.51E-01	
			140.51	1.247E-01	?(	9.267E-01	2.19E+02	8.93E+01 G
BA-133	F	4.5021E-01					3.85E+03	
			356.00	2.771E-01	?(	8.823E-01	9.31E+01	6.20E+01 G
			302.85	1.036E+00	?(	5.468E+00	1.55E+02	1.83E+01 G
			383.84	2.349E+00	P	9.536E+00	1.19E+02	8.94E+00 GA
			80.99	-2.618E-01	-	1.631E+00	2.38E+02	3.41E+01 GA
CS-134	I	3.1584E-01					7.54E+02	
			604.71	0.000E+00	?(	1.565E+00	1.00E+03	9.76E+01 G
			795.87	1.131E-01	?(	1.081E+00	2.63E+02	8.55E+01 G
			569.32	2.946E+00	?(	2.763E+00	3.50E+01	1.54E+01 G
			801.95	-1.599E-01	%	1.138E+01	1.92E+03	8.69E+00 G
			563.24	1.241E+00	?(P	6.349E+00	1.96E+02	8.35E+00 G
CS-137	I	-6.0407E-01					1.10E+04	
			661.66	-6.041E-01	&(P	1.703E+00	5.47E+01	8.52E+01 G
CE-139	F	2.1538E-01					1.38E+02	
			165.85	2.154E-01	?(	7.642E-01	1.05E+02	7.99E+01 G
Ba-140	I	2.2716E-01					1.28E+01	
			537.26	-3.418E-01	?(P	2.537E+00	3.24E+02	2.44E+01 G
			162.66	-2.994E+00	+	1.018E+01	1.01E+02	6.22E+00 G
			304.85	3.462E+00	?(	2.450E+01	2.07E+02	4.29E+00 G
La-140	I	-7.1012E-01					1.28E+01	
			1596.21	-7.101E-01	?(	1.417E+00	9.69E+01	9.54E+01 G
			487.02	3.306E-01	+	2.216E+00	1.93E+02	4.55E+01 G
			328.76	-1.810E+00	+	8.224E+00	1.35E+02	2.03E+01 G
			815.77	0.000E+00	+	2.727E+00	1.00E+03	2.33E+01 G
CE-141	I	-3.6704E-01					3.25E+01	
			145.44	-3.670E-01	?(	2.014E+00	1.63E+02	4.82E+01 G
CE-144	I	1.1773E+00					2.85E+02	
			133.54	1.177E+00	&(	6.445E+00	1.61E+02	1.11E+01 G
PM-144	C	2.8787E-01					3.63E+02	
			696.54	2.879E-01	?(	8.457E-01	8.63E+01	9.90E+01 G
			618.06	0.000E+00	&	1.531E+00	1.00E+03	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	-1.5296E+00					4.94E+03	
			344.29	-1.530E+00	?(P	7.316E+00	6.08E+01	2.65E+01 G
			1112.07	3.904E+00	+	2.877E+00	3.16E+01	1.36E+01 G
			121.78	-1.096E-01	&	1.766E+00	4.62E+02	2.86E+01 G
			778.92	7.357E-01	+	4.028E+00	2.07E+02	1.29E+01 G
			964.11	1.583E+00	+	4.974E+00	9.06E+01	1.46E+01 G
			244.69	1.301E+00	+	8.885E+00	1.97E+02	7.58E+00 G
			1408.00	-2.171E+00	+ P	5.748E+00	4.90E+01	2.10E+01 GA
EU-154	I	8.5449E-01					3.14E+03	
			873.23	-4.976E-01	?(P	9.480E+00	5.32E+02	1.23E+01 G
			123.10	2.983E-01	(P	1.102E+00	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.442E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	3.601E+00	1.00E+03	2.02E+01 G
			1004.77	1.723E+00	?(	6.110E+00	1.03E+02	1.80E+01 G
			996.33	3.084E+00	?(	1.121E+01	1.05E+02	1.06E+01 G
EU-155	I	-1.0488E-07					1.81E+03	
			105.31	-1.049E-07	%(	3.256E+00	8.99E+08	2.12E+01 G
			86.54	0.000E+00	+	3.449E+00	1.00E+03	3.07E+01 G
HF-181	F	3.8248E-01					4.24E+01	
			482.00	2.902E-01	?(	1.154E+00	1.16E+02	8.05E+01 G
			133.02	3.010E-01	?(	1.590E+00	1.56E+02	4.33E+01 G
			345.83	-2.466E+00	& P	1.252E+01	6.70E+01	1.51E+01 G
			136.30	2.255E+00	?(	1.274E+01	1.67E+02	5.85E+00 G
Hg-203	F	-2.8454E-01					4.66E+01	
			279.20	-2.845E-01	?(	9.366E-01	9.74E+01	8.15E+01 G
TL-208	N	-8.0405E-02					6.98E+02	
			583.02	-8.041E-02	&(P	7.193E-01	2.78E+02	8.45E+01 G
			277.28	-1.117E+00	+	1.052E+01	2.69E+02	6.31E+00 G
			860.56	-3.356E+00	& P	9.444E+00	7.54E+01	1.24E+01 G
pm-146	C	5.6636E-01					2.02E+03	
			747.16	3.102E-01	?(	1.972E+00	2.51E+02	3.40E+01 G
			735.72	9.534E-01	?(	2.221E+00	9.38E+01	2.25E+01 G
			453.88	-4.640E-01	+	1.117E+00	9.93E+01	6.50E+01 G
y-88	F	6.5943E-01					1.07E+02	
			898.04	6.594E-01	?(P	3.568E-01	2.82E+01	9.37E+01 G
			1836.06	-2.097E-01	-	1.159E+00	2.54E+02	9.92E+01 G
Cd-109	F	-2.2333E+00					4.53E+02	
			88.04	-2.233E+00	(	2.764E+01	3.66E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.0956E-01					3.28E+05	
			176.60	1.096E-01	(	2.541E+00	8.54E+02	1.70E+01 G
			227.00	-2.293E+00	+	8.184E+00	1.35E+02	6.30E+00 GA
Cf-249	T	-4.9117E-01					1.28E+05	
			387.95	-4.912E-01	?(	1.723E+00	1.04E+02	6.60E+01 G
			333.44	-2.402E+00	+	1.122E+01	1.39E+02	1.55E+01 G
Sn-126		1.0550E+00					3.65E+07	
			87.57	-4.663E-01	+	2.860E+00	1.82E+02	3.75E+01 GA
			64.28	1.055E+00	?(	8.140E+00	2.25E+02	9.70E+00 G
			86.94	-1.939E+00	+	1.215E+01	1.86E+02	9.04E+00 GA
PB-210	N	1.6587E+01					8.14E+03	
			46.54	1.659E+01	*(P	2.142E+01	4.55E+01	4.25E+00 G
PB-212	N	1.1652E+00					6.98E+02	
			238.63	1.165E+00	*(P	1.509E+00	4.15E+01	4.33E+01 G
			300.03	6.233E+00	? P	3.073E+01	1.45E+02	3.28E+00 GA
PB-214	N	-6.8190E-01					5.84E+05	
			351.93	-6.819E-01	(P	2.148E+00	1.09E+02	3.76E+01 G
			295.09	0.000E+00	+	2.850E+00	1.00E+03	1.93E+01 G
			242.00	0.000E+00	+	1.078E+01	1.00E+03	7.43E+00 GA
BI-207	C	1.1042E-02					1.18E+04	
			569.70	1.104E-02	%(	7.567E-01	1.84E+03	9.77E+01 G
			1063.66	-3.065E-02	% P	5.096E-01	1.47E+03	7.45E+01 G
BI-212	N	-1.8935E+00					6.98E+02	
			727.17	-1.893E+00	?(P	8.168E+00	2.27E+02	7.55E+00 G
			785.42	1.334E+01	? P	5.557E+01	1.66E+02	1.28E+00 GA
BI-214	N	2.2611E-01					5.84E+05	
			609.31	-6.766E-01	?(P	3.502E+00	8.15E+01	4.61E+01 G
			1120.29	-1.116E+00	+ P	6.954E+00	1.17E+02	1.51E+01 G
			1764.49	2.928E+00	?(P	5.325E+00	5.90E+01	1.54E+01 G
BI-210M	T	3.3641E-01					1.10E+09	
			265.83	3.364E-01	?(	1.013E+00	8.87E+01	5.00E+01 G
			304.90	0.000E+00	-	3.870E+00	1.00E+03	2.80E+01 G
AC-228	N	-6.3252E-01					2.10E+03	
			911.07	-6.325E-01	?(	3.282E+00	2.19E+02	2.90E+01 G
			968.97	-2.750E-01	+	5.367E+00	5.20E+02	1.75E+01 G
			338.32	-3.146E+00	&	1.508E+01	1.43E+02	1.20E+01 G
			93.35	-4.097E-07	%	1.823E+01	1.31E+09	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-3.2868E+00					7.95E+03	
			50.14	-3.287E+00	*(	1.603E+01	1.44E+02	8.00E+00 G
			256.24	-9.050E-01	+ P	8.010E+00	3.50E+02	7.00E+00 G
TH-229	N	5.2566E-01					2.68E+06	
			193.51	5.257E-01	?(	6.959E+00	4.68E+02	4.40E+00 G
			210.85	-7.265E-01	& P	1.928E+01	8.47E+02	2.99E+00 G
TH-234	N	1.5807E+00					1.63E+12	
			63.29	9.240E-01	(P	1.314E+01	4.38E+02	3.81E+00 G
			92.59	2.029E+00	(P	9.496E+00	1.76E+02	5.58E+00 G
PA-231	N	2.2310E+00					1.20E+07	
			302.65	0.000E+00	?(	3.774E+01	1.00E+03	2.88E+00 G
			300.07	4.843E+00	?(	4.285E+01	2.58E+02	2.46E+00 G
PA-233	C	2.1322E-01					7.82E+08	
			312.01	2.132E-01	?(P	2.198E+00	2.96E+02	3.60E+01 G
			300.18	0.000E+00	-	1.743E+01	1.00E+03	6.20E+00 G
PA-234	N	9.9539E-01					1.63E+12	
			131.29	7.197E-01	(	3.660E+00	1.50E+02	1.80E+01 G
			946.02	1.366E+00	?(P	4.666E+00	1.38E+02	1.34E+01 G
			569.47	0.000E+00	-	9.088E+00	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	1.049E+01	1.00E+03	9.60E+00 G
			880.53	1.341E+01	&	5.491E+00	2.36E+01	6.00E+00 GA
PA-234M	N	-2.3354E+01					1.63E+12	
			1001.00	-2.335E+01	?(P	1.709E+02	1.57E+02	8.37E-01 G
			766.41	-1.040E+01	% P	2.826E+02	1.12E+03	2.94E-01 G
U-235	N	-1.4552E-01					2.57E+11	
			143.79	-1.455E-01	?(P	7.603E+00	8.95E+02	1.10E+01 G
			205.33	-1.240E+00	+	1.042E+01	3.14E+02	5.01E+00 G
			163.38	-3.012E-01	&	1.338E+01	1.28E+03	5.08E+00 G
AM-241	T	-1.0174E+00					1.58E+05	
			59.54	-1.017E+00	(P	2.762E+00	6.64E+01	3.59E+01 G
Np-237	F	6.5758E-01					2.14E+06	
			86.49	6.576E-01	?(	7.999E+00	3.59E+02	1.31E+01 G
Ir-192	F	1.4733E-01					7.40E+01	
			316.49	1.018E-01	?(	9.457E-01	2.67E+02	8.70E+01 G
			468.06	-1.640E-01	+	2.161E+00	3.77E+02	5.18E+01 G
			308.44	2.722E-01	?(	2.376E+00	2.50E+02	3.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-239	T	4.2775E-01					2.36E+00	
			103.70	9.280E-08 %		2.881E+00	8.99E+08	2.40E+01 X
			106.13	4.277E-01 ?(		2.905E+00	1.99E+02	2.27E+01 G
			99.50	9.511E-01 *		4.345E+00	1.35E+02	1.50E+01 X
Nd-147		6.3076E-01					1.11E+01	
			531.00	6.308E-01 ?(		2.936E+00	1.71E+02	1.30E+01 G
			91.10	0.000E+00 &		3.613E+00	1.00E+03	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	157.	-13.	-0.007	144.23	-3.287E+00	
AM-241	59.54	148.	-22.	-0.012	66.35	-1.017E+00	P
Sn-126	64.28	109.	7.	0.004	225.17	1.055E+00	
BA-133	80.99	77.	-7.	-0.004	237.55	-2.618E-01	
Np-237	86.49	313.	7.	0.004	359.42	6.576E-01	
Sn-126	86.94	346.	-14.	-0.008	186.25	-1.939E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	87.57	332.	-14.	-0.008	182.33	-4.663E-01	
Cd-109	88.04	318.	-7.	-0.004	365.71	-2.233E+00	
Gd-153	97.50	116.	12.	0.007	128.95	4.767E-01	
Np-239	99.50	128.	12.	0.007	134.96	9.511E-01	
Gd-153	103.20	140.	7.	0.004	251.25	3.615E-01	
Np-239	106.13	134.	8.	0.005	199.24	4.277E-01	
EU-152	121.78	75.	-3.	-0.001	462.33	-1.096E-01	
EU-154	123.10	58.	10.	0.006	109.11	2.983E-01	P
PA-234	131.29	126.	11.	0.006	149.87	7.197E-01	
HF-181	133.02	137.	11.	0.006	155.68	3.010E-01	
CE-144	133.54	148.	11.	0.006	161.43	1.177E+00	
HF-181	136.30	158.	11.	0.006	166.65	2.255E+00	
CO-57	136.47	169.	11.	0.006	172.08	1.236E+00	
Tc-99m	140.51	180.	9.	0.005	218.84	1.247E-01	
U-235	143.79	190.	-1.	-0.001	895.13	-1.455E-01	P
CE-141	145.44	258.	-14.	-0.008	162.86	-3.670E-01	
Ba-140	162.66	91.	-14.	-0.008	100.94	-2.994E+00	
CE-139	165.85	85.	13.	0.007	105.06	2.154E-01	
Cf-251	176.60	37.	1.	0.001	854.04	1.096E-01	
TH-229	193.51	15.	2.	0.001	468.35	5.257E-01	
U-235	205.33	44.	-4.	-0.002	314.25	-1.240E+00	
TH-229	210.85	52.	-1.	-0.001	846.92	-7.265E-01	P
Cf-251	227.00	37.	-9.	-0.005	135.05	-2.293E+00	
PB-212	238.63	57.	29.	0.016	41.48	1.165E+00	P
EU-152	244.69	58.	6.	0.003	197.15	1.301E+00	
TH-227	256.24	36.	-3.	-0.002	349.80	-9.050E-01	P
BI-210M	265.83	28.	9.	0.005	88.72	3.364E-01	
TL-208	277.28	47.	-4.	-0.002	268.61	-1.117E+00	
Hg-203	279.20	62.	-12.	-0.007	97.42	-2.845E-01	
I-131	284.30	56.	-16.	-0.009	78.24	-4.997E+00	P
PB-212	300.03	101.	10.	0.006	145.07	6.233E+00	P
PA-231	300.07	111.	6.	0.003	257.84	4.843E+00	
BA-133	302.85	98.	9.	0.005	154.78	1.036E+00	
Ba-140	304.85	108.	7.	0.004	206.71	3.462E+00	
Ir-192	308.44	52.	4.	0.002	249.96	2.722E-01	
PA-233	312.01	57.	4.	0.002	295.69	2.132E-01	P
Ir-192	316.49	61.	4.	0.002	266.91	1.018E-01	
CR-51	320.08	107.	7.	0.004	204.32	1.560E+00	
La-140	328.76	253.	-17.	-0.009	135.21	-1.810E+00	
Cf-249	333.44	270.	-17.	-0.009	139.03	-2.402E+00	
AC-228	338.32	287.	-17.	-0.009	142.68	-3.146E+00	
Cs-136	340.57	304.	-17.	-0.009	146.50	-8.108E-01	
EU-152	344.29	322.	-18.	-0.010	60.78	-1.530E+00	P
HF-181	345.83	303.	-17.	-0.009	66.99	-2.466E+00	P
PB-214	351.93	49.	-11.	-0.006	108.98	-6.819E-01	P
BA-133	356.00	20.	7.	0.004	93.13	2.771E-01	
I-131	364.48	29.	-4.	-0.002	339.05	-1.042E-01	P
BA-133	383.84	48.	9.	0.005	118.95	2.349E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	387.95	88.	-13.	-0.007	103.92	-4.912E-01	
SN-113	391.69	78.	-13.	-0.007	81.06	-4.923E-01	P
SB-125	427.88	13.	5.	0.003	159.96	4.291E-01	P
pm-146	453.88	26.	-11.	-0.006	99.31	-4.640E-01	
SB-125	463.37	54.	-13.	-0.007	62.55	-3.325E+00	P
Ir-192	468.06	64.	-3.	-0.002	377.17	-1.640E-01	
BE-7	477.60	34.	7.	0.004	121.08	1.929E+00	P
HF-181	482.00	41.	8.	0.005	115.94	2.902E-01	
La-140	487.02	48.	5.	0.003	192.67	3.306E-01	
RH-106	511.86	14.	79.	0.044	16.73	1.182E+01	
Nd-147	531.00	4.	3.	0.001	170.71	6.308E-01	
Ba-140	537.26	14.	-3.	-0.001	323.60	-3.418E-01	P
CS-134	563.24	9.	3.	0.002	195.77	1.241E+00	P
CS-134	569.32	5.	14.	0.008	34.99	2.946E+00	
TL-208	583.02	11.	-2.	-0.001	277.81	-8.041E-02	P
SB-125	600.50	74.	9.	0.005	139.22	1.696E+00	
BI-214	609.31	92.	-9.	-0.005	81.49	-6.766E-01	P
RH-106	621.92	66.	9.	0.005	132.87	3.096E+00	
SB-125	635.89	34.	-12.	-0.007	62.44	-3.823E+00	P
I-131	636.97	32.	10.	0.006	83.53	5.084E+00	
AG-110M	657.76	44.	-13.	-0.007	78.11	-4.890E-01	
CS-137	661.66	65.	-14.	-0.008	54.67	-6.041E-01	P
PM-144	696.54	18.	8.	0.004	86.32	2.879E-01	
NB-94	702.63	25.	6.	0.003	130.58	2.217E-01	
SB-124	722.79	8.	4.	0.002	102.34	1.547E+00	
BI-212	727.17	8.	-4.	-0.002	227.37	-1.893E+00	P
pm-146	735.72	5.	5.	0.003	93.82	9.534E-01	
pm-146	747.16	9.	3.	0.001	250.62	3.102E-01	
ZR-95	756.73	14.	-1.	-0.001	800.00	-7.332E-02	
AG-110M	763.94	12.	2.	0.001	307.90	3.008E-01	
EU-152	778.92	5.	2.	0.001	207.02	7.357E-01	
BI-212	785.42	10.	4.	0.002	165.53	1.334E+01	P
CS-134	795.87	18.	2.	0.001	263.03	1.131E-01	
CO-58	810.78	0.	7.	0.004	37.81	2.956E-01	
MN-54	834.85	5.	2.	0.001	255.77	8.594E-02	
Co-56	846.77	15.	2.	0.001	431.57	8.689E-02	
TL-208	860.56	26.	-9.	-0.005	75.40	-3.356E+00	P
NB-94	871.10	19.	-5.	-0.003	131.15	-2.220E-01	
EU-154	873.23	25.	-1.	-0.001	532.45	-4.976E-01	P
PA-234	880.53	0.	18.	0.010	23.57	1.341E+01	
AC-228	911.07	15.	-4.	-0.002	218.66	-6.325E-01	
AG-110M	937.49	5.	-4.	-0.002	132.68	-5.454E-01	
PA-234	946.02	5.	4.	0.002	137.83	1.366E+00	P
EU-152	964.11	7.	5.	0.003	90.58	1.583E+00	
AC-228	968.97	13.	-1.	-0.001	519.62	-2.750E-01	
EU-154	996.33	21.	7.	0.004	105.36	3.084E+00	
PA-234M	1001.00	32.	-4.	-0.002	157.14	-2.335E+01	P
EU-154	1004.77	18.	6.	0.003	102.59	1.723E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	1037.84	6.	-2.	-0.001	283.83	-8.101E-01	P
Cs-136	1048.07	13.	-4.	-0.002	136.93	-2.547E-01	
RH-106	1050.36	11.	6.	0.003	88.19	1.962E+01	
Ga-68	1077.40	11.	-2.	-0.001	452.11	-3.076E+00	
FE-59	1099.25	0.	5.	0.003	51.88	4.278E-01	P
EU-152	1112.07	0.	10.	0.006	31.62	3.904E+00	
BI-214	1120.29	13.	-3.	-0.002	117.07	-1.116E+00	P
CO-60	1173.24	2.	4.	0.002	63.17	2.462E-01	P
Ta-182	1189.05	11.	-4.	-0.002	188.42	-1.499E+00	
Co-56	1238.28	13.	-4.	-0.002	90.35	-3.204E-01	P
NA-22	1274.53	17.	-9.	-0.005	72.86	-5.317E-01	
FE-59	1291.60	17.	-8.	-0.005	41.83	-1.119E+00	P
CO-60	1332.50	17.	-13.	-0.007	82.12	-7.660E-01	
AG-110M	1384.30	0.	5.	0.003	44.72	1.294E+00	
EU-152	1408.00	12.	-7.	-0.004	48.97	-2.171E+00	P
K-40	1460.83	10.	-3.	-0.002	129.58	-2.033E+00	P
La-140	1596.21	13.	-10.	-0.005	96.92	-7.101E-01	
SB-124	1690.98	6.	-2.	-0.001	275.72	-3.576E-01	
BI-214	1764.49	3.	6.	0.003	58.97	2.928E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.9288E+00	1.9289E+00	1.211E+02%	8.03E+00
NA-22	#A	-5.3174E-01	-5.3174E-01	7.286E+01%	1.30E+00
K-40	#A	-2.0333E+00	-2.0333E+00	1.296E+02%	1.08E+01
Sc-46	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.01E+00
CR-51	#A	1.5604E+00	1.5605E+00	2.043E+02%	1.09E+01
MN-54	#A	8.5938E-02	8.5939E-02	2.558E+02%	5.64E-01
FE-59	#A	4.2783E-01	4.2783E-01	5.188E+01%	6.89E-01
Co-56	#A	8.6891E-02	8.6892E-02	4.316E+02%	9.02E-01
CO-57	#A	1.3708E-01	1.3708E-01	1.721E+02%	6.00E-01
CO-58	#A	2.9563E-01	2.9563E-01	3.781E+01%	3.11E-01
CO-60	#A	-7.6595E-01	-7.6595E-01	8.212E+01%	1.34E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.84E+00
NB-94	#A	2.2174E-01	2.2174E-01	1.306E+02%	1.01E+00
ZR-95	#A	-7.3323E-02	-7.3323E-02	8.000E+02%	1.48E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.13E-01
RU-103	#A	1.5814E-02	1.5814E-02	1.747E+03%	7.16E-01
RH-106	#A	5.3401E+00	5.3401E+00	7.974E+01%	1.41E+01
AG-108M	#A	1.9553E-02	1.9553E-02	1.281E+03%	6.49E-01
AG-110M	#A	3.1980E-01	3.1980E-01	4.472E+01%	1.39E+00
SN-113	#A	-4.9232E-01	-4.9232E-01	8.106E+01%	1.69E+00
SB-124	#A	1.5334E-01	1.5334E-01	1.023E+02%	1.55E+00

SB-125	#A	9.0583E-01	9.0584E-01	1.060E+02%	1.74E+00
I-131	#A	3.1444E-01	3.1445E-01	8.353E+01%	7.92E-01
Gd-153	#A	4.2821E-01	4.2821E-01	1.290E+02%	2.08E+00
Ga-68	#A	-3.0532E+00	-3.0762E+00	4.521E+02%	3.31E+01
Tc-99m	#A	1.2450E-01	1.2467E-01	2.188E+02%	9.27E-01
BA-133	#A	4.5021E-01	4.5021E-01	9.032E+01%	8.82E-01
CS-134	#A	3.1584E-01	3.1584E-01	3.499E+01%	1.57E+00
CS-137	#A	-6.0407E-01	-6.0407E-01	5.467E+01%	1.70E+00
CE-139	#A	2.1537E-01	2.1538E-01	1.051E+02%	7.64E-01
Ba-140	#A	2.2715E-01	2.2716E-01	1.920E+02%	2.54E+00
La-140	#A	-7.1010E-01	-7.1012E-01	9.692E+01%	1.42E+00
CE-141	#A	-3.6703E-01	-3.6704E-01	1.629E+02%	2.01E+00
CE-144	#A	1.1773E+00	1.1773E+00	1.614E+02%	6.45E+00
PM-144	#A	2.8787E-01	2.8787E-01	8.632E+01%	8.46E-01
EU-152	#A	-1.5296E+00	-1.5296E+00	6.078E+01%	7.32E+00
EU-154	#A	8.5449E-01	8.5449E-01	1.026E+02%	9.48E+00
EU-155	#A	-1.0488E-07	-1.0488E-07	8.990E+08%	3.26E+00
HF-181	#A	3.8248E-01	3.8248E-01	8.528E+01%	1.15E+00
Ta-182	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.68E+00
Hg-203	#A	-2.8453E-01	-2.8454E-01	9.742E+01%	9.37E-01
TL-208	#A	-8.0405E-02	-8.0405E-02	2.778E+02%	7.19E-01
pm-146	#A	5.6636E-01	5.6636E-01	9.382E+01%	1.97E+00
y-88	#	6.5943E-01	6.5943E-01	2.816E+01%	3.57E-01
Cd-113m	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.04E+03
Cd-109	#A	-2.2333E+00	-2.2333E+00	3.657E+02%	2.76E+01
Cf-251	#A	1.0956E-01	1.0956E-01	8.540E+02%	2.54E+00
Cf-249	#A	-4.9117E-01	-4.9117E-01	1.039E+02%	1.72E+00
Sn-126	#A	1.0550E+00	1.0550E+00	2.252E+02%	8.14E+00
PB-210	#A	1.6587E+01	1.6587E+01	4.545E+01%	2.14E+01
PB-212	#A	1.1652E+00	1.1652E+00	4.148E+01%	1.51E+00
PB-214	#A	-6.8190E-01	-6.8190E-01	1.090E+02%	2.15E+00
BI-207	#A	1.1042E-02	1.1042E-02	1.841E+03%	7.57E-01
BI-212	#A	-1.8935E+00	-1.8935E+00	2.274E+02%	8.17E+00
BI-214	#A	2.2611E-01	2.2611E-01	5.029E+01%	3.50E+00
BI-210M	#A	3.3641E-01	3.3641E-01	8.872E+01%	1.01E+00
AC-228	#A	-6.3252E-01	-6.3252E-01	2.187E+02%	3.28E+00
TH-227	#A	-3.2868E+00	-3.2868E+00	1.442E+02%	1.60E+01
TH-229	#A	5.2566E-01	5.2566E-01	4.684E+02%	6.96E+00
TH-234	A	1.5807E+00	1.5807E+00	1.755E+02%	1.31E+01
PA-231	#A	2.2310E+00	2.2310E+00	2.578E+02%	3.77E+01
PA-233	#A	2.1322E-01	2.1322E-01	2.957E+02%	2.20E+00
PA-234	#A	9.9539E-01	9.9539E-01	1.018E+02%	3.66E+00
PA-234M	#A	-2.3354E+01	-2.3354E+01	1.571E+02%	1.71E+02
U-235	#A	-1.4552E-01	-1.4552E-01	8.951E+02%	7.60E+00
AM-241	#A	-1.0174E+00	-1.0174E+00	6.635E+01%	2.76E+00
Np-237	#A	6.5758E-01	6.5758E-01	3.594E+02%	8.00E+00
Ir-192	#A	1.4733E-01	1.4733E-01	1.828E+02%	9.46E-01
Cs-136	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.36E-01
Np-239	#A	4.2768E-01	4.2775E-01	1.992E+02%	2.90E+00

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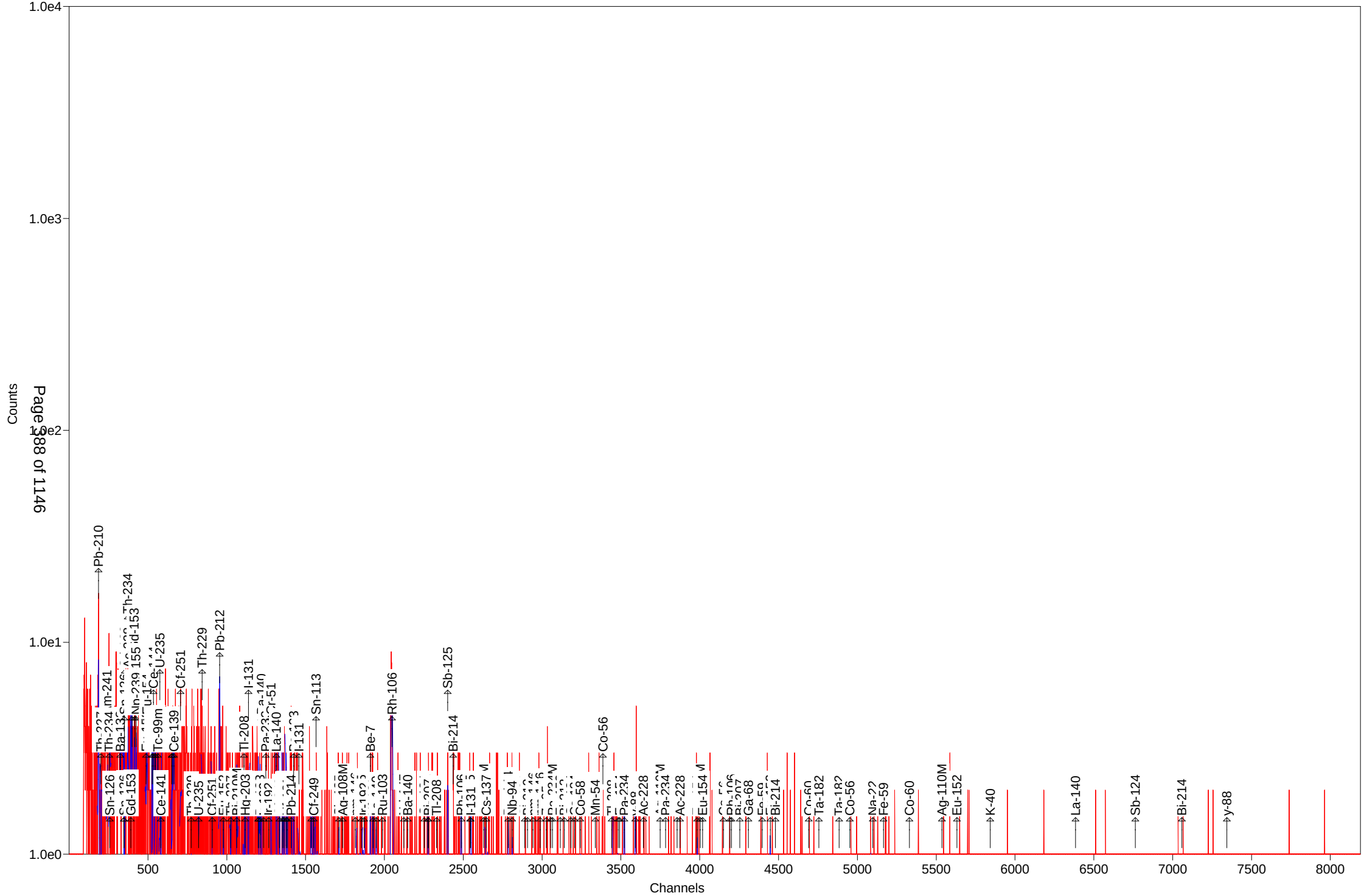
Nd-147 #A    6.3074E-01    6.3076E-01    1.707E+02%                2.94E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.6 keV)     1.659E+01  Bq/Sample
Total Decayed Activity (   37.6 to  1999.6 keV) 1.6587074E+01  Bq/Sample
```

264535_Gamma_MB 160-264535~1-A. 16_Gamma_20162106.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161129

Sample Description: 264535_Gamma_LCS 160-264535~2-A
Detector: Detector #17
Batch ID: 264535
Work Order Number: Gamma
Lot Number: LCS 160-264535~2-A

Decay to Time: 9/1/2016 11:50 Live Time: 1800 sec
Acquisition Time: 9/1/2016 11:51:20 Real Time: 1837 sec
Analysis Time: 9/1/2016 12:22 Dead Time: 2.03 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev11.lib
Bkgd Correction File: 17_2016-08-18_0548.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.291E+01	92.0	1.188E+01	1.190E+01	3.940E+01
NA-22	-3.377E-01	167.7	5.664E-01	5.666E-01	1.975E+00
K-40	1.010E+01	51.9	5.244E+00	5.270E+00	1.316E+01
Sc-46	-2.210E+00	94.5	2.087E+00	2.090E+00	6.923E+00
CR-51	8.750E+00	101.3	8.864E+00	8.876E+00	2.945E+01
MN-54	7.636E-01	196.0	1.496E+00	1.497E+00	3.386E+00
FE-59	-4.153E+00	74.7	3.104E+00	3.111E+00	7.563E+00
Co-56	2.943E-01	117.2	3.449E-01	3.453E-01	3.489E+00
CO-57	0.000E+00	1.#INF	5.548E-01	5.548E-01	2.532E+00
CO-58	-3.755E-01	329.7	1.238E+00	1.238E+00	4.179E+00
CO-60	2.037E+02	1.3	2.645E+00	1.056E+01	9.560E-01
ZN-65	0.000E+00	1.#INF	1.326E+00	1.326E+00	1.060E+01
NB-94	8.311E-01	121.1	1.006E+00	1.007E+00	2.369E+00
ZR-95	1.327E+00	114.9	1.525E+00	1.526E+00	4.572E+00
NB-95	7.959E-01	118.6	9.441E-01	9.450E-01	3.167E+00
RU-103	-8.598E-01	182.4	1.568E+00	1.569E+00	3.079E+00
RH-106	-1.130E+01	149.3	1.688E+01	1.689E+01	5.620E+01
AG-108M	-1.451E+00	73.7	1.070E+00	1.072E+00	3.539E+00
AG-110M	-2.918E+00	92.2	2.689E+00	2.693E+00	8.921E+00
SN-113	1.575E+00	119.1	1.876E+00	1.877E+00	6.234E+00
SB-124	-1.207E+00	138.5	1.672E+00	1.673E+00	5.709E+00
SB-125	-4.525E+00	92.6	4.191E+00	4.197E+00	1.057E+01
I-131	3.277E-01	66.6	2.184E-01	2.190E-01	3.247E+00
Gd-153	1.473E-01	93.4	1.376E-01	1.379E-01	8.317E+00
Ga-68	-2.188E+01	280.7	6.142E+01	6.144E+01	1.348E+02
Tc-99m	5.120E-01	176.8	9.051E-01	9.056E-01	3.010E+00
BA-133	1.931E-01	834.8	1.612E+00	1.612E+00	5.412E+00
CS-134	1.259E+00	36.2	4.556E-01	4.602E-01	5.673E+00
CS-137	3.615E+02	1.2	4.278E+00	1.929E+01	3.096E+00
CE-139	-8.311E-01	104.1	8.653E-01	8.689E-01	2.871E+00
Ba-140	-3.871E+00	159.8	6.187E+00	6.190E+00	1.109E+01
La-140	5.589E-01	174.7	9.762E-01	9.766E-01	1.478E+00
CE-141	9.987E-01	158.7	1.585E+00	1.586E+00	5.270E+00

CE-144	-1.425E-08	50531646961.1	7.198E+00	7.198E+00	2.404E+01
PM-144	-1.420E+00	91.2	1.296E+00	1.298E+00	3.016E+00
EU-152	3.933E+00	72.7	2.859E+00	2.867E+00	1.424E+01
EU-154	-1.548E+01	68.9	1.066E+01	1.069E+01	3.524E+01
EU-155	-1.612E-02	27792.8	4.479E+00	4.479E+00	1.209E+01
HF-181	4.725E-01	116.9	5.525E-01	5.530E-01	5.381E+00
Ta-182	1.388E+00	147.0	2.041E+00	2.042E+00	1.543E+01
Hg-203	1.022E+00	96.0	9.811E-01	9.829E-01	3.258E+00
TL-208	1.448E+00	90.7	1.313E+00	1.315E+00	3.183E+00
pm-146	1.448E+00	108.8	1.575E+00	1.577E+00	7.350E+00
y-88	1.343E+00	119.8	1.610E+00	1.611E+00	3.628E+00
Cd-113m	-2.489E+03	485.2	1.208E+04	1.208E+04	4.059E+04
Cd-109	1.897E+01	142.9	2.711E+01	2.713E+01	8.989E+01
Cf-251	2.822E+00	142.5	4.022E+00	4.030E+00	1.069E+01
Cf-249	1.516E+00	117.3	1.778E+00	1.780E+00	5.911E+00
Sn-126	9.296E+00	100.2	9.315E+00	9.328E+00	3.088E+01
PB-210	9.960E+03	0.9	9.403E+01	5.923E+02	1.710E+02
PB-212	6.327E+00	23.9	1.514E+00	1.569E+00	3.957E+00
PB-214	2.202E+00	115.0	2.532E+00	2.534E+00	8.421E+00
BI-207	-7.292E-01	113.3	8.260E-01	8.268E-01	2.766E+00
BI-212	1.335E+01	99.7	1.331E+01	1.332E+01	4.442E+01
BI-214	9.053E+00	17.3	1.562E+00	1.632E+00	4.110E+00
BI-210M	1.236E+00	94.7	1.171E+00	1.173E+00	5.020E+00
AC-228	1.046E+01	44.1	4.615E+00	4.646E+00	1.120E+01
TH-227	-3.428E+01	200.7	6.881E+01	6.883E+01	2.273E+02
TH-229	-2.724E+00	287.7	7.836E+00	7.839E+00	4.615E+01
TH-234	-2.619E+01	266.3	6.974E+01	6.975E+01	8.881E+01
PA-231	-3.348E+01	143.5	4.804E+01	4.807E+01	1.595E+02
PA-233	-2.829E+00	143.7	4.066E+00	4.069E+00	1.349E+01
PA-234	4.827E+00	85.4	4.122E+00	4.130E+00	1.480E+01
PA-234M	1.391E+02	140.2	1.949E+02	1.951E+02	6.518E+02
U-235	2.615E+00	276.4	7.227E+00	7.228E+00	2.407E+01
AM-241	1.155E+03	0.8	9.801E+00	6.072E+01	1.435E+01
Np-237	5.329E+00	150.7	8.033E+00	8.039E+00	2.664E+01
Ir-192	8.130E-01	145.8	1.186E+00	1.186E+00	3.459E+00
Cs-136	-4.367E-01	73.8	3.223E-01	3.233E-01	4.732E+00
Np-239	1.820E+00	179.4	3.264E+00	3.266E+00	1.086E+01
Nd-147	6.911E-01	142.1	9.819E-01	9.827E-01	2.033E+01
Total	1.195E+04				

Analyst: kody Saulters

Sample description
264535_Gamma_LCS 160-264535~2-A

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161129.An1

Acquisition information
Start time: 9/1/2016 11:51:20 AM
Live time: 1800
Real time: 1837
Dead time: 2.03 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 11:50:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2016-08-18_0548.PBC 8/18/2016 5:48:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0529

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.63	16003.	0.94	0.77	2.104E-02	46.54	4.250	9.960E+03	PB210
49.57	66.	118.89	0.78	2.315E-02	50.14	8.000	1.944E+01	TH227
59.59	22064.	0.85	0.80	2.960E-02	59.54	35.900	1.155E+03	AM241
65.53	52.	100.20	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
77.20	182.	24.11	0.77	3.765E-02				
86.49	51.	150.75	0.81	4.026E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.273E+00	EU155
88.00	196.	24.42	0.73	4.059E-02	87.57	37.500	7.170E+00	Sn126
					88.04	3.790	7.077E+01	Cd109
91.10	53.	142.08	0.82	4.119E-02	91.10	28.300	PBC<MDA	Nd147
92.59	9.	802.94	0.82	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.35	32.	241.08	0.82	4.156E-02	93.35	5.561	PBC<MDA	AC228
99.50	26.	212.08	0.82	4.234E-02	99.50	15.000	PBC<MDA	Np239
103.20	47.	123.70	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
103.70	28.	209.06	0.83	4.269E-02	103.70	24.000	PBC<MDA	Np239
106.13	32.	179.37	0.83	4.282E-02	106.13	22.700	PBC<MDA	Np239
107.94	22.	123.92	0.93	4.286E-02				
107.94	22.	123.92	0.93	4.286E-02				
123.10	21.	230.67	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
133.02	16.	376.49	0.86	4.197E-02	133.02	43.300	PBC<MDA	HF181
140.51	33.	176.79	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
143.76	21.	276.37	0.87	4.080E-02	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	35.	158.70	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
176.60	32.	142.53	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251
227.00	11.	397.30	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.49	187.	22.93	1.23	2.990E-02	238.63	43.300	8.015E+00	PB212
242.00	43.	126.71	0.96	2.960E-02	242.00	7.430	PBC<MDA	PB214
255.75	5.	812.19	0.97	2.846E-02	256.24	7.000	PBC<MDA	TH227
265.66	40.	94.75	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
279.20	40.	95.95	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
284.30	38.	104.70	1.00	2.648E-02	284.30	6.140	PBC<MDA	I131
305.37	8.	851.99	1.02	2.521E-02	304.90	28.000	PBC<MDA	BI210M
316.49	19.	211.40	1.03	2.456E-02	316.49	87.040	PBC<MDA	Ir192
320.08	38.	101.30	1.03	2.437E-02	320.08	9.940	PBC<MDA	CR51
328.76	12.	337.45	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
338.32	40.	115.64	1.05	2.344E-02	338.32	12.010	PBC<MDA	AC228
340.57	40.	117.55	1.05	2.333E-02	340.57	46.900	PBC<MDA	Cs136
345.83	40.	116.92	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.93	34.	114.97	1.06	2.279E-02	351.93	37.600	PBC<MDA	PB214
356.00	5.	834.78	1.06	2.261E-02	356.00	62.050	PBC<MDA	BA133
383.84	38.	115.50	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
387.95	38.	117.34	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
391.69	38.	119.10	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
435.18	52.	36.39	0.79	1.959E-02				
453.88	41.	108.76	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
468.06	24.	200.88	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
487.02	12.	312.62	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
512.27	25.	244.57	2.45	1.742E-02	511.86	20.000	PBC<MDA	RH106
569.32	54.	36.19	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.270E+01	PA234
					569.70	97.740	1.905E+00	BI207
583.22	94.	27.78	0.91	1.583E-02	583.02	84.500	3.902E+00	TL208
609.22	123.	20.50	0.94	1.533E-02	609.31	46.090	9.701E+00	BI214
					610.30	5.750	7.786E+01	RU103
614.35	22.	200.90	1.29	1.524E-02	614.28	89.850	PBC<MDA	AG108M
618.06	32.	137.27	1.30	1.517E-02	618.06	99.100	PBC<MDA	PM144
636.97	16.	145.76	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
657.76	31.	412.24	1.33	1.449E-02	657.76	94.640	PBC<MDA	AG110M
661.71	8000.	1.18	1.34	1.443E-02	661.66	85.210	3.615E+02	CS137
702.63	20.	121.05	1.37	1.380E-02	702.63	97.900	PBC<MDA	NB94
723.36	29.	79.78	1.39	1.350E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.309E+00	AG108M
					723.36	20.220	5.884E+00	EU154
724.20	19.	120.36	1.39	1.349E-02	724.20	44.150	PBC<MDA	ZR95
727.14	24.	99.70	1.39	1.345E-02	727.17	7.550	PBC<MDA	BI212
747.16	6.	446.22	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	13.	195.68	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
765.79	18.	118.61	1.42	1.294E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	29.	87.19	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
801.95	19.	140.39	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
834.85	17.	195.96	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
897.83	26.	119.85	1.53	1.148E-02	898.04	93.700	PBC<MDA	y88
911.07	68.	44.11	1.55	1.135E-02	911.07	29.000	1.153E+01	AC228
946.02	35.	85.41	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	38.	72.69	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
968.97	18.	166.56	1.59	1.083E-02	968.97	17.460	PBC<MDA	AC228
1001.22	22.	140.15	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1112.07	8.	344.15	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1120.48	30.	90.31	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	7.	377.82	1.72	9.696E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.178E-01	Sc46
					1121.30	34.900	1.198E+00	Ta182
1173.34	3446.	1.86	1.71	9.358E-03	1173.24	99.900	2.048E+02	CO60
1189.05	12.	147.01	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	11.	117.19	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1332.59	3094.	1.81	1.80	8.480E-03	1332.50	99.980	2.027E+02	CO60
1384.30	7.	111.19	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	1.	563.47	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1460.68	15.	51.94	1.98	7.894E-03	1460.83	10.670	PBC<MDA	K40
1596.21	3.	250.95	2.09	7.364E-03	1596.21	95.400	PBC<MDA	La140
1764.09	5.	107.29	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
197.97	49.54	3052.	62.	2.666E+03	127.24	0.778	-	c
308.23	77.20	616.	182.	4.833E+03	24.11	0.767	-	s
431.10	107.03	319.	22.	5.211E+02	123.92	0.929	-	sc
1739.65	435.18	129.	52.	2.638E+03	36.39	0.794	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.63	46.54	3410.	16003.	8.891	0.94	0.775D
TH-227	200.03	50.14	27204.	-116.	-0.065	200.75	0.778s
AM-241	237.81	59.59	3394.	22064.	12.258	0.85	0.796
TH-234	252.59	63.29	1663.	-57.	-0.032	266.29	0.791s
Sn-126	256.56	64.28	1342.	52.	0.029	100.20	0.792
BA-133	323.36	80.99	1044.	-10.	-0.006	434.99	0.807s
Np-237	345.35	86.49	2882.	51.	0.028	150.75	0.813s
EU-155	345.56	86.54	3018.	-52.	-0.029	148.74	0.813
Sn-126	347.15	86.94	2947.	-30.	-0.017	252.83	0.813s
Sn-126	349.67	87.57	2917.	133.	0.074	29.16	0.814D
Cd-109	351.55	88.04	2792.	53.	0.029	142.88	0.814A
Nd-147	363.79	91.10	2780.	53.	0.029	142.08	0.817s
TH-234	369.74	92.59	2666.	9.	0.005	802.94	0.818s
AC-228	372.78	93.35	2885.	32.	0.018	241.08	0.819
Gd-153	389.37	97.50	1602.	-41.	-0.023	140.06	0.823
Np-239	397.37	99.50	1469.	26.	0.014	212.08	0.825s
Gd-153	412.16	103.20	1669.	47.	0.026	123.70	0.828s
Np-239	414.16	103.70	1716.	28.	0.016	209.06	0.829s
Np-239	423.88	106.13	1614.	32.	0.018	179.37	0.831s
EU-152	486.43	121.78	1227.	-12.	-0.007	402.72	0.846s
CO-57	487.57	122.06	1240.	0.	0.000	1000.00	0.846s
EU-154	491.73	123.10	1126.	21.	0.011	230.67	0.847s
PA-234	524.49	131.29	1829.	-17.	-0.010	351.00	0.855s
HF-181	531.41	133.02	1830.	16.	0.009	376.49	0.856s
CO-57	545.20	136.47	1826.	-49.	-0.027	124.64	0.859s
Tc-99m	561.34	140.51	1668.	33.	0.018	176.79	0.863s
U-235	574.43	143.79	1680.	21.	0.012	276.37	0.866s
CE-141	581.05	145.44	1540.	35.	0.020	158.70	0.868s
U-235	652.78	163.38	1079.	-12.	-0.007	181.43	0.885s
CE-139	662.67	165.85	1110.	-46.	-0.025	104.10	0.887s
Cf-251	705.64	176.60	633.	32.	0.018	142.53	0.897s
TH-229	773.25	193.51	700.	-7.	-0.004	287.70	0.913s
U-235	820.52	205.33	678.	-6.	-0.004	334.44	0.924
TH-229	842.58	210.85	727.	-25.	-0.014	195.51	0.929s
Cf-251	907.16	227.00	637.	11.	0.006	397.30	0.944s
PB-212	953.87	238.68	369.	147.	0.082	23.93	1.201s
PB-214	967.13	242.00	1490.	43.	0.024	126.71	0.958s
EU-152	977.91	244.69	1585.	-46.	-0.026	122.33	0.960
TH-227	1024.08	256.24	537.	5.	0.003	812.19	0.971
Cd-113m	1053.91	263.70	658.	-8.	-0.004	485.25	0.978s
BI-210M	1062.44	265.83	692.	40.	0.022	94.75	0.979
TL-208	1108.23	277.28	810.	-44.	-0.025	49.22	0.990s
Hg-203	1115.89	279.20	724.	40.	0.022	95.95	0.992
I-131	1136.28	284.30	451.	38.	0.021	104.70	0.996s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1179.43	295.09	555.	-32.	-0.018	68.02	1.006s
PB-212	1199.19	300.03	1855.	-45.	-0.025	43.67	1.011s
PA-231	1199.35	300.07	1882.	-44.	-0.024	140.63	1.011s
PA-233	1199.79	300.18	1926.	-44.	-0.024	142.21	1.011s
PA-231	1209.66	302.65	1970.	-44.	-0.024	143.48	1.013s
BA-133	1210.47	302.85	2014.	-32.	-0.018	196.85	1.013s
BI-210M	1218.64	304.90	2054.	8.	0.004	851.99	1.015s
Ir-192	1232.82	308.44	2046.	0.	0.000	1000.00	1.019s
PA-233	1247.10	312.01	2113.	-45.	-0.025	143.72	1.022s
Ir-192	1265.01	316.49	783.	19.	0.010	211.40	1.026s
CR-51	1279.38	320.08	728.	38.	0.021	101.30	1.029s
La-140	1314.07	328.76	492.	12.	0.007	337.45	1.037
Cf-249	1332.79	333.44	488.	-20.	-0.011	211.28	1.041s
AC-228	1352.30	338.32	1049.	40.	0.022	115.64	1.046s
Cs-136	1361.30	340.57	1089.	40.	0.022	117.55	1.048s
EU-152	1376.16	344.29	1100.	-42.	-0.023	112.37	1.051
HF-181	1382.33	345.83	1087.	40.	0.022	116.92	1.053
PB-214	1406.74	351.93	745.	34.	0.019	114.97	1.058s
BA-133	1423.00	356.00	826.	5.	0.003	834.78	1.062s
I-131	1456.93	364.48	493.	-44.	-0.025	88.02	1.070s
BA-133	1534.34	383.84	952.	38.	0.021	115.50	1.087
Cf-249	1550.77	387.95	990.	38.	0.021	117.34	1.091
SN-113	1565.73	391.69	1022.	38.	0.021	119.10	1.094s
SB-125	1710.44	427.88	546.	-48.	-0.027	92.62	1.127s
AG-108M	1734.69	433.94	561.	-46.	-0.026	73.69	1.132s
pm-146	1814.44	453.88	508.	41.	0.023	108.76	1.150s
SB-125	1852.38	463.37	1101.	-50.	-0.028	92.11	1.158s
Ir-192	1871.15	468.06	1102.	24.	0.013	200.88	1.163s
BE-7	1909.29	477.59	826.	-45.	-0.025	92.00	1.171s
HF-181	1926.89	482.00	892.	-17.	-0.010	246.42	1.175s
La-140	1946.98	487.02	364.	12.	0.007	312.62	1.180s
RU-103	1987.11	497.05	348.	-25.	-0.014	182.39	1.188
RH-106	2046.35	511.86	587.	25.	0.014	244.57	2.452s
Nd-147	2122.88	531.00	280.	-13.	-0.007	253.54	1.219s
Ba-140	2147.92	537.26	289.	-29.	-0.016	159.81	1.224s
CS-134	2251.82	563.24	264.	-25.	-0.014	179.67	1.247s
CS-134	2276.15	569.32	164.	54.	0.030	36.19	1.252s
PA-234	2276.75	569.47	246.	-16.	-0.009	143.72	1.253
BI-207	2277.67	569.70	264.	-21.	-0.011	113.27	1.253s
TL-208	2330.95	583.02	252.	35.	0.019	90.68	1.264s
SB-125	2400.86	600.50	1114.	-32.	-0.018	148.20	1.280s
SB-124	2409.78	602.73	1083.	-33.	-0.018	138.49	1.282s
CS-134	2417.70	604.71	1050.	-32.	-0.018	143.51	1.284
BI-214	2436.10	609.31	113.	106.	0.059	17.26	1.288D
RU-103	2440.05	610.30	1018.	-18.	-0.010	254.09	1.288s
AG-108M	2455.98	614.28	978.	22.	0.012	200.90	1.292s
PM-144	2471.11	618.06	920.	32.	0.018	137.27	1.295
RH-106	2486.52	621.92	1023.	-31.	-0.017	149.29	1.299

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2542.41	635.89	234.	-25.	-0.014	88.81	1.311s
I-131	2546.75	636.97	279.	16.	0.009	145.76	1.312s
AG-110M	2629.90	657.76	8337.	31.	0.017	412.24	1.330s
CS-137	2645.69	661.71	199.	8000.	4.444	1.18	1.338
PM-144	2785.03	696.54	238.	-35.	-0.020	91.23	1.363
NB-94	2809.38	702.63	139.	20.	0.011	121.05	1.368s
SB-124	2890.01	722.79	358.	-32.	-0.018	85.54	1.386s
AG-108M	2890.61	722.94	330.	-11.	-0.006	240.30	1.386s
EU-154	2892.29	723.36	252.	29.	0.016	79.78	1.386s
ZR-95	2895.66	724.20	245.	19.	0.010	120.36	1.387s
BI-212	2907.54	727.17	284.	24.	0.014	99.70	1.390s
pm-146	2987.51	747.16	147.	6.	0.003	446.22	1.407s
ZR-95	3025.79	756.73	143.	13.	0.007	195.68	1.415s
AG-110M	3054.64	763.94	220.	-28.	-0.016	77.26	1.421s
NB-95	3062.03	765.79	232.	18.	0.010	118.61	1.423s
PA-234M	3064.52	766.41	292.	-35.	-0.019	71.40	1.423
EU-152	3114.56	778.92	152.	29.	0.016	87.19	1.434s
BI-212	3140.56	785.42	195.	-27.	-0.015	107.31	1.440
CS-134	3182.35	795.87	169.	0.	0.000	1000.00	1.448s
CS-134	3206.69	801.95	160.	19.	0.010	140.39	1.454s
CO-58	3241.99	810.78	373.	-8.	-0.005	329.73	1.461s
La-140	3261.97	815.77	382.	0.	0.000	1000.00	1.465s
Cs-136	3272.90	818.50	480.	-35.	-0.020	89.27	1.467s
MN-54	3338.30	834.85	233.	17.	0.009	195.96	1.481s
Co-56	3385.99	846.77	243.	-5.	-0.003	709.63	1.491s
TL-208	3441.18	860.56	211.	-5.	-0.003	503.35	1.503
NB-94	3483.32	871.10	219.	-3.	-0.002	630.71	1.512
EU-154	3491.85	873.23	361.	-40.	-0.022	68.87	1.514
PA-234	3521.06	880.53	736.	-44.	-0.025	88.08	1.520s
PA-234	3531.90	883.24	768.	-44.	-0.025	89.75	1.522s
AG-110M	3537.67	884.68	812.	-44.	-0.025	92.16	1.523s
Sc-46	3556.06	889.28	920.	-46.	-0.026	94.45	1.527s
y-88	3591.11	898.04	210.	26.	0.014	119.85	1.534s
AC-228	3643.24	911.07	187.	68.	0.038	44.11	1.545s
AG-110M	3748.95	937.49	266.	-14.	-0.008	248.57	1.567s
PA-234	3783.07	946.02	187.	35.	0.019	85.41	1.574
EU-152	3855.45	964.11	360.	38.	0.021	72.69	1.589s
AC-228	3874.90	968.97	446.	18.	0.010	166.56	1.593s
EU-154	3984.36	996.33	477.	-16.	-0.009	196.65	1.616s
PA-234M	4003.04	1001.00	471.	22.	0.012	140.15	1.620s
EU-154	4018.15	1004.77	461.	0.	0.000	1000.00	1.623s
Co-56	4150.45	1037.84	230.	-26.	-0.014	119.24	1.650s
Cs-136	4191.39	1048.07	230.	-22.	-0.012	99.79	1.658s
RH-106	4200.55	1050.36	382.	-42.	-0.024	66.92	1.661s
BI-207	4253.77	1063.66	220.	-23.	-0.013	143.30	1.671
Ga-68	4308.74	1077.40	195.	-11.	-0.006	280.72	1.683s
FE-59	4396.18	1099.25	245.	-42.	-0.023	74.73	1.700s
EU-152	4447.49	1112.07	375.	8.	0.004	344.15	1.711s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.38	1115.55	383.	0.	0.000	1000.00	1.713
BI-214	4480.35	1120.29	346.	30.	0.017	90.31	1.717s
Sc-46	4481.41	1120.55	376.	7.	0.004	377.82	1.717s
Ta-182	4484.41	1121.30	383.	0.	0.000	1000.00	1.718
CO-60	4692.64	1173.34	92.	3446.	1.915	1.86	1.705
Ta-182	4755.52	1189.05	60.	12.	0.007	147.01	1.772s
Ta-182	4885.02	1221.41	65.	-11.	-0.006	165.55	1.798s
Co-56	4952.53	1238.28	33.	11.	0.006	117.19	1.812s
NA-22	5097.60	1274.53	37.	-5.	-0.003	167.71	1.840
EU-154	5097.66	1274.54	43.	0.	0.000	1000.00	1.840
FE-59	5165.90	1291.60	48.	-15.	-0.008	108.12	1.854s
CO-60	5329.97	1332.59	6.	3094.	1.719	1.81	1.804
AG-110M	5536.92	1384.30	11.	7.	0.004	111.19	1.926
EU-152	5631.79	1408.00	11.	1.	0.001	563.47	1.944s
K-40	5843.25	1460.83	14.	15.	0.009	51.94	1.985
La-140	6385.15	1596.21	12.	3.	0.002	250.95	2.087s
SB-124	6764.55	1690.98	12.	-5.	-0.003	152.72	2.157s
BI-214	7058.84	1764.49	12.	5.	0.003	107.29	2.211
Co-56	7086.31	1771.35	39.	-9.	-0.005	101.80	2.216s
y-88	7345.39	1836.06	18.	-3.	-0.002	346.41	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.2910E+01				5.31E+01	
			477.60	-1.291E+01	?(	3.940E+01 9.20E+01 1.05E+01	G
NA-22	C	-3.3772E-01				9.50E+02	
			1274.53	-3.377E-01	?(	1.975E+00 1.68E+02 9.99E+01	G
K-40	N	1.0097E+01				4.66E+11	
			1460.83	1.010E+01	?(P	1.316E+01 5.19E+01 1.07E+01	G
Sc-46	F	-2.2097E+00				8.38E+01	
			889.28	-2.210E+00	?(	6.923E+00 9.45E+01 1.00E+02	G
			1120.55	4.178E-01	+	5.332E+00 3.78E+02 1.00E+02	G
CR-51	F	8.7500E+00				2.77E+01	
			320.08	8.750E+00	&(P	2.945E+01 1.01E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	7.6362E-01					3.12E+02	
			834.85	7.636E-01	&(	3.386E+00	1.96E+02	1.00E+02 G
FE-59	F	-4.1532E+00					4.45E+01	
			1099.25	-4.153E+00	?(P	7.563E+00	7.47E+01	5.65E+01 G
			1291.60	-2.220E+00	&	5.180E+00	1.08E+02	4.32E+01 G
Co-56	C	2.9434E-01					7.73E+01	
			846.77	-2.162E-01	?(	3.489E+00	7.10E+02	9.99E+01 G
			1238.28	1.067E+00	(P	2.747E+00	1.17E+02	6.61E+01 G
			1037.84	-9.956E+00	+ P	2.806E+01	1.19E+02	1.41E+01 G
			1771.35	-4.864E+00	+	1.687E+01	1.02E+02	1.55E+01 A
CO-58	C	-3.7546E-01					7.09E+01	
			810.78	-3.755E-01	(	4.179E+00	3.30E+02	9.95E+01 G
CO-60	F	2.0374E+02					1.93E+03	
			1332.50	2.027E+02	(	9.560E-01	1.81E+00	1.00E+02 G
			1173.24	2.048E+02	(	2.824E+00	1.86E+00	9.99E+01 G
NB-94	I	8.3111E-01					7.41E+06	
			702.63	8.311E-01	?(P	2.369E+00	1.21E+02	9.79E+01 G
			871.10	-1.578E-01	-	3.396E+00	6.31E+02	9.99E+01 G
ZR-95	I	1.3273E+00					6.40E+01	
			756.73	9.857E-01	?(P	4.572E+00	1.96E+02	5.45E+01 G
			724.20	1.749E+00	?(	7.060E+00	1.20E+02	4.42E+01 G
NB-95	I	7.9595E-01					6.40E+01	
			765.79	7.959E-01	?(	3.167E+00	1.19E+02	9.98E+01 G
RU-103	I	-8.5976E-01					3.93E+01	
			497.05	-8.598E-01	&(P	3.079E+00	1.82E+02	9.09E+01 G
			610.30	-1.125E+01	+	9.551E+01	2.54E+02	5.75E+00 GA
RH-106	I	-1.1304E+01					3.74E+02	
			621.92	-1.130E+01	?(	5.620E+01	1.49E+02	9.93E+00 G
			1050.36	-1.483E+02	+	3.278E+02	6.69E+01	1.56E+00 G
			511.86	4.040E+00	+	1.843E+01	2.45E+02	2.00E+01 GA
AG-108M	C	-1.4514E+00					1.53E+05	
			433.94	-1.451E+00	?(	3.539E+00	7.37E+01	9.05E+01 G
			722.94	-4.876E-01	&	3.953E+00	2.40E+02	9.08E+01 G
			614.28	8.981E-01	+	6.022E+00	2.01E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	-2.9181E+00					2.50E+02	
			884.68	-2.918E+00	?(	8.921E+00	9.22E+01	7.27E+01 G
			657.76	1.270E+00	+	1.735E+01	4.12E+02	9.46E+01 G
			937.49	-2.037E+00	+	1.146E+01	2.49E+02	3.44E+01 G
			1384.30	1.979E+00	+ P	5.023E+00	1.11E+02	2.43E+01 G
			763.94	-5.386E+00	+	1.382E+01	7.73E+01	2.23E+01 G
SN-113	F	1.5747E+00					1.15E+02	
			391.69	1.575E+00	?(P	6.234E+00	1.19E+02	6.40E+01 G
SB-124	F	-1.2074E+00					6.02E+01	
			602.73	-1.207E+00	?(P	5.709E+00	1.38E+02	9.83E+01 G
			1690.98	-8.880E-01	+ P	3.156E+00	1.53E+02	4.78E+01 G
			722.79	-1.216E+01	&	3.456E+01	8.55E+01	1.08E+01 G
SB-125	I	-4.5247E+00					1.01E+03	
			427.88	-4.525E+00	?(	1.057E+01	9.26E+01	2.96E+01 G
			600.50	-6.439E+00	+	3.176E+01	1.48E+02	1.79E+01 G
			635.89	-8.265E+00	+	2.446E+01	8.88E+01	1.13E+01 G
			463.37	-1.405E+01	+ P	4.458E+01	9.21E+01	1.05E+01 G
I-131	I	3.2770E-01					8.02E+00	
			364.48	-1.358E+00	?(P	3.247E+00	8.80E+01	8.17E+01 G
			284.30	1.313E+01	&(	3.475E+01	1.05E+02	6.14E+00 G
			636.97	8.581E+00	&(P	4.203E+01	1.46E+02	7.17E+00 G
Gd-153	F	1.4728E-01					2.42E+02	
			97.50	-1.788E+00	?(	8.317E+00	1.40E+02	3.00E+01 G
			103.20	2.810E+00	&(	1.154E+01	1.24E+02	2.18E+01 G
Ga-68	C	-2.1881E+01					4.71E-02	
			1077.40	-2.188E+01	&(	1.348E+02	2.81E+02	3.30E+00 G
Tc-99m	I	5.1197E-01					2.51E-01	
			140.51	5.120E-01	?(	3.010E+00	1.77E+02	8.93E+01 G
BA-133	F	1.9313E-01					3.85E+03	
			356.00	1.931E-01	&(	5.412E+00	8.35E+02	6.20E+01 G
			302.85	-3.873E+00	&	2.534E+01	1.97E+02	1.83E+01 G
			383.84	1.106E+01	?	4.248E+01	1.15E+02	8.94E+00 GA
			80.99	-4.236E-01	+ P	6.438E+00	4.35E+02	3.41E+01 GA
CS-134	I	1.2587E+00					7.54E+02	
			604.71	-1.188E+00	(	5.673E+00	1.44E+02	9.76E+01 G
			795.87	0.000E+00	&	3.270E+00	1.00E+03	8.55E+01 G
			569.32	1.210E+01	&(	1.398E+01	3.62E+01	1.54E+01 G
			801.95	9.547E+00	&(	3.156E+01	1.40E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-1.041E+01	+ P	3.215E+01	1.80E+02	8.35E+00 G
CS-137	I	3.6151E+02					1.10E+04	
			661.66	3.615E+02	(	3.096E+00	1.18E+00	8.52E+01 G
CE-139	F	-8.3113E-01					1.38E+02	
			165.85	-8.311E-01	&(	2.871E+00	1.04E+02	7.99E+01 G
Ba-140	I	-3.8715E+00					1.28E+01	
			537.26	-3.871E+00	?(P	1.109E+01	1.60E+02	2.44E+01 G
			162.66	-5.856E-01	%	3.671E+01	1.87E+03	6.22E+00 G
			304.85	-2.258E-01	% P	1.097E+02	4.50E+03	4.29E+00 G
La-140	I	5.5888E-01					1.28E+01	
			1596.21	2.570E-01	?(P	1.478E+00	2.51E+02	9.54E+01 G
			487.02	8.114E-01	?(	6.194E+00	3.13E+02	4.55E+01 G
			328.76	1.412E+00	(P	1.214E+01	3.37E+02	2.03E+01 G
			815.77	0.000E+00	-	1.813E+01	1.00E+03	2.33E+01 G
CE-141	I	9.9868E-01					3.25E+01	
			145.44	9.987E-01	(	5.270E+00	1.59E+02	4.82E+01 G
CE-144	I	-1.4245E-08					2.85E+02	
			133.54	-1.425E-08	%(	2.404E+01	5.05E+10	1.11E+01 G
PM-144	C	-1.4203E+00					3.63E+02	
			696.54	-1.420E+00	(	3.016E+00	9.12E+01	9.90E+01 G
			618.06	1.164E+00	+	5.323E+00	1.37E+02	9.91E+01 G
EU-152	F	3.9335E+00					4.94E+03	
			344.29	-3.816E+00	&(	1.424E+01	1.12E+02	2.65E+01 G
			1112.07	3.340E+00	&(	3.881E+01	3.44E+02	1.36E+01 G
			121.78	-5.605E-01	+	7.543E+00	4.03E+02	2.86E+01 G
			778.92	9.912E+00	?(	2.020E+01	8.72E+01	1.29E+01 G
			964.11	1.325E+01	(	3.188E+01	7.27E+01	1.46E+01 G
			244.69	-1.156E+01	+	4.696E+01	1.22E+02	7.58E+00 G
			1408.00	4.340E-01	-	5.837E+00	5.63E+02	2.10E+01 GA
EU-154	I	-1.5481E+01					3.14E+03	
			873.23	-1.548E+01	&(	3.524E+01	6.89E+01	1.23E+01 G
			123.10	6.592E-01	+	5.074E+00	2.31E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.961E+00	1.00E+03	3.52E+01 G
			723.36	5.884E+00	+	1.559E+01	7.98E+01	2.02E+01 G
			1004.77	0.000E+00	+	3.008E+01	1.00E+03	1.80E+01 G
			996.33	-7.823E+00	+	5.162E+01	1.97E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-1.6116E-02					1.81E+03	
			105.31	-1.612E-02	&(P	1.209E+01	2.78E+04	2.12E+01 G
			86.54	-2.357E+00	+	1.163E+01	1.49E+02	3.07E+01 G
HF-181	F	4.7255E-01					4.24E+01	
			482.00	-6.532E-01	&(	5.381E+00	2.46E+02	8.05E+01 G
			133.02	4.924E-01	&(	6.178E+00	3.76E+02	4.33E+01 G
			345.83	6.429E+00	(	2.497E+01	1.17E+02	1.51E+01 G
			136.30	-2.718E-08	%	4.588E+01	5.05E+10	5.85E+00 G
Ta-182	F	1.3881E+00					1.14E+02	
			1121.30	0.000E+00	&(	1.543E+01	1.00E+03	3.49E+01 G
			1221.41	-2.387E+00	+ P	9.104E+00	1.66E+02	2.70E+01 G
			1189.05	4.379E+00	?(P	1.439E+01	1.47E+02	1.62E+01 G
Hg-203	F	1.0225E+00					4.66E+01	
			279.20	1.022E+00	&(	3.258E+00	9.60E+01	8.15E+01 G
TL-208	N	1.4483E+00					6.98E+02	
			583.02	1.448E+00	?(	3.183E+00	9.07E+01	8.45E+01 G
			277.28	-1.443E+01	+ P	4.424E+01	4.92E+01	6.31E+00 G
			860.56	-1.856E+00	+ P	2.656E+01	5.03E+02	1.24E+01 G
pm-146	C	1.4483E+00					2.02E+03	
			747.16	6.917E-01	&(P	7.350E+00	4.46E+02	3.40E+01 G
			735.72	-1.773E-01	& P	1.159E+01	2.56E+03	2.25E+01 G
			453.88	1.844E+00	&(	4.846E+00	1.09E+02	6.50E+01 G
y-88	F	1.3431E+00					1.07E+02	
			898.04	1.343E+00	?(	3.628E+00	1.20E+02	9.37E+01 G
			1836.06	-2.548E-01	-	1.910E+00	3.46E+02	9.92E+01 G
Cd-113m		-2.4893E+03					5.33E+03	
			263.70	-2.489E+03	(	4.059E+04	4.85E+02	6.00E-03 K
Cd-109	F	1.8974E+01					4.53E+02	
							Derived Ave Activity	
			88.04	1.897E+01	}(	8.989E+01	1.43E+02	3.79E+00 G
Cf-251	T	2.8217E+00					3.28E+05	
			176.60	2.822E+00	(	1.069E+01	1.43E+02	1.70E+01 G
			227.00	3.231E+00	?	3.430E+01	3.97E+02	6.30E+00 GA
Cf-249	T	1.5155E+00					1.28E+05	
			387.95	1.516E+00	&(	5.911E+00	1.17E+02	6.60E+01 G
			333.44	-2.975E+00	+	1.598E+01	2.11E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		9.2963E+00					3.65E+07	
			87.57	4.852E+00	}	9.306E+00	2.92E+01	3.75E+01 GA
			64.28	9.296E+00	&(	3.088E+01	1.00E+02	9.70E+00 G
			86.94	-4.636E+00	-	3.894E+01	2.53E+02	9.04E+00 GA
PB-210	N	9.9597E+03					8.14E+03	
			46.54	9.960E+03	(P	1.710E+02	9.44E-01	4.25E+00 G
PB-212	N	6.3266E+00					6.98E+02	
			238.63	6.327E+00	(P	3.957E+00	2.39E+01	4.33E+01 G
			300.03	-3.006E+01	- P	1.351E+02	4.37E+01	3.28E+00 GA
PB-214	N	2.2019E+00					5.84E+05	
			351.93	2.202E+00	*(P	8.421E+00	1.15E+02	3.76E+01 G
			295.09	-3.615E+00	+ P	1.256E+01	6.80E+01	1.93E+01 G
			242.00	1.096E+01		4.612E+01	1.27E+02	7.43E+00 GA
BI-207	C	-7.2921E-01					1.18E+04	
			569.70	-7.292E-01	?(	2.766E+00	1.13E+02	9.77E+01 G
			1063.66	-1.700E+00	&	5.308E+00	1.43E+02	7.45E+01 G
BI-212	N	1.3348E+01					6.98E+02	
			727.17	1.335E+01	?(	4.442E+01	9.97E+01	7.55E+00 G
			785.42	-9.230E+01	+	2.317E+02	1.07E+02	1.28E+00 GA
BI-214	N	9.0527E+00					5.84E+05	
			609.31	8.319E+00	(P	4.110E+00	1.73E+01	4.61E+01 G
			1120.29	1.129E+01	?(P	3.391E+01	9.03E+01	1.51E+01 G
			1764.49	2.713E+00	- P	1.014E+01	1.07E+02	1.54E+01 G
BI-210M	T	1.2356E+00					1.10E+09	
			265.83	1.596E+00	?(	5.020E+00	9.47E+01	5.00E+01 G
			304.90	5.926E-01	?(P	1.683E+01	8.52E+02	2.80E+01 G
AC-228	N	1.0464E+01					2.10E+03	
			911.07	1.153E+01	(	1.120E+01	4.41E+01	2.90E+01 G
			968.97	5.318E+00	-	2.969E+01	1.67E+02	1.75E+01 G
			338.32	7.891E+00	*(	3.032E+01	1.16E+02	1.20E+01 G
			93.35	7.595E+00		6.082E+01	2.41E+02	5.56E+00 XA
TH-227	N	-3.4275E+01					7.95E+03	
			50.14	-3.428E+01	&(	2.273E+02	2.01E+02	8.00E+00 G
			256.24	1.418E+00	+ P	3.087E+01	8.12E+02	7.00E+00 G
TH-229	N	-2.7238E+00					2.68E+06	
			193.51	-2.724E+00	&(P	4.615E+01	2.88E+02	4.40E+00 G
			210.85	-1.409E+01	&	7.330E+01	1.96E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-2.6189E+01					1.63E+12	
			63.29	-2.619E+01	*(P	8.881E+01	2.66E+02	3.81E+00 G
			92.59	2.186E+00	+ P	5.842E+01	8.03E+02	5.58E+00 G
PA-231	N	-3.3479E+01					1.20E+07	
			302.65	-3.348E+01	(	1.595E+02	1.43E+02	2.88E+00 G
			300.07	-3.886E+01	+	1.815E+02	1.41E+02	2.46E+00 G
PA-233	C	-2.8288E+00					7.82E+08	
			312.01	-2.829E+00	?(	1.349E+01	1.44E+02	3.60E+01 G
			300.18	-1.543E+01	&	7.284E+01	1.42E+02	6.20E+00 G
PA-234	N	4.8268E+00					1.63E+12	
			131.29	-1.266E+00	&(	1.480E+01	3.51E+02	1.80E+01 G
			946.02	1.301E+01	(	2.494E+01	8.54E+01	1.34E+01 G
			569.47	-6.587E+00	+	3.185E+01	1.44E+02	8.20E+00 G
			883.24	-2.205E+01	+	6.563E+01	8.97E+01	9.60E+00 G
			880.53	-3.514E+01	+	1.026E+02	8.81E+01	6.00E+00 GA
PA-234M	N	1.3909E+02					1.63E+12	
			1001.00	1.391E+02	?(P	6.518E+02	1.40E+02	8.37E-01 G
			766.41	-5.059E+02	+ P	1.204E+03	7.14E+01	2.94E-01 G
U-235	N	2.6150E+00					2.57E+11	
			143.79	2.615E+00	?(P	2.407E+01	2.76E+02	1.10E+01 G
			205.33	-2.152E+00	+ P	4.154E+01	3.34E+02	5.01E+00 G
			163.38	-3.387E+00	+ P	4.480E+01	1.81E+02	5.08E+00 G
AM-241	T	1.1547E+03					1.58E+05	
			59.54	1.155E+03	(	1.435E+01	8.49E-01	3.59E+01 G
Np-237	F	5.3289E+00					2.14E+06	
			86.49	5.329E+00	?(	2.664E+01	1.51E+02	1.31E+01 G
Ir-192	F	8.1304E-01					7.40E+01	
			316.49	4.894E-01	(	3.459E+00	2.11E+02	8.70E+01 G
			468.06	1.357E+00	?(	9.094E+00	2.01E+02	5.18E+01 G
			308.44	0.000E+00	-	1.494E+01	1.00E+03	3.18E+01 G
Cs-136	F	-4.3667E-01					1.30E+01	
			818.50	-1.596E+00	?(	4.732E+00	8.93E+01	1.00E+02 G
			1048.07	-1.497E+00	+	4.994E+00	9.98E+01	8.00E+01 G
			340.57	2.034E+00	?(	7.946E+00	1.18E+02	4.69E+01 G
Np-239	T	1.8199E+00					2.36E+00	
			103.70	1.526E+00	?	1.062E+01	2.09E+02	2.40E+01 X
			106.13	1.820E+00	?(	1.086E+01	1.79E+02	2.27E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                            99.50 2.246E+00     1.586E+01 2.12E+02 1.50E+01 X

Nd-147       6.9107E-01                                        1.11E+01
                           531.00-3.276E+00 ?(  2.033E+01 2.54E+02 1.30E+01 G
                            91.10 2.513E+00 ?(  1.184E+01 1.42E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	63.29	1663.	-57.	-0.032	266.29	-2.619E+01	P
BA-133	80.99	1044.	-10.	-0.006	434.99	-4.236E-01	P
Np-237	86.49	2882.	51.	0.028	150.75	5.329E+00	
EU-155	86.54	3018.	-52.	-0.029	148.74	-2.357E+00	
Nd-147	91.10	2780.	53.	0.029	142.08	2.513E+00	
TH-234	92.59	2666.	9.	0.005	802.94	2.186E+00	P
AC-228	93.35	2885.	32.	0.018	241.08	7.595E+00	
Gd-153	97.50	1602.	-41.	-0.023	140.06	-1.788E+00	
Np-239	99.50	1469.	26.	0.014	212.08	2.246E+00	
Gd-153	103.20	1669.	47.	0.026	123.70	2.810E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	103.70	1716.	28.	0.016	209.06	1.526E+00	
Np-239	106.13	1614.	32.	0.018	179.37	1.820E+00	
EU-152	121.78	1227.	-12.	-0.007	402.72	-5.605E-01	
EU-154	123.10	1126.	21.	0.011	230.67	6.592E-01	
CO-57	136.47	1826.	-49.	-0.027	124.64	-6.098E+00	
Tc-99m	140.51	1668.	33.	0.018	176.79	5.120E-01	
CE-141	145.44	1540.	35.	0.020	158.70	9.987E-01	
CE-139	165.85	1110.	-46.	-0.025	104.10	-8.311E-01	
Cf-251	176.60	633.	32.	0.018	142.53	2.822E+00	
TH-229	193.51	700.	-7.	-0.004	287.70	-2.724E+00	P
TH-229	210.85	727.	-25.	-0.014	195.51	-1.409E+01	
Cf-251	227.00	637.	11.	0.006	397.30	3.231E+00	
PB-214	242.00	1490.	43.	0.024	126.71	1.096E+01	
EU-152	244.69	1585.	-46.	-0.026	122.33	-1.156E+01	
Cd-113m	263.70	658.	-8.	-0.004	485.25	-2.489E+03	
Hg-203	279.20	724.	40.	0.022	95.95	1.022E+00	
I-131	284.30	451.	38.	0.021	104.70	1.313E+01	
PB-214	295.09	555.	-32.	-0.018	68.02	-3.615E+00	P
PA-231	300.07	1882.	-44.	-0.024	140.63	-3.886E+01	
PA-233	300.18	1926.	-44.	-0.024	142.21	-1.543E+01	
PA-231	302.65	1970.	-44.	-0.024	143.48	-3.348E+01	
BA-133	302.85	2014.	-32.	-0.018	196.85	-3.873E+00	
PA-233	312.01	2113.	-45.	-0.025	143.72	-2.829E+00	
Ir-192	316.49	783.	19.	0.010	211.40	4.894E-01	
CR-51	320.08	728.	38.	0.021	101.30	8.750E+00	P
La-140	328.76	492.	12.	0.007	337.45	1.412E+00	P
Cf-249	333.44	488.	-20.	-0.011	211.28	-2.975E+00	
AC-228	338.32	1049.	40.	0.022	115.64	7.891E+00	
Cs-136	340.57	1089.	40.	0.022	117.55	2.034E+00	
EU-152	344.29	1100.	-42.	-0.023	112.37	-3.816E+00	
PB-214	351.93	745.	34.	0.019	114.97	2.202E+00	P
BA-133	356.00	826.	5.	0.003	834.78	1.931E-01	
I-131	364.48	493.	-44.	-0.025	88.02	-1.358E+00	P
BA-133	383.84	952.	38.	0.021	115.50	1.106E+01	
Cf-249	387.95	990.	38.	0.021	117.34	1.516E+00	
SN-113	391.69	1022.	38.	0.021	119.10	1.575E+00	P
SB-125	427.88	546.	-48.	-0.027	92.62	-4.525E+00	
pm-146	453.88	508.	41.	0.023	108.76	1.844E+00	
SB-125	463.37	1101.	-50.	-0.028	92.11	-1.405E+01	P
Ir-192	468.06	1102.	24.	0.013	200.88	1.357E+00	
BE-7	477.59	826.	-45.	-0.025	92.00	-1.291E+01	
La-140	487.02	364.	12.	0.007	312.62	8.114E-01	
RU-103	497.05	348.	-25.	-0.014	182.39	-8.598E-01	P
Nd-147	531.00	280.	-13.	-0.007	253.54	-3.276E+00	
Ba-140	537.26	289.	-29.	-0.016	159.81	-3.871E+00	P
CS-134	563.24	264.	-25.	-0.014	179.67	-1.041E+01	P
CS-134	569.32	164.	54.	0.030	36.19	1.210E+01	
BI-207	569.70	264.	-21.	-0.011	113.27	-7.292E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	600.50	1114.	-32.	-0.018	148.20	-6.439E+00	
SB-124	602.73	1083.	-33.	-0.018	138.49	-1.207E+00	P
CS-134	604.71	1050.	-32.	-0.018	143.51	-1.188E+00	
RU-103	610.30	1018.	-18.	-0.010	254.09	-1.125E+01	
PM-144	618.06	920.	32.	0.018	137.27	1.164E+00	
SB-125	635.89	234.	-25.	-0.014	88.81	-8.265E+00	
I-131	636.97	279.	16.	0.009	145.76	8.581E+00	P
AG-110M	657.76	8337.	31.	0.017	412.24	1.270E+00	
PM-144	696.54	238.	-35.	-0.020	91.23	-1.420E+00	
NB-94	702.63	139.	20.	0.011	121.05	8.311E-01	P
SB-124	722.79	358.	-32.	-0.018	85.54	-1.216E+01	
EU-154	723.36	252.	29.	0.016	79.78	5.884E+00	
ZR-95	724.20	245.	19.	0.010	120.36	1.749E+00	
pm-146	747.16	147.	6.	0.003	446.22	6.917E-01	P
ZR-95	756.73	143.	13.	0.007	195.68	9.857E-01	P
AG-110M	763.94	220.	-28.	-0.016	77.26	-5.386E+00	
NB-95	765.79	232.	18.	0.010	118.61	7.959E-01	
EU-152	778.92	152.	29.	0.016	87.19	9.912E+00	
CS-134	801.95	160.	19.	0.010	140.39	9.547E+00	
CO-58	810.78	373.	-8.	-0.005	329.73	-3.755E-01	
Cs-136	818.50	480.	-35.	-0.020	89.27	-1.596E+00	
MN-54	834.85	233.	17.	0.009	195.96	7.636E-01	
Co-56	846.77	243.	-5.	-0.003	709.63	-2.162E-01	
NB-94	871.10	219.	-3.	-0.002	630.71	-1.578E-01	
EU-154	873.23	361.	-40.	-0.022	68.87	-1.548E+01	
AG-110M	884.68	812.	-44.	-0.025	92.16	-2.918E+00	
Sc-46	889.28	920.	-46.	-0.026	94.45	-2.210E+00	
AC-228	911.07	187.	68.	0.038	44.11	1.153E+01	
AG-110M	937.49	266.	-14.	-0.008	248.57	-2.037E+00	
EU-152	964.11	360.	38.	0.021	72.69	1.325E+01	
AC-228	968.97	446.	18.	0.010	166.56	5.318E+00	
EU-154	996.33	477.	-16.	-0.009	196.65	-7.823E+00	
Co-56	1037.84	230.	-26.	-0.014	119.24	-9.956E+00	P
Cs-136	1048.07	230.	-22.	-0.012	99.79	-1.497E+00	
BI-207	1063.66	220.	-23.	-0.013	143.30	-1.700E+00	
Ga-68	1077.40	195.	-11.	-0.006	280.72	-2.188E+01	
FE-59	1099.25	245.	-42.	-0.023	74.73	-4.153E+00	P
EU-152	1112.07	375.	8.	0.004	344.15	3.340E+00	
Sc-46	1120.55	376.	7.	0.004	377.82	4.178E-01	
Ta-182	1189.05	60.	12.	0.007	147.01	4.379E+00	P
Ta-182	1221.41	65.	-11.	-0.006	165.55	-2.387E+00	P
Co-56	1238.28	33.	11.	0.006	117.19	1.067E+00	P
NA-22	1274.53	37.	-5.	-0.003	167.71	-3.377E-01	
FE-59	1291.60	48.	-15.	-0.008	108.12	-2.220E+00	
AG-110M	1384.30	11.	7.	0.004	111.19	1.979E+00	P
EU-152	1408.00	11.	1.	0.001	563.47	4.340E-01	
La-140	1596.21	12.	3.	0.002	250.95	2.570E-01	P
SB-124	1690.98	12.	-5.	-0.003	152.72	-8.880E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	1771.35	39.	-9.	-0.005	101.80	-4.864E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.2910E+01	-1.2910E+01	9.200E+01%	3.94E+01
NA-22	#A	-3.3772E-01	-3.3772E-01	1.677E+02%	1.97E+00
K-40	#A	1.0097E+01	1.0097E+01	5.194E+01%	1.32E+01
Sc-46	#A	-2.2097E+00	-2.2097E+00	9.445E+01%	6.92E+00
CR-51	#A	8.7497E+00	8.7500E+00	1.013E+02%	2.95E+01
MN-54	#A	7.6362E-01	7.6362E-01	1.960E+02%	3.39E+00
FE-59	#A	-4.1531E+00	-4.1532E+00	7.473E+01%	7.56E+00
Co-56	#A	2.9434E-01	2.9434E-01	1.172E+02%	3.49E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.53E+00
CO-58	#A	-3.7545E-01	-3.7546E-01	3.297E+02%	4.18E+00
CO-60		2.0374E+02	2.0374E+02	1.298E+00%	9.56E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.06E+01
NB-94	#A	8.3111E-01	8.3111E-01	1.211E+02%	2.37E+00
ZR-95	#A	1.3273E+00	1.3273E+00	1.149E+02%	4.57E+00
NB-95	#A	7.9594E-01	7.9595E-01	1.186E+02%	3.17E+00
RU-103	#A	-8.5975E-01	-8.5976E-01	1.824E+02%	3.08E+00
RH-106	#A	-1.1304E+01	-1.1304E+01	1.493E+02%	5.62E+01
AG-108M	#A	-1.4514E+00	-1.4514E+00	7.369E+01%	3.54E+00
AG-110M	#A	-2.9181E+00	-2.9181E+00	9.216E+01%	8.92E+00
SN-113	#A	1.5747E+00	1.5747E+00	1.191E+02%	6.23E+00
SB-124	#A	-1.2073E+00	-1.2074E+00	1.385E+02%	5.71E+00
SB-125	#A	-4.5247E+00	-4.5247E+00	9.262E+01%	1.06E+01
I-131	#A	3.2768E-01	3.2770E-01	6.663E+01%	3.25E+00
Gd-153	#A	1.4728E-01	1.4728E-01	9.343E+01%	8.32E+00
Ga-68	#A	-2.1585E+01	-2.1881E+01	2.807E+02%	1.35E+02
Tc-99m	#A	5.1066E-01	5.1197E-01	1.768E+02%	3.01E+00
BA-133	#A	1.9313E-01	1.9313E-01	8.348E+02%	5.41E+00
CS-134	#A	1.2587E+00	1.2587E+00	3.619E+01%	5.67E+00
CS-137		3.6151E+02	3.6151E+02	1.183E+00%	3.10E+00
CE-139	#A	-8.3113E-01	-8.3113E-01	1.041E+02%	2.87E+00
Ba-140	#A	-3.8713E+00	-3.8715E+00	1.598E+02%	1.11E+01
La-140	#A	5.5885E-01	5.5888E-01	1.747E+02%	1.48E+00
CE-141	#A	9.9866E-01	9.9868E-01	1.587E+02%	5.27E+00
CE-144	#A	-1.4245E-08	-1.4245E-08	5.053E+10%	2.40E+01
PM-144	#A	-1.4203E+00	-1.4203E+00	9.123E+01%	3.02E+00
EU-152	#A	3.9335E+00	3.9335E+00	7.269E+01%	1.42E+01
EU-154	#A	-1.5481E+01	-1.5481E+01	6.887E+01%	3.52E+01
EU-155	#A	-1.6116E-02	-1.6116E-02	2.779E+04%	1.21E+01
HF-181	A	4.7254E-01	4.7255E-01	1.169E+02%	5.38E+00

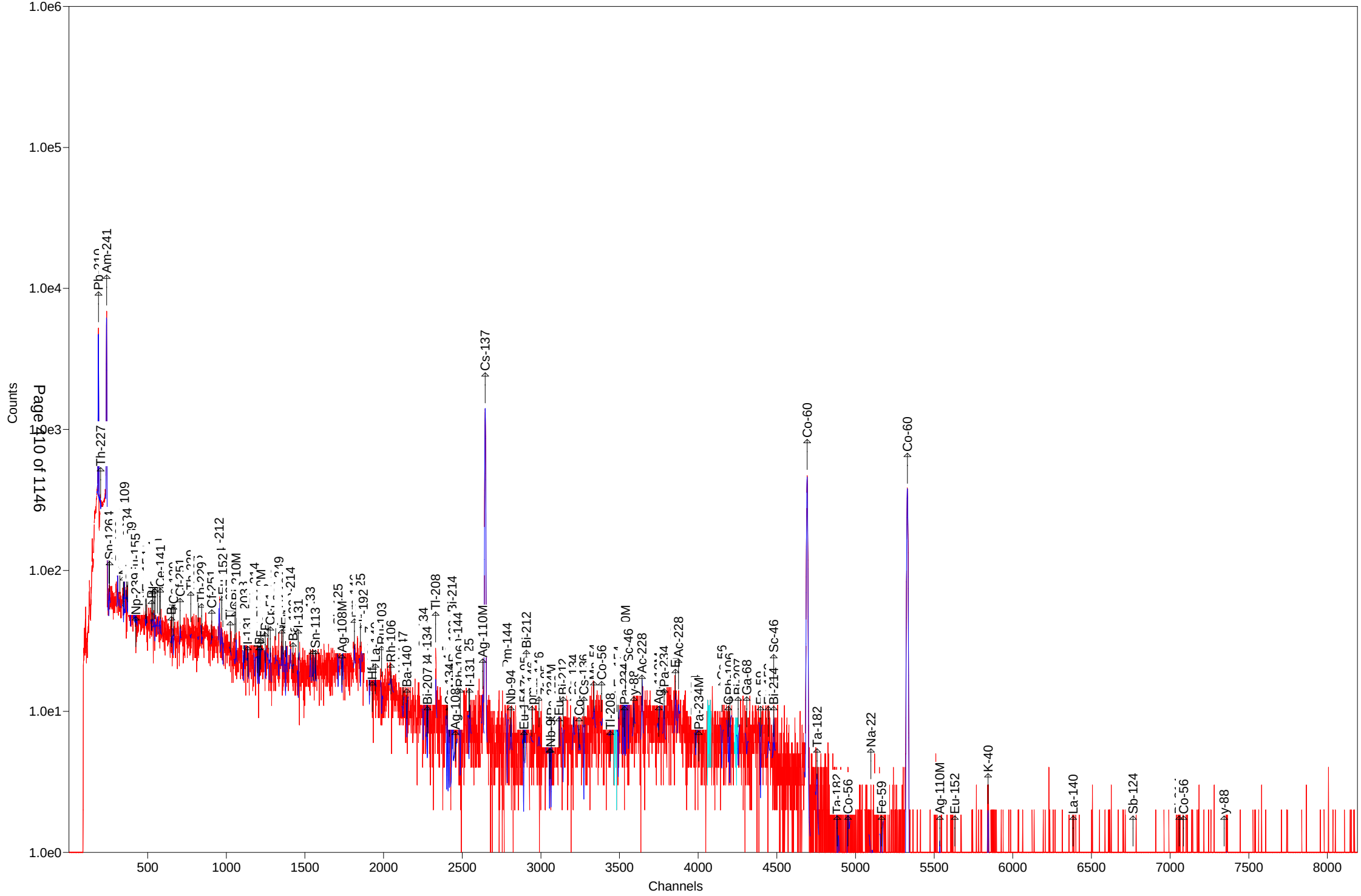
Ta-182 #A	1.3881E+00	1.3881E+00	1.470E+02%	1.54E+01
Hg-203 #A	1.0225E+00	1.0225E+00	9.595E+01%	3.26E+00
TL-208 #A	1.4483E+00	1.4483E+00	9.068E+01%	3.18E+00
pm-146 #A	1.4483E+00	1.4483E+00	1.088E+02%	7.35E+00
y-88 #A	1.3430E+00	1.3431E+00	1.198E+02%	3.63E+00
Cd-113m#A	-2.4893E+03	-2.4893E+03	4.852E+02%	4.06E+04
Cd-109 A	1.8974E+01	1.8974E+01	1.429E+02%	8.99E+01
Cf-251 #A	2.8217E+00	2.8217E+00	1.425E+02%	1.07E+01
Cf-249 #A	1.5155E+00	1.5155E+00	1.173E+02%	5.91E+00
Sn-126 #A	9.2963E+00	9.2963E+00	1.002E+02%	3.09E+01
PB-210	9.9597E+03	9.9597E+03	9.441E-01%	1.71E+02
PB-212	6.3266E+00	6.3266E+00	2.393E+01%	3.96E+00
PB-214 #A	2.2019E+00	2.2019E+00	1.150E+02%	8.42E+00
BI-207 #A	-7.2921E-01	-7.2921E-01	1.133E+02%	2.77E+00
BI-212 #A	1.3348E+01	1.3348E+01	9.970E+01%	4.44E+01
BI-214	9.0527E+00	9.0527E+00	1.726E+01%	4.11E+00
BI-210M#A	1.2356E+00	1.2356E+00	9.475E+01%	5.02E+00
AC-228 #A	1.0464E+01	1.0464E+01	4.411E+01%	1.12E+01
TH-227 #A	-3.4275E+01	-3.4275E+01	2.007E+02%	2.27E+02
TH-229 #A	-2.7238E+00	-2.7238E+00	2.877E+02%	4.62E+01
TH-234 #A	-2.6189E+01	-2.6189E+01	2.663E+02%	8.88E+01
PA-231 #A	-3.3479E+01	-3.3479E+01	1.435E+02%	1.59E+02
PA-233 #A	-2.8288E+00	-2.8288E+00	1.437E+02%	1.35E+01
PA-234 A	4.8268E+00	4.8268E+00	8.541E+01%	1.48E+01
PA-234M#A	1.3909E+02	1.3909E+02	1.402E+02%	6.52E+02
U-235 #A	2.6150E+00	2.6150E+00	2.764E+02%	2.41E+01
AM-241	1.1547E+03	1.1547E+03	8.488E-01%	1.44E+01
Np-237 #A	5.3289E+00	5.3289E+00	1.507E+02%	2.66E+01
Ir-192 #A	8.1303E-01	8.1304E-01	1.458E+02%	3.46E+00
Cs-136 #A	-4.3665E-01	-4.3667E-01	7.380E+01%	4.73E+00
Np-239 #A	1.8194E+00	1.8199E+00	1.794E+02%	1.09E+01
Nd-147 #A	6.9103E-01	6.9107E-01	1.421E+02%	2.03E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.171E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 1.1705076E+04 Bq/Sample

264535_Gamma_LCS 160-264535~2-A. 17_Gamma_20161129.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161403

Sample Description: 264535_Gamma_160-18554-A-1-B
Detector: Detector # 8
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-1-B

Decay to Time: 9/1/2016 11:53 Live Time: 1800 sec
Acquisition Time: 9/1/2016 11:54:13 Real Time: 1847 sec
Analysis Time: 9/1/2016 12:25 Dead Time: 2.54 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev11.lib
Bkgd Correction File: 8_2016-08-08_1838.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.678E+00	109.3	5.112E+00	5.117E+00	1.724E+01
NA-22	-1.068E-01	497.5	5.314E-01	5.314E-01	1.941E+00
K-40	2.960E+02	5.4	1.598E+01	2.201E+01	9.713E+00
Sc-46	-4.163E-01	155.7	6.482E-01	6.485E-01	2.232E+00
CR-51	5.294E+00	159.6	8.448E+00	8.453E+00	2.826E+01
MN-54	-1.098E+00	87.0	9.549E-01	9.566E-01	2.177E+00
FE-59	7.309E-01	88.8	6.487E-01	6.497E-01	3.524E+00
Co-56	9.737E-01	63.8	6.216E-01	6.236E-01	1.149E+00
CO-57	-4.080E-01	81.3	3.319E-01	3.326E-01	1.104E+00
CO-58	2.555E-01	195.6	4.998E-01	5.000E-01	1.748E+00
CO-60	-8.633E-01	73.6	6.358E-01	6.372E-01	1.932E+00
ZN-65	-2.691E-07	646385631.8	1.739E+00	1.739E+00	6.114E+00
NB-94	3.510E-01	72.8	2.556E-01	2.563E-01	1.624E+00
ZR-95	9.970E-01	92.0	9.177E-01	9.191E-01	2.156E+00
NB-95	-9.555E-01	69.7	6.662E-01	6.680E-01	2.210E+00
RU-103	1.223E-01	316.7	3.874E-01	3.875E-01	9.803E-01
RH-106	-4.366E+00	241.2	1.053E+01	1.053E+01	3.559E+01
AG-108M	-1.318E-01	331.9	4.375E-01	4.375E-01	1.084E+00
AG-110M	7.654E-01	88.5	6.776E-01	6.787E-01	2.330E+00
SN-113	1.560E-02	5518.0	8.608E-01	8.608E-01	2.962E+00
SB-124	-6.036E-01	176.4	1.065E+00	1.065E+00	3.585E+00
SB-125	6.331E+00	22.2	1.407E+00	1.444E+00	3.158E+00
I-131	-1.147E-01	580.2	6.655E-01	6.656E-01	1.260E+00
Gd-153	0.000E+00	1.#INF	4.989E-01	4.990E-01	8.479E+00
Ga-68	9.913E+00	305.2	3.025E+01	3.025E+01	6.997E+01
Tc-99m	-4.950E-01	143.2	7.088E-01	7.094E-01	2.361E+00
BA-133	-8.505E-01	101.0	8.587E-01	8.598E-01	3.815E+00
CS-134	2.364E-01	84.0	1.987E-01	1.990E-01	3.534E+00
CS-137	-1.023E+00	81.8	8.371E-01	8.388E-01	2.595E+00
CE-139	-5.201E-01	92.5	4.811E-01	4.836E-01	1.603E+00
Ba-140	1.549E+00	111.6	1.729E+00	1.731E+00	4.217E+00
La-140	-1.412E+00	85.1	1.201E+00	1.203E+00	2.541E+00
CE-141	-9.355E-01	147.4	1.379E+00	1.380E+00	4.592E+00

CE-144	-3.640E+00	145.5	5.297E+00	5.300E+00	1.765E+01
PM-144	4.181E-01	125.3	5.238E-01	5.242E-01	1.423E+00
EU-152	1.647E+00	91.4	1.506E+00	1.508E+00	9.308E+00
EU-154	-4.012E+00	100.9	4.049E+00	4.055E+00	1.383E+01
EU-155	2.008E+00	161.8	3.250E+00	3.251E+00	1.081E+01
HF-181	0.000E+00	1.#INF	3.681E-01	3.681E-01	2.402E+00
Ta-182	-1.252E+00	179.9	2.253E+00	2.254E+00	7.791E+00
Hg-203	4.496E-01	106.1	4.768E-01	4.775E-01	1.603E+00
TL-208	7.916E+00	8.8	7.002E-01	8.118E-01	9.678E-01
pm-146	5.015E-01	97.6	4.895E-01	4.902E-01	4.388E+00
y-88	2.197E-01	146.4	3.216E-01	3.218E-01	1.073E+00
Cd-113m	-2.310E+03	339.7	7.849E+03	7.850E+03	2.667E+04
Cd-109	0.000E+00	1.#INF	2.105E+01	2.105E+01	6.999E+01
Cf-251	1.790E+00	106.1	1.898E+00	1.905E+00	4.872E+00
Cf-249	-9.310E-02	835.8	7.781E-01	7.781E-01	2.677E+00
Sn-126	-5.987E+00	112.9	6.762E+00	6.769E+00	2.251E+01
PB-210	-1.878E+01	66.1	1.241E+01	1.246E+01	6.312E+01
PB-212	2.395E+01	5.1	1.211E+00	1.966E+00	2.060E+00
PB-214	1.353E+01	7.8	1.056E+00	1.269E+00	2.434E+00
BI-207	6.922E-01	37.7	2.612E-01	2.637E-01	1.848E+00
BI-212	1.029E+01	96.4	9.917E+00	9.932E+00	3.331E+01
BI-214	1.527E+01	9.4	1.434E+00	1.639E+00	1.732E+00
BI-210M	-7.209E-01	158.5	1.142E+00	1.143E+00	3.228E+00
AC-228	2.591E+01	8.0	2.065E+00	2.452E+00	4.733E+00
TH-227	7.719E+00	104.3	8.052E+00	8.063E+00	2.688E+01
TH-229	5.298E+00	110.8	5.870E+00	5.885E+00	2.082E+01
TH-234	1.589E+01	32.6	5.178E+00	5.244E+00	3.229E+01
PA-231	-1.811E+01	172.4	3.122E+01	3.124E+01	1.044E+02
PA-233	-1.498E+00	47.9	7.178E-01	7.223E-01	7.854E+00
PA-234	5.912E-01	86.8	5.131E-01	5.140E-01	1.054E+01
PA-234M	4.262E+00	65.7	2.799E+00	2.807E+00	3.228E+02
U-235	-2.654E+00	65.9	1.748E+00	1.754E+00	1.929E+01
AM-241	7.494E-01	241.5	1.810E+00	1.810E+00	6.069E+00
Np-237	-3.826E+00	174.7	6.686E+00	6.690E+00	2.222E+01
Ir-192	-5.016E-01	195.2	9.793E-01	9.797E-01	3.281E+00
Cs-136	4.849E-01	99.4	4.822E-01	4.830E-01	1.644E+00
Np-239	-2.052E+00	160.7	3.298E+00	3.300E+00	1.097E+01
Nd-147	1.671E+00	202.8	3.388E+00	3.390E+00	8.367E+00
Total	4.694E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-1-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161403.An1

Acquisition information
Start time: 9/1/2016 11:54:13 AM
Live time: 1800
Real time: 1847
Dead time: 2.54 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 11:53:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-08-08_1838.PBC 8/8/2016 6:38:16 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0952

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	25.	104.31	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
59.74	40.	51.48	0.38	2.893E-02	59.54	35.900	PBC<MDA	AM241
63.20	42.	49.99	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
74.77	247.	10.52	1.03	3.615E-02				
77.16	293.	8.47	1.04	3.700E-02				
87.04	134.	17.30	1.09	3.971E-02	86.49	13.100	1.437E+01	Np237
					86.54	30.700	6.130E+00	EU155
					86.94	9.040	2.077E+01	Sn126
					87.57	37.500	4.991E+00	Sn126
					88.04	3.790	4.927E+01	Cd109
92.81	151.	16.15	1.18	4.075E-02	92.59	5.584	2.408E+01	TH234
					93.35	5.561	3.695E+01	AC228
105.31	32.	161.85	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
121.78	24.	91.43	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.731E-01	CO57
123.10	10.	203.24	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
163.29	-1.	955.47	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
178.22	19.	106.07	1.11	3.460E-02	176.60	17.000	PBC<MDA	Cf251
210.85	24.	110.80	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
226.79	11.	163.37	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.64	452.	5.88	0.91	2.744E-02	238.63	43.300	2.114E+01	PB212
242.00	80.	17.72	1.16	2.714E-02	242.00	7.430	2.200E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
269.81	64.	22.66	0.78	2.493E-02				
276.96	37.	36.48	1.77	2.440E-02	277.28	6.310	1.318E+01	TL208
279.20	16.	106.07	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203
295.37	117.	13.08	0.93	2.322E-02	295.09	19.300	1.449E+01	PB214
300.23	42.	24.77	1.20	2.294E-02	300.03	3.280	3.077E+01	PB212
					300.07	2.460	4.103E+01	PA231
					300.18	6.200	PBC<MDA	PA233
320.08	21.	159.58	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
338.34	105.	17.51	1.01	2.085E-02	338.32	12.010	2.322E+01	AC228
344.29	8.	360.37	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.84	177.	10.85	0.98	2.021E-02	351.93	37.600	1.294E+01	PB214
427.88	13.	91.25	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
453.88	11.	97.61	1.32	1.647E-02	453.88	65.000	PBC<MDA	pm146
463.37	62.	22.23	1.32	1.620E-02	463.37	10.470	2.031E+01	SB125
477.60	14.	109.26	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
487.02	11.	113.50	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	316.74	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	65.	30.88	2.61	1.494E-02	511.86	20.000	1.204E+01	RH106
531.00	6.	202.79	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
537.26	10.	111.59	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
563.24	7.	185.99	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
583.17	162.	8.85	1.35	1.342E-02	583.02	84.500	7.916E+00	TL208
609.21	160.	9.39	1.22	1.294E-02	609.31	46.090	1.493E+01	BI214
618.06	10.	200.20	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
657.76	5.	254.75	1.45	1.215E-02	657.76	94.640	PBC<MDA	AG110M
696.54	8.	150.65	1.48	1.158E-02	696.54	99.000	PBC<MDA	PM144
702.63	5.	278.57	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
726.89	16.	96.36	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
747.16	2.	523.72	1.51	1.093E-02	747.16	34.000	PBC<MDA	pm146
756.73	11.	92.04	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	2.	349.29	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
766.41	14.	87.01	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.87	11.	84.02	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
810.78	5.	195.62	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
818.50	9.	99.45	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
846.77	9.	92.74	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.41	40.	16.11	0.62	9.705E-03	860.56	12.420	1.822E+01	TL208
871.10	8.	72.84	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
883.24	10.	99.61	1.60	9.493E-03	883.24	9.600	PBC<MDA	PA234
884.68	10.	88.52	1.60	9.480E-03	884.68	72.680	PBC<MDA	AG110M
898.04	5.	146.39	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.30	126.	10.51	1.29	9.245E-03	911.07	29.000	2.610E+01	AC228
964.11	10.	152.41	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.02	83.	10.98	1.57	8.776E-03	968.97	17.460	3.009E+01	AC228
1063.66	17.	37.74	1.71	8.106E-03	1063.66	74.500	1.564E+00	BI207
1077.40	4.	305.16	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1120.30	34.	20.61	1.74	7.754E-03	1120.29	15.100	1.629E+01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					1120.55	99.987	PBC<MDA	Sc46
1238.28	14.	87.75	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	9.	88.75	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	3.	216.40	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	16.	25.18	1.90	6.366E-03	1408.00	21.005	6.623E+00	EU152
1460.82	350.	5.40	1.78	6.165E-03	1460.83	10.670	2.960E+02	K40
1764.62	38.	16.22	2.07	5.226E-03	1764.49	15.400	2.623E+01	BI214
1836.06	1.	427.57	2.10	5.046E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.88	74.74	213.	247.	6.822E+03	10.52	1.034	-	sD
308.46	77.14	161.	293.	7.911E+03	8.47	1.036	-	sD
1079.09	269.81	33.	64.	2.553E+03	22.66	0.781	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	408.	-29.	-0.016	66.11	1.012s
TH-227	200.37	50.14	333.	25.	0.014	104.31	1.015s
AM-241	237.95	59.54	560.	14.	0.008	241.49	1.022s
TH-234	252.96	63.29	199.	42.	0.023	49.99	1.025D
Sn-126	256.93	64.28	673.	-33.	-0.018	112.95	1.026s
BA-133	323.77	80.99	1406.	-37.	-0.020	144.88	1.039
Np-237	345.77	86.49	1931.	-36.	-0.020	174.75	1.043
EU-155	345.98	86.54	1694.	-34.	-0.019	170.97	1.043
Sn-126	347.57	86.94	1660.	-34.	-0.019	169.19	1.044
Sn-126	350.09	87.57	1531.	-34.	-0.019	162.50	1.044s
Cd-109	351.97	88.04	1626.	0.	0.000	167.33	1.044A
Nd-147	364.21	91.10	1529.	-34.	-0.019	161.96	1.047s
TH-234	370.17	92.59	226.	54.	0.030	41.84	1.048D
AC-228	373.21	93.35	1614.	12.	0.006	492.26	1.049s
Gd-153	389.81	97.50	1602.	0.	0.000	1000.00	1.052s
Np-239	397.81	99.50	1602.	0.	0.000	1000.00	1.053s
Gd-153	412.62	103.20	1602.	0.	0.000	1000.00	1.056s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	414.62	103.70	1602.	0.	0.000	1000.00	1.057s
EU-155	421.07	105.31	1330.	32.	0.018	161.85	1.058s
Np-239	424.34	106.13	1574.	-35.	-0.020	160.70	1.058s
EU-152	486.92	121.78	226.	24.	0.013	91.43	1.071s
CO-57	488.06	122.06	212.	-26.	-0.014	81.35	1.071s
EU-154	492.22	123.10	209.	10.	0.006	203.24	1.072s
PA-234	525.00	131.29	851.	-29.	-0.016	142.15	1.078s
HF-181	531.92	133.02	866.	-29.	-0.016	143.22	1.079s
CE-144	533.98	133.54	895.	-29.	-0.016	145.53	1.080s
HF-181	545.02	136.30	925.	-18.	-0.010	240.83	1.082s
CO-57	545.72	136.47	943.	0.	0.000	1000.00	1.082s
Tc-99m	561.86	140.51	933.	-30.	-0.017	143.19	1.085
U-235	574.97	143.79	977.	-20.	-0.011	65.88	1.087
CE-141	581.59	145.44	1059.	-31.	-0.017	147.42	1.089s
Ba-140	650.47	162.66	300.	-10.	-0.006	246.98	1.102s
U-235	653.35	163.38	311.	-1.	-0.001	955.47	1.102s
CE-139	663.24	165.85	302.	-27.	-0.015	92.49	1.104
Cf-251	706.23	176.60	110.	19.	0.011	106.07	1.112
TH-229	773.87	193.51	117.	-3.	-0.002	610.41	1.125s
U-235	821.17	205.33	145.	-14.	-0.008	56.08	1.134s
TH-229	843.24	210.85	185.	24.	0.014	110.80	1.138s
Cf-251	907.84	227.00	88.	11.	0.006	163.37	1.151s
PB-212	954.37	238.63	79.	512.	0.285	5.06	1.159D
PB-214	967.84	242.00	60.	80.	0.044	17.72	1.162D
EU-152	978.62	244.69	836.	-22.	-0.012	185.76	1.164s
TH-227	1024.81	256.24	120.	-17.	-0.009	128.47	1.172s
Cd-113m	1054.65	263.70	228.	-6.	-0.004	339.75	1.178s
BI-210M	1063.18	265.83	229.	-16.	-0.009	158.47	1.179s
TL-208	1107.70	276.96	42.	37.	0.020	36.48	1.768s
Hg-203	1116.66	279.20	136.	16.	0.009	106.07	1.189s
I-131	1137.05	284.30	88.	-6.	-0.003	213.75	1.193s
PB-214	1180.22	295.09	29.	118.	0.066	11.24	1.201D
PB-212	1199.98	300.03	32.	42.	0.023	24.77	1.205D
PA-231	1200.14	300.07	712.	-21.	-0.012	177.97	1.205s
PA-233	1200.58	300.18	690.	-21.	-0.012	175.29	1.205s
PA-231	1210.46	302.65	669.	-21.	-0.012	172.36	1.207s
BA-133	1211.27	302.85	647.	-21.	-0.012	169.60	1.207s
Ba-140	1219.26	304.85	626.	-21.	-0.012	166.62	1.208s
BI-210M	1219.45	304.90	605.	-21.	-0.012	163.80	1.208s
Ir-192	1233.62	308.44	583.	-21.	-0.012	160.56	1.211s
PA-233	1247.91	312.01	562.	-22.	-0.012	47.93	1.214s
Ir-192	1265.82	316.49	560.	-17.	-0.010	195.25	1.217s
CR-51	1280.20	320.08	532.	21.	0.011	159.58	1.219
La-140	1314.91	328.76	430.	-20.	-0.011	166.47	1.226s
Cf-249	1333.63	333.44	411.	-20.	-0.011	148.07	1.229s
AC-228	1353.24	338.34	43.	105.	0.058	17.51	1.009
Cs-136	1362.15	340.57	391.	-5.	-0.003	555.06	1.234s
EU-152	1377.01	344.29	362.	8.	0.004	360.37	1.237s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	1383.19	345.83	405.	-20.	-0.011	142.77	1.238s
PB-214	1407.25	351.84	43.	177.	0.098	10.85	0.981
BA-133	1423.87	356.00	314.	-19.	-0.011	100.95	1.245s
I-131	1457.81	364.48	52.	-3.	-0.002	580.20	1.252s
BA-133	1535.24	383.84	131.	-18.	-0.010	94.90	1.266s
Cf-249	1551.68	387.95	148.	-2.	-0.001	835.77	1.269s
SB-125	1711.39	427.88	32.	13.	0.007	91.25	1.297s
AG-108M	1735.64	433.94	35.	-4.	-0.002	331.91	1.301s
pm-146	1815.41	453.88	26.	11.	0.006	97.61	1.315s
SB-125	1853.36	463.37	64.	62.	0.034	22.23	1.322s
Ir-192	1872.14	468.06	137.	-15.	-0.008	116.59	1.325s
BE-7	1910.28	477.60	110.	14.	0.008	109.26	1.332s
HF-181	1927.89	482.00	124.	0.	0.000	1000.00	1.335s
La-140	1947.98	487.02	78.	11.	0.006	113.50	1.339s
RU-103	1988.12	497.05	22.	3.	0.002	316.74	1.346s
RH-106	2047.36	511.86	49.	65.	0.036	30.88	2.606s
Nd-147	2123.91	531.00	30.	6.	0.003	202.79	1.369s
Ba-140	2148.95	537.26	26.	10.	0.005	111.59	1.373s
CS-134	2252.86	563.24	39.	7.	0.004	185.99	1.391s
CS-134	2277.20	569.32	48.	-5.	-0.003	214.29	1.395s
PA-234	2277.80	569.47	68.	-10.	-0.006	116.80	1.395s
TL-208	2332.60	583.17	13.	162.	0.090	8.85	1.347
SB-125	2401.92	600.50	353.	-16.	-0.009	172.57	1.416s
SB-124	2410.85	602.73	295.	-14.	-0.008	176.37	1.418s
CS-134	2418.76	604.71	281.	-9.	-0.005	252.28	1.419s
BI-214	2436.77	609.21	12.	160.	0.089	9.39	1.222
RU-103	2441.12	610.30	272.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	272.	0.	0.000	1000.00	1.426s
PM-144	2472.18	618.06	193.	10.	0.006	200.20	1.428s
RH-106	2487.60	621.92	282.	-10.	-0.006	241.21	1.431s
SB-125	2543.49	635.89	66.	-17.	-0.010	70.46	1.440s
I-131	2547.83	636.97	79.	-4.	-0.002	348.51	1.441s
AG-110M	2630.98	657.76	68.	5.	0.003	254.75	1.455s
CS-137	2646.58	661.66	95.	-19.	-0.011	81.81	1.457
PM-144	2786.11	696.54	33.	8.	0.005	150.65	1.480
NB-94	2810.46	702.63	42.	5.	0.003	278.57	1.484s
SB-124	2891.09	722.79	87.	-10.	-0.006	135.65	1.497
AG-108M	2891.70	722.94	77.	0.	0.000	1000.00	1.498s
EU-154	2893.37	723.36	77.	0.	0.000	1000.00	1.498
ZR-95	2896.74	724.20	103.	-18.	-0.010	83.07	1.498s
BI-212	2908.63	727.17	106.	16.	0.009	96.36	1.500s
pm-146	2988.59	747.16	33.	2.	0.001	523.72	1.513s
ZR-95	3026.87	756.73	19.	11.	0.006	92.04	1.519s
AG-110M	3055.73	763.94	37.	2.	0.001	349.29	1.524s
NB-95	3063.11	765.79	73.	-18.	-0.010	69.72	1.525s
PA-234M	3065.60	766.41	67.	14.	0.008	87.01	1.526s
EU-152	3115.64	778.92	42.	-5.	-0.003	233.37	1.534s
BI-212	3141.64	785.42	28.	-1.	-0.001	305.30	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3183.43	795.87	35.	11.	0.006	84.02	1.544s
CS-134	3207.77	801.95	64.	-3.	-0.002	416.66	1.548s
CO-58	3243.06	810.78	39.	5.	0.003	195.62	1.554s
La-140	3263.04	815.77	44.	0.	0.000	1000.00	1.557s
Cs-136	3273.97	818.50	34.	9.	0.005	99.45	1.559s
MN-54	3339.36	834.85	61.	-20.	-0.011	86.98	1.569s
Co-56	3387.05	846.77	14.	9.	0.005	92.74	1.577s
TL-208	3442.23	860.56	14.	32.	0.018	31.00	1.585s
NB-94	3484.36	871.10	12.	8.	0.004	72.84	1.592s
EU-154	3492.89	873.23	32.	-8.	-0.005	100.93	1.593s
PA-234	3522.10	880.53	75.	-15.	-0.008	87.15	1.598s
PA-234	3532.94	883.24	41.	10.	0.005	99.61	1.599s
AG-110M	3538.71	884.68	32.	10.	0.005	88.52	1.600s
Sc-46	3557.10	889.28	57.	-7.	-0.004	155.69	1.603s
y-88	3592.14	898.04	9.	5.	0.003	146.39	1.608
AC-228	3644.26	911.07	19.	118.	0.066	12.02	1.616
AG-110M	3749.96	937.49	30.	-4.	-0.002	305.16	1.633s
PA-234	3784.07	946.02	35.	-8.	-0.005	116.74	1.638s
EU-152	3856.43	964.11	110.	10.	0.006	152.41	1.649s
AC-228	3876.07	969.02	0.	83.	0.046	10.98	1.571
EU-154	3985.31	996.33	52.	-13.	-0.007	83.77	1.668s
PA-234M	4003.99	1001.00	69.	-10.	-0.006	98.38	1.671s
Cs-136	4192.29	1048.07	57.	-18.	-0.010	64.79	1.698s
RH-106	4201.45	1050.36	76.	-13.	-0.007	100.54	1.700s
BI-207	4254.65	1063.66	5.	17.	0.009	37.74	1.708s
Ga-68	4309.61	1077.40	30.	4.	0.002	305.16	1.716s
EU-152	4448.32	1112.07	84.	-8.	-0.005	163.50	1.736s
BI-214	4481.17	1120.29	8.	34.	0.019	20.61	1.740D
Sc-46	4482.22	1120.55	59.	-11.	-0.006	105.01	1.740
Ta-182	4485.22	1121.30	57.	-6.	-0.003	179.92	1.741s
CO-60	4692.97	1173.24	30.	-2.	-0.001	606.22	1.770s
Ta-182	4756.23	1189.05	40.	-10.	-0.006	69.60	1.779
Ta-182	4885.67	1221.41	32.	-12.	-0.007	110.97	1.797s
Co-56	4953.16	1238.28	27.	14.	0.008	87.75	1.806s
NA-22	5098.16	1274.53	21.	-1.	-0.001	497.49	1.826s
EU-154	5098.22	1274.54	23.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	11.	9.	0.005	88.75	1.835s
CO-60	5330.06	1332.50	19.	-10.	-0.006	73.64	1.857s
AG-110M	5537.25	1384.30	5.	3.	0.001	216.40	1.884s
EU-152	5632.07	1408.00	0.	16.	0.009	25.18	1.896s
K-40	5843.34	1460.82	4.	350.	0.195	5.40	1.781
La-140	6384.93	1596.21	23.	-14.	-0.008	85.07	1.990s
SB-124	6764.03	1690.98	11.	-4.	-0.002	188.42	2.034s
BI-214	7058.07	1764.49	0.	38.	0.021	16.22	2.067s
Co-56	7085.51	1771.35	38.	0.	0.000	1000.00	2.070
y-88	7344.36	1836.06	6.	1.	0.001	427.57	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.6784E+00				5.31E+01	
			477.60	4.678E+00	?(	1.724E+01	1.09E+02 1.05E+01 G
NA-22	C	-1.0681E-01				9.50E+02	
			1274.53	-1.068E-01	?(	1.941E+00	4.97E+02 9.99E+01 G
K-40	N	2.9596E+02				4.66E+11	
			1460.83	2.960E+02	(P	9.713E+00	5.40E+00 1.07E+01 G
Sc-46	F	-4.1631E-01				8.38E+01	
			889.28	-4.163E-01	?(	2.232E+00	1.56E+02 1.00E+02 G
			1120.55	-7.733E-01	+	2.755E+00	1.05E+02 1.00E+02 G
CR-51	F	5.2940E+00				2.77E+01	
			320.08	5.294E+00	?(P	2.826E+01	1.60E+02 9.94E+00 G
MN-54	C	-1.0979E+00				3.12E+02	
			834.85	-1.098E+00	?(	2.177E+00	8.70E+01 1.00E+02 G
FE-59	F	7.3090E-01				4.45E+01	
			1099.25	-3.566E-03	%(P	3.524E+00	3.60E+04 5.65E+01 G
			1291.60	1.691E+00	?(	3.361E+00	8.88E+01 4.32E+01 G
Co-56	C	9.7374E-01				7.73E+01	
			846.77	5.202E-01	(P	1.149E+00	9.27E+01 9.99E+01 G
			1238.28	1.660E+00	?(	3.164E+00	8.77E+01 6.61E+01 G
			1037.84	-1.346E-02	% P	9.868E+00	3.63E+04 1.41E+01 G
			1771.35	0.000E+00	-	2.166E+01	1.00E+03 1.55E+01 A
CO-57	C	-4.0797E-01				2.72E+02	
			122.06	-4.080E-01	?(	1.104E+00	8.13E+01 8.56E+01 G
			136.47	0.000E+00	+	1.896E+01	1.00E+03 1.07E+01 G
CO-58	C	2.5549E-01				7.09E+01	
			810.78	2.555E-01	?(	1.748E+00	1.96E+02 9.95E+01 G
CO-60	F	-8.6334E-01				1.93E+03	
			1332.50	-8.633E-01	?(P	1.932E+00	7.36E+01 1.00E+02 G
			1173.24	-1.492E-01	+	2.107E+00	6.06E+02 9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-2.6909E-07					2.44E+02	
			1115.55	-2.691E-07	%(	6.114E+00	6.46E+08	5.06E+01 G
NB-94	I	3.5098E-01					7.41E+06	
			702.63	2.467E-01	?(	1.624E+00	2.79E+02	9.79E+01 G
			871.10	4.532E-01	?(	1.105E+00	7.28E+01	9.99E+01 G
ZR-95	I	9.9699E-01					6.40E+01	
			756.73	9.970E-01	?(	2.156E+00	9.20E+01	5.45E+01 G
			724.20	-2.025E+00	+	5.619E+00	8.31E+01	4.42E+01 G
NB-95	I	-9.5548E-01					6.40E+01	
			765.79	-9.555E-01	?(	2.210E+00	6.97E+01	9.98E+01 G
RU-103	I	1.2232E-01					3.93E+01	
			497.05	1.223E-01	?(P	9.803E-01	3.17E+02	9.09E+01 G
			610.30	0.000E+00	-	5.947E+01	1.00E+03	5.75E+00 GA
RH-106	I	-4.3656E+00					3.74E+02	
			621.92	-4.366E+00	?(	3.559E+01	2.41E+02	9.93E+00 G
			1050.36	-5.557E+01	+	1.886E+02	1.01E+02	1.56E+00 G
			511.86	1.204E+01	?	6.571E+00	3.09E+01	2.00E+01 GA
AG-108M	C	-1.3181E-01					1.53E+05	
			433.94	-1.318E-01	?(	1.084E+00	3.32E+02	9.05E+01 G
			722.94	0.000E+00	+	2.374E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	3.826E+00	1.00E+03	8.98E+01 G
AG-110M	F	7.6542E-01					2.50E+02	
			884.68	7.770E-01	?(	2.330E+00	8.85E+01	7.27E+01 G
			657.76	2.255E-01	-	1.992E+00	2.55E+02	9.46E+01 G
			937.49	-7.166E-01	-	5.058E+00	3.05E+02	3.44E+01 G
			1384.30	9.019E-01	?(P	4.812E+00	2.16E+02	2.43E+01 G
			763.94	5.788E-01	?(P	7.177E+00	3.49E+02	2.23E+01 G
SN-113	F	1.5599E-02					1.15E+02	
			391.69	1.560E-02	%(	2.962E+00	5.52E+03	6.40E+01 G
SB-124	F	-6.0363E-01					6.02E+01	
			602.73	-6.036E-01	?(	3.585E+00	1.76E+02	9.83E+01 G
			1690.98	-9.286E-01	+	3.943E+00	1.88E+02	4.78E+01 G
			722.79	-4.575E+00	+	2.113E+01	1.36E+02	1.08E+01 G
SB-125	I	6.3308E+00					1.01E+03	
			427.88	1.386E+00	?(	3.158E+00	9.12E+01	2.96E+01 G
			600.50	-3.698E+00	+	2.144E+01	1.73E+02	1.79E+01 G
			635.89	-6.818E+00	+	1.595E+01	7.05E+01	1.13E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          463.37 2.031E+01  (  1.310E+01 2.22E+01 1.05E+01 G

I-131    I  -1.1471E-01                                     8.02E+00
                          364.48-1.147E-01 ?(P 1.260E+00 5.80E+02 8.17E+01 G
                          284.30-2.363E+00 + P 1.758E+01 2.14E+02 6.14E+00 G
                          636.97-2.271E+00 +   2.746E+01 3.49E+02 7.17E+00 G

Ga-68    C   9.9125E+00                                     4.71E-02
                         1077.40 9.913E+00 ?(  6.997E+01 3.05E+02 3.30E+00 G

Tc-99m   I  -4.9502E-01                                     2.51E-01
                          140.51-4.950E-01 &(  2.361E+00 1.43E+02 8.93E+01 G

BA-133   F  -8.5054E-01                                     3.85E+03
                          356.00-8.505E-01 &(P 3.815E+00 1.01E+02 6.20E+01 G
                          302.85-2.848E+00 +   1.615E+01 1.70E+02 1.83E+01 G
                          383.84-5.801E+00 &   1.845E+01 9.49E+01 8.94E+00 GA
                           80.99-1.573E+00 &   7.576E+00 1.45E+02 3.41E+01 GA

CS-134   I   2.3645E-01                                     7.54E+02
                          604.71-4.144E-01 ?(  3.534E+00 2.52E+02 9.76E+01 G
                          795.87 6.731E-01 ?(  1.906E+00 8.40E+01 8.55E+01 G
                          569.32-1.231E+00 +   9.205E+00 2.14E+02 1.54E+01 G
                          801.95-1.700E+00 +   2.478E+01 4.17E+02 8.69E+00 G
                          563.24 3.372E+00 ?(  1.533E+01 1.86E+02 8.35E+00 G

CS-137   I  -1.0233E+00                                     1.10E+04
                          661.66-1.023E+00 ?(P 2.595E+00 8.18E+01 8.52E+01 G

CE-139   F  -5.2014E-01                                     1.38E+02
                          165.85-5.201E-01 &(  1.603E+00 9.25E+01 7.99E+01 G

Ba-140   I   1.5494E+00                                     1.28E+01
                          537.26 1.549E+00 &(P 4.217E+00 1.12E+02 2.44E+01 G
                          162.66-2.486E+00 +   2.074E+01 2.47E+02 6.22E+00 G
                          304.85-1.225E+01 +   6.822E+01 1.67E+02 4.29E+00 G

La-140   I  -1.4120E+00                                     1.28E+01
                         1596.21-1.412E+00 ?(  2.541E+00 8.51E+01 9.54E+01 G
                          487.02 8.949E-01 &   3.444E+00 1.13E+02 4.55E+01 G
                          328.76-2.539E+00 + P 1.275E+01 1.66E+02 2.03E+01 G
                          815.77 0.000E+00 &   7.905E+00 1.00E+03 2.33E+01 G

CE-141   I  -9.3550E-01                                     3.25E+01
                          145.44-9.355E-01  (  4.592E+00 1.47E+02 4.82E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-144	I	-3.6396E+00					2.85E+02	
			133.54	-3.640E+00	?(	1.765E+01	1.46E+02	1.11E+01 G
PM-144	C	4.1812E-01					3.63E+02	
			696.54	4.010E-01	?(P	1.423E+00	1.51E+02	9.90E+01 G
			618.06	4.352E-01	?(	2.953E+00	2.00E+02	9.91E+01 G
EU-152	F	1.6468E+00					4.94E+03	
			344.29	7.645E-01	*(	9.308E+00	3.60E+02	2.65E+01 G
			1112.07	-4.238E+00	&	2.372E+01	1.64E+02	1.36E+01 G
			121.78	1.117E+00	?(	3.407E+00	9.14E+01	2.86E+01 G
			778.92	-2.129E+00	+ P	1.342E+01	2.33E+02	1.29E+01 G
			964.11	4.285E+00	?(	2.222E+01	1.52E+02	1.46E+01 G
			244.69	-6.036E+00	&	3.744E+01	1.86E+02	7.58E+00 G
			1408.00	6.623E+00	? P	3.062E+00	2.52E+01	2.10E+01 GA
EU-154	I	-4.0120E+00					3.14E+03	
			873.23	-4.012E+00	?(	1.383E+01	1.01E+02	1.23E+01 G
			123.10	3.354E-01	& P	2.308E+00	2.03E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.664E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	1.067E+01	1.00E+03	2.02E+01 G
			1004.77	-3.021E-01	%	1.540E+01	1.45E+03	1.80E+01 G
			996.33	-7.929E+00	+	2.230E+01	8.38E+01	1.06E+01 G
EU-155	I	2.0078E+00					1.81E+03	
			105.31	2.008E+00	*(	1.081E+01	1.62E+02	2.12E+01 G
			86.54	-1.564E+00	+	8.888E+00	1.71E+02	3.07E+01 G
Ta-182	F	-1.2524E+00					1.14E+02	
			1121.30	-1.252E+00	?(	7.791E+00	1.80E+02	3.49E+01 G
			1221.41	-3.430E+00	+	8.309E+00	1.11E+02	2.70E+01 G
			1189.05	-4.763E+00	+ P	1.502E+01	6.96E+01	1.62E+01 G
Hg-203	F	4.4955E-01					4.66E+01	
			279.20	4.496E-01	?(	1.603E+00	1.06E+02	8.15E+01 G
TL-208	N	7.9156E+00					6.98E+02	
			583.02	7.916E+00	(P	9.678E-01	8.85E+00	8.45E+01 G
			277.28	1.318E+01	+ P	1.193E+01	3.65E+01	6.31E+00 G
			860.56	1.453E+01	+ P	9.421E+00	3.10E+01	1.24E+01 G
pm-146	C	5.0147E-01					2.02E+03	
			747.16	3.489E-01	?(	4.388E+00	5.24E+02	3.40E+01 G
			735.72	1.487E-01	%	5.626E+00	1.54E+03	2.25E+01 G
			453.88	5.812E-01	?(	1.374E+00	9.76E+01	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	2.1970E-01					1.07E+02	
			898.04	2.956E-01	?(	1.073E+00	1.46E+02	9.37E+01 G
			1836.06	1.480E-01	?(	1.532E+00	4.28E+02	9.92E+01 G
Cd-113m		-2.3101E+03					5.33E+03	
			263.70	-2.310E+03	(	2.667E+04	3.40E+02	6.00E-03 K
Cf-251	T	1.7897E+00					3.28E+05	
			176.60	1.790E+00	&(	4.872E+00	1.06E+02	1.70E+01 G
			227.00	3.534E+00	?	1.435E+01	1.63E+02	6.30E+00 GA
Cf-249	T	-9.3101E-02					1.28E+05	
			387.95	-9.310E-02	?(	2.677E+00	8.36E+02	6.60E+01 G
			333.44	-3.325E+00	+	1.649E+01	1.48E+02	1.55E+01 G
Sn-126		-5.9866E+00					3.65E+07	
			87.57	-1.274E+00	}	6.885E+00	1.63E+02	3.75E+01 GA
			64.28	-5.987E+00	?(	2.251E+01	1.13E+02	9.70E+00 G
			86.94	-5.300E+00	+	2.982E+01	1.69E+02	9.04E+00 GA
PB-210	N	-1.8777E+01					8.14E+03	
			46.54	-1.878E+01	&(P	6.312E+01	6.61E+01	4.25E+00 G
PB-212	N	2.3945E+01					6.98E+02	
			238.63	2.395E+01	(P	2.060E+00	5.06E+00	4.33E+01 G
			300.03	3.077E+01	+ P	2.157E+01	2.48E+01	3.28E+00 GA
PB-214	N	1.3527E+01					5.84E+05	
			351.93	1.294E+01	(P	2.434E+00	1.08E+01	3.76E+01 G
			295.09	1.468E+01	(	3.469E+00	1.12E+01	1.93E+01 G
			242.00	2.200E+01	+	1.070E+01	1.77E+01	7.43E+00 GA
BI-207	C	6.9217E-01					1.18E+04	
			569.70	2.770E-02	%(	1.848E+00	1.91E+03	9.77E+01 G
			1063.66	1.564E+00	?(	1.208E+00	3.77E+01	7.45E+01 G
BI-212	N	1.0292E+01					6.98E+02	
			727.17	1.029E+01	?(P	3.331E+01	9.64E+01	7.55E+00 G
			785.42	-4.816E+00	- P	1.137E+02	3.05E+02	1.28E+00 GA
BI-214	N	1.5269E+01					5.84E+05	
			609.31	1.493E+01	(P	1.732E+00	9.39E+00	4.61E+01 G
			1120.29	1.629E+01	(P	7.477E+00	2.06E+01	1.51E+01 G
			1764.49	2.623E+01	+	5.088E+00	1.62E+01	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	-7.2094E-01						1.10E+09	
			265.83	-7.209E-01	?(P	3.228E+00	1.58E+02	5.00E+01	G
			304.90	-1.876E+00	+	1.028E+01	1.64E+02	2.80E+01	G
AC-228	N	2.5914E+01						2.10E+03	
			911.07	2.452E+01	?(	4.733E+00	1.20E+01	2.90E+01	G
			968.97	3.009E+01	(	2.672E+00	1.10E+01	1.75E+01	G
			338.32	2.322E+01	(	7.406E+00	1.75E+01	1.20E+01	G
			93.35	2.829E+00	-	4.647E+01	4.92E+02	5.56E+00	XA
TH-227	N	7.7195E+00						7.95E+03	
			50.14	7.719E+00	&(	2.688E+01	1.04E+02	8.00E+00	G
			256.24	-5.197E+00	-	1.643E+01	1.28E+02	7.00E+00	G
TH-229	N	5.2976E+00						2.68E+06	
			193.51	-1.305E+00	&(	2.082E+01	6.10E+02	4.40E+00	G
			210.85	1.501E+01	?(P	4.062E+01	1.11E+02	2.99E+00	G
TH-234	N	1.5886E+01						1.63E+12	
			63.29	1.983E+01	(P	3.229E+01	5.00E+01	3.81E+00	G
			92.59	1.320E+01	(P	1.780E+01	4.18E+01	5.58E+00	G
PA-231	N	-1.8113E+01						1.20E+07	
			302.65	-1.811E+01	?(	1.044E+02	1.72E+02	2.88E+00	G
			300.07	-2.103E+01	+	1.251E+02	1.78E+02	2.46E+00	G
PA-233	C	-1.4978E+00						7.82E+08	
			312.01	-1.498E+00	?(P	7.854E+00	4.79E+01	3.60E+01	G
			300.18	-8.348E+00	+	4.891E+01	1.75E+02	6.20E+00	G
PA-234	N	5.9125E-01						1.63E+12	
			131.29	-2.225E+00	&(	1.054E+01	1.42E+02	1.80E+01	G
			946.02	-3.896E+00	+ P	1.409E+01	1.17E+02	1.34E+01	G
			569.47	-5.115E+00	+	2.032E+01	1.17E+02	8.20E+00	G
			883.24	5.871E+00	?(	1.989E+01	9.96E+01	9.60E+00	G
			880.53	-1.430E+01	&	4.181E+01	8.72E+01	6.00E+00	GA
PA-234M	N	4.2619E+00						1.63E+12	
			1001.00	-8.116E+01	?(P	3.228E+02	9.84E+01	8.37E-01	G
			766.41	2.474E+02	?(P	7.228E+02	8.70E+01	2.94E-01	G
U-235	N	-2.6540E+00						2.57E+11	
			143.79	-2.654E+00	&(P	1.929E+01	6.59E+01	1.10E+01	G
			205.33	-4.925E+00	+ P	2.114E+01	5.61E+01	5.01E+00	G
			163.38	-4.340E-01	+ P	2.595E+01	9.55E+02	5.08E+00	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   7.4941E-01                                      1.58E+05
                           59.54 7.494E-01 ?(P 6.069E+00 2.41E+02 3.59E+01 G

Np-237   F  -3.8264E+00                                      2.14E+06
                           86.49-3.826E+00 &(  2.222E+01 1.75E+02 1.31E+01 G

Ir-192   F  -5.0157E-01                                      7.40E+01
                          316.49-5.016E-01 *(  3.281E+00 1.95E+02 8.70E+01 G
                          468.06-9.737E-01 +   3.826E+00 1.17E+02 5.18E+01 G
                          308.44-1.674E+00 +   8.987E+00 1.61E+02 3.18E+01 G

Cs-136   F   4.8486E-01                                      1.30E+01
                          818.50 4.849E-01 ?(  1.644E+00 9.94E+01 1.00E+02 G
                         1048.07-1.499E+00 &   3.206E+00 6.48E+01 8.00E+01 G
                          340.57-2.887E-01 -   5.417E+00 5.55E+02 4.69E+01 G

Np-239   T  -2.0523E+00                                      2.36E+00
                          103.70 0.000E+00 +   1.049E+01 1.00E+03 2.40E+01 X
                          106.13-2.052E+00 &(  1.097E+01 1.61E+02 2.27E+01 G
                           99.50 0.000E+00 +   1.689E+01 1.00E+03 1.50E+01 X

Nd-147       1.6709E+00                                      1.11E+01
                          531.00 1.671E+00 ?(  8.367E+00 2.03E+02 1.30E+01 G
                           91.10-1.665E+00 +   8.968E+00 1.62E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
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N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	408.	-29.	-0.016	66.11	-1.878E+01	P
TH-227	50.14	333.	25.	0.014	104.31	7.719E+00	
Sn-126	64.28	673.	-33.	-0.018	112.95	-5.987E+00	
BA-133	80.99	1406.	-37.	-0.020	144.88	-1.573E+00	
Np-237	86.49	1931.	-36.	-0.020	174.75	-3.826E+00	
EU-155	86.54	1694.	-34.	-0.019	170.97	-1.564E+00	
Sn-126	86.94	1660.	-34.	-0.019	169.19	-5.300E+00	
Sn-126	87.57	1531.	-34.	-0.019	162.50	-1.274E+00	
Nd-147	91.10	1529.	-34.	-0.019	161.96	-1.665E+00	
EU-155	105.31	1330.	32.	0.018	161.85	2.008E+00	
Np-239	106.13	1574.	-35.	-0.020	160.70	-2.052E+00	
EU-152	121.78	226.	24.	0.013	91.43	1.117E+00	
CO-57	122.06	212.	-26.	-0.014	81.35	-4.080E-01	
EU-154	123.10	209.	10.	0.006	203.24	3.354E-01	P
PA-234	131.29	851.	-29.	-0.016	142.15	-2.225E+00	
HF-181	133.02	866.	-29.	-0.016	143.22	-9.305E-01	
CE-144	133.54	895.	-29.	-0.016	145.53	-3.640E+00	
HF-181	136.30	925.	-18.	-0.010	240.83	-4.259E+00	
Tc-99m	140.51	933.	-30.	-0.017	143.19	-4.950E-01	
U-235	143.79	977.	-20.	-0.011	65.88	-2.654E+00	P
CE-141	145.44	1059.	-31.	-0.017	147.42	-9.355E-01	
Ba-140	162.66	300.	-10.	-0.006	246.98	-2.486E+00	
U-235	163.38	311.	-1.	-0.001	955.47	-4.340E-01	P
CE-139	165.85	302.	-27.	-0.015	92.49	-5.201E-01	
TH-229	193.51	117.	-3.	-0.002	610.41	-1.305E+00	
U-235	205.33	145.	-14.	-0.008	56.08	-4.925E+00	P
TH-229	210.85	185.	24.	0.014	110.80	1.501E+01	P
EU-152	244.69	836.	-22.	-0.012	185.76	-6.036E+00	
TH-227	256.24	120.	-17.	-0.009	128.47	-5.197E+00	
Cd-113m	263.70	228.	-6.	-0.004	339.75	-2.310E+03	
BI-210M	265.83	229.	-16.	-0.009	158.47	-7.209E-01	P
Hg-203	279.20	136.	16.	0.009	106.07	4.496E-01	
I-131	284.30	88.	-6.	-0.003	213.75	-2.363E+00	P
PA-231	300.07	712.	-21.	-0.012	177.97	-2.103E+01	
PA-233	300.18	690.	-21.	-0.012	175.29	-8.348E+00	
PA-231	302.65	669.	-21.	-0.012	172.36	-1.811E+01	
BA-133	302.85	647.	-21.	-0.012	169.60	-2.848E+00	
Ba-140	304.85	626.	-21.	-0.012	166.62	-1.225E+01	
BI-210M	304.90	605.	-21.	-0.012	163.80	-1.876E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	308.44	583.	-21.	-0.012	160.56	-1.674E+00	
PA-233	312.01	562.	-22.	-0.012	47.93	-1.498E+00	P
Ir-192	316.49	560.	-17.	-0.010	195.25	-5.016E-01	
CR-51	320.08	532.	21.	0.011	159.58	5.294E+00	P
La-140	328.76	430.	-20.	-0.011	166.47	-2.539E+00	P
Cf-249	333.44	411.	-20.	-0.011	148.07	-3.325E+00	
Cs-136	340.57	391.	-5.	-0.003	555.06	-2.887E-01	
EU-152	344.29	362.	8.	0.004	360.37	7.645E-01	
HF-181	345.83	405.	-20.	-0.011	142.77	-3.632E+00	
BA-133	356.00	314.	-19.	-0.011	100.95	-8.505E-01	P
I-131	364.48	52.	-3.	-0.002	580.20	-1.147E-01	P
BA-133	383.84	131.	-18.	-0.010	94.90	-5.801E+00	
Cf-249	387.95	148.	-2.	-0.001	835.77	-9.310E-02	
AG-108M	433.94	35.	-4.	-0.002	331.91	-1.318E-01	
pm-146	453.88	26.	11.	0.006	97.61	5.812E-01	
Ir-192	468.06	137.	-15.	-0.008	116.59	-9.737E-01	
BE-7	477.60	110.	14.	0.008	109.26	4.678E+00	
La-140	487.02	78.	11.	0.006	113.50	8.949E-01	
RU-103	497.05	22.	3.	0.002	316.74	1.223E-01	P
RH-106	511.86	49.	65.	0.036	30.88	1.204E+01	
Nd-147	531.00	30.	6.	0.003	202.79	1.671E+00	
Ba-140	537.26	26.	10.	0.005	111.59	1.549E+00	P
CS-134	563.24	39.	7.	0.004	185.99	3.372E+00	
CS-134	569.32	48.	-5.	-0.003	214.29	-1.231E+00	
PA-234	569.47	68.	-10.	-0.006	116.80	-5.115E+00	
SB-124	602.73	295.	-14.	-0.008	176.37	-6.036E-01	
CS-134	604.71	281.	-9.	-0.005	252.28	-4.144E-01	
PM-144	618.06	193.	10.	0.006	200.20	4.352E-01	
RH-106	621.92	282.	-10.	-0.006	241.21	-4.366E+00	
I-131	636.97	79.	-4.	-0.002	348.51	-2.271E+00	
AG-110M	657.76	68.	5.	0.003	254.75	2.255E-01	
CS-137	661.66	95.	-19.	-0.011	81.81	-1.023E+00	P
PM-144	696.54	33.	8.	0.005	150.65	4.010E-01	P
NB-94	702.63	42.	5.	0.003	278.57	2.467E-01	
SB-124	722.79	87.	-10.	-0.006	135.65	-4.575E+00	
ZR-95	724.20	103.	-18.	-0.010	83.07	-2.025E+00	
pm-146	747.16	33.	2.	0.001	523.72	3.489E-01	
ZR-95	756.73	19.	11.	0.006	92.04	9.970E-01	
AG-110M	763.94	37.	2.	0.001	349.29	5.788E-01	P
NB-95	765.79	73.	-18.	-0.010	69.72	-9.555E-01	
PA-234M	766.41	67.	14.	0.008	87.01	2.474E+02	P
EU-152	778.92	42.	-5.	-0.003	233.37	-2.129E+00	P
CS-134	795.87	35.	11.	0.006	84.02	6.731E-01	
CS-134	801.95	64.	-3.	-0.002	416.66	-1.700E+00	
CO-58	810.78	39.	5.	0.003	195.62	2.555E-01	
Cs-136	818.50	34.	9.	0.005	99.45	4.849E-01	
MN-54	834.85	61.	-20.	-0.011	86.98	-1.098E+00	
Co-56	846.77	14.	9.	0.005	92.74	5.202E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	871.10	12.	8.	0.004	72.84	4.532E-01		
EU-154	873.23	32.	-8.	-0.005	100.93	-4.012E+00		
PA-234	880.53	75.	-15.	-0.008	87.15	-1.430E+01		
PA-234	883.24	41.	10.	0.005	99.61	5.871E+00		
AG-110M	884.68	32.	10.	0.005	88.52	7.770E-01		
Sc-46	889.28	57.	-7.	-0.004	155.69	-4.163E-01		
y-88	898.04	9.	5.	0.003	146.39	2.956E-01		
AG-110M	937.49	30.	-4.	-0.002	305.16	-7.166E-01		
PA-234	946.02	35.	-8.	-0.005	116.74	-3.896E+00		P
EU-152	964.11	110.	10.	0.006	152.41	4.285E+00		
EU-154	996.33	52.	-13.	-0.007	83.77	-7.929E+00		
PA-234M	1001.00	69.	-10.	-0.006	98.38	-8.116E+01		P
Cs-136	1048.07	57.	-18.	-0.010	64.79	-1.499E+00		
RH-106	1050.36	76.	-13.	-0.007	100.54	-5.557E+01		
BI-207	1063.66	5.	17.	0.009	37.74	1.564E+00		
Ga-68	1077.40	30.	4.	0.002	305.16	9.913E+00		
EU-152	1112.07	84.	-8.	-0.005	163.50	-4.238E+00		
Sc-46	1120.55	59.	-11.	-0.006	105.01	-7.733E-01		
Ta-182	1121.30	57.	-6.	-0.003	179.92	-1.252E+00		
CO-60	1173.24	30.	-2.	-0.001	606.22	-1.492E-01		
Ta-182	1189.05	40.	-10.	-0.006	69.60	-4.763E+00		P
Ta-182	1221.41	32.	-12.	-0.007	110.97	-3.430E+00		
Co-56	1238.28	27.	14.	0.008	87.75	1.660E+00		
NA-22	1274.53	21.	-1.	-0.001	497.49	-1.068E-01		
FE-59	1291.60	11.	9.	0.005	88.75	1.691E+00		
CO-60	1332.50	19.	-10.	-0.006	73.64	-8.633E-01		P
AG-110M	1384.30	5.	3.	0.001	216.40	9.019E-01		P
EU-152	1408.00	0.	16.	0.009	25.18	6.623E+00		P
La-140	1596.21	23.	-14.	-0.008	85.07	-1.412E+00		
SB-124	1690.98	11.	-4.	-0.002	188.42	-9.286E-01		
y-88	1836.06	6.	1.	0.001	427.57	1.480E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	4.6783E+00	4.6784E+00	1.093E+02%	1.72E+01
NA-22	#A	-1.0681E-01	-1.0681E-01	4.975E+02%	1.94E+00
K-40		2.9596E+02	2.9596E+02	5.399E+00%	9.71E+00
Sc-46	#A	-4.1631E-01	-4.1631E-01	1.557E+02%	2.23E+00
CR-51	#A	5.2938E+00	5.2940E+00	1.596E+02%	2.83E+01
MN-54	#A	-1.0979E+00	-1.0979E+00	8.698E+01%	2.18E+00
FE-59	#A	7.3089E-01	7.3090E-01	8.875E+01%	3.52E+00
Co-56	#A	9.7373E-01	9.7374E-01	6.383E+01%	1.15E+00
CO-57	#A	-4.0797E-01	-4.0797E-01	8.135E+01%	1.10E+00

CO-58	#A	2.5549E-01	2.5549E-01	1.956E+02%	1.75E+00
CO-60	#A	-8.6334E-01	-8.6334E-01	7.364E+01%	1.93E+00
ZN-65	#A	-2.6909E-07	-2.6909E-07	6.464E+08%	6.11E+00
NB-94	#A	3.5098E-01	3.5098E-01	7.284E+01%	1.62E+00
ZR-95	#A	9.9698E-01	9.9699E-01	9.204E+01%	2.16E+00
NB-95	#A	-9.5547E-01	-9.5548E-01	6.972E+01%	2.21E+00
RU-103	#A	1.2232E-01	1.2232E-01	3.167E+02%	9.80E-01
RH-106	#A	-4.3656E+00	-4.3656E+00	2.412E+02%	3.56E+01
AG-108M	#A	-1.3181E-01	-1.3181E-01	3.319E+02%	1.08E+00
AG-110M	#A	7.6542E-01	7.6542E-01	8.852E+01%	2.33E+00
SN-113	#A	1.5599E-02	1.5599E-02	5.518E+03%	2.96E+00
SB-124	#A	-6.0362E-01	-6.0363E-01	1.764E+02%	3.58E+00
SB-125	#C	6.3308E+00	6.3308E+00	2.223E+01%	3.16E+00
I-131	#A	-1.1470E-01	-1.1471E-01	5.802E+02%	1.26E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	8.48E+00
Ga-68	#A	9.7900E+00	9.9125E+00	3.052E+02%	7.00E+01
Tc-99m	#A	-4.9386E-01	-4.9502E-01	1.432E+02%	2.36E+00
BA-133	#A	-8.5054E-01	-8.5054E-01	1.010E+02%	3.82E+00
CS-134	#A	2.3645E-01	2.3645E-01	8.402E+01%	3.53E+00
CS-137	#A	-1.0233E+00	-1.0233E+00	8.181E+01%	2.60E+00
CE-139	#A	-5.2013E-01	-5.2014E-01	9.249E+01%	1.60E+00
Ba-140	#A	1.5493E+00	1.5494E+00	1.116E+02%	4.22E+00
La-140	#A	-1.4119E+00	-1.4120E+00	8.507E+01%	2.54E+00
CE-141	#A	-9.3549E-01	-9.3550E-01	1.474E+02%	4.59E+00
CE-144	#A	-3.6396E+00	-3.6396E+00	1.455E+02%	1.76E+01
PM-144	#A	4.1812E-01	4.1812E-01	1.253E+02%	1.42E+00
EU-152	#A	1.6468E+00	1.6468E+00	9.143E+01%	9.31E+00
EU-154	#A	-4.0120E+00	-4.0120E+00	1.009E+02%	1.38E+01
EU-155	#A	2.0078E+00	2.0078E+00	1.618E+02%	1.08E+01
HF-181	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.40E+00
Ta-182	#A	-1.2524E+00	-1.2524E+00	1.799E+02%	7.79E+00
Hg-203	#A	4.4955E-01	4.4955E-01	1.061E+02%	1.60E+00
TL-208		7.9156E+00	7.9156E+00	8.846E+00%	9.68E-01
pm-146	#A	5.0147E-01	5.0147E-01	9.761E+01%	4.39E+00
y-88	#A	2.1969E-01	2.1970E-01	1.464E+02%	1.07E+00
Cd-113m	#A	-2.3101E+03	-2.3101E+03	3.397E+02%	2.67E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.00E+01
Cf-251	#A	1.7897E+00	1.7897E+00	1.061E+02%	4.87E+00
Cf-249	#A	-9.3101E-02	-9.3101E-02	8.358E+02%	2.68E+00
Sn-126	#A	-5.9866E+00	-5.9866E+00	1.129E+02%	2.25E+01
PB-210	#A	-1.8777E+01	-1.8777E+01	6.611E+01%	6.31E+01
PB-212		2.3945E+01	2.3945E+01	5.059E+00%	2.06E+00
PB-214		1.3527E+01	1.3527E+01	7.810E+00%	2.43E+00
BI-207	#A	6.9217E-01	6.9217E-01	3.774E+01%	1.85E+00
BI-212	#A	1.0292E+01	1.0292E+01	9.636E+01%	3.33E+01
BI-214		1.5269E+01	1.5269E+01	9.392E+00%	1.73E+00
BI-210M	#A	-7.2094E-01	-7.2094E-01	1.585E+02%	3.23E+00
AC-228		2.5914E+01	2.5914E+01	7.969E+00%	4.73E+00
TH-227	#A	7.7195E+00	7.7195E+00	1.043E+02%	2.69E+01

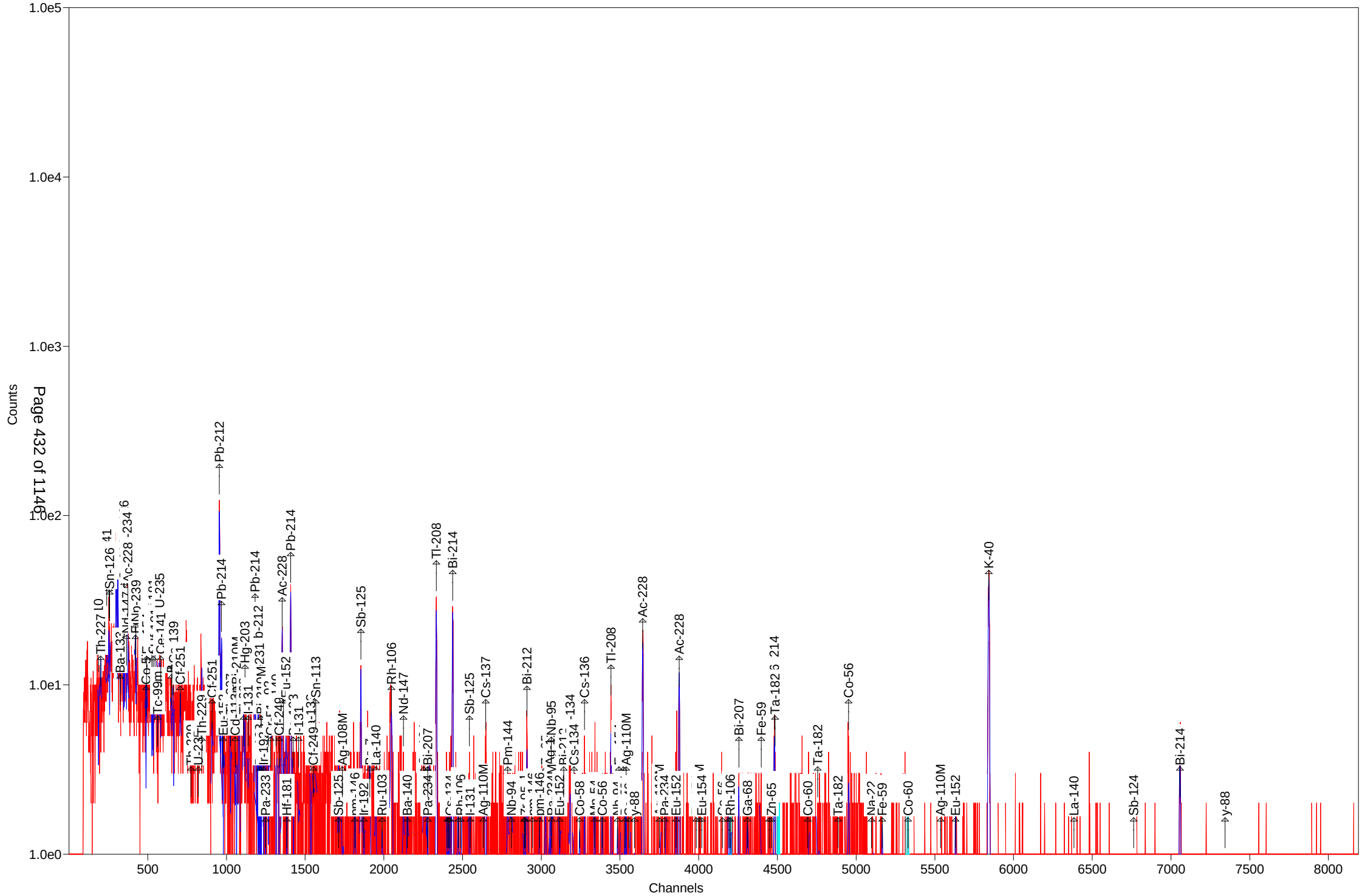
TH-229	#A	5.2976E+00	5.2976E+00	1.108E+02%	2.08E+01
TH-234	A	1.5886E+01	1.5886E+01	3.260E+01%	3.23E+01
PA-231	#A	-1.8113E+01	-1.8113E+01	1.724E+02%	1.04E+02
PA-233	#A	-1.4978E+00	-1.4978E+00	4.793E+01%	7.85E+00
PA-234	#A	5.9125E-01	5.9125E-01	8.679E+01%	1.05E+01
PA-234M	#A	4.2619E+00	4.2619E+00	6.567E+01%	3.23E+02
U-235	#A	-2.6540E+00	-2.6540E+00	6.588E+01%	1.93E+01
AM-241	#A	7.4941E-01	7.4941E-01	2.415E+02%	6.07E+00
Np-237	#A	-3.8264E+00	-3.8264E+00	1.747E+02%	2.22E+01
Ir-192	#A	-5.0157E-01	-5.0157E-01	1.952E+02%	3.28E+00
Cs-136	#A	4.8484E-01	4.8486E-01	9.945E+01%	1.64E+00
Np-239	#A	-2.0518E+00	-2.0523E+00	1.607E+02%	1.10E+01
Nd-147	#A	1.6708E+00	1.6709E+00	2.028E+02%	8.37E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 3.984E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 3.9841907E+02 Bq/Sample

264535_Gamma_160-18554-A-1-B. 8_Gamma_20161403.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20162141

Sample Description: 264535_Gamma_160-18554-A-1-C DU
Detector: Detector # 7
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-1-C DU

Decay to Time: 9/1/2016 12:39 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:39:48 Real Time: 1829 sec
Analysis Time: 9/1/2016 13:11 Dead Time: 1.56 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-31_1448.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.500E+00	186.3	2.794E+00	2.795E+00	9.684E+00
NA-22	-1.141E+00	64.2	7.323E-01	7.346E-01	2.416E+00
K-40	3.175E+02	4.8	1.516E+01	2.222E+01	7.938E+00
Sc-46	1.219E-01	299.4	3.650E-01	3.651E-01	1.851E+00
CR-51	2.904E+00	123.8	3.596E+00	3.599E+00	1.212E+01
MN-54	-6.752E-01	77.5	5.231E-01	5.242E-01	1.814E+00
FE-59	1.384E-01	884.6	1.224E+00	1.224E+00	2.779E+00
Co-56	5.102E-01	126.6	6.459E-01	6.465E-01	1.275E+00
CO-57	5.180E-01	82.0	4.249E-01	4.258E-01	9.306E-01
CO-58	3.890E-01	129.1	5.021E-01	5.025E-01	1.717E+00
CO-60	-8.039E-01	141.8	1.140E+00	1.140E+00	1.928E+00
ZN-65	-2.127E+00	84.8	1.803E+00	1.806E+00	6.027E+00
NB-94	5.163E-02	135.4	6.991E-02	6.996E-02	1.385E+00
ZR-95	3.337E-01	283.9	9.473E-01	9.475E-01	2.260E+00
NB-95	3.621E-01	169.0	6.120E-01	6.122E-01	2.090E+00
RU-103	-3.491E-01	123.6	4.315E-01	4.319E-01	1.245E+00
RH-106	-7.217E+00	139.3	1.006E+01	1.006E+01	3.368E+01
AG-108M	3.354E-01	110.5	3.707E-01	3.711E-01	9.558E-01
AG-110M	2.618E-01	146.9	3.845E-01	3.848E-01	2.415E+00
SN-113	6.130E-03	12078.0	7.404E-01	7.404E-01	2.539E+00
SB-124	3.074E-02	80.4	2.473E-02	2.478E-02	3.642E+00
SB-125	2.960E-01	94.4	2.793E-01	2.797E-01	3.458E+00
I-131	3.520E-01	116.1	4.086E-01	4.090E-01	1.018E+00
Gd-153	-1.001E-01	901.4	9.024E-01	9.024E-01	2.449E+00
Ga-68	6.826E-01	3525.6	2.407E+01	2.407E+01	5.483E+01
Tc-99m	-3.233E-01	120.3	3.890E-01	3.894E-01	1.298E+00
BA-133	-9.731E-02	123.5	1.202E-01	1.203E-01	3.119E+00
CS-134	-2.303E-01	91.6	2.110E-01	2.113E-01	3.602E+00
CS-137	2.913E-02	1652.3	4.812E-01	4.812E-01	1.700E+00
CE-139	3.134E-01	107.2	3.358E-01	3.371E-01	1.123E+00
Ba-140	1.639E+00	143.2	2.348E+00	2.350E+00	4.257E+00
La-140	3.459E-01	119.3	4.124E-01	4.128E-01	1.221E+00
CE-141	-6.613E-01	163.4	1.081E+00	1.081E+00	3.598E+00

CE-144	-2.588E+00	126.9	3.284E+00	3.287E+00	1.095E+01
PM-144	5.755E-01	92.4	5.318E-01	5.327E-01	1.227E+00
EU-152	1.335E+00	79.6	1.063E+00	1.065E+00	3.463E+00
EU-154	1.253E+00	79.6	9.977E-01	9.997E-01	1.228E+01
EU-155	1.164E+00	142.4	1.657E+00	1.658E+00	5.533E+00
HF-181	5.145E-01	91.7	4.716E-01	4.723E-01	1.340E+00
Ta-182	-3.638E-01	194.0	7.059E-01	7.061E-01	9.076E+00
Hg-203	-3.316E-01	114.1	3.783E-01	3.788E-01	1.273E+00
TL-208	7.388E+00	10.1	7.484E-01	8.408E-01	1.137E+00
pm-146	3.337E-01	415.7	1.387E+00	1.387E+00	3.352E+00
y-88	-5.899E-01	93.3	5.502E-01	5.510E-01	1.685E+00
Cd-113m	2.098E+03	232.7	4.881E+03	4.883E+03	1.664E+04
Cd-109	7.726E+00	152.7	1.180E+01	1.181E+01	3.933E+01
Cf-251	1.606E+00	107.6	1.728E+00	1.734E+00	4.413E+00
Cf-249	-3.647E-01	194.3	7.084E-01	7.086E-01	2.400E+00
Sn-126	6.083E-01	681.3	4.144E+00	4.144E+00	1.400E+01
PB-210	-3.909E+00	355.5	1.390E+01	1.390E+01	4.742E+01
PB-212	2.206E+01	4.5	9.961E-01	1.740E+00	1.588E+00
PB-214	1.412E+01	7.5	1.064E+00	1.293E+00	1.579E+00
BI-207	-1.669E-02	1870.8	3.122E-01	3.122E-01	1.116E+00
BI-212	9.364E+00	77.7	7.273E+00	7.289E+00	2.425E+01
BI-214	1.434E+01	9.2	1.313E+00	1.510E+00	1.921E+00
BI-210M	4.770E-01	118.1	5.635E-01	5.642E-01	1.900E+00
AC-228	2.356E+01	8.3	1.966E+00	2.304E+00	2.706E+00
TH-227	-5.800E+00	118.4	6.865E+00	6.873E+00	2.294E+01
TH-229	6.135E+00	105.5	6.472E+00	6.490E+00	1.676E+01
TH-234	1.418E+01	82.7	1.173E+01	1.176E+01	3.144E+01
PA-231	1.013E+01	125.0	1.266E+01	1.268E+01	5.729E+01
PA-233	1.373E+00	119.0	1.634E+00	1.636E+00	4.608E+00
PA-234	6.932E-01	92.2	6.388E-01	6.398E-01	6.405E+00
PA-234M	5.919E+01	116.6	6.899E+01	6.905E+01	2.355E+02
U-235	-3.261E+00	131.6	4.292E+00	4.295E+00	1.496E+01
AM-241	2.071E-02	6017.2	1.246E+00	1.246E+00	3.376E+00
Np-237	2.239E+00	165.2	3.698E+00	3.700E+00	1.232E+01
Ir-192	5.866E-01	39.9	2.339E-01	2.365E-01	1.920E+00
Cs-136	8.303E-01	32.6	2.711E-01	2.752E-01	1.231E+00
Np-239	8.367E-01	83.4	6.977E-01	6.996E-01	2.329E+00
Nd-147	1.220E+00	120.9	1.475E+00	1.477E+00	7.506E+00
Total	2.630E+03				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-1-C DU

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20162141.An1

Acquisition information
Start time: 9/1/2016 12:39:48 PM
Live time: 1800
Real time: 1829
Dead time: 1.56 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:39:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-31_1448.PBC 7/31/2016 2:48:35 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1654

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.42	27.	62.81	0.80	2.471E-02	46.54	4.250	PBC<MDA	PB210
63.29	39.	82.74	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.28	4.	681.32	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
74.76	219.	11.93	0.87	4.764E-02				
77.14	386.	7.71	0.87	4.889E-02				
87.31	162.	18.16	0.39	5.306E-02	86.49	13.100	1.305E+01	Np237
					86.54	30.700	5.569E+00	EU155
					86.94	9.040	1.886E+01	Sn126
					87.57	37.500	4.530E+00	Sn126
					88.04	3.790	4.470E+01	Cd109
91.10	28.	154.47	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.59	4.	995.79	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
93.03	178.	18.03	1.62	5.470E-02	92.59	5.584	2.814E+01	TH234
					93.35	5.561	3.251E+01	AC228
105.31	25.	142.41	0.90	5.638E-02	105.31	21.200	PBC<MDA	EU155
106.13	19.	83.40	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
121.78	23.	101.28	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.639E-01	CO57
122.06	23.	105.50	0.92	5.606E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.639E-01	CO57
123.10	22.	102.54	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
136.47	27.	125.64	0.93	5.410E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.554E+00	CO57
165.85	22.	107.16	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
176.60	23.	107.60	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
193.51	10.	213.16	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
210.85	23.	105.48	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229
227.00	10.	195.51	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.66	613.	5.24	1.00	3.601E-02	238.63	43.300	2.184E+01	PB212
242.07	102.	16.40	1.04	3.560E-02	242.00	7.430	2.150E+01	PB214
256.24	4.	416.13	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
263.70	8.	232.67	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	14.	118.14	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.56	48.	31.22	1.07	3.172E-02	277.28	6.310	1.329E+01	TL208
295.13	165.	12.78	1.15	3.008E-02	295.09	19.300	1.578E+01	PB214
300.00	56.	28.15	0.44	2.966E-02	300.03	3.280	3.207E+01	PB212
					300.07	2.460	4.277E+01	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	14.	173.03	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.094E+01	PA231
					300.18	6.200	4.343E+00	PA233
300.18	14.	177.01	1.10	2.965E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.094E+01	PA231
					300.18	6.200	4.343E+00	PA233
302.65	14.	180.48	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.484E+00	BA133
302.85	14.	184.25	1.11	2.943E-02	302.65	2.880	9.439E+00	PA231
					302.85	18.330	1.484E+00	BA133
304.85	14.	187.63	1.11	2.926E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	9.788E-01	BI210M
312.01	16.	159.20	1.12	2.869E-02	312.01	36.000	PBC<MDA	PA233
316.65	16.	157.83	1.12	2.834E-02	316.49	87.040	PBC<MDA	Ir192
320.08	15.	123.82	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
338.41	108.	15.88	1.10	2.676E-02	338.32	12.010	1.860E+01	AC228
344.29	8.	162.23	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
345.83	15.	91.65	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.04	232.	8.00	1.04	2.587E-02	351.93	37.600	1.327E+01	PB214
365.91	13.	116.07	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
433.94	11.	121.85	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
463.37	15.	94.36	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
467.47	18.	39.87	1.65	2.022E-02	468.06	51.750	9.644E-01	Ir192
477.60	6.	186.33	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
482.00	6.	178.96	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
487.02	11.	119.25	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
511.86	60.	47.30	2.56	1.870E-02	511.86	20.000	8.861E+00	RH106
531.00	7.	185.99	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
537.26	6.	216.45	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
563.24	13.	95.21	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.32	1.	888.82	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	3.977E-01	PA234
					569.70	97.740	3.338E-02	BI207
583.30	188.	10.13	1.32	1.668E-02	583.02	84.500	7.388E+00	TL208
609.39	191.	9.16	1.32	1.605E-02	609.31	46.090	1.434E+01	BI214
					610.30	5.750	1.151E+02	RU103
657.76	6.	193.58	1.45	1.500E-02	657.76	94.640	PBC<MDA	AG110M
696.54	15.	92.40	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
722.79	17.	80.44	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.723E-01	AG108M
					723.36	20.220	3.471E+00	EU154
722.94	8.	184.42	1.51	1.380E-02	722.79	10.810	3.008E+00	SB124
					722.94	90.840	3.581E-01	AG108M
					723.36	20.220	1.609E+00	EU154
727.14	17.	77.67	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
747.16	3.	415.65	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
756.73	4.	283.89	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
765.79	9.	169.01	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.230E+02	PA234M
786.47	4.	341.53	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
810.78	9.	129.10	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
818.50	7.	164.75	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
846.77	2.	649.72	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
861.03	27.	28.51	0.94	1.181E-02	860.56	12.420	1.018E+01	TL208
871.10	6.	135.40	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
880.53	10.	86.58	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
883.24	10.	97.39	1.65	1.154E-02	883.24	9.600	PBC<MDA	PA234
884.68	5.	220.95	1.65	1.152E-02	884.68	72.680	PBC<MDA	AG110M
911.35	137.	9.49	1.88	1.122E-02	911.07	29.000	2.340E+01	AC228
964.11	10.	143.05	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.28	80.	13.73	1.37	1.062E-02	968.97	17.460	2.383E+01	AC228
996.33	12.	79.64	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1001.00	9.	116.55	1.75	1.031E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	9.	126.60	1.78	9.978E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	21.	32.65	1.79	9.890E-03	1048.07	80.000	1.475E+00	Cs136
1099.25	1.	884.59	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1120.01	18.	90.19	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	299.43	1.85	9.309E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.911E-01	Sc46
					1121.30	34.900	8.346E-01	Ta182
1189.05	4.	325.32	1.90	8.821E-03	1189.05	16.200	PBC<MDA	Ta182
1408.00	3.	321.60	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1460.83	446.	4.77	1.77	7.309E-03	1460.83	10.670	3.175E+02	K40
1596.21	2.	304.14	2.19	6.737E-03	1596.21	95.400	PBC<MDA	La140
1764.66	11.	66.89	2.29	6.141E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	7.	126.15	2.29	6.119E-03	1771.35	15.480	PBC<MDA	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.60	74.76	230.	219.	4.587E+03	11.93	0.867	- D
308.14	77.15	249.	386.	7.893E+03	7.71	0.869	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	351.	-7.	-0.004	355.50	0.836
TH-227	200.12	50.14	382.	-24.	-0.013	118.37	0.840s
TH-234	252.71	63.29	322.	39.	0.022	82.74	0.854s
Sn-126	256.68	64.28	434.	4.	0.002	681.32	0.856
BA-133	323.52	80.99	300.	-8.	-0.005	361.28	0.874
Np-237	345.53	86.49	1046.	28.	0.015	165.18	0.880A
EU-155	345.74	86.54	1078.	-29.	-0.016	163.84	0.880s
Sn-126	347.33	86.94	1008.	5.	0.003	473.98	0.880D
Sn-126	349.85	87.57	878.	22.	0.012	113.77	0.881D
Cd-109	351.73	88.04	906.	28.	0.016	152.72	0.881A
Nd-147	363.97	91.10	934.	28.	0.016	154.47	0.885s
TH-234	369.93	92.59	986.	4.	0.002	995.79	0.886s
AC-228	371.67	93.03	213.	178.	0.099	18.03	1.617s
Gd-153	389.57	97.50	230.	-3.	-0.002	901.44	0.892s
Np-239	397.57	99.50	791.	-28.	-0.016	142.56	0.894
Gd-153	412.38	103.20	768.	-28.	-0.016	139.96	0.898s
Np-239	414.38	103.70	805.	-28.	-0.016	143.17	0.898
EU-155	420.83	105.31	623.	25.	0.014	142.41	0.900s
Np-239	424.10	106.13	120.	19.	0.011	83.40	0.901D
EU-152	486.69	121.78	255.	23.	0.013	101.28	0.918s
CO-57	487.83	122.06	278.	23.	0.013	105.50	0.918s
EU-154	491.98	123.10	241.	22.	0.012	102.54	0.919s
PA-234	524.77	131.29	570.	-28.	-0.016	156.49	0.928s
HF-181	531.68	133.02	598.	-28.	-0.016	124.15	0.930s
CE-144	533.74	133.54	626.	-28.	-0.016	126.90	0.930s
HF-181	544.79	136.30	655.	-12.	-0.007	291.22	0.933s
CO-57	545.48	136.47	544.	27.	0.015	125.64	0.933s
Tc-99m	561.63	140.51	510.	-27.	-0.015	120.32	0.938s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	574.73	143.79	1076.	-34.	-0.019	131.62	0.941s
CE-141	581.35	145.44	1190.	-30.	-0.017	163.40	0.943s
Ba-140	650.24	162.66	348.	-25.	-0.014	108.35	0.961s
U-235	653.11	163.38	374.	-7.	-0.004	648.82	0.962s
CE-139	663.01	165.85	267.	22.	0.012	107.16	0.965s
Cf-251	706.00	176.60	165.	23.	0.013	107.60	0.976s
TH-229	773.64	193.51	136.	10.	0.006	213.16	0.994
U-235	820.94	205.33	152.	-8.	-0.004	586.38	1.007
TH-229	843.01	210.85	162.	23.	0.013	105.48	1.012
Cf-251	907.62	227.00	114.	10.	0.006	195.51	1.029s
PB-212	954.15	238.63	81.	619.	0.344	4.52	1.041D
PB-214	967.61	242.00	90.	102.	0.057	16.40	1.045D
EU-152	978.39	244.69	1035.	-23.	-0.013	123.71	1.048s
TH-227	1024.59	256.24	92.	4.	0.002	416.13	1.060
Cd-113m	1054.43	263.70	148.	8.	0.004	232.67	1.067s
BI-210M	1062.96	265.83	132.	14.	0.008	118.14	1.070s
TL-208	1109.88	277.56	46.	48.	0.027	31.22	1.067
Hg-203	1116.44	279.20	145.	-15.	-0.009	114.08	1.083s
I-131	1136.83	284.30	100.	-7.	-0.004	95.81	1.089s
PB-214	1180.17	295.13	58.	165.	0.092	12.78	1.155
PB-212	1199.63	300.00	49.	56.	0.031	28.15	0.438s
PA-231	1199.92	300.07	302.	14.	0.008	173.03	1.105s
PA-233	1200.36	300.18	316.	14.	0.008	177.01	1.105s
PA-231	1210.24	302.65	331.	14.	0.008	180.48	1.107s
BA-133	1211.05	302.85	345.	14.	0.008	184.25	1.108s
Ba-140	1219.04	304.85	360.	14.	0.008	187.63	1.110s
BI-210M	1219.23	304.90	301.	-19.	-0.010	131.84	1.110s
PA-233	1247.69	312.01	317.	16.	0.009	159.20	1.117
Ir-192	1265.61	316.49	314.	16.	0.009	157.83	1.122s
CR-51	1279.99	320.08	156.	15.	0.008	123.82	1.125
Cf-249	1333.41	333.44	92.	-12.	-0.006	163.89	1.139s
AC-228	1353.30	338.41	44.	108.	0.060	15.88	1.095
EU-152	1376.80	344.29	77.	8.	0.004	162.23	1.150s
HF-181	1382.97	345.83	87.	15.	0.008	91.65	1.151s
PB-214	1407.81	352.04	29.	232.	0.129	8.00	1.042s
BA-133	1423.66	356.00	345.	-16.	-0.009	164.51	1.162s
I-131	1457.59	364.48	56.	13.	0.007	116.07	1.170s
BA-133	1535.03	383.84	177.	-18.	-0.010	107.11	1.189s
Cf-249	1551.47	387.95	195.	-10.	-0.006	194.25	1.193s
SB-125	1711.18	427.88	65.	-11.	-0.006	169.46	1.233s
AG-108M	1735.43	433.94	44.	11.	0.006	121.85	1.239s
pm-146	1815.20	453.88	56.	-3.	-0.002	542.66	1.258s
SB-125	1853.15	463.37	88.	15.	0.008	94.36	1.268s
Ir-192	1869.57	467.47	11.	18.	0.010	39.87	1.649s
BE-7	1910.07	477.60	52.	6.	0.003	186.33	1.282s
HF-181	1927.68	482.00	58.	6.	0.003	178.96	1.286s
La-140	1947.77	487.02	86.	11.	0.006	119.25	1.291s
RU-103	1987.91	497.05	61.	-11.	-0.006	123.59	1.301s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2047.15	511.86	113.	60.	0.033	47.30	2.565s
Nd-147	2123.70	531.00	39.	7.	0.004	185.99	1.333
Ba-140	2148.74	537.26	44.	6.	0.004	216.45	1.339s
CS-134	2252.65	563.24	35.	13.	0.007	95.21	1.364s
CS-134	2276.99	569.32	39.	1.	0.001	888.82	1.369s
TL-208	2332.91	583.30	32.	188.	0.104	10.13	1.324
SB-125	2401.71	600.50	496.	-19.	-0.011	163.41	1.399s
SB-124	2410.64	602.73	476.	-19.	-0.011	159.99	1.401s
CS-134	2418.55	604.71	457.	-20.	-0.011	156.54	1.403s
BI-214	2437.29	609.39	24.	191.	0.106	9.16	1.316
RU-103	2440.91	610.30	437.	-20.	-0.011	152.68	1.408s
AG-108M	2456.84	614.28	417.	-20.	-0.011	148.91	1.412s
PM-144	2471.96	618.06	398.	-20.	-0.011	145.09	1.415s
RH-106	2487.38	621.92	391.	-20.	-0.011	139.35	1.419s
SB-125	2543.28	635.89	56.	-18.	-0.010	88.58	1.432s
AG-110M	2630.77	657.76	57.	6.	0.003	193.58	1.452s
PM-144	2785.90	696.54	37.	15.	0.008	92.40	1.487
NB-94	2810.25	702.63	47.	-5.	-0.003	313.96	1.493s
SB-124	2890.87	722.79	90.	17.	0.010	80.44	1.511s
AG-108M	2891.48	722.94	107.	8.	0.004	184.42	1.511s
EU-154	2893.15	723.36	115.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	178.	-26.	-0.015	74.44	1.512s
BI-212	2908.41	727.17	83.	17.	0.010	77.67	1.515s
pm-146	2988.37	747.16	28.	3.	0.002	415.65	1.533s
ZR-95	3026.65	756.73	33.	4.	0.002	283.89	1.541s
AG-110M	3055.51	763.94	91.	-22.	-0.012	66.17	1.548s
NB-95	3062.89	765.79	100.	9.	0.005	169.01	1.549s
PA-234M	3065.38	766.41	106.	-10.	-0.006	141.74	1.550s
EU-152	3115.41	778.92	28.	0.	0.000	1000.00	1.561s
BI-212	3141.41	785.42	52.	4.	0.002	341.53	1.567s
CS-134	3207.54	801.95	38.	-2.	-0.001	566.68	1.581s
CO-58	3242.84	810.78	58.	9.	0.005	129.10	1.589s
Cs-136	3273.74	818.50	28.	7.	0.004	164.75	1.596s
MN-54	3339.13	834.85	63.	-15.	-0.008	77.46	1.610s
Co-56	3386.82	846.77	28.	2.	0.001	649.72	1.620s
TL-208	3443.88	861.03	7.	27.	0.015	28.51	0.944s
NB-94	3484.13	871.10	30.	6.	0.003	135.40	1.641
EU-154	3492.66	873.23	38.	-2.	-0.001	590.67	1.643s
PA-234	3521.86	880.53	32.	10.	0.006	86.58	1.649s
PA-234	3532.70	883.24	42.	10.	0.006	97.39	1.652s
AG-110M	3538.47	884.68	52.	5.	0.003	220.95	1.653s
y-88	3591.90	898.04	40.	-11.	-0.006	93.27	1.664
AC-228	3645.12	911.35	8.	137.	0.076	9.49	1.884s
AG-110M	3749.71	937.49	40.	-9.	-0.005	158.05	1.697s
EU-152	3856.18	964.11	104.	10.	0.006	143.05	1.719s
AC-228	3876.87	969.28	10.	80.	0.044	13.73	1.370
EU-154	3985.06	996.33	41.	12.	0.007	79.64	1.746s
PA-234M	4003.73	1001.00	53.	9.	0.005	116.55	1.750s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4018.84	1004.77	85.	-15.	-0.008	91.26	1.753s
Co-56	4151.10	1037.84	25.	9.	0.005	126.60	1.780s
Cs-136	4192.02	1048.07	13.	21.	0.012	32.65	1.788s
RH-106	4201.18	1050.36	69.	-16.	-0.009	75.41	1.790s
BI-207	4254.38	1063.66	43.	-14.	-0.008	111.96	1.801s
FE-59	4396.74	1099.25	27.	1.	0.001	884.59	1.829s
EU-152	4448.04	1112.07	127.	-18.	-0.010	91.17	1.839s
ZN-65	4461.92	1115.55	109.	-18.	-0.010	84.76	1.842s
BI-214	4480.88	1120.29	123.	18.	0.010	90.19	1.845s
Sc-46	4481.94	1120.55	104.	5.	0.003	299.43	1.846s
Ta-182	4484.94	1121.30	117.	-7.	-0.004	211.59	1.846s
CO-60	4692.68	1173.24	38.	-7.	-0.004	245.50	1.886s
Ta-182	4755.93	1189.05	32.	4.	0.002	325.32	1.899
Ta-182	4885.37	1221.41	32.	-2.	-0.001	646.79	1.923s
Co-56	4952.84	1238.28	65.	-6.	-0.003	292.93	1.936s
NA-22	5097.84	1274.53	51.	-17.	-0.009	64.17	1.963
EU-154	5097.89	1274.54	68.	0.	0.000	1000.00	1.963
FE-59	5166.10	1291.60	40.	-12.	-0.007	137.52	1.975s
CO-60	5329.71	1332.50	29.	-12.	-0.006	141.79	2.005s
EU-152	5631.70	1408.00	11.	3.	0.001	321.60	2.059s
K-40	5843.02	1460.83	3.	446.	0.248	4.77	1.768
La-140	6384.49	1596.21	6.	2.	0.001	304.14	2.185s
SB-124	6763.55	1690.98	6.	-3.	-0.002	205.48	2.245s
BI-214	7057.56	1764.49	20.	11.	0.006	66.89	2.290s
Co-56	7084.99	1771.35	33.	7.	0.004	126.15	2.294s
y-88	7343.81	1836.06	25.	-14.	-0.008	91.11	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   1.4997E+00                                      5.31E+01
                            477.60 1.500E+00 ?(P 9.684E+00 1.86E+02 1.05E+01 G

NA-22    C  -1.1413E+00                                      9.50E+02
                           1274.53-1.141E+00 ?(  2.416E+00 6.42E+01 9.99E+01 G

K-40     N   3.1753E+02                                      4.66E+11
                           1460.83 3.175E+02  (P 7.938E+00 4.77E+00 1.07E+01 G

Sc-46    F   1.2190E-01                                      8.38E+01
                            889.28-4.733E-02 &(P 1.851E+00 1.08E+03 1.00E+02 G
                           1120.55 2.911E-01 ?(  3.001E+00 2.99E+02 1.00E+02 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	2.9040E+00					2.77E+01	
			320.08	2.904E+00	?(P	1.212E+01	1.24E+02	9.94E+00 G
MN-54	C	-6.7523E-01					3.12E+02	
			834.85	-6.752E-01	?(P	1.814E+00	7.75E+01	1.00E+02 G
FE-59	F	1.3841E-01					4.45E+01	
			1099.25	1.384E-01	&(	2.779E+00	8.85E+02	5.65E+01 G
			1291.60	-1.863E+00	+ P	5.051E+00	1.38E+02	4.32E+01 G
Co-56	C	5.1019E-01					7.73E+01	
			846.77	8.090E-02	?(P	1.275E+00	6.50E+02	9.99E+01 G
			1238.28	-5.498E-01	+ P	3.972E+00	2.93E+02	6.61E+01 G
			1037.84	3.546E+00	&(	1.025E+01	1.27E+02	1.41E+01 G
			1771.35	3.979E+00	? P	1.734E+01	1.26E+02	1.55E+01 A
CO-57	C	5.1800E-01					2.72E+02	
			122.06	2.639E-01	&(	9.306E-01	1.05E+02	8.56E+01 G
			136.47	2.554E+00	?(	1.071E+01	1.26E+02	1.07E+01 G
CO-58	C	3.8896E-01					7.09E+01	
			810.78	3.890E-01	?(P	1.717E+00	1.29E+02	9.95E+01 G
CO-60	F	-8.0388E-01					1.93E+03	
			1332.50	-8.039E-01	?(P	1.928E+00	1.42E+02	1.00E+02 G
			1173.24	-4.121E-01	+ P	1.949E+00	2.46E+02	9.99E+01 G
ZN-65	F	-2.1272E+00					2.44E+02	
			1115.55	-2.127E+00	?(	6.027E+00	8.48E+01	5.06E+01 G
NB-94	I	5.1634E-02					7.41E+06	
			702.63	-1.872E-01	&(	1.385E+00	3.14E+02	9.79E+01 G
			871.10	2.857E-01	&(	1.344E+00	1.35E+02	9.99E+01 G
ZR-95	I	3.3370E-01					6.40E+01	
			756.73	3.337E-01	?(	2.260E+00	2.84E+02	5.45E+01 G
			724.20	-2.401E+00	+	5.932E+00	7.44E+01	4.42E+01 G
NB-95	I	3.6208E-01					6.40E+01	
			765.79	3.621E-01	?(	2.090E+00	1.69E+02	9.98E+01 G
RU-103	I	-3.4913E-01					3.93E+01	
			497.05	-3.491E-01	?(P	1.245E+00	1.24E+02	9.09E+01 G
			610.30	-1.180E+01	+	6.036E+01	1.53E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-7.2175E+00					3.74E+02	
			621.92	-7.217E+00	?(	3.368E+01	1.39E+02	9.93E+00 G
			1050.36	-5.940E+01	&	1.493E+02	7.54E+01	1.56E+00 G
			511.86	8.861E+00	?	7.770E+00	4.73E+01	2.00E+01 GA
AG-108M	C	3.3544E-01					1.53E+05	
			433.94	3.127E-01	?(	9.558E-01	1.22E+02	9.05E+01 G
			722.94	3.581E-01	?(	2.256E+00	1.84E+02	9.08E+01 G
			614.28	-7.617E-01	+	3.799E+00	1.49E+02	8.98E+01 G
AG-110M	F	2.6181E-01					2.50E+02	
			884.68	3.140E-01	?(P	2.415E+00	2.21E+02	7.27E+01 G
			657.76	2.217E-01	?(	1.487E+00	1.94E+02	9.46E+01 G
			937.49	-1.331E+00	+	4.758E+00	1.58E+02	3.44E+01 G
			1384.30	-9.929E-02	%	5.480E+00	2.37E+03	2.43E+01 G
			763.94	-4.086E+00	+	8.938E+00	6.62E+01	2.23E+01 G
SN-113	F	6.1298E-03					1.15E+02	
			391.69	6.130E-03	%(	2.539E+00	1.21E+04	6.40E+01 G
SB-124	F	3.0739E-02					6.02E+01	
			602.73	-6.797E-01	?(	3.642E+00	1.60E+02	9.83E+01 G
			1690.98	-5.460E-01	+	2.571E+00	2.05E+02	4.78E+01 G
			722.79	6.489E+00	?(	1.743E+01	8.04E+01	1.08E+01 G
SB-125	I	2.9597E-01					1.01E+03	
			427.88	-9.442E-01	?(P	3.458E+00	1.69E+02	2.96E+01 G
			600.50	-3.722E+00	&	2.036E+01	1.63E+02	1.79E+01 G
			635.89	-5.703E+00	+	1.198E+01	8.86E+01	1.13E+01 G
			463.37	3.802E+00	?(	1.206E+01	9.44E+01	1.05E+01 G
I-131	I	3.5205E-01					8.02E+00	
			364.48	3.520E-01	&(	1.018E+00	1.16E+02	8.17E+01 G
			284.30	-2.112E+00	& P	1.438E+01	9.58E+01	6.14E+00 G
			636.97	-5.293E-01	%	2.228E+01	1.20E+03	7.17E+00 G
Gd-153	F	-1.0011E-01					2.42E+02	
			97.50	-1.001E-01	?(	2.449E+00	9.01E+02	3.00E+01 G
			103.20	-1.281E+00	&	5.978E+00	1.40E+02	2.18E+01 G
Ga-68	C	6.8264E-01					4.71E-02	
			1077.40	6.826E-01	%(	5.483E+01	3.53E+03	3.30E+00 G
Tc-99m	I	-3.2330E-01					2.51E-01	
			140.51	-3.233E-01	&(	1.298E+00	1.20E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-9.7315E-02					3.85E+03	
			356.00	-5.644E-01	*(	3.119E+00	1.65E+02	6.20E+01 G
			302.85	1.484E+00	?(	9.195E+00	1.84E+02	1.83E+01 G
			383.84	-4.664E+00	+	1.676E+01	1.07E+02	8.94E+00 GA
			80.99	-2.651E-01	+ P	2.685E+00	3.61E+02	3.41E+01 GA
CS-134	I	-2.3033E-01					7.54E+02	
			604.71	-6.871E-01	?(	3.602E+00	1.57E+02	9.76E+01 G
			795.87	-5.129E-02	%	2.342E+00	1.31E+03	8.55E+01 G
			569.32	2.120E-01	+	6.744E+00	8.89E+02	1.54E+01 G
			801.95	-1.186E+00	+	1.604E+01	5.67E+02	8.69E+00 G
			563.24	5.110E+00	&(P	1.169E+01	9.52E+01	8.35E+00 G
CS-137	I	2.9125E-02					1.10E+04	
			661.66	2.913E-02	%(	1.700E+00	1.65E+03	8.52E+01 G
CE-139	F	3.1336E-01					1.38E+02	
			165.85	3.134E-01	(	1.123E+00	1.07E+02	7.99E+01 G
Ba-140	I	1.6393E+00					1.28E+01	
			537.26	8.041E-01	*(P	4.257E+00	2.16E+02	2.44E+01 G
			162.66	-4.571E+00	+	1.654E+01	1.08E+02	6.22E+00 G
			304.85	6.388E+00	(	4.030E+01	1.88E+02	4.29E+00 G
La-140	I	3.4585E-01					1.28E+01	
			1596.21	1.729E-01	?(	1.221E+00	3.04E+02	9.54E+01 G
			487.02	7.085E-01	?(P	2.865E+00	1.19E+02	4.55E+01 G
			328.76	-6.420E-02	& P	6.162E+00	2.81E+03	2.03E+01 G
			815.77	-1.797E-02	% P	7.875E+00	1.20E+04	2.33E+01 G
CE-141	I	-6.6134E-01					3.25E+01	
			145.44	-6.613E-01	?(	3.598E+00	1.63E+02	4.82E+01 G
CE-144	I	-2.5881E+00					2.85E+02	
			133.54	-2.588E+00	&(	1.095E+01	1.27E+02	1.11E+01 G
PM-144	C	5.7554E-01					3.63E+02	
			696.54	5.755E-01	&(	1.227E+00	9.24E+01	9.90E+01 G
			618.06	-6.961E-01	+	3.383E+00	1.45E+02	9.91E+01 G
EU-152	F	1.3348E+00					4.94E+03	
			344.29	6.227E-01	?(	3.463E+00	1.62E+02	2.65E+01 G
			1112.07	-7.855E+00	+	2.398E+01	9.12E+01	1.36E+01 G
			121.78	7.899E-01	&(	2.673E+00	1.01E+02	2.86E+01 G
			778.92	0.000E+00	-	9.101E+00	1.00E+03	1.29E+01 G
			964.11	3.693E+00	?(	1.796E+01	1.43E+02	1.46E+01 G
			244.69	-4.700E+00	+ P	3.172E+01	1.24E+02	7.58E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         1408.00 8.784E-01 ? P 6.474E+00 3.22E+02 2.10E+01 GA

EU-154   I   1.2528E+00                                     3.14E+03
                          873.23-5.827E-01 ?(  1.228E+01 5.91E+02 1.23E+01 G
                          123.10 5.333E-01 ?(  1.828E+00 1.03E+02 4.08E+01 G
                         1274.54 0.000E+00 -   7.843E+00 1.00E+03 3.52E+01 G
                          723.36 0.000E+00 -   1.050E+01 1.00E+03 2.02E+01 G
                         1004.77-4.482E+00 +   1.374E+01 9.13E+01 1.80E+01 G
                          996.33 6.146E+00 ?(  1.642E+01 7.96E+01 1.06E+01 G

EU-155   I   1.1637E+00                                     1.81E+03
                          105.31 1.164E+00 *(  5.533E+00 1.42E+02 2.12E+01 G
                           86.54-9.777E-01 +   5.337E+00 1.64E+02 3.07E+01 G

HF-181   F   5.1452E-01                                     4.24E+01
                          482.00 2.168E-01 ?(P 1.340E+00 1.79E+02 8.05E+01 G
                          133.02-6.615E-01 +   2.738E+00 1.24E+02 4.33E+01 G
                          345.83 2.105E+00 &(  6.480E+00 9.17E+01 1.51E+01 G
                          136.30-2.190E+00 +   2.139E+01 2.91E+02 5.85E+00 G

Ta-182   F  -3.6377E-01                                     1.14E+02
                         1121.30-1.254E+00 ?(  9.076E+00 2.12E+02 3.49E+01 G
                         1221.41-4.781E-01 +   6.949E+00 6.47E+02 2.70E+01 G
                         1189.05 1.555E+00  (  1.130E+01 3.25E+02 1.62E+01 G

Hg-203   F  -3.3158E-01                                     4.66E+01
                          279.20-3.316E-01 ?(  1.273E+00 1.14E+02 8.15E+01 G

TL-208   N   7.3876E+00                                     6.98E+02
                          583.02 7.388E+00  (  1.137E+00 1.01E+01 8.45E+01 G
                          277.28 1.329E+01 + P 9.536E+00 3.12E+01 6.31E+00 G
                          860.56 1.018E+01 + P 5.740E+00 2.85E+01 1.24E+01 G

pm-146   C   3.3369E-01                                     2.02E+03
                          747.16 3.337E-01 ?(P 3.352E+00 4.16E+02 3.40E+01 G
                          735.72 1.818E-01 %   4.975E+00 1.13E+03 2.25E+01 G
                          453.88-1.416E-01 + P 1.552E+00 5.43E+02 6.50E+01 G

y-88     F  -5.8985E-01                                     1.07E+02
                          898.04-5.899E-01 ?(P 1.685E+00 9.33E+01 9.37E+01 G
                         1836.06-1.356E+00 +   2.476E+00 9.11E+01 9.92E+01 G

Cd-113m      2.0978E+03                                     5.33E+03
                          263.70 2.098E+03 ?(  1.664E+04 2.33E+02 6.00E-03   K

Cd-109   F   7.7262E+00                                     4.53E+02
                                                          Derived Ave Activity
                           88.04 7.726E+00 }(  3.933E+01 1.53E+02 3.79E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.6059E+00					3.28E+05	
			176.60	1.606E+00	&(	4.413E+00	1.08E+02	1.70E+01 G
			227.00	2.426E+00	?	1.230E+01	1.96E+02	6.30E+00 GA
Cf-249	T	-3.6465E-01					1.28E+05	
			387.95	-3.647E-01	?(	2.400E+00	1.94E+02	6.60E+01 G
			333.44	-1.542E+00	&	6.275E+00	1.64E+02	1.55E+01 G
Sn-126		6.0825E-01					3.65E+07	
			87.57	6.083E-01	}	3.925E+00	1.14E+02	3.75E+01 GA
			64.28	6.083E-01	(	1.400E+01	6.81E+02	9.70E+00 G
			86.94	6.083E-01	}	1.749E+01	4.74E+02	9.04E+00 GA
PB-210	N	-3.9092E+00					8.14E+03	
			46.54	-3.909E+00	?(P	4.742E+01	3.55E+02	4.25E+00 G
PB-212	N	2.2058E+01					6.98E+02	
			238.63	2.206E+01	(P	1.588E+00	4.52E+00	4.33E+01 G
			300.03	3.207E+01	+ P	2.014E+01	2.81E+01	3.28E+00 GA
PB-214	N	1.4118E+01					5.84E+05	
			351.93	1.327E+01	@(P	1.579E+00	8.00E+00	3.76E+01 G
			295.09	1.578E+01	(P	3.657E+00	1.28E+01	1.93E+01 G
			242.00	2.150E+01	+	9.838E+00	1.64E+01	7.43E+00 GA
BI-207	C	-1.6689E-02					1.18E+04	
			569.70	-1.669E-02	%(	1.116E+00	1.87E+03	9.77E+01 G
			1063.66	-1.044E+00	+	2.533E+00	1.12E+02	7.45E+01 G
BI-212	N	9.3642E+00					6.98E+02	
			727.17	9.364E+00	?(	2.425E+01	7.77E+01	7.55E+00 G
			785.42	1.523E+01	& P	1.224E+02	3.42E+02	1.28E+00 GA
BI-214	N	1.4337E+01					5.84E+05	
			609.31	1.434E+01	(P	1.921E+00	9.16E+00	4.61E+01 G
			1120.29	7.106E+00	- P	2.145E+01	9.02E+01	1.51E+01 G
			1764.49	6.322E+00	- P	1.398E+01	6.69E+01	1.54E+01 G
BI-210M	T	4.7698E-01					1.10E+09	
			265.83	4.770E-01	?(P	1.900E+00	1.18E+02	5.00E+01 G
			304.90	-1.282E+00	+	5.666E+00	1.32E+02	2.80E+01 G
AC-228	N	2.3560E+01					2.10E+03	
			911.07	2.340E+01	@(P	2.706E+00	9.49E+00	2.90E+01 G
			968.97	2.383E+01	(	5.117E+00	1.37E+01	1.75E+01 G
			338.32	1.860E+01	-	5.830E+00	1.59E+01	1.20E+01 G
			93.35	3.251E+01	+	1.292E+01	1.80E+01	5.56E+00 XA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227   N  -5.8002E+00                                     7.95E+03
                          50.14-5.800E+00 ?(  2.294E+01 1.18E+02 8.00E+00 G
                         256.24 1.014E+00 +   1.107E+01 4.16E+02 7.00E+00 G

TH-229   N   6.1355E+00                                     2.68E+06
                         193.51 3.039E+00 ?(  1.676E+01 2.13E+02 4.40E+00 G
                         210.85 1.069E+01 ?(P 2.881E+01 1.05E+02 2.99E+00 G

TH-234   N   1.4181E+01                                     1.63E+12
                          63.29 1.418E+01 *(P 3.144E+01 8.27E+01 3.81E+00 G
                          92.59 8.152E-01 - P 2.720E+01 9.96E+02 5.58E+00 G

PA-231   N   1.0130E+01                                     1.20E+07
                         302.65 9.437E+00 ?(  5.729E+01 1.80E+02 2.88E+00 G
                         300.07 1.094E+01  (  6.372E+01 1.73E+02 2.46E+00 G

PA-233   C   1.3728E+00                                     7.82E+08
                         312.01 8.613E-01 &(  4.608E+00 1.59E+02 3.60E+01 G
                         300.18 4.343E+00  (  2.587E+01 1.77E+02 6.20E+00 G

PA-234   N   6.9317E-01                                     1.63E+12
                         131.29-1.598E+00 &(P 6.405E+00 1.56E+02 1.80E+01 G
                         946.02 3.822E-01 %   9.941E+00 1.10E+03 1.34E+01 G
                         569.47 1.989E-01 %   1.302E+01 1.83E+03 8.20E+00 G
                         883.24 4.988E+00 ?(  1.649E+01 9.74E+01 9.60E+00 G
                         880.53 7.948E+00 ?   2.327E+01 8.66E+01 6.00E+00 GA

PA-234M  N   5.9189E+01                                     1.63E+12
                        1001.00 5.919E+01 &(  2.355E+02 1.17E+02 8.37E-01 G
                         766.41-1.515E+02 +   7.296E+02 1.42E+02 2.94E-01 G

U-235    N  -3.2608E+00                                     2.57E+11
                         143.79-3.261E+00 ?(P 1.496E+01 1.32E+02 1.10E+01 G
                         205.33-2.069E+00 + P 1.631E+01 5.86E+02 5.01E+00 G
                         163.38-1.560E+00 & P 2.105E+01 6.49E+02 5.08E+00 G

AM-241   T   2.0711E-02                                     1.58E+05
                          59.54 2.071E-02 %(P 3.376E+00 6.02E+03 3.59E+01 G

Np-237   F   2.2387E+00                                     2.14E+06
                                                          Derived Ave Activity
                          86.49 2.239E+00 }(  1.232E+01 1.65E+02 1.31E+01 G

Ir-192   F   5.8665E-01                                     7.40E+01
                         316.49 3.621E-01 ?(  1.920E+00 1.58E+02 8.70E+01 G
                         468.06 9.644E-01  (  9.581E-01 3.99E+01 5.18E+01 G
                         308.44-1.464E-01 %   5.996E+00 1.21E+03 3.18E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   8.3030E-01                                      1.30E+01
                          818.50 3.149E-01 ?(  1.231E+00 1.65E+02 1.00E+02 G
                         1048.07 1.475E+00 ?(  1.370E+00 3.26E+01 8.00E+01 G
                          340.57-3.709E-02 %   3.602E+00 2.85E+03 4.69E+01 G

Np-239   T   8.3666E-01                                      2.36E+00
                          103.70-1.164E+00 -   5.554E+00 1.43E+02 2.40E+01 X
                          106.13 8.367E-01  (  2.329E+00 8.34E+01 2.27E+01 G
                           99.50-1.868E+00 +   8.879E+00 1.43E+02 1.50E+01 X

Nd-147       1.2201E+00                                      1.11E+01
                          531.00 1.652E+00 ?(  7.506E+00 1.86E+02 1.30E+01 G
                           91.10 1.022E+00 ?(  5.261E+00 1.54E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	351.	-7.	-0.004	355.50	-3.909E+00	P
TH-227	50.14	382.	-24.	-0.013	118.37	-5.800E+00	
TH-234	63.29	322.	39.	0.022	82.74	1.418E+01	P
BA-133	80.99	300.	-8.	-0.005	361.28	-2.651E-01	P
EU-155	86.54	1078.	-29.	-0.016	163.84	-9.777E-01	
Nd-147	91.10	934.	28.	0.016	154.47	1.022E+00	
TH-234	92.59	986.	4.	0.002	995.79	8.152E-01	P
Gd-153	97.50	230.	-3.	-0.002	901.44	-1.001E-01	
Gd-153	103.20	768.	-28.	-0.016	139.96	-1.281E+00	
EU-155	105.31	623.	25.	0.014	142.41	1.164E+00	
EU-152	121.78	255.	23.	0.013	101.28	7.899E-01	
CO-57	122.06	278.	23.	0.013	105.50	2.639E-01	
EU-154	123.10	241.	22.	0.012	102.54	5.333E-01	
PA-234	131.29	570.	-28.	-0.016	156.49	-1.598E+00	P
HF-181	133.02	598.	-28.	-0.016	124.15	-6.615E-01	
CE-144	133.54	626.	-28.	-0.016	126.90	-2.588E+00	
HF-181	136.30	655.	-12.	-0.007	291.22	-2.190E+00	
CO-57	136.47	544.	27.	0.015	125.64	2.554E+00	
Tc-99m	140.51	510.	-27.	-0.015	120.32	-3.233E-01	
U-235	143.79	1076.	-34.	-0.019	131.62	-3.261E+00	P
CE-141	145.44	1190.	-30.	-0.017	163.40	-6.613E-01	
Ba-140	162.66	348.	-25.	-0.014	108.35	-4.571E+00	
U-235	163.38	374.	-7.	-0.004	648.82	-1.560E+00	P
CE-139	165.85	267.	22.	0.012	107.16	3.134E-01	
Cf-251	176.60	165.	23.	0.013	107.60	1.606E+00	
TH-229	193.51	136.	10.	0.006	213.16	3.039E+00	
U-235	205.33	152.	-8.	-0.004	586.38	-2.069E+00	P
TH-229	210.85	162.	23.	0.013	105.48	1.069E+01	P
Cf-251	227.00	114.	10.	0.006	195.51	2.426E+00	
EU-152	244.69	1035.	-23.	-0.013	123.71	-4.700E+00	P
TH-227	256.24	92.	4.	0.002	416.13	1.014E+00	
Cd-113m	263.70	148.	8.	0.004	232.67	2.098E+03	
BI-210M	265.83	132.	14.	0.008	118.14	4.770E-01	P
Hg-203	279.20	145.	-15.	-0.009	114.08	-3.316E-01	
PA-231	300.07	302.	14.	0.008	173.03	1.094E+01	
PA-233	300.18	316.	14.	0.008	177.01	4.343E+00	
PA-231	302.65	331.	14.	0.008	180.48	9.437E+00	
BA-133	302.85	345.	14.	0.008	184.25	1.484E+00	
Ba-140	304.85	360.	14.	0.008	187.63	6.388E+00	
BI-210M	304.90	301.	-19.	-0.010	131.84	-1.282E+00	
PA-233	312.01	317.	16.	0.009	159.20	8.613E-01	
CR-51	320.08	156.	15.	0.008	123.82	2.904E+00	P
Cf-249	333.44	92.	-12.	-0.006	163.89	-1.542E+00	
EU-152	344.29	77.	8.	0.004	162.23	6.227E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	345.83	87.	15.	0.008	91.65	2.105E+00	
BA-133	356.00	345.	-16.	-0.009	164.51	-5.644E-01	
BA-133	383.84	177.	-18.	-0.010	107.11	-4.664E+00	
Cf-249	387.95	195.	-10.	-0.006	194.25	-3.647E-01	
SB-125	427.88	65.	-11.	-0.006	169.46	-9.442E-01	P
AG-108M	433.94	44.	11.	0.006	121.85	3.127E-01	
pm-146	453.88	56.	-3.	-0.002	542.66	-1.416E-01	P
SB-125	463.37	88.	15.	0.008	94.36	3.802E+00	
BE-7	477.60	52.	6.	0.003	186.33	1.500E+00	P
HF-181	482.00	58.	6.	0.003	178.96	2.168E-01	P
La-140	487.02	86.	11.	0.006	119.25	7.085E-01	P
RU-103	497.05	61.	-11.	-0.006	123.59	-3.491E-01	P
RH-106	511.86	113.	60.	0.033	47.30	8.861E+00	
Nd-147	531.00	39.	7.	0.004	185.99	1.652E+00	
Ba-140	537.26	44.	6.	0.004	216.45	8.041E-01	P
CS-134	563.24	35.	13.	0.007	95.21	5.110E+00	P
CS-134	569.32	39.	1.	0.001	888.82	2.120E-01	
SB-125	600.50	496.	-19.	-0.011	163.41	-3.722E+00	
SB-124	602.73	476.	-19.	-0.011	159.99	-6.797E-01	
CS-134	604.71	457.	-20.	-0.011	156.54	-6.871E-01	
RU-103	610.30	437.	-20.	-0.011	152.68	-1.180E+01	
AG-108M	614.28	417.	-20.	-0.011	148.91	-7.617E-01	
PM-144	618.06	398.	-20.	-0.011	145.09	-6.961E-01	
RH-106	621.92	391.	-20.	-0.011	139.35	-7.217E+00	
SB-125	635.89	56.	-18.	-0.010	88.58	-5.703E+00	
AG-110M	657.76	57.	6.	0.003	193.58	2.217E-01	
PM-144	696.54	37.	15.	0.008	92.40	5.755E-01	
NB-94	702.63	47.	-5.	-0.003	313.96	-1.872E-01	
SB-124	722.79	90.	17.	0.010	80.44	6.489E+00	
AG-108M	722.94	107.	8.	0.004	184.42	3.581E-01	
ZR-95	724.20	178.	-26.	-0.015	74.44	-2.401E+00	
pm-146	747.16	28.	3.	0.002	415.65	3.337E-01	P
ZR-95	756.73	33.	4.	0.002	283.89	3.337E-01	
AG-110M	763.94	91.	-22.	-0.012	66.17	-4.086E+00	
NB-95	765.79	100.	9.	0.005	169.01	3.621E-01	
PA-234M	766.41	106.	-10.	-0.006	141.74	-1.515E+02	
CS-134	801.95	38.	-2.	-0.001	566.68	-1.186E+00	
CO-58	810.78	58.	9.	0.005	129.10	3.890E-01	P
Cs-136	818.50	28.	7.	0.004	164.75	3.149E-01	
MN-54	834.85	63.	-15.	-0.008	77.46	-6.752E-01	P
Co-56	846.77	28.	2.	0.001	649.72	8.090E-02	P
NB-94	871.10	30.	6.	0.003	135.40	2.857E-01	
EU-154	873.23	38.	-2.	-0.001	590.67	-5.827E-01	
PA-234	880.53	32.	10.	0.006	86.58	7.948E+00	
PA-234	883.24	42.	10.	0.006	97.39	4.988E+00	
AG-110M	884.68	52.	5.	0.003	220.95	3.140E-01	P
y-88	898.04	40.	-11.	-0.006	93.27	-5.899E-01	P
AG-110M	937.49	40.	-9.	-0.005	158.05	-1.331E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	964.11	104.	10.	0.006	143.05	3.693E+00		
EU-154	996.33	41.	12.	0.007	79.64	6.146E+00		
PA-234M	1001.00	53.	9.	0.005	116.55	5.919E+01		
EU-154	1004.77	85.	-15.	-0.008	91.26	-4.482E+00		
Co-56	1037.84	25.	9.	0.005	126.60	3.546E+00		
Cs-136	1048.07	13.	21.	0.012	32.65	1.475E+00		
RH-106	1050.36	69.	-16.	-0.009	75.41	-5.940E+01		
BI-207	1063.66	43.	-14.	-0.008	111.96	-1.044E+00		
FE-59	1099.25	27.	1.	0.001	884.59	1.384E-01		
EU-152	1112.07	127.	-18.	-0.010	91.17	-7.855E+00		
ZN-65	1115.55	109.	-18.	-0.010	84.76	-2.127E+00		
Sc-46	1120.55	104.	5.	0.003	299.43	2.911E-01		
CO-60	1173.24	38.	-7.	-0.004	245.50	-4.121E-01		P
Co-56	1238.28	65.	-6.	-0.003	292.93	-5.498E-01		P
NA-22	1274.53	51.	-17.	-0.009	64.17	-1.141E+00		
FE-59	1291.60	40.	-12.	-0.007	137.52	-1.863E+00		P
CO-60	1332.50	29.	-12.	-0.006	141.79	-8.039E-01		P
EU-152	1408.00	11.	3.	0.001	321.60	8.784E-01		P
La-140	1596.21	6.	2.	0.001	304.14	1.729E-01		
SB-124	1690.98	6.	-3.	-0.002	205.48	-5.460E-01		
Co-56	1771.35	33.	7.	0.004	126.15	3.979E+00		P
y-88	1836.06	25.	-14.	-0.008	91.11	-1.356E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.4997E+00	1.4997E+00	1.863E+02%	9.68E+00
NA-22	#A	-1.1413E+00	-1.1413E+00	6.417E+01%	2.42E+00
K-40		3.1753E+02	3.1753E+02	4.774E+00%	7.94E+00
Sc-46	#A	1.2190E-01	1.2190E-01	2.994E+02%	1.85E+00
CR-51	#A	2.9040E+00	2.9040E+00	1.238E+02%	1.21E+01
MN-54	#A	-6.7523E-01	-6.7523E-01	7.746E+01%	1.81E+00
FE-59	#A	1.3841E-01	1.3841E-01	8.846E+02%	2.78E+00
Co-56	#A	5.1019E-01	5.1019E-01	1.266E+02%	1.28E+00
CO-57	#A	5.1800E-01	5.1800E-01	8.203E+01%	9.31E-01
CO-58	#A	3.8896E-01	3.8896E-01	1.291E+02%	1.72E+00
CO-60	#A	-8.0388E-01	-8.0388E-01	1.418E+02%	1.93E+00
ZN-65	#A	-2.1272E+00	-2.1272E+00	8.476E+01%	6.03E+00
NB-94	#A	5.1634E-02	5.1634E-02	1.354E+02%	1.39E+00
ZR-95	#A	3.3370E-01	3.3370E-01	2.839E+02%	2.26E+00
NB-95	#A	3.6208E-01	3.6208E-01	1.690E+02%	2.09E+00
RU-103	#A	-3.4913E-01	-3.4913E-01	1.236E+02%	1.25E+00
RH-106	#A	-7.2175E+00	-7.2175E+00	1.393E+02%	3.37E+01
AG-108M	#A	3.3544E-01	3.3544E-01	1.105E+02%	9.56E-01

AG-110M#A	2.6181E-01	2.6181E-01	1.469E+02%	2.42E+00
SN-113 #A	6.1298E-03	6.1298E-03	1.208E+04%	2.54E+00
SB-124 #A	3.0738E-02	3.0739E-02	8.044E+01%	3.64E+00
SB-125 #A	2.9597E-01	2.9597E-01	9.436E+01%	3.46E+00
I-131 #A	3.5203E-01	3.5205E-01	1.161E+02%	1.02E+00
Gd-153 #A	-1.0011E-01	-1.0011E-01	9.014E+02%	2.45E+00
Ga-68 #A	6.7708E-01	6.8264E-01	3.526E+03%	5.48E+01
Tc-99m #A	-3.2280E-01	-3.2330E-01	1.203E+02%	1.30E+00
BA-133 #A	-9.7315E-02	-9.7315E-02	1.235E+02%	3.12E+00
CS-134 #A	-2.3033E-01	-2.3033E-01	9.161E+01%	3.60E+00
CS-137 #A	2.9125E-02	2.9125E-02	1.652E+03%	1.70E+00
CE-139 #A	3.1336E-01	3.1336E-01	1.072E+02%	1.12E+00
Ba-140 #A	1.6393E+00	1.6393E+00	1.432E+02%	4.26E+00
La-140 #A	3.4584E-01	3.4585E-01	1.193E+02%	1.22E+00
CE-141 #A	-6.6133E-01	-6.6134E-01	1.634E+02%	3.60E+00
CE-144 #A	-2.5881E+00	-2.5881E+00	1.269E+02%	1.10E+01
PM-144 #A	5.7554E-01	5.7554E-01	9.240E+01%	1.23E+00
EU-152 #A	1.3348E+00	1.3348E+00	7.961E+01%	3.46E+00
EU-154 #A	1.2528E+00	1.2528E+00	7.964E+01%	1.23E+01
EU-155 #A	1.1637E+00	1.1637E+00	1.424E+02%	5.53E+00
HF-181 #A	5.1451E-01	5.1452E-01	9.165E+01%	1.34E+00
Ta-182 A	-3.6377E-01	-3.6377E-01	1.940E+02%	9.08E+00
Hg-203 #A	-3.3158E-01	-3.3158E-01	1.141E+02%	1.27E+00
TL-208	7.3876E+00	7.3876E+00	1.013E+01%	1.14E+00
pm-146 #A	3.3369E-01	3.3369E-01	4.157E+02%	3.35E+00
y-88 #A	-5.8985E-01	-5.8985E-01	9.327E+01%	1.68E+00
Cd-113m#A	2.0978E+03	2.0978E+03	2.327E+02%	1.66E+04
Cd-109 #A	7.7262E+00	7.7262E+00	1.527E+02%	3.93E+01
Cf-251 #A	1.6059E+00	1.6059E+00	1.076E+02%	4.41E+00
Cf-249 #A	-3.6465E-01	-3.6465E-01	1.943E+02%	2.40E+00
Sn-126 A	6.0825E-01	6.0825E-01	6.813E+02%	1.40E+01
PB-210 #A	-3.9092E+00	-3.9092E+00	3.555E+02%	4.74E+01
PB-212	2.2058E+01	2.2058E+01	4.516E+00%	1.59E+00
PB-214	1.4118E+01	1.4118E+01	7.538E+00%	1.58E+00
BI-207 #A	-1.6689E-02	-1.6689E-02	1.871E+03%	1.12E+00
BI-212 #A	9.3642E+00	9.3642E+00	7.767E+01%	2.43E+01
BI-214	1.4337E+01	1.4337E+01	9.160E+00%	1.92E+00
BI-210M#A	4.7698E-01	4.7698E-01	1.181E+02%	1.90E+00
AC-228	2.3560E+01	2.3560E+01	8.343E+00%	2.71E+00
TH-227 #A	-5.8002E+00	-5.8002E+00	1.184E+02%	2.29E+01
TH-229 #A	6.1355E+00	6.1355E+00	1.055E+02%	1.68E+01
TH-234 #A	1.4181E+01	1.4181E+01	8.274E+01%	3.14E+01
PA-231 #A	1.0130E+01	1.0130E+01	1.250E+02%	5.73E+01
PA-233 #A	1.3728E+00	1.3728E+00	1.190E+02%	4.61E+00
PA-234 #A	6.9317E-01	6.9317E-01	9.216E+01%	6.40E+00
PA-234M#A	5.9189E+01	5.9189E+01	1.166E+02%	2.35E+02
U-235 #A	-3.2608E+00	-3.2608E+00	1.316E+02%	1.50E+01
AM-241 #A	2.0711E-02	2.0711E-02	6.017E+03%	3.38E+00
Np-237 #A	2.2387E+00	2.2387E+00	1.652E+02%	1.23E+01

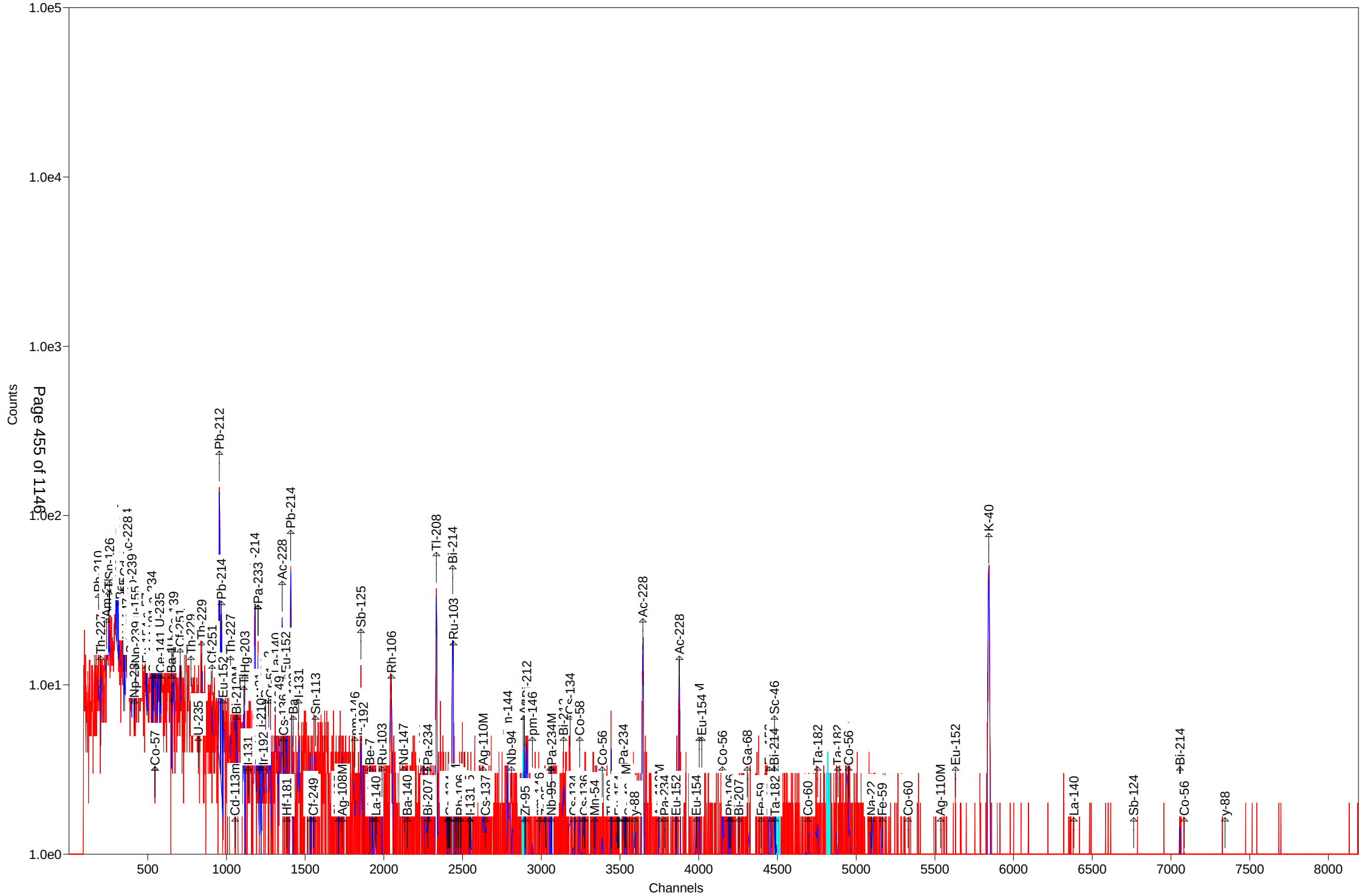
Ir-192	A	5.8664E-01	5.8665E-01	3.987E+01%	1.92E+00
Cs-136	#A	8.3028E-01	8.3030E-01	3.265E+01%	1.23E+00
Np-239	A	8.3652E-01	8.3666E-01	8.340E+01%	2.33E+00
Nd-147	#A	1.2201E+00	1.2201E+00	1.209E+02%	7.51E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 3.990E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.9899521E+02 Bq/Sample

264535_Gamma_160-18554-A-1-C DU. 7_Gamma_20162141.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20162140

Sample Description: 264535_Gamma_160-18554-A-2-B
Detector: Detector # 7
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-2-B

Decay to Time: 9/1/2016 11:52 Live Time: 1800 sec
Acquisition Time: 9/1/2016 11:52:50 Real Time: 1829 sec
Analysis Time: 9/1/2016 12:23 Dead Time: 1.56 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-31_1448.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.391E-01	1231.3	4.176E+00	4.176E+00	1.444E+01
NA-22	7.385E-01	61.0	4.503E-01	4.519E-01	1.472E+00
K-40	2.841E+02	5.1	1.435E+01	2.043E+01	7.938E+00
Sc-46	6.009E-01	95.8	5.758E-01	5.766E-01	1.943E+00
CR-51	9.129E-01	637.2	5.817E+00	5.817E+00	1.965E+01
MN-54	-6.905E-01	68.5	4.728E-01	4.742E-01	1.541E+00
FE-59	5.190E-01	187.3	9.719E-01	9.723E-01	2.216E+00
Co-56	9.792E-02	122.9	1.203E-01	1.205E-01	1.366E+00
CO-57	0.000E+00	1.#INF	1.446E-01	1.446E-01	1.095E+00
CO-58	4.808E-01	87.9	4.225E-01	4.232E-01	1.426E+00
CO-60	-9.437E-01	125.2	1.181E+00	1.182E+00	1.928E+00
ZN-65	-7.148E-01	249.4	1.782E+00	1.783E+00	6.114E+00
NB-94	-1.337E-02	3892.3	5.203E-01	5.203E-01	1.251E+00
ZR-95	6.843E-01	117.2	8.019E-01	8.027E-01	2.260E+00
NB-95	7.235E-01	79.1	5.721E-01	5.733E-01	1.910E+00
RU-103	4.226E-01	100.1	4.231E-01	4.236E-01	1.017E+00
RH-106	-1.144E+00	88.8	1.015E+00	1.017E+00	3.538E+01
AG-108M	4.865E-02	237.9	1.158E-01	1.158E-01	1.137E+00
AG-110M	6.343E-01	106.5	6.758E-01	6.766E-01	2.301E+00
SN-113	-6.253E-01	122.5	7.660E-01	7.666E-01	2.574E+00
SB-124	0.000E+00	1.#INF	8.546E-02	8.546E-02	3.268E+00
SB-125	1.793E+00	73.6	1.320E+00	1.323E+00	2.531E+00
I-131	9.119E-01	77.0	7.021E-01	7.037E-01	1.051E+00
Gd-153	-9.195E-01	140.7	1.293E+00	1.295E+00	4.313E+00
Ga-68	-8.195E+00	325.3	2.666E+01	2.666E+01	5.956E+01
Tc-99m	-3.257E-01	120.3	3.918E-01	3.923E-01	1.307E+00
BA-133	-1.394E-01	106.4	1.483E-01	1.485E-01	3.404E+00
CS-134	0.000E+00	1.#INF	9.962E-02	9.962E-02	3.299E+00
CS-137	0.000E+00	1.#INF	1.513E-01	1.513E-01	1.834E+00
CE-139	3.846E-01	50.6	1.948E-01	1.982E-01	5.528E-01
Ba-140	1.629E+00	157.3	2.562E+00	2.563E+00	4.447E+00
La-140	1.286E-01	100.0	1.286E-01	1.287E-01	1.943E+00
CE-141	-6.534E-01	159.9	1.045E+00	1.046E+00	3.481E+00

CE-144	0.000E+00	1.#INF	1.062E+00	1.062E+00	1.030E+01
PM-144	4.550E-01	93.4	4.249E-01	4.255E-01	9.925E-01
EU-152	2.428E+00	86.7	2.106E+00	2.110E+00	6.426E+00
EU-154	1.149E+00	80.5	9.253E-01	9.272E-01	1.610E+01
EU-155	-1.773E-07	1047045827.5	1.857E+00	1.857E+00	6.244E+00
HF-181	1.682E-01	286.5	4.817E-01	4.818E-01	1.661E+00
Ta-182	2.456E+00	95.4	2.342E+00	2.345E+00	7.879E+00
Hg-203	-4.534E-01	89.9	4.074E-01	4.083E-01	1.361E+00
TL-208	8.387E+00	8.3	7.003E-01	8.245E-01	8.412E-01
pm-146	3.743E-01	399.9	1.497E+00	1.497E+00	3.592E+00
y-88	4.012E-01	133.3	5.347E-01	5.350E-01	1.237E+00
Cd-113m	-2.890E+03	178.2	5.150E+03	5.153E+03	1.747E+04
Cd-109	7.863E+00	177.0	1.391E+01	1.392E+01	4.634E+01
Cf-251	-1.693E+00	117.4	1.987E+00	1.993E+00	5.066E+00
Cf-249	0.000E+00	1.#INF	1.324E-01	1.324E-01	2.388E+00
Sn-126	-1.956E+00	258.9	5.064E+00	5.066E+00	1.698E+01
PB-210	3.409E+01	37.6	1.282E+01	1.297E+01	4.124E+01
PB-212	2.154E+01	4.6	9.863E-01	1.707E+00	1.585E+00
PB-214	1.402E+01	6.7	9.361E-01	1.186E+00	1.763E+00
BI-207	2.281E-01	186.9	4.264E-01	4.265E-01	1.466E+00
BI-212	4.914E+01	14.1	6.933E+00	7.388E+00	9.864E+00
BI-214	1.319E+01	10.1	1.329E+00	1.495E+00	3.091E+00
BI-210M	7.692E-01	96.2	7.402E-01	7.416E-01	1.988E+00
AC-228	2.690E+01	8.1	2.191E+00	2.586E+00	1.940E+00
TH-227	4.531E+00	85.1	3.856E+00	3.864E+00	2.206E+01
TH-229	4.999E+00	138.7	6.934E+00	6.945E+00	1.780E+01
TH-234	2.919E+00	417.6	1.219E+01	1.219E+01	4.099E+01
PA-231	1.183E+01	155.6	1.841E+01	1.842E+01	6.173E+01
PA-233	8.862E-01	165.9	1.470E+00	1.471E+00	4.937E+00
PA-234	2.008E+00	103.3	2.074E+00	2.076E+00	6.238E+00
PA-234M	5.346E+01	73.9	3.949E+01	3.959E+01	2.096E+02
U-235	-3.313E+00	96.5	3.196E+00	3.200E+00	1.457E+01
AM-241	-7.637E-01	133.4	1.019E+00	1.020E+00	5.074E+00
Np-237	1.215E+00	345.9	4.203E+00	4.203E+00	1.403E+01
Ir-192	6.317E-01	84.5	5.336E-01	5.349E-01	2.112E+00
Cs-136	2.416E-01	64.6	1.560E-01	1.566E-01	1.779E+00
Np-239	-4.193E-01	409.9	1.719E+00	1.719E+00	5.765E+00
Nd-147	7.127E-01	178.3	1.271E+00	1.271E+00	8.568E+00
Total	5.621E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-2-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20162140.An1

Acquisition information
Start time: 9/1/2016 11:52:50 AM
Live time: 1800
Real time: 1829
Dead time: 1.56 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 11:52:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-31_1448.PBC 7/31/2016 2:48:35 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 31 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1562

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.68	65.	37.60	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	20.	133.12	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
63.22	71.	35.30	0.77	3.999E-02	63.29	3.810	PBC<MDA	TH234
74.81	221.	11.79	0.87	4.767E-02				
77.12	393.	7.18	0.87	4.889E-02				
80.99	28.	185.17	0.87	5.069E-02	80.99	34.060	PBC<MDA	BA133
84.30	63.	32.46	0.88	5.205E-02				
86.16	15.	345.88	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.183E-01	EU155
87.19	140.	15.23	0.88	5.305E-02	86.54	30.700	4.803E+00	EU155
					86.94	9.040	1.627E+01	Sn126
					87.57	37.500	3.907E+00	Sn126
					88.04	3.790	3.855E+01	Cd109
91.10	29.	178.28	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.76	29.	168.88	0.89	5.470E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	5.255E+00	AC228
123.10	3.	906.15	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
131.29	12.	282.63	0.93	5.493E-02	131.29	18.000	PBC<MDA	PA234
162.66	3.	868.24	0.96	4.843E-02	162.66	6.220	PBC<MDA	Ba140
163.38	4.	533.03	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
165.74	27.	50.65	0.27	4.881E-02	165.85	79.900	PBC<MDA	CE139
193.51	17.	138.70	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
208.77	81.	27.30	0.84	4.030E-02				
238.69	596.	5.17	1.08	3.601E-02	238.63	43.300	2.123E+01	PB212
242.06	76.	22.51	1.04	3.560E-02	242.00	7.430	1.595E+01	PB214
256.24	17.	106.09	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
265.83	17.	105.44	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.58	32.	47.39	1.65	3.172E-02	277.28	6.310	PBC<MDA	TL208
295.61	156.	11.04	1.01	3.004E-02	295.09	19.300	1.488E+01	PB214
302.65	18.	155.60	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.860E+00	BA133
302.94	17.	153.73	1.11	2.943E-02	302.65	2.880	1.100E+01	PA231
					302.85	18.330	1.729E+00	BA133
304.85	17.	157.27	1.11	2.926E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.140E+00	BI210M
304.90	17.	161.01	1.11	2.926E-02	304.85	4.290	7.441E+00	Ba140
					304.90	28.000	1.140E+00	BI210M
308.44	16.	162.76	1.11	2.897E-02	308.44	31.750	PBC<MDA	Ir192
312.01	16.	165.90	1.12	2.869E-02	312.01	36.000	PBC<MDA	PA233
316.49	17.	168.83	1.12	2.834E-02	316.49	87.040	PBC<MDA	Ir192
320.08	5.	637.22	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	16.	99.97	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
338.23	121.	14.48	1.33	2.677E-02	338.32	12.010	2.085E+01	AC228
340.57	15.	151.54	1.15	2.662E-02	340.57	46.900	PBC<MDA	Cs136
344.29	12.	201.29	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
351.93	238.	8.42	0.97	2.588E-02	351.93	37.600	1.357E+01	PB214
364.08	11.	141.13	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
427.88	11.	104.78	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
463.37	16.	103.46	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	16.	95.96	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
482.00	5.	286.46	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
497.10	13.	100.12	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	105.	22.03	2.56	1.870E-02	511.86	20.000	1.564E+01	RH106
537.26	7.	205.36	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
569.70	7.	186.93	1.37	1.703E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.718E+00	PA234
					569.70	97.740	2.281E-01	BI207
583.23	212.	8.35	1.56	1.669E-02	583.02	84.500	8.353E+00	TL208
609.38	202.	9.13	1.09	1.605E-02	609.31	46.090	1.515E+01	BI214
					610.30	5.750	1.216E+02	RU103
614.28	7.	395.73	1.41	1.594E-02	614.28	89.850	PBC<MDA	AG108M
636.97	16.	76.99	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
696.54	12.	93.38	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
723.36	9.	155.12	1.51	1.379E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.034E-01	AG108M
					723.36	20.220	1.813E+00	EU154
724.20	9.	161.95	1.51	1.378E-02	724.20	44.150	PBC<MDA	ZR95
727.19	92.	14.11	2.11	1.373E-02	727.17	7.550	4.914E+01	BI212
747.16	3.	399.90	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
756.73	7.	169.41	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
765.79	17.	79.07	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.457E+02	PA234M
766.41	14.	73.87	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.057E+02	PA234M
778.92	12.	89.19	1.56	1.291E-02	778.92	12.940	PBC<MDA	EU152
810.78	11.	87.87	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
815.77	2.	460.57	1.59	1.239E-02	815.77	23.280	PBC<MDA	La140
860.41	34.	19.46	0.72	1.181E-02	860.56	12.420	1.295E+01	TL208
884.68	10.	106.55	1.65	1.152E-02	884.68	72.680	PBC<MDA	AG110M
889.28	12.	95.81	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
898.04	8.	133.26	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.13	158.	8.15	2.01	1.122E-02	911.07	29.000	2.690E+01	AC228
946.02	10.	103.28	1.70	1.085E-02	946.02	13.400	PBC<MDA	PA234
964.11	10.	138.63	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.18	74.	13.18	1.61	1.062E-02	968.97	17.460	2.228E+01	AC228
996.33	10.	80.53	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1048.07	12.	64.57	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	9.	88.75	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1099.25	5.	187.26	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1120.62	52.	18.53	2.07	9.311E-03	1120.29	15.100	2.048E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.870E+00	Ta182
1121.37	14.	95.37	1.85	9.303E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.566E-01	Sc46
					1121.30	34.900	2.456E+00	Ta182
1221.41	2.	646.79	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	8.	208.14	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	11.	60.98	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.097E+00	EU154
1408.00	7.	88.65	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1460.84	391.	5.29	2.35	7.309E-03	1460.83	10.670	2.784E+02	K40
1764.76	23.	29.33	2.29	6.141E-03	1764.49	15.400	1.322E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
252.61	63.22	164.	69.	1.737E+03	28.71	0.854	- sD
298.79	74.82	229.	221.	4.638E+03	11.79	0.867	- D
308.04	77.13	201.	393.	8.040E+03	7.18	0.869	- D
335.75	84.38	164.	68.	1.298E+03	29.46	0.877	- sD
834.70	208.77	102.	81.	2.010E+03	27.30	0.835	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	263.	65.	0.036	37.60	0.836
TH-227	200.12	50.14	353.	20.	0.011	133.12	0.840s
AM-241	237.70	59.54	648.	-18.	-0.010	133.45	0.850s
TH-234	252.71	63.29	556.	8.	0.004	417.58	0.854
Sn-126	256.68	64.28	644.	-14.	-0.008	258.87	0.856s
BA-133	323.52	80.99	1339.	28.	0.016	185.17	0.874
Np-237	345.53	86.49	1361.	15.	0.008	345.88	0.880
EU-155	345.74	86.54	1376.	0.	0.000	1000.00	0.880s
Sn-126	347.33	86.94	1376.	0.	0.000	1000.00	0.880
Sn-126	349.85	87.57	1237.	29.	0.016	84.41	0.881D
Cd-109	351.73	88.04	1265.	29.	0.016	176.97	0.881A
Nd-147	363.97	91.10	1294.	29.	0.016	178.28	0.885s
TH-234	369.93	92.59	1501.	-55.	-0.031	94.91	0.886
AC-228	372.97	93.35	1166.	29.	0.016	168.88	0.887s
Gd-153	389.57	97.50	737.	-28.	-0.015	140.65	0.892s
Np-239	397.57	99.50	765.	-28.	-0.015	142.87	0.894s
Gd-153	412.38	103.20	793.	-5.	-0.003	773.66	0.898
Np-239	424.10	106.13	780.	-10.	-0.005	409.94	0.901
EU-152	486.69	121.78	365.	-24.	-0.013	114.41	0.918s
CO-57	487.83	122.06	389.	0.	0.000	1000.00	0.918s
EU-154	491.98	123.10	328.	3.	0.002	906.15	0.919s
PA-234	524.77	131.29	540.	12.	0.006	282.63	0.928
HF-181	531.68	133.02	552.	0.	0.000	1000.00	0.930
CE-144	533.74	133.54	552.	0.	0.000	1000.00	0.930
HF-181	544.79	136.30	552.	0.	0.000	1000.00	0.933
CO-57	545.48	136.47	552.	-29.	-0.016	115.26	0.933
Tc-99m	561.63	140.51	518.	-27.	-0.015	120.31	0.938
U-235	574.73	143.79	1019.	-34.	-0.019	96.45	0.941s
CE-141	581.35	145.44	1113.	-30.	-0.016	159.94	0.943s
Ba-140	650.24	162.66	301.	3.	0.002	868.24	0.961s
U-235	653.11	163.38	264.	4.	0.002	533.03	0.962
CE-139	662.54	165.74	60.	27.	0.015	50.65	0.271s
Cf-251	706.00	176.60	220.	-24.	-0.013	117.41	0.976s
TH-229	773.64	193.51	154.	17.	0.009	138.70	0.994s
U-235	820.94	205.33	317.	-5.	-0.003	500.29	1.007s
TH-229	843.01	210.85	445.	-25.	-0.014	91.74	1.012s
Cf-251	907.62	227.00	158.	-6.	-0.003	416.67	1.029
PB-212	954.15	238.63	80.	605.	0.336	4.58	1.041D
PB-214	967.61	242.00	108.	76.	0.042	22.51	1.045D
EU-152	978.39	244.69	981.	-14.	-0.008	197.97	1.048s
TH-227	1024.59	256.24	92.	17.	0.010	106.09	1.060s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1054.43	263.70	164.	-10.	-0.006	178.18	1.067s
BI-210M	1062.96	265.83	145.	17.	0.009	105.44	1.070s
TL-208	1109.96	277.58	59.	32.	0.018	47.39	1.646s
Hg-203	1116.44	279.20	167.	-21.	-0.012	89.85	1.083s
PB-214	1182.08	295.61	37.	156.	0.086	11.10	1.008
PB-212	1199.76	300.03	464.	-17.	-0.010	69.32	1.105s
PA-231	1199.92	300.07	463.	0.	0.000	1000.00	1.105s
PA-233	1200.36	300.18	463.	0.	0.000	1000.00	1.105s
PA-231	1210.24	302.65	386.	18.	0.010	155.60	1.107s
BA-133	1211.05	302.85	325.	17.	0.009	153.73	1.108s
Ba-140	1219.04	304.85	341.	17.	0.009	157.27	1.110s
BI-210M	1219.23	304.90	358.	17.	0.009	161.01	1.110s
Ir-192	1233.41	308.44	349.	16.	0.009	162.76	1.113s
PA-233	1247.69	312.01	365.	16.	0.009	165.90	1.117s
Ir-192	1265.61	316.49	382.	17.	0.009	168.83	1.122
CR-51	1279.99	320.08	424.	5.	0.003	637.22	1.125s
La-140	1314.69	328.76	123.	16.	0.009	99.97	1.134s
Cf-249	1333.41	333.44	201.	-21.	-0.011	99.94	1.139s
AC-228	1352.58	338.23	44.	121.	0.067	14.48	1.326
Cs-136	1361.93	340.57	266.	15.	0.009	151.54	1.146s
EU-152	1376.80	344.29	281.	12.	0.007	201.29	1.150s
HF-181	1382.97	345.83	345.	-18.	-0.010	148.57	1.151s
PB-214	1407.39	351.93	37.	238.	0.132	7.42	1.157D
BA-133	1423.66	356.00	413.	-20.	-0.011	147.03	1.162s
I-131	1457.59	364.48	60.	11.	0.006	141.13	1.170s
BA-133	1535.03	383.84	187.	-7.	-0.004	292.40	1.189s
Cf-249	1551.47	387.95	193.	0.	0.000	1000.00	1.193s
SN-113	1566.43	391.69	208.	-17.	-0.009	122.50	1.197s
SB-125	1711.18	427.88	33.	11.	0.006	104.78	1.233s
AG-108M	1735.43	433.94	64.	-6.	-0.003	264.22	1.239s
pm-146	1815.20	453.88	52.	-11.	-0.006	102.34	1.258s
SB-125	1853.15	463.37	129.	16.	0.009	103.46	1.268
Ir-192	1871.93	468.06	109.	16.	0.009	95.96	1.272s
HF-181	1927.68	482.00	92.	5.	0.003	286.46	1.286
La-140	1947.77	487.02	103.	-10.	-0.005	139.88	1.291s
RU-103	1987.91	497.05	39.	13.	0.007	100.12	1.301
RH-106	2047.15	511.86	67.	105.	0.059	22.03	2.565s
Nd-147	2123.70	531.00	52.	0.	0.000	1000.00	1.333s
Ba-140	2148.74	537.26	48.	7.	0.004	205.36	1.339s
CS-134	2276.99	569.32	56.	-9.	-0.005	118.34	1.369s
PA-234	2277.59	569.47	77.	-8.	-0.005	155.77	1.370s
BI-207	2278.51	569.70	78.	7.	0.004	186.93	1.370s
TL-208	2332.64	583.23	16.	212.	0.118	8.35	1.565s
SB-125	2401.71	600.50	390.	-9.	-0.005	326.65	1.399s
SB-124	2410.64	602.73	381.	0.	0.000	1000.00	1.401s
CS-134	2418.55	604.71	381.	0.	0.000	1000.00	1.403s
BI-214	2436.96	609.31	68.	176.	0.098	10.07	1.407D
RU-103	2440.91	610.30	359.	15.	0.009	174.86	1.408s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2456.84	614.28	374.	7.	0.004	395.73	1.412s
PM-144	2471.96	618.06	381.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	433.	-18.	-0.010	167.20	1.419s
SB-125	2543.28	635.89	65.	-14.	-0.008	120.55	1.432s
I-131	2547.62	636.97	66.	16.	0.009	76.99	1.433
AG-110M	2630.77	657.76	64.	-10.	-0.005	123.88	1.452s
CS-137	2646.36	661.66	71.	0.	0.000	1000.00	1.455s
PM-144	2785.90	696.54	23.	12.	0.006	93.38	1.487s
SB-124	2890.87	722.79	126.	-8.	-0.004	209.91	1.511s
AG-108M	2891.48	722.94	145.	-14.	-0.008	125.29	1.511s
EU-154	2893.15	723.36	95.	9.	0.005	155.12	1.511s
ZR-95	2896.52	724.20	104.	9.	0.005	161.95	1.512s
BI-212	2908.48	727.19	11.	92.	0.051	14.11	2.111s
pm-146	2942.61	735.72	47.	-10.	-0.005	153.32	1.523s
pm-146	2988.37	747.16	33.	3.	0.002	399.90	1.533s
ZR-95	3026.65	756.73	33.	7.	0.004	169.41	1.541s
AG-110M	3055.51	763.94	96.	-22.	-0.012	66.07	1.548s
NB-95	3062.89	765.79	82.	17.	0.009	79.07	1.549s
PA-234M	3065.38	766.41	48.	14.	0.008	73.87	1.550s
EU-152	3115.41	778.92	23.	12.	0.007	89.19	1.561
BI-212	3141.41	785.42	47.	-16.	-0.009	34.34	1.567s
CS-134	3183.20	795.87	85.	-9.	-0.005	148.66	1.576s
CS-134	3207.54	801.95	115.	-17.	-0.009	92.45	1.581s
CO-58	3242.84	810.78	39.	11.	0.006	87.87	1.589s
La-140	3262.82	815.77	50.	2.	0.001	460.57	1.593s
Cs-136	3273.74	818.50	62.	-10.	-0.006	110.86	1.596s
MN-54	3339.13	834.85	44.	-15.	-0.008	68.48	1.610s
Co-56	3386.82	846.77	33.	-8.	-0.004	130.75	1.620s
TL-208	3441.38	860.41	3.	34.	0.019	19.46	0.719s
NB-94	3484.13	871.10	54.	-17.	-0.010	65.35	1.641s
PA-234	3521.86	880.53	83.	-16.	-0.009	83.09	1.649s
PA-234	3532.70	883.24	99.	-3.	-0.002	411.20	1.652s
AG-110M	3538.47	884.68	47.	10.	0.005	106.55	1.653s
Sc-46	3556.86	889.28	64.	12.	0.007	95.81	1.657s
y-88	3591.90	898.04	20.	8.	0.004	133.26	1.664s
AC-228	3644.28	911.13	3.	158.	0.088	8.15	2.006
AG-110M	3749.71	937.49	60.	-20.	-0.011	86.19	1.697s
PA-234	3783.82	946.02	20.	10.	0.006	103.28	1.704s
EU-152	3856.18	964.11	98.	10.	0.006	138.63	1.719s
AC-228	3876.48	969.18	6.	74.	0.041	13.18	1.611
EU-154	3985.06	996.33	30.	10.	0.006	80.53	1.746s
PA-234M	4003.73	1001.00	41.	0.	0.000	1000.00	1.750s
EU-154	4018.84	1004.77	64.	-14.	-0.008	87.23	1.753s
Co-56	4151.10	1037.84	30.	-8.	-0.004	154.62	1.780s
Cs-136	4192.02	1048.07	26.	12.	0.007	64.57	1.788
RH-106	4201.18	1050.36	26.	9.	0.005	88.75	1.790s
BI-207	4254.38	1063.66	37.	-9.	-0.005	152.36	1.801s
Ga-68	4309.34	1077.40	32.	-4.	-0.002	325.32	1.812s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.74	1099.25	16.	5.	0.003	187.26	1.829s
EU-152	4448.04	1112.07	129.	-17.	-0.009	98.03	1.839s
ZN-65	4461.92	1115.55	112.	-6.	-0.003	249.35	1.842s
BI-214	4482.23	1120.62	8.	52.	0.029	18.53	2.069s
Ta-182	4484.94	1121.30	86.	14.	0.008	95.37	1.846
CO-60	4692.68	1173.24	43.	-15.	-0.008	64.50	1.886s
Ta-182	4885.37	1221.41	32.	2.	0.001	646.79	1.923
Co-56	4952.84	1238.28	54.	8.	0.005	208.14	1.936s
NA-22	5097.84	1274.53	17.	11.	0.006	60.98	1.963
EU-154	5097.89	1274.54	28.	0.	0.000	1000.00	1.963
FE-59	5166.10	1291.60	29.	-8.	-0.004	224.73	1.975
CO-60	5329.71	1332.50	29.	-14.	-0.008	125.19	2.005s
AG-110M	5536.89	1384.30	17.	-3.	-0.002	327.45	2.042s
EU-152	5631.70	1408.00	6.	7.	0.004	88.65	2.059s
K-40	5842.82	1460.78	3.	399.	0.222	5.05	2.358s
La-140	6384.49	1596.21	18.	-3.	-0.002	346.41	2.185s
SB-124	6763.55	1690.98	6.	-1.	-0.001	600.00	2.245s
BI-214	7057.56	1764.49	10.	23.	0.013	29.33	2.290s
Co-56	7084.99	1771.35	45.	-11.	-0.006	60.69	2.294s
y-88	7343.81	1836.06	13.	-5.	-0.003	194.96	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.3912E-01					5.31E+01
			477.60	3.391E-01	%(P	1.444E+01	1.23E+03 1.05E+01 G
NA-22	C	7.3847E-01					9.50E+02
			1274.53	7.385E-01	?(	1.472E+00	6.10E+01 9.99E+01 G
K-40	N	2.8405E+02					4.66E+11
			1460.83	2.841E+02	@(P	7.938E+00	5.05E+00 1.07E+01 G
Sc-46	F	6.0093E-01					8.38E+01
			889.28	6.009E-01	?(P	1.943E+00	9.58E+01 1.00E+02 G
			1120.55	-1.138E-07	%	3.025E+00	7.63E+08 1.00E+02 G
CR-51	F	9.1290E-01					2.77E+01
			320.08	9.129E-01	?(P	1.965E+01	6.37E+02 9.94E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

MN-54    C  -6.9049E-01                                     3.12E+02
                          834.85-6.905E-01 &(P 1.541E+00 6.85E+01 1.00E+02 G

FE-59    F   5.1903E-01                                     4.45E+01
                         1099.25 5.190E-01 ?(  2.216E+00 1.87E+02 5.65E+01 G
                         1291.60-1.182E+00 + P 4.338E+00 2.25E+02 4.32E+01 G

Co-56    C   9.7921E-02                                     7.73E+01
                          846.77-3.676E-01 ?(P 1.366E+00 1.31E+02 9.99E+01 G
                         1238.28 8.021E-01 &(P 3.652E+00 2.08E+02 6.61E+01 G
                         1037.84-3.152E+00 +   1.113E+01 1.55E+02 1.41E+01 G
                         1771.35-6.427E+00 + P 1.992E+01 6.07E+01 1.55E+01  A

CO-58    C   4.8082E-01                                     7.09E+01
                          810.78 4.808E-01 ?(P 1.426E+00 8.79E+01 9.95E+01 G

CO-60    F  -9.4365E-01                                     1.93E+03
                         1332.50-9.437E-01 ?(P 1.928E+00 1.25E+02 1.00E+02 G
                         1173.24-9.311E-01 + P 2.071E+00 6.45E+01 9.99E+01 G

ZN-65    F  -7.1484E-01                                     2.44E+02
                         1115.55-7.148E-01 ?(  6.114E+00 2.49E+02 5.06E+01 G

NB-94    I  -1.3368E-02                                     7.41E+06
                          702.63-1.337E-02 %(  1.251E+00 3.89E+03 9.79E+01 G
                          871.10-8.149E-01 +   1.759E+00 6.54E+01 9.99E+01 G

ZR-95    I   6.8434E-01                                     6.40E+01
                          756.73 5.647E-01 ?(  2.260E+00 1.69E+02 5.45E+01 G
                          724.20 8.319E-01 ?(  4.593E+00 1.62E+02 4.42E+01 G

NB-95    I   7.2350E-01                                     6.40E+01
                          765.79 7.235E-01 ?(  1.910E+00 7.91E+01 9.98E+01 G

RU-103   I   4.2257E-01                                     3.93E+01
                          497.05 4.226E-01 ?(P 1.017E+00 1.00E+02 9.09E+01 G
                          610.30 9.331E+00 ?   5.483E+01 1.75E+02 5.75E+00 GA

RH-106   I  -1.1439E+00                                     3.74E+02
                          621.92-6.312E+00 ?(  3.538E+01 1.67E+02 9.93E+00 G
                         1050.36 3.175E+01 ?(  9.567E+01 8.88E+01 1.56E+00 G
                          511.86 1.564E+01 ?   6.053E+00 2.20E+01 2.00E+01 GA

AG-108M  C   4.8652E-02                                     1.53E+05
                          433.94-1.706E-01 ?(  1.137E+00 2.64E+02 9.05E+01 G
                          722.94-6.161E-01 +   2.605E+00 1.25E+02 9.08E+01 G
                          614.28 2.694E-01 ?(  3.602E+00 3.96E+02 8.98E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	6.3429E-01					2.50E+02	
			884.68	6.343E-01	?(P	2.301E+00	1.07E+02	7.27E+01 G
			657.76	-3.717E-01	-	1.570E+00	1.24E+02	9.46E+01 G
			937.49	-3.022E+00	+	5.737E+00	8.62E+01	3.44E+01 G
			1384.30	-8.936E-01	+	6.531E+00	3.27E+02	2.43E+01 G
			763.94	-4.212E+00	+	9.197E+00	6.61E+01	2.23E+01 G
SN-113	F	-6.2528E-01					1.15E+02	
			391.69	-6.253E-01	?(	2.574E+00	1.22E+02	6.40E+01 G
SB-125	I	1.7929E+00					1.01E+03	
			427.88	9.551E-01	*(P	2.531E+00	1.05E+02	2.96E+01 G
			600.50	-1.644E+00	+	1.812E+01	3.27E+02	1.79E+01 G
			635.89	-4.449E+00	&	1.280E+01	1.21E+02	1.13E+01 G
			463.37	4.161E+00	(	1.447E+01	1.03E+02	1.05E+01 G
I-131	I	9.1190E-01					8.02E+00	
			364.48	2.979E-01	?(	1.051E+00	1.41E+02	8.17E+01 G
			284.30	5.100E-01	% P	1.511E+01	1.13E+03	6.14E+00 G
			636.97	7.908E+00	(	2.032E+01	7.70E+01	7.17E+00 G
Gd-153	F	-9.1950E-01					2.42E+02	
			97.50	-9.195E-01	?(	4.313E+00	1.41E+02	3.00E+01 G
			103.20	-2.337E-01	&	6.070E+00	7.74E+02	2.18E+01 G
Ga-68	C	-8.1945E+00					4.71E-02	
			1077.40	-8.195E+00	?(	5.956E+01	3.25E+02	3.30E+00 G
Tc-99m	I	-3.2569E-01					2.51E-01	
			140.51	-3.257E-01	?(	1.307E+00	1.20E+02	8.93E+01 G
BA-133	F	-1.3941E-01					3.85E+03	
			356.00	-6.913E-01	?(	3.404E+00	1.47E+02	6.20E+01 G
			302.85	1.729E+00	?(	8.925E+00	1.54E+02	1.83E+01 G
			383.84	-1.725E+00	+	1.718E+01	2.92E+02	8.94E+00 GA
			80.99	9.042E-01	P	5.575E+00	1.85E+02	3.41E+01 GA
CE-139	F	3.8462E-01					1.38E+02	
			165.85	3.846E-01	(	5.528E-01	5.06E+01	7.99E+01 G
Ba-140	I	1.6290E+00					1.28E+01	
			537.26	8.888E-01	?(P	4.447E+00	2.05E+02	2.44E+01 G
			162.66	5.225E-01	?(	1.541E+01	8.68E+02	6.22E+00 G
			304.85	7.441E+00	?(	3.930E+01	1.57E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	1.2859E-01					1.28E+01	
			1596.21	-2.593E-01	?(	1.943E+00	3.46E+02	9.54E+01 G
			487.02	-6.170E-01	+ P	3.124E+00	1.40E+02	4.55E+01 G
			328.76	1.615E+00	?(P	5.422E+00	1.00E+02	2.03E+01 G
			815.77	4.222E-01	?(P	6.858E+00	4.61E+02	2.33E+01 G
CE-141	I	-6.5342E-01					3.25E+01	
			145.44	-6.534E-01	&(	3.481E+00	1.60E+02	4.82E+01 G
PM-144	C	4.5500E-01					3.63E+02	
			696.54	4.550E-01	?(	9.925E-01	9.34E+01	9.90E+01 G
			618.06	0.000E+00	-	3.313E+00	1.00E+03	9.91E+01 G
EU-152	F	2.4282E+00					4.94E+03	
			344.29	9.462E-01	&(	6.426E+00	2.01E+02	2.65E+01 G
			1112.07	-7.348E+00	+	2.417E+01	9.80E+01	1.36E+01 G
			121.78	-8.319E-01	+	3.180E+00	1.14E+02	2.86E+01 G
			778.92	4.035E+00	&(	8.387E+00	8.92E+01	1.29E+01 G
			964.11	3.693E+00	?(	1.741E+01	1.39E+02	1.46E+01 G
			244.69	-2.908E+00	+ P	3.090E+01	1.98E+02	7.58E+00 G
			1408.00	2.449E+00	? P	4.882E+00	8.87E+01	2.10E+01 GA
EU-154	I	1.1490E+00					3.14E+03	
			873.23	4.509E-02	%(	1.610E+01	1.01E+04	1.23E+01 G
			123.10	6.896E-02	&(	2.121E+00	9.06E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.218E+00	1.00E+03	3.52E+01 G
			723.36	1.813E+00	&(	9.595E+00	1.55E+02	2.02E+01 G
			1004.77	-4.091E+00	+	1.199E+01	8.72E+01	1.80E+01 G
			996.33	5.316E+00	&(	1.440E+01	8.05E+01	1.06E+01 G
EU-155	I	-1.7731E-07					1.81E+03	
			105.31	-1.773E-07	%(	6.244E+00	1.05E+09	2.12E+01 G
			86.54	0.000E+00	+	6.016E+00	1.00E+03	3.07E+01 G
HF-181	F	1.6817E-01					4.24E+01	
			482.00	1.682E-01	?(P	1.661E+00	2.86E+02	8.05E+01 G
			133.02	0.000E+00	-	2.633E+00	1.00E+03	4.33E+01 G
			345.83	-2.512E+00	+	1.252E+01	1.49E+02	1.51E+01 G
			136.30	0.000E+00	&	1.969E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.4557E+00					1.14E+02	
			1121.30	2.456E+00	(	7.879E+00	9.54E+01	3.49E+01 G
			1221.41	4.781E-01	-	6.949E+00	6.47E+02	2.70E+01 G
			1189.05	-5.184E-01	%	1.212E+01	1.05E+03	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-4.5344E-01					4.66E+01	
			279.20	-4.534E-01	&(	1.361E+00	8.99E+01	8.15E+01 G
TL-208	N	8.3872E+00					6.98E+02	
			583.02	8.353E+00	@(	8.412E-01	8.35E+00	8.45E+01 G
			277.28	8.845E+00	(P	1.070E+01	4.74E+01	6.31E+00 G
			860.56	1.295E+01	+ P	3.979E+00	1.95E+01	1.24E+01 G
pm-146	C	3.7435E-01					2.02E+03	
			747.16	3.743E-01	?(P	3.592E+00	4.00E+02	3.40E+01 G
			735.72	-1.757E+00	+	6.279E+00	1.53E+02	2.25E+01 G
			453.88	-4.707E-01	+ P	1.500E+00	1.02E+02	6.50E+01 G
y-88	F	4.0122E-01					1.07E+02	
			898.04	4.012E-01	?(P	1.237E+00	1.33E+02	9.37E+01 G
			1836.06	-4.415E-01	+	1.826E+00	1.95E+02	9.92E+01 G
Cd-113m		-2.8903E+03					5.33E+03	
			263.70	-2.890E+03	&(	1.747E+04	1.78E+02	6.00E-03 K
Cd-109	F	7.8630E+00					4.53E+02	
								Derived Ave Activity
			88.04	7.863E+00	}(	4.634E+01	1.77E+02	3.79E+00 G
Cf-251	T	-1.6927E+00					3.28E+05	
			176.60	-1.693E+00	?(	5.066E+00	1.17E+02	1.70E+01 G
			227.00	-1.330E+00	&	1.437E+01	4.17E+02	6.30E+00 GA
Sn-126		-1.9564E+00					3.65E+07	
			87.57	7.964E-01	}	4.644E+00	8.44E+01	3.75E+01 GA
			64.28	-1.956E+00	?(	1.698E+01	2.59E+02	9.70E+00 G
			86.94	0.000E+00	+	2.038E+01	1.00E+03	9.04E+00 GA
PB-210	N	3.4086E+01					8.14E+03	
			46.54	3.409E+01	?(P	4.124E+01	3.76E+01	4.25E+00 G
PB-212	N	2.1536E+01					6.98E+02	
			238.63	2.154E+01	(P	1.585E+00	4.58E+00	4.33E+01 G
			300.03	-9.921E+00	- P	5.888E+01	6.93E+01	3.28E+00 GA
PB-214	N	1.4022E+01					5.84E+05	
			351.93	1.358E+01	(P	1.763E+00	7.42E+00	3.76E+01 G
			295.09	1.488E+01	(P	2.987E+00	1.11E+01	1.93E+01 G
			242.00	1.595E+01		1.075E+01	2.25E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	2.2808E-01					1.18E+04	
			569.70	2.281E-01	(	1.466E+00	1.87E+02	9.77E+01 G
			1063.66	-7.132E-01	+	2.383E+00	1.52E+02	7.45E+01 G
BI-212	N	4.9145E+01					6.98E+02	
			727.17	4.914E+01	(	9.864E+00	1.41E+01	7.55E+00 G
			785.42	-5.364E+01	- P	1.172E+02	3.43E+01	1.28E+00 GA
BI-214	N	1.3195E+01					5.84E+05	
			609.31	1.319E+01	(P	3.091E+00	1.01E+01	4.61E+01 G
			1120.29	2.048E+01	+ P	6.331E+00	1.85E+01	1.51E+01 G
			1764.49	1.322E+01	?(P	1.046E+01	2.93E+01	1.54E+01 G
BI-210M	T	7.6924E-01					1.10E+09	
			265.83	5.615E-01	?(P	1.988E+00	1.05E+02	5.00E+01 G
			304.90	1.140E+00	?(	6.163E+00	1.61E+02	2.80E+01 G
AC-228	N	2.6899E+01					2.10E+03	
			911.07	2.690E+01	(P	1.940E+00	8.15E+00	2.90E+01 G
			968.97	2.228E+01	-	4.137E+00	1.32E+01	1.75E+01 G
			338.32	2.085E+01	-	5.830E+00	1.45E+01	1.20E+01 G
			93.35	5.255E+00	&	2.956E+01	1.69E+02	5.56E+00 XA
TH-227	N	4.5309E+00					7.95E+03	
			50.14	4.946E+00	?(	2.206E+01	1.33E+02	8.00E+00 G
			256.24	4.056E+00	&(	1.107E+01	1.06E+02	7.00E+00 G
TH-229	N	4.9989E+00					2.68E+06	
			193.51	4.999E+00	?(	1.780E+01	1.39E+02	4.40E+00 G
			210.85	-1.173E+01	+ P	4.694E+01	9.17E+01	2.99E+00 G
TH-234	N	2.9194E+00					1.63E+12	
			63.29	2.919E+00	(P	4.099E+01	4.18E+02	3.81E+00 G
			92.59	-1.010E+01	+ P	3.344E+01	9.49E+01	5.58E+00 G
PA-231	N	1.1829E+01					1.20E+07	
			302.65	1.183E+01	?(	6.173E+01	1.56E+02	2.88E+00 G
			300.07	0.000E+00	-	7.841E+01	1.00E+03	2.46E+00 G
PA-233	C	8.8624E-01					7.82E+08	
			312.01	8.862E-01	&(	4.937E+00	1.66E+02	3.60E+01 G
			300.18	0.000E+00	-	3.112E+01	1.00E+03	6.20E+00 G
PA-234	N	2.0077E+00					1.63E+12	
			131.29	6.571E-01	(P	6.238E+00	2.83E+02	1.80E+01 G
			946.02	3.822E+00	?(	9.001E+00	1.03E+02	1.34E+01 G
			569.47	-3.248E+00	+	1.732E+01	1.56E+02	8.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          883.24-1.730E+00 +   2.460E+01 4.11E+02 9.60E+00 G
                          880.53-1.298E+01 +   3.608E+01 8.31E+01 6.00E+00 GA

PA-234M  N   5.3463E+01                                     1.63E+12
                         1001.00 0.000E+00 &(  2.096E+02 1.00E+03 8.37E-01 G
                          766.41 2.057E+02 ?(  5.064E+02 7.39E+01 2.94E-01 G

U-235    N  -3.3134E+00                                     2.57E+11
                          143.79-3.313E+00 ?(P 1.457E+01 9.65E+01 1.10E+01 G
                          205.33-1.254E+00 + P 2.324E+01 5.00E+02 5.01E+00 G
                          163.38 9.805E-01 + P 1.776E+01 5.33E+02 5.08E+00 G

AM-241   T  -7.6369E-01                                     1.58E+05
                           59.54-7.637E-01 ?(P 5.074E+00 1.33E+02 3.59E+01 G

Np-237   F   1.2151E+00                                     2.14E+06
                           86.49 1.215E+00 &(  1.403E+01 3.46E+02 1.31E+01 G

Ir-192   F   6.3170E-01                                     7.40E+01
                          316.49 3.726E-01 &(  2.112E+00 1.69E+02 8.70E+01 G
                          468.06 8.467E-01  (  2.728E+00 9.60E+01 5.18E+01 G
                          308.44 9.916E-01 &(  5.421E+00 1.63E+02 3.18E+01 G

Cs-136   F   2.4158E-01                                     1.30E+01
                          818.50-4.723E-01 ?(  1.779E+00 1.11E+02 1.00E+02 G
                         1048.07 8.730E-01 ?(  1.859E+00 6.46E+01 8.00E+01 G
                          340.57 6.867E-01 ?(  3.501E+00 1.52E+02 4.69E+01 G

Np-239   T  -4.1934E-01                                     2.36E+00
                          103.70 1.570E-07 &   5.528E+00 1.05E+09 2.40E+01 X
                          106.13-4.193E-01 &(  5.765E+00 4.10E+02 2.27E+01 G
                           99.50-1.834E+00 &   8.736E+00 1.43E+02 1.50E+01 X

Nd-147       7.1268E-01                                     1.11E+01
                          531.00 0.000E+00 &(  8.568E+00 1.00E+03 1.30E+01 G
                           91.10 1.040E+00 ?(  6.174E+00 1.78E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	353.	20.	0.011	133.12	4.946E+00	
AM-241	59.54	648.	-18.	-0.010	133.45	-7.637E-01	P
TH-234	63.29	556.	8.	0.004	417.58	2.919E+00	P
Nd-147	91.10	1294.	29.	0.016	178.28	1.040E+00	
TH-234	92.59	1501.	-55.	-0.031	94.91	-1.010E+01	P
Gd-153	97.50	737.	-28.	-0.015	140.65	-9.195E-01	
Np-239	99.50	765.	-28.	-0.015	142.87	-1.834E+00	
Gd-153	103.20	793.	-5.	-0.003	773.66	-2.337E-01	
Np-239	106.13	780.	-10.	-0.005	409.94	-4.193E-01	
EU-152	121.78	365.	-24.	-0.013	114.41	-8.319E-01	
EU-154	123.10	328.	3.	0.002	906.15	6.896E-02	
PA-234	131.29	540.	12.	0.006	282.63	6.571E-01	P
CO-57	136.47	552.	-29.	-0.016	115.26	-2.809E+00	
Tc-99m	140.51	518.	-27.	-0.015	120.31	-3.257E-01	
U-235	143.79	1019.	-34.	-0.019	96.45	-3.313E+00	P
CE-141	145.44	1113.	-30.	-0.016	159.94	-6.534E-01	
Ba-140	162.66	301.	3.	0.002	868.24	5.225E-01	
U-235	163.38	264.	4.	0.002	533.03	9.805E-01	P
Cf-251	176.60	220.	-24.	-0.013	117.41	-1.693E+00	
TH-229	193.51	154.	17.	0.009	138.70	4.999E+00	
U-235	205.33	317.	-5.	-0.003	500.29	-1.254E+00	P
TH-229	210.85	445.	-25.	-0.014	91.74	-1.173E+01	P
Cf-251	227.00	158.	-6.	-0.003	416.67	-1.330E+00	
EU-152	244.69	981.	-14.	-0.008	197.97	-2.908E+00	P
TH-227	256.24	92.	17.	0.010	106.09	4.056E+00	
Cd-113m	263.70	164.	-10.	-0.006	178.18	-2.890E+03	
BI-210M	265.83	145.	17.	0.009	105.44	5.615E-01	P
Hg-203	279.20	167.	-21.	-0.012	89.85	-4.534E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	302.65	386.	18.	0.010	155.60	1.183E+01	
Ba-140	304.85	341.	17.	0.009	157.27	7.441E+00	
BI-210M	304.90	358.	17.	0.009	161.01	1.140E+00	
Ir-192	308.44	349.	16.	0.009	162.76	9.916E-01	
PA-233	312.01	365.	16.	0.009	165.90	8.862E-01	
Ir-192	316.49	382.	17.	0.009	168.83	3.726E-01	
CR-51	320.08	424.	5.	0.003	637.22	9.129E-01	P
La-140	328.76	123.	16.	0.009	99.97	1.615E+00	P
Cf-249	333.44	201.	-21.	-0.011	99.94	-2.718E+00	
Cs-136	340.57	266.	15.	0.009	151.54	6.867E-01	
EU-152	344.29	281.	12.	0.007	201.29	9.462E-01	
HF-181	345.83	345.	-18.	-0.010	148.57	-2.512E+00	
SN-113	391.69	208.	-17.	-0.009	122.50	-6.253E-01	
SB-125	427.88	33.	11.	0.006	104.78	9.551E-01	P
AG-108M	433.94	64.	-6.	-0.003	264.22	-1.706E-01	
pm-146	453.88	52.	-11.	-0.006	102.34	-4.707E-01	P
SB-125	463.37	129.	16.	0.009	103.46	4.161E+00	
Ir-192	468.06	109.	16.	0.009	95.96	8.467E-01	
HF-181	482.00	92.	5.	0.003	286.46	1.682E-01	P
La-140	487.02	103.	-10.	-0.005	139.88	-6.170E-01	P
RH-106	511.86	67.	105.	0.059	22.03	1.564E+01	
Ba-140	537.26	48.	7.	0.004	205.36	8.888E-01	P
CS-134	569.32	56.	-9.	-0.005	118.34	-1.979E+00	
PA-234	569.47	77.	-8.	-0.005	155.77	-3.248E+00	
BI-207	569.70	78.	7.	0.004	186.93	2.281E-01	
SB-125	600.50	390.	-9.	-0.005	326.65	-1.644E+00	
AG-108M	614.28	374.	7.	0.004	395.73	2.694E-01	
RH-106	621.92	433.	-18.	-0.010	167.20	-6.312E+00	
SB-125	635.89	65.	-14.	-0.008	120.55	-4.449E+00	
AG-110M	657.76	64.	-10.	-0.005	123.88	-3.717E-01	
PM-144	696.54	23.	12.	0.006	93.38	4.550E-01	
SB-124	722.79	126.	-8.	-0.004	209.91	-2.855E+00	
AG-108M	722.94	145.	-14.	-0.008	125.29	-6.161E-01	
EU-154	723.36	95.	9.	0.005	155.12	1.813E+00	
ZR-95	724.20	104.	9.	0.005	161.95	8.319E-01	
pm-146	735.72	47.	-10.	-0.005	153.32	-1.757E+00	
pm-146	747.16	33.	3.	0.002	399.90	3.743E-01	P
ZR-95	756.73	33.	7.	0.004	169.41	5.647E-01	
AG-110M	763.94	96.	-22.	-0.012	66.07	-4.212E+00	
NB-95	765.79	82.	17.	0.009	79.07	7.235E-01	
PA-234M	766.41	48.	14.	0.008	73.87	2.057E+02	
EU-152	778.92	23.	12.	0.007	89.19	4.035E+00	
CS-134	795.87	85.	-9.	-0.005	148.66	-4.616E-01	
CS-134	801.95	115.	-17.	-0.009	92.45	-8.640E+00	
CO-58	810.78	39.	11.	0.006	87.87	4.808E-01	P
La-140	815.77	50.	2.	0.001	460.57	4.222E-01	P
Cs-136	818.50	62.	-10.	-0.006	110.86	-4.723E-01	
MN-54	834.85	44.	-15.	-0.008	68.48	-6.905E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	846.77	33.	-8.	-0.004	130.75	-3.676E-01	P
NB-94	871.10	54.	-17.	-0.010	65.35	-8.149E-01	
PA-234	880.53	83.	-16.	-0.009	83.09	-1.298E+01	
PA-234	883.24	99.	-3.	-0.002	411.20	-1.730E+00	
AG-110M	884.68	47.	10.	0.005	106.55	6.343E-01	P
Sc-46	889.28	64.	12.	0.007	95.81	6.009E-01	P
y-88	898.04	20.	8.	0.004	133.26	4.012E-01	P
AG-110M	937.49	60.	-20.	-0.011	86.19	-3.022E+00	
PA-234	946.02	20.	10.	0.006	103.28	3.822E+00	
EU-152	964.11	98.	10.	0.006	138.63	3.693E+00	
EU-154	996.33	30.	10.	0.006	80.53	5.316E+00	
EU-154	1004.77	64.	-14.	-0.008	87.23	-4.091E+00	
Co-56	1037.84	30.	-8.	-0.004	154.62	-3.152E+00	
Cs-136	1048.07	26.	12.	0.007	64.57	8.730E-01	
RH-106	1050.36	26.	9.	0.005	88.75	3.175E+01	
BI-207	1063.66	37.	-9.	-0.005	152.36	-7.132E-01	
Ga-68	1077.40	32.	-4.	-0.002	325.32	-8.194E+00	
FE-59	1099.25	16.	5.	0.003	187.26	5.190E-01	
EU-152	1112.07	129.	-17.	-0.009	98.03	-7.348E+00	
ZN-65	1115.55	112.	-6.	-0.003	249.35	-7.148E-01	
Ta-182	1121.30	86.	14.	0.008	95.37	2.456E+00	
CO-60	1173.24	43.	-15.	-0.008	64.50	-9.311E-01	P
Ta-182	1221.41	32.	2.	0.001	646.79	4.781E-01	
Co-56	1238.28	54.	8.	0.005	208.14	8.021E-01	P
NA-22	1274.53	17.	11.	0.006	60.98	7.385E-01	
FE-59	1291.60	29.	-8.	-0.004	224.73	-1.182E+00	P
CO-60	1332.50	29.	-14.	-0.008	125.19	-9.437E-01	P
AG-110M	1384.30	17.	-3.	-0.002	327.45	-8.936E-01	
EU-152	1408.00	6.	7.	0.004	88.65	2.449E+00	P
La-140	1596.21	18.	-3.	-0.002	346.41	-2.593E-01	
SB-124	1690.98	6.	-1.	-0.001	600.00	-1.820E-01	
Co-56	1771.35	45.	-11.	-0.006	60.69	-6.427E+00	P
y-88	1836.06	13.	-5.	-0.003	194.96	-4.415E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.3912E-01	3.3912E-01	1.231E+03%	1.44E+01
NA-22	#A	7.3847E-01	7.3847E-01	6.098E+01%	1.47E+00
K-40	#	2.8405E+02	2.8405E+02	5.053E+00%	7.94E+00
Sc-46	#A	6.0093E-01	6.0093E-01	9.581E+01%	1.94E+00
CR-51	#A	9.1288E-01	9.1290E-01	6.372E+02%	1.97E+01
MN-54	#A	-6.9049E-01	-6.9049E-01	6.848E+01%	1.54E+00
FE-59	#A	5.1903E-01	5.1903E-01	1.873E+02%	2.22E+00

Co-56	#A	9.7921E-02	9.7921E-02	1.229E+02%	1.37E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E+00
CO-58	#A	4.8082E-01	4.8082E-01	8.787E+01%	1.43E+00
CO-60	#A	-9.4365E-01	-9.4365E-01	1.252E+02%	1.93E+00
ZN-65	#A	-7.1484E-01	-7.1484E-01	2.494E+02%	6.11E+00
NB-94	#A	-1.3368E-02	-1.3368E-02	3.892E+03%	1.25E+00
ZR-95	#A	6.8434E-01	6.8434E-01	1.172E+02%	2.26E+00
NB-95	#A	7.2350E-01	7.2350E-01	7.907E+01%	1.91E+00
RU-103	#A	4.2257E-01	4.2257E-01	1.001E+02%	1.02E+00
RH-106	#A	-1.1439E+00	-1.1439E+00	8.875E+01%	3.54E+01
AG-108M	#A	4.8652E-02	4.8652E-02	2.379E+02%	1.14E+00
AG-110M	#A	6.3429E-01	6.3429E-01	1.065E+02%	2.30E+00
SN-113	#A	-6.2528E-01	-6.2528E-01	1.225E+02%	2.57E+00
SB-124	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.27E+00
SB-125	#A	1.7929E+00	1.7929E+00	7.363E+01%	2.53E+00
I-131	A	9.1186E-01	9.1190E-01	7.699E+01%	1.05E+00
Gd-153	#A	-9.1950E-01	-9.1950E-01	1.407E+02%	4.31E+00
Ga-68	#A	-8.1250E+00	-8.1945E+00	3.253E+02%	5.96E+01
Tc-99m	#A	-3.2517E-01	-3.2569E-01	1.203E+02%	1.31E+00
BA-133	A	-1.3941E-01	-1.3941E-01	1.064E+02%	3.40E+00
CS-134	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.30E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.83E+00
CE-139	A	3.8462E-01	3.8462E-01	5.065E+01%	5.53E-01
Ba-140	#A	1.6290E+00	1.6290E+00	1.573E+02%	4.45E+00
La-140	#A	1.2859E-01	1.2859E-01	9.997E+01%	1.94E+00
CE-141	#A	-6.5341E-01	-6.5342E-01	1.599E+02%	3.48E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.03E+01
PM-144	#A	4.5500E-01	4.5500E-01	9.338E+01%	9.92E-01
EU-152	#A	2.4282E+00	2.4282E+00	8.673E+01%	6.43E+00
EU-154	#A	1.1490E+00	1.1490E+00	8.053E+01%	1.61E+01
EU-155	#A	-1.7731E-07	-1.7731E-07	1.047E+09%	6.24E+00
HF-181	#A	1.6817E-01	1.6817E-01	2.865E+02%	1.66E+00
Ta-182	#A	2.4557E+00	2.4557E+00	9.537E+01%	7.88E+00
Hg-203	#A	-4.5344E-01	-4.5344E-01	8.985E+01%	1.36E+00
TL-208		8.3872E+00	8.3872E+00	8.350E+00%	8.41E-01
pm-146	#A	3.7435E-01	3.7435E-01	3.999E+02%	3.59E+00
y-88	#A	4.0122E-01	4.0122E-01	1.333E+02%	1.24E+00
Cd-113m	#A	-2.8903E+03	-2.8903E+03	1.782E+02%	1.75E+04
Cd-109	#A	7.8629E+00	7.8630E+00	1.770E+02%	4.63E+01
Cf-251	#A	-1.6927E+00	-1.6927E+00	1.174E+02%	5.07E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.39E+00
Sn-126	#A	-1.9564E+00	-1.9564E+00	2.589E+02%	1.70E+01
PB-210	#A	3.4086E+01	3.4086E+01	3.760E+01%	4.12E+01
PB-212		2.1536E+01	2.1536E+01	4.580E+00%	1.59E+00
PB-214		1.4022E+01	1.4022E+01	6.675E+00%	1.76E+00
BI-207	#A	2.2808E-01	2.2808E-01	1.869E+02%	1.47E+00
BI-212		4.9145E+01	4.9145E+01	1.411E+01%	9.86E+00
BI-214		1.3195E+01	1.3195E+01	1.007E+01%	3.09E+00
BI-210M	#A	7.6924E-01	7.6924E-01	9.623E+01%	1.99E+00

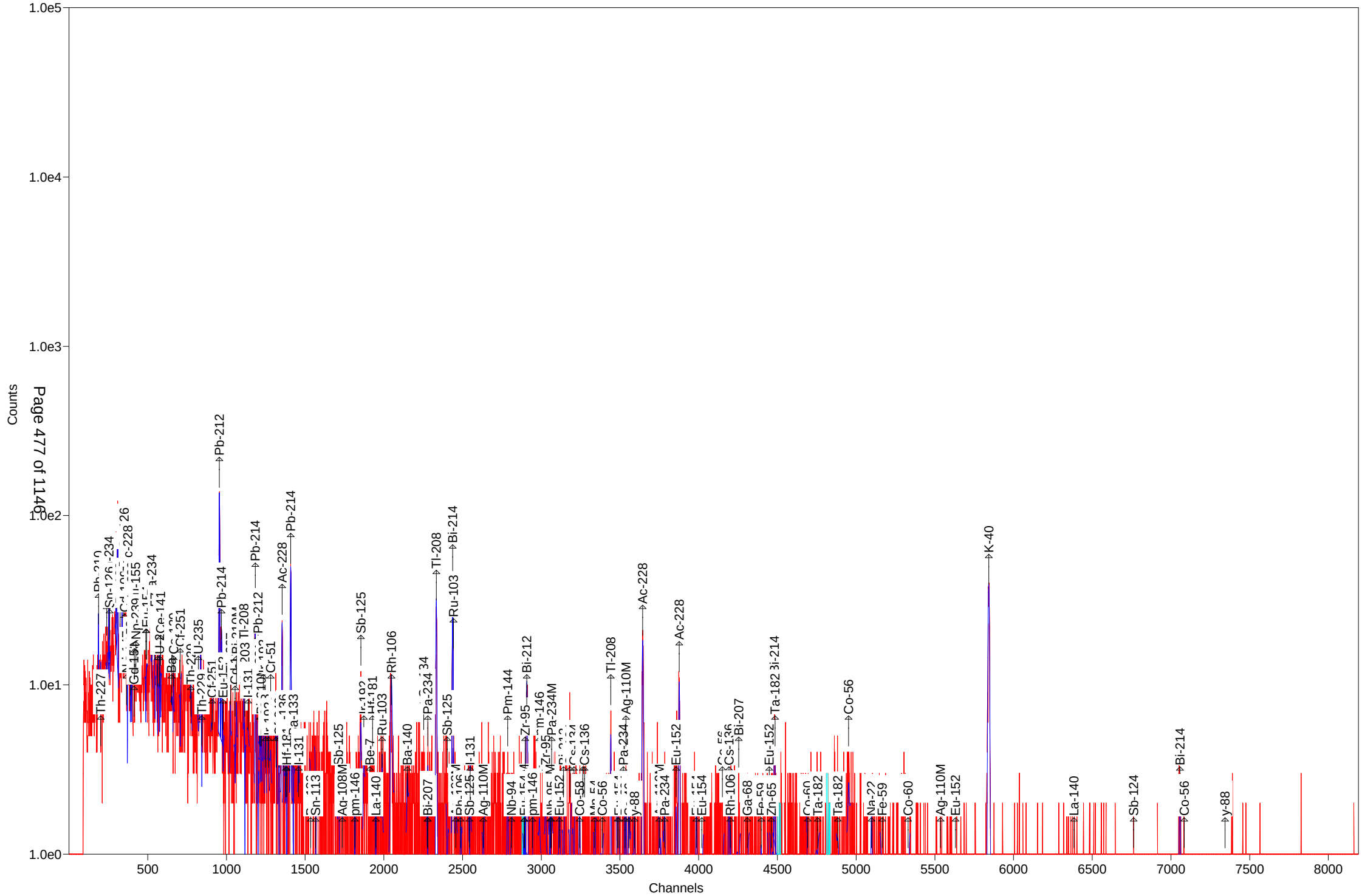
AC-228	2.6899E+01	2.6899E+01	8.147E+00%	1.94E+00
TH-227 #A	4.5309E+00	4.5309E+00	8.511E+01%	2.21E+01
TH-229 #A	4.9989E+00	4.9989E+00	1.387E+02%	1.78E+01
TH-234 #A	2.9194E+00	2.9194E+00	4.176E+02%	4.10E+01
PA-231 #A	1.1829E+01	1.1829E+01	1.556E+02%	6.17E+01
PA-233 #A	8.8624E-01	8.8624E-01	1.659E+02%	4.94E+00
PA-234 #A	2.0077E+00	2.0077E+00	1.033E+02%	6.24E+00
PA-234M#A	5.3463E+01	5.3463E+01	7.387E+01%	2.10E+02
U-235 #A	-3.3134E+00	-3.3134E+00	9.645E+01%	1.46E+01
AM-241 #A	-7.6369E-01	-7.6369E-01	1.334E+02%	5.07E+00
Np-237 A	1.2151E+00	1.2151E+00	3.459E+02%	1.40E+01
Ir-192 #A	6.3170E-01	6.3170E-01	8.446E+01%	2.11E+00
Cs-136 #A	2.4157E-01	2.4158E-01	6.457E+01%	1.78E+00
Np-239 #A	-4.1927E-01	-4.1934E-01	4.099E+02%	5.76E+00
Nd-147 #A	7.1265E-01	7.1268E-01	1.783E+02%	8.57E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 4.517E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 4.5170612E+02 Bq/Sample

264535_Gamma_160-18554-A-2-B. 7_Gamma_20162140.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161668

Sample Description: 264535_Gamma_160-18554-A-3-B
Detector: Detector # 5
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-3-B

Decay to Time: 9/1/2016 11:51 Live Time: 1800 sec
Acquisition Time: 9/1/2016 11:51:55 Real Time: 1809 sec
Analysis Time: 9/1/2016 12:22 Dead Time: 0.47 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 5_2016-07-31_1355.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.489E+00	95.3	4.278E+00	4.284E+00	1.448E+01
NA-22	8.092E-01	65.4	5.289E-01	5.304E-01	1.741E+00
K-40	3.267E+02	5.7	1.848E+01	2.492E+01	1.207E+01
Sc-46	3.210E-01	116.5	3.740E-01	3.744E-01	3.710E+00
CR-51	9.223E-01	513.7	4.738E+00	4.738E+00	1.256E+01
MN-54	-3.628E-01	246.9	8.956E-01	8.958E-01	2.121E+00
FE-59	-1.213E+00	166.4	2.019E+00	2.020E+00	4.592E+00
Co-56	5.126E-01	106.0	5.432E-01	5.439E-01	1.580E+00
CO-57	7.185E-01	81.8	5.877E-01	5.890E-01	1.299E+00
CO-58	1.557E-01	440.5	6.859E-01	6.859E-01	2.416E+00
CO-60	6.189E-01	88.9	5.501E-01	5.510E-01	2.169E+00
ZN-65	1.011E+00	210.6	2.128E+00	2.129E+00	7.342E+00
NB-94	1.949E-01	80.0	1.559E-01	1.563E-01	1.813E+00
ZR-95	6.134E-01	183.3	1.125E+00	1.125E+00	2.806E+00
NB-95	-3.804E-01	166.7	6.340E-01	6.343E-01	2.197E+00
RU-103	5.715E-01	98.6	5.634E-01	5.642E-01	1.414E+00
RH-106	1.245E+01	73.4	9.136E+00	9.159E+00	4.349E+01
AG-108M	2.173E-01	263.9	5.735E-01	5.736E-01	1.463E+00
AG-110M	5.902E-01	83.9	4.950E-01	4.960E-01	5.055E+00
SN-113	-1.022E+00	42.2	4.312E-01	4.344E-01	3.682E+00
SB-124	-2.189E-02	3873.8	8.479E-01	8.479E-01	4.413E+00
SB-125	4.929E+00	26.6	1.312E+00	1.336E+00	4.232E+00
I-131	3.950E-02	800.5	3.162E-01	3.162E-01	1.697E+00
Gd-153	1.226E+00	76.2	9.343E-01	9.373E-01	3.518E+00
Ga-68	-2.995E+00	988.3	2.959E+01	2.959E+01	7.052E+01
Tc-99m	-4.191E-01	124.5	5.217E-01	5.222E-01	1.745E+00
BA-133	-3.587E-01	367.4	1.318E+00	1.318E+00	4.464E+00
CS-134	1.290E+00	33.1	4.268E-01	4.321E-01	4.451E+00
CS-137	-2.469E-01	294.6	7.274E-01	7.275E-01	2.603E+00
CE-139	-5.184E-01	106.4	5.517E-01	5.539E-01	1.843E+00
Ba-140	-2.301E+00	98.1	2.258E+00	2.261E+00	6.809E+00
La-140	1.143E+00	33.1	3.787E-01	3.835E-01	2.262E+00
CE-141	7.261E-01	120.7	8.766E-01	8.774E-01	2.934E+00

CE-144	-9.163E-02	3402.0	3.117E+00	3.117E+00	1.505E+01
PM-144	-3.935E-01	214.9	8.457E-01	8.460E-01	2.059E+00
EU-152	3.427E+00	81.7	2.800E+00	2.806E+00	9.588E+00
EU-154	1.803E+00	85.6	1.544E+00	1.546E+00	1.066E+01
EU-155	9.457E-01	161.2	1.524E+00	1.525E+00	7.355E+00
HF-181	3.695E-01	179.9	6.646E-01	6.649E-01	2.285E+00
Ta-182	3.492E+00	60.6	2.117E+00	2.124E+00	9.194E+00
Hg-203	5.141E-01	100.4	5.159E-01	5.168E-01	1.734E+00
TL-208	1.118E+01	8.6	9.568E-01	1.119E+00	1.253E+00
pm-146	6.853E-01	132.6	9.085E-01	9.092E-01	4.474E+00
y-88	2.993E-01	186.8	5.591E-01	5.593E-01	1.763E+00
Cd-113m	-8.554E+03	96.3	8.241E+03	8.259E+03	2.758E+04
Cd-109	2.893E+00	608.5	1.761E+01	1.761E+01	5.905E+01
Cf-251	1.245E+00	185.9	2.315E+00	2.318E+00	6.282E+00
Cf-249	1.085E+00	78.7	8.545E-01	8.564E-01	2.803E+00
Sn-126	5.086E+00	103.1	5.244E+00	5.251E+00	1.751E+01
PB-210	-1.651E+00	953.8	1.575E+01	1.575E+01	4.617E+01
PB-212	2.611E+01	5.5	1.435E+00	2.216E+00	2.729E+00
PB-214	1.827E+01	8.4	1.527E+00	1.798E+00	2.922E+00
BI-207	9.303E-01	23.7	2.203E-01	2.255E-01	1.835E+00
BI-212	3.758E+01	16.5	6.217E+00	6.516E+00	8.828E+00
BI-214	1.606E+01	10.9	1.756E+00	1.944E+00	2.966E+00
BI-210M	9.154E-01	101.6	9.302E-01	9.318E-01	3.121E+00
AC-228	2.845E+01	8.7	2.487E+00	2.879E+00	5.006E+00
TH-227	-1.120E+00	275.0	3.079E+00	3.080E+00	2.179E+01
TH-229	9.743E+00	88.7	8.640E+00	8.675E+00	2.327E+01
TH-234	7.754E+00	63.8	4.946E+00	4.962E+00	4.494E+01
PA-231	0.000E+00	1.#INF	7.017E+00	7.018E+00	8.395E+01
PA-233	1.213E+00	155.8	1.890E+00	1.891E+00	6.365E+00
PA-234	-2.063E+00	128.1	2.644E+00	2.646E+00	8.836E+00
PA-234M	8.204E+01	109.0	8.944E+01	8.953E+01	3.057E+02
U-235	3.736E+00	125.0	4.672E+00	4.676E+00	1.350E+01
AM-241	6.844E-01	134.4	9.202E-01	9.209E-01	2.908E+00
Np-237	0.000E+00	1.#INF	5.484E+00	5.484E+00	1.832E+01
Ir-192	-3.478E-02	1513.3	5.264E-01	5.264E-01	1.825E+00
Cs-136	7.057E-01	99.1	6.994E-01	7.006E-01	2.173E+00
Np-239	1.291E+00	169.8	2.192E+00	2.193E+00	7.340E+00
Nd-147	-5.837E+00	93.3	5.445E+00	5.456E+00	1.347E+01
Total	6.287E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-3-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161668.An1

Acquisition information
Start time: 9/1/2016 11:51:55 AM
Live time: 1800
Real time: 1809
Dead time: 0.47 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 11:51:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-31_1355.PBC 7/31/2016 1:55:22 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2338

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-2.	953.77	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
59.66	11.	134.45	1.13	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.52	9.	278.61	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.51	24.	103.11	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.84	195.	12.37	0.81	3.152E-02				
77.15	325.	8.55	0.82	3.220E-02				
87.15	117.	21.83	1.12	3.447E-02	86.49	13.100	1.444E+01	Np237
					86.54	30.700	6.162E+00	EU155
					86.94	9.040	2.088E+01	Sn126
					87.57	37.500	5.018E+00	Sn126
88.05	7.	608.54	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
92.44	35.	63.79	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.20	23.	108.47	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
97.50	20.	99.72	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	12.	190.21	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
103.20	21.	115.33	0.84	3.612E-02	103.20	21.800	PBC<MDA	Gd153
103.70	21.	119.37	0.84	3.614E-02	103.70	24.000	PBC<MDA	Np239
105.31	19.	161.19	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
106.13	19.	169.83	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
122.06	21.	100.24	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.877E-01	CO57
123.10	13.	171.39	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
136.47	22.	129.31	0.88	3.457E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.370E+00	CO57
144.22	21.	125.05	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
145.44	21.	120.73	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
163.64	4.	540.71	0.90	3.102E-02	163.38	5.080	PBC<MDA	U235
176.50	11.	185.95	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
186.07	63.	24.70	1.02	2.849E-02				
193.51	18.	102.76	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
205.33	17.	137.99	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
209.44	63.	23.12	0.70	2.587E-02				
210.85	16.	144.54	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	8.	212.79	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.70	483.	6.27	0.96	2.319E-02	238.63	43.300	2.671E+01	PB212
242.12	81.	19.98	0.98	2.293E-02	242.00	7.430	2.629E+01	PB214
244.69	9.	441.37	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
256.24	2.	898.07	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
265.83	17.	101.62	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
277.30	16.	94.41	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
279.20	15.	100.36	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
295.36	140.	13.17	1.00	1.943E-02	295.09	19.300	1.991E+01	PB214
299.96	57.	27.64	0.37	1.918E-02	300.03	3.280	5.062E+01	PB212
					300.07	2.460	6.750E+01	PA231
312.01	15.	155.82	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
320.08	3.	513.70	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	47.	33.11	1.07	1.778E-02	328.76	20.300	7.227E+00	La140
333.44	13.	109.49	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.41	125.	16.14	0.68	1.736E-02	338.32	12.010	3.329E+01	AC228
340.57	14.	167.63	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
344.29	4.	552.49	1.08	1.711E-02	344.29	26.500	PBC<MDA	EU152
352.09	198.	9.48	1.32	1.680E-02	351.93	37.600	1.742E+01	PB214
387.95	14.	113.14	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
427.38	13.	101.59	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
433.94	5.	263.92	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
453.88	6.	224.86	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.37	48.	26.61	1.19	1.336E-02	463.37	10.470	1.911E+01	SB125
477.60	11.	95.29	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
482.00	7.	179.86	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	5.	261.53	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	12.	98.59	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	68.	35.66	2.48	1.230E-02	511.86	20.000	1.536E+01	RH106
563.24	12.	92.64	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
583.59	188.	8.51	1.35	1.102E-02	583.02	84.500	1.118E+01	TL208
600.50	7.	349.05	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
609.56	142.	10.94	1.11	1.063E-02	609.31	46.090	1.606E+01	BI214
					610.30	5.750	1.289E+02	RU103
621.92	12.	205.09	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
636.97	1.	900.08	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	11.	83.87	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
661.66	-4.	294.55	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
727.43	47.	16.54	1.08	9.170E-03	727.17	7.550	3.758E+01	BI212
747.16	7.	140.45	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
756.73	5.	183.34	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
763.94	2.	524.21	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
785.54	10.	95.07	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	29.	33.07	1.48	8.503E-03	795.87	85.530	2.215E+00	CS134
810.78	2.	440.55	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
815.77	9.	108.30	1.49	8.328E-03	815.77	23.280	PBC<MDA	La140
818.50	9.	105.76	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
860.74	6.	210.85	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	5.	80.03	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	2.	202.77	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
898.04	4.	216.89	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.36	96.	13.24	1.38	7.591E-03	911.07	29.000	2.435E+01	AC228
937.49	1.	692.82	1.59	7.411E-03	937.49	34.360	PBC<MDA	AG110M
964.11	14.	81.71	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.41	72.	15.87	1.61	7.209E-03	968.97	17.460	3.192E+01	AC228
996.33	10.	85.62	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	9.	109.01	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	2.	427.65	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	10.	73.40	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	19.	23.68	1.68	6.666E-03	1063.66	74.500	2.085E+00	BI207
1112.07	8.	140.09	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	210.61	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1120.53	8.	119.73	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	8.	116.54	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.375E-01	Sc46
					1121.30	34.900	2.114E+00	Ta182
1121.34	8.	126.96	1.72	6.376E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.378E-01	Sc46
					1121.30	34.900	2.115E+00	Ta182
1173.24	12.	88.89	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	9.	88.27	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	13.	95.69	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	105.98	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	8.	65.36	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.298E+00	EU154
1332.50	2.	541.17	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	7.	89.99	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	87.98	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.40	320.	5.66	1.52	5.103E-03	1460.83	10.670	3.267E+02	K40
1764.98	5.	101.09	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	28.	23.70	2.12	4.337E-03	1771.35	15.480	2.276E+01	Co56
1836.06	2.	304.14	2.15	4.208E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.99	74.84	194.	195.	6.194E+03	12.37	0.813	- D
308.22	77.15	224.	325.	1.010E+04	8.55	0.815	- sD
744.26	186.07	68.	63.	2.200E+03	24.70	1.016	-
836.45	209.10	91.	56.	2.173E+03	27.43	0.949	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	168.	-2.	-0.001	953.77	0.783s
TH-227	200.11	50.14	168.	-8.	-0.004	275.00	0.787s
AM-241	238.21	59.66	93.	11.	0.006	134.45	1.131s
TH-234	252.74	63.29	301.	9.	0.005	278.61	0.801s
Sn-126	256.71	64.28	306.	24.	0.014	103.11	0.802
BA-133	323.61	80.99	248.	-10.	-0.005	291.49	0.819s
Np-237	345.63	86.49	977.	0.	0.000	242.40	0.825A
EU-155	345.84	86.54	892.	12.	0.007	338.99	0.825s
Sn-126	347.43	86.94	843.	25.	0.014	88.42	0.825D
Sn-126	349.95	87.57	834.	77.	0.043	27.00	0.826D
Cd-109	351.83	88.04	861.	7.	0.004	608.54	0.826A
TH-234	370.05	92.59	226.	35.	0.019	63.79	0.831D
AC-228	373.09	93.35	289.	23.	0.013	108.47	0.832s
Gd-153	389.70	97.50	196.	20.	0.011	99.72	0.836s
Np-239	397.71	99.50	268.	12.	0.007	190.21	0.838s
Gd-153	412.52	103.20	275.	21.	0.012	115.33	0.842s
Np-239	414.52	103.70	296.	21.	0.012	119.37	0.842s
EU-155	420.98	105.31	450.	19.	0.010	161.19	0.844s
Np-239	424.25	106.13	516.	19.	0.011	169.83	0.845s
EU-152	486.88	121.78	304.	-24.	-0.013	105.81	0.861s
CO-57	488.03	122.06	219.	21.	0.012	100.24	0.861s
EU-154	492.18	123.10	228.	13.	0.007	171.39	0.862s
PA-234	524.99	131.29	440.	-23.	-0.013	128.12	0.871s
HF-181	531.91	133.02	463.	-16.	-0.009	197.56	0.872s
HF-181	545.02	136.30	479.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	408.	22.	0.012	129.31	0.876s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Tc-99m	561.88	140.51	374.	-22.	-0.012	124.48	0.880s
U-235	574.99	143.79	349.	21.	0.012	125.05	0.883
CE-141	581.61	145.44	314.	21.	0.012	120.73	0.885s
Ba-140	650.54	162.66	268.	-8.	-0.005	280.14	0.902s
U-235	653.42	163.38	272.	4.	0.002	540.71	0.903
CE-139	663.32	165.85	297.	-23.	-0.013	106.42	0.905s
Cf-251	706.34	176.60	137.	11.	0.006	185.95	0.916
TH-229	774.03	193.51	107.	18.	0.010	102.76	0.933s
U-235	821.35	205.33	260.	17.	0.009	137.99	0.945s
TH-229	843.44	210.85	266.	16.	0.009	144.54	0.950s
Cf-251	908.08	227.00	97.	8.	0.005	212.79	0.966
PB-212	954.64	238.63	100.	472.	0.262	5.50	0.978D
PB-214	968.10	242.00	89.	81.	0.045	19.98	0.981D
EU-152	978.89	244.69	861.	9.	0.005	441.37	0.984s
TH-227	1025.11	256.24	100.	2.	0.001	898.07	0.995s
Cd-113m	1054.97	263.70	171.	-20.	-0.011	96.33	1.002s
BI-210M	1063.50	265.83	149.	17.	0.010	101.62	1.005s
TL-208	1109.33	277.28	103.	16.	0.009	94.41	1.016s
Hg-203	1117.00	279.20	111.	15.	0.009	100.36	1.017s
I-131	1137.41	284.30	110.	-19.	-0.011	103.26	1.022s
PB-214	1181.67	295.36	52.	135.	0.075	13.78	1.001s
PB-212	1200.09	299.96	49.	57.	0.032	27.64	0.374s
PA-233	1200.97	300.18	296.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	296.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	296.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	296.	0.	0.000	1000.00	1.042
BI-210M	1219.85	304.90	296.	0.	0.000	1000.00	1.042
Ir-192	1234.03	308.44	296.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	251.	15.	0.008	155.82	1.049
CR-51	1280.63	320.08	67.	3.	0.002	513.70	1.057s
La-140	1315.35	328.76	56.	47.	0.026	33.11	1.065s
Cf-249	1334.08	333.44	51.	13.	0.007	109.49	1.070s
AC-228	1353.96	338.41	55.	125.	0.069	16.14	0.677s
Cs-136	1362.62	340.57	249.	14.	0.008	167.63	1.077s
EU-152	1377.49	344.29	263.	4.	0.002	552.49	1.080s
HF-181	1383.66	345.83	267.	0.	0.000	1000.00	1.082s
PB-214	1408.74	352.09	43.	198.	0.110	9.48	1.316s
BA-133	1424.36	356.00	297.	-7.	-0.004	367.42	1.091s
BA-133	1535.78	383.84	162.	-16.	-0.009	114.91	1.117s
Cf-249	1552.22	387.95	110.	14.	0.008	113.14	1.121s
SN-113	1567.19	391.69	180.	-18.	-0.010	42.21	1.125s
SB-125	1711.99	427.88	40.	13.	0.007	101.59	1.158s
AG-108M	1736.25	433.94	44.	5.	0.003	263.92	1.164s
pm-146	1816.05	453.88	45.	6.	0.003	224.86	1.182s
SB-125	1854.01	463.37	58.	48.	0.027	26.61	1.191
Ir-192	1872.79	468.06	128.	-14.	-0.008	118.93	1.195s
BE-7	1910.94	477.59	50.	11.	0.006	95.29	1.204s
HF-181	1928.56	482.00	74.	7.	0.004	179.86	1.208s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1948.65	487.02	36.	5.	0.003	261.53	1.212s
RU-103	1988.80	497.05	32.	12.	0.007	98.59	1.221
RH-106	2048.06	511.86	80.	68.	0.038	35.66	2.485
Nd-147	2124.62	531.00	56.	-16.	-0.009	93.29	1.252s
Ba-140	2149.67	537.26	49.	-12.	-0.007	98.13	1.258s
CS-134	2253.60	563.24	28.	12.	0.007	92.64	1.280s
CS-134	2277.94	569.32	52.	-2.	-0.001	514.78	1.286s
PA-234	2278.54	569.47	54.	0.	0.000	1000.00	1.286s
TL-208	2335.04	583.59	15.	188.	0.104	8.56	1.350
SB-125	2402.69	600.50	295.	7.	0.004	349.05	1.313
CS-134	2419.53	604.71	302.	0.	0.000	1000.00	1.317s
BI-214	2438.94	609.56	25.	142.	0.079	10.94	1.112
RU-103	2441.89	610.30	302.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	302.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	302.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	284.	12.	0.007	205.09	1.332s
SB-125	2544.26	635.89	37.	-4.	-0.002	238.72	1.344s
I-131	2548.61	636.97	40.	1.	0.001	900.08	1.345
AG-110M	2631.76	657.76	34.	11.	0.006	83.87	1.362
CS-137	2647.36	661.66	63.	-4.	-0.002	294.55	1.366s
PM-144	2786.90	696.54	48.	-7.	-0.004	214.91	1.395s
SB-124	2891.88	722.79	113.	-15.	-0.008	104.91	1.417s
AG-108M	2892.48	722.94	98.	-7.	-0.004	202.09	1.417s
BI-212	2910.44	727.43	3.	47.	0.026	16.54	1.082s
pm-146	2989.37	747.16	22.	7.	0.004	140.45	1.437s
ZR-95	3027.65	756.73	22.	5.	0.003	183.34	1.445s
AG-110M	3056.50	763.94	37.	2.	0.001	524.21	1.451s
NB-95	3063.89	765.79	47.	-6.	-0.003	166.67	1.453s
PA-234M	3066.38	766.41	57.	-6.	-0.003	177.52	1.453s
EU-152	3116.41	778.92	33.	-7.	-0.004	185.94	1.463
BI-212	3142.41	785.42	19.	10.	0.006	95.07	1.468s
CS-134	3184.19	795.87	14.	29.	0.016	33.07	1.477s
CS-134	3208.53	801.95	24.	-3.	-0.001	370.84	1.482
CO-58	3243.82	810.78	52.	2.	0.001	440.55	1.489s
La-140	3263.80	815.77	43.	9.	0.005	108.30	1.493s
Cs-136	3274.72	818.50	41.	9.	0.005	105.76	1.495s
MN-54	3340.10	834.85	37.	-5.	-0.003	246.86	1.508
Co-56	3387.78	846.77	19.	-3.	-0.002	348.97	1.518s
TL-208	3442.95	860.56	38.	6.	0.003	210.85	1.529s
NB-94	3485.08	871.10	6.	5.	0.003	80.03	1.537s
EU-154	3493.61	873.23	12.	2.	0.001	202.77	1.539s
PA-234	3522.80	880.53	83.	-15.	-0.008	88.49	1.544s
PA-234	3533.64	883.24	98.	-11.	-0.006	125.35	1.547s
y-88	3592.83	898.04	19.	4.	0.002	216.89	1.558s
AC-228	3646.10	911.36	14.	96.	0.054	13.24	1.383
AG-110M	3750.60	937.49	19.	1.	0.001	692.82	1.589s
PA-234	3784.70	946.02	37.	-4.	-0.002	302.94	1.595s
EU-152	3857.05	964.11	54.	14.	0.008	81.71	1.609s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3876.48	968.97	30.	72.	0.040	15.87	1.612
EU-154	3985.88	996.33	30.	10.	0.005	85.62	1.633s
PA-234M	4004.55	1001.00	40.	9.	0.005	109.01	1.636s
EU-154	4019.65	1004.77	82.	-14.	-0.008	95.86	1.639s
Co-56	4151.87	1037.84	10.	2.	0.001	427.65	1.664s
Cs-136	4192.77	1048.07	36.	-1.	-0.001	854.40	1.671
RH-106	4201.93	1050.36	21.	10.	0.005	73.40	1.673s
BI-207	4255.11	1063.66	0.	19.	0.010	23.68	1.682s
Ga-68	4310.04	1077.40	20.	-1.	-0.001	988.26	1.692
FE-59	4397.41	1099.25	35.	-8.	-0.004	166.38	1.708s
EU-152	4448.68	1112.07	66.	8.	0.005	140.09	1.717
ZN-65	4462.56	1115.55	74.	6.	0.003	210.61	1.720s
BI-214	4481.51	1120.29	37.	8.	0.004	119.73	1.723s
Sc-46	4482.57	1120.55	44.	8.	0.005	116.54	1.723s
Ta-182	4485.56	1121.30	54.	8.	0.005	126.96	1.724
CO-60	4693.21	1173.24	20.	12.	0.007	88.89	1.760s
Ta-182	4756.42	1189.05	10.	9.	0.005	88.27	1.771
Ta-182	4885.79	1221.41	27.	13.	0.007	95.69	1.793
Co-56	4953.23	1238.28	22.	10.	0.006	105.98	1.804s
NA-22	5098.13	1274.53	11.	8.	0.005	65.36	1.828s
EU-154	5098.19	1274.54	19.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	16.	0.	0.000	1000.00	1.840s
CO-60	5329.85	1332.50	16.	2.	0.001	541.17	1.866s
AG-110M	5536.88	1384.30	5.	7.	0.004	89.99	1.899s
EU-152	5631.62	1408.00	5.	7.	0.004	87.98	1.914s
K-40	5845.04	1461.40	4.	320.	0.178	5.66	1.517
La-140	6383.73	1596.21	11.	-1.	-0.001	598.44	2.024s
BI-214	7056.06	1764.49	12.	5.	0.003	101.09	2.114s
Co-56	7083.46	1771.35	7.	28.	0.015	23.70	2.117s
y-88	7341.96	1836.06	6.	2.	0.001	304.14	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.4892E+00				5.31E+01	
			477.60	4.489E+00	?(	1.448E+01 9.53E+01	1.05E+01 G
NA-22	C	8.0918E-01				9.50E+02	
			1274.53	8.092E-01	?(	1.741E+00 6.54E+01	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	3.2666E+02					4.66E+11	
			1460.83	3.267E+02	(P	1.207E+01	5.66E+00	1.07E+01 G
Sc-46	F	3.2096E-01					8.38E+01	
			889.28	-9.563E-02	%(	3.710E+00	1.12E+03	1.00E+02 G
			1120.55	7.375E-01	?(	2.942E+00	1.17E+02	1.00E+02 G
CR-51	F	9.2234E-01					2.77E+01	
			320.08	9.223E-01	&(	1.256E+01	5.14E+02	9.94E+00 G
MN-54	C	-3.6280E-01					3.12E+02	
			834.85	-3.628E-01	?(	2.121E+00	2.47E+02	1.00E+02 G
FE-59	F	-1.2133E+00					4.45E+01	
			1099.25	-1.213E+00	?(	4.592E+00	1.66E+02	5.65E+01 G
			1291.60	0.000E+00	+	4.850E+00	1.00E+03	4.32E+01 G
Co-56	C	5.1257E-01					7.73E+01	
			846.77	-1.969E-01	?(P	1.580E+00	3.49E+02	9.99E+01 G
			1238.28	1.489E+00	?(P	3.494E+00	1.06E+02	6.61E+01 G
			1037.84	9.623E-01	?(P	1.022E+01	4.28E+02	1.41E+01 G
			1771.35	2.276E+01	?	1.280E+01	2.37E+01	1.55E+01 A
CO-57	C	7.1848E-01					2.72E+02	
			122.06	3.877E-01	(	1.299E+00	1.00E+02	8.56E+01 G
			136.47	3.370E+00	?(	1.457E+01	1.29E+02	1.07E+01 G
CO-58	C	1.5569E-01					7.09E+01	
			810.78	1.557E-01	?(	2.416E+00	4.41E+02	9.95E+01 G
CO-60	F	6.1885E-01					1.93E+03	
			1332.50	1.717E-01	?(P	2.169E+00	5.41E+02	1.00E+02 G
			1173.24	1.066E+00	?(P	2.155E+00	8.89E+01	9.99E+01 G
ZN-65	F	1.0106E+00					2.44E+02	
			1115.55	1.011E+00	?(	7.342E+00	2.11E+02	5.06E+01 G
NB-94	I	1.9486E-01					7.41E+06	
			702.63	2.004E-02	%(	1.813E+00	3.61E+03	9.79E+01 G
			871.10	3.662E-01	?(P	9.956E-01	8.00E+01	9.99E+01 G
ZR-95	I	6.1341E-01					6.40E+01	
			756.73	6.134E-01	?(	2.806E+00	1.83E+02	5.45E+01 G
			724.20	6.837E-02	%	6.399E+00	2.68E+03	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-95	I	-3.8039E-01					6.40E+01	
			765.79	-3.804E-01	?(	2.197E+00	1.67E+02	9.98E+01 G
RU-103	I	5.7145E-01					3.93E+01	
			497.05	5.715E-01	&(P	1.414E+00	9.86E+01	9.09E+01 G
			610.30	0.000E+00	-	7.616E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.2446E+01					3.74E+02	
			621.92	6.285E+00	?(P	4.349E+01	2.05E+02	9.93E+00 G
			1050.36	5.166E+01	?(P	1.267E+02	7.34E+01	1.56E+00 G
			511.86	1.536E+01		1.003E+01	3.57E+01	2.00E+01 GA
AG-108M	C	2.1729E-01					1.53E+05	
			433.94	2.173E-01	?(P	1.463E+00	2.64E+02	9.05E+01 G
			722.94	-4.681E-01	+	3.242E+00	2.02E+02	9.08E+01 G
			614.28	0.000E+00	-	4.900E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.9022E-01					2.50E+02	
			884.68	-9.519E-03	%(P	5.055E+00	4.33E+03	7.27E+01 G
			657.76	6.234E-01	?(	1.763E+00	8.39E+01	9.46E+01 G
			937.49	2.909E-01	?(	4.984E+00	6.93E+02	3.44E+01 G
			1384.30	2.787E+00	?(P	5.809E+00	9.00E+01	2.43E+01 G
			763.94	4.723E-01	&(	8.837E+00	5.24E+02	2.23E+01 G
SN-113	F	-1.0216E+00					1.15E+02	
			391.69	-1.022E+00	&(P	3.682E+00	4.22E+01	6.40E+01 G
SB-124	F	-2.1887E-02					6.02E+01	
			602.73	-2.189E-02	%(P	4.413E+00	3.87E+03	9.83E+01 G
			1690.98	8.591E-02	%	3.557E+00	1.68E+03	4.78E+01 G
			722.79	-8.241E+00	&	2.911E+01	1.05E+02	1.08E+01 G
SB-125	I	4.9294E+00					1.01E+03	
			427.88	1.668E+00	?(P	4.232E+00	1.02E+02	2.96E+01 G
			600.50	2.023E+00	(	2.392E+01	3.49E+02	1.79E+01 G
			635.89	-1.760E+00	+	1.481E+01	2.39E+02	1.13E+01 G
			463.37	1.911E+01	(P	1.515E+01	2.66E+01	1.05E+01 G
I-131	I	3.9499E-02					8.02E+00	
			364.48	-2.374E-02	%(P	1.697E+00	1.32E+03	8.17E+01 G
			284.30	-8.786E+00	&	2.327E+01	1.03E+02	6.14E+00 G
			636.97	7.601E-01	&(P	2.444E+01	9.00E+02	7.17E+00 G
Gd-153	F	1.2256E+00					2.42E+02	
			97.50	1.054E+00	?(	3.518E+00	9.97E+01	3.00E+01 G
			103.20	1.462E+00	&(	5.644E+00	1.15E+02	2.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ga-68    C  -2.9945E+00                                     4.71E-02
                         1077.40-2.995E+00 ?(  7.052E+01 9.88E+02 3.30E+00 G

Tc-99m   I  -4.1909E-01                                     2.51E-01
                          140.51-4.191E-01 &(  1.745E+00 1.24E+02 8.93E+01 G

BA-133   F  -3.5867E-01                                     3.85E+03
                          356.00-3.587E-01 ?(  4.464E+00 3.67E+02 6.20E+01 G
                          302.85 0.000E+00 +   1.320E+01 1.00E+03 1.83E+01 G
                          383.84-6.370E+00 +   2.462E+01 1.15E+02 8.94E+00 GA
                           80.99-4.694E-01 + P 3.735E+00 2.91E+02 3.41E+01 GA

CS-134   I   1.2905E+00                                     7.54E+02
                          604.71 0.000E+00 ?(  4.451E+00 1.00E+03 9.76E+01 G
                          795.87 2.215E+00  (  1.539E+00 3.31E+01 8.55E+01 G
                          569.32-6.420E-01 &   1.166E+01 5.15E+02 1.54E+01 G
                          801.95-2.030E+00 + P 1.921E+01 3.71E+02 8.69E+00 G
                          563.24 6.903E+00 ?(  1.604E+01 9.26E+01 8.35E+00 G

CS-137   I  -2.4694E-01                                     1.10E+04
                          661.66-2.469E-01 ?(P 2.603E+00 2.95E+02 8.52E+01 G

CE-139   F  -5.1843E-01                                     1.38E+02
                          165.85-5.184E-01 *(  1.843E+00 1.06E+02 7.99E+01 G

Ba-140   I  -2.3012E+00                                     1.28E+01
                          537.26-2.301E+00 &(P 6.809E+00 9.81E+01 2.44E+01 G
                          162.66-2.391E+00 +   2.268E+01 2.80E+02 6.22E+00 G
                          304.85 0.000E+00 +   5.670E+01 1.00E+03 4.29E+00 G

La-140   I   1.1435E+00                                     1.28E+01
                         1596.21-1.640E-01 ?(  2.262E+00 5.98E+02 9.54E+01 G
                          487.02 4.363E-01 ?(P 2.937E+00 2.62E+02 4.55E+01 G
                          328.76 7.227E+00 &(P 5.787E+00 3.31E+01 2.03E+01 G
                          815.77 2.579E+00 ?(  9.533E+00 1.08E+02 2.33E+01 G

CE-141   I   7.2609E-01                                     3.25E+01
                          145.44 7.261E-01 ?(  2.934E+00 1.21E+02 4.82E+01 G

CE-144   I  -9.1629E-02                                     2.85E+02
                          133.54-9.163E-02 %(P 1.505E+01 3.40E+03 1.11E+01 G

PM-144   C  -3.9352E-01                                     3.63E+02
                          696.54-3.935E-01 &(  2.059E+00 2.15E+02 9.90E+01 G
                          618.06 0.000E+00 +   4.466E+00 1.00E+03 9.91E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	3.4267E+00					4.94E+03	
			344.29	5.104E-01	&(	9.588E+00	5.52E+02	2.65E+01 G
			1112.07	5.352E+00	?(	2.567E+01	1.40E+02	1.36E+01 G
			121.78	-1.290E+00	&	4.558E+00	1.06E+02	2.86E+01 G
			778.92	-3.306E+00	+	1.455E+01	1.86E+02	1.29E+01 G
			964.11	7.120E+00	?(P	1.950E+01	8.17E+01	1.46E+01 G
			244.69	3.041E+00	&(P	4.498E+01	4.41E+02	7.58E+00 G
			1408.00	3.340E+00	?	6.769E+00	8.80E+01	2.10E+01 GA
EU-154	I	1.8029E+00					3.14E+03	
			873.23	1.434E+00	?(	1.066E+01	2.03E+02	1.23E+01 G
			123.10	4.814E-01	&(P	2.784E+00	1.71E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.349E+00	1.00E+03	3.52E+01 G
			723.36	-5.690E-07	%	1.407E+01	7.07E+08	2.02E+01 G
			1004.77	-6.156E+00	+	1.987E+01	9.59E+01	1.80E+01 G
			996.33	7.316E+00	?(	2.117E+01	8.56E+01	1.06E+01 G
EU-155	I	9.4567E-01					1.81E+03	
			105.31	1.362E+00	(	7.355E+00	1.61E+02	2.12E+01 G
			86.54	6.583E-01	?(	7.471E+00	3.39E+02	3.07E+01 G
HF-181	F	3.6953E-01					4.24E+01	
			482.00	3.695E-01	&(	2.285E+00	1.80E+02	8.05E+01 G
			133.02	-5.709E-01	+	3.785E+00	1.98E+02	4.33E+01 G
			345.83	0.000E+00	-	1.705E+01	1.00E+03	1.51E+01 G
			136.30	0.000E+00	&	2.875E+01	1.00E+03	5.85E+00 G
Ta-182	F	3.4924E+00					1.14E+02	
			1121.30	2.115E+00	(	9.194E+00	1.27E+02	3.49E+01 G
			1221.41	4.462E+00	(P	9.357E+00	9.57E+01	2.70E+01 G
			1189.05	4.843E+00	(P	9.912E+00	8.83E+01	1.62E+01 G
Hg-203	F	5.1408E-01					4.66E+01	
			279.20	5.141E-01	?(P	1.734E+00	1.00E+02	8.15E+01 G
TL-208	N	1.1178E+01					6.98E+02	
			583.02	1.118E+01	(P	1.253E+00	8.56E+00	8.45E+01 G
			277.28	6.792E+00	-	2.153E+01	9.44E+01	6.31E+00 G
			860.56	3.526E+00	- P	1.760E+01	2.11E+02	1.24E+01 G
pm-146	C	6.8534E-01					2.02E+03	
			747.16	1.285E+00	?(P	4.474E+00	1.40E+02	3.40E+01 G
			735.72	2.719E-01	%	7.198E+00	1.05E+03	2.25E+01 G
			453.88	3.718E-01	?(P	2.138E+00	2.25E+02	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	2.9932E-01					1.07E+02	
			898.04	3.344E-01	?(	1.763E+00	2.17E+02	9.37E+01 G
			1836.06	2.662E-01	?(	1.880E+00	3.04E+02	9.92E+01 G
Cd-113m		-8.5543E+03					5.33E+03	
			263.70	-8.554E+03	(	2.758E+04	9.63E+01	6.00E-03 K
Cd-109	F	2.8932E+00					4.53E+02	
								Derived Ave Activity
			88.04	2.893E+00	}(	5.905E+01	6.09E+02	3.79E+00 G
Cf-251	T	1.2450E+00					3.28E+05	
			176.60	1.245E+00	?(	6.282E+00	1.86E+02	1.70E+01 G
			227.00	3.040E+00		1.770E+01	2.13E+02	6.30E+00 GA
Cf-249	T	1.0855E+00					1.28E+05	
			387.95	7.338E-01	?(	2.803E+00	1.13E+02	6.60E+01 G
			333.44	2.582E+00	(	7.358E+00	1.09E+02	1.55E+01 G
Sn-126		5.0861E+00					3.65E+07	
			87.57	3.320E+00	}	5.889E+00	2.70E+01	3.75E+01 GA
			64.28	5.086E+00	&(	1.751E+01	1.03E+02	9.70E+00 G
			86.94	4.482E+00	}	2.464E+01	8.84E+01	9.04E+00 GA
PB-210	N	-1.6509E+00					8.14E+03	
			46.54	-1.651E+00	?(P	4.617E+01	9.54E+02	4.25E+00 G
PB-212	N	2.6108E+01					6.98E+02	
			238.63	2.611E+01	(P	2.729E+00	5.50E+00	4.33E+01 G
			300.03	5.062E+01	+ P	3.110E+01	2.76E+01	3.28E+00 GA
PB-214	N	1.8268E+01					5.84E+05	
			351.93	1.742E+01	(P	2.922E+00	9.48E+00	3.76E+01 G
			295.09	1.991E+01	@(P	5.396E+00	1.38E+01	1.93E+01 G
			242.00	2.629E+01	+	1.525E+01	2.00E+01	7.43E+00 GA
BI-207	C	9.3032E-01					1.18E+04	
			569.70	5.054E-02	&(	1.835E+00	1.02E+03	9.77E+01 G
			1063.66	2.085E+00	?(P	8.245E-01	2.37E+01	7.45E+01 G
BI-212	N	3.7579E+01					6.98E+02	
			727.17	3.758E+01	*(	8.828E+00	1.65E+01	7.55E+00 G
			785.42	5.154E+01	?	1.153E+02	9.51E+01	1.28E+00 GA
BI-214	N	1.6060E+01					5.84E+05	
			609.31	1.606E+01	(P	2.966E+00	1.09E+01	4.61E+01 G
			1120.29	4.347E+00	- P	1.789E+01	1.20E+02	1.51E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1764.49	4.449E+00	- P	1.561E+01	1.01E+02	1.54E+01 G
BI-210M	T	9.1539E-01					1.10E+09	
			265.83	9.154E-01	(	3.121E+00	1.02E+02	5.00E+01 G
			304.90	0.000E+00	-	8.688E+00	1.00E+03	2.80E+01 G
AC-228	N	2.8446E+01					2.10E+03	
			911.07	2.435E+01	(P	5.006E+00	1.32E+01	2.90E+01 G
			968.97	3.192E+01	?(P	1.240E+01	1.59E+01	1.75E+01 G
			338.32	3.329E+01	*(P	9.936E+00	1.61E+01	1.20E+01 G
			93.35	6.385E+00	-	2.315E+01	1.08E+02	5.56E+00 XA
TH-227	N	-1.1197E+00					7.95E+03	
			50.14	-2.762E+00	?(	2.179E+01	2.75E+02	8.00E+00 G
			256.24	7.568E-01	&(P	1.789E+01	8.98E+02	7.00E+00 G
TH-229	N	9.7435E+00					2.68E+06	
			193.51	8.406E+00	&(	2.327E+01	1.03E+02	4.40E+00 G
			210.85	1.171E+01	?(	5.691E+01	1.45E+02	2.99E+00 G
TH-234	N	7.7537E+00					1.63E+12	
			63.29	4.776E+00	?(P	4.494E+01	2.79E+02	3.81E+00 G
			92.59	9.785E+00	(P	2.054E+01	6.38E+01	5.58E+00 G
PA-233	C	1.2130E+00					7.82E+08	
			312.01	1.213E+00	(	6.365E+00	1.56E+02	3.60E+01 G
			300.18	0.000E+00	-	3.873E+01	1.00E+03	6.20E+00 G
PA-234	N	-2.0635E+00					1.63E+12	
			131.29	-2.063E+00	?(	8.836E+00	1.28E+02	1.80E+01 G
			946.02	-2.443E+00	+	1.758E+01	3.03E+02	1.34E+01 G
			569.47	0.000E+00	&	2.225E+01	1.00E+03	8.20E+00 G
			883.24	-8.529E+00	+	3.625E+01	1.25E+02	9.60E+00 G
			880.53	-1.800E+01	+	5.343E+01	8.85E+01	6.00E+00 GA
PA-234M	N	8.2044E+01					1.63E+12	
			1001.00	8.204E+01	&(	3.057E+02	1.09E+02	8.37E-01 G
			766.41	-1.328E+02	+	8.148E+02	1.78E+02	2.94E-01 G
U-235	N	3.7359E+00					2.57E+11	
			143.79	3.225E+00	?(	1.350E+01	1.25E+02	1.10E+01 G
			205.33	7.092E+00	&(P	3.288E+01	1.38E+02	5.01E+00 G
			163.38	1.528E+00	?(	2.806E+01	5.41E+02	5.08E+00 G
AM-241	T	6.8442E-01					1.58E+05	
			59.54	6.844E-01	(P	2.908E+00	1.34E+02	3.59E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ir-192   F  -3.4782E-02                                      7.40E+01
                         316.49-3.478E-02 &(  1.825E+00 1.51E+03 8.70E+01 G
                         468.06-1.117E+00 +   4.483E+00 1.19E+02 5.18E+01 G
                         308.44 0.000E+00 +   7.736E+00 1.00E+03 3.18E+01 G

Cs-136   F   7.0571E-01                                      1.30E+01
                         818.50 6.023E-01 &(  2.173E+00 1.06E+02 1.00E+02 G
                        1048.07-1.029E-01 -   3.156E+00 8.54E+02 8.00E+01 G
                         340.57 9.262E-01 ?(  5.234E+00 1.68E+02 4.69E+01 G

Np-239   T   1.2907E+00                                      2.36E+00
                         103.70 1.328E+00 ?   5.308E+00 1.19E+02 2.40E+01 X
                         106.13 1.291E+00  (  7.340E+00 1.70E+02 2.27E+01 G
                          99.50 1.269E+00 &   8.142E+00 1.90E+02 1.50E+01 X

Nd-147      -5.8367E+00                                      1.11E+01
                         531.00-5.837E+00 ?(  1.347E+01 9.33E+01 1.30E+01 G
                          91.10 1.011E-02 %   7.922E+00 2.33E+04 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	168.	-2.	-0.001	953.77	-1.651E+00	P
TH-227	50.14	168.	-8.	-0.004	275.00	-2.762E+00	
BA-133	80.99	248.	-10.	-0.005	291.49	-4.694E-01	P
EU-155	86.54	892.	12.	0.007	338.99	6.583E-01	
Gd-153	97.50	196.	20.	0.011	99.72	1.054E+00	
Np-239	99.50	268.	12.	0.007	190.21	1.269E+00	
Gd-153	103.20	275.	21.	0.012	115.33	1.462E+00	
Np-239	103.70	296.	21.	0.012	119.37	1.328E+00	
EU-155	105.31	450.	19.	0.010	161.19	1.362E+00	
Np-239	106.13	516.	19.	0.011	169.83	1.291E+00	
EU-152	121.78	304.	-24.	-0.013	105.81	-1.290E+00	
CO-57	122.06	219.	21.	0.012	100.24	3.877E-01	
EU-154	123.10	228.	13.	0.007	171.39	4.814E-01	P
PA-234	131.29	440.	-23.	-0.013	128.12	-2.063E+00	
HF-181	133.02	463.	-16.	-0.009	197.56	-5.709E-01	
CO-57	136.47	408.	22.	0.012	129.31	3.370E+00	
Tc-99m	140.51	374.	-22.	-0.012	124.48	-4.191E-01	
CE-141	145.44	314.	21.	0.012	120.73	7.261E-01	
Ba-140	162.66	268.	-8.	-0.005	280.14	-2.391E+00	
CE-139	165.85	297.	-23.	-0.013	106.42	-5.184E-01	
TH-229	193.51	107.	18.	0.010	102.76	8.406E+00	
TH-229	210.85	266.	16.	0.009	144.54	1.171E+01	
EU-152	244.69	861.	9.	0.005	441.37	3.041E+00	P
TH-227	256.24	100.	2.	0.001	898.07	7.568E-01	P
Cd-113m	263.70	171.	-20.	-0.011	96.33	-8.554E+03	
BI-210M	265.83	149.	17.	0.010	101.62	9.154E-01	
Hg-203	279.20	111.	15.	0.009	100.36	5.141E-01	P
PA-233	312.01	251.	15.	0.008	155.82	1.213E+00	
CR-51	320.08	67.	3.	0.002	513.70	9.223E-01	
La-140	328.76	56.	47.	0.026	33.11	7.227E+00	P
Cf-249	333.44	51.	13.	0.007	109.49	2.582E+00	
Cs-136	340.57	249.	14.	0.008	167.63	9.262E-01	
EU-152	344.29	263.	4.	0.002	552.49	5.104E-01	
BA-133	356.00	297.	-7.	-0.004	367.42	-3.587E-01	
BA-133	383.84	162.	-16.	-0.009	114.91	-6.370E+00	
Cf-249	387.95	110.	14.	0.008	113.14	7.338E-01	
SN-113	391.69	180.	-18.	-0.010	42.21	-1.022E+00	P
AG-108M	433.94	44.	5.	0.003	263.92	2.173E-01	P
pm-146	453.88	45.	6.	0.003	224.86	3.718E-01	P
Ir-192	468.06	128.	-14.	-0.008	118.93	-1.117E+00	
BE-7	477.59	50.	11.	0.006	95.29	4.489E+00	
HF-181	482.00	74.	7.	0.004	179.86	3.695E-01	
La-140	487.02	36.	5.	0.003	261.53	4.363E-01	P
RU-103	497.05	32.	12.	0.007	98.59	5.715E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
RH-106	511.86	80.	68.	0.038	35.66	1.536E+01		
Nd-147	531.00	56.	-16.	-0.009	93.29	-5.837E+00		
Ba-140	537.26	49.	-12.	-0.007	98.13	-2.301E+00		P
CS-134	563.24	28.	12.	0.007	92.64	6.903E+00		
CS-134	569.32	52.	-2.	-0.001	514.78	-6.420E-01		
RH-106	621.92	284.	12.	0.007	205.09	6.285E+00		P
AG-110M	657.76	34.	11.	0.006	83.87	6.234E-01		
CS-137	661.66	63.	-4.	-0.002	294.55	-2.469E-01		P
PM-144	696.54	48.	-7.	-0.004	214.91	-3.935E-01		
SB-124	722.79	113.	-15.	-0.008	104.91	-8.241E+00		
AG-108M	722.94	98.	-7.	-0.004	202.09	-4.681E-01		
pm-146	747.16	22.	7.	0.004	140.45	1.285E+00		P
ZR-95	756.73	22.	5.	0.003	183.34	6.134E-01		
AG-110M	763.94	37.	2.	0.001	524.21	4.723E-01		
NB-95	765.79	47.	-6.	-0.003	166.67	-3.804E-01		
PA-234M	766.41	57.	-6.	-0.003	177.52	-1.328E+02		
EU-152	778.92	33.	-7.	-0.004	185.94	-3.306E+00		
CS-134	795.87	14.	29.	0.016	33.07	2.215E+00		
CS-134	801.95	24.	-3.	-0.001	370.84	-2.030E+00		P
CO-58	810.78	52.	2.	0.001	440.55	1.557E-01		
La-140	815.77	43.	9.	0.005	108.30	2.579E+00		
Cs-136	818.50	41.	9.	0.005	105.76	6.023E-01		
MN-54	834.85	37.	-5.	-0.003	246.86	-3.628E-01		
Co-56	846.77	19.	-3.	-0.002	348.97	-1.969E-01		P
NB-94	871.10	6.	5.	0.003	80.03	3.662E-01		P
EU-154	873.23	12.	2.	0.001	202.77	1.434E+00		
PA-234	880.53	83.	-15.	-0.008	88.49	-1.800E+01		
PA-234	883.24	98.	-11.	-0.006	125.35	-8.529E+00		
y-88	898.04	19.	4.	0.002	216.89	3.344E-01		
AG-110M	937.49	19.	1.	0.001	692.82	2.909E-01		
PA-234	946.02	37.	-4.	-0.002	302.94	-2.443E+00		
EU-152	964.11	54.	14.	0.008	81.71	7.120E+00		P
EU-154	996.33	30.	10.	0.005	85.62	7.316E+00		
PA-234M	1001.00	40.	9.	0.005	109.01	8.204E+01		
EU-154	1004.77	82.	-14.	-0.008	95.86	-6.156E+00		
Co-56	1037.84	10.	2.	0.001	427.65	9.623E-01		P
Cs-136	1048.07	36.	-1.	-0.001	854.40	-1.029E-01		
RH-106	1050.36	21.	10.	0.005	73.40	5.166E+01		P
BI-207	1063.66	0.	19.	0.010	23.68	2.085E+00		P
Ga-68	1077.40	20.	-1.	-0.001	988.26	-2.995E+00		
FE-59	1099.25	35.	-8.	-0.004	166.38	-1.213E+00		
EU-152	1112.07	66.	8.	0.005	140.09	5.352E+00		
ZN-65	1115.55	74.	6.	0.003	210.61	1.011E+00		
Sc-46	1120.55	44.	8.	0.005	116.54	7.375E-01		
Ta-182	1121.30	54.	8.	0.005	126.96	2.115E+00		
CO-60	1173.24	20.	12.	0.007	88.89	1.066E+00		P
Ta-182	1189.05	10.	9.	0.005	88.27	4.843E+00		P
Ta-182	1221.41	27.	13.	0.007	95.69	4.462E+00		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	1238.28	22.	10.	0.006	105.98	1.489E+00	P
NA-22	1274.53	11.	8.	0.005	65.36	8.092E-01	
CO-60	1332.50	16.	2.	0.001	541.17	1.717E-01	P
AG-110M	1384.30	5.	7.	0.004	89.99	2.787E+00	P
EU-152	1408.00	5.	7.	0.004	87.98	3.340E+00	
La-140	1596.21	11.	-1.	-0.001	598.44	-1.640E-01	
Co-56	1771.35	7.	28.	0.015	23.70	2.276E+01	
y-88	1836.06	6.	2.	0.001	304.14	2.662E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

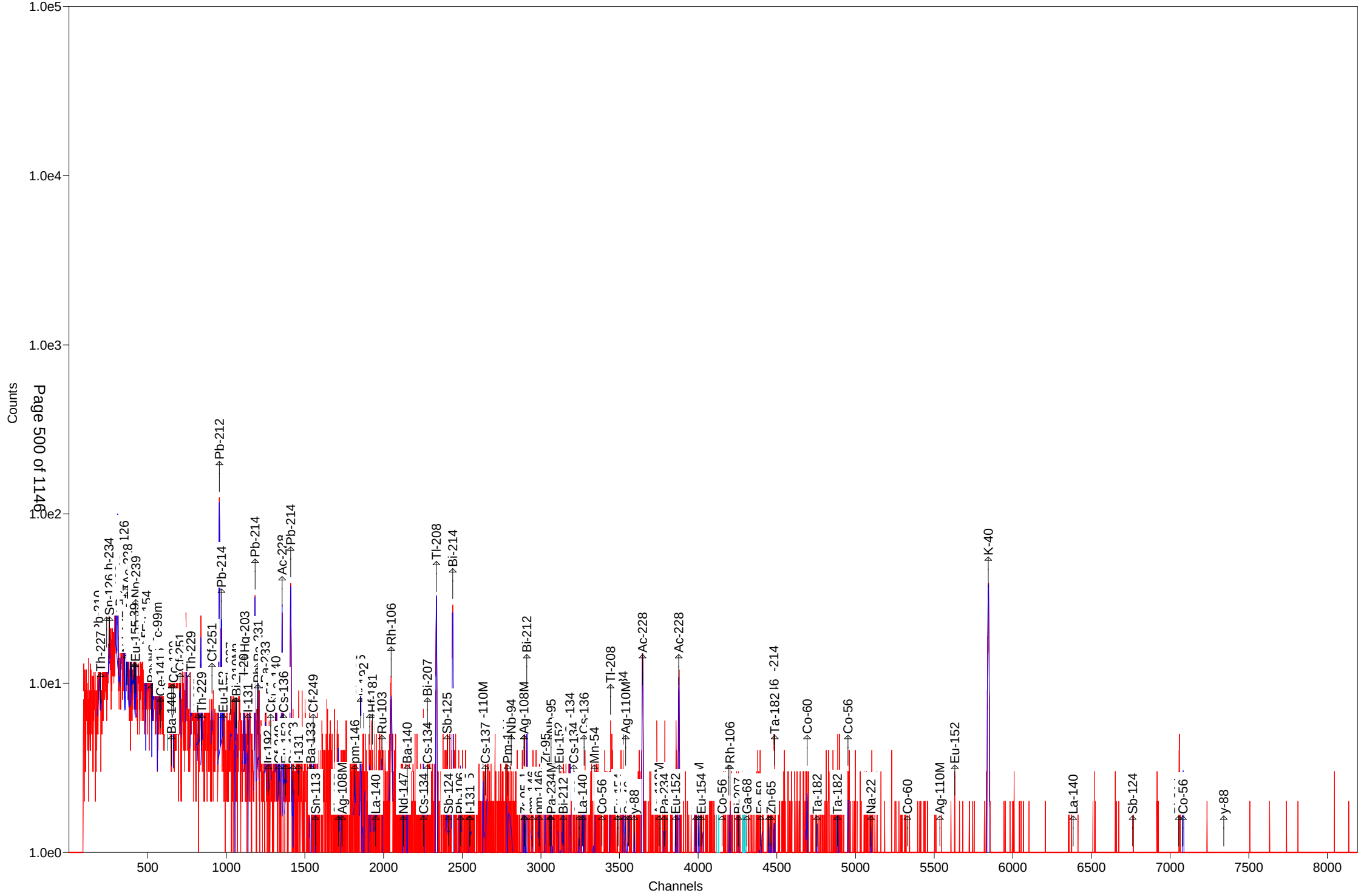
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	4.4891E+00	4.4892E+00	9.529E+01%	1.45E+01
NA-22	#A	8.0918E-01	8.0918E-01	6.536E+01%	1.74E+00
K-40		3.2666E+02	3.2666E+02	5.658E+00%	1.21E+01
Sc-46	#A	3.2096E-01	3.2096E-01	1.165E+02%	3.71E+00
CR-51	#A	9.2232E-01	9.2234E-01	5.137E+02%	1.26E+01
MN-54	#A	-3.6280E-01	-3.6280E-01	2.469E+02%	2.12E+00
FE-59	#A	-1.2132E+00	-1.2133E+00	1.664E+02%	4.59E+00
Co-56	#A	5.1257E-01	5.1257E-01	1.060E+02%	1.58E+00
CO-57	#A	7.1848E-01	7.1848E-01	8.180E+01%	1.30E+00
CO-58	#A	1.5569E-01	1.5569E-01	4.405E+02%	2.42E+00
CO-60	#A	6.1885E-01	6.1885E-01	8.889E+01%	2.17E+00
ZN-65	#A	1.0106E+00	1.0106E+00	2.106E+02%	7.34E+00
NB-94	#A	1.9486E-01	1.9486E-01	8.003E+01%	1.81E+00
ZR-95	#A	6.1341E-01	6.1341E-01	1.833E+02%	2.81E+00
NB-95	#A	-3.8039E-01	-3.8039E-01	1.667E+02%	2.20E+00
RU-103	#A	5.7145E-01	5.7145E-01	9.859E+01%	1.41E+00
RH-106	#A	1.2446E+01	1.2446E+01	7.340E+01%	4.35E+01
AG-108M	#A	2.1729E-01	2.1729E-01	2.639E+02%	1.46E+00
AG-110M	#A	5.9022E-01	5.9022E-01	8.387E+01%	5.06E+00
SN-113	#A	-1.0216E+00	-1.0216E+00	4.221E+01%	3.68E+00
SB-124	#A	-2.1887E-02	-2.1887E-02	3.874E+03%	4.41E+00
SB-125	C	4.9294E+00	4.9294E+00	2.661E+01%	4.23E+00
I-131	#A	3.9497E-02	3.9499E-02	8.005E+02%	1.70E+00
Gd-153	#A	1.2256E+00	1.2256E+00	7.623E+01%	3.52E+00
Ga-68	#A	-2.9666E+00	-2.9945E+00	9.883E+02%	7.05E+01
Tc-99m	#A	-4.1836E-01	-4.1909E-01	1.245E+02%	1.74E+00
BA-133	#A	-3.5867E-01	-3.5867E-01	3.674E+02%	4.46E+00
CS-134	#A	1.2905E+00	1.2905E+00	3.307E+01%	4.45E+00
CS-137	#A	-2.4694E-01	-2.4694E-01	2.946E+02%	2.60E+00
CE-139	#A	-5.1843E-01	-5.1843E-01	1.064E+02%	1.84E+00
Ba-140	#A	-2.3011E+00	-2.3012E+00	9.813E+01%	6.81E+00
La-140	#A	1.1435E+00	1.1435E+00	3.311E+01%	2.26E+00

CE-141 #A	7.2609E-01	7.2609E-01	1.207E+02%	2.93E+00
CE-144 #A	-9.1629E-02	-9.1629E-02	3.402E+03%	1.51E+01
PM-144 #A	-3.9352E-01	-3.9352E-01	2.149E+02%	2.06E+00
EU-152 #A	3.4267E+00	3.4267E+00	8.171E+01%	9.59E+00
EU-154 #A	1.8029E+00	1.8029E+00	8.562E+01%	1.07E+01
EU-155 #A	9.4567E-01	9.4567E-01	1.612E+02%	7.35E+00
HF-181 #A	3.6953E-01	3.6953E-01	1.799E+02%	2.29E+00
Ta-182 #A	3.4924E+00	3.4924E+00	6.062E+01%	9.19E+00
Hg-203 #A	5.1407E-01	5.1408E-01	1.004E+02%	1.73E+00
TL-208	1.1178E+01	1.1178E+01	8.559E+00%	1.25E+00
pm-146 #A	6.8534E-01	6.8534E-01	1.326E+02%	4.47E+00
y-88 #A	2.9932E-01	2.9932E-01	1.868E+02%	1.76E+00
Cd-113m#A	-8.5543E+03	-8.5543E+03	9.633E+01%	2.76E+04
Cd-109 #A	2.8932E+00	2.8932E+00	6.085E+02%	5.90E+01
Cf-251 A	1.2450E+00	1.2450E+00	1.859E+02%	6.28E+00
Cf-249 #A	1.0855E+00	1.0855E+00	7.872E+01%	2.80E+00
Sn-126 #A	5.0861E+00	5.0861E+00	1.031E+02%	1.75E+01
PB-210 #A	-1.6509E+00	-1.6509E+00	9.538E+02%	4.62E+01
PB-212	2.6108E+01	2.6108E+01	5.497E+00%	2.73E+00
PB-214	1.8268E+01	1.8268E+01	8.361E+00%	2.92E+00
BI-207 #A	9.3032E-01	9.3032E-01	2.368E+01%	1.84E+00
BI-212 #	3.7579E+01	3.7579E+01	1.654E+01%	8.83E+00
BI-214	1.6060E+01	1.6060E+01	1.094E+01%	2.97E+00
BI-210M#A	9.1539E-01	9.1539E-01	1.016E+02%	3.12E+00
AC-228	2.8446E+01	2.8446E+01	8.742E+00%	5.01E+00
TH-227 #A	-1.1197E+00	-1.1197E+00	2.750E+02%	2.18E+01
TH-229 #A	9.7435E+00	9.7435E+00	8.868E+01%	2.33E+01
TH-234 #A	7.7537E+00	7.7537E+00	6.379E+01%	4.49E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	8.40E+01
PA-233 #A	1.2130E+00	1.2130E+00	1.558E+02%	6.36E+00
PA-234 #A	-2.0635E+00	-2.0635E+00	1.281E+02%	8.84E+00
PA-234M#A	8.2044E+01	8.2044E+01	1.090E+02%	3.06E+02
U-235 A	3.7359E+00	3.7359E+00	1.250E+02%	1.35E+01
AM-241 A	6.8442E-01	6.8442E-01	1.344E+02%	2.91E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.83E+01
Ir-192 #A	-3.4782E-02	-3.4782E-02	1.513E+03%	1.82E+00
Cs-136 #A	7.0569E-01	7.0571E-01	9.910E+01%	2.17E+00
Np-239 #A	1.2904E+00	1.2907E+00	1.698E+02%	7.34E+00
Nd-147 #A	-5.8365E+00	-5.8367E+00	9.329E+01%	1.35E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

```
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  2000.8 keV)     4.643E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 4.6429755E+02  Bq/Sample
```

264535_Gamma_160-18554-A-3-B. 5_Gamma_20161668.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161869

Sample Description: 264535_Gamma_160-18554-A-4-B
Detector: Detector #12
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-4-B

Decay to Time: 9/1/2016 12:30 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:31:00 Real Time: 1813 sec
Analysis Time: 9/1/2016 13:01 Dead Time: 0.73 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCanCal_90099_100212
Efficiency Cal Date: 10/4/2012 09:05
Energy Cal Date: 2/28/2012 13:26
Library: Client_Long_Rev11.lib
Bkgd Correction File: 12_2016-08-07_1353.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.890E+00	120.7	4.695E+00	4.699E+00	1.582E+01
NA-22	1.223E+00	31.2	3.818E-01	3.867E-01	1.058E+00
K-40	3.231E+02	4.4	1.417E+01	2.177E+01	8.496E+00
Sc-46	-3.970E-01	211.1	8.382E-01	8.384E-01	2.847E+00
CR-51	0.000E+00	1.#INF	9.477E-01	9.477E-01	2.335E+01
MN-54	4.927E-01	100.4	4.948E-01	4.955E-01	1.156E+00
FE-59	-3.954E-01	243.9	9.642E-01	9.644E-01	2.681E+00
Co-56	1.700E-01	148.8	2.530E-01	2.532E-01	1.400E+00
CO-57	0.000E+00	1.#INF	2.212E-01	2.212E-01	1.357E+00
CO-58	-7.172E-01	83.7	6.003E-01	6.015E-01	2.007E+00
CO-60	-1.258E+00	68.6	8.631E-01	8.654E-01	2.171E+00
ZN-65	-1.123E+00	158.4	1.779E+00	1.780E+00	6.035E+00
NB-94	1.989E-01	293.6	5.841E-01	5.841E-01	1.380E+00
ZR-95	-9.843E-01	112.8	1.110E+00	1.111E+00	3.084E+00
NB-95	5.266E-02	985.5	5.190E-01	5.190E-01	1.811E+00
RU-103	4.211E-01	122.3	5.152E-01	5.157E-01	1.232E+00
RH-106	-6.039E+00	174.7	1.055E+01	1.055E+01	3.536E+01
AG-108M	-2.304E-01	210.7	4.853E-01	4.855E-01	1.217E+00
AG-110M	2.490E-01	59.3	1.478E-01	1.483E-01	3.536E+00
SN-113	6.382E-01	115.8	7.388E-01	7.395E-01	2.483E+00
SB-124	0.000E+00	1.#INF	1.646E-01	1.646E-01	3.364E+00
SB-125	5.353E+00	15.3	8.209E-01	8.652E-01	4.535E+00
I-131	6.973E-01	97.1	6.773E-01	6.782E-01	1.257E+00
Gd-153	-4.446E-01	386.8	1.720E+00	1.720E+00	5.761E+00
Ga-68	-1.939E+01	142.5	2.763E+01	2.765E+01	6.025E+01
Tc-99m	-5.370E-01	159.1	8.544E-01	8.550E-01	2.840E+00
BA-133	-7.338E-01	154.6	1.135E+00	1.135E+00	3.798E+00
CS-134	5.886E-01	77.4	4.555E-01	4.566E-01	3.395E+00
CS-137	-7.829E-01	81.6	6.386E-01	6.399E-01	2.131E+00
CE-139	4.923E-01	106.4	5.239E-01	5.260E-01	1.746E+00
Ba-140	-1.677E-01	1639.3	2.750E+00	2.750E+00	5.204E+00
La-140	5.090E-01	75.4	3.836E-01	3.846E-01	1.638E+00
CE-141	-9.784E-01	160.9	1.574E+00	1.575E+00	5.232E+00

CE-144	-4.099E+00	154.9	6.349E+00	6.353E+00	2.111E+01
PM-144	-8.282E-01	87.3	7.231E-01	7.243E-01	1.690E+00
EU-152	8.911E-02	609.0	5.427E-01	5.427E-01	7.988E+00
EU-154	3.603E+00	80.0	2.881E+00	2.887E+00	1.428E+01
EU-155	1.199E+00	190.6	2.285E+00	2.286E+00	7.637E+00
HF-181	0.000E+00	1.#INF	1.209E-01	1.209E-01	2.176E+00
Ta-182	1.057E+00	206.5	2.182E+00	2.183E+00	7.477E+00
Hg-203	-4.971E-01	104.7	5.205E-01	5.212E-01	1.741E+00
TL-208	1.094E+01	8.3	9.068E-01	1.070E+00	1.376E+00
pm-146	1.085E+00	53.1	5.760E-01	5.787E-01	3.931E+00
y-88	4.699E-01	91.7	4.310E-01	4.317E-01	9.852E-01
Cd-113m	1.487E+03	388.8	5.780E+03	5.781E+03	1.975E+04
Cd-109	1.144E+01	226.4	2.590E+01	2.590E+01	8.601E+01
Cf-251	1.415E+00	156.7	2.218E+00	2.222E+00	5.684E+00
Cf-249	1.037E+00	76.5	7.927E-01	7.945E-01	2.257E+00
Sn-126	-5.848E+00	118.0	6.902E+00	6.909E+00	2.296E+01
PB-210	3.243E+01	44.6	1.448E+01	1.460E+01	3.655E+01
PB-212	3.040E+01	4.1	1.255E+00	2.333E+00	2.092E+00
PB-214	1.795E+01	6.8	1.225E+00	1.539E+00	2.476E+00
BI-207	2.465E-01	86.1	2.122E-01	2.126E-01	1.379E+00
BI-212	4.663E+01	14.7	6.840E+00	7.256E+00	1.161E+01
BI-214	1.717E+01	8.2	1.405E+00	1.664E+00	2.193E+00
BI-210M	2.660E-01	259.9	6.911E-01	6.913E-01	2.354E+00
AC-228	3.155E+01	6.4	2.010E+00	2.575E+00	1.142E+00
TH-227	-7.471E+00	122.0	9.113E+00	9.123E+00	3.041E+01
TH-229	-1.024E+00	854.7	8.753E+00	8.754E+00	2.268E+01
TH-234	1.378E+01	40.2	5.541E+00	5.588E+00	3.226E+01
PA-231	-1.021E+01	229.4	2.342E+01	2.343E+01	7.857E+01
PA-233	0.000E+00	1.#INF	6.350E-01	6.350E-01	6.335E+00
PA-234	-2.172E+00	156.1	3.391E+00	3.393E+00	1.129E+01
PA-234M	-2.729E+01	200.9	5.484E+01	5.485E+01	2.880E+02
U-235	1.946E+00	40.9	7.953E-01	8.014E-01	2.143E+01
AM-241	-1.621E+00	113.1	1.834E+00	1.836E+00	6.106E+00
Np-237	3.205E+00	238.8	7.653E+00	7.655E+00	2.542E+01
Ir-192	0.000E+00	1.#INF	2.201E-01	2.201E-01	2.646E+00
Cs-136	4.649E-01	95.9	4.460E-01	4.468E-01	1.947E+00
Np-239	1.531E+00	135.3	2.071E+00	2.073E+00	6.906E+00
Nd-147	1.864E+00	110.1	2.053E+00	2.056E+00	6.983E+00
Total	2.056E+03				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-4-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161869.An1

Acquisition information
Start time: 9/1/2016 12:31:00 PM
Live time: 1800
Real time: 1813
Dead time: 0.73 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:30:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2016-08-07_1353.PBC 8/7/2016 1:53:38 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1613

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.62	55.	44.64	1.22	2.229E-02	46.54	4.250	PBC<MDA	PB210
63.38	44.	51.27	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
74.82	279.	10.38	0.92	3.878E-02				
77.15	429.	7.24	0.92	3.964E-02				
80.99	31.	245.50	0.92	4.091E-02	80.99	34.060	PBC<MDA	BA133
84.30	73.	28.94	0.93	4.184E-02				
87.43	172.	13.80	0.93	4.263E-02	86.54	30.700	7.318E+00	EU155
					86.94	9.040	2.480E+01	Sn126
					87.57	37.500	5.957E+00	Sn126
					88.04	3.790	5.880E+01	Cd109
90.08	101.	21.32	0.93	4.320E-02				
91.10	33.	226.97	0.93	4.341E-02	91.10	28.300	PBC<MDA	Nd147
93.12	154.	16.09	0.93	4.377E-02	92.59	5.584	2.807E+01	TH234
					93.35	5.561	3.506E+01	AC228
103.70	29.	133.96	0.94	4.505E-02	103.70	24.000	PBC<MDA	Np239
105.31	21.	190.57	0.95	4.516E-02	105.31	21.200	PBC<MDA	EU155
106.13	28.	135.27	0.95	4.521E-02	106.13	22.700	PBC<MDA	Np239
121.78	4.	695.52	0.96	4.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.735E-02	CO57
164.83	29.	106.41	1.00	4.089E-02	165.85	79.900	PBC<MDA	CE139
176.60	17.	156.74	1.01	3.926E-02	176.60	17.000	PBC<MDA	Cf251
205.33	52.	43.83	1.04	3.557E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.58	749.	4.60	1.15	3.220E-02	238.63	43.300	2.984E+01	PB212
241.97	73.	25.53	1.07	3.189E-02	242.00	7.430	1.717E+01	PB214
256.24	2.	973.21	1.09	3.069E-02	256.24	7.000	PBC<MDA	TH227
263.70	5.	388.82	1.09	3.010E-02	263.70	0.006	PBC<MDA	Cd113m
267.24	7.	259.86	1.10	2.994E-02	265.83	50.000	PBC<MDA	BI210M
277.21	73.	27.32	1.16	2.910E-02	277.28	6.310	2.195E+01	TL208
284.30	11.	164.16	1.11	2.861E-02	284.30	6.140	PBC<MDA	I131
295.22	175.	11.02	0.92	2.788E-02	295.09	19.300	1.807E+01	PB214
300.32	88.	26.03	1.03	2.757E-02	300.03	3.280	5.424E+01	PB212
					300.07	2.460	7.232E+01	PA231
					300.18	6.200	2.870E+01	PA233
328.76	27.	75.38	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
333.44	21.	102.89	1.16	2.564E-02	333.44	15.510	PBC<MDA	Cf249
338.09	163.	12.78	0.85	2.540E-02	338.32	12.010	2.973E+01	AC228
351.86	299.	8.04	1.14	2.470E-02	351.93	37.600	1.789E+01	PB214
364.48	17.	103.84	1.19	2.410E-02	364.48	81.700	PBC<MDA	I131
383.84	16.	107.91	1.20	2.325E-02	383.84	8.940	PBC<MDA	BA133
387.95	16.	113.13	1.21	2.307E-02	387.95	66.000	PBC<MDA	Cf249
391.69	17.	115.77	1.21	2.292E-02	391.69	64.000	PBC<MDA	SN113
453.88	13.	127.77	1.27	2.065E-02	453.88	65.000	PBC<MDA	pm146
463.37	100.	15.34	1.28	2.035E-02	463.37	10.470	2.613E+01	SB125
477.60	15.	120.69	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
487.02	14.	111.81	1.30	1.964E-02	487.02	45.500	PBC<MDA	La140
497.05	13.	122.35	1.31	1.935E-02	497.05	90.900	PBC<MDA	RU103
510.80	130.	16.92	1.09	1.897E-02	511.86	20.000	1.909E+01	RH106
531.00	11.	110.13	1.34	1.845E-02	531.00	13.000	PBC<MDA	Nd147
583.28	286.	8.29	1.06	1.723E-02	583.02	84.500	1.090E+01	TL208
609.43	238.	8.18	1.61	1.669E-02	609.31	46.090	1.717E+01	BI214
657.76	13.	74.11	1.45	1.578E-02	657.76	94.640	PBC<MDA	AG110M
702.63	5.	293.58	1.49	1.503E-02	702.63	97.900	PBC<MDA	NB94
727.69	93.	14.67	2.11	1.465E-02	727.17	7.550	4.663E+01	BI212
735.72	23.	53.07	1.51	1.452E-02	735.72	22.500	PBC<MDA	pm146
747.16	2.	624.50	1.52	1.436E-02	747.16	34.000	PBC<MDA	pm146
763.94	7.	139.15	1.54	1.412E-02	763.94	22.280	PBC<MDA	AG110M
765.79	1.	985.52	1.54	1.410E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.62	30.	23.21	1.33	1.383E-02	785.42	1.280	9.350E+01	BI212
795.87	14.	77.39	1.56	1.369E-02	795.87	85.530	PBC<MDA	CS134
801.95	13.	90.44	1.57	1.362E-02	801.95	8.690	PBC<MDA	CS134
818.50	15.	95.93	1.58	1.341E-02	818.50	100.000	PBC<MDA	Cs136
835.01	12.	100.43	1.60	1.321E-02	834.85	99.980	PBC<MDA	MN54
861.01	43.	20.07	0.46	1.291E-02	860.56	12.420	1.483E+01	TL208
873.23	15.	79.97	1.63	1.277E-02	873.23	12.270	PBC<MDA	EU154
898.04	10.	91.73	1.65	1.250E-02	898.04	93.700	PBC<MDA	y88
911.33	197.	7.12	1.58	1.237E-02	911.07	29.000	3.052E+01	AC228
969.24	128.	12.30	1.46	1.180E-02	968.97	17.460	3.452E+01	AC228
1004.77	9.	155.42	1.74	1.148E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	606.22	1.76	1.119E-02	1037.84	14.130	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1048.07	5.	207.02	1.77	1.111E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	12.	86.07	1.78	1.099E-02	1063.66	74.500	PBC<MDA	BI207
1120.37	81.	14.46	0.64	1.055E-02	1120.29	15.100	2.808E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.48	7.	206.53	1.83	1.055E-02	1121.30	34.900	PBC<MDA	Ta182
1173.24	20.	43.28	1.87	1.018E-02	1173.24	99.900	1.098E+00	CO60
1238.28	10.	148.80	1.92	9.765E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	21.	31.23	1.95	9.547E-03	1274.53	99.940	1.223E+00	NA22
					1274.54	35.190	3.473E+00	EU154
1384.30	5.	113.28	2.03	8.948E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	13.	50.03	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1460.85	532.	4.39	2.16	8.576E-03	1460.83	10.670	3.231E+02	K40
1764.76	43.	21.33	2.30	7.376E-03	1764.49	15.400	2.094E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.81	74.83	278.	279.	7.185E+03	10.38	0.916	- D
308.12	77.15	267.	429.	1.081E+04	7.24	0.919	- D
336.54	84.23	185.	74.	1.761E+03	28.61	0.926	- D
359.64	90.01	183.	101.	2.333E+03	21.44	0.931	- D
2041.80	510.80	94.	130.	6.862E+03	16.92	1.091	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.11	46.62	164.	55.	0.031	44.64	1.222s
TH-227	200.19	50.14	523.	-27.	-0.015	121.99	0.893s
AM-241	237.74	59.54	668.	-33.	-0.018	113.13	0.902s
TH-234	252.73	63.29	233.	44.	0.025	51.27	0.905D
Sn-126	256.70	64.28	818.	-35.	-0.019	118.01	0.906s
BA-133	323.48	80.99	2883.	31.	0.017	245.50	0.922s
Np-237	345.47	86.49	2914.	32.	0.018	238.78	0.928A
EU-155	345.68	86.54	3040.	-33.	-0.019	234.52	0.928s
Sn-126	349.78	87.57	2809.	33.	0.019	80.10	0.929D
Cd-109	351.66	88.04	2839.	33.	0.019	226.35	0.929A

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	363.89	91.10	2873.	33.	0.019	226.97	0.932s
TH-234	369.85	92.59	347.	44.	0.024	62.00	0.934D
AC-228	372.88	93.35	2837.	34.	0.019	222.96	0.934
Gd-153	389.47	97.50	846.	-11.	-0.006	386.77	0.938s
Np-239	397.47	99.50	856.	0.	0.000	1000.00	0.940s
Gd-153	412.25	103.20	856.	0.	0.000	1000.00	0.944s
Np-239	414.25	103.70	757.	29.	0.016	133.96	0.944s
EU-155	420.70	105.31	765.	21.	0.011	190.57	0.946s
Np-239	423.96	106.13	718.	28.	0.016	135.27	0.946s
EU-152	486.50	121.78	385.	4.	0.002	695.52	0.961s
CO-57	487.64	122.06	389.	0.	0.000	1000.00	0.962s
EU-154	491.79	123.10	416.	-33.	-0.018	90.18	0.963s
PA-234	524.55	131.29	1189.	-31.	-0.017	156.09	0.970s
HF-181	531.46	133.02	1220.	-31.	-0.017	157.89	0.972s
CE-144	533.51	133.54	1571.	-36.	-0.020	154.92	0.973s
HF-181	544.55	136.30	1607.	-36.	-0.020	156.26	0.975s
CO-57	545.24	136.47	1644.	-36.	-0.020	158.01	0.975s
Tc-99m	561.38	140.51	1680.	-37.	-0.020	159.11	0.979
U-235	574.47	143.79	1503.	-40.	-0.022	69.00	0.982s
CE-141	581.09	145.44	1720.	-37.	-0.020	160.90	0.984s
Ba-140	649.91	162.66	462.	-28.	-0.016	110.11	1.000s
U-235	652.79	163.38	383.	-30.	-0.017	90.85	1.001s
CE-139	662.68	165.85	460.	29.	0.016	106.41	1.003s
Cf-251	705.64	176.60	198.	17.	0.009	156.74	1.013s
TH-229	773.22	193.51	187.	-3.	-0.002	854.73	1.029s
U-235	820.49	205.33	137.	52.	0.029	43.83	1.040s
Cf-251	907.10	227.00	209.	-7.	-0.004	388.22	1.061s
PB-212	953.60	238.63	114.	763.	0.424	4.13	1.071D
PB-214	967.05	242.00	138.	73.	0.041	25.53	1.074D
EU-152	977.83	244.69	1236.	-14.	-0.008	345.00	1.077s
TH-227	1023.99	256.24	147.	2.	0.001	973.21	1.088s
Cd-113m	1053.81	263.70	174.	5.	0.003	388.82	1.095
BI-210M	1062.33	265.83	170.	7.	0.004	259.86	1.097s
TL-208	1107.82	277.21	74.	73.	0.040	27.32	1.161s
Hg-203	1115.78	279.20	234.	-21.	-0.012	104.71	1.109s
I-131	1136.16	284.30	89.	11.	0.006	164.16	1.114s
PB-214	1179.81	295.22	56.	175.	0.097	11.02	0.916s
PB-212	1200.20	300.32	83.	88.	0.049	26.03	1.025
PA-231	1199.21	300.07	588.	-21.	-0.012	166.76	1.128
PA-233	1199.65	300.18	567.	-21.	-0.012	163.81	1.128
PA-231	1209.52	302.65	547.	-15.	-0.008	229.41	1.131s
BA-133	1210.33	302.85	532.	0.	0.000	1000.00	1.131s
Ba-140	1218.32	304.85	532.	0.	0.000	1000.00	1.133s
BI-210M	1218.50	304.90	532.	0.	0.000	1000.00	1.133
Ir-192	1232.67	308.44	532.	0.	0.000	1000.00	1.136s
PA-233	1246.95	312.01	532.	0.	0.000	1000.00	1.139
Ir-192	1264.85	316.49	532.	0.	0.000	1000.00	1.143s
CR-51	1279.22	320.08	532.	0.	0.000	1000.00	1.147s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1313.91	328.76	192.	27.	0.015	75.38	1.155s
Cf-249	1332.62	333.44	221.	21.	0.012	102.89	1.159s
AC-228	1351.20	338.09	71.	163.	0.091	12.78	0.854s
Cs-136	1361.13	340.57	406.	-9.	-0.005	312.67	1.165
EU-152	1375.98	344.29	397.	0.	0.000	1000.00	1.169s
HF-181	1382.15	345.83	415.	-10.	-0.006	280.64	1.170
PB-214	1406.27	351.86	69.	299.	0.166	8.04	1.135s
BA-133	1422.81	356.00	472.	-20.	-0.011	154.62	1.180s
I-131	1456.73	364.48	81.	17.	0.010	103.84	1.187s
BA-133	1534.13	383.84	145.	16.	0.009	107.91	1.205s
Cf-249	1550.56	387.95	161.	16.	0.009	113.13	1.209s
SN-113	1565.51	391.69	182.	17.	0.009	115.77	1.212
SB-125	1710.19	427.88	112.	-23.	-0.013	92.91	1.245s
AG-108M	1734.43	433.94	72.	-8.	-0.004	210.65	1.250s
pm-146	1814.18	453.88	68.	13.	0.007	127.77	1.268s
SB-125	1852.11	463.37	68.	100.	0.056	15.34	1.277
Ir-192	1870.88	468.06	179.	-14.	-0.008	134.74	1.281s
BE-7	1909.00	477.60	149.	15.	0.008	120.69	1.289s
HF-181	1926.61	482.00	164.	0.	0.000	1000.00	1.293s
La-140	1946.69	487.02	108.	14.	0.008	111.81	1.298s
RU-103	1986.82	497.05	61.	13.	0.007	122.35	1.307s
RH-106	2046.04	511.86	307.	-36.	-0.020	71.31	2.570s
Nd-147	2122.56	531.00	35.	11.	0.006	110.13	1.337s
CS-134	2275.81	569.32	58.	-6.	-0.003	201.24	1.370
PA-234	2276.41	569.47	64.	0.	0.000	1000.00	1.370
BI-207	2277.34	569.70	73.	-6.	-0.003	205.48	1.371
TL-208	2331.62	583.28	51.	286.	0.159	8.29	1.065
SB-124	2409.43	602.73	437.	0.	0.000	1000.00	1.399s
CS-134	2417.34	604.71	437.	0.	0.000	1000.00	1.401s
BI-214	2436.20	609.43	35.	238.	0.132	8.18	1.613
RU-103	2439.69	610.30	437.	0.	0.000	1000.00	1.406s
AG-108M	2455.62	614.28	437.	0.	0.000	1000.00	1.410s
PM-144	2470.74	618.06	437.	0.	0.000	1000.00	1.413s
RH-106	2486.16	621.92	472.	-18.	-0.010	174.70	1.416s
SB-125	2542.05	635.89	65.	-16.	-0.009	74.23	1.428s
I-131	2546.39	636.97	96.	-11.	-0.006	133.68	1.429s
AG-110M	2629.52	657.76	42.	13.	0.007	74.11	1.447s
CS-137	2645.12	661.66	109.	-19.	-0.010	81.57	1.451s
PM-144	2784.64	696.54	84.	-22.	-0.012	87.30	1.481s
NB-94	2808.99	702.63	53.	5.	0.003	293.58	1.486s
SB-124	2889.61	722.79	186.	-17.	-0.010	113.96	1.503s
AG-108M	2890.22	722.94	169.	-3.	-0.002	614.67	1.503s
EU-154	2891.89	723.36	166.	0.	0.000	1000.00	1.503s
BI-212	2909.23	727.69	19.	93.	0.052	14.67	2.110s
pm-146	2941.34	735.72	28.	23.	0.013	53.07	1.514s
pm-146	2987.11	747.16	47.	2.	0.001	624.50	1.524s
ZR-95	3025.38	756.73	75.	-14.	-0.008	112.80	1.532s
AG-110M	3054.24	763.94	49.	7.	0.004	139.15	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-95	3061.63	765.79	86.	1.	0.001	985.52	1.539s
PA-234M	3064.12	766.41	104.	-9.	-0.005	109.01	1.540s
EU-152	3114.15	778.92	42.	0.	0.000	1000.00	1.550s
BI-212	3140.93	785.62	5.	30.	0.017	23.21	1.330
CS-134	3181.95	795.87	55.	14.	0.008	77.39	1.565s
CS-134	3206.28	801.95	66.	13.	0.007	90.44	1.570s
CO-58	3241.58	810.78	97.	-17.	-0.010	83.71	1.577s
La-140	3261.56	815.77	114.	-5.	-0.003	286.77	1.581
Cs-136	3272.49	818.50	90.	15.	0.008	95.93	1.583s
MN-54	3337.89	834.85	28.	12.	0.007	100.43	1.597s
Co-56	3385.58	846.77	42.	-8.	-0.004	175.45	1.607s
TL-208	3440.76	860.56	24.	32.	0.018	36.16	1.619s
NB-94	3482.90	871.10	60.	-14.	-0.008	82.68	1.627s
EU-154	3491.44	873.23	65.	15.	0.008	79.97	1.629s
PA-234	3520.64	880.53	103.	-18.	-0.010	83.37	1.635s
PA-234	3531.48	883.24	121.	-15.	-0.009	104.60	1.637s
AG-110M	3537.26	884.68	143.	-13.	-0.007	136.59	1.638s
Sc-46	3555.65	889.28	176.	-9.	-0.005	211.11	1.642s
y-88	3590.70	898.04	15.	10.	0.006	91.73	1.649s
AC-228	3643.87	911.33	0.	197.	0.109	7.12	1.583
AG-110M	3748.54	937.49	45.	-17.	-0.009	53.30	1.682s
PA-234	3782.66	946.02	70.	-22.	-0.012	86.40	1.688s
EU-152	3855.05	964.11	234.	-17.	-0.010	127.19	1.703
AC-228	3875.55	969.24	20.	128.	0.071	12.30	1.455
EU-154	3983.96	996.33	83.	-17.	-0.009	79.39	1.729s
PA-234M	4002.64	1001.00	103.	-5.	-0.003	200.91	1.733s
EU-154	4017.76	1004.77	93.	9.	0.005	155.42	1.736s
Co-56	4150.07	1037.84	30.	2.	0.001	606.22	1.762s
Cs-136	4191.00	1048.07	44.	5.	0.003	207.02	1.771s
RH-106	4200.17	1050.36	63.	-12.	-0.007	96.73	1.772s
BI-207	4253.39	1063.66	20.	12.	0.007	86.07	1.783s
Ga-68	4308.37	1077.40	43.	-11.	-0.006	142.52	1.794s
FE-59	4395.81	1099.25	32.	-4.	-0.002	243.86	1.811s
ZN-65	4461.03	1115.55	142.	-11.	-0.006	158.41	1.824s
BI-214	4480.33	1120.37	10.	81.	0.045	14.46	0.641s
Sc-46	4481.05	1120.55	131.	0.	0.000	1000.00	1.828s
Ta-182	4484.05	1121.30	101.	7.	0.004	206.53	1.828
CO-60	4691.91	1173.24	11.	20.	0.011	43.28	1.869s
Ta-182	4755.20	1189.05	43.	-8.	-0.004	197.00	1.881
Co-56	4952.24	1238.28	38.	10.	0.005	148.80	1.919
NA-22	5097.34	1274.53	11.	21.	0.012	31.23	1.946s
FE-59	5165.65	1291.60	34.	-12.	-0.007	117.56	1.959s
CO-60	5329.39	1332.50	51.	-21.	-0.012	68.60	1.990
AG-110M	5536.74	1384.30	6.	5.	0.003	113.28	2.029s
EU-152	5631.64	1408.00	6.	13.	0.007	50.03	2.046s
K-40	5843.21	1460.85	6.	532.	0.296	4.39	2.156
La-140	6385.21	1596.21	18.	-2.	-0.001	517.20	2.182s
SB-124	6764.73	1690.98	6.	-1.	-0.001	600.00	2.247s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	7059.14	1764.49	20.	43.	0.024	21.33	2.297
Co-56	7086.61	1771.35	90.	-16.	-0.009	87.35	2.302s
y-88	7345.80	1836.06	13.	-3.	-0.001	337.04	2.345s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.8897E+00				5.31E+01	
			477.60	3.890E+00	?(	1.582E+01 1.21E+02 1.05E+01	G
NA-22	C	1.2227E+00				9.50E+02	
			1274.53	1.223E+00	&(	1.058E+00 3.12E+01 9.99E+01	G
K-40	N	3.2309E+02				4.66E+11	
			1460.83	3.231E+02	(P	8.496E+00 4.39E+00 1.07E+01	G
Sc-46	F	-3.9704E-01				8.38E+01	
			889.28	-3.970E-01	?(	2.847E+00 2.11E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.951E+00 1.00E+03 1.00E+02	G
MN-54	C	4.9273E-01				3.12E+02	
			834.85	4.927E-01	?(P	1.156E+00 1.00E+02 1.00E+02	G
FE-59	F	-3.9538E-01				4.45E+01	
			1099.25	-3.954E-01	&(P	2.681E+00 2.44E+02 5.65E+01	G
			1291.60	-1.633E+00	+	4.067E+00 1.18E+02 4.32E+01	G
Co-56	C	1.7003E-01				7.73E+01	
			846.77	-3.403E-01	(	1.400E+00 1.75E+02 9.99E+01	G
			1238.28	8.280E-01	?(P	2.720E+00 1.49E+02 6.61E+01	G
			1037.84	7.024E-01	?(	9.916E+00 6.06E+02 1.41E+01	G
			1771.35	-7.822E+00	+	2.290E+01 8.74E+01 1.55E+01	A
CO-58	C	-7.1719E-01				7.09E+01	
			810.78	-7.172E-01	?(	2.007E+00 8.37E+01 9.95E+01	G
CO-60	F	-1.2582E+00				1.93E+03	
			1332.50	-1.258E+00	?(P	2.171E+00 6.86E+01 1.00E+02	G
			1173.24	1.098E+00	+ P	9.877E-01 4.33E+01 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.1233E+00					2.44E+02	
			1115.55	-1.123E+00	?(	6.035E+00	1.58E+02	5.06E+01 G
NB-94	I	1.9894E-01					7.41E+06	
			702.63	1.989E-01	?(P	1.380E+00	2.94E+02	9.79E+01 G
			871.10	-6.086E-01	&	1.687E+00	8.27E+01	9.99E+01 G
ZR-95	I	-9.8433E-01					6.40E+01	
			756.73	-9.843E-01	?(P	3.084E+00	1.13E+02	5.45E+01 G
			724.20	7.136E-02	%	5.345E+00	2.18E+03	4.42E+01 G
NB-95	I	5.2662E-02					6.40E+01	
			765.79	5.266E-02	?(	1.811E+00	9.86E+02	9.98E+01 G
RU-103	I	4.2113E-01					3.93E+01	
			497.05	4.211E-01	(	1.232E+00	1.22E+02	9.09E+01 G
			610.30	0.000E+00	-	5.802E+01	1.00E+03	5.75E+00 GA
RH-106	I	-6.0385E+00					3.74E+02	
			621.92	-6.039E+00	?(	3.536E+01	1.75E+02	9.93E+00 G
			1050.36	-3.906E+01	+	1.276E+02	9.67E+01	1.56E+00 G
			511.86	-5.238E+00	+	1.236E+01	7.13E+01	2.00E+01 GA
AG-108M	C	-2.3039E-01					1.53E+05	
			433.94	-2.304E-01	?(	1.217E+00	2.11E+02	9.05E+01 G
			722.94	-1.249E-01	&	2.631E+00	6.15E+02	9.08E+01 G
			614.28	0.000E+00	+	3.731E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.4904E-01					2.50E+02	
			884.68	-7.657E-01	?(	3.536E+00	1.37E+02	7.27E+01 G
			657.76	4.952E-01	*(	1.224E+00	7.41E+01	9.46E+01 G
			937.49	-2.285E+00	+ P	4.544E+00	5.33E+01	3.44E+01 G
			1384.30	1.363E+00	?(	3.528E+00	1.13E+02	2.43E+01 G
			763.94	1.299E+00	?(P	6.218E+00	1.39E+02	2.23E+01 G
SN-113	F	6.3816E-01					1.15E+02	
			391.69	6.382E-01	?(	2.483E+00	1.16E+02	6.40E+01 G
SB-125	I	5.3529E+00					1.01E+03	
			427.88	-1.995E+00	?(	4.535E+00	9.29E+01	2.96E+01 G
			600.50	2.458E-01	%	1.843E+01	2.22E+03	1.79E+01 G
			635.89	-4.959E+00	+	1.226E+01	7.42E+01	1.13E+01 G
			463.37	2.613E+01	(P	1.071E+01	1.53E+01	1.05E+01 G
I-131	I	6.9734E-01					8.02E+00	
			364.48	4.902E-01	(P	1.257E+00	1.04E+02	8.17E+01 G
			284.30	3.454E+00	?(P	1.477E+01	1.64E+02	6.14E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			636.97	-5.115E+00	&	2.323E+01	1.34E+02	7.17E+00 G
Gd-153	F	-4.4460E-01					2.42E+02	
			97.50	-4.446E-01	?(	5.761E+00	3.87E+02	3.00E+01 G
			103.20	0.000E+00	+	7.873E+00	1.00E+03	2.18E+01 G
Ga-68	C	-1.9388E+01					4.71E-02	
			1077.40	-1.939E+01	?(	6.025E+01	1.43E+02	3.30E+00 G
Tc-99m	I	-5.3699E-01					2.51E-01	
			140.51	-5.370E-01	&(	2.840E+00	1.59E+02	8.93E+01 G
BA-133	F	-7.3378E-01					3.85E+03	
			356.00	-7.338E-01	?(	3.798E+00	1.55E+02	6.20E+01 G
			302.85	0.000E+00	+	1.219E+01	1.00E+03	1.83E+01 G
			383.84	4.335E+00	?	1.572E+01	1.08E+02	8.94E+00 GA
			80.99	1.236E+00	? P	1.008E+01	2.45E+02	3.41E+01 GA
CS-134	I	5.8863E-01					7.54E+02	
			604.71	0.000E+00	?(	3.395E+00	1.00E+03	9.76E+01 G
			795.87	6.826E-01	?(	1.765E+00	7.74E+01	8.55E+01 G
			569.32	-1.133E+00	+	7.898E+00	2.01E+02	1.54E+01 G
			801.95	6.276E+00	?(	1.910E+01	9.04E+01	8.69E+00 G
			563.24	5.695E-01	% P	1.420E+01	1.02E+03	8.35E+00 G
CS-137	I	-7.8290E-01					1.10E+04	
			661.66	-7.829E-01	?(	2.131E+00	8.16E+01	8.52E+01 G
CE-139	F	4.9233E-01					1.38E+02	
			165.85	4.923E-01	&(	1.746E+00	1.06E+02	7.99E+01 G
Ba-140	I	-1.6774E-01					1.28E+01	
			537.26	-1.677E-01	%(P	5.204E+00	1.64E+03	2.44E+01 G
			162.66	-6.144E+00	&	2.256E+01	1.10E+02	6.22E+00 G
			304.85	0.000E+00	+	5.232E+01	1.00E+03	4.29E+00 G
La-140	I	5.0898E-01					1.28E+01	
			1596.21	-1.457E-01	?(	1.638E+00	5.17E+02	9.54E+01 G
			487.02	8.414E-01	?(	3.175E+00	1.12E+02	4.55E+01 G
			328.76	2.841E+00	&(P	7.105E+00	7.54E+01	2.03E+01 G
			815.77	-9.456E-01	+	9.314E+00	2.87E+02	2.33E+01 G
CE-141	I	-9.7843E-01					3.25E+01	
			145.44	-9.784E-01	?(	5.232E+00	1.61E+02	4.82E+01 G
CE-144	I	-4.0985E+00					2.85E+02	
			133.54	-4.099E+00	&(	2.111E+01	1.55E+02	1.11E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C	-8.2824E-01					3.63E+02	
			696.54	-8.282E-01	&(P	1.690E+00	8.73E+01	9.90E+01 G
			618.06	0.000E+00	+	3.398E+00	1.00E+03	9.91E+01 G
EU-152	F	8.9110E-02					4.94E+03	
			344.29	0.000E+00	?(	7.988E+00	1.00E+03	2.65E+01 G
			1112.07	-1.279E-01	%	2.153E+01	4.87E+03	1.36E+01 G
			121.78	1.717E-01	(	4.042E+00	6.96E+02	2.86E+01 G
			778.92	0.000E+00	-	1.015E+01	1.00E+03	1.29E+01 G
			964.11	-5.566E+00	+	2.378E+01	1.27E+02	1.46E+01 G
			244.69	-3.347E+00	&	3.856E+01	3.45E+02	7.58E+00 G
			1408.00	3.994E+00	?	4.135E+00	5.00E+01	2.10E+01 GA
EU-154	I	3.6026E+00					3.14E+03	
			873.23	5.340E+00	?(P	1.428E+01	8.00E+01	1.23E+01 G
			123.10	-9.818E-01	-	2.943E+00	9.02E+01	4.08E+01 G
			1274.54	5.512E-02	&	4.785E+00	2.39E+03	3.52E+01 G
			723.36	0.000E+00	-	1.172E+01	1.00E+03	2.02E+01 G
			1004.77	2.419E+00	?(	1.283E+01	1.55E+02	1.80E+01 G
			996.33	-7.718E+00	+	2.045E+01	7.94E+01	1.06E+01 G
EU-155	I	1.1992E+00					1.81E+03	
			105.31	1.199E+00	(	7.637E+00	1.91E+02	2.12E+01 G
			86.54	-1.422E+00	+	1.107E+01	2.35E+02	3.07E+01 G
Ta-182	F	1.0565E+00					1.14E+02	
			1121.30	1.057E+00	(	7.477E+00	2.07E+02	3.49E+01 G
			1221.41	1.390E-01	%	6.501E+00	2.09E+03	2.70E+01 G
			1189.05	-2.609E+00	+	1.128E+01	1.97E+02	1.62E+01 G
Hg-203	F	-4.9706E-01					4.66E+01	
			279.20	-4.971E-01	?(	1.741E+00	1.05E+02	8.15E+01 G
TL-208	N	1.0942E+01					6.98E+02	
			583.02	1.090E+01	(P	1.376E+00	8.29E+00	8.45E+01 G
			277.28	2.195E+01	+ P	1.299E+01	2.73E+01	6.31E+00 G
			860.56	1.125E+01	?(P	8.767E+00	3.62E+01	1.24E+01 G
pm-146	C	1.0853E+00					2.02E+03	
			747.16	2.656E-01	?(	3.931E+00	6.25E+02	3.40E+01 G
			735.72	3.910E+00	(	4.653E+00	5.31E+01	2.25E+01 G
			453.88	5.361E-01	?(P	1.703E+00	1.28E+02	6.50E+01 G
y-88	F	4.6985E-01					1.07E+02	
			898.04	4.699E-01	?(P	9.852E-01	9.17E+01	9.37E+01 G
			1836.06	-2.090E-01	-	1.513E+00	3.37E+02	9.92E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-113m		1.4866E+03					5.33E+03	
			263.70	1.487E+03	?(	1.975E+04	3.89E+02	6.00E-03 K
Cd-109	F	1.1441E+01					4.53E+02	
								Derived Ave Activity
			88.04	1.144E+01	}(	8.601E+01	2.26E+02	3.79E+00 G
Cf-251	T	1.4151E+00					3.28E+05	
			176.60	1.415E+00	(	5.684E+00	1.57E+02	1.70E+01 G
			227.00	-1.854E+00	&	1.857E+01	3.88E+02	6.30E+00 GA
Cf-249	T	1.0368E+00					1.28E+05	
			387.95	5.935E-01	(	2.257E+00	1.13E+02	6.60E+01 G
			333.44	2.923E+00	&(	1.006E+01	1.03E+02	1.55E+01 G
Sn-126		-5.8484E+00					3.65E+07	
			87.57	1.159E+00	}	8.669E+00	8.01E+01	3.75E+01 GA
			64.28	-5.848E+00	?(	2.296E+01	1.18E+02	9.70E+00 G
			86.94	-6.208E-02	}	3.687E+01	1.78E+04	9.04E+00 GA
PB-210	N	3.2429E+01					8.14E+03	
			46.54	3.243E+01	*(P	3.655E+01	4.46E+01	4.25E+00 G
PB-212	N	3.0404E+01					6.98E+02	
			238.63	3.040E+01	(P	2.092E+00	4.13E+00	4.33E+01 G
			300.03	5.424E+01	+ P	2.770E+01	2.60E+01	3.28E+00 GA
PB-214	N	1.7952E+01					5.84E+05	
			351.93	1.789E+01	@(P	2.476E+00	8.04E+00	3.76E+01 G
			295.09	1.807E+01	@(P	3.877E+00	1.10E+01	1.93E+01 G
			242.00	1.717E+01	P	1.346E+01	2.55E+01	7.43E+00 GA
BI-207	C	2.4651E-01					1.18E+04	
			569.70	-1.945E-01	?(	1.379E+00	2.05E+02	9.77E+01 G
			1063.66	8.251E-01	?(P	1.607E+00	8.61E+01	7.45E+01 G
BI-212	N	4.6627E+01					6.98E+02	
			727.17	4.663E+01	@(	1.161E+01	1.47E+01	7.55E+00 G
			785.42	9.350E+01	+ P	4.187E+01	2.32E+01	1.28E+00 GA
BI-214	N	1.7169E+01					5.84E+05	
			609.31	1.717E+01	(P	2.193E+00	8.18E+00	4.61E+01 G
			1120.29	2.808E+01	+ P	6.194E+00	1.45E+01	1.51E+01 G
			1764.49	2.094E+01	+ P	1.156E+01	2.13E+01	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	2.6596E-01						1.10E+09	
			265.83	2.660E-01	&(	2.354E+00	2.60E+02	5.00E+01	G
			304.90	0.000E+00	-	8.017E+00	1.00E+03	2.80E+01	G
AC-228	N	3.1551E+01						2.10E+03	
			911.07	3.052E+01	(	1.142E+00	7.12E+00	2.90E+01	G
			968.97	3.452E+01	(	6.351E+00	1.23E+01	1.75E+01	G
			338.32	2.973E+01	@(	7.641E+00	1.28E+01	1.20E+01	G
			93.35	7.725E+00	-	5.721E+01	2.23E+02	5.56E+00	XA
TH-227	N	-7.4706E+00						7.95E+03	
			50.14	-7.471E+00	(	3.041E+01	1.22E+02	8.00E+00	G
			256.24	6.034E-01	&	1.529E+01	9.73E+02	7.00E+00	G
TH-229	N	-1.0241E+00						2.68E+06	
			193.51	-1.024E+00	&(	2.268E+01	8.55E+02	4.40E+00	G
			210.85	1.417E+00	%	4.386E+01	1.20E+03	2.99E+00	G
TH-234	N	1.3776E+01						1.63E+12	
			63.29	1.931E+01	(P	3.226E+01	5.13E+01	3.81E+00	G
			92.59	1.000E+01	(P	2.038E+01	6.20E+01	5.58E+00	G
PA-231	N	-1.0209E+01						1.20E+07	
			302.65	-1.021E+01	(	7.857E+01	2.29E+02	2.88E+00	G
			300.07	-1.699E+01	+	9.478E+01	1.67E+02	2.46E+00	G
PA-234	N	-2.1725E+00						1.63E+12	
			131.29	-2.172E+00	?(	1.129E+01	1.56E+02	1.80E+01	G
			946.02	-7.580E+00	+	1.439E+01	8.64E+01	1.34E+01	G
			569.47	0.000E+00	+	1.545E+01	1.00E+03	8.20E+00	G
			883.24	-7.019E+00	+	2.470E+01	1.05E+02	9.60E+00	G
			880.53	-1.312E+01	&	3.654E+01	8.34E+01	6.00E+00	GA
PA-234M	N	-2.7293E+01						1.63E+12	
			1001.00	-2.729E+01	?(P	2.880E+02	2.01E+02	8.37E-01	G
			766.41	-1.267E+02	& P	6.752E+02	1.09E+02	2.94E-01	G
U-235	N	1.9458E+00						2.57E+11	
			143.79	-4.644E+00	(P	2.143E+01	6.90E+01	1.10E+01	G
			205.33	1.636E+01	(P	1.782E+01	4.38E+01	5.01E+00	G
			163.38	-8.139E+00	+ P	2.528E+01	9.09E+01	5.08E+00	G
AM-241	T	-1.6214E+00						1.58E+05	
			59.54	-1.621E+00	?(	6.106E+00	1.13E+02	3.59E+01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-237   F   3.2052E+00                                        2.14E+06
                                                              Derived Ave Activity
                            86.49 3.205E+00 }(  2.542E+01 2.39E+02 1.31E+01 G

Cs-136   F   4.6490E-01                                        1.30E+01
                           818.50 6.035E-01 ?(  1.947E+00 9.59E+01 1.00E+02 G
                          1048.07 2.917E-01 ?(  2.109E+00 2.07E+02 8.00E+01 G
                           340.57-4.297E-01 -   4.530E+00 3.13E+02 4.69E+01 G

Np-239   T   1.5313E+00                                        2.36E+00
                           103.70 1.507E+00 &   6.730E+00 1.34E+02 2.40E+01 X
                           106.13 1.531E+00  (  6.906E+00 1.35E+02 2.27E+01 G
                            99.50 0.000E+00 &   1.153E+01 1.00E+03 1.50E+01 X

Nd-147       1.8641E+00                                        1.11E+01
                           531.00 2.625E+00 ?(  6.983E+00 1.10E+02 1.30E+01 G
                            91.10 1.515E+00 ?(  1.142E+01 2.27E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	523.	-27.	-0.015	121.99	-7.471E+00	
AM-241	59.54	668.	-33.	-0.018	113.13	-1.621E+00	
BA-133	80.99	2883.	31.	0.017	245.50	1.236E+00	P
EU-155	86.54	3040.	-33.	-0.019	234.52	-1.422E+00	
Nd-147	91.10	2873.	33.	0.019	226.97	1.515E+00	
Gd-153	97.50	846.	-11.	-0.006	386.77	-4.446E-01	
Np-239	103.70	757.	29.	0.016	133.96	1.507E+00	
EU-155	105.31	765.	21.	0.011	190.57	1.199E+00	
Np-239	106.13	718.	28.	0.016	135.27	1.531E+00	
EU-152	121.78	385.	4.	0.002	695.52	1.717E-01	
EU-154	123.10	416.	-33.	-0.018	90.18	-9.818E-01	
PA-234	131.29	1189.	-31.	-0.017	156.09	-2.172E+00	
HF-181	133.02	1220.	-31.	-0.017	157.89	-9.075E-01	
CE-144	133.54	1571.	-36.	-0.020	154.92	-4.099E+00	
HF-181	136.30	1607.	-36.	-0.020	156.26	-7.837E+00	
CO-57	136.47	1644.	-36.	-0.020	158.01	-4.295E+00	
Tc-99m	140.51	1680.	-37.	-0.020	159.11	-5.370E-01	
U-235	143.79	1503.	-40.	-0.022	69.00	-4.644E+00	P
CE-141	145.44	1720.	-37.	-0.020	160.90	-9.784E-01	
Ba-140	162.66	462.	-28.	-0.016	110.11	-6.144E+00	
U-235	163.38	383.	-30.	-0.017	90.85	-8.139E+00	P
Cf-251	176.60	198.	17.	0.009	156.74	1.415E+00	
TH-229	193.51	187.	-3.	-0.002	854.73	-1.024E+00	
U-235	205.33	137.	52.	0.029	43.83	1.636E+01	P
Cf-251	227.00	209.	-7.	-0.004	388.22	-1.854E+00	
EU-152	244.69	1236.	-14.	-0.008	345.00	-3.347E+00	
TH-227	256.24	147.	2.	0.001	973.21	6.034E-01	
Cd-113m	263.70	174.	5.	0.003	388.82	1.487E+03	
Hg-203	279.20	234.	-21.	-0.012	104.71	-4.971E-01	
I-131	284.30	89.	11.	0.006	164.16	3.454E+00	P
PA-231	300.07	588.	-21.	-0.012	166.76	-1.699E+01	
PA-233	300.18	567.	-21.	-0.012	163.81	-6.745E+00	
PA-231	302.65	547.	-15.	-0.008	229.41	-1.021E+01	
La-140	328.76	192.	27.	0.015	75.38	2.841E+00	P
Cf-249	333.44	221.	21.	0.012	102.89	2.923E+00	
Cs-136	340.57	406.	-9.	-0.005	312.67	-4.297E-01	
HF-181	345.83	415.	-10.	-0.006	280.64	-1.524E+00	
BA-133	356.00	472.	-20.	-0.011	154.62	-7.338E-01	
I-131	364.48	81.	17.	0.010	103.84	4.902E-01	P
BA-133	383.84	145.	16.	0.009	107.91	4.335E+00	
Cf-249	387.95	161.	16.	0.009	113.13	5.935E-01	
SN-113	391.69	182.	17.	0.009	115.77	6.382E-01	
AG-108M	433.94	72.	-8.	-0.004	210.65	-2.304E-01	
pm-146	453.88	68.	13.	0.007	127.77	5.361E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	468.06	179.	-14.	-0.008	134.74	-7.617E-01	
BE-7	477.60	149.	15.	0.008	120.69	3.890E+00	
La-140	487.02	108.	14.	0.008	111.81	8.414E-01	
RU-103	497.05	61.	13.	0.007	122.35	4.211E-01	
RH-106	511.86	307.	-36.	-0.020	71.31	-5.238E+00	
Nd-147	531.00	35.	11.	0.006	110.13	2.625E+00	
CS-134	569.32	58.	-6.	-0.003	201.24	-1.133E+00	
BI-207	569.70	73.	-6.	-0.003	205.48	-1.945E-01	
RH-106	621.92	472.	-18.	-0.010	174.70	-6.039E+00	
I-131	636.97	96.	-11.	-0.006	133.68	-5.115E+00	
AG-110M	657.76	42.	13.	0.007	74.11	4.952E-01	
CS-137	661.66	109.	-19.	-0.010	81.57	-7.829E-01	
PM-144	696.54	84.	-22.	-0.012	87.30	-8.282E-01	P
NB-94	702.63	53.	5.	0.003	293.58	1.989E-01	P
SB-124	722.79	186.	-17.	-0.010	113.96	-6.052E+00	
AG-108M	722.94	169.	-3.	-0.002	614.67	-1.249E-01	
pm-146	735.72	28.	23.	0.013	53.07	3.910E+00	
pm-146	747.16	47.	2.	0.001	624.50	2.656E-01	
ZR-95	756.73	75.	-14.	-0.008	112.80	-9.843E-01	P
AG-110M	763.94	49.	7.	0.004	139.15	1.299E+00	P
NB-95	765.79	86.	1.	0.001	985.52	5.266E-02	
PA-234M	766.41	104.	-9.	-0.005	109.01	-1.267E+02	P
CS-134	795.87	55.	14.	0.008	77.39	6.826E-01	
CS-134	801.95	66.	13.	0.007	90.44	6.276E+00	
CO-58	810.78	97.	-17.	-0.010	83.71	-7.172E-01	
La-140	815.77	114.	-5.	-0.003	286.77	-9.456E-01	
Cs-136	818.50	90.	15.	0.008	95.93	6.035E-01	
Co-56	846.77	42.	-8.	-0.004	175.45	-3.403E-01	
NB-94	871.10	60.	-14.	-0.008	82.68	-6.086E-01	
EU-154	873.23	65.	15.	0.008	79.97	5.340E+00	P
PA-234	880.53	103.	-18.	-0.010	83.37	-1.312E+01	
PA-234	883.24	121.	-15.	-0.009	104.60	-7.019E+00	
AG-110M	884.68	143.	-13.	-0.007	136.59	-7.657E-01	
Sc-46	889.28	176.	-9.	-0.005	211.11	-3.970E-01	
y-88	898.04	15.	10.	0.006	91.73	4.699E-01	P
AG-110M	937.49	45.	-17.	-0.009	53.30	-2.285E+00	P
PA-234	946.02	70.	-22.	-0.012	86.40	-7.580E+00	
EU-152	964.11	234.	-17.	-0.010	127.19	-5.566E+00	
EU-154	996.33	83.	-17.	-0.009	79.39	-7.718E+00	
PA-234M	1001.00	103.	-5.	-0.003	200.91	-2.729E+01	P
EU-154	1004.77	93.	9.	0.005	155.42	2.419E+00	
Co-56	1037.84	30.	2.	0.001	606.22	7.024E-01	
Cs-136	1048.07	44.	5.	0.003	207.02	2.917E-01	
RH-106	1050.36	63.	-12.	-0.007	96.73	-3.906E+01	
BI-207	1063.66	20.	12.	0.007	86.07	8.251E-01	P
Ga-68	1077.40	43.	-11.	-0.006	142.52	-1.939E+01	
FE-59	1099.25	32.	-4.	-0.002	243.86	-3.954E-01	P
ZN-65	1115.55	142.	-11.	-0.006	158.41	-1.123E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1121.30	101.	7.	0.004	206.53	1.057E+00		
CO-60	1173.24	11.	20.	0.011	43.28	1.098E+00		P
Ta-182	1189.05	43.	-8.	-0.004	197.00	-2.609E+00		
Co-56	1238.28	38.	10.	0.005	148.80	8.280E-01		P
FE-59	1291.60	34.	-12.	-0.007	117.56	-1.633E+00		
CO-60	1332.50	51.	-21.	-0.012	68.60	-1.258E+00		P
AG-110M	1384.30	6.	5.	0.003	113.28	1.363E+00		
EU-152	1408.00	6.	13.	0.007	50.03	3.994E+00		
La-140	1596.21	18.	-2.	-0.001	517.20	-1.457E-01		
SB-124	1690.98	6.	-1.	-0.001	600.00	-1.523E-01		
Co-56	1771.35	90.	-16.	-0.009	87.35	-7.822E+00		
y-88	1836.06	13.	-3.	-0.001	337.04	-2.090E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.8897E+00	3.8897E+00	1.207E+02%	1.58E+01
NA-22	#	1.2227E+00	1.2227E+00	3.123E+01%	1.06E+00
K-40		3.2309E+02	3.2309E+02	4.385E+00%	8.50E+00
Sc-46	#A	-3.9704E-01	-3.9704E-01	2.111E+02%	2.85E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.34E+01
MN-54	#A	4.9272E-01	4.9273E-01	1.004E+02%	1.16E+00
FE-59	#A	-3.9538E-01	-3.9538E-01	2.439E+02%	2.68E+00
Co-56	#A	1.7003E-01	1.7003E-01	1.488E+02%	1.40E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.36E+00
CO-58	#A	-7.1718E-01	-7.1719E-01	8.371E+01%	2.01E+00
CO-60	#A	-1.2582E+00	-1.2582E+00	6.860E+01%	2.17E+00
ZN-65	#A	-1.1233E+00	-1.1233E+00	1.584E+02%	6.04E+00
NB-94	#A	1.9894E-01	1.9894E-01	2.936E+02%	1.38E+00
ZR-95	#A	-9.8432E-01	-9.8433E-01	1.128E+02%	3.08E+00
NB-95	#A	5.2662E-02	5.2662E-02	9.855E+02%	1.81E+00
RU-103	#A	4.2113E-01	4.2113E-01	1.223E+02%	1.23E+00
RH-106	#A	-6.0385E+00	-6.0385E+00	1.747E+02%	3.54E+01
AG-108M	#A	-2.3039E-01	-2.3039E-01	2.107E+02%	1.22E+00
AG-110M	#A	2.4904E-01	2.4904E-01	5.934E+01%	3.54E+00
SN-113	#A	6.3816E-01	6.3816E-01	1.158E+02%	2.48E+00
SB-124	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.36E+00
SB-125	C	5.3529E+00	5.3529E+00	1.534E+01%	4.53E+00
I-131	#A	6.9730E-01	6.9734E-01	9.712E+01%	1.26E+00
Gd-153	#A	-4.4460E-01	-4.4460E-01	3.868E+02%	5.76E+00
Ga-68	#A	-1.9190E+01	-1.9388E+01	1.425E+02%	6.03E+01
Tc-99m	#A	-5.3596E-01	-5.3699E-01	1.591E+02%	2.84E+00
BA-133	#A	-7.3378E-01	-7.3378E-01	1.546E+02%	3.80E+00
CS-134	#A	5.8863E-01	5.8863E-01	7.739E+01%	3.39E+00

CS-137 #A	-7.8290E-01	-7.8290E-01	8.157E+01%	2.13E+00
CE-139 #A	4.9233E-01	4.9233E-01	1.064E+02%	1.75E+00
Ba-140 #A	-1.6773E-01	-1.6774E-01	1.639E+03%	5.20E+00
La-140 #A	5.0896E-01	5.0898E-01	7.538E+01%	1.64E+00
CE-141 #A	-9.7842E-01	-9.7843E-01	1.609E+02%	5.23E+00
CE-144 #A	-4.0985E+00	-4.0985E+00	1.549E+02%	2.11E+01
PM-144 #A	-8.2824E-01	-8.2824E-01	8.730E+01%	1.69E+00
EU-152 #A	8.9110E-02	8.9110E-02	6.090E+02%	7.99E+00
EU-154 #A	3.6026E+00	3.6026E+00	7.997E+01%	1.43E+01
EU-155 #A	1.1992E+00	1.1992E+00	1.906E+02%	7.64E+00
HF-181 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+00
Ta-182 #A	1.0565E+00	1.0565E+00	2.065E+02%	7.48E+00
Hg-203 #A	-4.9706E-01	-4.9706E-01	1.047E+02%	1.74E+00
TL-208	1.0942E+01	1.0942E+01	8.288E+00%	1.38E+00
pm-146 #A	1.0853E+00	1.0853E+00	5.307E+01%	3.93E+00
y-88 #A	4.6985E-01	4.6985E-01	9.173E+01%	9.85E-01
Cd-113m#A	1.4866E+03	1.4866E+03	3.888E+02%	1.97E+04
Cd-109 #A	1.1441E+01	1.1441E+01	2.264E+02%	8.60E+01
Cf-251 #A	1.4151E+00	1.4151E+00	1.567E+02%	5.68E+00
Cf-249 #A	1.0368E+00	1.0368E+00	7.646E+01%	2.26E+00
Sn-126 #A	-5.8484E+00	-5.8484E+00	1.180E+02%	2.30E+01
PB-210 #A	3.2429E+01	3.2429E+01	4.464E+01%	3.66E+01
PB-212	3.0404E+01	3.0404E+01	4.129E+00%	2.09E+00
PB-214 #	1.7952E+01	1.7952E+01	6.822E+00%	2.48E+00
BI-207 #A	2.4651E-01	2.4651E-01	8.607E+01%	1.38E+00
BI-212	4.6627E+01	4.6627E+01	1.467E+01%	1.16E+01
BI-214	1.7169E+01	1.7169E+01	8.182E+00%	2.19E+00
BI-210M#A	2.6596E-01	2.6596E-01	2.599E+02%	2.35E+00
AC-228	3.1551E+01	3.1551E+01	6.372E+00%	1.14E+00
TH-227 #A	-7.4706E+00	-7.4706E+00	1.220E+02%	3.04E+01
TH-229 #A	-1.0241E+00	-1.0241E+00	8.547E+02%	2.27E+01
TH-234 #A	1.3776E+01	1.3776E+01	4.023E+01%	3.23E+01
PA-231 #A	-1.0209E+01	-1.0209E+01	2.294E+02%	7.86E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.34E+00
PA-234 #A	-2.1725E+00	-2.1725E+00	1.561E+02%	1.13E+01
PA-234M#A	-2.7293E+01	-2.7293E+01	2.009E+02%	2.88E+02
U-235 #A	1.9458E+00	1.9458E+00	4.087E+01%	2.14E+01
AM-241 #A	-1.6214E+00	-1.6214E+00	1.131E+02%	6.11E+00
Np-237 #A	3.2052E+00	3.2052E+00	2.388E+02%	2.54E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.65E+00
Cs-136 #A	4.6489E-01	4.6490E-01	9.593E+01%	1.95E+00
Np-239 #A	1.5309E+00	1.5313E+00	1.353E+02%	6.91E+00
Nd-147 #A	1.8641E+00	1.8641E+00	1.101E+02%	6.98E+00

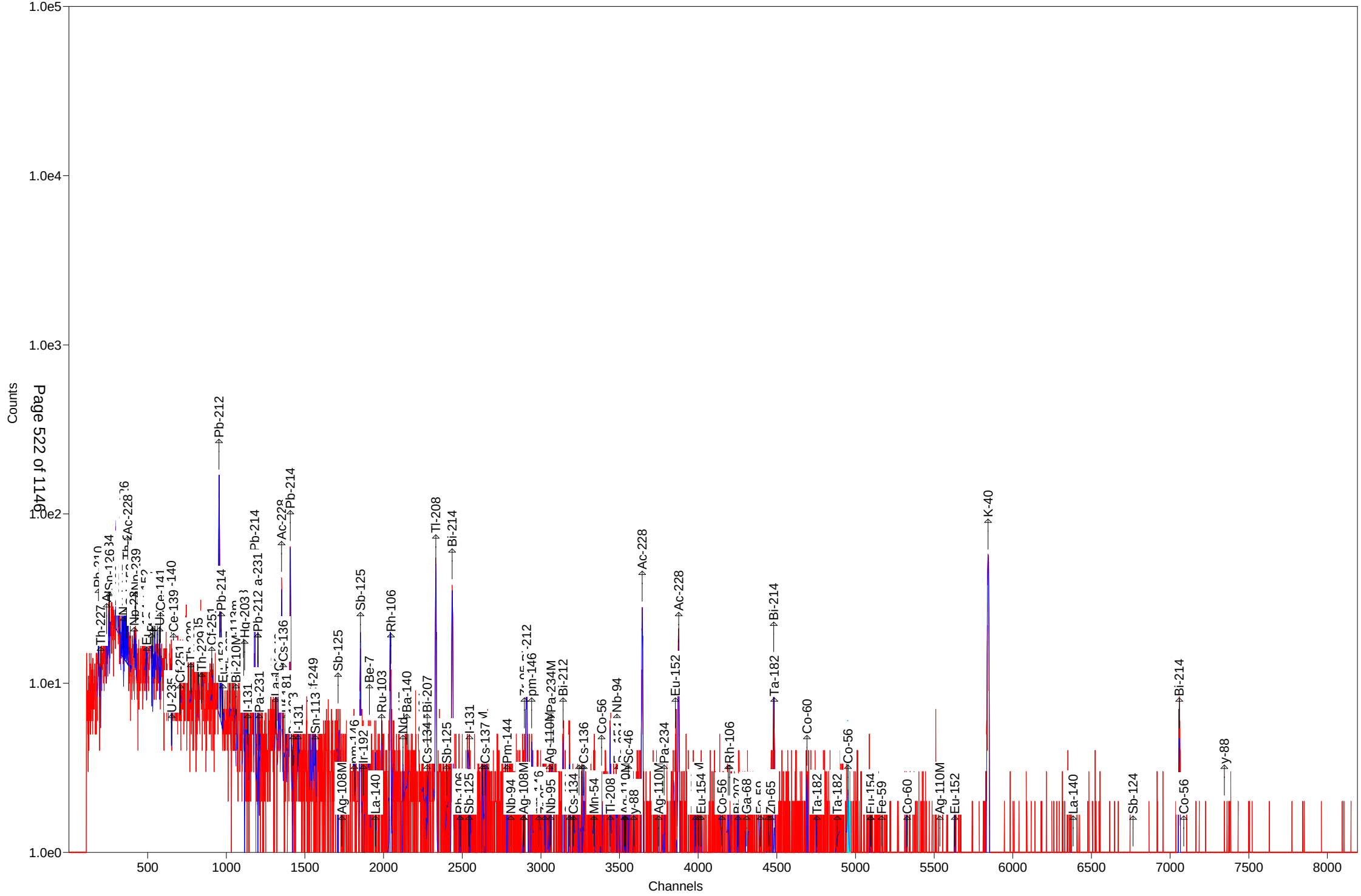
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 5.239E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 5.2393817E+02 Bq/Sample

264535_Gamma_160-18554-A-4-B. 12_Gamma_20161869.spc.



Test America St. Louis Spectrum ID: 13_Gamma_20160732

Sample Description: 264535_Gamma_160-18554-A-5-B
Detector: Detector #13
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-5-B

Decay to Time: 9/1/2016 12:31 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:32:15 Real Time: 1808 sec
Analysis Time: 9/1/2016 13:02 Dead Time: 0.45 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 13_Soil_TunaCan.Clb
Efficiency Cal Desc: 13_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/29/2012 07:50
Energy Cal Date: 2/23/2012 09:31
Library: Client_Long_Rev11.lib
Bkgd Correction File: 13_2016-08-07_0547.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.398E+00	99.6	3.385E+00	3.390E+00	1.138E+01
NA-22	4.554E-01	79.2	3.608E-01	3.615E-01	1.215E+00
K-40	2.875E+02	4.4	1.277E+01	1.948E+01	1.029E+01
Sc-46	-3.799E-01	130.9	4.974E-01	4.978E-01	1.692E+00
CR-51	-2.513E+00	120.2	3.021E+00	3.024E+00	1.246E+01
MN-54	5.521E-01	86.3	4.763E-01	4.771E-01	1.060E+00
FE-59	-1.177E+00	111.2	1.309E+00	1.311E+00	2.820E+00
Co-56	9.630E-01	59.3	5.710E-01	5.731E-01	8.342E-01
CO-57	3.471E-01	93.2	3.236E-01	3.241E-01	1.077E+00
CO-58	-6.082E-01	79.6	4.840E-01	4.850E-01	1.615E+00
CO-60	3.976E-01	129.5	5.150E-01	5.154E-01	1.140E+00
ZN-65	0.000E+00	1.#INF	2.124E-01	2.124E-01	4.930E+00
NB-94	3.035E-01	80.4	2.441E-01	2.446E-01	1.278E+00
ZR-95	6.070E-01	97.9	5.943E-01	5.952E-01	2.026E+00
NB-95	9.306E-02	423.3	3.939E-01	3.939E-01	1.374E+00
RU-103	1.161E-01	348.3	4.043E-01	4.043E-01	9.855E-01
RH-106	1.010E+01	72.7	7.342E+00	7.361E+00	2.618E+01
AG-108M	1.747E-01	196.2	3.429E-01	3.430E-01	8.365E-01
AG-110M	9.759E-02	175.9	1.717E-01	1.717E-01	2.170E+00
SN-113	-7.975E-01	90.6	7.225E-01	7.237E-01	2.585E+00
SB-124	-5.697E-01	152.1	8.666E-01	8.671E-01	2.901E+00
SB-125	3.588E+00	23.8	8.530E-01	8.725E-01	2.895E+00
I-131	-2.268E-01	236.8	5.371E-01	5.373E-01	1.144E+00
Gd-153	0.000E+00	1.#INF	4.150E-01	4.150E-01	7.047E+00
Ga-68	-1.522E+00	1578.0	2.402E+01	2.402E+01	5.328E+01
Tc-99m	-4.574E-01	133.8	6.118E-01	6.123E-01	2.034E+00
BA-133	-5.511E-01	154.6	8.518E-01	8.523E-01	2.856E+00
CS-134	4.490E-01	59.6	2.674E-01	2.684E-01	2.865E+00
CS-137	4.202E-01	80.7	3.389E-01	3.396E-01	1.137E+00
CE-139	-3.116E-01	134.9	4.204E-01	4.215E-01	1.406E+00
Ba-140	-2.219E-01	721.4	1.601E+00	1.601E+00	4.033E+00
La-140	1.539E-01	121.9	1.875E-01	1.877E-01	1.414E+00
CE-141	-8.437E-01	51.3	4.325E-01	4.347E-01	3.932E+00

CE-144	-3.154E+00	140.4	4.428E+00	4.431E+00	1.473E+01
PM-144	4.195E-01	80.3	3.370E-01	3.377E-01	1.129E+00
EU-152	5.614E-01	102.5	5.757E-01	5.764E-01	7.479E+00
EU-154	5.078E-01	59.3	3.011E-01	3.022E-01	9.828E+00
EU-155	1.900E+00	48.5	9.208E-01	9.267E-01	2.471E+00
HF-181	-5.845E-01	98.2	5.742E-01	5.750E-01	1.921E+00
Ta-182	-2.410E+00	96.2	2.318E+00	2.321E+00	7.759E+00
Hg-203	-4.611E-01	91.9	4.237E-01	4.245E-01	1.413E+00
TL-208	8.131E+00	8.5	6.889E-01	8.078E-01	1.058E+00
pm-146	6.962E-01	168.6	1.173E+00	1.174E+00	2.697E+00
y-88	-5.854E-02	675.9	3.957E-01	3.957E-01	1.037E+00
Cd-113m	4.284E+03	112.7	4.828E+03	4.836E+03	1.622E+04
Cd-109	0.000E+00	1.#INF	1.807E+01	1.807E+01	6.003E+01
Cf-251	-2.249E+00	100.4	2.257E+00	2.266E+00	5.474E+00
Cf-249	5.735E-01	102.3	5.868E-01	5.875E-01	1.966E+00
Sn-126	5.056E+00	107.5	5.437E+00	5.443E+00	1.808E+01
PB-210	-1.451E+01	107.3	1.557E+01	1.559E+01	5.186E+01
PB-212	2.460E+01	4.1	9.977E-01	1.878E+00	1.537E+00
PB-214	1.264E+01	7.1	8.988E-01	1.113E+00	1.973E+00
BI-207	3.351E-01	94.3	3.160E-01	3.164E-01	1.051E+00
BI-212	3.610E+01	12.2	4.402E+00	4.785E+00	5.257E+00
BI-214	1.219E+01	10.3	1.250E+00	1.402E+00	1.869E+00
BI-210M	2.491E-01	229.8	5.723E-01	5.725E-01	1.945E+00
AC-228	2.309E+01	6.8	1.570E+00	1.963E+00	2.395E+00
TH-227	-1.827E+00	372.6	6.807E+00	6.808E+00	2.295E+01
TH-229	7.543E+00	85.2	6.429E+00	6.458E+00	1.778E+01
TH-234	2.150E+00	65.8	1.414E+00	1.419E+00	4.486E+01
PA-231	1.139E+01	196.5	2.238E+01	2.238E+01	7.481E+01
PA-233	-5.336E-02	1530.9	8.168E-01	8.168E-01	6.197E+00
PA-234	-2.080E+00	51.7	1.075E+00	1.080E+00	9.197E+00
PA-234M	8.015E+01	68.1	5.461E+01	5.476E+01	1.821E+02
U-235	5.079E+00	37.2	1.890E+00	1.907E+00	4.743E+00
AM-241	-1.581E+00	51.9	8.206E-01	8.247E-01	5.159E+00
Np-237	0.000E+00	1.#INF	5.476E+00	5.476E+00	1.819E+01
Ir-192	-7.995E-02	84.1	6.725E-02	6.741E-02	1.060E+00
Cs-136	5.395E-01	93.1	5.021E-01	5.031E-01	1.686E+00
Np-239	9.011E-01	305.8	2.756E+00	2.756E+00	9.177E+00
Nd-147	1.277E-01	2301.4	2.940E+00	2.940E+00	7.221E+00
Total	4.829E+03				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-5-B

Spectrum Filename: C:\User\SPC\Det13\13_Gamma_20160732.An1

Acquisition information

Start time:	9/1/2016 12:32:15 PM
Live time:	1800
Real time:	1808
Dead time:	0.45 %
Detector ID:	13

Detector system
Ge13 SN/10064006

Calibration

Filename:	13_Soil_TunaCan.Clb

13_Soil_TunaCan_90099_032712

Energy Calibration

Created:	2/23/2012 9:31:24 AM
Zero offset:	0.036 keV
Gain:	0.250 keV/channel
Quadratic:	-2.347E-08 keV/channel^2

Efficiency Calibration

Created:	3/29/2012 7:50:26 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.91 %
Log(Eff):	-5.308398E-01 + (-3.057754E-01*Log(E)) + (-3.437570E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.60 %
Log(Eff):	-2.292218E+01 + (8.455931E+00*Log(E)) + (-8.924057E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev11.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:31:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	13_2016-08-07_0547.PBC 8/7/2016 5:47:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1354

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
64.31	36.	107.53	1.03	4.135E-02	64.28	9.700	PBC<MDA	Sn126
74.61	260.	11.19	1.04	4.721E-02				
77.10	464.	6.67	1.05	4.836E-02				
87.01	148.	15.68	1.06	5.195E-02	86.49	13.100	1.213E+01	Np237
					86.54	30.700	5.173E+00	EU155
					86.94	9.040	1.753E+01	Sn126
					87.57	37.500	4.211E+00	Sn126
					88.04	3.790	4.156E+01	Cd109
89.88	90.	24.11	1.06	5.273E-02				
93.07	107.	20.60	1.06	5.346E-02	92.59	5.584	2.000E+01	TH234
					93.35	5.561	2.002E+01	AC228
105.67	40.	48.48	1.69	5.518E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	1.773E+00	Np239
106.13	20.	305.83	1.07	5.524E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	9.011E-01	Np239
114.77	45.	42.99	0.77	5.550E-02				
121.78	30.	89.55	1.09	5.530E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.470E-01	CO57
122.06	30.	93.23	1.09	5.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.471E-01	CO57
143.87	53.	37.21	0.97	5.293E-02	143.79	10.960	5.079E+00	U235
192.57	23.	113.57	1.16	4.533E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
212.20	21.	127.12	1.17	4.279E-02	210.85	2.990	PBC<MDA	TH229
222.28	21.	58.03	0.55	4.129E-02				
227.00	14.	175.68	1.19	4.071E-02	227.00	6.300	PBC<MDA	Cf251
238.51	697.	5.12	1.09	3.936E-02	238.63	43.300	2.272E+01	PB212
241.92	25.	186.11	1.20	3.897E-02	242.00	7.430	PBC<MDA	PB214
244.69	26.	180.36	1.20	3.868E-02	244.69	7.580	PBC<MDA	EU152
263.70	17.	112.69	1.22	3.674E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	8.	229.77	1.22	3.654E-02	265.83	50.000	PBC<MDA	BI210M
277.42	69.	26.27	1.23	3.549E-02	277.28	6.310	1.704E+01	TL208
295.14	164.	16.04	0.64	3.398E-02	295.09	19.300	1.388E+01	PB214
300.11	49.	5.03	1.25	3.360E-02	300.03	3.280	2.460E+01	PB212
					300.07	2.460	3.280E+01	PA231
					300.18	6.200	1.302E+01	PA233
302.73	20.	196.47	1.26	3.339E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.790E+00	BA133
328.76	17.	121.87	1.28	3.151E-02	328.76	20.300	PBC<MDA	La140
338.33	176.	13.96	1.01	3.088E-02	338.32	12.010	2.630E+01	AC228
351.99	247.	9.37	1.04	3.003E-02	351.93	37.600	1.214E+01	PB214
387.95	19.	102.32	1.33	2.802E-02	387.95	66.000	PBC<MDA	Cf249
433.94	7.	196.21	1.37	2.585E-02	433.94	90.480	PBC<MDA	AG108M
463.37	63.	23.78	1.40	2.465E-02	463.37	10.470	1.353E+01	SB125
468.06	12.	138.45	1.40	2.447E-02	468.06	51.750	PBC<MDA	Ir192
477.60	16.	99.63	1.41	2.411E-02	477.60	10.520	PBC<MDA	BE7
497.05	4.	348.34	1.43	2.341E-02	497.05	90.900	PBC<MDA	RU103
511.86	156.	17.32	2.69	2.292E-02	511.86	20.000	1.891E+01	RH106
563.24	13.	113.03	1.49	2.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	16.	64.18	1.49	2.118E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.973E+00	PA234
					569.70	97.740	4.174E-01	BI207
569.47	11.	98.48	1.49	2.118E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.397E+00	PA234
					569.70	97.740	2.851E-01	BI207
583.12	257.	8.47	1.14	2.081E-02	583.02	84.500	8.131E+00	TL208
609.33	196.	10.25	0.96	2.014E-02	609.31	46.090	1.170E+01	BI214
					610.30	5.750	9.392E+01	RU103
621.92	20.	141.93	1.54	1.983E-02	621.92	9.930	PBC<MDA	RH106
657.76	6.	175.92	1.57	1.902E-02	657.76	94.640	PBC<MDA	AG110M
661.66	12.	80.66	1.57	1.893E-02	661.66	85.210	PBC<MDA	CS137
696.54	14.	80.32	1.60	1.821E-02	696.54	99.000	PBC<MDA	PM144
702.63	14.	88.71	1.60	1.809E-02	702.63	97.900	PBC<MDA	NB94
724.20	16.	97.91	1.62	1.769E-02	724.20	44.150	PBC<MDA	ZR95
727.66	86.	12.19	1.76	1.763E-02	727.17	7.550	3.610E+01	BI212
747.16	7.	168.55	1.64	1.727E-02	747.16	34.000	PBC<MDA	pm146
756.73	3.	494.97	1.65	1.710E-02	756.73	54.460	PBC<MDA	ZR95
765.79	3.	423.28	1.66	1.695E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.161E+01	PA234M
766.41	16.	68.13	1.66	1.694E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.818E+02	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
778.92	8.	141.44	1.67	1.673E-02	778.92	12.940	PBC<MDA	EU152
786.35	13.	85.17	1.67	1.663E-02	785.42	1.280	PBC<MDA	BI212
795.87	16.	78.90	1.68	1.646E-02	795.87	85.530	PBC<MDA	CS134
801.95	6.	208.40	1.69	1.636E-02	801.95	8.690	PBC<MDA	CS134
818.50	16.	93.08	1.70	1.611E-02	818.50	100.000	PBC<MDA	Cs136
834.85	16.	86.26	1.71	1.587E-02	834.85	99.980	PBC<MDA	MN54
846.77	12.	86.98	1.72	1.569E-02	846.77	99.935	PBC<MDA	Co56
859.71	50.	19.69	1.18	1.550E-02	860.56	12.420	1.456E+01	TL208
871.10	5.	134.16	1.74	1.536E-02	871.10	99.890	PBC<MDA	NB94
880.53	43.	24.06	1.75	1.523E-02	880.53	6.000	2.615E+01	PA234
911.30	174.	8.90	1.57	1.483E-02	911.07	29.000	2.253E+01	AC228
964.11	3.	530.89	1.82	1.419E-02	964.11	14.605	PBC<MDA	EU152
968.97	97.	11.92	1.60	1.414E-02	968.97	17.460	2.180E+01	AC228
996.33	13.	77.79	1.84	1.384E-02	996.33	10.600	PBC<MDA	EU154
1001.00	9.	120.13	1.85	1.379E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	9.	129.95	1.88	1.340E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	15.	72.69	1.89	1.328E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	13.	94.29	1.90	1.315E-02	1063.66	74.500	PBC<MDA	BI207
1120.30	71.	19.37	1.73	1.262E-02	1120.29	15.100	2.058E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	5.	350.75	2.02	1.179E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	19.	84.81	2.03	1.166E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	9.	79.22	2.06	1.139E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.293E+00	EU154
1332.50	8.	129.52	2.10	1.100E-02	1332.50	99.980	PBC<MDA	CO60
1408.00	2.	513.54	2.16	1.052E-02	1408.00	21.005	PBC<MDA	EU152
1460.82	564.	4.44	2.41	1.021E-02	1460.83	10.670	2.875E+02	K40
1764.15	33.	18.91	1.36	8.758E-03	1764.49	15.400	1.366E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.15	74.58	292.	260.	5.500E+03	11.19	1.045	-	sD
308.10	77.06	247.	463.	9.583E+03	6.67	1.047	-	sD
358.62	89.83	192.	90.	1.707E+03	24.17	1.059	-	D
458.73	114.77	104.	45.	8.108E+02	42.99	0.774	-	s
888.62	222.28	51.	21.	5.086E+02	58.03	0.551	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.92	46.54	504.	-30.	-0.017	107.32	1.018s
TH-227	200.32	50.14	438.	-8.	-0.004	372.59	1.021
AM-241	237.89	59.54	708.	-39.	-0.022	51.91	1.030s
TH-234	252.89	63.29	691.	-13.	-0.007	144.15	1.034s
Sn-126	256.85	64.28	752.	36.	0.020	107.53	1.035s
BA-133	323.66	80.99	1757.	-41.	-0.023	46.11	1.051
Np-237	345.65	86.49	2219.	0.	0.000	176.27	1.056A
EU-155	345.86	86.54	2132.	46.	0.026	54.45	1.056D
Sn-126	347.45	86.94	2094.	-38.	-0.021	171.23	1.056D
Sn-126	349.97	87.57	1917.	83.	0.046	30.03	1.057D
Cd-109	351.85	88.04	2056.	0.	0.000	169.50	1.057A
Nd-147	364.09	91.10	1879.	-38.	-0.021	161.68	1.060s
TH-234	370.04	92.59	270.	36.	0.020	65.79	1.061D
AC-228	373.08	93.35	1880.	-34.	-0.019	183.62	1.062s
Gd-153	389.67	97.50	1914.	0.	0.000	1000.00	1.066
Np-239	397.67	99.50	1914.	0.	0.000	1000.00	1.068s
Gd-153	412.46	103.20	1914.	0.	0.000	1000.00	1.071s
Np-239	414.46	103.70	1873.	-28.	-0.016	216.85	1.072s
EU-155	422.33	105.67	112.	40.	0.022	48.48	1.691s
Np-239	424.18	106.13	1923.	20.	0.011	305.83	1.074s
EU-152	486.74	121.78	336.	30.	0.016	89.55	1.089
CO-57	487.88	122.06	365.	30.	0.016	93.23	1.089
EU-154	492.03	123.10	433.	-35.	-0.019	86.91	1.090
PA-234	524.80	131.29	1176.	-37.	-0.020	51.67	1.098s
HF-181	531.71	133.02	1140.	-34.	-0.019	140.74	1.100s
CE-144	533.77	133.54	1135.	-34.	-0.019	140.38	1.100s
HF-181	544.81	136.30	1169.	-34.	-0.019	142.12	1.103s
CO-57	545.50	136.47	1203.	-34.	-0.019	144.12	1.103s
Tc-99m	561.64	140.51	1277.	-38.	-0.021	133.75	1.106s
U-235	575.07	143.87	101.	53.	0.029	37.21	0.975s
CE-141	581.36	145.44	1443.	-39.	-0.021	51.27	1.111s
Ba-140	650.21	162.66	330.	-32.	-0.018	82.67	1.127
U-235	653.08	163.38	362.	-15.	-0.008	179.03	1.128
CE-139	662.98	165.85	450.	-22.	-0.013	134.92	1.130
Cf-251	705.95	176.60	280.	-33.	-0.018	100.36	1.140s
TH-229	773.56	193.51	172.	23.	0.013	113.57	1.156s
U-235	820.84	205.33	220.	-27.	-0.015	40.53	1.167s
TH-229	842.90	210.85	184.	21.	0.012	127.12	1.172s
Cf-251	907.48	227.00	274.	14.	0.007	175.68	1.186s
PB-212	953.99	238.63	91.	754.	0.419	4.06	1.197D
PB-214	967.44	242.00	1093.	25.	0.014	186.11	1.200s
EU-152	978.22	244.69	1114.	26.	0.015	180.36	1.203s
TH-227	1024.40	256.24	160.	-16.	-0.009	156.79	1.213s
Cd-113m	1054.23	263.70	175.	17.	0.009	112.69	1.220s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.75	265.83	173.	8.	0.005	229.77	1.222s
TL-208	1108.54	277.28	128.	69.	0.038	26.27	1.232
Hg-203	1116.21	279.20	229.	-24.	-0.013	91.90	1.234s
I-131	1136.60	284.30	144.	-6.	-0.003	393.70	1.239s
PB-214	1179.75	295.09	66.	161.	0.089	10.70	1.249D
PB-212	1199.51	300.03	63.	49.	0.027	5.03	1.253A
PA-233	1200.11	300.18	760.	0.	0.000	1000.00	1.253s
PA-231	1209.98	302.65	740.	20.	0.011	196.47	1.255s
BA-133	1210.79	302.85	760.	0.	0.000	1000.00	1.256s
Ba-140	1218.78	304.85	760.	0.	0.000	1000.00	1.257s
BI-210M	1218.97	304.90	760.	0.	0.000	1000.00	1.257s
Ir-192	1233.14	308.44	760.	0.	0.000	1000.00	1.261
Ir-192	1265.33	316.49	120.	-23.	-0.013	95.55	1.268
CR-51	1279.70	320.08	218.	-14.	-0.008	120.25	1.271
La-140	1314.40	328.76	109.	17.	0.009	121.87	1.279s
Cf-249	1333.11	333.44	675.	-25.	-0.014	149.33	1.283
AC-228	1352.66	338.33	73.	176.	0.098	13.96	1.005
Cs-136	1361.62	340.57	650.	-25.	-0.014	145.87	1.290
EU-152	1376.48	344.29	518.	-24.	-0.013	102.55	1.293s
HF-181	1382.65	345.83	602.	-25.	-0.014	140.00	1.294
PB-214	1407.28	351.99	64.	247.	0.137	9.37	1.039
BA-133	1423.33	356.00	392.	-18.	-0.010	154.57	1.303s
I-131	1457.25	364.48	100.	-10.	-0.005	236.84	1.311s
BA-133	1534.67	383.84	108.	-8.	-0.005	257.29	1.328s
Cf-249	1551.10	387.95	181.	19.	0.011	102.32	1.332
SN-113	1566.06	391.69	296.	-26.	-0.014	90.60	1.335s
AG-108M	1735.01	433.94	49.	7.	0.004	196.21	1.373s
pm-146	1814.77	453.88	95.	-22.	-0.012	91.72	1.390s
SB-125	1852.71	463.37	80.	63.	0.035	23.78	1.399
Ir-192	1871.48	468.06	144.	12.	0.007	138.45	1.403s
BE-7	1909.62	477.60	112.	16.	0.009	99.63	1.411s
HF-181	1927.22	482.00	188.	-20.	-0.011	98.25	1.415s
La-140	1947.31	487.02	204.	-22.	-0.012	96.43	1.419s
RU-103	1987.44	497.05	57.	4.	0.002	348.34	1.428s
RH-106	2046.68	511.86	84.	156.	0.087	17.32	2.691s
Ba-140	2148.25	537.26	61.	-2.	-0.001	721.43	1.463s
CS-134	2252.15	563.24	47.	13.	0.007	113.03	1.486s
CS-134	2276.48	569.32	42.	16.	0.009	64.18	1.491s
PA-234	2277.07	569.47	49.	11.	0.006	98.48	1.491s
TL-208	2331.68	583.12	44.	257.	0.143	8.47	1.137s
SB-125	2401.19	600.50	494.	-20.	-0.011	155.49	1.518s
SB-124	2410.11	602.73	474.	-20.	-0.011	152.12	1.519s
CS-134	2418.03	604.71	454.	-20.	-0.011	148.71	1.521
BI-214	2436.51	609.33	37.	196.	0.109	10.25	0.958s
RU-103	2440.38	610.30	433.	-21.	-0.011	144.95	1.526s
AG-108M	2456.31	614.28	413.	-13.	-0.007	230.04	1.529s
PM-144	2471.43	618.06	400.	0.	0.000	1000.00	1.533s
RH-106	2486.85	621.92	374.	20.	0.011	141.93	1.536

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2542.74	635.89	68.	-14.	-0.008	87.48	1.548s
I-131	2547.08	636.97	83.	-5.	-0.003	245.90	1.549s
AG-110M	2630.23	657.76	45.	6.	0.003	175.92	1.566s
CS-137	2645.82	661.66	42.	12.	0.007	80.66	1.570s
PM-144	2785.35	696.54	53.	14.	0.008	80.32	1.599s
NB-94	2809.70	702.63	67.	14.	0.008	88.71	1.604s
SB-124	2890.33	722.79	175.	-18.	-0.010	107.56	1.621s
AG-108M	2890.93	722.94	157.	-18.	-0.010	102.20	1.621s
EU-154	2892.61	723.36	139.	-6.	-0.003	272.63	1.622s
ZR-95	2895.98	724.20	114.	16.	0.009	97.91	1.622s
BI-212	2909.84	727.66	4.	86.	0.048	12.19	1.762s
pm-146	2942.07	735.72	56.	-18.	-0.010	56.35	1.632s
pm-146	2987.83	747.16	31.	7.	0.004	168.55	1.641s
ZR-95	3026.11	756.73	45.	3.	0.002	494.97	1.649s
AG-110M	3054.97	763.94	52.	-3.	-0.001	386.09	1.655s
NB-95	3062.35	765.79	70.	3.	0.002	423.28	1.657s
PA-234M	3064.84	766.41	53.	16.	0.009	68.13	1.657s
EU-152	3114.88	778.92	63.	8.	0.005	141.44	1.668s
BI-212	3140.88	785.42	55.	13.	0.007	85.17	1.673s
CS-134	3182.67	795.87	76.	16.	0.009	78.90	1.682s
CS-134	3207.01	801.95	88.	6.	0.004	208.40	1.687s
CO-58	3242.31	810.78	90.	-18.	-0.010	79.57	1.694s
La-140	3262.29	815.77	108.	-9.	-0.005	160.63	1.698s
Cs-136	3273.21	818.50	98.	16.	0.009	93.08	1.700s
MN-54	3338.61	834.85	35.	16.	0.009	86.26	1.714
Co-56	3386.31	846.77	20.	12.	0.007	86.98	1.723s
TL-208	3438.07	859.71	10.	50.	0.028	19.69	1.182s
NB-94	3483.63	871.10	20.	5.	0.003	134.16	1.743s
EU-154	3492.16	873.23	43.	-11.	-0.006	89.54	1.745s
PA-234	3521.37	880.53	32.	43.	0.024	24.06	1.751s
PA-234	3532.21	883.24	75.	0.	0.000	1000.00	1.753s
AG-110M	3537.98	884.68	75.	0.	0.000	1000.00	1.754s
Sc-46	3556.37	889.28	86.	-10.	-0.006	130.91	1.758s
y-88	3591.42	898.04	25.	-1.	-0.001	675.93	1.765s
AC-228	3644.48	911.30	12.	174.	0.097	8.90	1.568
AG-110M	3749.25	937.49	53.	-13.	-0.007	127.48	1.797s
EU-152	3855.75	964.11	159.	3.	0.002	530.89	1.818s
AC-228	3875.18	968.97	9.	97.	0.054	11.92	1.601
EU-154	3984.66	996.33	43.	13.	0.007	77.79	1.844s
PA-234M	4003.33	1001.00	57.	9.	0.005	120.13	1.847s
EU-154	4018.45	1004.77	88.	-16.	-0.009	87.72	1.850s
Co-56	4150.74	1037.84	27.	9.	0.005	129.95	1.876s
Cs-136	4191.67	1048.07	53.	-15.	-0.009	72.03	1.884s
RH-106	4200.83	1050.36	50.	15.	0.008	72.69	1.886s
BI-207	4254.05	1063.66	28.	13.	0.007	94.29	1.896s
FE-59	4396.46	1099.25	53.	-15.	-0.009	111.23	1.924s
EU-152	4447.77	1112.07	140.	-5.	-0.003	337.64	1.934s
ZN-65	4461.66	1115.55	135.	0.	0.000	1000.00	1.937s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4480.70	1120.30	18.	71.	0.039	19.37	1.727
Sc-46	4481.68	1120.55	135.	0.	0.000	1000.00	1.941
Ta-182	4484.68	1121.30	159.	-19.	-0.011	96.16	1.941
CO-60	4692.51	1173.24	79.	-26.	-0.014	83.39	1.981
Ta-182	4755.78	1189.05	51.	-16.	-0.009	84.54	1.993
Ta-182	4885.27	1221.41	51.	5.	0.003	350.75	2.017
Co-56	4952.78	1238.28	46.	19.	0.011	84.81	2.030s
NA-22	5097.85	1274.53	23.	9.	0.005	79.22	2.057s
EU-154	5097.90	1274.54	32.	0.	0.000	1000.00	2.057s
FE-59	5166.14	1291.60	45.	-16.	-0.009	99.79	2.070s
CO-60	5329.84	1332.50	18.	8.	0.004	129.52	2.100s
AG-110M	5537.14	1384.30	24.	0.	0.000	1000.00	2.138s
EU-152	5632.00	1408.00	25.	2.	0.001	513.54	2.155s
K-40	5843.38	1460.82	14.	564.	0.313	4.44	2.413
BI-214	7057.58	1764.15	3.	33.	0.018	18.91	1.363s
Co-56	7086.40	1771.35	70.	-15.	-0.008	85.70	2.407s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.3982E+00					5.31E+01	
			477.60	3.398E+00	?(	1.138E+01	9.96E+01 1.05E+01	G
NA-22	C	4.5540E-01					9.50E+02	
			1274.53	4.554E-01	?(	1.215E+00	7.92E+01 9.99E+01	G
K-40	N	2.8753E+02					4.66E+11	
			1460.83	2.875E+02	(P	1.029E+01	4.44E+00 1.07E+01	G
Sc-46	F	-3.7993E-01					8.38E+01	
			889.28	-3.799E-01	?(	1.692E+00	1.31E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.504E+00	1.00E+03 1.00E+02	G
CR-51	F	-2.5127E+00					2.77E+01	
			320.08	-2.513E+00	(P	1.246E+01	1.20E+02 9.94E+00	G
MN-54	C	5.5215E-01					3.12E+02	
			834.85	5.521E-01	&(	1.060E+00	8.63E+01 1.00E+02	G
FE-59	F	-1.1770E+00					4.45E+01	
			1099.25	-1.177E+00	?(	2.820E+00	1.11E+02 5.65E+01	G
			1291.60	-1.863E+00	+	3.889E+00	9.98E+01 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	9.6296E-01				7.73E+01		
			846.77	4.245E-01	&(	8.342E-01	8.70E+01	9.99E+01 G
			1238.28	1.398E+00	*(P	2.473E+00	8.48E+01	6.61E+01 G
			1037.84	2.738E+00	?(	7.855E+00	1.30E+02	1.41E+01 G
			1771.35	-5.963E+00	+	1.714E+01	8.57E+01	1.55E+01 A
CO-57	C	3.4705E-01				2.72E+02		
			122.06	3.471E-01	?(	1.077E+00	9.32E+01	8.56E+01 G
			136.47	-3.305E+00	&	1.585E+01	1.44E+02	1.07E+01 G
CO-58	C	-6.0824E-01				7.09E+01		
			810.78	-6.082E-01	?(	1.615E+00	7.96E+01	9.95E+01 G
CO-60	F	3.9759E-01				1.93E+03		
			1332.50	3.976E-01	?(P	1.140E+00	1.30E+02	1.00E+02 G
			1173.24	-1.178E+00	+	2.021E+00	8.34E+01	9.99E+01 G
NB-94	I	3.0353E-01				7.41E+06		
			702.63	4.284E-01	&(	1.278E+00	8.87E+01	9.79E+01 G
			871.10	1.811E-01	?(	8.530E-01	1.34E+02	9.99E+01 G
ZR-95	I	6.0701E-01				6.40E+01		
			756.73	1.789E-01	?(	2.026E+00	4.95E+02	5.45E+01 G
			724.20	1.135E+00	&(	3.733E+00	9.79E+01	4.42E+01 G
NB-95	I	9.3062E-02				6.40E+01		
			765.79	9.306E-02	?(	1.374E+00	4.23E+02	9.98E+01 G
RU-103	I	1.1606E-01				3.93E+01		
			497.05	1.161E-01	?(P	9.855E-01	3.48E+02	9.09E+01 G
			610.30	-9.868E+00	+	4.788E+01	1.45E+02	5.75E+00 GA
RH-106	I	1.0100E+01				3.74E+02		
			621.92	5.507E+00	&(P	2.618E+01	1.42E+02	9.93E+00 G
			1050.36	3.934E+01	?(	9.522E+01	7.27E+01	1.56E+00 G
			511.86	1.891E+01	?	5.506E+00	1.73E+01	2.00E+01 GA
AG-108M	C	1.7474E-01				1.53E+05		
			433.94	1.747E-01	?(P	8.365E-01	1.96E+02	9.05E+01 G
			722.94	-6.156E-01	+	2.110E+00	1.02E+02	9.08E+01 G
			614.28	-3.886E-01	+	3.007E+00	2.30E+02	8.98E+01 G
AG-110M	F	9.7588E-02				2.50E+02		
			884.68	0.000E+00	?(	2.170E+00	1.00E+03	7.27E+01 G
			657.76	1.725E-01	?(P	1.053E+00	1.76E+02	9.46E+01 G
			937.49	-1.486E+00	+	4.095E+00	1.27E+02	3.44E+01 G
			1384.30	0.000E+00	-	5.478E+00	1.00E+03	2.43E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          763.94-3.916E-01 +   5.316E+00 3.86E+02 2.23E+01 G

SN-113   F  -7.9751E-01                                     1.15E+02
                          391.69-7.975E-01 &(P 2.585E+00 9.06E+01 6.40E+01 G

SB-124   F  -5.6970E-01                                     6.02E+01
                          602.73-5.697E-01 ?(  2.901E+00 1.52E+02 9.83E+01 G
                         1690.98-4.273E-02 %   1.851E+00 1.88E+03 4.78E+01 G
                          722.79-5.171E+00 +   1.867E+01 1.08E+02 1.08E+01 G

SB-125   I   3.5879E+00                                     1.01E+03
                          427.88 7.188E-02 &(  2.895E+00 1.65E+03 2.96E+01 G
                          600.50-3.122E+00 +   1.625E+01 1.55E+02 1.79E+01 G
                          635.89-3.525E+00 +   1.036E+01 8.75E+01 1.13E+01 G
                          463.37 1.353E+01  (  9.567E+00 2.38E+01 1.05E+01 G

I-131    I  -2.2680E-01                                     8.02E+00
                          364.48-2.268E-01  (P 1.144E+00 2.37E+02 8.17E+01 G
                          284.30-1.557E+00 +   1.521E+01 3.94E+02 6.14E+00 G
                          636.97-2.121E+00 &   1.800E+01 2.46E+02 7.17E+00 G

Ga-68    C  -1.5225E+00                                     4.71E-02
                         1077.40-1.522E+00 %(  5.328E+01 1.58E+03 3.30E+00 G

Tc-99m   I  -4.5742E-01                                     2.51E-01
                          140.51-4.574E-01 ?(  2.034E+00 1.34E+02 8.93E+01 G

BA-133   F  -5.5108E-01                                     3.85E+03
                          356.00-5.511E-01 &(  2.856E+00 1.55E+02 6.20E+01 G
                          302.85 0.000E+00 +   1.191E+01 1.00E+03 1.83E+01 G
                          383.84-1.834E+00 +   1.127E+01 2.57E+02 8.94E+00 GA
                           80.99-1.333E+00 + P 6.465E+00 4.61E+01 3.41E+01 GA

CS-134   I   4.4898E-01                                     7.54E+02
                          604.71-5.755E-01 &(  2.865E+00 1.49E+02 9.76E+01 G
                          795.87 6.512E-01 ?(  1.716E+00 7.89E+01 8.55E+01 G
                          569.32 2.651E+00 ?(  5.612E+00 6.42E+01 1.54E+01 G
                          801.95 2.540E+00 ?(  1.819E+01 2.08E+02 8.69E+00 G
                          563.24 4.123E+00 ?(P 1.077E+01 1.13E+02 8.35E+00 G

CS-137   I   4.2019E-01                                     1.10E+04
                          661.66 4.202E-01 ?(  1.137E+00 8.07E+01 8.52E+01 G

CE-139   F  -3.1163E-01                                     1.38E+02
                          165.85-3.116E-01 ?(  1.406E+00 1.35E+02 7.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-2.2188E-01					1.28E+01	
			537.26	-2.219E-01	?(P	4.033E+00	7.21E+02	2.44E+01 G
			162.66	-5.726E+00	+	1.572E+01	8.27E+01	6.22E+00 G
			304.85	0.000E+00	+	5.113E+01	1.00E+03	4.29E+00 G
La-140	I	1.5387E-01					1.28E+01	
			1596.21	-1.291E-01	%(P	1.414E+00	1.19E+03	9.54E+01 G
			487.02	-1.105E+00	&	3.561E+00	9.64E+01	4.55E+01 G
			328.76	1.484E+00	&(P	4.460E+00	1.22E+02	2.03E+01 G
			815.77	-1.379E+00	&	7.546E+00	1.61E+02	2.33E+01 G
CE-141	I	-8.4366E-01					3.25E+01	
			145.44	-8.437E-01	&(P	3.932E+00	5.13E+01	4.82E+01 G
CE-144	I	-3.1540E+00					2.85E+02	
			133.54	-3.154E+00	?(	1.473E+01	1.40E+02	1.11E+01 G
PM-144	C	4.1953E-01					3.63E+02	
			696.54	4.195E-01	&(	1.129E+00	8.03E+01	9.90E+01 G
			618.06	0.000E+00	-	2.698E+00	1.00E+03	9.91E+01 G
EU-152	F	5.6137E-01					4.94E+03	
			344.29	-1.647E+00	?(P	7.479E+00	1.03E+02	2.65E+01 G
			1112.07	-1.604E+00	&	1.856E+01	3.38E+02	1.36E+01 G
			121.78	1.039E+00	+	3.096E+00	8.96E+01	2.86E+01 G
			778.92	2.104E+00	?(	1.020E+01	1.41E+02	1.29E+01 G
			964.11	9.042E-01	(P	1.645E+01	5.31E+02	1.46E+01 G
			244.69	4.988E+00	?(P	2.998E+01	1.80E+02	7.58E+00 G
			1408.00	5.871E-01	? P	6.500E+00	5.14E+02	2.10E+01 GA
EU-154	I	5.0775E-01					3.14E+03	
			873.23	-3.250E+00	&(	9.828E+00	8.95E+01	1.23E+01 G
			123.10	-8.512E-01	&	2.457E+00	8.69E+01	4.08E+01 G
			1274.54	0.000E+00	+	4.028E+00	1.00E+03	3.52E+01 G
			723.36	-9.604E-01	+	8.954E+00	2.73E+02	2.02E+01 G
			1004.77	-3.537E+00	+	1.040E+01	8.77E+01	1.80E+01 G
			996.33	4.857E+00	?(	1.265E+01	7.78E+01	1.06E+01 G
EU-155	I	1.8995E+00					1.81E+03	
			105.31	1.900E+00	(	2.471E+00	4.85E+01	2.12E+01 G
			86.54	1.622E+00	}	7.607E+00	5.44E+01	3.07E+01 G
HF-181	F	-5.8445E-01					4.24E+01	
			482.00	-5.845E-01	?(	1.921E+00	9.82E+01	8.05E+01 G
			133.02	-8.066E-01	+	3.777E+00	1.41E+02	4.33E+01 G
			345.83	-3.037E+00	+	1.420E+01	1.40E+02	1.51E+01 G
			136.30	-6.030E+00	+	2.851E+01	1.42E+02	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	-2.4103E+00					1.14E+02	
			1121.30	-2.410E+00	(	7.759E+00	9.62E+01	3.49E+01 G
			1221.41	8.415E-01	+ P	6.294E+00	3.51E+02	2.70E+01 G
			1189.05	-4.616E+00	+ P	1.027E+01	8.45E+01	1.62E+01 G
Hg-203	F	-4.6109E-01					4.66E+01	
			279.20	-4.611E-01	?(	1.413E+00	9.19E+01	8.15E+01 G
TL-208	N	8.1310E+00					6.98E+02	
			583.02	8.131E+00	(P	1.058E+00	8.47E+00	8.45E+01 G
			277.28	1.704E+01	+	1.377E+01	2.63E+01	6.31E+00 G
			860.56	1.456E+01	+ P	4.938E+00	1.97E+01	1.24E+01 G
pm-146	C	6.9621E-01					2.02E+03	
			747.16	6.962E-01	*(P	2.697E+00	1.69E+02	3.40E+01 G
			735.72	-2.485E+00	+ P	5.292E+00	5.64E+01	2.25E+01 G
			453.88	-7.630E-01	+	1.647E+00	9.17E+01	6.50E+01 G
y-88	F	-5.8540E-02					1.07E+02	
			898.04	-5.854E-02	?(P	1.037E+00	6.76E+02	9.37E+01 G
			1836.06	2.202E-02	%	9.740E-01	1.98E+03	9.92E+01 G
Cd-113m		4.2841E+03					5.33E+03	
			263.70	4.284E+03	&(	1.622E+04	1.13E+02	6.00E-03 K
Cf-251	T	-2.2488E+00					3.28E+05	
			176.60	-2.249E+00	?(	5.474E+00	1.00E+02	1.70E+01 G
			227.00	2.924E+00	?	1.731E+01	1.76E+02	6.30E+00 GA
Cf-249	T	5.7350E-01					1.28E+05	
			387.95	5.735E-01	(	1.966E+00	1.02E+02	6.60E+01 G
			333.44	-2.851E+00	+	1.421E+01	1.49E+02	1.55E+01 G
Sn-126		5.0559E+00					3.65E+07	
			87.57	2.352E+00	}	5.876E+00	3.00E+01	3.75E+01 GA
			64.28	5.056E+00	?(	1.808E+01	1.08E+02	9.70E+00 G
			86.94	-4.491E+00	+	2.555E+01	1.71E+02	9.04E+00 GA
PB-210	N	-1.4506E+01					8.14E+03	
			46.54	-1.451E+01	?(	5.186E+01	1.07E+02	4.25E+00 G
PB-212	N	2.4598E+01					6.98E+02	
			238.63	2.460E+01	(	1.537E+00	4.06E+00	4.33E+01 G
			300.03	2.460E+01	}	2.003E+01	5.03E+00	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.2637E+01					5.84E+05	
			351.93	1.214E+01	(P	1.973E+00	9.37E+00	3.76E+01 G
			295.09	1.361E+01	(P	3.435E+00	1.07E+01	1.93E+01 G
			242.00	4.848E+00	& P	3.008E+01	1.86E+02	7.43E+00 GA
BI-207	C	3.3509E-01					1.18E+04	
			569.70	2.237E-02	%(	1.051E+00	1.33E+03	9.77E+01 G
			1063.66	7.454E-01	?(P	1.549E+00	9.43E+01	7.45E+01 G
BI-212	N	3.6102E+01					6.98E+02	
			727.17	3.610E+01	@(	5.257E+00	1.22E+01	7.55E+00 G
			785.42	3.396E+01	&	9.719E+01	8.52E+01	1.28E+00 GA
BI-214	N	1.2193E+01					5.84E+05	
			609.31	1.170E+01	(P	1.869E+00	1.03E+01	4.61E+01 G
			1120.29	2.058E+01	+ P	6.619E+00	1.94E+01	1.51E+01 G
			1764.49	1.366E+01	(P	4.347E+00	1.89E+01	1.54E+01 G
BI-210M	T	2.4909E-01					1.10E+09	
			265.83	2.491E-01	?(P	1.945E+00	2.30E+02	5.00E+01 G
			304.90	0.000E+00	-	7.835E+00	1.00E+03	2.80E+01 G
AC-228	N	2.3087E+01					2.10E+03	
			911.07	2.253E+01	(P	2.395E+00	8.90E+00	2.90E+01 G
			968.97	2.180E+01	(P	3.781E+00	1.19E+01	1.75E+01 G
			338.32	2.630E+01	(P	6.387E+00	1.40E+01	1.20E+01 G
			93.35	-6.260E+00	-	3.822E+01	1.84E+02	5.56E+00 XA
TH-227	N	-1.8270E+00					7.95E+03	
			50.14	-1.827E+00	(	2.295E+01	3.73E+02	8.00E+00 G
			256.24	-3.389E+00	+	1.306E+01	1.57E+02	7.00E+00 G
TH-229	N	7.5432E+00					2.68E+06	
			193.51	6.407E+00	&(	1.778E+01	1.14E+02	4.40E+00 G
			210.85	9.215E+00	&(P	2.865E+01	1.27E+02	2.99E+00 G
TH-234	N	2.1497E+00					1.63E+12	
			63.29	-4.669E+00	?(P	4.486E+01	1.44E+02	3.81E+00 G
			92.59	6.802E+00	(	1.478E+01	6.58E+01	5.58E+00 G
PA-231	N	1.1389E+01					1.20E+07	
			302.65	1.139E+01	?(	7.481E+01	1.96E+02	2.88E+00 G
			300.07	2.029E+00	%	8.801E+01	1.29E+03	2.46E+00 G
PA-233	C	-5.3357E-02					7.82E+08	
			312.01	-5.336E-02	%(P	6.197E+00	1.53E+03	3.60E+01 G
			300.18	0.000E+00	+	3.500E+01	1.00E+03	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -2.0803E+00                                      1.63E+12
                         131.29-2.080E+00 ?(P 9.197E+00 5.17E+01 1.80E+01 G
                         946.02-2.476E-02 % P 9.057E+00 1.62E+04 1.34E+01 G
                         569.47 3.397E+00 +   1.134E+01 9.85E+01 8.20E+00 G
                         883.24 0.000E+00 +   1.641E+01 1.00E+03 9.60E+00 G
                         880.53 2.615E+01 +   1.768E+01 2.41E+01 6.00E+00 GA

PA-234M  N   8.0154E+01                                      1.63E+12
                        1001.00 4.444E+01 ?(P 1.821E+02 1.20E+02 8.37E-01 G
                         766.41 1.818E+02 ?(  4.105E+02 6.81E+01 2.94E-01 G

U-235    N   5.0789E+00                                      2.57E+11
                         143.79 5.079E+00  (P 4.743E+00 3.72E+01 1.10E+01 G
                         205.33-6.973E+00 - P 1.830E+01 4.05E+01 5.01E+00 G
                         163.38-3.355E+00 -   2.018E+01 1.79E+02 5.08E+00 G

AM-241   T  -1.5810E+00                                      1.58E+05
                          59.54-1.581E+00  (P 5.159E+00 5.19E+01 3.59E+01 G

Ir-192   F  -7.9951E-02                                      7.40E+01
                         316.49-4.536E-01 ?(  1.060E+00 9.56E+01 8.70E+01 G
                         468.06 5.485E-01 &(  2.568E+00 1.38E+02 5.18E+01 G
                         308.44 0.000E+00 +   6.965E+00 1.00E+03 3.18E+01 G

Cs-136   F   5.3945E-01                                      1.30E+01
                         818.50 5.395E-01 ?(  1.686E+00 9.31E+01 1.00E+02 G
                        1048.07-8.007E-01 +   1.919E+00 7.20E+01 8.00E+01 G
                         340.57-9.619E-01 +   4.684E+00 1.46E+02 4.69E+01 G

Np-239   T   9.0106E-01                                      2.36E+00
                         103.70-1.192E+00 +   8.597E+00 2.17E+02 2.40E+01 X
                         106.13 9.011E-01 ?(  9.177E+00 3.06E+02 2.27E+01 G
                          99.50 0.000E+00 -   1.402E+01 1.00E+03 1.50E+01 X

Nd-147       1.2774E-01                                      1.11E+01
                         531.00 1.277E-01 %(  7.221E+00 2.30E+03 1.30E+01 G
                          91.10-1.411E+00 +   7.578E+00 1.62E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
```

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	504.	-30.	-0.017	107.32	-1.451E+01	
TH-227	50.14	438.	-8.	-0.004	372.59	-1.827E+00	
AM-241	59.54	708.	-39.	-0.022	51.91	-1.581E+00	P
BA-133	80.99	1757.	-41.	-0.023	46.11	-1.333E+00	P
Nd-147	91.10	1879.	-38.	-0.021	161.68	-1.411E+00	
Np-239	103.70	1873.	-28.	-0.016	216.85	-1.192E+00	
Np-239	106.13	1923.	20.	0.011	305.83	9.011E-01	
EU-152	121.78	336.	30.	0.016	89.55	1.039E+00	
CO-57	122.06	365.	30.	0.016	93.23	3.471E-01	
EU-154	123.10	433.	-35.	-0.019	86.91	-8.512E-01	
PA-234	131.29	1176.	-37.	-0.020	51.67	-2.080E+00	P
HF-181	133.02	1140.	-34.	-0.019	140.74	-8.066E-01	
CE-144	133.54	1135.	-34.	-0.019	140.38	-3.154E+00	
HF-181	136.30	1169.	-34.	-0.019	142.12	-6.030E+00	
CO-57	136.47	1203.	-34.	-0.019	144.12	-3.305E+00	
Tc-99m	140.51	1277.	-38.	-0.021	133.75	-4.574E-01	
CE-141	145.44	1443.	-39.	-0.021	51.27	-8.437E-01	P
Ba-140	162.66	330.	-32.	-0.018	82.67	-5.726E+00	
CE-139	165.85	450.	-22.	-0.013	134.92	-3.116E-01	
Cf-251	176.60	280.	-33.	-0.018	100.36	-2.249E+00	
Cf-251	227.00	274.	14.	0.007	175.68	2.924E+00	
EU-152	244.69	1114.	26.	0.015	180.36	4.988E+00	P
TH-227	256.24	160.	-16.	-0.009	156.79	-3.389E+00	
Cd-113m	263.70	175.	17.	0.009	112.69	4.284E+03	
BI-210M	265.83	173.	8.	0.005	229.77	2.491E-01	P
Hg-203	279.20	229.	-24.	-0.013	91.90	-4.611E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	284.30	144.	-6.	-0.003	393.70	-1.557E+00	
Ir-192	316.49	120.	-23.	-0.013	95.55	-4.536E-01	
CR-51	320.08	218.	-14.	-0.008	120.25	-2.513E+00	P
La-140	328.76	109.	17.	0.009	121.87	1.484E+00	P
Cs-136	340.57	650.	-25.	-0.014	145.87	-9.619E-01	
EU-152	344.29	518.	-24.	-0.013	102.55	-1.647E+00	P
HF-181	345.83	602.	-25.	-0.014	140.00	-3.037E+00	
BA-133	356.00	392.	-18.	-0.010	154.57	-5.511E-01	
I-131	364.48	100.	-10.	-0.005	236.84	-2.268E-01	P
BA-133	383.84	108.	-8.	-0.005	257.29	-1.834E+00	
SN-113	391.69	296.	-26.	-0.014	90.60	-7.975E-01	P
AG-108M	433.94	49.	7.	0.004	196.21	1.747E-01	P
pm-146	453.88	95.	-22.	-0.012	91.72	-7.630E-01	
Ir-192	468.06	144.	12.	0.007	138.45	5.485E-01	
BE-7	477.60	112.	16.	0.009	99.63	3.398E+00	
HF-181	482.00	188.	-20.	-0.011	98.25	-5.845E-01	
La-140	487.02	204.	-22.	-0.012	96.43	-1.105E+00	
RU-103	497.05	57.	4.	0.002	348.34	1.161E-01	P
RH-106	511.86	84.	156.	0.087	17.32	1.891E+01	
Ba-140	537.26	61.	-2.	-0.001	721.43	-2.219E-01	P
CS-134	563.24	47.	13.	0.007	113.03	4.123E+00	P
CS-134	569.32	42.	16.	0.009	64.18	2.651E+00	
PA-234	569.47	49.	11.	0.006	98.48	3.397E+00	
SB-124	602.73	474.	-20.	-0.011	152.12	-5.697E-01	
CS-134	604.71	454.	-20.	-0.011	148.71	-5.755E-01	
RU-103	610.30	433.	-21.	-0.011	144.95	-9.868E+00	
AG-108M	614.28	413.	-13.	-0.007	230.04	-3.886E-01	
RH-106	621.92	374.	20.	0.011	141.93	5.507E+00	P
I-131	636.97	83.	-5.	-0.003	245.90	-2.121E+00	
AG-110M	657.76	45.	6.	0.003	175.92	1.725E-01	P
CS-137	661.66	42.	12.	0.007	80.66	4.202E-01	
PM-144	696.54	53.	14.	0.008	80.32	4.195E-01	
NB-94	702.63	67.	14.	0.008	88.71	4.284E-01	
SB-124	722.79	175.	-18.	-0.010	107.56	-5.171E+00	
AG-108M	722.94	157.	-18.	-0.010	102.20	-6.156E-01	
EU-154	723.36	139.	-6.	-0.003	272.63	-9.604E-01	
ZR-95	724.20	114.	16.	0.009	97.91	1.135E+00	
pm-146	735.72	56.	-18.	-0.010	56.35	-2.485E+00	P
pm-146	747.16	31.	7.	0.004	168.55	6.962E-01	P
ZR-95	756.73	45.	3.	0.002	494.97	1.789E-01	
AG-110M	763.94	52.	-3.	-0.001	386.09	-3.916E-01	
NB-95	765.79	70.	3.	0.002	423.28	9.306E-02	
PA-234M	766.41	53.	16.	0.009	68.13	1.818E+02	
EU-152	778.92	63.	8.	0.005	141.44	2.104E+00	
CS-134	795.87	76.	16.	0.009	78.90	6.512E-01	
CS-134	801.95	88.	6.	0.004	208.40	2.540E+00	
CO-58	810.78	90.	-18.	-0.010	79.57	-6.082E-01	
La-140	815.77	108.	-9.	-0.005	160.63	-1.379E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cs-136	818.50	98.	16.	0.009	93.08	5.395E-01		
MN-54	834.85	35.	16.	0.009	86.26	5.521E-01		
NB-94	871.10	20.	5.	0.003	134.16	1.811E-01		
EU-154	873.23	43.	-11.	-0.006	89.54	-3.250E+00		
PA-234	880.53	32.	43.	0.024	24.06	2.615E+01		
Sc-46	889.28	86.	-10.	-0.006	130.91	-3.799E-01		
y-88	898.04	25.	-1.	-0.001	675.93	-5.854E-02		P
AG-110M	937.49	53.	-13.	-0.007	127.48	-1.486E+00		
EU-152	964.11	159.	3.	0.002	530.89	9.042E-01		P
EU-154	996.33	43.	13.	0.007	77.79	4.857E+00		
PA-234M	1001.00	57.	9.	0.005	120.13	4.444E+01		P
EU-154	1004.77	88.	-16.	-0.009	87.72	-3.537E+00		
Cs-136	1048.07	53.	-15.	-0.009	72.03	-8.007E-01		
RH-106	1050.36	50.	15.	0.008	72.69	3.934E+01		
BI-207	1063.66	28.	13.	0.007	94.29	7.454E-01		P
FE-59	1099.25	53.	-15.	-0.009	111.23	-1.177E+00		
EU-152	1112.07	140.	-5.	-0.003	337.64	-1.604E+00		
Ta-182	1121.30	159.	-19.	-0.011	96.16	-2.410E+00		
CO-60	1173.24	79.	-26.	-0.014	83.39	-1.178E+00		
Ta-182	1189.05	51.	-16.	-0.009	84.54	-4.616E+00		P
Ta-182	1221.41	51.	5.	0.003	350.75	8.415E-01		P
NA-22	1274.53	23.	9.	0.005	79.22	4.554E-01		
FE-59	1291.60	45.	-16.	-0.009	99.79	-1.863E+00		
CO-60	1332.50	18.	8.	0.004	129.52	3.976E-01		P
EU-152	1408.00	25.	2.	0.001	513.54	5.871E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.3982E+00	3.3982E+00	9.963E+01%	1.14E+01
NA-22	#A	4.5540E-01	4.5540E-01	7.922E+01%	1.21E+00
K-40		2.8753E+02	2.8753E+02	4.440E+00%	1.03E+01
Sc-46	#A	-3.7993E-01	-3.7993E-01	1.309E+02%	1.69E+00
CR-51	#A	-2.5126E+00	-2.5127E+00	1.202E+02%	1.25E+01
MN-54	#A	5.5215E-01	5.5215E-01	8.626E+01%	1.06E+00
FE-59	#A	-1.1770E+00	-1.1770E+00	1.112E+02%	2.82E+00
Co-56	#	9.6296E-01	9.6296E-01	5.930E+01%	8.34E-01
CO-57	#A	3.4705E-01	3.4705E-01	9.323E+01%	1.08E+00
CO-58	#A	-6.0823E-01	-6.0824E-01	7.957E+01%	1.62E+00
CO-60	#A	3.9759E-01	3.9759E-01	1.295E+02%	1.14E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.93E+00
NB-94	#A	3.0353E-01	3.0353E-01	8.042E+01%	1.28E+00
ZR-95	#A	6.0701E-01	6.0701E-01	9.791E+01%	2.03E+00
NB-95	#A	9.3061E-02	9.3062E-02	4.233E+02%	1.37E+00

RU-103 #A	1.1606E-01	1.1606E-01	3.483E+02%	9.86E-01
RH-106 #A	1.0100E+01	1.0100E+01	7.269E+01%	2.62E+01
AG-108M#A	1.7474E-01	1.7474E-01	1.962E+02%	8.36E-01
AG-110M#A	9.7588E-02	9.7588E-02	1.759E+02%	2.17E+00
SN-113 #A	-7.9750E-01	-7.9751E-01	9.060E+01%	2.59E+00
SB-124 #A	-5.6969E-01	-5.6970E-01	1.521E+02%	2.90E+00
SB-125 #C	3.5879E+00	3.5879E+00	2.378E+01%	2.90E+00
I-131 #A	-2.2678E-01	-2.2680E-01	2.368E+02%	1.14E+00
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	7.05E+00
Ga-68 #A	-1.5032E+00	-1.5225E+00	1.578E+03%	5.33E+01
Tc-99m #A	-4.5632E-01	-4.5742E-01	1.338E+02%	2.03E+00
BA-133 #A	-5.5108E-01	-5.5108E-01	1.546E+02%	2.86E+00
CS-134 #A	4.4898E-01	4.4898E-01	5.955E+01%	2.86E+00
CS-137 #A	4.2019E-01	4.2019E-01	8.066E+01%	1.14E+00
CE-139 #A	-3.1163E-01	-3.1163E-01	1.349E+02%	1.41E+00
Ba-140 #A	-2.2187E-01	-2.2188E-01	7.214E+02%	4.03E+00
La-140 #A	1.5386E-01	1.5387E-01	1.219E+02%	1.41E+00
CE-141 #A	-8.4365E-01	-8.4366E-01	5.127E+01%	3.93E+00
CE-144 #A	-3.1540E+00	-3.1540E+00	1.404E+02%	1.47E+01
PM-144 #A	4.1953E-01	4.1953E-01	8.032E+01%	1.13E+00
EU-152 #A	5.6137E-01	5.6137E-01	1.025E+02%	7.48E+00
EU-154 #A	5.0775E-01	5.0775E-01	5.930E+01%	9.83E+00
EU-155 #A	1.8995E+00	1.8995E+00	4.848E+01%	2.47E+00
HF-181 #A	-5.8444E-01	-5.8445E-01	9.825E+01%	1.92E+00
Ta-182 #A	-2.4102E+00	-2.4103E+00	9.616E+01%	7.76E+00
Hg-203 #A	-4.6108E-01	-4.6109E-01	9.190E+01%	1.41E+00
TL-208	8.1310E+00	8.1310E+00	8.473E+00%	1.06E+00
pm-146 #A	6.9621E-01	6.9621E-01	1.686E+02%	2.70E+00
y-88 #A	-5.8539E-02	-5.8540E-02	6.759E+02%	1.04E+00
Cd-113m#A	4.2841E+03	4.2841E+03	1.127E+02%	1.62E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.00E+01
Cf-251 #A	-2.2488E+00	-2.2488E+00	1.004E+02%	5.47E+00
Cf-249 A	5.7350E-01	5.7350E-01	1.023E+02%	1.97E+00
Sn-126 #A	5.0559E+00	5.0559E+00	1.075E+02%	1.81E+01
PB-210 #A	-1.4506E+01	-1.4506E+01	1.073E+02%	5.19E+01
PB-212	2.4598E+01	2.4598E+01	4.056E+00%	1.54E+00
PB-214	1.2637E+01	1.2637E+01	7.113E+00%	1.97E+00
BI-207 #A	3.3509E-01	3.3509E-01	9.429E+01%	1.05E+00
BI-212 #	3.6102E+01	3.6102E+01	1.219E+01%	5.26E+00
BI-214	1.2193E+01	1.2193E+01	1.025E+01%	1.87E+00
BI-210M#A	2.4909E-01	2.4909E-01	2.298E+02%	1.95E+00
AC-228	2.3087E+01	2.3087E+01	6.800E+00%	2.39E+00
TH-227 #A	-1.8270E+00	-1.8270E+00	3.726E+02%	2.29E+01
TH-229 #A	7.5432E+00	7.5432E+00	8.523E+01%	1.78E+01
TH-234 A	2.1497E+00	2.1497E+00	6.579E+01%	4.49E+01
PA-231 #A	1.1389E+01	1.1389E+01	1.965E+02%	7.48E+01
PA-233 #A	-5.3357E-02	-5.3357E-02	1.531E+03%	6.20E+00
PA-234 #A	-2.0803E+00	-2.0803E+00	5.167E+01%	9.20E+00
PA-234M#A	8.0154E+01	8.0154E+01	6.813E+01%	1.82E+02

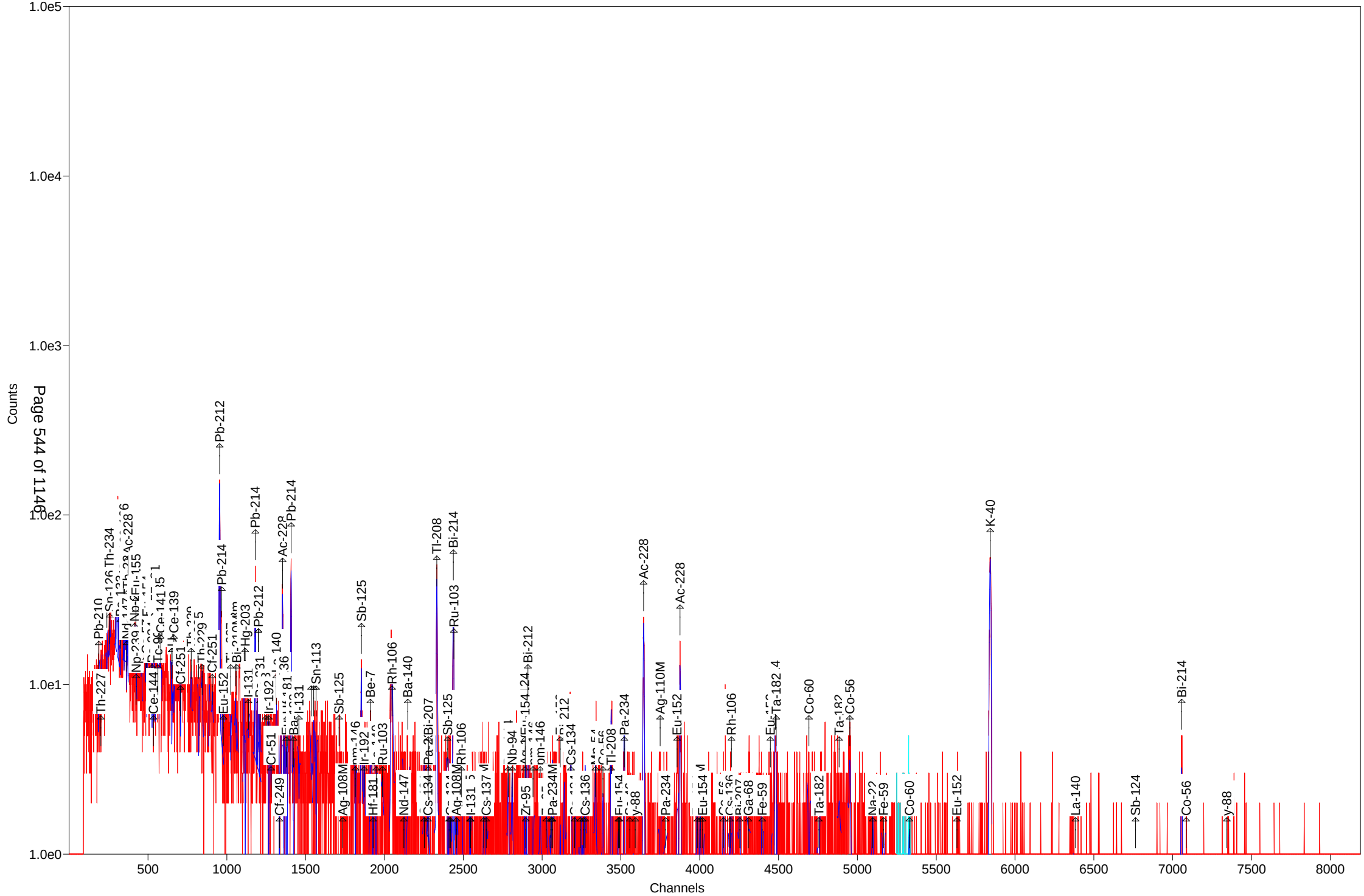
U-235	#	5.0789E+00	5.0789E+00	3.721E+01%	4.74E+00
AM-241	#A	-1.5810E+00	-1.5810E+00	5.191E+01%	5.16E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.82E+01
Ir-192	#A	-7.9950E-02	-7.9951E-02	8.411E+01%	1.06E+00
Cs-136	#A	5.3943E-01	5.3945E-01	9.308E+01%	1.69E+00
Np-239	#A	9.0083E-01	9.0106E-01	3.058E+02%	9.18E+00
Nd-147	#A	1.2773E-01	1.2774E-01	2.301E+03%	7.22E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 4.113E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.1126291E+02 Bq/Sample

264535_Gamma_160-18554-A-5-B. 13_Gamma_20160732.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20162250

Sample Description: 264535_Gamma_160-18554-A-6-B
Detector: Detector #14
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-6-B

Decay to Time: 9/1/2016 12:32 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:33:11 Real Time: 1809 sec
Analysis Time: 9/1/2016 13:05 Dead Time: 0.50 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev11.lib
Bkgd Correction File: 14_2016-08-07_0544.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	8.783E-01	485.4	4.263E+00	4.264E+00	1.478E+01
NA-22	-4.572E-01	142.1	6.497E-01	6.501E-01	2.251E+00
K-40	2.824E+02	5.2	1.482E+01	2.070E+01	9.895E+00
Sc-46	-3.851E-01	220.1	8.477E-01	8.479E-01	2.898E+00
CR-51	1.054E+00	415.9	4.384E+00	4.384E+00	1.500E+01
MN-54	-3.829E-01	143.6	5.498E-01	5.501E-01	1.846E+00
FE-59	8.938E-01	113.7	1.016E+00	1.017E+00	2.353E+00
Co-56	-9.330E-01	60.1	5.607E-01	5.628E-01	1.877E+00
CO-57	-3.459E-01	97.5	3.374E-01	3.378E-01	1.153E+00
CO-58	4.140E-02	1300.0	5.382E-01	5.382E-01	1.902E+00
CO-60	-1.516E-01	593.0	8.991E-01	8.991E-01	1.840E+00
ZN-65	0.000E+00	1.#INF	2.556E-01	2.556E-01	4.190E+00
NB-94	-4.936E-01	146.0	7.208E-01	7.213E-01	1.585E+00
ZR-95	-6.059E-01	186.0	1.127E+00	1.127E+00	2.754E+00
NB-95	-5.828E-01	85.9	5.008E-01	5.017E-01	1.910E+00
RU-103	1.111E-01	395.8	4.397E-01	4.397E-01	1.136E+00
RH-106	-5.624E-01	64.8	3.645E-01	3.656E-01	3.552E+01
AG-108M	-5.122E-01	99.7	5.105E-01	5.111E-01	1.320E+00
AG-110M	4.370E-01	61.3	2.680E-01	2.689E-01	3.759E+00
SN-113	2.251E-01	376.7	8.479E-01	8.480E-01	2.893E+00
SB-124	4.433E-01	33.3	1.478E-01	1.495E-01	3.660E+00
SB-125	4.819E-01	133.2	6.422E-01	6.426E-01	3.764E+00
I-131	2.150E-01	107.1	2.302E-01	2.305E-01	1.384E+00
Gd-153	9.491E-01	117.4	1.114E+00	1.116E+00	3.727E+00
Ga-68	1.792E+01	141.9	2.542E+01	2.544E+01	5.825E+01
Tc-99m	-3.763E-01	127.4	4.795E-01	4.800E-01	1.602E+00
BA-133	-7.527E-01	156.9	1.181E+00	1.182E+00	3.961E+00
CS-134	3.579E-01	71.0	2.541E-01	2.547E-01	3.616E+00
CS-137	-3.629E-01	165.3	5.997E-01	6.000E-01	2.061E+00
CE-139	2.857E-01	151.3	4.324E-01	4.332E-01	1.454E+00
Ba-140	-1.321E+00	160.4	2.119E+00	2.120E+00	5.332E+00
La-140	-1.314E+00	136.0	1.787E+00	1.788E+00	2.738E+00
CE-141	6.710E-01	131.9	8.848E-01	8.854E-01	2.956E+00

CE-144	-2.915E+00	142.3	4.147E+00	4.150E+00	1.385E+01
PM-144	-2.641E-01	267.5	7.066E-01	7.067E-01	1.558E+00
EU-152	1.368E+00	70.2	9.600E-01	9.626E-01	8.446E+00
EU-154	1.212E+00	84.7	1.026E+00	1.028E+00	1.534E+01
EU-155	3.567E+00	33.8	1.207E+00	1.223E+00	3.084E+00
HF-181	5.022E-01	97.5	4.896E-01	4.903E-01	1.653E+00
Ta-182	-1.332E+00	175.3	2.335E+00	2.336E+00	8.021E+00
Hg-203	-4.928E-01	99.7	4.915E-01	4.924E-01	1.647E+00
TL-208	9.750E+00	8.4	8.159E-01	9.600E-01	1.076E+00
pm-146	1.512E+00	91.3	1.381E+00	1.383E+00	3.348E+00
y-88	3.535E-01	35.4	1.250E-01	1.263E-01	1.472E+00
Cd-113m	-6.405E+03	98.1	6.283E+03	6.297E+03	2.105E+04
Cd-109	8.645E+00	207.6	1.794E+01	1.795E+01	5.980E+01
Cf-251	-2.361E-01	889.1	2.099E+00	2.099E+00	5.723E+00
Cf-249	2.002E-01	197.8	3.960E-01	3.961E-01	2.653E+00
Sn-126	-4.842E+00	111.0	5.372E+00	5.379E+00	1.791E+01
PB-210	7.945E-01	1766.5	1.403E+01	1.403E+01	4.088E+01
PB-212	2.718E+01	4.7	1.280E+00	2.175E+00	2.315E+00
PB-214	1.459E+01	8.6	1.256E+00	1.467E+00	2.320E+00
BI-207	4.633E-01	81.9	3.796E-01	3.803E-01	1.226E+00
BI-212	7.024E+00	89.6	6.295E+00	6.306E+00	2.122E+01
BI-214	1.336E+01	10.4	1.389E+00	1.553E+00	2.257E+00
BI-210M	6.091E-01	108.5	6.606E-01	6.616E-01	2.223E+00
AC-228	3.083E+01	7.1	2.200E+00	2.704E+00	4.367E+00
TH-227	-1.502E+00	442.4	6.644E+00	6.644E+00	1.873E+01
TH-229	6.636E-01	1210.4	8.032E+00	8.032E+00	2.201E+01
TH-234	2.153E+01	45.0	9.686E+00	9.751E+00	2.761E+01
PA-231	-1.467E+01	147.5	2.165E+01	2.166E+01	7.259E+01
PA-233	-1.146E+00	104.0	1.192E+00	1.194E+00	3.067E+00
PA-234	1.793E+00	88.9	1.594E+00	1.597E+00	3.389E+00
PA-234M	1.008E+02	78.0	7.857E+01	7.874E+01	2.569E+02
U-235	-2.844E-01	71.4	2.031E-01	2.036E-01	1.312E+01
AM-241	1.224E+00	112.0	1.372E+00	1.373E+00	3.872E+00
Np-237	0.000E+00	1.#INF	5.385E+00	5.385E+00	1.794E+01
Ir-192	-4.717E-01	95.3	4.495E-01	4.504E-01	1.507E+00
Cs-136	5.162E-01	85.2	4.397E-01	4.407E-01	1.484E+00
Np-239	-1.336E+00	118.7	1.587E+00	1.589E+00	5.301E+00
Nd-147	1.991E-01	646.7	1.288E+00	1.288E+00	9.175E+00
Total	5.560E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-6-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20162250.An1

Acquisition information
Start time: 9/1/2016 12:33:11 PM
Live time: 1800
Real time: 1809
Dead time: 0.50 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:32:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2016-08-07_0544.PBC 8/7/2016 5:44:13 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1953

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
59.54	24.	112.04	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.28	48.	44.98	0.92	3.281E-02	63.29	3.810	PBC<MDA	TH234
74.90	207.	12.61	0.78	3.815E-02				
77.26	333.	8.25	0.78	3.900E-02				
84.14	62.	27.24	0.79	4.107E-02				
87.09	112.	18.23	0.79	4.177E-02	86.49	13.100	1.140E+01	Np237
					86.54	30.700	4.863E+00	EU155
					86.94	9.040	1.648E+01	Sn126
					87.57	37.500	3.960E+00	Sn126
88.05	25.	207.56	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
89.86	80.	23.13	0.79	4.233E-02				
91.21	6.	820.38	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
93.36	25.	197.75	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.50	22.	117.42	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
105.21	60.	33.85	1.17	4.403E-02	105.31	21.200	3.567E+00	EU155
121.30	20.	114.71	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
123.10	14.	163.92	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
129.03	59.	25.79	0.76	4.323E-02				
131.24	12.	120.95	0.84	4.301E-02	131.29	18.000	PBC<MDA	PA234
145.44	24.	131.85	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
163.38	21.	112.24	0.87	3.841E-02	163.38	5.080	PBC<MDA	U235
165.85	16.	151.32	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.22	688.	4.48	1.03	2.935E-02	238.63	43.300	2.973E+01	PB212
241.59	18.	226.45	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.29	18.	235.60	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
265.83	15.	108.47	0.97	2.697E-02	265.83	50.000	PBC<MDA	BI210M
277.06	16.	97.29	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
284.30	16.	107.06	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.76	121.	14.04	1.00	2.489E-02	295.09	19.300	1.355E+01	PB214
299.68	57.	27.34	0.97	2.457E-02	300.03	3.280	3.921E+01	PB212
					300.07	2.460	5.229E+01	PA231
					300.18	6.200	2.075E+01	PA233
318.49	4.	415.88	1.03	2.334E-02	320.08	9.940	PBC<MDA	CR51
328.76	2.	748.97	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	197.83	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
337.90	130.	13.58	1.13	2.237E-02	338.32	12.010	2.701E+01	AC228
351.56	228.	8.77	1.49	2.169E-02	351.93	37.600	1.512E+01	PB214
391.69	5.	376.72	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
462.81	73.	17.66	1.11	1.747E-02	463.37	10.470	2.208E+01	SB125
477.60	3.	485.43	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	97.50	1.18	1.691E-02	482.00	80.500	PBC<MDA	HF181
487.02	10.	133.67	1.18	1.677E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	395.81	1.19	1.650E-02	497.05	90.900	PBC<MDA	RU103
511.86	65.	34.28	2.46	1.612E-02	511.86	20.000	1.128E+01	RH106
563.24	10.	105.04	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.70	12.	81.93	1.26	1.481E-02	569.32	15.380	2.828E+00	CS134
					569.47	8.200	5.305E+00	PA234
					569.70	97.740	4.452E-01	BI207
583.02	216.	8.37	1.64	1.453E-02	583.02	84.500	9.750E+00	TL208
609.04	160.	9.68	1.24	1.404E-02	609.31	46.090	1.301E+01	BI214
					610.30	5.750	1.100E+02	RU103
635.89	7.	133.25	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
636.97	1.	974.68	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
657.76	13.	61.34	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
722.79	11.	134.34	1.40	1.223E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.335E-01	AG108M
					723.36	20.220	2.398E+00	EU154
727.24	55.	16.58	0.77	1.217E-02	727.17	7.550	3.327E+01	BI212
747.16	11.	91.33	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
763.94	3.	288.68	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M
766.41	14.	79.95	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.284E+02	PA234M
785.25	26.	19.61	0.79	1.144E-02	785.42	1.280	9.868E+01	BI212
795.87	13.	75.66	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
801.95	6.	185.64	1.46	1.124E-02	801.95	8.690	PBC<MDA	CS134
818.50	10.	85.17	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136
860.38	28.	29.82	0.58	1.062E-02	860.56	12.420	1.200E+01	TL208
910.98	161.	9.90	1.36	1.014E-02	911.07	29.000	3.039E+01	AC228
945.92	7.	130.32	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
964.11	11.	138.06	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.81	104.	13.26	1.60	9.642E-03	968.97	17.460	3.418E+01	AC228
996.33	11.	84.67	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1001.00	8.	133.89	1.63	9.389E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	10.	89.78	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	193.28	1.67	8.934E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	141.88	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	8.	113.66	1.70	8.697E-03	1099.25	56.500	PBC<MDA	FE59
1111.86	7.	119.59	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152
1120.47	34.	20.10	1.72	8.562E-03	1120.29	15.100	1.441E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	2.	641.49	1.79	7.975E-03	1221.41	27.000	PBC<MDA	Ta182
1384.30	3.	308.52	1.91	7.192E-03	1384.30	24.290	PBC<MDA	AG110M
1460.86	373.	5.25	1.85	6.879E-03	1460.83	10.670	2.824E+02	K40
1690.98	9.	33.33	2.10	6.091E-03	1690.98	47.790	1.718E+00	SB124
1764.77	33.	17.41	2.14	5.878E-03	1764.49	15.400	2.025E+01	BI214
1836.06	8.	35.36	2.19	5.686E-03	1836.06	99.200	7.879E-01	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.99	74.88	230.	211.	5.521E+03	12.32	0.777	- sD
308.44	77.25	206.	338.	8.662E+03	8.11	0.780	- D
336.10	84.18	112.	62.	1.506E+03	27.36	0.787	- sD
347.90	87.13	191.	96.	2.299E+03	22.78	0.790	- sD
358.97	89.90	133.	80.	1.889E+03	23.27	0.793	- sD
515.21	129.03	79.	56.	1.294E+03	26.13	0.834	- D
1850.37	462.81	19.	73.	4.170E+03	17.66	1.113	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-227	199.98	50.14	183.	-5.	-0.003	442.41	0.751s
AM-241	237.55	59.54	252.	24.	0.013	112.04	0.761s
TH-234	252.51	63.28	163.	48.	0.027	44.98	0.922s
Sn-126	256.52	64.28	475.	-28.	-0.016	110.96	0.766

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	323.33	80.99	1439.	-26.	-0.014	101.17	0.784s
Np-237	345.33	86.49	1385.	0.	0.000	214.07	0.789A
EU-155	345.54	86.54	1295.	49.	0.027	43.40	0.790D
Sn-126	347.13	86.94	1320.	18.	0.010	284.98	0.790D
Sn-126	349.65	87.57	1338.	0.	0.000	1000.00	0.791
Cd-109	351.53	88.04	1307.	25.	0.014	207.56	0.791s
Nd-147	363.77	91.10	1332.	6.	0.003	820.38	0.794
AC-228	372.76	93.35	1217.	25.	0.014	197.75	0.797s
Gd-153	389.36	97.50	331.	22.	0.012	117.42	0.801s
Np-239	397.36	99.50	365.	-25.	-0.014	110.71	0.803s
Gd-153	412.15	103.20	412.	-5.	-0.003	595.52	0.807s
Np-239	414.15	103.70	385.	-25.	-0.014	113.03	0.807s
EU-155	420.18	105.21	111.	60.	0.033	33.85	1.168s
Np-239	423.87	106.13	396.	-24.	-0.013	118.73	0.810s
EU-152	486.43	121.78	248.	20.	0.011	114.71	0.826s
CO-57	487.58	122.06	259.	-23.	-0.013	97.53	0.826
EU-154	491.73	123.10	254.	14.	0.008	163.92	0.828s
PA-234	524.50	131.29	91.	12.	0.006	120.95	0.836D
HF-181	531.42	133.02	639.	-25.	-0.014	145.15	0.838s
CE-144	533.47	133.54	614.	-25.	-0.014	142.27	0.838s
HF-181	544.52	136.30	590.	-25.	-0.014	138.91	0.841s
CO-57	545.21	136.47	579.	-17.	-0.009	207.20	0.841s
Tc-99m	561.35	140.51	478.	-25.	-0.014	127.43	0.845s
U-235	574.45	143.79	504.	-26.	-0.014	88.31	0.849s
CE-141	581.07	145.44	489.	24.	0.013	131.85	0.850s
Ba-140	649.93	162.66	348.	-23.	-0.013	98.14	0.868s
U-235	652.81	163.38	262.	21.	0.012	112.24	0.869s
CE-139	662.70	165.85	282.	16.	0.009	151.32	0.871
Cf-251	705.68	176.60	177.	-3.	-0.001	889.09	0.882
U-235	820.58	205.33	140.	-8.	-0.005	263.24	0.912s
TH-229	842.65	210.85	253.	-28.	-0.015	103.67	0.917s
Cf-251	907.23	227.00	143.	-13.	-0.007	162.11	0.933
PB-212	953.75	238.63	116.	621.	0.345	4.71	0.945D
PB-214	967.21	242.00	854.	18.	0.010	226.45	0.948s
EU-152	977.99	244.69	871.	18.	0.010	235.60	0.951
TH-227	1024.17	256.24	120.	-19.	-0.011	105.13	0.962s
Cd-113m	1054.01	263.70	160.	-19.	-0.010	98.10	0.970s
BI-210M	1062.53	265.83	121.	15.	0.008	108.47	0.972s
TL-208	1108.33	277.28	108.	16.	0.009	97.29	0.983
Hg-203	1115.99	279.20	166.	-19.	-0.010	99.75	0.985s
I-131	1136.39	284.30	84.	16.	0.009	107.06	0.990s
PB-214	1178.22	294.76	49.	117.	0.065	14.60	0.998
PB-212	1197.90	299.68	48.	57.	0.032	27.34	0.965
PA-231	1199.46	300.07	402.	-18.	-0.010	155.06	1.006
PA-233	1199.90	300.18	384.	-19.	-0.010	151.50	1.006
PA-231	1209.78	302.65	365.	-19.	-0.010	147.54	1.008
BA-133	1210.59	302.85	347.	-19.	-0.010	143.80	1.009
Ba-140	1218.57	304.85	363.	-19.	-0.010	146.71	1.011s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1218.76	304.90	381.	-8.	-0.005	327.65	1.011s
PA-233	1247.22	312.01	92.	-18.	-0.010	104.04	1.018s
Ir-192	1265.13	316.49	129.	-17.	-0.010	95.30	1.022s
CR-51	1279.51	320.08	165.	4.	0.002	415.88	1.026
La-140	1314.21	328.76	77.	2.	0.001	748.97	1.034s
Cf-249	1332.92	333.44	88.	9.	0.005	197.83	1.039s
AC-228	1350.74	337.90	52.	130.	0.072	13.58	1.133
Cs-136	1361.44	340.57	374.	-18.	-0.010	152.29	1.045s
EU-152	1376.30	344.29	341.	-18.	-0.010	145.25	1.049s
PB-214	1405.40	351.56	45.	222.	0.123	9.13	1.489s
BA-133	1423.15	356.00	392.	-18.	-0.010	156.93	1.060
I-131	1457.08	364.48	74.	-7.	-0.004	274.72	1.069s
BA-133	1534.50	383.84	180.	-17.	-0.009	114.85	1.087s
Cf-249	1550.94	387.95	169.	-2.	-0.001	879.54	1.091s
SN-113	1565.90	391.69	187.	5.	0.003	376.72	1.095s
SB-125	1710.63	427.88	55.	-3.	-0.002	466.07	1.129s
AG-108M	1734.87	433.94	62.	-15.	-0.009	99.66	1.135
pm-146	1814.64	453.88	57.	-4.	-0.002	502.66	1.154s
SB-125	1852.59	463.37	155.	-13.	-0.007	156.86	1.163s
Ir-192	1871.36	468.06	142.	-3.	-0.002	622.47	1.167s
BE-7	1909.50	477.60	93.	3.	0.002	485.43	1.176s
HF-181	1927.10	482.00	66.	12.	0.007	97.50	1.180
La-140	1947.19	487.02	44.	10.	0.006	133.67	1.185s
RU-103	1987.33	497.05	36.	3.	0.002	395.81	1.194s
RH-106	2046.57	511.86	67.	65.	0.036	34.28	2.458s
Nd-147	2123.11	531.00	44.	0.	0.000	1000.00	1.225
Ba-140	2148.15	537.26	52.	-9.	-0.005	160.38	1.231s
CS-134	2252.06	563.24	29.	10.	0.006	105.04	1.255s
CS-134	2276.40	569.32	56.	-9.	-0.005	122.22	1.260s
PA-234	2276.99	569.47	65.	0.	0.000	1000.00	1.261
BI-207	2277.92	569.70	39.	12.	0.006	81.93	1.261s
TL-208	2331.21	583.02	20.	216.	0.120	8.37	1.636s
SB-125	2401.12	600.50	380.	-16.	-0.009	179.33	1.289s
SB-124	2410.04	602.73	364.	-16.	-0.009	175.43	1.291s
CS-134	2417.96	604.71	348.	-16.	-0.009	171.49	1.292s
BI-214	2435.28	609.04	26.	151.	0.084	10.40	1.241s
RU-103	2440.31	610.30	333.	-16.	-0.009	167.07	1.297s
AG-108M	2456.25	614.28	317.	-4.	-0.002	594.68	1.301s
PM-144	2471.37	618.06	299.	-2.	-0.001	691.62	1.304s
RH-106	2486.79	621.92	332.	-17.	-0.009	93.49	1.308s
SB-125	2542.69	635.89	40.	7.	0.004	133.25	1.320
I-131	2547.03	636.97	47.	1.	0.001	974.68	1.321s
AG-110M	2630.18	657.76	27.	13.	0.007	61.34	1.339s
CS-137	2645.77	661.66	69.	-7.	-0.004	165.27	1.343s
PM-144	2785.32	696.54	48.	-6.	-0.003	267.50	1.374s
NB-94	2809.67	702.63	48.	-11.	-0.006	146.04	1.379
SB-124	2890.31	722.79	97.	11.	0.006	134.34	1.396s
AG-108M	2890.91	722.94	108.	0.	0.000	1000.00	1.397s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	2892.59	723.36	113.	-7.	-0.004	228.47	1.397s
ZR-95	2895.96	724.20	106.	0.	0.000	1000.00	1.398s
BI-212	2907.84	727.17	48.	12.	0.006	89.62	1.400s
pm-146	2942.05	735.72	48.	-6.	-0.003	252.22	1.408s
pm-146	2987.81	747.16	22.	11.	0.006	91.33	1.417s
ZR-95	3026.09	756.73	39.	-7.	-0.004	185.99	1.426s
AG-110M	3054.96	763.94	36.	3.	0.002	288.68	1.432s
NB-95	3062.34	765.79	64.	-12.	-0.007	85.93	1.433s
PA-234M	3064.83	766.41	56.	14.	0.008	79.95	1.434s
EU-152	3114.87	778.92	52.	-11.	-0.006	137.17	1.444s
BI-212	3140.19	785.25	0.	26.	0.014	19.61	0.791s
CS-134	3182.67	795.87	22.	13.	0.007	75.66	1.459s
CS-134	3207.01	801.95	23.	6.	0.003	185.64	1.464s
La-140	3262.30	815.77	37.	-8.	-0.005	111.22	1.475s
Cs-136	3273.22	818.50	33.	10.	0.006	85.17	1.478s
MN-54	3338.63	834.85	52.	-8.	-0.004	143.58	1.492s
Co-56	3386.32	846.77	52.	-18.	-0.010	60.10	1.501s
TL-208	3440.78	860.38	12.	28.	0.016	29.82	0.577s
NB-94	3483.65	871.10	33.	-8.	-0.004	111.44	1.522s
EU-154	3492.19	873.23	50.	-1.	-0.001	752.50	1.523s
PA-234	3521.39	880.53	93.	-15.	-0.008	94.43	1.529
PA-234	3532.24	883.24	96.	-11.	-0.006	126.49	1.531s
AG-110M	3538.01	884.68	108.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	121.	-7.	-0.004	220.11	1.536s
y-88	3591.45	898.04	24.	-2.	-0.001	592.29	1.543
AC-228	3643.21	910.98	19.	161.	0.089	9.90	1.362
AG-110M	3749.30	937.49	28.	-3.	-0.002	378.59	1.576s
PA-234	3783.42	946.02	19.	7.	0.004	130.32	1.582s
EU-152	3855.80	964.11	112.	11.	0.006	138.06	1.597
AC-228	3875.25	968.97	42.	104.	0.058	13.26	1.601
EU-154	3984.71	996.33	40.	11.	0.006	84.67	1.622s
PA-234M	4003.39	1001.00	52.	8.	0.004	133.89	1.626s
EU-154	4018.51	1004.77	83.	-14.	-0.008	96.65	1.629s
Co-56	4150.81	1037.84	15.	-1.	-0.001	734.14	1.655s
Cs-136	4191.74	1048.07	48.	-16.	-0.009	66.14	1.663s
RH-106	4200.91	1050.36	36.	10.	0.006	89.78	1.665s
BI-207	4254.12	1063.66	25.	6.	0.003	193.28	1.675s
Ga-68	4309.10	1077.40	25.	8.	0.004	141.88	1.685s
FE-59	4396.54	1099.25	15.	8.	0.004	113.66	1.702s
EU-152	4447.85	1112.07	34.	7.	0.004	119.59	1.712s
ZN-65	4461.74	1115.55	42.	0.	0.000	1000.00	1.714s
BI-214	4480.72	1120.29	6.	34.	0.019	20.10	1.718D
Sc-46	4481.77	1120.55	42.	0.	0.000	1000.00	1.718s
Ta-182	4484.77	1121.30	75.	-7.	-0.004	175.30	1.719s
CO-60	4692.60	1173.24	51.	-15.	-0.008	46.46	1.757
Ta-182	4755.88	1189.05	45.	-6.	-0.003	249.17	1.769s
Ta-182	4885.38	1221.41	27.	2.	0.001	641.49	1.792
Co-56	4952.89	1238.28	54.	-5.	-0.003	247.27	1.805

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NA-22	5097.96	1274.53	37.	-6.	-0.004	142.11	1.831s
EU-154	5098.01	1274.54	44.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	54.	-20.	-0.011	58.43	1.843
CO-60	5329.96	1332.50	22.	-2.	-0.001	592.99	1.871s
AG-110M	5537.26	1384.30	16.	3.	0.002	308.52	1.907s
EU-152	5632.13	1408.00	21.	-7.	-0.004	147.85	1.923s
K-40	5843.68	1460.86	5.	373.	0.207	5.25	1.853
La-140	6385.44	1596.21	34.	-14.	-0.008	136.02	2.044s
SB-124	6764.81	1690.98	0.	9.	0.005	33.33	2.102s
BI-214	7059.07	1764.49	0.	33.	0.018	17.41	2.145s
Co-56	7086.53	1771.35	33.	0.	0.000	1000.00	2.149s
y-88	7345.59	1836.06	0.	8.	0.004	35.36	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	8.7828E-01				5.31E+01	
			477.60	8.783E-01	?(	1.478E+01 4.85E+02 1.05E+01	G
NA-22	C	-4.5721E-01				9.50E+02	
			1274.53	-4.572E-01	?(	2.251E+00 1.42E+02 9.99E+01	G
K-40	N	2.8237E+02				4.66E+11	
			1460.83	2.824E+02	(P	9.895E+00 5.25E+00 1.07E+01	G
Sc-46	F	-3.8512E-01				8.38E+01	
			889.28	-3.851E-01	&(	2.898E+00 2.20E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.128E+00 1.00E+03 1.00E+02	G
CR-51	F	1.0542E+00				2.77E+01	
			320.08	1.054E+00	&(	1.500E+01 4.16E+02 9.94E+00	G
MN-54	C	-3.8289E-01				3.12E+02	
			834.85	-3.829E-01	?(P	1.846E+00 1.44E+02 1.00E+02	G
FE-59	F	8.9383E-01				4.45E+01	
			1099.25	8.938E-01	?(P	2.353E+00 1.14E+02 5.65E+01	G
			1291.60	-3.451E+00	+ P	6.213E+00 5.84E+01 4.32E+01	G
Co-56	C	-9.3305E-01				7.73E+01	
			846.77	-9.330E-01	?(P	1.877E+00 6.01E+01 9.99E+01	G
			1238.28	-5.139E-01	+ P	3.934E+00 2.47E+02 6.61E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1037.84	-6.255E-01	+ P	9.069E+00	7.34E+02	1.41E+01 G
			1771.35	0.000E+00	+	1.806E+01	1.00E+03	1.55E+01 A
CO-57	C	-3.4589E-01					2.72E+02	
			122.06	-3.459E-01	?(P	1.153E+00	9.75E+01	8.56E+01 G
			136.47	-2.028E+00	+	1.408E+01	2.07E+02	1.07E+01 G
CO-58	C	4.1400E-02					7.09E+01	
			810.78	4.140E-02	%(P	1.902E+00	1.30E+03	9.95E+01 G
CO-60	F	-1.5162E-01					1.93E+03	
			1332.50	-1.516E-01	?(P	1.840E+00	5.93E+02	1.00E+02 G
			1173.24	-9.995E-01	+ P	2.424E+00	4.65E+01	9.99E+01 G
NB-94	I	-4.9360E-01					7.41E+06	
			702.63	-4.936E-01	&(P	1.585E+00	1.46E+02	9.79E+01 G
			871.10	-4.055E-01	+	1.552E+00	1.11E+02	9.99E+01 G
ZR-95	I	-6.0590E-01					6.40E+01	
			756.73	-6.059E-01	&(	2.754E+00	1.86E+02	5.45E+01 G
			724.20	0.000E+00	+	5.223E+00	1.00E+03	4.42E+01 G
NB-95	I	-5.8281E-01					6.40E+01	
			765.79	-5.828E-01	?(P	1.910E+00	8.59E+01	9.98E+01 G
RU-103	I	1.1109E-01					3.93E+01	
			497.05	1.111E-01	?(	1.136E+00	3.96E+02	9.09E+01 G
			610.30	-1.077E+01	+	6.050E+01	1.67E+02	5.75E+00 GA
RH-106	I	-5.6238E-01					3.74E+02	
			621.92	-6.865E+00	?(P	3.552E+01	9.35E+01	9.93E+00 G
			1050.36	3.956E+01	?(	1.202E+02	8.98E+01	1.56E+00 G
			511.86	1.128E+01	? P	7.062E+00	3.43E+01	2.00E+01 GA
AG-108M	C	-5.1223E-01					1.53E+05	
			433.94	-5.122E-01	?(	1.320E+00	9.97E+01	9.05E+01 G
			722.94	0.000E+00	+	2.558E+00	1.00E+03	9.08E+01 G
			614.28	-1.885E-01	&	3.802E+00	5.95E+02	8.98E+01 G
AG-110M	F	4.3696E-01					2.50E+02	
			884.68	0.000E+00	?(	3.759E+00	1.00E+03	7.27E+01 G
			657.76	5.921E-01	&(	1.191E+00	6.13E+01	9.46E+01 G
			937.49	-4.897E-01	+	4.467E+00	3.79E+02	3.44E+01 G
			1384.30	9.540E-01	?(	6.789E+00	3.09E+02	2.43E+01 G
			763.94	6.396E-01	&(	6.539E+00	2.89E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	2.2508E-01					1.15E+02	
			391.69	2.251E-01	&(	2.893E+00	3.77E+02	6.40E+01 G
SB-124	F	4.4326E-01					6.02E+01	
			602.73	-6.209E-01	?(	3.660E+00	1.75E+02	9.83E+01 G
			1690.98	1.718E+00	?(	1.407E+00	3.33E+01	4.78E+01 G
			722.79	4.482E+00	?(	2.046E+01	1.34E+02	1.08E+01 G
SB-125	I	4.8193E-01					1.01E+03	
			427.88	-3.030E-01	?(	3.764E+00	4.66E+02	2.96E+01 G
			600.50	-3.401E+00	+	2.049E+01	1.79E+02	1.79E+01 G
			635.89	2.536E+00	&(	1.166E+01	1.33E+02	1.13E+01 G
			463.37	-3.953E+00	+ P	1.845E+01	1.57E+02	1.05E+01 G
I-131	I	2.1504E-01					8.02E+00	
			364.48	-2.385E-01	?(P	1.384E+00	2.75E+02	8.17E+01 G
			284.30	5.832E+00	?(P	1.609E+01	1.07E+02	6.14E+00 G
			636.97	5.723E-01	&(	1.984E+01	9.75E+02	7.17E+00 G
Gd-153	F	9.4910E-01					2.42E+02	
			97.50	9.491E-01	?(	3.727E+00	1.17E+02	3.00E+01 G
			103.20	-2.804E-01	&	5.644E+00	5.96E+02	2.18E+01 G
Ga-68	C	1.7917E+01					4.71E-02	
			1077.40	1.792E+01	?(	5.825E+01	1.42E+02	3.30E+00 G
Tc-99m	I	-3.7626E-01					2.51E-01	
			140.51	-3.763E-01	?(	1.602E+00	1.27E+02	8.93E+01 G
BA-133	F	-7.5272E-01					3.85E+03	
			356.00	-7.527E-01	?(	3.961E+00	1.57E+02	6.20E+01 G
			302.85	-2.307E+00	+	1.113E+01	1.44E+02	1.83E+01 G
			383.84	-5.188E+00	+	2.002E+01	1.15E+02	8.94E+00 GA
			80.99	-1.044E+00	+ P	7.284E+00	1.01E+02	3.41E+01 GA
CS-134	I	3.5789E-01					7.54E+02	
			604.71	-6.275E-01	(	3.616E+00	1.71E+02	9.76E+01 G
			795.87	7.728E-01	&(	1.401E+00	7.57E+01	8.55E+01 G
			569.32	-2.195E+00	+	9.165E+00	1.22E+02	1.54E+01 G
			801.95	3.222E+00	(	1.434E+01	1.86E+02	8.69E+00 G
			563.24	4.648E+00	(P	1.240E+01	1.05E+02	8.35E+00 G
CS-137	I	-3.6289E-01					1.10E+04	
			661.66	-3.629E-01	&(	2.061E+00	1.65E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	2.8573E-01					1.38E+02	
			165.85	2.857E-01	?(	1.454E+00	1.51E+02	7.99E+01 G
Ba-140	I	-1.3214E+00					1.28E+01	
			537.26	-1.321E+00	(	5.332E+00	1.60E+02	2.44E+01 G
			162.66	-5.405E+00	+ P	2.079E+01	9.81E+01	6.22E+00 G
			304.85	-9.929E+00	+	4.884E+01	1.47E+02	4.29E+00 G
La-140	I	-1.3136E+00					1.28E+01	
			1596.21	-1.314E+00	?(P	2.738E+00	1.36E+02	9.54E+01 G
			487.02	7.279E-01	+	2.447E+00	1.34E+02	4.55E+01 G
			328.76	2.635E-01	+	5.220E+00	7.49E+02	2.03E+01 G
			815.77	-1.757E+00	+	6.697E+00	1.11E+02	2.33E+01 G
CE-141	I	6.7102E-01					3.25E+01	
			145.44	6.710E-01	*(	2.956E+00	1.32E+02	4.82E+01 G
CE-144	I	-2.9150E+00					2.85E+02	
			133.54	-2.915E+00	?(	1.385E+01	1.42E+02	1.11E+01 G
PM-144	C	-2.6415E-01					3.63E+02	
			696.54	-2.641E-01	?(P	1.558E+00	2.67E+02	9.90E+01 G
			618.06	-9.224E-02	+ P	3.368E+00	6.92E+02	9.91E+01 G
EU-152	F	1.3679E+00					4.94E+03	
			344.29	-1.733E+00	?(	8.446E+00	1.45E+02	2.65E+01 G
			1112.07	3.446E+00	?(	1.419E+01	1.20E+02	1.36E+01 G
			121.78	8.797E-01	?(P	3.380E+00	1.15E+02	2.86E+01 G
			778.92	-4.102E+00	+	1.354E+01	1.37E+02	1.29E+01 G
			964.11	4.364E+00	(	2.044E+01	1.38E+02	1.46E+01 G
			244.69	4.538E+00	?(	3.574E+01	2.36E+02	7.58E+00 G
			1408.00	-2.735E+00	+	9.038E+00	1.48E+02	2.10E+01 GA
EU-154	I	1.2120E+00					3.14E+03	
			873.23	-5.753E-01	?(	1.534E+01	7.52E+02	1.23E+01 G
			123.10	4.339E-01	?(	2.396E+00	1.64E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.869E+00	1.00E+03	3.52E+01 G
			723.36	-1.499E+00	+	1.173E+01	2.28E+02	2.02E+01 G
			1004.77	-4.573E+00	&	1.488E+01	9.66E+01	1.80E+01 G
			996.33	6.275E+00	?(	1.790E+01	8.47E+01	1.06E+01 G
EU-155	I	3.5667E+00					1.81E+03	
			105.31	3.567E+00	(P	3.084E+00	3.38E+01	2.12E+01 G
			86.54	2.118E+00	}	7.407E+00	4.34E+01	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	5.0219E-01					4.24E+01	
			482.00	5.022E-01	(	1.653E+00	9.75E+01	8.05E+01 G
			133.02	-7.452E-01	+	3.611E+00	1.45E+02	4.33E+01 G
			345.83	-2.125E-01	%	1.451E+01	2.01E+03	1.51E+01 G
			136.30	-5.588E+00	+	2.592E+01	1.39E+02	5.85E+00 G
Ta-182	F	-1.3319E+00					1.14E+02	
			1121.30	-1.332E+00	?(	8.021E+00	1.75E+02	3.49E+01 G
			1221.41	4.771E-01	+ P	6.964E+00	6.41E+02	2.70E+01 G
			1189.05	-2.524E+00	+	1.429E+01	2.49E+02	1.62E+01 G
Hg-203	F	-4.9279E-01					4.66E+01	
			279.20	-4.928E-01	?(	1.647E+00	9.97E+01	8.15E+01 G
TL-208	N	9.7501E+00					6.98E+02	
			583.02	9.750E+00	@(P	1.076E+00	8.37E+00	8.45E+01 G
			277.28	5.285E+00	-	1.728E+01	9.73E+01	6.31E+00 G
			860.56	1.200E+01	+	8.081E+00	2.98E+01	1.24E+01 G
pm-146	C	1.5122E+00					2.02E+03	
			747.16	1.512E+00	&(	3.348E+00	9.13E+01	3.40E+01 G
			735.72	-1.161E+00	-	7.144E+00	2.52E+02	2.25E+01 G
			453.88	-1.953E-01	- P	1.827E+00	5.03E+02	6.50E+01 G
y-88	F	3.5346E-01					1.07E+02	
			898.04	-1.065E-01	?(P	1.472E+00	5.92E+02	9.37E+01 G
			1836.06	7.879E-01	?(	7.259E-01	3.54E+01	9.92E+01 G
Cd-113m		-6.4049E+03					5.33E+03	
			263.70	-6.405E+03	&(	2.105E+04	9.81E+01	6.00E-03 K
Cd-109	F	8.6454E+00					4.53E+02	
			88.04	8.645E+00	?(	5.980E+01	2.08E+02	3.79E+00 G
Cf-251	T	-2.3606E-01					3.28E+05	
			176.60	-2.361E-01	?(	5.723E+00	8.89E+02	1.70E+01 G
			227.00	-3.860E+00	+	1.693E+01	1.62E+02	6.30E+00 GA
Cf-249	T	2.0017E-01					1.28E+05	
			387.95	-8.788E-02	&(	2.653E+00	8.80E+02	6.60E+01 G
			333.44	1.426E+00	?(	7.355E+00	1.98E+02	1.55E+01 G
Sn-126		-4.8419E+00					3.65E+07	
			87.57	0.000E+00	+	6.128E+00	1.00E+03	3.75E+01 GA
			64.28	-4.842E+00	(	1.791E+01	1.11E+02	9.70E+00 G
			86.94	2.664E+00	+	2.533E+01	2.85E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	7.9448E-01					8.14E+03	
			46.54	7.945E-01	%(P	4.088E+01	1.77E+03	4.25E+00 G
PB-212	N	2.7183E+01					6.98E+02	
			238.63	2.718E+01	(P	2.315E+00	4.71E+00	4.33E+01 G
			300.03	3.921E+01	+	2.418E+01	2.73E+01	3.28E+00 GA
PB-214	N	1.4589E+01					5.84E+05	
			351.93	1.512E+01	@(P	2.320E+00	9.13E+00	3.76E+01 G
			295.09	1.355E+01	(P	4.087E+00	1.46E+01	1.93E+01 G
			242.00	4.732E+00	&	3.582E+01	2.26E+02	7.43E+00 GA
BI-207	C	4.6332E-01					1.18E+04	
			569.70	4.452E-01	(	1.226E+00	8.19E+01	9.77E+01 G
			1063.66	4.871E-01	?(P	2.177E+00	1.93E+02	7.45E+01 G
BI-212	N	7.0241E+00					6.98E+02	
			727.17	7.024E+00	?(P	2.122E+01	8.96E+01	7.55E+00 G
			785.42	9.868E+01		2.797E+01	1.96E+01	1.28E+00 GA
BI-214	N	1.3355E+01					5.84E+05	
			609.31	1.301E+01	(P	2.257E+00	1.04E+01	4.61E+01 G
			1120.29	1.441E+01	(P	6.000E+00	2.01E+01	1.51E+01 G
			1764.49	2.025E+01	+	4.523E+00	1.74E+01	1.54E+01 G
BI-210M	T	6.0908E-01					1.10E+09	
			265.83	6.091E-01	?(P	2.223E+00	1.08E+02	5.00E+01 G
			304.90	-6.935E-01	+	7.668E+00	3.28E+02	2.80E+01 G
AC-228	N	3.0825E+01					2.10E+03	
			911.07	3.039E+01	(	4.367E+00	9.90E+00	2.90E+01 G
			968.97	3.418E+01	?(	1.091E+01	1.33E+01	1.75E+01 G
			338.32	2.701E+01	(	7.548E+00	1.36E+01	1.20E+01 G
			93.35	5.838E+00	-	3.847E+01	1.98E+02	5.56E+00 XA
TH-227	N	-1.5017E+00					7.95E+03	
			50.14	-1.502E+00	&(P	1.873E+01	4.42E+02	8.00E+00 G
			256.24	-5.435E+00	+	1.538E+01	1.05E+02	7.00E+00 G
TH-229	N	6.6358E-01					2.68E+06	
			193.51	6.636E-01	%(P	2.201E+01	1.21E+03	4.40E+00 G
			210.85	-1.602E+01	+	4.431E+01	1.04E+02	2.99E+00 G
TH-234	N	2.1535E+01					1.63E+12	
			63.29	2.153E+01	(P	2.761E+01	4.50E+01	3.81E+00 G
			92.59	8.225E-02	& P	3.981E+01	1.45E+04	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	-1.4674E+01					1.20E+07	
			302.65	-1.467E+01	(	7.259E+01	1.48E+02	2.88E+00 G
			300.07	-1.702E+01	+	8.847E+01	1.55E+02	2.46E+00 G
PA-233	C	-1.1461E+00					7.82E+08	
			312.01	-1.146E+00	?(	3.067E+00	1.04E+02	3.60E+01 G
			300.18	-6.757E+00	+	3.432E+01	1.52E+02	6.20E+00 G
PA-234	N	1.7933E+00					1.63E+12	
			131.29	8.264E-01	(	3.389E+00	1.21E+02	1.80E+01 G
			946.02	3.092E+00	?(	9.632E+00	1.30E+02	1.34E+01 G
			569.47	0.000E+00	-	1.843E+01	1.00E+03	8.20E+00 G
			883.24	-6.286E+00	&	2.697E+01	1.26E+02	9.60E+00 G
			880.53	-1.336E+01	+	4.240E+01	9.44E+01	6.00E+00 GA
PA-234M	N	1.0077E+02					1.63E+12	
			1001.00	5.593E+01	?(P	2.569E+02	1.34E+02	8.37E-01 G
			766.41	2.284E+02	?(	6.113E+02	7.99E+01	2.94E-01 G
U-235	N	-2.8439E-01					2.57E+11	
			143.79	-3.161E+00	?(P	1.312E+01	8.83E+01	1.10E+01 G
			205.33	-2.809E+00	+ P	1.952E+01	2.63E+02	5.01E+00 G
			163.38	5.921E+00	?(P	2.224E+01	1.12E+02	5.08E+00 G
AM-241	T	1.2244E+00					1.58E+05	
			59.54	1.224E+00	@(	3.872E+00	1.12E+02	3.59E+01 G
Ir-192	F	-4.7170E-01					7.40E+01	
			316.49	-4.717E-01	&(	1.507E+00	9.53E+01	8.70E+01 G
			468.06	-1.685E-01	+	3.608E+00	6.22E+02	5.18E+01 G
			308.44	2.778E-07	%	6.897E+00	7.32E+08	3.18E+01 G
Cs-136	F	5.1624E-01					1.30E+01	
			818.50	5.162E-01	?(	1.484E+00	8.52E+01	1.00E+02 G
			1048.07	-1.229E+00	+	2.688E+00	6.61E+01	8.00E+01 G
			340.57	-9.679E-01	&	4.943E+00	1.52E+02	4.69E+01 G
Np-239	T	-1.3363E+00					2.36E+00	
			103.70	-1.314E+00	&	4.959E+00	1.13E+02	2.40E+01 X
			106.13	-1.336E+00	?(	5.301E+00	1.19E+02	2.27E+01 G
			99.50	-2.105E+00	+	7.782E+00	1.11E+02	1.50E+01 X
Nd-147		1.9914E-01					1.11E+01	
			531.00	0.000E+00	(	9.175E+00	1.00E+03	1.30E+01 G
			91.10	2.906E-01	(	7.972E+00	8.20E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	183.	-5.	-0.003	442.41	-1.502E+00	P
AM-241	59.54	252.	24.	0.013	112.04	1.224E+00	
BA-133	80.99	1439.	-26.	-0.014	101.17	-1.044E+00	P
Nd-147	91.10	1332.	6.	0.003	820.38	2.906E-01	
Gd-153	97.50	331.	22.	0.012	117.42	9.491E-01	
Np-239	99.50	365.	-25.	-0.014	110.71	-2.105E+00	
Gd-153	103.20	412.	-5.	-0.003	595.52	-2.804E-01	
Np-239	103.70	385.	-25.	-0.014	113.03	-1.314E+00	
Np-239	106.13	396.	-24.	-0.013	118.73	-1.336E+00	
CO-57	122.06	259.	-23.	-0.013	97.53	-3.459E-01	P
EU-154	123.10	254.	14.	0.008	163.92	4.339E-01	
HF-181	133.02	639.	-25.	-0.014	145.15	-7.452E-01	
CE-144	133.54	614.	-25.	-0.014	142.27	-2.915E+00	
HF-181	136.30	590.	-25.	-0.014	138.91	-5.588E+00	
CO-57	136.47	579.	-17.	-0.009	207.20	-2.028E+00	
Tc-99m	140.51	478.	-25.	-0.014	127.43	-3.763E-01	
U-235	143.79	504.	-26.	-0.014	88.31	-3.161E+00	P
CE-141	145.44	489.	24.	0.013	131.85	6.710E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	162.66	348.	-23.	-0.013	98.14	-5.405E+00	P
U-235	163.38	262.	21.	0.012	112.24	5.921E+00	P
CE-139	165.85	282.	16.	0.009	151.32	2.857E-01	
Cf-251	176.60	177.	-3.	-0.001	889.09	-2.361E-01	
U-235	205.33	140.	-8.	-0.005	263.24	-2.809E+00	P
TH-229	210.85	253.	-28.	-0.015	103.67	-1.602E+01	
Cf-251	227.00	143.	-13.	-0.007	162.11	-3.860E+00	
TH-227	256.24	120.	-19.	-0.011	105.13	-5.435E+00	
Cd-113m	263.70	160.	-19.	-0.010	98.10	-6.405E+03	
BI-210M	265.83	121.	15.	0.008	108.47	6.091E-01	P
Hg-203	279.20	166.	-19.	-0.010	99.75	-4.928E-01	
I-131	284.30	84.	16.	0.009	107.06	5.832E+00	P
PA-231	300.07	402.	-18.	-0.010	155.06	-1.702E+01	
PA-233	300.18	384.	-19.	-0.010	151.50	-6.757E+00	
PA-231	302.65	365.	-19.	-0.010	147.54	-1.467E+01	
BA-133	302.85	347.	-19.	-0.010	143.80	-2.307E+00	
Ba-140	304.85	363.	-19.	-0.010	146.71	-9.929E+00	
BI-210M	304.90	381.	-8.	-0.005	327.65	-6.935E-01	
PA-233	312.01	92.	-18.	-0.010	104.04	-1.146E+00	
Ir-192	316.49	129.	-17.	-0.010	95.30	-4.717E-01	
La-140	328.76	77.	2.	0.001	748.97	2.635E-01	
Cf-249	333.44	88.	9.	0.005	197.83	1.426E+00	
Cs-136	340.57	374.	-18.	-0.010	152.29	-9.679E-01	
BA-133	356.00	392.	-18.	-0.010	156.93	-7.527E-01	
I-131	364.48	74.	-7.	-0.004	274.72	-2.385E-01	P
BA-133	383.84	180.	-17.	-0.009	114.85	-5.188E+00	
Cf-249	387.95	169.	-2.	-0.001	879.54	-8.788E-02	
SN-113	391.69	187.	5.	0.003	376.72	2.251E-01	
SB-125	427.88	55.	-3.	-0.002	466.07	-3.030E-01	
AG-108M	433.94	62.	-15.	-0.009	99.66	-5.122E-01	
pm-146	453.88	57.	-4.	-0.002	502.66	-1.953E-01	P
SB-125	463.37	155.	-13.	-0.007	156.86	-3.953E+00	P
Ir-192	468.06	142.	-3.	-0.002	622.47	-1.685E-01	
BE-7	477.60	93.	3.	0.002	485.43	8.783E-01	
HF-181	482.00	66.	12.	0.007	97.50	5.022E-01	
La-140	487.02	44.	10.	0.006	133.67	7.279E-01	
RU-103	497.05	36.	3.	0.002	395.81	1.111E-01	
RH-106	511.86	67.	65.	0.036	34.28	1.128E+01	P
Ba-140	537.26	52.	-9.	-0.005	160.38	-1.321E+00	
CS-134	563.24	29.	10.	0.006	105.04	4.648E+00	P
CS-134	569.32	56.	-9.	-0.005	122.22	-2.195E+00	
BI-207	569.70	39.	12.	0.006	81.93	4.452E-01	
SB-125	600.50	380.	-16.	-0.009	179.33	-3.401E+00	
SB-124	602.73	364.	-16.	-0.009	175.43	-6.209E-01	
CS-134	604.71	348.	-16.	-0.009	171.49	-6.275E-01	
RU-103	610.30	333.	-16.	-0.009	167.07	-1.077E+01	
AG-108M	614.28	317.	-4.	-0.002	594.68	-1.885E-01	
PM-144	618.06	299.	-2.	-0.001	691.62	-9.224E-02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	621.92	332.	-17.	-0.009	93.49	-6.865E+00	P
SB-125	635.89	40.	7.	0.004	133.25	2.536E+00	
I-131	636.97	47.	1.	0.001	974.68	5.723E-01	
AG-110M	657.76	27.	13.	0.007	61.34	5.921E-01	
CS-137	661.66	69.	-7.	-0.004	165.27	-3.629E-01	
PM-144	696.54	48.	-6.	-0.003	267.50	-2.641E-01	P
NB-94	702.63	48.	-11.	-0.006	146.04	-4.936E-01	P
SB-124	722.79	97.	11.	0.006	134.34	4.482E+00	
EU-154	723.36	113.	-7.	-0.004	228.47	-1.499E+00	
pm-146	735.72	48.	-6.	-0.003	252.22	-1.161E+00	
pm-146	747.16	22.	11.	0.006	91.33	1.512E+00	
ZR-95	756.73	39.	-7.	-0.004	185.99	-6.059E-01	
AG-110M	763.94	36.	3.	0.002	288.68	6.396E-01	
NB-95	765.79	64.	-12.	-0.007	85.93	-5.828E-01	P
PA-234M	766.41	56.	14.	0.008	79.95	2.284E+02	
CS-134	795.87	22.	13.	0.007	75.66	7.728E-01	
CS-134	801.95	23.	6.	0.003	185.64	3.222E+00	
La-140	815.77	37.	-8.	-0.005	111.22	-1.757E+00	
Cs-136	818.50	33.	10.	0.006	85.17	5.162E-01	
MN-54	834.85	52.	-8.	-0.004	143.58	-3.829E-01	P
Co-56	846.77	52.	-18.	-0.010	60.10	-9.330E-01	P
NB-94	871.10	33.	-8.	-0.004	111.44	-4.055E-01	
EU-154	873.23	50.	-1.	-0.001	752.50	-5.753E-01	
Sc-46	889.28	121.	-7.	-0.004	220.11	-3.851E-01	
y-88	898.04	24.	-2.	-0.001	592.29	-1.065E-01	P
AG-110M	937.49	28.	-3.	-0.002	378.59	-4.897E-01	
EU-154	996.33	40.	11.	0.006	84.67	6.275E+00	
PA-234M	1001.00	52.	8.	0.004	133.89	5.593E+01	P
EU-154	1004.77	83.	-14.	-0.008	96.65	-4.573E+00	
Co-56	1037.84	15.	-1.	-0.001	734.14	-6.255E-01	P
Cs-136	1048.07	48.	-16.	-0.009	66.14	-1.229E+00	
RH-106	1050.36	36.	10.	0.006	89.78	3.956E+01	
BI-207	1063.66	25.	6.	0.003	193.28	4.871E-01	P
Ga-68	1077.40	25.	8.	0.004	141.88	1.792E+01	
FE-59	1099.25	15.	8.	0.004	113.66	8.938E-01	P
CO-60	1173.24	51.	-15.	-0.008	46.46	-9.995E-01	P
Co-56	1238.28	54.	-5.	-0.003	247.27	-5.139E-01	P
NA-22	1274.53	37.	-6.	-0.004	142.11	-4.572E-01	
FE-59	1291.60	54.	-20.	-0.011	58.43	-3.451E+00	P
CO-60	1332.50	22.	-2.	-0.001	592.99	-1.516E-01	P
AG-110M	1384.30	16.	3.	0.002	308.52	9.540E-01	
La-140	1596.21	34.	-14.	-0.008	136.02	-1.314E+00	P
SB-124	1690.98	0.	9.	0.005	33.33	1.718E+00	
y-88	1836.06	0.	8.	0.004	35.36	7.879E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	8.7827E-01	8.7828E-01	4.854E+02%	1.48E+01
NA-22	#A	-4.5721E-01	-4.5721E-01	1.421E+02%	2.25E+00
K-40		2.8237E+02	2.8237E+02	5.249E+00%	9.89E+00
Sc-46	#A	-3.8511E-01	-3.8512E-01	2.201E+02%	2.90E+00
CR-51	#A	1.0541E+00	1.0542E+00	4.159E+02%	1.50E+01
MN-54	#A	-3.8289E-01	-3.8289E-01	1.436E+02%	1.85E+00
FE-59	#A	8.9382E-01	8.9383E-01	1.137E+02%	2.35E+00
Co-56	#A	-9.3304E-01	-9.3305E-01	6.010E+01%	1.88E+00
CO-57	#A	-3.4589E-01	-3.4589E-01	9.753E+01%	1.15E+00
CO-58	#A	4.1400E-02	4.1400E-02	1.300E+03%	1.90E+00
CO-60	#A	-1.5162E-01	-1.5162E-01	5.930E+02%	1.84E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.19E+00
NB-94	#A	-4.9360E-01	-4.9360E-01	1.460E+02%	1.59E+00
ZR-95	#A	-6.0590E-01	-6.0590E-01	1.860E+02%	2.75E+00
NB-95	#A	-5.8280E-01	-5.8281E-01	8.593E+01%	1.91E+00
RU-103	#A	1.1109E-01	1.1109E-01	3.958E+02%	1.14E+00
RH-106	#A	-5.6238E-01	-5.6238E-01	6.481E+01%	3.55E+01
AG-108M	#A	-5.1223E-01	-5.1223E-01	9.966E+01%	1.32E+00
AG-110M	#A	4.3696E-01	4.3696E-01	6.134E+01%	3.76E+00
SN-113	#A	2.2508E-01	2.2508E-01	3.767E+02%	2.89E+00
SB-124	#A	4.4326E-01	4.4326E-01	3.333E+01%	3.66E+00
SB-125	#A	4.8193E-01	4.8193E-01	1.332E+02%	3.76E+00
I-131	#A	2.1502E-01	2.1504E-01	1.071E+02%	1.38E+00
Gd-153	#A	9.4910E-01	9.4910E-01	1.174E+02%	3.73E+00
Ga-68	#A	1.7702E+01	1.7917E+01	1.419E+02%	5.83E+01
Tc-99m	#A	-3.7540E-01	-3.7626E-01	1.274E+02%	1.60E+00
BA-133	#A	-7.5272E-01	-7.5272E-01	1.569E+02%	3.96E+00
CS-134	#A	3.5789E-01	3.5789E-01	7.099E+01%	3.62E+00
CS-137	#A	-3.6289E-01	-3.6289E-01	1.653E+02%	2.06E+00
CE-139	#A	2.8573E-01	2.8573E-01	1.513E+02%	1.45E+00
Ba-140	#A	-1.3214E+00	-1.3214E+00	1.604E+02%	5.33E+00
La-140	#A	-1.3135E+00	-1.3136E+00	1.360E+02%	2.74E+00
CE-141	#A	6.7101E-01	6.7102E-01	1.319E+02%	2.96E+00
CE-144	#A	-2.9150E+00	-2.9150E+00	1.423E+02%	1.38E+01
PM-144	#A	-2.6415E-01	-2.6415E-01	2.675E+02%	1.56E+00
EU-152	A	1.3679E+00	1.3679E+00	7.018E+01%	8.45E+00
EU-154	#A	1.2120E+00	1.2120E+00	8.467E+01%	1.53E+01
EU-155		3.5667E+00	3.5667E+00	3.385E+01%	3.08E+00
HF-181	#A	5.0218E-01	5.0219E-01	9.750E+01%	1.65E+00
Ta-182	A	-1.3319E+00	-1.3319E+00	1.753E+02%	8.02E+00
Hg-203	#A	-4.9278E-01	-4.9279E-01	9.975E+01%	1.65E+00
TL-208		9.7501E+00	9.7501E+00	8.368E+00%	1.08E+00
pm-146	#A	1.5122E+00	1.5122E+00	9.133E+01%	3.35E+00

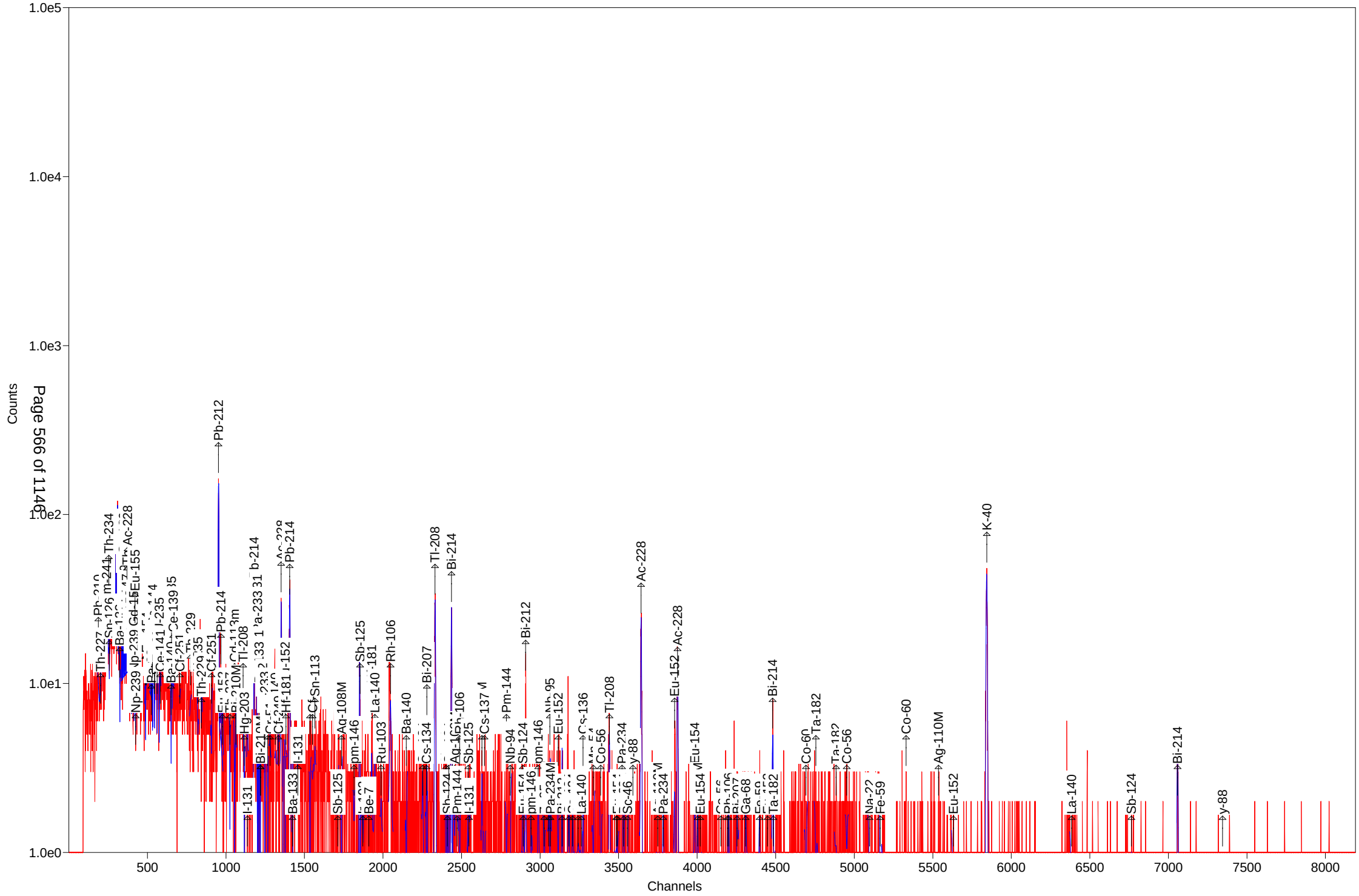
y-88 #A	3.5346E-01	3.5346E-01	3.536E+01%		1.47E+00
Cd-113m#A	-6.4049E+03	-6.4049E+03	9.810E+01%		2.10E+04
Cd-109 #A	8.6454E+00	8.6454E+00	2.076E+02%		5.98E+01
Cf-251 #A	-2.3606E-01	-2.3606E-01	8.891E+02%		5.72E+00
Cf-249 #A	2.0017E-01	2.0017E-01	1.978E+02%		2.65E+00
Sn-126 A	-4.8419E+00	-4.8419E+00	1.110E+02%		1.79E+01
PB-210 #A	7.9448E-01	7.9448E-01	1.767E+03%		4.09E+01
PB-212	2.7183E+01	2.7183E+01	4.707E+00%		2.32E+00
PB-214	1.4589E+01	1.4589E+01	8.610E+00%		2.32E+00
BI-207 #A	4.6332E-01	4.6332E-01	8.193E+01%		1.23E+00
BI-212 A	7.0241E+00	7.0241E+00	8.962E+01%		2.12E+01
BI-214	1.3355E+01	1.3355E+01	1.040E+01%		2.26E+00
BI-210M#A	6.0908E-01	6.0908E-01	1.085E+02%		2.22E+00
AC-228	3.0825E+01	3.0825E+01	7.135E+00%		4.37E+00
TH-227 #A	-1.5017E+00	-1.5017E+00	4.424E+02%		1.87E+01
TH-229 #A	6.6358E-01	6.6358E-01	1.210E+03%		2.20E+01
TH-234 A	2.1535E+01	2.1535E+01	4.498E+01%		2.76E+01
PA-231 #A	-1.4674E+01	-1.4674E+01	1.475E+02%		7.26E+01
PA-233 #A	-1.1461E+00	-1.1461E+00	1.040E+02%		3.07E+00
PA-234 A	1.7933E+00	1.7933E+00	8.890E+01%		3.39E+00
PA-234M#A	1.0077E+02	1.0077E+02	7.797E+01%		2.57E+02
U-235 #A	-2.8439E-01	-2.8439E-01	7.141E+01%		1.31E+01
AM-241 #A	1.2244E+00	1.2244E+00	1.120E+02%		3.87E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.79E+01
Ir-192 #A	-4.7169E-01	-4.7170E-01	9.530E+01%		1.51E+00
Cs-136 #A	5.1621E-01	5.1624E-01	8.517E+01%		1.48E+00
Np-239 #A	-1.3359E+00	-1.3363E+00	1.187E+02%		5.30E+00
Nd-147 #A	1.9913E-01	1.9914E-01	6.467E+02%		9.18E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 4.032E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.0317862E+02 Bq/Sample

264535_Gamma_160-18554-A-6-B. 14_Gamma_20162250.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161065

Sample Description: 264535_Gamma_160-18554-A-7-B
Detector: Detector #15
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-7-B

Decay to Time: 9/1/2016 12:33 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:33:54 Real Time: 1803 sec
Analysis Time: 9/1/2016 13:05 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev11.lib
Bkgd Correction File: 15_2016-08-07_0540.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.630E+00	108.7	5.033E+00	5.039E+00	1.698E+01
NA-22	-8.450E-02	574.5	4.854E-01	4.854E-01	1.804E+00
K-40	2.997E+02	5.9	1.753E+01	2.329E+01	1.532E+01
Sc-46	3.549E-01	122.8	4.360E-01	4.364E-01	2.736E+00
CR-51	4.555E+00	146.6	6.678E+00	6.682E+00	2.243E+01
MN-54	5.649E-01	88.3	4.989E-01	4.997E-01	1.179E+00
FE-59	1.161E+00	118.8	1.380E+00	1.381E+00	3.849E+00
Co-56	6.871E-01	84.1	5.778E-01	5.789E-01	1.622E+00
CO-57	-4.090E-01	120.0	4.907E-01	4.912E-01	1.639E+00
CO-58	7.072E-01	86.0	6.082E-01	6.093E-01	2.047E+00
CO-60	7.907E-01	106.4	8.411E-01	8.421E-01	1.876E+00
ZN-65	1.858E+00	85.9	1.596E+00	1.598E+00	5.367E+00
NB-94	5.438E-01	70.6	3.840E-01	3.851E-01	1.612E+00
ZR-95	-7.030E-01	184.9	1.300E+00	1.301E+00	3.258E+00
NB-95	8.409E-01	88.5	7.439E-01	7.452E-01	2.495E+00
RU-103	-5.441E-01	129.6	7.051E-01	7.057E-01	1.686E+00
RH-106	4.458E+00	108.5	4.835E+00	4.841E+00	1.388E+01
AG-108M	-3.392E-01	166.2	5.637E-01	5.640E-01	1.417E+00
AG-110M	5.231E-01	95.0	4.972E-01	4.979E-01	3.820E+00
SN-113	-1.163E+00	71.1	8.268E-01	8.290E-01	2.489E+00
SB-124	7.748E-01	139.1	1.078E+00	1.078E+00	4.119E+00
SB-125	5.409E+00	16.0	8.654E-01	9.084E-01	4.028E+00
I-131	4.474E-01	134.2	6.003E-01	6.008E-01	1.541E+00
Gd-153	-1.702E+00	170.5	2.901E+00	2.903E+00	9.644E+00
Ga-68	-1.812E+01	189.6	3.436E+01	3.437E+01	7.838E+01
Tc-99m	0.000E+00	1.#INF	2.078E-01	2.078E-01	2.413E+00
BA-133	-9.559E-01	119.7	1.144E+00	1.145E+00	4.812E+00
CS-134	3.754E-01	76.3	2.866E-01	2.872E-01	4.203E+00
CS-137	-9.659E-01	106.8	1.032E+00	1.033E+00	2.523E+00
CE-139	-2.244E-01	227.1	5.098E-01	5.102E-01	1.720E+00
Ba-140	-1.251E-02	18759.8	2.348E+00	2.348E+00	5.819E+00
La-140	1.046E+00	31.0	3.239E-01	3.286E-01	1.997E+00
CE-141	4.142E-01	204.4	8.465E-01	8.468E-01	2.175E+00

CE-144	0.000E+00	1.#INF	1.740E+00	1.740E+00	1.847E+01
PM-144	-6.765E-02	976.0	6.602E-01	6.602E-01	1.582E+00
EU-152	2.957E+00	85.1	2.517E+00	2.521E+00	8.948E+00
EU-154	1.555E+00	83.2	1.293E+00	1.295E+00	1.678E+01
EU-155	-2.487E+00	153.2	3.811E+00	3.814E+00	1.267E+01
HF-181	8.920E-01	73.7	6.577E-01	6.593E-01	2.050E+00
Ta-182	1.483E+00	91.2	1.352E+00	1.354E+00	1.037E+01
Hg-203	5.325E-01	102.6	5.466E-01	5.475E-01	1.833E+00
TL-208	9.853E+00	8.7	8.567E-01	9.976E-01	1.178E+00
pm-146	5.476E-02	95.4	5.223E-02	5.231E-02	5.157E+00
y-88	-8.640E-01	116.8	1.009E+00	1.010E+00	2.258E+00
Cd-113m	-5.780E+02	1038.2	6.000E+03	6.000E+03	2.075E+04
Cd-109	0.000E+00	1.#INF	2.469E+01	2.469E+01	8.207E+01
Cf-251	-1.311E+00	209.9	2.752E+00	2.754E+00	7.068E+00
Cf-249	-2.184E-02	4289.6	9.369E-01	9.369E-01	3.213E+00
Sn-126	-6.514E+00	116.8	7.607E+00	7.615E+00	2.532E+01
PB-210	-2.962E+01	42.9	1.270E+01	1.282E+01	7.074E+01
PB-212	2.981E+01	4.5	1.337E+00	2.347E+00	1.978E+00
PB-214	2.261E+01	7.1	1.598E+00	1.983E+00	2.978E+00
BI-207	3.167E-01	91.3	2.892E-01	2.897E-01	1.582E+00
BI-212	-6.392E-02	14138.9	9.038E+00	9.038E+00	3.169E+01
BI-214	1.864E+01	9.7	1.814E+00	2.056E+00	2.876E+00
BI-210M	4.885E-01	197.5	9.650E-01	9.654E-01	2.395E+00
AC-228	3.425E+01	7.4	2.525E+00	3.071E+00	3.229E+00
TH-227	8.096E+00	107.9	8.736E+00	8.747E+00	2.916E+01
TH-229	-1.655E-01	68.4	1.132E-01	1.140E-01	2.845E+01
TH-234	-2.503E+01	40.1	1.005E+01	1.013E+01	6.447E+01
PA-231	-1.860E+01	148.9	2.768E+01	2.770E+01	9.265E+01
PA-233	1.345E+00	152.4	2.050E+00	2.051E+00	6.873E+00
PA-234	2.744E+00	97.2	2.667E+00	2.671E+00	1.131E+01
PA-234M	6.416E+00	677.5	4.347E+01	4.348E+01	3.429E+02
U-235	3.305E+00	95.6	3.161E+00	3.166E+00	1.928E+01
AM-241	7.444E+00	28.2	2.099E+00	2.134E+00	6.731E+00
Np-237	0.000E+00	1.#INF	7.413E+00	7.413E+00	2.464E+01
Ir-192	8.164E-01	107.8	8.797E-01	8.810E-01	2.807E+00
Cs-136	2.255E-01	148.3	3.345E-01	3.347E-01	2.334E+00
Np-239	1.784E+00	112.1	1.999E+00	2.002E+00	6.665E+00
Nd-147	-2.779E+00	185.9	5.166E+00	5.168E+00	1.244E+01
Total	4.854E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-7-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161065.An1

Acquisition information
Start time: 9/1/2016 12:33:54 PM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:33:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2016-08-07_0540.PBC 8/7/2016 5:40:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1543

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.62	36.	51.17	0.71	1.962E-02	46.54	4.250	PBC<MDA	PB210
50.14	26.	107.91	0.95	2.192E-02	50.14	8.000	PBC<MDA	TH227
59.54	132.	28.20	0.96	2.737E-02	59.54	35.900	7.444E+00	AM241
74.71	268.	10.53	0.97	3.376E-02				
77.29	449.	6.57	0.97	3.456E-02				
87.22	142.	16.96	1.39	3.692E-02	86.49	13.100	1.637E+01	Np237
					86.54	30.700	6.985E+00	EU155
					86.94	9.040	2.367E+01	Sn126
					87.57	37.500	5.689E+00	Sn126
					88.04	3.790	5.616E+01	Cd109
93.10	212.	14.38	1.38	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	5.595E+01	AC228
106.13	28.	112.08	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
123.10	28.	94.70	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
145.44	13.	204.39	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
163.38	26.	95.65	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
205.33	14.	160.26	1.09	2.900E-02	205.33	5.010	PBC<MDA	U235
210.85	25.	96.17	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229
238.71	561.	6.03	1.04	2.591E-02	238.63	43.300	2.775E+01	PB212
242.11	83.	21.71	1.12	2.565E-02	242.00	7.430	2.421E+01	PB214
244.69	22.	196.72	1.13	2.543E-02	244.69	7.580	PBC<MDA	EU152
256.24	4.	468.04	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
265.72	10.	197.55	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
277.17	51.	37.64	0.47	2.313E-02	277.28	6.310	1.940E+01	TL208
279.20	18.	102.65	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
284.30	13.	134.19	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.22	181.	11.32	1.30	2.204E-02	295.09	19.300	2.365E+01	PB214
300.29	49.	23.39	0.30	2.177E-02	300.03	3.280	3.813E+01	PB212
					300.18	6.200	2.018E+01	PA233
308.44	18.	156.33	1.18	2.131E-02	308.44	31.750	PBC<MDA	Ir192
312.01	18.	152.42	1.18	2.112E-02	312.01	36.000	PBC<MDA	PA233
316.49	18.	148.33	1.19	2.089E-02	316.49	87.040	PBC<MDA	Ir192
320.08	17.	146.61	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
328.76	61.	30.97	1.20	2.028E-02	328.76	20.300	8.209E+00	La140
338.26	136.	11.91	1.05	1.983E-02	338.32	12.010	3.180E+01	AC228
340.57	12.	207.90	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
345.83	14.	100.76	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.83	287.	8.47	1.24	1.923E-02	351.93	37.600	2.207E+01	PB214
364.48	3.	665.71	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
428.32	13.	109.38	1.28	1.647E-02	427.88	29.600	PBC<MDA	SB125
453.88	14.	97.57	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	72.	16.00	1.31	1.545E-02	463.37	10.470	2.469E+01	SB125
477.60	13.	108.72	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	107.67	1.33	1.497E-02	482.00	80.500	PBC<MDA	HF181
511.86	91.	32.16	2.60	1.426E-02	511.86	20.000	1.773E+01	RH106
569.47	5.	213.51	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.505E+00	PA234
					569.70	97.740	2.103E-01	BI207
583.16	192.	8.70	1.16	1.282E-02	583.02	84.500	9.853E+00	TL208
599.33	14.	190.99	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
602.73	8.	329.28	1.43	1.247E-02	602.73	98.260	PBC<MDA	SB124
609.27	187.	9.73	1.14	1.236E-02	609.31	46.090	1.823E+01	BI214
					610.30	5.750	1.463E+02	RU103
635.83	2.	352.54	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
657.76	8.	108.78	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
702.63	7.	198.24	1.50	1.098E-02	702.63	97.900	PBC<MDA	NB94
722.79	9.	139.08	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	PBC<MDA	AG108M
					723.36	20.220	PBC<MDA	EU154
723.36	15.	83.15	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	8.521E-01	AG108M
					723.36	20.220	3.830E+00	EU154
765.79	15.	88.47	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.856E+02	PA234M
766.41	1.	914.47	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.468E+01	PA234M
785.42	21.	54.24	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
795.87	12.	76.34	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
810.78	12.	86.01	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
834.85	10.	88.31	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.17	11.	90.54	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
871.10	12.	70.62	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
880.53	13.	88.84	1.64	9.072E-03	880.53	6.000	PBC<MDA	PA234
883.24	13.	97.18	1.64	9.048E-03	883.24	9.600	PBC<MDA	PA234
911.41	162.	8.70	1.30	8.811E-03	911.07	29.000	3.527E+01	AC228
964.11	6.	240.07	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
969.21	17.	80.83	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
1048.07	5.	148.32	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	7.	108.45	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	10.	91.32	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	6.	205.73	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	13.	85.10	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	13.	85.87	1.80	7.395E-03	1115.55	50.600	PBC<MDA	ZN65
1120.27	12.	102.08	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	11.	122.84	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.128E-01	Sc46
					1121.30	34.900	2.330E+00	Ta182
1221.41	11.	91.19	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	16.	84.10	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	8.	119.02	1.91	6.502E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	9.	106.38	1.94	6.325E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	7.	95.04	1.97	6.114E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	89.39	1.98	6.023E-03	1408.00	21.005	PBC<MDA	EU152
1461.04	335.	5.85	1.57	5.828E-03	1460.83	10.670	2.997E+02	K40
1764.45	27.	25.89	2.18	4.916E-03	1764.49	15.400	1.988E+01	BI214
1836.06	1.	691.19	2.22	4.741E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.44	74.68	258.	273.	8.087E+03	10.29	0.972	-	D
308.75	77.25	211.	455.	1.316E+04	6.51	0.975	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	490.	-44.	-0.025	42.89	0.946
TH-227	200.23	50.14	367.	26.	0.014	107.91	0.950s
AM-241	237.79	59.54	623.	132.	0.073	28.20	0.958s
TH-234	252.78	63.29	737.	-50.	-0.028	40.14	0.962s
Sn-126	256.75	64.28	761.	-34.	-0.019	116.77	0.963
BA-133	323.54	80.99	1695.	-37.	-0.021	54.19	0.978s
Np-237	345.53	86.49	2050.	0.	0.000	190.11	0.983A
EU-155	345.74	86.54	2068.	-35.	-0.019	185.38	0.983s
Sn-126	347.33	86.94	1966.	-35.	-0.019	180.75	0.984A
Sn-126	349.84	87.57	1824.	-35.	-0.019	174.05	0.984s
Cd-109	351.72	88.04	1931.	0.	0.000	178.94	0.985A
Nd-147	363.95	91.10	1789.	-35.	-0.019	171.83	0.987s
TH-234	369.91	92.59	1777.	-58.	-0.032	37.17	0.989s
AC-228	371.94	93.10	187.	212.	0.118	14.38	1.384s
Gd-153	389.54	97.50	1782.	-35.	-0.020	170.45	0.993s
Gd-153	412.32	103.20	1497.	-37.	-0.020	149.94	0.998s
Np-239	414.32	103.70	1533.	-37.	-0.020	151.68	0.999s
EU-155	420.77	105.31	1570.	-37.	-0.020	153.22	1.001s
Np-239	424.03	106.13	487.	28.	0.016	112.08	1.001s
EU-152	486.57	121.78	380.	-31.	-0.017	69.80	1.016s
CO-57	487.72	122.06	411.	-24.	-0.013	119.98	1.016
EU-154	491.87	123.10	338.	28.	0.016	94.70	1.017
HF-181	531.54	133.02	848.	0.	0.000	1000.00	1.026s
CE-144	533.60	133.54	848.	0.	0.000	1000.00	1.026s
HF-181	544.63	136.30	848.	0.	0.000	1000.00	1.029s
CO-57	545.33	136.47	848.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	848.	0.	0.000	1000.00	1.032
CE-141	581.17	145.44	198.	13.	0.007	204.39	1.037s
Ba-140	650.01	162.66	351.	-26.	-0.014	103.77	1.053s
U-235	652.88	163.38	287.	26.	0.014	95.65	1.053s
CE-139	662.77	165.85	304.	-11.	-0.006	227.13	1.055
Cf-251	705.73	176.60	209.	-13.	-0.007	209.89	1.065s
TH-229	773.33	193.51	198.	-28.	-0.015	97.33	1.080s
U-235	820.60	205.33	147.	14.	0.008	160.26	1.091s
TH-229	842.65	210.85	161.	25.	0.014	96.17	1.096s
Cf-251	907.22	227.00	169.	-10.	-0.005	253.40	1.110s
PB-212	953.72	238.63	64.	602.	0.335	4.49	1.120D
PB-214	967.17	242.00	121.	83.	0.046	21.71	1.123D
EU-152	977.95	244.69	966.	22.	0.012	196.72	1.126s
TH-227	1024.12	256.24	99.	4.	0.002	468.04	1.136s
BI-210M	1062.46	265.83	110.	10.	0.006	197.55	1.144s
TL-208	1107.78	277.17	76.	51.	0.028	37.64	0.474s
Hg-203	1115.91	279.20	161.	18.	0.010	102.65	1.156
I-131	1136.30	284.30	76.	13.	0.007	134.19	1.160s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1179.95	295.22	58.	181.	0.101	11.32	1.304
PB-212	1200.25	300.29	26.	49.	0.027	23.39	0.297s
PA-231	1199.35	300.07	513.	-21.	-0.012	155.49	1.174s
PA-233	1199.79	300.18	492.	-21.	-0.012	152.34	1.174s
PA-231	1209.66	302.65	471.	-21.	-0.012	148.88	1.176s
BA-133	1210.47	302.85	477.	-21.	-0.012	149.81	1.176s
Ba-140	1218.46	304.85	498.	-18.	-0.010	173.34	1.178s
BI-210M	1218.64	304.90	516.	0.	0.000	1000.00	1.178
Ir-192	1232.81	308.44	403.	18.	0.010	156.33	1.181s
PA-233	1247.09	312.01	384.	18.	0.010	152.42	1.184s
Ir-192	1265.00	316.49	366.	18.	0.010	148.33	1.188s
CR-51	1279.37	320.08	297.	17.	0.009	146.61	1.191s
La-140	1314.06	328.76	77.	61.	0.034	30.97	1.199s
AC-228	1352.06	338.26	35.	136.	0.076	11.91	1.049
Cs-136	1361.28	340.57	288.	12.	0.006	207.90	1.209s
HF-181	1382.30	345.83	49.	14.	0.008	100.76	1.213s
PB-214	1406.28	351.83	60.	287.	0.160	8.47	1.239
BA-133	1422.97	356.00	458.	-20.	-0.011	119.72	1.222s
I-131	1456.89	364.48	72.	3.	0.001	665.71	1.229
BA-133	1534.29	383.84	201.	-19.	-0.010	108.80	1.246
SN-113	1565.67	391.69	106.	-24.	-0.013	71.08	1.253
SB-125	1710.36	427.88	49.	13.	0.007	109.38	1.283s
AG-108M	1734.60	433.94	56.	-9.	-0.005	166.17	1.288s
pm-146	1814.35	453.88	39.	14.	0.008	97.57	1.304s
SB-125	1852.29	463.37	30.	72.	0.040	16.00	1.312
Ir-192	1871.05	468.06	124.	-2.	-0.001	634.35	1.316s
BE-7	1909.18	477.60	97.	13.	0.007	108.72	1.324s
HF-181	1926.79	482.00	80.	12.	0.007	107.67	1.328s
RU-103	1987.00	497.05	65.	-13.	-0.007	129.60	1.340s
RH-106	2046.22	511.86	112.	91.	0.051	32.16	2.602s
Nd-147	2122.75	531.00	65.	-9.	-0.005	185.87	1.368s
CS-134	2251.67	563.24	69.	-13.	-0.007	130.38	1.394s
CS-134	2276.00	569.32	43.	-10.	-0.006	95.31	1.399s
PA-234	2276.59	569.47	51.	5.	0.003	213.51	1.399s
BI-207	2277.52	569.70	52.	-4.	-0.002	249.99	1.399s
TL-208	2331.36	583.16	19.	192.	0.107	8.70	1.162
SB-125	2400.69	600.50	344.	14.	0.008	190.99	1.424s
SB-124	2409.62	602.73	358.	8.	0.005	329.28	1.425s
CS-134	2417.53	604.71	366.	0.	0.000	1000.00	1.427s
BI-214	2435.76	609.27	33.	187.	0.104	9.73	1.144
RU-103	2439.88	610.30	366.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	366.	0.	0.000	1000.00	1.435s
SB-125	2542.23	635.89	33.	2.	0.001	352.54	1.451s
AG-110M	2629.71	657.76	38.	8.	0.005	108.78	1.469s
CS-137	2645.30	661.66	81.	-17.	-0.010	106.82	1.472s
PM-144	2784.82	696.54	37.	-1.	-0.001	975.96	1.499s
NB-94	2809.17	702.63	37.	7.	0.004	198.24	1.503s
SB-124	2889.79	722.79	79.	9.	0.005	139.08	1.519s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2890.40	722.94	88.	0.	0.000	1000.00	1.519s
EU-154	2892.07	723.36	70.	15.	0.008	83.15	1.519s
pm-146	2941.53	735.72	51.	-13.	-0.007	98.25	1.529s
pm-146	2987.29	747.16	42.	-8.	-0.004	163.92	1.537s
ZR-95	3025.56	756.73	42.	-7.	-0.004	184.94	1.544s
AG-110M	3054.42	763.94	63.	-19.	-0.011	62.00	1.550s
NB-95	3061.80	765.79	85.	15.	0.009	88.47	1.551s
PA-234M	3064.30	766.41	74.	1.	0.001	914.47	1.552s
BI-212	3140.33	785.42	23.	21.	0.011	54.24	1.566s
CS-134	3182.12	795.87	38.	12.	0.007	76.34	1.574s
CS-134	3206.46	801.95	90.	-16.	-0.009	85.25	1.578s
CO-58	3241.75	810.78	50.	12.	0.007	86.01	1.585s
La-140	3261.74	815.77	61.	-5.	-0.003	212.55	1.589
Cs-136	3272.66	818.50	66.	-3.	-0.002	387.30	1.591s
MN-54	3338.05	834.85	14.	10.	0.005	88.31	1.603s
Co-56	3385.75	846.77	28.	-3.	-0.002	378.59	1.612s
TL-208	3440.93	860.56	19.	11.	0.006	90.54	1.622s
NB-94	3483.06	871.10	31.	12.	0.007	70.62	1.629s
PA-234	3520.80	880.53	58.	13.	0.007	88.84	1.636s
PA-234	3531.64	883.24	70.	13.	0.007	97.18	1.638s
Sc-46	3555.81	889.28	80.	-2.	-0.001	761.31	1.642s
y-88	3590.85	898.04	45.	-13.	-0.007	116.79	1.649s
AC-228	3644.35	911.41	7.	162.	0.090	8.70	1.303
AG-110M	3748.69	937.49	50.	-12.	-0.007	132.72	1.677s
PA-234	3782.81	946.02	26.	-5.	-0.003	292.54	1.683s
EU-152	3855.18	964.11	118.	6.	0.004	240.07	1.696s
AC-228	3874.63	968.97	83.	17.	0.009	80.83	1.699s
EU-154	3984.09	996.33	62.	-9.	-0.005	128.14	1.718s
PA-234M	4002.77	1001.00	71.	0.	0.000	1000.00	1.722s
EU-154	4017.88	1004.77	84.	-8.	-0.004	172.55	1.724s
Cs-136	4191.11	1048.07	25.	5.	0.003	148.32	1.754s
RH-106	4200.27	1050.36	25.	7.	0.004	108.45	1.755s
BI-207	4253.49	1063.66	16.	10.	0.006	91.32	1.765s
Ga-68	4308.47	1077.40	35.	-7.	-0.004	189.61	1.774s
FE-59	4395.90	1099.25	33.	6.	0.004	205.73	1.789s
EU-152	4447.22	1112.07	50.	13.	0.007	85.10	1.797
ZN-65	4461.11	1115.55	52.	13.	0.007	85.87	1.800s
BI-214	4480.08	1120.29	70.	12.	0.007	102.08	1.803s
Sc-46	4481.13	1120.55	82.	11.	0.006	122.84	1.803
CO-60	4691.97	1173.24	32.	-6.	-0.004	192.47	1.838s
Ta-182	4755.25	1189.05	37.	-2.	-0.001	598.81	1.848
Ta-182	4884.75	1221.41	17.	11.	0.006	91.19	1.869
Co-56	4952.26	1238.28	32.	16.	0.009	84.10	1.879
NA-22	5097.34	1274.53	16.	-1.	-0.001	574.46	1.902s
EU-154	5097.40	1274.54	17.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	16.	8.	0.004	119.02	1.913s
CO-60	5329.36	1332.50	16.	9.	0.005	106.38	1.938s
AG-110M	5536.68	1384.30	6.	7.	0.004	95.04	1.970s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5631.56	1408.00	6.	7.	0.004	89.39	1.984s
K-40	5843.86	1461.04	10.	335.	0.186	5.85	1.575
La-140	6384.98	1596.21	11.	-4.	-0.002	444.04	2.092s
SB-124	6764.43	1690.98	6.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	11.	27.	0.015	25.89	2.181s
y-88	7345.35	1836.06	6.	1.	0.000	691.19	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.6296E+00				5.31E+01	
			477.60	4.630E+00	(P	1.698E+01 1.09E+02 1.05E+01	G
NA-22	C	-8.4496E-02				9.50E+02	
			1274.53	-8.450E-02	?(	1.804E+00 5.74E+02 9.99E+01	G
K-40	N	2.9965E+02				4.66E+11	
			1460.83	2.997E+02	(P	1.532E+01 5.85E+00 1.07E+01	G
Sc-46	F	3.5494E-01				8.38E+01	
			889.28	-1.029E-01	&(	2.736E+00 7.61E+02 1.00E+02	G
			1120.55	8.128E-01	?(	3.392E+00 1.23E+02 1.00E+02	G
CR-51	F	4.5549E+00				2.77E+01	
			320.08	4.555E+00	*(P	2.243E+01 1.47E+02 9.94E+00	G
MN-54	C	5.6490E-01				3.12E+02	
			834.85	5.649E-01	?(	1.179E+00 8.83E+01 1.00E+02	G
FE-59	F	1.1613E+00				4.45E+01	
			1099.25	8.395E-01	&(P	3.849E+00 2.06E+02 5.65E+01	G
			1291.60	1.582E+00	?(	4.223E+00 1.19E+02 4.32E+01	G
Co-56	C	6.8708E-01				7.73E+01	
			846.77	-1.778E-01	?(	1.622E+00 3.79E+02 9.99E+01	G
			1238.28	1.995E+00	&(	3.622E+00 8.41E+01 6.61E+01	G
			1037.84	-4.780E-02	% P	1.301E+01 1.41E+04 1.41E+01	G
			1771.35	-2.442E-01	%	2.367E+01 2.70E+03 1.55E+01	A
CO-57	C	-4.0904E-01				2.72E+02	
			122.06	-4.090E-01	&(	1.639E+00 1.20E+02 8.56E+01	G
			136.47	0.000E+00	+	1.933E+01 1.00E+03 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	7.0718E-01					7.09E+01	
			810.78	7.072E-01	?(	2.047E+00	8.60E+01	9.95E+01 G
CO-60	F	7.9068E-01					1.93E+03	
			1332.50	7.907E-01	&(	1.876E+00	1.06E+02	1.00E+02 G
			1173.24	-5.062E-01	- P	2.299E+00	1.92E+02	9.99E+01 G
ZN-65	F	1.8583E+00					2.44E+02	
			1115.55	1.858E+00	?(	5.367E+00	8.59E+01	5.06E+01 G
NB-94	I	5.4377E-01					7.41E+06	
			702.63	3.445E-01	?(	1.612E+00	1.98E+02	9.79E+01 G
			871.10	7.390E-01	?(	1.736E+00	7.06E+01	9.99E+01 G
ZR-95	I	-7.0304E-01					6.40E+01	
			756.73	-7.030E-01	?(P	3.258E+00	1.85E+02	5.45E+01 G
			724.20	1.166E-01	% P	5.369E+00	1.32E+03	4.42E+01 G
NB-95	I	8.4087E-01					6.40E+01	
			765.79	8.409E-01	?(	2.495E+00	8.85E+01	9.98E+01 G
RU-103	I	-5.4408E-01					3.93E+01	
			497.05	-5.441E-01	?(	1.686E+00	1.30E+02	9.09E+01 G
			610.30	0.000E+00	+	7.189E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.4583E+00					3.74E+02	
			621.92	1.534E-01	&(	1.388E+01	3.61E+03	9.93E+00 G
			1050.36	3.186E+01	?(P	1.189E+02	1.08E+02	1.56E+00 G
			511.86	1.773E+01	?	1.013E+01	3.22E+01	2.00E+01 GA
AG-108M	C	-3.3922E-01					1.53E+05	
			433.94	-3.392E-01	?(	1.417E+00	1.66E+02	9.05E+01 G
			722.94	0.000E+00	+	2.648E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	4.626E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.2314E-01					2.50E+02	
			884.68	3.689E-03	&(	3.820E+00	2.95E+04	7.27E+01 G
			657.76	4.301E-01	&(	1.600E+00	1.09E+02	9.46E+01 G
			937.49	-2.257E+00	+	6.706E+00	1.33E+02	3.44E+01 G
			1384.30	2.440E+00	?(P	5.282E+00	9.50E+01	2.43E+01 G
			763.94	-4.733E+00	+	9.659E+00	6.20E+01	2.23E+01 G
SN-113	F	-1.1633E+00					1.15E+02	
			391.69	-1.163E+00	&(P	2.489E+00	7.11E+01	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	7.7483E-01					6.02E+01	
			602.73	3.704E-01	?(	4.119E+00	3.29E+02	9.83E+01 G
			1690.98	0.000E+00	-	3.214E+00	1.00E+03	4.78E+01 G
			722.79	4.451E+00	?(P	2.111E+01	1.39E+02	1.08E+01 G
SB-125	I	5.4089E+00					1.01E+03	
			427.88	1.471E+00	?(P	4.028E+00	1.09E+02	2.96E+01 G
			600.50	3.449E+00	&(P	2.216E+01	1.91E+02	1.79E+01 G
			635.89	9.605E-01	?(	1.208E+01	3.53E+02	1.13E+01 G
			463.37	2.469E+01	(P	9.706E+00	1.60E+01	1.05E+01 G
I-131	I	4.4735E-01					8.02E+00	
			364.48	9.133E-02	?(P	1.541E+00	6.66E+02	8.17E+01 G
			284.30	5.185E+00	&(	1.728E+01	1.34E+02	6.14E+00 G
			636.97	3.251E-01	%	2.056E+01	1.76E+03	7.17E+00 G
Gd-153	F	-1.7020E+00					2.42E+02	
			97.50	-1.702E+00	?(	9.644E+00	1.70E+02	3.00E+01 G
			103.20	-2.419E+00	+	1.206E+01	1.50E+02	2.18E+01 G
Ga-68	C	-1.8121E+01					4.71E-02	
			1077.40	-1.812E+01	&(	7.838E+01	1.90E+02	3.30E+00 G
BA-133	F	-9.5585E-01					3.85E+03	
			356.00	-9.559E-01	&(P	4.812E+00	1.20E+02	6.20E+01 G
			302.85	-2.923E+00	+	1.466E+01	1.50E+02	1.83E+01 G
			383.84	-6.530E+00	&	2.382E+01	1.09E+02	8.94E+00 GA
			80.99	-1.711E+00	+ P	8.922E+00	5.42E+01	3.41E+01 GA
CS-134	I	3.7538E-01					7.54E+02	
			604.71	0.000E+00	?(	4.203E+00	1.00E+03	9.76E+01 G
			795.87	8.038E-01	?(	2.053E+00	7.63E+01	8.55E+01 G
			569.32	-2.855E+00	+	9.225E+00	9.53E+01	1.54E+01 G
			801.95	-1.071E+01	+	3.057E+01	8.52E+01	8.69E+00 G
			563.24	-6.726E+00	+	2.094E+01	1.30E+02	8.35E+00 G
CS-137	I	-9.6587E-01					1.10E+04	
			661.66	-9.659E-01	?(P	2.523E+00	1.07E+02	8.52E+01 G
CE-139	F	-2.2444E-01					1.38E+02	
			165.85	-2.244E-01	(	1.720E+00	2.27E+02	7.99E+01 G
Ba-140	I	-1.2514E-02					1.28E+01	
			537.26	-1.251E-02	%(P	5.819E+00	1.88E+04	2.44E+01 G
			162.66	-6.876E+00	+	2.380E+01	1.04E+02	6.22E+00 G
			304.85	-1.107E+01	+	6.426E+01	1.73E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	1.0459E+00					1.28E+01	
			1596.21	-4.783E-01	?(P	1.997E+00	4.44E+02	9.54E+01 G
			487.02	5.622E-02	% P	4.462E+00	2.29E+03	4.55E+01 G
			328.76	8.209E+00	&(P	5.891E+00	3.10E+01	2.03E+01 G
			815.77	-1.312E+00	&	9.663E+00	2.13E+02	2.33E+01 G
CE-141	I	4.1418E-01					3.25E+01	
			145.44	4.142E-01	?(	2.175E+00	2.04E+02	4.82E+01 G
PM-144	C	-6.7646E-02					3.63E+02	
			696.54	-6.765E-02	?(	1.582E+00	9.76E+02	9.90E+01 G
			618.06	-4.883E-03	% P	4.216E+00	1.71E+04	9.91E+01 G
EU-152	F	2.9574E+00					4.94E+03	
			344.29	-5.374E-02	%(P	8.948E+00	3.76E+03	2.65E+01 G
			1112.07	6.864E+00	?(	1.964E+01	8.51E+01	1.36E+01 G
			121.78	-1.565E+00	& P	4.727E+00	6.98E+01	2.86E+01 G
			778.92	-1.421E-01	%	1.075E+01	3.08E+03	1.29E+01 G
			964.11	2.946E+00	&(	2.422E+01	2.40E+02	1.46E+01 G
			244.69	6.475E+00	?(	4.251E+01	1.97E+02	7.58E+00 G
			1408.00	3.031E+00	?	6.062E+00	8.94E+01	2.10E+01 GA
EU-154	I	1.5550E+00					3.14E+03	
			873.23	-3.304E-01	%(	1.678E+01	1.42E+03	1.23E+01 G
			123.10	9.945E-01	?(	3.137E+00	9.47E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.261E+00	1.00E+03	3.52E+01 G
			723.36	3.830E+00	?(	1.067E+01	8.32E+01	2.02E+01 G
			1004.77	-2.920E+00	+	1.727E+01	1.73E+02	1.80E+01 G
			996.33	-5.782E+00	+	2.531E+01	1.28E+02	1.06E+01 G
EU-155	I	-2.4874E+00					1.81E+03	
			105.31	-2.487E+00	(	1.267E+01	1.53E+02	2.12E+01 G
			86.54	-1.714E+00	&	1.056E+01	1.85E+02	3.07E+01 G
HF-181	F	8.9205E-01					4.24E+01	
			482.00	5.628E-01	?(	2.050E+00	1.08E+02	8.05E+01 G
			133.02	0.000E+00	&	4.724E+00	1.00E+03	4.33E+01 G
			345.83	2.651E+00	@(P	6.656E+00	1.01E+02	1.51E+01 G
			136.30	0.000E+00	-	3.528E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.4827E+00					1.14E+02	
			1121.30	1.441E-01	%(	1.037E+01	2.06E+03	3.49E+01 G
			1221.41	3.213E+00	(P	6.535E+00	9.12E+01	2.70E+01 G
			1189.05	-1.144E+00	+	1.529E+01	5.99E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	5.3252E-01					4.66E+01	
			279.20	5.325E-01	&(	1.833E+00	1.03E+02	8.15E+01 G
TL-208	N	9.8526E+00					6.98E+02	
			583.02	9.853E+00	(P	1.178E+00	8.70E+00	8.45E+01 G
			277.28	1.940E+01	+ P	1.650E+01	3.76E+01	6.31E+00 G
			860.56	5.228E+00	- P	1.116E+01	9.05E+01	1.24E+01 G
pm-146	C	5.4762E-02					2.02E+03	
			747.16	-1.255E+00	&(P	5.157E+00	1.64E+02	3.40E+01 G
			735.72	-3.120E+00	+ P	8.438E+00	9.83E+01	2.25E+01 G
			453.88	7.398E-01	(	1.730E+00	9.76E+01	6.50E+01 G
y-88	F	-8.6404E-01					1.07E+02	
			898.04	-8.640E-01	?(	2.258E+00	1.17E+02	9.37E+01 G
			1836.06	1.028E-01	+ P	1.683E+00	6.91E+02	9.92E+01 G
Cd-113m		-5.7797E+02					5.33E+03	
			263.70	-5.780E+02	&(	2.075E+04	1.04E+03	6.00E-03 K
Cf-251	T	-1.3111E+00					3.28E+05	
			176.60	-1.311E+00	(	7.068E+00	2.10E+02	1.70E+01 G
			227.00	-3.168E+00	&	2.072E+01	2.53E+02	6.30E+00 GA
Cf-249	T	-2.1841E-02					1.28E+05	
			387.95	-2.184E-02	%(	3.213E+00	4.29E+03	6.60E+01 G
			333.44	4.762E-01	&	1.914E+01	1.19E+03	1.55E+01 G
Sn-126		-6.5145E+00					3.65E+07	
			87.57	-1.397E+00	}	8.082E+00	1.74E+02	3.75E+01 GA
			64.28	-6.514E+00	(	2.532E+01	1.17E+02	9.70E+00 G
			86.94	-5.809E+00	}	3.490E+01	1.81E+02	9.04E+00 GA
PB-210	N	-2.9615E+01					8.14E+03	
			46.54	-2.962E+01	?(P	7.074E+01	4.29E+01	4.25E+00 G
PB-212	N	2.9807E+01					6.98E+02	
			238.63	2.981E+01	(	1.978E+00	4.49E+00	4.33E+01 G
			300.03	3.813E+01	+	2.060E+01	2.34E+01	3.28E+00 GA
PB-214	N	2.2606E+01					5.84E+05	
			351.93	2.207E+01	(P	2.978E+00	8.47E+00	3.76E+01 G
			295.09	2.365E+01	(P	4.980E+00	1.13E+01	1.93E+01 G
			242.00	2.421E+01		1.573E+01	2.17E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	3.1672E-01					1.18E+04	
			569.70	-1.813E-01	(	1.582E+00	2.50E+02	9.77E+01 G
			1063.66	9.700E-01	&(P	2.043E+00	9.13E+01	7.45E+01 G
BI-212	N	-6.3923E-02					6.98E+02	
			727.17	-6.392E-02	%(P	3.169E+01	1.41E+04	7.55E+00 G
			785.42	8.972E+01		1.095E+02	5.42E+01	1.28E+00 GA
BI-214	N	1.8643E+01					5.84E+05	
			609.31	1.823E+01	(P	2.876E+00	9.73E+00	4.61E+01 G
			1120.29	6.043E+00	- P	2.084E+01	1.02E+02	1.51E+01 G
			1764.49	1.988E+01	?(P	1.329E+01	2.59E+01	1.54E+01 G
BI-210M	T	4.8848E-01					1.10E+09	
			265.83	4.885E-01	?(	2.395E+00	1.98E+02	5.00E+01 G
			304.90	0.000E+00	-	1.002E+01	1.00E+03	2.80E+01 G
AC-228	N	3.4252E+01					2.10E+03	
			911.07	3.527E+01	(P	3.229E+00	8.70E+00	2.90E+01 G
			968.97	6.353E+00	- P	1.715E+01	8.08E+01	1.75E+01 G
			338.32	3.180E+01	(	7.032E+00	1.19E+01	1.20E+01 G
			93.35	5.595E+01	+	1.753E+01	1.44E+01	5.56E+00 XA
TH-227	N	8.0961E+00					7.95E+03	
			50.14	8.096E+00	*(	2.916E+01	1.08E+02	8.00E+00 G
			256.24	1.293E+00	-	1.586E+01	4.68E+02	7.00E+00 G
TH-229	N	-1.6545E-01					2.68E+06	
			193.51	-1.149E+01	@(	2.845E+01	9.73E+01	4.40E+00 G
			210.85	1.650E+01	?(	4.045E+01	9.62E+01	2.99E+00 G
TH-234	N	-2.5034E+01					1.63E+12	
			63.29	-2.503E+01	*(P	6.447E+01	4.01E+01	3.81E+00 G
			92.59	-1.530E+01	+ P	5.248E+01	3.72E+01	5.58E+00 G
PA-231	N	-1.8595E+01					1.20E+07	
			302.65	-1.860E+01	?(	9.265E+01	1.49E+02	2.88E+00 G
			300.07	-2.158E+01	+	1.123E+02	1.55E+02	2.46E+00 G
PA-233	C	1.3449E+00					7.82E+08	
			312.01	1.345E+00	?(	6.873E+00	1.52E+02	3.60E+01 G
			300.18	-8.568E+00	+	4.368E+01	1.52E+02	6.20E+00 G
PA-234	N	2.7444E+00					1.63E+12	
			131.29	-2.725E-02	%(	1.131E+01	1.23E+04	1.80E+01 G
			946.02	-2.356E+00	+ P	1.283E+01	2.93E+02	1.34E+01 G
			569.47	2.505E+00	(	1.863E+01	2.14E+02	8.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          883.24 8.145E+00 ?(  2.671E+01 9.72E+01 9.60E+00 G
                          880.53 1.298E+01 &   3.883E+01 8.88E+01 6.00E+00 GA

PA-234M  N   6.4164E+00                                     1.63E+12
                         1001.00 0.000E+00 &(  3.429E+02 1.00E+03 8.37E-01 G
                          766.41 2.468E+01 ?(  7.906E+02 9.14E+02 2.94E-01 G

U-235    N   3.3051E+00                                     2.57E+11
                          143.79-1.374E-02 &(P 1.928E+01 2.20E+04 1.10E+01 G
                          205.33 5.481E+00 &(  2.262E+01 1.60E+02 5.01E+00 G
                          163.38 8.320E+00 &(  2.654E+01 9.56E+01 5.08E+00 G

AM-241   T   7.4444E+00                                     1.58E+05
                           59.54 7.444E+00 ?(  6.731E+00 2.82E+01 3.59E+01 G

Ir-192   F   8.1642E-01                                     7.40E+01
                          316.49 5.643E-01  (  2.807E+00 1.48E+02 8.70E+01 G
                          468.06-1.751E-01 -   3.831E+00 6.34E+02 5.18E+01 G
                          308.44 1.508E+00 *(  7.902E+00 1.56E+02 3.18E+01 G

Cs-136   F   2.2551E-01                                     1.30E+01
                          818.50-1.726E-01 ?(  2.334E+00 3.87E+02 1.00E+02 G
                         1048.07 4.447E-01 ?(  2.313E+00 1.48E+02 8.00E+01 G
                          340.57 7.005E-01 ?(  4.914E+00 2.08E+02 4.69E+01 G

Np-239   T   1.7838E+00                                     2.36E+00
                          103.70-2.197E+00 +   1.108E+01 1.52E+02 2.40E+01 X
                          106.13 1.784E+00  (  6.665E+00 1.12E+02 2.27E+01 G
                           99.50-3.077E-01 %   1.940E+01 1.89E+03 1.50E+01 X

Nd-147      -2.7792E+00                                     1.11E+01
                          531.00-2.779E+00 ?(  1.244E+01 1.86E+02 1.30E+01 G
                           91.10-1.829E+00 +   1.045E+01 1.72E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
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library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	490.	-44.	-0.025	42.89	-2.962E+01	P
TH-227	50.14	367.	26.	0.014	107.91	8.096E+00	
TH-234	63.29	737.	-50.	-0.028	40.14	-2.503E+01	P
Sn-126	64.28	761.	-34.	-0.019	116.77	-6.514E+00	
BA-133	80.99	1695.	-37.	-0.021	54.19	-1.711E+00	P
EU-155	86.54	2068.	-35.	-0.019	185.38	-1.714E+00	
Sn-126	86.94	1966.	-35.	-0.019	180.75	-5.809E+00	
Sn-126	87.57	1824.	-35.	-0.019	174.05	-1.397E+00	
Nd-147	91.10	1789.	-35.	-0.019	171.83	-1.829E+00	
TH-234	92.59	1777.	-58.	-0.032	37.17	-1.530E+01	P
Gd-153	97.50	1782.	-35.	-0.020	170.45	-1.702E+00	
Gd-153	103.20	1497.	-37.	-0.020	149.94	-2.419E+00	
Np-239	103.70	1533.	-37.	-0.020	151.68	-2.197E+00	
EU-155	105.31	1570.	-37.	-0.020	153.22	-2.487E+00	
Np-239	106.13	487.	28.	0.016	112.08	1.784E+00	
EU-152	121.78	380.	-31.	-0.017	69.80	-1.565E+00	P
CO-57	122.06	411.	-24.	-0.013	119.98	-4.090E-01	
EU-154	123.10	338.	28.	0.016	94.70	9.945E-01	
CE-141	145.44	198.	13.	0.007	204.39	4.142E-01	
Ba-140	162.66	351.	-26.	-0.014	103.77	-6.876E+00	
U-235	163.38	287.	26.	0.014	95.65	8.320E+00	
CE-139	165.85	304.	-11.	-0.006	227.13	-2.244E-01	
Cf-251	176.60	209.	-13.	-0.007	209.89	-1.311E+00	
TH-229	193.51	198.	-28.	-0.015	97.33	-1.149E+01	
U-235	205.33	147.	14.	0.008	160.26	5.481E+00	
TH-229	210.85	161.	25.	0.014	96.17	1.650E+01	
Cf-251	227.00	169.	-10.	-0.005	253.40	-3.168E+00	
EU-152	244.69	966.	22.	0.012	196.72	6.475E+00	
TH-227	256.24	99.	4.	0.002	468.04	1.293E+00	
Hg-203	279.20	161.	18.	0.010	102.65	5.325E-01	
I-131	284.30	76.	13.	0.007	134.19	5.185E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	300.07	513.	-21.	-0.012	155.49	-2.158E+01	
PA-233	300.18	492.	-21.	-0.012	152.34	-8.568E+00	
PA-231	302.65	471.	-21.	-0.012	148.88	-1.860E+01	
BA-133	302.85	477.	-21.	-0.012	149.81	-2.923E+00	
Ba-140	304.85	498.	-18.	-0.010	173.34	-1.107E+01	
Ir-192	308.44	403.	18.	0.010	156.33	1.508E+00	
PA-233	312.01	384.	18.	0.010	152.42	1.345E+00	
Ir-192	316.49	366.	18.	0.010	148.33	5.643E-01	
CR-51	320.08	297.	17.	0.009	146.61	4.555E+00	P
La-140	328.76	77.	61.	0.034	30.97	8.209E+00	P
Cs-136	340.57	288.	12.	0.006	207.90	7.005E-01	
HF-181	345.83	49.	14.	0.008	100.76	2.651E+00	P
BA-133	356.00	458.	-20.	-0.011	119.72	-9.559E-01	P
I-131	364.48	72.	3.	0.001	665.71	9.133E-02	P
BA-133	383.84	201.	-19.	-0.010	108.80	-6.530E+00	
SN-113	391.69	106.	-24.	-0.013	71.08	-1.163E+00	P
AG-108M	433.94	56.	-9.	-0.005	166.17	-3.392E-01	
pm-146	453.88	39.	14.	0.008	97.57	7.398E-01	
Ir-192	468.06	124.	-2.	-0.001	634.35	-1.751E-01	
BE-7	477.60	97.	13.	0.007	108.72	4.630E+00	P
HF-181	482.00	80.	12.	0.007	107.67	5.628E-01	
RU-103	497.05	65.	-13.	-0.007	129.60	-5.441E-01	
RH-106	511.86	112.	91.	0.051	32.16	1.773E+01	
Nd-147	531.00	65.	-9.	-0.005	185.87	-2.779E+00	
CS-134	563.24	69.	-13.	-0.007	130.38	-6.726E+00	
CS-134	569.32	43.	-10.	-0.006	95.31	-2.855E+00	
PA-234	569.47	51.	5.	0.003	213.51	2.505E+00	
BI-207	569.70	52.	-4.	-0.002	249.99	-1.813E-01	
SB-124	602.73	358.	8.	0.005	329.28	3.704E-01	
AG-110M	657.76	38.	8.	0.005	108.78	4.301E-01	
CS-137	661.66	81.	-17.	-0.010	106.82	-9.659E-01	P
PM-144	696.54	37.	-1.	-0.001	975.96	-6.765E-02	
NB-94	702.63	37.	7.	0.004	198.24	3.445E-01	
SB-124	722.79	79.	9.	0.005	139.08	4.451E+00	P
EU-154	723.36	70.	15.	0.008	83.15	3.830E+00	
pm-146	735.72	51.	-13.	-0.007	98.25	-3.120E+00	P
pm-146	747.16	42.	-8.	-0.004	163.92	-1.255E+00	P
ZR-95	756.73	42.	-7.	-0.004	184.94	-7.030E-01	P
AG-110M	763.94	63.	-19.	-0.011	62.00	-4.733E+00	
NB-95	765.79	85.	15.	0.009	88.47	8.409E-01	
PA-234M	766.41	74.	1.	0.001	914.47	2.468E+01	
BI-212	785.42	23.	21.	0.011	54.24	8.972E+01	
CS-134	795.87	38.	12.	0.007	76.34	8.038E-01	
CS-134	801.95	90.	-16.	-0.009	85.25	-1.071E+01	
CO-58	810.78	50.	12.	0.007	86.01	7.072E-01	
La-140	815.77	61.	-5.	-0.003	212.55	-1.312E+00	
Cs-136	818.50	66.	-3.	-0.002	387.30	-1.726E-01	
MN-54	834.85	14.	10.	0.005	88.31	5.649E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	846.77	28.	-3.	-0.002	378.59	-1.778E-01		
NB-94	871.10	31.	12.	0.007	70.62	7.390E-01		
PA-234	880.53	58.	13.	0.007	88.84	1.298E+01		
PA-234	883.24	70.	13.	0.007	97.18	8.145E+00		
Sc-46	889.28	80.	-2.	-0.001	761.31	-1.029E-01		
y-88	898.04	45.	-13.	-0.007	116.79	-8.640E-01		
AG-110M	937.49	50.	-12.	-0.007	132.72	-2.257E+00		
PA-234	946.02	26.	-5.	-0.003	292.54	-2.356E+00	P	
EU-152	964.11	118.	6.	0.004	240.07	2.946E+00		
EU-154	996.33	62.	-9.	-0.005	128.14	-5.782E+00		
EU-154	1004.77	84.	-8.	-0.004	172.55	-2.920E+00		
Cs-136	1048.07	25.	5.	0.003	148.32	4.447E-01		
RH-106	1050.36	25.	7.	0.004	108.45	3.186E+01	P	
BI-207	1063.66	16.	10.	0.006	91.32	9.700E-01	P	
Ga-68	1077.40	35.	-7.	-0.004	189.61	-1.812E+01		
FE-59	1099.25	33.	6.	0.004	205.73	8.395E-01	P	
EU-152	1112.07	50.	13.	0.007	85.10	6.864E+00		
ZN-65	1115.55	52.	13.	0.007	85.87	1.858E+00		
Sc-46	1120.55	82.	11.	0.006	122.84	8.128E-01		
CO-60	1173.24	32.	-6.	-0.004	192.47	-5.062E-01	P	
Ta-182	1189.05	37.	-2.	-0.001	598.81	-1.144E+00		
Ta-182	1221.41	17.	11.	0.006	91.19	3.213E+00	P	
Co-56	1238.28	32.	16.	0.009	84.10	1.995E+00		
NA-22	1274.53	16.	-1.	-0.001	574.46	-8.450E-02		
FE-59	1291.60	16.	8.	0.004	119.02	1.582E+00		
CO-60	1332.50	16.	9.	0.005	106.38	7.907E-01		
AG-110M	1384.30	6.	7.	0.004	95.04	2.440E+00	P	
EU-152	1408.00	6.	7.	0.004	89.39	3.031E+00		
La-140	1596.21	11.	-4.	-0.002	444.04	-4.783E-01	P	
y-88	1836.06	6.	1.	0.000	691.19	1.028E-01	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	4.6296E+00	4.6296E+00	1.087E+02%	1.70E+01
NA-22	#A	-8.4496E-02	-8.4496E-02	5.745E+02%	1.80E+00
K-40		2.9965E+02	2.9965E+02	5.850E+00%	1.53E+01
Sc-46	#A	3.5494E-01	3.5494E-01	1.228E+02%	2.74E+00
CR-51	#A	4.5548E+00	4.5549E+00	1.466E+02%	2.24E+01
MN-54	#A	5.6490E-01	5.6490E-01	8.831E+01%	1.18E+00
FE-59	#A	1.1613E+00	1.1613E+00	1.188E+02%	3.85E+00
Co-56	#A	6.8708E-01	6.8708E-01	8.410E+01%	1.62E+00
CO-57	#A	-4.0904E-01	-4.0904E-01	1.200E+02%	1.64E+00
CO-58	#A	7.0718E-01	7.0718E-01	8.601E+01%	2.05E+00

CO-60	#A	7.9068E-01	7.9068E-01	1.064E+02%	1.88E+00
ZN-65	#A	1.8583E+00	1.8583E+00	8.587E+01%	5.37E+00
NB-94	#A	5.4377E-01	5.4377E-01	7.062E+01%	1.61E+00
ZR-95	#A	-7.0304E-01	-7.0304E-01	1.849E+02%	3.26E+00
NB-95	#A	8.4086E-01	8.4087E-01	8.847E+01%	2.50E+00
RU-103	#A	-5.4407E-01	-5.4408E-01	1.296E+02%	1.69E+00
RH-106	#A	4.4583E+00	4.4583E+00	1.085E+02%	1.39E+01
AG-108M	#A	-3.3922E-01	-3.3922E-01	1.662E+02%	1.42E+00
AG-110M	#A	5.2314E-01	5.2314E-01	9.504E+01%	3.82E+00
SN-113	#A	-1.1633E+00	-1.1633E+00	7.108E+01%	2.49E+00
SB-124	#A	7.7482E-01	7.7483E-01	1.391E+02%	4.12E+00
SB-125	C	5.4089E+00	5.4089E+00	1.600E+01%	4.03E+00
I-131	#A	4.4733E-01	4.4735E-01	1.342E+02%	1.54E+00
Gd-153	#A	-1.7020E+00	-1.7020E+00	1.705E+02%	9.64E+00
Ga-68	#A	-1.7955E+01	-1.8121E+01	1.896E+02%	7.84E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.41E+00
BA-133	#A	-9.5585E-01	-9.5585E-01	1.197E+02%	4.81E+00
CS-134	#A	3.7538E-01	3.7538E-01	7.634E+01%	4.20E+00
CS-137	#A	-9.6587E-01	-9.6587E-01	1.068E+02%	2.52E+00
CE-139	#A	-2.2444E-01	-2.2444E-01	2.271E+02%	1.72E+00
Ba-140	#A	-1.2514E-02	-1.2514E-02	1.876E+04%	5.82E+00
La-140	#A	1.0459E+00	1.0459E+00	3.097E+01%	2.00E+00
CE-141	#A	4.1417E-01	4.1418E-01	2.044E+02%	2.18E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.85E+01
PM-144	#A	-6.7646E-02	-6.7646E-02	9.760E+02%	1.58E+00
EU-152	#A	2.9574E+00	2.9574E+00	8.510E+01%	8.95E+00
EU-154	#A	1.5550E+00	1.5550E+00	8.315E+01%	1.68E+01
EU-155	#A	-2.4874E+00	-2.4874E+00	1.532E+02%	1.27E+01
HF-181	#A	8.9204E-01	8.9205E-01	7.373E+01%	2.05E+00
Ta-182	#A	1.4827E+00	1.4827E+00	9.119E+01%	1.04E+01
Hg-203	#A	5.3252E-01	5.3252E-01	1.026E+02%	1.83E+00
TL-208		9.8526E+00	9.8526E+00	8.696E+00%	1.18E+00
pm-146	#A	5.4762E-02	5.4762E-02	9.538E+01%	5.16E+00
y-88	#A	-8.6404E-01	-8.6404E-01	1.168E+02%	2.26E+00
Cd-113m	#B	-5.7797E+02	-5.7797E+02	1.038E+03%	2.08E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.21E+01
Cf-251	#A	-1.3111E+00	-1.3111E+00	2.099E+02%	7.07E+00
Cf-249	#A	-2.1841E-02	-2.1841E-02	4.290E+03%	3.21E+00
Sn-126	#A	-6.5145E+00	-6.5145E+00	1.168E+02%	2.53E+01
PB-210	#A	-2.9615E+01	-2.9615E+01	4.289E+01%	7.07E+01
PB-212		2.9807E+01	2.9807E+01	4.487E+00%	1.98E+00
PB-214		2.2606E+01	2.2606E+01	7.070E+00%	2.98E+00
BI-207	#A	3.1672E-01	3.1672E-01	9.132E+01%	1.58E+00
BI-212	#A	-6.3923E-02	-6.3923E-02	1.414E+04%	3.17E+01
BI-214		1.8643E+01	1.8643E+01	9.730E+00%	2.88E+00
BI-210M	#A	4.8848E-01	4.8848E-01	1.975E+02%	2.39E+00
AC-228		3.4252E+01	3.4252E+01	7.372E+00%	3.23E+00
TH-227	#A	8.0961E+00	8.0961E+00	1.079E+02%	2.92E+01
TH-229	#A	-1.6545E-01	-1.6545E-01	6.842E+01%	2.85E+01

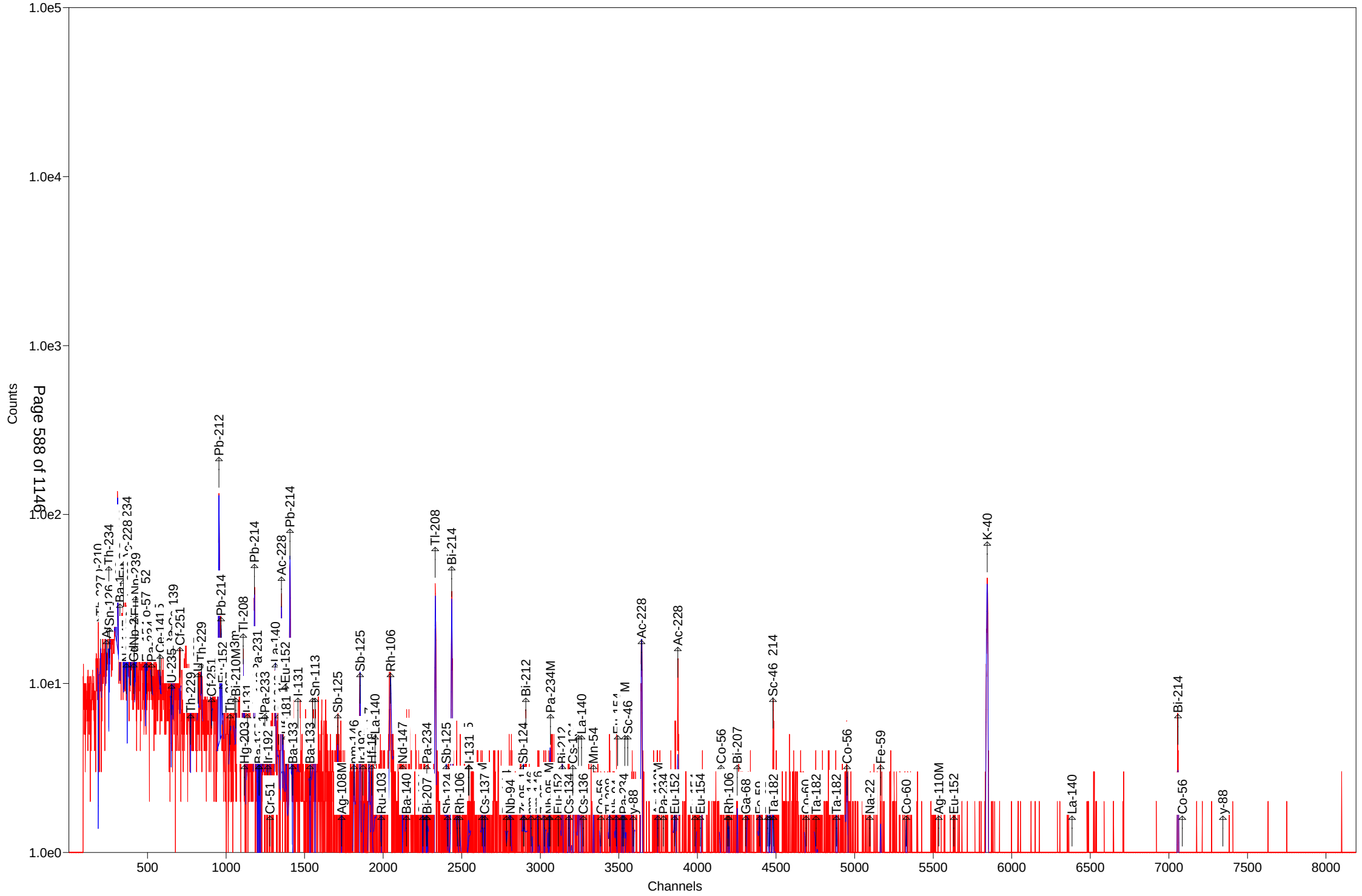
TH-234 #A	-2.5034E+01	-2.5034E+01	4.014E+01%	6.45E+01
PA-231 #A	-1.8595E+01	-1.8595E+01	1.489E+02%	9.26E+01
PA-233 #A	1.3449E+00	1.3449E+00	1.524E+02%	6.87E+00
PA-234 #A	2.7444E+00	2.7444E+00	9.718E+01%	1.13E+01
PA-234M#A	6.4164E+00	6.4164E+00	6.775E+02%	3.43E+02
U-235 #A	3.3051E+00	3.3051E+00	9.565E+01%	1.93E+01
AM-241 #	7.4444E+00	7.4444E+00	2.820E+01%	6.73E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.46E+01
Ir-192 #A	8.1642E-01	8.1642E-01	1.078E+02%	2.81E+00
Cs-136 #A	2.2550E-01	2.2551E-01	1.483E+02%	2.33E+00
Np-239 #A	1.7834E+00	1.7838E+00	1.121E+02%	6.67E+00
Nd-147 #A	-2.7791E+00	-2.7792E+00	1.859E+02%	1.24E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 4.148E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.1481171E+02 Bq/Sample

264535_Gamma_160-18554-A-7-B. 15_Gamma_20161065.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162107

Sample Description: 264535_Gamma_160-18554-A-8-B
Detector: Detector #16
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-8-B

Decay to Time: 9/1/2016 12:34 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:35:01 Real Time: 1822 sec
Analysis Time: 9/1/2016 13:05 Dead Time: 1.21 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Soil_TunaCan.Clb
Efficiency Cal Desc: 16_TunaCan_90099_071012
Efficiency Cal Date: 7/13/2012 09:47
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 16_2016-08-07_0542.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.129E+00	109.2	4.507E+00	4.512E+00	1.516E+01
NA-22	-9.847E-01	58.8	5.789E-01	5.810E-01	1.894E+00
K-40	2.275E+02	5.3	1.216E+01	1.684E+01	1.085E+01
Sc-46	-8.258E-02	615.9	5.086E-01	5.086E-01	1.786E+00
CR-51	4.029E+00	191.1	7.698E+00	7.701E+00	2.576E+01
MN-54	6.087E-01	89.1	5.421E-01	5.430E-01	1.213E+00
FE-59	4.681E-01	85.5	4.003E-01	4.010E-01	2.733E+00
Co-56	9.047E-01	43.1	3.903E-01	3.931E-01	1.476E+00
CO-57	-1.691E-01	82.0	1.387E-01	1.390E-01	1.203E+00
CO-58	-7.633E-01	81.8	6.241E-01	6.253E-01	2.084E+00
CO-60	4.683E-01	109.1	5.111E-01	5.116E-01	1.124E+00
ZN-65	0.000E+00	1.#INF	2.585E-01	2.585E-01	5.739E+00
NB-94	6.237E-01	90.5	5.645E-01	5.655E-01	1.893E+00
ZR-95	1.419E+00	57.7	8.183E-01	8.216E-01	2.533E+00
NB-95	0.000E+00	1.#INF	9.889E-02	9.889E-02	2.156E+00
RU-103	4.541E-01	94.5	4.292E-01	4.298E-01	1.027E+00
RH-106	-1.834E-01	67.1	1.232E-01	1.235E-01	3.940E+01
AG-108M	4.389E-01	115.3	5.062E-01	5.067E-01	1.105E+00
AG-110M	7.818E-01	85.5	6.686E-01	6.698E-01	2.248E+00
SN-113	2.720E-01	271.3	7.379E-01	7.381E-01	2.511E+00
SB-124	7.891E-01	31.6	2.495E-01	2.529E-01	3.322E+00
SB-125	2.556E+00	54.4	1.391E+00	1.397E+00	3.227E+00
I-131	-2.452E-01	124.5	3.053E-01	3.056E-01	1.416E+00
Gd-153	-1.575E+00	169.3	2.667E+00	2.669E+00	8.856E+00
Ga-68	-1.791E+01	156.9	2.810E+01	2.812E+01	6.141E+01
Tc-99m	4.001E-01	166.9	6.679E-01	6.683E-01	2.225E+00
BA-133	-7.671E-01	155.5	1.193E+00	1.194E+00	3.992E+00
CS-134	1.202E+00	39.8	4.782E-01	4.823E-01	3.402E+00
CS-137	2.976E-01	184.1	5.478E-01	5.480E-01	1.879E+00
CE-139	3.960E-01	130.9	5.185E-01	5.199E-01	1.733E+00
Ba-140	-2.994E-01	569.0	1.704E+00	1.704E+00	4.986E+00
La-140	6.856E-01	100.2	6.869E-01	6.879E-01	1.417E+00
CE-141	2.205E-01	359.9	7.935E-01	7.936E-01	2.038E+00

CE-144	3.040E+00	164.8	5.009E+00	5.011E+00	1.669E+01
PM-144	-7.339E-01	74.1	5.440E-01	5.453E-01	1.809E+00
EU-152	2.117E-01	98.2	2.078E-01	2.081E-01	9.944E+00
EU-154	1.930E+00	129.6	2.501E+00	2.503E+00	1.073E+01
EU-155	-2.217E+00	173.9	3.856E+00	3.858E+00	1.280E+01
HF-181	4.342E-01	73.2	3.177E-01	3.184E-01	2.348E+00
Ta-182	9.355E-02	84.7	7.928E-02	7.942E-02	8.762E+00
Hg-203	1.327E-01	344.9	4.576E-01	4.576E-01	1.561E+00
TL-208	9.207E+00	8.0	7.383E-01	8.793E-01	1.027E+00
pm-146	2.781E-02	107.4	2.986E-02	2.989E-02	4.019E+00
y-88	-5.510E-01	76.2	4.196E-01	4.206E-01	1.733E+00
Cd-113m	-2.988E+03	178.9	5.344E+03	5.348E+03	1.816E+04
Cd-109	0.000E+00	1.#INF	2.296E+01	2.296E+01	7.624E+01
Cf-251	-4.109E-01	570.4	2.344E+00	2.344E+00	6.043E+00
Cf-249	6.126E-01	100.1	6.131E-01	6.139E-01	2.059E+00
Sn-126	1.659E+00	366.6	6.083E+00	6.083E+00	2.040E+01
PB-210	2.641E+01	47.7	1.261E+01	1.270E+01	3.264E+01
PB-212	2.613E+01	4.4	1.154E+00	2.047E+00	1.862E+00
PB-214	2.015E+01	8.4	1.686E+00	1.985E+00	2.827E+00
BI-207	-6.073E-02	630.2	3.827E-01	3.828E-01	1.342E+00
BI-212	3.645E+01	18.1	6.597E+00	6.863E+00	1.262E+01
BI-214	2.019E+01	6.9	1.385E+00	1.737E+00	1.832E+00
BI-210M	-3.108E-01	233.8	7.268E-01	7.271E-01	2.470E+00
AC-228	2.890E+01	6.5	1.868E+00	2.380E+00	3.016E+00
TH-227	5.760E+00	123.0	7.087E+00	7.094E+00	2.371E+01
TH-229	9.013E+00	96.2	8.667E+00	8.697E+00	2.206E+01
TH-234	1.903E+01	27.3	5.198E+00	5.293E+00	3.170E+01
PA-231	-1.769E+01	145.7	2.578E+01	2.580E+01	8.606E+01
PA-233	1.184E+00	185.4	2.195E+00	2.196E+00	7.339E+00
PA-234	1.858E+00	160.7	2.986E+00	2.988E+00	9.952E+00
PA-234M	3.776E+00	177.5	6.702E+00	6.705E+00	2.467E+02
U-235	8.737E-01	370.4	3.236E+00	3.237E+00	1.801E+01
AM-241	-2.068E+00	52.3	1.082E+00	1.087E+00	5.926E+00
Np-237	-3.220E+00	190.8	6.145E+00	6.147E+00	2.042E+01
Ir-192	7.367E-01	127.8	9.415E-01	9.426E-01	3.110E+00
Cs-136	-1.464E-03	554.5	8.116E-03	8.117E-03	2.370E+00
Np-239	1.949E+00	174.9	3.408E+00	3.410E+00	1.132E+01
Nd-147	-5.011E+00	90.1	4.514E+00	4.524E+00	1.064E+01
Total	4.684E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-8-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162107.An1

Acquisition information

Start time:	9/1/2016 12:35:01 PM
Live time:	1800
Real time:	1822
Dead time:	1.21 %
Detector ID:	16

Detector system
Ge16 SN/11012217

Calibration

Filename:	16_Soil_TunaCan.Clb

16_TunaCan_90099_071012

Energy Calibration

Created:	2/28/2012 9:35:31 AM
Zero offset:	0.050 keV
Gain:	0.250 keV/channel
Quadratic:	-2.285E-08 keV/channel^2

Efficiency Calibration

Created:	7/13/2012 9:47:24 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.01 %
Log(Eff):	1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.17 %
Log(Eff):	-2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev11.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.64keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-08-07_0542.PBC 8/7/2016 5:42:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 33 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1404

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.51	48.	47.74	1.06	2.352E-02	46.54	4.250	PBC<MDA	PB210
50.14	22.	123.03	0.96	2.644E-02	50.14	8.000	PBC<MDA	TH227
63.28	62.	38.62	0.97	3.561E-02	63.29	3.810	PBC<MDA	TH234
64.27	10.	366.58	0.98	3.619E-02	64.28	9.700	PBC<MDA	Sn126
74.91	261.	11.49	0.99	4.141E-02				
77.17	376.	7.96	0.99	4.229E-02				
80.99	35.	158.96	0.99	4.361E-02	80.99	34.060	PBC<MDA	BA133
87.24	170.	13.67	1.00	4.530E-02	86.49	13.100	1.594E+01	Np237
					86.54	30.700	6.800E+00	EU155
					86.94	9.040	2.304E+01	Sn126
					87.57	37.500	5.537E+00	Sn126
					88.04	3.790	5.466E+01	Cd109
89.86	113.	20.33	1.00	4.587E-02				
92.80	93.	26.93	1.00	4.640E-02	92.59	5.584	1.987E+01	TH234
					93.35	5.561	1.990E+01	AC228
106.13	38.	174.88	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
121.78	22.	111.68	1.03	4.731E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.005E-01	CO57
123.10	13.	201.92	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154
129.24	71.	41.09	0.78	4.662E-02				
131.29	28.	160.71	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	28.	162.67	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					133.54	11.090	3.038E+00	CE144
133.54	28.	164.78	1.04	4.612E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.040E+00	CE144
136.30	28.	166.53	1.04	4.576E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.191E+00	CO57
136.47	18.	266.31	1.04	4.573E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.016E+00	CO57
141.24	28.	166.93	1.05	4.516E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	8.	359.94	1.05	4.440E-02	145.44	48.200	PBC<MDA	CE141
165.85	24.	130.94	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
185.91	108.	19.89	0.79	3.836E-02				
193.54	27.	96.16	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
205.33	7.	370.42	1.11	3.577E-02	205.33	5.010	PBC<MDA	U235
226.90	11.	209.28	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.60	618.	5.25	1.10	3.217E-02	238.63	43.300	2.466E+01	PB212
241.93	103.	17.75	1.14	3.185E-02	242.00	7.430	2.411E+01	PB214
277.19	46.	29.40	1.17	2.890E-02	277.28	6.310	1.398E+01	TL208
279.11	6.	344.87	1.17	2.876E-02	279.20	81.460	PBC<MDA	Hg203
284.30	8.	264.57	1.18	2.839E-02	284.30	6.140	PBC<MDA	I131
295.31	237.	10.65	1.06	2.763E-02	295.09	19.300	2.468E+01	PB214
299.88	65.	22.16	1.31	2.732E-02	300.03	3.280	4.055E+01	PB212
					300.07	2.460	5.408E+01	PA231
					300.18	6.200	2.146E+01	PA233
308.44	21.	178.64	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
312.01	20.	185.40	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
316.49	21.	182.84	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
320.08	19.	191.06	1.21	2.608E-02	320.08	9.940	PBC<MDA	CR51
338.23	156.	13.39	1.13	2.507E-02	338.32	12.010	2.870E+01	AC228
345.83	22.	143.30	1.23	2.467E-02	345.83	15.070	PBC<MDA	HF181
351.91	332.	8.37	1.23	2.436E-02	351.93	37.600	2.015E+01	PB214
383.84	16.	94.31	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
387.95	17.	100.07	1.27	2.271E-02	387.95	66.000	PBC<MDA	Cf249
391.69	7.	271.29	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
427.88	29.	54.43	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
433.94	14.	115.32	1.31	2.093E-02	433.94	90.480	PBC<MDA	AG108M
453.88	7.	149.04	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
477.60	15.	109.17	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
497.05	14.	94.51	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.86	113.	23.99	2.63	1.856E-02	511.86	20.000	1.691E+01	RH106
563.24	22.	52.24	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
569.32	24.	39.77	1.43	1.717E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.605E+00	PA234
					569.70	97.740	8.061E-01	BI207
583.15	236.	8.02	1.64	1.687E-02	583.02	84.500	9.207E+00	TL208
600.50	13.	215.91	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
602.73	12.	231.02	1.46	1.646E-02	602.73	98.260	PBC<MDA	SB124
604.71	12.	234.19	1.46	1.642E-02	604.71	97.620	PBC<MDA	CS134
609.43	274.	6.86	1.36	1.633E-02	609.31	46.090	2.019E+01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					610.30	5.750	1.620E+02	RU103
614.28	13.	239.60	1.47	1.623E-02	614.28	89.850	PBC<MDA	AG108M
618.06	10.	304.87	1.47	1.616E-02	618.06	99.100	PBC<MDA	PM144
635.89	8.	111.07	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
636.97	4.	247.49	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
661.66	7.	184.09	1.51	1.537E-02	661.66	85.210	PBC<MDA	CS137
702.63	16.	90.51	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
724.20	18.	76.86	1.57	1.437E-02	724.20	44.150	PBC<MDA	ZR95
727.34	71.	18.10	1.90	1.433E-02	727.17	7.550	3.645E+01	BI212
735.72	5.	228.91	1.58	1.421E-02	735.72	22.500	PBC<MDA	pm146
756.73	18.	85.97	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
766.41	6.	267.07	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
779.24	2.	915.20	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
795.87	14.	73.42	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
834.85	14.	89.06	1.66	1.293E-02	834.85	99.980	PBC<MDA	MN54
860.34	41.	26.55	0.61	1.264E-02	860.56	12.420	1.451E+01	TL208
873.23	7.	129.57	1.70	1.251E-02	873.23	12.270	PBC<MDA	EU154
884.68	13.	85.52	1.71	1.238E-02	884.68	72.680	PBC<MDA	AG110M
911.52	181.	9.08	1.59	1.211E-02	911.07	29.000	2.857E+01	AC228
964.41	14.	128.78	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152
969.27	108.	10.70	1.78	1.157E-02	968.97	17.460	2.958E+01	AC228
996.33	3.	381.52	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1048.07	1.	554.53	1.84	1.091E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	11.	67.14	1.85	1.089E-02	1050.36	1.560	PBC<MDA	RH106
1120.31	73.	13.49	1.56	1.037E-02	1120.29	15.100	2.596E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	12.	94.90	1.96	9.916E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	4.	345.51	1.99	9.717E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	29.	43.14	2.00	9.617E-03	1238.28	66.070	2.536E+00	Co56
1291.60	10.	85.51	2.05	9.314E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	8.	109.13	2.08	9.097E-03	1332.50	99.980	PBC<MDA	CO60
1461.11	371.	5.34	1.82	8.481E-03	1460.83	10.670	2.275E+02	K40
1596.21	9.	100.19	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1690.98	10.	31.62	2.37	7.585E-03	1690.98	47.790	1.533E+00	SB124
1764.93	31.	30.19	2.43	7.342E-03	1764.49	15.400	1.521E+01	BI214
1836.06	7.	37.80	2.48	7.121E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.29	74.90	323.	256.	6.182E+03	11.75	0.986	-	D
308.31	77.15	268.	366.	8.649E+03	8.23	0.988	-	D
358.54	89.77	200.	113.	2.461E+03	20.06	0.999	-	D
516.53	129.24	195.	71.	1.523E+03	41.09	0.779	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
743.12	185.91	123.	108.	2.820E+03	19.89	0.794	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.75	46.51	144.	48.	0.026	47.74	1.056
TH-227	200.26	50.14	353.	22.	0.012	123.03	0.963s
AM-241	237.83	59.54	716.	-44.	-0.025	52.32	0.971s
TH-234	252.82	63.29	257.	62.	0.035	38.62	0.975D
Sn-126	256.79	64.28	734.	10.	0.006	366.58	0.976s
BA-133	323.60	80.99	1512.	35.	0.019	158.96	0.991
Np-237	345.59	86.49	2122.	-34.	-0.019	190.85	0.996
EU-155	345.80	86.54	2600.	-40.	-0.022	182.66	0.996s
Sn-126	347.39	86.94	2560.	-40.	-0.022	181.23	0.997
Sn-126	349.91	87.57	2338.	51.	0.028	50.80	0.997D
Cd-109	351.79	88.04	2521.	0.	0.000	179.63	0.998A
Nd-147	364.02	91.10	2299.	-40.	-0.022	171.13	1.001D
TH-234	369.98	92.59	306.	68.	0.038	38.63	1.002D
AC-228	373.02	93.35	2238.	-40.	-0.022	168.51	1.003s
Gd-153	389.61	97.50	2278.	-40.	-0.022	169.33	1.007s
Np-239	397.61	99.50	2318.	-40.	-0.022	170.49	1.008s
Gd-153	412.40	103.20	2358.	-40.	-0.022	171.40	1.012s
Np-239	414.40	103.70	2398.	-40.	-0.022	172.77	1.012s
EU-155	420.85	105.31	2438.	-40.	-0.022	173.92	1.014s
Np-239	424.11	106.13	2185.	38.	0.021	174.88	1.014s
EU-152	486.67	121.78	288.	22.	0.012	111.68	1.029
CO-57	487.81	122.06	332.	-32.	-0.018	82.03	1.029s
EU-154	491.96	123.10	336.	13.	0.007	201.92	1.030s
PA-234	524.73	131.29	993.	28.	0.016	160.71	1.038s
HF-181	531.64	133.02	1021.	28.	0.016	162.67	1.039s
CE-144	533.70	133.54	1049.	28.	0.016	164.78	1.040s
HF-181	544.74	136.30	1077.	28.	0.016	166.53	1.042s
CO-57	545.43	136.47	1105.	18.	0.010	266.31	1.042s
Tc-99m	561.57	140.51	1091.	28.	0.016	166.93	1.046s
CE-141	581.29	145.44	265.	8.	0.005	359.94	1.050s
Ba-140	650.14	162.66	444.	-32.	-0.018	95.15	1.066s
U-235	653.01	163.38	476.	-28.	-0.016	111.30	1.067
CE-139	662.90	165.85	468.	24.	0.013	130.94	1.069s
Cf-251	705.88	176.60	231.	-5.	-0.003	570.44	1.079s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	773.49	193.51	180.	27.	0.015	96.16	1.094s
U-235	820.76	205.33	172.	7.	0.004	370.42	1.105
TH-229	842.82	210.85	254.	-33.	-0.018	32.11	1.110s
Cf-251	907.40	227.00	139.	11.	0.006	209.28	1.125s
PB-212	953.91	238.63	89.	655.	0.364	4.42	1.136D
PB-214	967.37	242.00	115.	103.	0.057	17.75	1.139D
TH-227	1024.32	256.24	140.	-6.	-0.004	446.52	1.152s
Cd-113m	1054.15	263.70	145.	-10.	-0.005	178.88	1.158
BI-210M	1062.67	265.83	186.	-8.	-0.005	233.82	1.160s
TL-208	1108.46	277.28	68.	46.	0.026	29.40	1.171D
Hg-203	1116.13	279.20	183.	6.	0.003	344.87	1.173
I-131	1136.52	284.30	104.	8.	0.004	264.57	1.177s
PB-214	1180.55	295.31	80.	237.	0.132	10.65	1.061s
PB-212	1198.82	299.88	46.	65.	0.036	22.16	1.308
PA-231	1199.58	300.07	696.	-25.	-0.014	151.43	1.192
PA-233	1200.02	300.18	671.	-25.	-0.014	148.75	1.192
PA-231	1209.90	302.65	646.	-25.	-0.014	145.75	1.194s
BA-133	1210.70	302.85	639.	-25.	-0.014	144.98	1.194s
Ba-140	1218.69	304.85	664.	-25.	-0.014	147.50	1.196s
BI-210M	1218.88	304.90	689.	-25.	-0.014	150.19	1.196s
Ir-192	1233.05	308.44	682.	21.	0.012	178.64	1.199s
PA-233	1247.34	312.01	704.	20.	0.011	185.40	1.202s
Ir-192	1265.24	316.49	724.	21.	0.012	182.84	1.206s
CR-51	1279.62	320.08	636.	19.	0.010	191.06	1.210s
La-140	1314.31	328.76	678.	-24.	-0.014	152.86	1.217s
Cf-249	1333.02	333.44	654.	-24.	-0.014	149.62	1.222s
AC-228	1352.16	338.23	58.	156.	0.086	13.39	1.129s
Cs-136	1361.54	340.57	629.	-25.	-0.014	146.08	1.228s
EU-152	1376.40	344.29	606.	-26.	-0.014	148.20	1.231s
HF-181	1382.56	345.83	477.	22.	0.012	143.30	1.233s
PB-214	1406.89	351.91	89.	332.	0.185	8.37	1.231
BA-133	1423.24	356.00	508.	-21.	-0.012	155.52	1.242s
I-131	1457.16	364.48	101.	-22.	-0.012	124.54	1.250s
BA-133	1534.57	383.84	112.	16.	0.009	94.31	1.267s
Cf-249	1551.01	387.95	128.	17.	0.009	100.07	1.271s
SN-113	1565.96	391.69	180.	7.	0.004	271.29	1.274s
SB-125	1710.67	427.88	52.	29.	0.016	54.43	1.307s
AG-108M	1734.91	433.94	56.	14.	0.008	115.32	1.312s
pm-146	1814.67	453.88	22.	7.	0.004	149.04	1.330s
SB-125	1852.61	463.37	154.	-8.	-0.004	208.96	1.338s
Ir-192	1871.38	468.06	161.	-4.	-0.002	492.67	1.342s
BE-7	1909.51	477.60	131.	15.	0.008	109.17	1.351s
HF-181	1927.12	482.00	184.	-19.	-0.010	104.49	1.355s
La-140	1947.21	487.02	171.	-12.	-0.007	151.26	1.359s
RU-103	1987.33	497.05	39.	14.	0.008	94.51	1.368s
RH-106	2046.57	511.86	91.	113.	0.063	23.99	2.631s
Nd-147	2123.10	531.00	82.	-21.	-0.012	90.09	1.398s
Ba-140	2148.14	537.26	61.	-2.	-0.001	569.04	1.404

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2252.03	563.24	26.	22.	0.012	52.24	1.427s
CS-134	2276.36	569.32	35.	24.	0.014	39.77	1.432s
PA-234	2276.96	569.47	74.	-10.	-0.005	127.63	1.432s
BI-207	2277.89	569.70	66.	-2.	-0.001	630.23	1.432
TL-208	2331.68	583.15	26.	236.	0.131	8.02	1.636s
SB-125	2401.07	600.50	413.	13.	0.007	215.91	1.460s
SB-124	2409.99	602.73	407.	12.	0.007	231.02	1.462s
CS-134	2417.91	604.71	420.	12.	0.007	234.19	1.463
BI-214	2436.77	609.43	22.	274.	0.152	6.86	1.359s
RU-103	2440.26	610.30	432.	13.	0.007	236.82	1.468s
AG-108M	2456.19	614.28	444.	13.	0.007	239.60	1.472s
PM-144	2471.31	618.06	457.	10.	0.006	304.87	1.475
RH-106	2486.73	621.92	563.	-17.	-0.009	198.37	1.479s
SB-125	2542.62	635.89	39.	8.	0.005	111.07	1.491s
I-131	2546.96	636.97	47.	4.	0.002	247.49	1.492s
AG-110M	2630.10	657.76	73.	-13.	-0.007	94.87	1.510s
CS-137	2645.69	661.66	80.	7.	0.004	184.09	1.513s
PM-144	2785.22	696.54	93.	-19.	-0.011	74.12	1.544s
NB-94	2809.57	702.63	99.	16.	0.009	90.51	1.549s
SB-124	2890.19	722.79	205.	-22.	-0.012	92.61	1.567
AG-108M	2890.80	722.94	183.	-22.	-0.012	87.66	1.567
EU-154	2892.47	723.36	160.	-21.	-0.012	87.61	1.567
ZR-95	2895.84	724.20	88.	18.	0.010	76.86	1.568s
BI-212	2908.41	727.34	22.	71.	0.039	18.10	1.896s
pm-146	2941.93	735.72	28.	5.	0.003	228.91	1.578s
pm-146	2987.69	747.16	47.	-9.	-0.005	170.62	1.588s
ZR-95	3025.97	756.73	47.	18.	0.010	85.97	1.596s
AG-110M	3054.82	763.94	99.	-20.	-0.011	74.90	1.602s
NB-95	3062.21	765.79	118.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	121.	6.	0.003	267.07	1.605
EU-152	3114.73	778.92	51.	2.	0.001	915.20	1.615s
BI-212	3140.74	785.42	66.	-11.	-0.006	32.68	1.621s
CS-134	3182.53	795.87	45.	14.	0.008	73.42	1.630s
CS-134	3206.86	801.95	86.	-6.	-0.003	226.61	1.635s
CO-58	3242.16	810.78	100.	-18.	-0.010	81.76	1.643s
La-140	3262.14	815.77	118.	-11.	-0.006	143.69	1.647
Cs-136	3273.06	818.50	131.	-2.	-0.001	973.04	1.649s
MN-54	3338.46	834.85	30.	14.	0.008	89.06	1.663
Co-56	3386.15	846.77	45.	-4.	-0.002	372.07	1.674s
TL-208	3440.45	860.34	15.	41.	0.023	26.55	0.608s
NB-94	3483.47	871.10	38.	0.	0.000	1000.00	1.695s
EU-154	3492.00	873.23	33.	7.	0.004	129.57	1.696s
PA-234	3521.21	880.53	64.	-4.	-0.002	287.23	1.703s
PA-234	3532.05	883.24	68.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	52.	13.	0.007	85.52	1.706s
Sc-46	3556.21	889.28	63.	-2.	-0.001	615.91	1.710s
y-88	3591.26	898.04	50.	-11.	-0.006	76.16	1.718s
AC-228	3645.16	911.52	12.	181.	0.100	9.08	1.594

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	3749.09	937.49	50.	-9.	-0.005	175.92	1.751s
PA-234	3783.21	946.02	40.	-15.	-0.008	57.65	1.759s
EU-152	3855.58	964.11	151.	14.	0.008	128.78	1.774s
AC-228	3875.02	968.97	12.	108.	0.060	10.70	1.778D
EU-154	3984.48	996.33	64.	3.	0.002	381.52	1.801s
PA-234M	4003.15	1001.00	71.	-4.	-0.002	233.93	1.805s
EU-154	4018.27	1004.77	80.	-11.	-0.006	118.88	1.808s
Co-56	4150.56	1037.84	38.	-4.	-0.002	220.85	1.836s
Cs-136	4191.49	1048.07	27.	1.	0.001	554.53	1.845s
RH-106	4200.65	1050.36	22.	11.	0.006	67.14	1.847s
BI-207	4253.86	1063.66	54.	-20.	-0.011	47.99	1.858s
Ga-68	4308.84	1077.40	43.	-10.	-0.005	156.93	1.870s
FE-59	4396.27	1099.25	32.	-2.	-0.001	394.68	1.888
EU-152	4447.58	1112.07	131.	-8.	-0.005	197.54	1.899s
ZN-65	4461.46	1115.55	123.	0.	0.000	1000.00	1.901s
BI-214	4480.54	1120.31	7.	73.	0.041	13.49	1.563
Sc-46	4481.49	1120.55	123.	0.	0.000	1000.00	1.906
Ta-182	4484.49	1121.30	136.	-12.	-0.007	140.44	1.906
CO-60	4692.30	1173.24	41.	-6.	-0.003	161.37	1.950s
Ta-182	4755.57	1189.05	23.	12.	0.007	94.90	1.963
Ta-182	4885.06	1221.41	34.	4.	0.002	345.51	1.990
Co-56	4952.57	1238.28	24.	29.	0.016	43.14	2.004s
NA-22	5097.62	1274.53	40.	-17.	-0.009	58.79	2.034s
EU-154	5097.68	1274.54	56.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	11.	10.	0.006	85.51	2.048s
CO-60	5329.61	1332.50	11.	8.	0.004	109.13	2.081s
AG-110M	5536.89	1384.30	24.	0.	0.000	1000.00	2.124
EU-152	5631.75	1408.00	36.	-12.	-0.007	70.49	2.143
K-40	5844.30	1461.11	10.	371.	0.206	5.34	1.822
La-140	6385.02	1596.21	13.	9.	0.005	100.19	2.294s
SB-124	6764.37	1690.98	0.	10.	0.006	31.62	2.369s
BI-214	7058.61	1764.49	28.	31.	0.017	30.19	2.427s
Co-56	7086.08	1771.35	66.	-8.	-0.004	158.04	2.433s
y-88	7345.12	1836.06	0.	7.	0.004	37.80	2.483s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.1289E+00				5.31E+01	
			477.60	4.129E+00	?(P	1.516E+01	1.09E+02 1.05E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NA-22	C -9.8471E-01					9.50E+02	
		1274.53	-9.847E-01	?(	1.894E+00	5.88E+01	9.99E+01 G
K-40	N 2.2754E+02					4.66E+11	
		1460.83	2.275E+02	(P	1.085E+01	5.34E+00	1.07E+01 G
Sc-46	F -8.2578E-02					8.38E+01	
		889.28	-8.258E-02	?(	1.786E+00	6.16E+02	1.00E+02 G
		1120.55	0.000E+00	+	2.914E+00	1.00E+03	1.00E+02 G
CR-51	F 4.0291E+00					2.77E+01	
		320.08	4.029E+00	?(	2.576E+01	1.91E+02	9.94E+00 G
MN-54	C 6.0872E-01					3.12E+02	
		834.85	6.087E-01	?(	1.213E+00	8.91E+01	1.00E+02 G
FE-59	F 4.6812E-01					4.45E+01	
		1099.25	-2.263E-01	?(P	2.733E+00	3.95E+02	5.65E+01 G
		1291.60	1.376E+00	?(P	2.550E+00	8.55E+01	4.32E+01 G
Co-56	C 9.0467E-01					7.73E+01	
		846.77	-1.738E-01	?(	1.476E+00	3.72E+02	9.99E+01 G
		1238.28	2.536E+00	(P	2.233E+00	4.31E+01	6.61E+01 G
		1037.84	-1.526E+00	+ P	1.129E+01	2.21E+02	1.41E+01 G
		1771.35	-3.677E+00	+	1.996E+01	1.58E+02	1.55E+01 A
CO-57	C -1.6909E-01					2.72E+02	
		122.06	-4.417E-01	*(	1.203E+00	8.20E+01	8.56E+01 G
		136.47	2.016E+00	?(	1.793E+01	2.66E+02	1.07E+01 G
CO-58	C -7.6331E-01					7.09E+01	
		810.78	-7.633E-01	&(	2.084E+00	8.18E+01	9.95E+01 G
CO-60	F 4.6832E-01					1.93E+03	
		1332.50	4.683E-01	?(	1.124E+00	1.09E+02	1.00E+02 G
		1173.24	-3.459E-01	& P	1.812E+00	1.61E+02	9.99E+01 G
NB-94	I 6.2372E-01					7.41E+06	
		702.63	6.237E-01	?(	1.893E+00	9.05E+01	9.79E+01 G
		871.10	0.000E+00	-	1.396E+00	1.00E+03	9.99E+01 G
ZR-95	I 1.4191E+00					6.40E+01	
		756.73	1.287E+00	?(	2.533E+00	8.60E+01	5.45E+01 G
		724.20	1.583E+00	?(	4.053E+00	7.69E+01	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	4.5414E-01					3.93E+01	
			497.05	4.541E-01	?(P	1.027E+00	9.45E+01	9.09E+01 G
			610.30	7.405E+00	?	5.898E+01	2.37E+02	5.75E+00 GA
RH-106	I	-1.8343E-01					3.74E+02	
			621.92	-5.929E+00	?(	3.940E+01	1.98E+02	9.93E+00 G
			1050.36	3.639E+01	&(	8.089E+01	6.71E+01	1.56E+00 G
			511.86	1.691E+01	?	7.059E+00	2.40E+01	2.00E+01 GA
AG-108M	C	4.3894E-01					1.53E+05	
			433.94	4.008E-01	?(	1.105E+00	1.15E+02	9.05E+01 G
			722.94	-9.543E-01	+	2.791E+00	8.77E+01	9.08E+01 G
			614.28	4.773E-01	?(	3.845E+00	2.40E+02	8.98E+01 G
AG-110M	F	7.8184E-01					2.50E+02	
			884.68	7.818E-01	?(	2.248E+00	8.55E+01	7.27E+01 G
			657.76	-5.071E-01	-	1.621E+00	9.49E+01	9.46E+01 G
			937.49	-1.227E+00	+	4.862E+00	1.76E+02	3.44E+01 G
			1384.30	0.000E+00	-	6.610E+00	1.00E+03	2.43E+01 G
			763.94	-3.550E+00	+	8.844E+00	7.49E+01	2.23E+01 G
SN-113	F	2.7201E-01					1.15E+02	
			391.69	2.720E-01	?(P	2.511E+00	2.71E+02	6.40E+01 G
SB-124	F	7.8906E-01					6.02E+01	
			602.73	4.274E-01	?(	3.322E+00	2.31E+02	9.83E+01 G
			1690.98	1.533E+00	?(	1.130E+00	3.16E+01	4.78E+01 G
			722.79	-8.017E+00	+	2.479E+01	9.26E+01	1.08E+01 G
SB-125	I	2.5563E+00					1.01E+03	
			427.88	2.559E+00	*(P	3.227E+00	5.44E+01	2.96E+01 G
			600.50	2.530E+00	?(	1.836E+01	2.16E+02	1.79E+01 G
			635.89	2.592E+00	?(P	9.834E+00	1.11E+02	1.13E+01 G
			463.37	-2.002E+00	& P	1.607E+01	2.09E+02	1.05E+01 G
I-131	I	-2.4516E-01					8.02E+00	
			364.48	-6.400E-01	?(P	1.416E+00	1.25E+02	8.17E+01 G
			284.30	2.432E+00	&(P	1.604E+01	2.65E+02	6.14E+00 G
			636.97	1.961E+00	?(	1.699E+01	2.47E+02	7.17E+00 G
Gd-153	F	-1.5750E+00					2.42E+02	
			97.50	-1.575E+00	?(	8.856E+00	1.69E+02	3.00E+01 G
			103.20	-2.156E+00	+	1.227E+01	1.71E+02	2.18E+01 G
Ga-68	C	-1.7907E+01					4.71E-02	
			1077.40	-1.791E+01	?(	6.141E+01	1.57E+02	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	4.0010E-01					2.51E-01	
			140.51	4.001E-01	&(	2.225E+00	1.67E+02	8.93E+01 G
BA-133	F	-7.6712E-01					3.85E+03	
			356.00	-7.671E-01	&(	3.992E+00	1.56E+02	6.20E+01 G
			302.85	-2.781E+00	+	1.346E+01	1.45E+02	1.83E+01 G
			383.84	4.471E+00	& P	1.413E+01	9.43E+01	8.94E+00 GA
			80.99	1.301E+00	?	6.877E+00	1.59E+02	3.41E+01 GA
CS-134	I	1.2023E+00					7.54E+02	
			604.71	4.318E-01	?(	3.402E+00	2.34E+02	9.76E+01 G
			795.87	6.729E-01	(	1.647E+00	7.34E+01	8.55E+01 G
			569.32	5.120E+00	*(	6.343E+00	3.98E+01	1.54E+01 G
			801.95	-2.822E+00	+	2.202E+01	2.27E+02	8.69E+00 G
			563.24	8.419E+00	*(P	1.020E+01	5.22E+01	8.35E+00 G
CS-137	I	2.9758E-01					1.10E+04	
			661.66	2.976E-01	?(P	1.879E+00	1.84E+02	8.52E+01 G
CE-139	F	3.9599E-01					1.38E+02	
			165.85	3.960E-01	?(	1.733E+00	1.31E+02	7.99E+01 G
Ba-140	I	-2.9943E-01					1.28E+01	
			537.26	-2.994E-01	&(P	4.986E+00	5.69E+02	2.44E+01 G
			162.66	-6.884E+00	+	2.179E+01	9.51E+01	6.22E+00 G
			304.85	-1.196E+01	+	5.887E+01	1.47E+02	4.29E+00 G
La-140	I	6.8564E-01					1.28E+01	
			1596.21	6.856E-01	?(	1.417E+00	1.00E+02	9.54E+01 G
			487.02	-7.886E-01	&	4.033E+00	1.51E+02	4.55E+01 G
			328.76	-2.600E+00	+	1.327E+01	1.53E+02	2.03E+01 G
			815.77	-1.984E+00	+	9.676E+00	1.44E+02	2.33E+01 G
CE-141	I	2.2046E-01					3.25E+01	
			145.44	2.205E-01	?(	2.038E+00	3.60E+02	4.82E+01 G
CE-144	I	3.0398E+00					2.85E+02	
			133.54	3.040E+00	(	1.669E+01	1.65E+02	1.11E+01 G
PM-144	C	-7.3394E-01					3.63E+02	
			696.54	-7.339E-01	?(	1.809E+00	7.41E+01	9.90E+01 G
			618.06	3.459E-01	+	3.550E+00	3.05E+02	9.91E+01 G
EU-152	F	2.1169E-01					4.94E+03	
			344.29	-2.162E+00	?(P	9.944E+00	1.48E+02	2.65E+01 G
			1112.07	-3.253E+00	+	2.191E+01	1.98E+02	1.36E+01 G
			121.78	8.996E-01	+	3.361E+00	1.12E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	5.255E-01	+	1.138E+01	9.15E+02	1.29E+01 G
			964.11	4.519E+00	?(	1.964E+01	1.29E+02	1.46E+01 G
			244.69	-8.866E-01	%	3.612E+01	1.22E+03	7.58E+00 G
			1408.00	-3.687E+00	+ P	9.318E+00	7.05E+01	2.10E+01 GA
EU-154	I	1.9303E+00					3.14E+03	
			873.23	2.399E+00	?(P	1.073E+01	1.30E+02	1.23E+01 G
			123.10	3.740E-01	- P	2.541E+00	2.02E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.324E+00	1.00E+03	3.52E+01 G
			723.36	-4.027E+00	+	1.178E+01	8.76E+01	2.02E+01 G
			1004.77	-3.014E+00	+	1.216E+01	1.19E+02	1.80E+01 G
			996.33	1.388E+00	?(	1.850E+01	3.82E+02	1.06E+01 G
EU-155	I	-2.2169E+00					1.81E+03	
			105.31	-2.217E+00	*(	1.280E+01	1.74E+02	2.12E+01 G
			86.54	-1.588E+00	+	9.631E+00	1.83E+02	3.07E+01 G
HF-181	F	4.3417E-01					4.24E+01	
			482.00	-6.703E-01	?(	2.348E+00	1.04E+02	8.05E+01 G
			133.02	7.771E-01	(	4.213E+00	1.63E+02	4.33E+01 G
			345.83	3.257E+00	&(P	1.561E+01	1.43E+02	1.51E+01 G
			136.30	5.822E+00	?(	3.231E+01	1.67E+02	5.85E+00 G
Ta-182	F	9.3549E-02					1.14E+02	
			1121.30	-1.843E+00	(	8.762E+00	1.40E+02	3.49E+01 G
			1221.41	8.470E-01	+	6.328E+00	3.46E+02	2.70E+01 G
			1189.05	4.265E+00	(	8.610E+00	9.49E+01	1.62E+01 G
Hg-203	F	1.3268E-01					4.66E+01	
			279.20	1.327E-01	?(	1.561E+00	3.45E+02	8.15E+01 G
TL-208	N	9.2073E+00					6.98E+02	
			583.02	9.207E+00	@(P	1.027E+00	8.02E+00	8.45E+01 G
			277.28	1.398E+01	+	1.254E+01	2.94E+01	6.31E+00 G
			860.56	1.451E+01	+ P	7.341E+00	2.66E+01	1.24E+01 G
pm-146	C	2.7813E-02					2.02E+03	
			747.16	-1.008E+00	?(	4.019E+00	1.71E+02	3.40E+01 G
			735.72	8.690E-01	?(	4.757E+00	2.29E+02	2.25E+01 G
			453.88	2.786E-01	?(	1.029E+00	1.49E+02	6.50E+01 G
y-88	F	-5.5099E-01					1.07E+02	
			898.04	-5.510E-01	?(P	1.733E+00	7.62E+01	9.37E+01 G
			1836.06	5.505E-01	+	5.796E-01	3.78E+01	9.92E+01 G
Cd-113m		-2.9877E+03					5.33E+03	
			263.70	-2.988E+03	&(	1.816E+04	1.79E+02	6.00E-03 K

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Cf-251	T	-4.1086E-01					3.28E+05		
			176.60	-4.109E-01	&(6.043E+00		5.70E+02	1.70E+01	G
			227.00	2.823E+00	? 1.527E+01		2.09E+02	6.30E+00	GA
Cf-249	T	6.1260E-01					1.28E+05		
			387.95	6.126E-01	?(2.059E+00		1.00E+02	6.60E+01	G
			333.44	-3.449E+00	+ 1.723E+01		1.50E+02	1.55E+01	G
Sn-126		1.6593E+00					3.65E+07		
			87.57	1.659E+00	} 7.442E+00		5.08E+01	3.75E+01	GA
			64.28	1.659E+00	?(2.040E+01		3.67E+02	9.70E+00	G
			86.94	-5.383E+00	+ 3.239E+01		1.81E+02	9.04E+00	GA
PB-210	N	2.6405E+01					8.14E+03		
			46.54	2.641E+01	(P 3.264E+01		4.77E+01	4.25E+00	G
PB-212	N	2.6130E+01					6.98E+02		
			238.63	2.613E+01	(P 1.862E+00		4.42E+00	4.33E+01	G
			300.03	4.055E+01	+ P 2.119E+01		2.22E+01	3.28E+00	GA
PB-214	N	2.0152E+01					5.84E+05		
			351.93	2.015E+01	(P 2.827E+00		8.37E+00	3.76E+01	G
			295.09	2.468E+01	+ 4.622E+00		1.06E+01	1.93E+01	G
			242.00	2.411E+01	1.236E+01		1.78E+01	7.43E+00	GA
BI-207	C	-6.0731E-02					1.18E+04		
			569.70	-6.073E-02	&(1.342E+00		6.30E+02	9.77E+01	G
			1063.66	-1.367E+00	+ P 2.550E+00		4.80E+01	7.45E+01	G
BI-212	N	3.6447E+01					6.98E+02		
			727.17	3.645E+01	(P 1.262E+01		1.81E+01	7.55E+00	G
			785.42	-3.476E+01	& P 1.300E+02		3.27E+01	1.28E+00	GA
BI-214	N	2.0187E+01					5.84E+05		
			609.31	2.019E+01	(P 1.832E+00		6.86E+00	4.61E+01	G
			1120.29	2.596E+01	+ P 5.276E+00		1.35E+01	1.51E+01	G
			1764.49	1.521E+01	- P 1.346E+01		3.02E+01	1.54E+01	G
BI-210M	T	-3.1085E-01					1.10E+09		
			265.83	-3.108E-01	?(2.470E+00		2.34E+02	5.00E+01	G
			304.90	-1.832E+00	+ 9.185E+00		1.50E+02	2.80E+01	G
AC-228	N	2.8899E+01					2.10E+03		
			911.07	2.857E+01	(3.016E+00		9.08E+00	2.90E+01	G
			968.97	2.958E+01	(5.266E+00		1.07E+01	1.75E+01	G
			338.32	2.870E+01	@(7.022E+00		1.34E+01	1.20E+01	G
			93.35	-8.566E+00	& 4.793E+01		1.69E+02	5.56E+00	XA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227   N   5.7602E+00                                     7.95E+03
                          50.14 5.760E+00  (  2.371E+01 1.23E+02 8.00E+00 G
                         256.24-1.684E+00 - P 1.504E+01 4.47E+02 7.00E+00 G

TH-229   N   9.0131E+00                                     2.68E+06
                         193.51 9.013E+00 ?(  2.206E+01 9.62E+01 4.40E+00 G
                         210.85-1.749E+01 + P 4.074E+01 3.21E+01 2.99E+00 G

TH-234   N   1.9032E+01                                     1.63E+12
                          63.29 2.553E+01  (P 3.170E+01 3.86E+01 3.81E+00 G
                          92.59 1.460E+01  (P 1.807E+01 3.86E+01 5.58E+00 G

PA-231   N  -1.7687E+01                                     1.20E+07
                         302.65-1.769E+01 ?(  8.606E+01 1.46E+02 2.88E+00 G
                         300.07-2.054E+01 +   1.038E+02 1.51E+02 2.46E+00 G

PA-233   C   1.1841E+00                                     7.82E+08
                         312.01 1.184E+00 ?(P 7.339E+00 1.85E+02 3.60E+01 G
                         300.18-8.152E+00 +   4.048E+01 1.49E+02 6.20E+00 G

PA-234   N   1.8582E+00                                     1.63E+12
                         131.29 1.858E+00 ?(  9.952E+00 1.61E+02 1.80E+01 G
                         946.02-5.322E+00 + P 1.134E+01 5.77E+01 1.34E+01 G
                         569.47-3.881E+00 +   1.688E+01 1.28E+02 8.20E+00 G
                         883.24 0.000E+00 -   1.920E+01 1.00E+03 9.60E+00 G
                         880.53-2.980E+00 +   2.979E+01 2.87E+02 6.00E+00 GA

PA-234M  N   3.7756E+00                                     1.63E+12
                        1001.00-2.335E+01 ?(P 2.467E+02 2.34E+02 8.37E-01 G
                         766.41 8.101E+01 ?(P 7.412E+02 2.67E+02 2.94E-01 G

U-235    N   8.7365E-01                                     2.57E+11
                         143.79 3.283E-01 %(P 1.801E+01 1.64E+03 1.10E+01 G
                         205.33 2.067E+00 &(  1.980E+01 3.70E+02 5.01E+00 G
                         163.38-7.460E+00 +   2.768E+01 1.11E+02 5.08E+00 G

AM-241   T  -2.0683E+00                                     1.58E+05
                          59.54-2.068E+00 &(P 5.926E+00 5.23E+01 3.59E+01 G

Np-237   F  -3.2198E+00                                     2.14E+06
                          86.49-3.220E+00 &(  2.042E+01 1.91E+02 1.31E+01 G

Ir-192   F   7.3666E-01                                     7.40E+01
                         316.49 5.088E-01 ?(  3.110E+00 1.83E+02 8.70E+01 G
                         468.06-1.987E-01 +   3.354E+00 4.93E+02 5.18E+01 G
                         308.44 1.361E+00 &(  8.129E+00 1.79E+02 3.18E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F  -1.4636E-03                                      1.30E+01
                          818.50-7.056E-02 ?(  2.370E+00 9.73E+02 1.00E+02 G
                         1048.07 8.490E-02 ?(  1.705E+00 5.55E+02 8.00E+01 G
                          340.57-1.165E+00 &   5.680E+00 1.46E+02 4.69E+01 G

Np-239   T   1.9488E+00                                      2.36E+00
                          103.70-1.959E+00 +   1.124E+01 1.73E+02 2.40E+01 X
                          106.13 1.949E+00  (  1.132E+01 1.75E+02 2.27E+01 G
                           99.50-3.143E+00 +   1.779E+01 1.70E+02 1.50E+01 X

Nd-147      -5.0112E+00                                      1.11E+01
                          531.00-5.011E+00 ?(  1.064E+01 9.01E+01 1.30E+01 G
                           91.10-1.694E+00 +   9.625E+00 1.71E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	353.	22.	0.012	123.03	5.760E+00	
AM-241	59.54	716.	-44.	-0.025	52.32	-2.068E+00	P
BA-133	80.99	1512.	35.	0.019	158.96	1.301E+00	
Np-237	86.49	2122.	-34.	-0.019	190.85	-3.220E+00	
EU-155	86.54	2600.	-40.	-0.022	182.66	-1.588E+00	
Nd-147	91.10	2299.	-40.	-0.022	171.13	-1.694E+00	
Gd-153	97.50	2278.	-40.	-0.022	169.33	-1.575E+00	
Np-239	99.50	2318.	-40.	-0.022	170.49	-3.143E+00	
Gd-153	103.20	2358.	-40.	-0.022	171.40	-2.156E+00	
Np-239	103.70	2398.	-40.	-0.022	172.77	-1.959E+00	
EU-155	105.31	2438.	-40.	-0.022	173.92	-2.217E+00	
Np-239	106.13	2185.	38.	0.021	174.88	1.949E+00	
CO-57	122.06	332.	-32.	-0.018	82.03	-4.417E-01	
EU-154	123.10	336.	13.	0.007	201.92	3.740E-01	P
PA-234	131.29	993.	28.	0.016	160.71	1.858E+00	
HF-181	133.02	1021.	28.	0.016	162.67	7.771E-01	
CE-144	133.54	1049.	28.	0.016	164.78	3.040E+00	
HF-181	136.30	1077.	28.	0.016	166.53	5.822E+00	
CO-57	136.47	1105.	18.	0.010	266.31	2.016E+00	
CE-141	145.44	265.	8.	0.005	359.94	2.205E-01	
Ba-140	162.66	444.	-32.	-0.018	95.15	-6.884E+00	
U-235	163.38	476.	-28.	-0.016	111.30	-7.460E+00	
CE-139	165.85	468.	24.	0.013	130.94	3.960E-01	
U-235	205.33	172.	7.	0.004	370.42	2.067E+00	
TH-227	256.24	140.	-6.	-0.004	446.52	-1.684E+00	P
Cd-113m	263.70	145.	-10.	-0.005	178.88	-2.988E+03	
BI-210M	265.83	186.	-8.	-0.005	233.82	-3.108E-01	
I-131	284.30	104.	8.	0.004	264.57	2.432E+00	P
PA-231	300.07	696.	-25.	-0.014	151.43	-2.054E+01	
PA-233	300.18	671.	-25.	-0.014	148.75	-8.152E+00	
PA-231	302.65	646.	-25.	-0.014	145.75	-1.769E+01	
BA-133	302.85	639.	-25.	-0.014	144.98	-2.781E+00	
Ba-140	304.85	664.	-25.	-0.014	147.50	-1.196E+01	
BI-210M	304.90	689.	-25.	-0.014	150.19	-1.832E+00	
Ir-192	308.44	682.	21.	0.012	178.64	1.361E+00	
PA-233	312.01	704.	20.	0.011	185.40	1.184E+00	P
Ir-192	316.49	724.	21.	0.012	182.84	5.088E-01	
CR-51	320.08	636.	19.	0.010	191.06	4.029E+00	
La-140	328.76	678.	-24.	-0.014	152.86	-2.600E+00	
Cf-249	333.44	654.	-24.	-0.014	149.62	-3.449E+00	
Cs-136	340.57	629.	-25.	-0.014	146.08	-1.165E+00	
HF-181	345.83	477.	22.	0.012	143.30	3.257E+00	P
BA-133	356.00	508.	-21.	-0.012	155.52	-7.671E-01	
I-131	364.48	101.	-22.	-0.012	124.54	-6.400E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	383.84	112.	16.	0.009	94.31	4.471E+00	P
Cf-249	387.95	128.	17.	0.009	100.07	6.126E-01	
SN-113	391.69	180.	7.	0.004	271.29	2.720E-01	P
SB-125	427.88	52.	29.	0.016	54.43	2.559E+00	P
AG-108M	433.94	56.	14.	0.008	115.32	4.008E-01	
pm-146	453.88	22.	7.	0.004	149.04	2.786E-01	
SB-125	463.37	154.	-8.	-0.004	208.96	-2.002E+00	P
Ir-192	468.06	161.	-4.	-0.002	492.67	-1.987E-01	
BE-7	477.60	131.	15.	0.008	109.17	4.129E+00	P
HF-181	482.00	184.	-19.	-0.010	104.49	-6.703E-01	
La-140	487.02	171.	-12.	-0.007	151.26	-7.886E-01	
RU-103	497.05	39.	14.	0.008	94.51	4.541E-01	P
RH-106	511.86	91.	113.	0.063	23.99	1.691E+01	
Nd-147	531.00	82.	-21.	-0.012	90.09	-5.011E+00	
Ba-140	537.26	61.	-2.	-0.001	569.04	-2.994E-01	P
CS-134	563.24	26.	22.	0.012	52.24	8.419E+00	P
CS-134	569.32	35.	24.	0.014	39.77	5.120E+00	
PA-234	569.47	74.	-10.	-0.005	127.63	-3.881E+00	
BI-207	569.70	66.	-2.	-0.001	630.23	-6.073E-02	
SB-125	600.50	413.	13.	0.007	215.91	2.530E+00	
SB-124	602.73	407.	12.	0.007	231.02	4.274E-01	
CS-134	604.71	420.	12.	0.007	234.19	4.318E-01	
RU-103	610.30	432.	13.	0.007	236.82	7.405E+00	
AG-108M	614.28	444.	13.	0.007	239.60	4.773E-01	
PM-144	618.06	457.	10.	0.006	304.87	3.459E-01	
RH-106	621.92	563.	-17.	-0.009	198.37	-5.929E+00	
SB-125	635.89	39.	8.	0.005	111.07	2.592E+00	P
I-131	636.97	47.	4.	0.002	247.49	1.961E+00	
AG-110M	657.76	73.	-13.	-0.007	94.87	-5.071E-01	
CS-137	661.66	80.	7.	0.004	184.09	2.976E-01	P
PM-144	696.54	93.	-19.	-0.011	74.12	-7.339E-01	
NB-94	702.63	99.	16.	0.009	90.51	6.237E-01	
SB-124	722.79	205.	-22.	-0.012	92.61	-8.017E+00	
AG-108M	722.94	183.	-22.	-0.012	87.66	-9.543E-01	
EU-154	723.36	160.	-21.	-0.012	87.61	-4.027E+00	
ZR-95	724.20	88.	18.	0.010	76.86	1.583E+00	
pm-146	735.72	28.	5.	0.003	228.91	8.690E-01	
pm-146	747.16	47.	-9.	-0.005	170.62	-1.008E+00	
ZR-95	756.73	47.	18.	0.010	85.97	1.287E+00	
AG-110M	763.94	99.	-20.	-0.011	74.90	-3.550E+00	
PA-234M	766.41	121.	6.	0.003	267.07	8.101E+01	P
CS-134	795.87	45.	14.	0.008	73.42	6.729E-01	
CS-134	801.95	86.	-6.	-0.003	226.61	-2.822E+00	
CO-58	810.78	100.	-18.	-0.010	81.76	-7.633E-01	
La-140	815.77	118.	-11.	-0.006	143.69	-1.984E+00	
Cs-136	818.50	131.	-2.	-0.001	973.04	-7.056E-02	
MN-54	834.85	30.	14.	0.008	89.06	6.087E-01	
Co-56	846.77	45.	-4.	-0.002	372.07	-1.738E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	873.23	33.	7.	0.004	129.57	2.399E+00		P
PA-234	880.53	64.	-4.	-0.002	287.23	-2.980E+00		
AG-110M	884.68	52.	13.	0.007	85.52	7.818E-01		
Sc-46	889.28	63.	-2.	-0.001	615.91	-8.258E-02		
y-88	898.04	50.	-11.	-0.006	76.16	-5.510E-01		P
AG-110M	937.49	50.	-9.	-0.005	175.92	-1.227E+00		
PA-234	946.02	40.	-15.	-0.008	57.65	-5.322E+00		P
EU-154	996.33	64.	3.	0.002	381.52	1.388E+00		
PA-234M	1001.00	71.	-4.	-0.002	233.93	-2.335E+01		P
EU-154	1004.77	80.	-11.	-0.006	118.88	-3.014E+00		
Co-56	1037.84	38.	-4.	-0.002	220.85	-1.526E+00		P
Cs-136	1048.07	27.	1.	0.001	554.53	8.490E-02		
RH-106	1050.36	22.	11.	0.006	67.14	3.639E+01		
BI-207	1063.66	54.	-20.	-0.011	47.99	-1.367E+00		P
Ga-68	1077.40	43.	-10.	-0.005	156.93	-1.791E+01		
FE-59	1099.25	32.	-2.	-0.001	394.68	-2.263E-01		P
Ta-182	1121.30	136.	-12.	-0.007	140.44	-1.843E+00		
CO-60	1173.24	41.	-6.	-0.003	161.37	-3.459E-01		P
Ta-182	1189.05	23.	12.	0.007	94.90	4.265E+00		
Ta-182	1221.41	34.	4.	0.002	345.51	8.470E-01		
Co-56	1238.28	24.	29.	0.016	43.14	2.536E+00		P
NA-22	1274.53	40.	-17.	-0.009	58.79	-9.847E-01		
FE-59	1291.60	11.	10.	0.006	85.51	1.376E+00		P
CO-60	1332.50	11.	8.	0.004	109.13	4.683E-01		
La-140	1596.21	13.	9.	0.005	100.19	6.856E-01		
SB-124	1690.98	0.	10.	0.006	31.62	1.533E+00		
Co-56	1771.35	66.	-8.	-0.004	158.04	-3.677E+00		
y-88	1836.06	0.	7.	0.004	37.80	5.505E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	4.1288E+00	4.1289E+00	1.092E+02%	1.52E+01
NA-22	#A	-9.8471E-01	-9.8471E-01	5.879E+01%	1.89E+00
K-40		2.2754E+02	2.2754E+02	5.344E+00%	1.08E+01
Sc-46	#A	-8.2577E-02	-8.2578E-02	6.159E+02%	1.79E+00
CR-51	#A	4.0290E+00	4.0291E+00	1.911E+02%	2.58E+01
MN-54	#A	6.0872E-01	6.0872E-01	8.906E+01%	1.21E+00
FE-59	#A	4.6811E-01	4.6812E-01	8.551E+01%	2.73E+00
Co-56	#A	9.0467E-01	9.0467E-01	4.314E+01%	1.48E+00
CO-57	#A	-1.6909E-01	-1.6909E-01	8.203E+01%	1.20E+00
CO-58	#A	-7.6331E-01	-7.6331E-01	8.176E+01%	2.08E+00
CO-60	#A	4.6832E-01	4.6832E-01	1.091E+02%	1.12E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.74E+00

NB-94	#A	6.2372E-01	6.2372E-01	9.051E+01%	1.89E+00
ZR-95	#A	1.4191E+00	1.4191E+00	5.766E+01%	2.53E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.16E+00
RU-103	#A	4.5413E-01	4.5414E-01	9.451E+01%	1.03E+00
RH-106	#A	-1.8343E-01	-1.8343E-01	6.714E+01%	3.94E+01
AG-108M	#A	4.3894E-01	4.3894E-01	1.153E+02%	1.11E+00
AG-110M	#A	7.8183E-01	7.8184E-01	8.552E+01%	2.25E+00
SN-113	#A	2.7201E-01	2.7201E-01	2.713E+02%	2.51E+00
SB-124	#A	7.8905E-01	7.8906E-01	3.162E+01%	3.32E+00
SB-125	#A	2.5563E+00	2.5563E+00	5.443E+01%	3.23E+00
I-131	#A	-2.4515E-01	-2.4516E-01	1.245E+02%	1.42E+00
Gd-153	#A	-1.5750E+00	-1.5750E+00	1.693E+02%	8.86E+00
Ga-68	#A	-1.7722E+01	-1.7907E+01	1.569E+02%	6.14E+01
Tc-99m	A	3.9932E-01	4.0010E-01	1.669E+02%	2.23E+00
BA-133	#A	-7.6712E-01	-7.6712E-01	1.555E+02%	3.99E+00
CS-134	#A	1.2023E+00	1.2023E+00	3.977E+01%	3.40E+00
CS-137	#A	2.9758E-01	2.9758E-01	1.841E+02%	1.88E+00
CE-139	#A	3.9599E-01	3.9599E-01	1.309E+02%	1.73E+00
Ba-140	#A	-2.9942E-01	-2.9943E-01	5.690E+02%	4.99E+00
La-140	#A	6.8561E-01	6.8564E-01	1.002E+02%	1.42E+00
CE-141	#A	2.2046E-01	2.2046E-01	3.599E+02%	2.04E+00
CE-144	#A	3.0398E+00	3.0398E+00	1.648E+02%	1.67E+01
PM-144	#A	-7.3393E-01	-7.3394E-01	7.412E+01%	1.81E+00
EU-152	A	2.1169E-01	2.1169E-01	9.817E+01%	9.94E+00
EU-154	#A	1.9303E+00	1.9303E+00	1.296E+02%	1.07E+01
EU-155	#A	-2.2169E+00	-2.2169E+00	1.739E+02%	1.28E+01
HF-181	#A	4.3417E-01	4.3417E-01	7.316E+01%	2.35E+00
Ta-182	#A	9.3548E-02	9.3549E-02	8.475E+01%	8.76E+00
Hg-203	#A	1.3268E-01	1.3268E-01	3.449E+02%	1.56E+00
TL-208	#	9.2073E+00	9.2073E+00	8.019E+00%	1.03E+00
pm-146	#A	2.7813E-02	2.7813E-02	1.074E+02%	4.02E+00
y-88	#A	-5.5098E-01	-5.5099E-01	7.616E+01%	1.73E+00
Cd-113m	#A	-2.9877E+03	-2.9877E+03	1.789E+02%	1.82E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.62E+01
Cf-251	#A	-4.1086E-01	-4.1086E-01	5.704E+02%	6.04E+00
Cf-249	#A	6.1260E-01	6.1260E-01	1.001E+02%	2.06E+00
Sn-126	#A	1.6593E+00	1.6593E+00	3.666E+02%	2.04E+01
PB-210	A	2.6405E+01	2.6405E+01	4.774E+01%	3.26E+01
PB-212		2.6130E+01	2.6130E+01	4.417E+00%	1.86E+00
PB-214		2.0152E+01	2.0152E+01	8.368E+00%	2.83E+00
BI-207	#A	-6.0731E-02	-6.0731E-02	6.302E+02%	1.34E+00
BI-212		3.6447E+01	3.6447E+01	1.810E+01%	1.26E+01
BI-214		2.0187E+01	2.0187E+01	6.859E+00%	1.83E+00
BI-210M	#A	-3.1085E-01	-3.1085E-01	2.338E+02%	2.47E+00
AC-228		2.8899E+01	2.8899E+01	6.465E+00%	3.02E+00
TH-227	#A	5.7602E+00	5.7602E+00	1.230E+02%	2.37E+01
TH-229	#A	9.0131E+00	9.0131E+00	9.616E+01%	2.21E+01
TH-234	#A	1.9032E+01	1.9032E+01	2.731E+01%	3.17E+01
PA-231	#A	-1.7687E+01	-1.7687E+01	1.457E+02%	8.61E+01

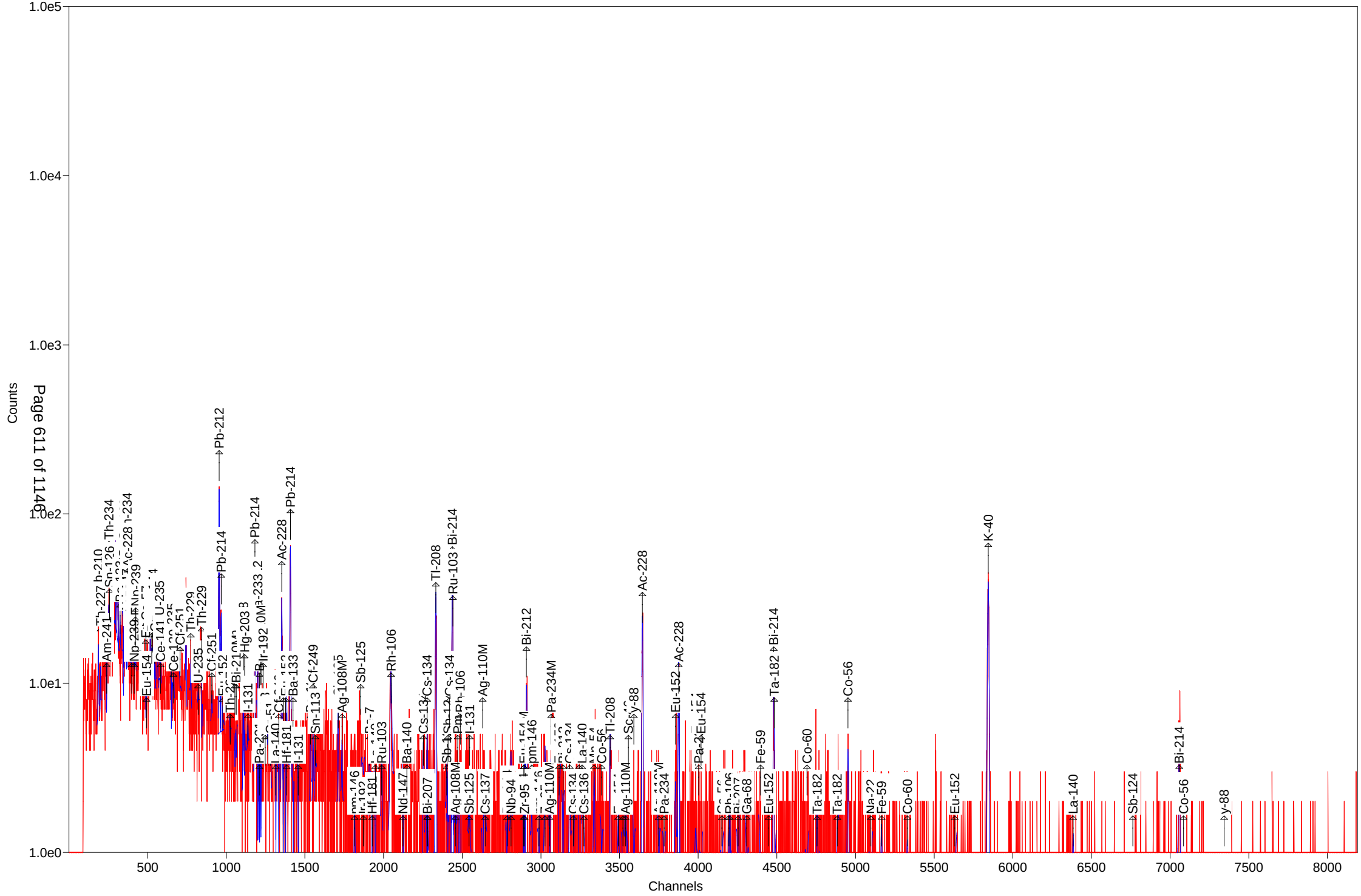
PA-233 #A	1.1841E+00	1.1841E+00	1.854E+02%		7.34E+00
PA-234 #A	1.8582E+00	1.8582E+00	1.607E+02%		9.95E+00
PA-234M#A	3.7756E+00	3.7756E+00	1.775E+02%		2.47E+02
U-235 #A	8.7365E-01	8.7365E-01	3.704E+02%		1.80E+01
AM-241 #A	-2.0683E+00	-2.0683E+00	5.232E+01%		5.93E+00
Np-237 #A	-3.2198E+00	-3.2198E+00	1.908E+02%		2.04E+01
Ir-192 #A	7.3665E-01	7.3666E-01	1.278E+02%		3.11E+00
Cs-136 #A	-1.4636E-03	-1.4636E-03	5.545E+02%		2.37E+00
Np-239 #A	1.9484E+00	1.9488E+00	1.749E+02%		1.13E+01
Nd-147 #A	-5.0110E+00	-5.0112E+00	9.009E+01%		1.06E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 4.140E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 4.1400015E+02 Bq/Sample

264535_Gamma_160-18554-A-8-B. 16_Gamma_20162107.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161130

Sample Description: 264535_Gamma_160-18554-A-9-B
Detector: Detector #17
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-9-B

Decay to Time: 9/1/2016 12:36 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:36:57 Real Time: 1844 sec
Analysis Time: 9/1/2016 13:07 Dead Time: 2.39 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev11.lib
Bkgd Correction File: 17_2016-08-18_0548.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.171E+00	111.7	3.543E+00	3.547E+00	1.202E+01
NA-22	1.266E-01	291.5	3.692E-01	3.693E-01	1.352E+00
K-40	1.822E+02	6.5	1.179E+01	1.503E+01	1.274E+01
Sc-46	3.608E-01	105.2	3.795E-01	3.799E-01	1.303E+00
CR-51	-3.221E+00	68.6	2.210E+00	2.217E+00	1.272E+01
MN-54	1.222E-01	389.1	4.754E-01	4.755E-01	1.156E+00
FE-59	1.828E-01	472.6	8.642E-01	8.642E-01	2.085E+00
Co-56	3.747E-01	121.3	4.545E-01	4.549E-01	1.058E+00
CO-57	-3.681E-01	109.7	4.037E-01	4.042E-01	1.348E+00
CO-58	3.964E-01	91.5	3.627E-01	3.633E-01	1.233E+00
CO-60	4.298E-01	89.0	3.827E-01	3.833E-01	8.827E-01
ZN-65	1.345E+00	95.0	1.277E+00	1.279E+00	4.313E+00
NB-94	3.211E-01	39.4	1.265E-01	1.276E-01	1.242E+00
ZR-95	6.992E-01	111.8	7.818E-01	7.826E-01	1.922E+00
NB-95	6.019E-01	83.3	5.011E-01	5.021E-01	1.680E+00
RU-103	3.424E-01	115.6	3.959E-01	3.963E-01	9.989E-01
RH-106	4.445E+00	165.4	7.353E+00	7.356E+00	2.486E+01
AG-108M	-3.545E-01	133.7	4.739E-01	4.742E-01	1.236E+00
AG-110M	-7.799E-01	98.7	7.699E-01	7.709E-01	2.603E+00
SN-113	-3.568E-01	169.5	6.047E-01	6.050E-01	2.206E+00
SB-124	5.563E-01	38.1	2.120E-01	2.139E-01	2.833E+00
SB-125	1.544E+00	104.5	1.613E+00	1.615E+00	3.058E+00
I-131	-5.010E-01	89.5	4.484E-01	4.491E-01	1.345E+00
Gd-153	-5.018E-02	82.5	4.139E-02	4.151E-02	3.873E+00
Ga-68	7.930E+00	218.7	1.734E+01	1.735E+01	4.115E+01
Tc-99m	-3.467E-01	128.0	4.437E-01	4.441E-01	1.484E+00
BA-133	-3.474E-01	135.2	4.696E-01	4.700E-01	3.113E+00
CS-134	6.764E-01	32.0	2.161E-01	2.189E-01	2.889E+00
CS-137	-6.402E-01	93.2	5.970E-01	5.979E-01	2.008E+00
CE-139	-3.882E-01	115.4	4.480E-01	4.495E-01	1.499E+00
Ba-140	-2.056E-01	79.4	1.632E-01	1.636E-01	4.185E+00
La-140	-1.439E+00	98.4	1.416E+00	1.418E+00	2.376E+00
CE-141	5.996E-01	131.0	7.856E-01	7.861E-01	2.629E+00

CE-144	0.000E+00	1.#INF	1.715E+00	1.715E+00	1.246E+01
PM-144	3.830E-01	95.4	3.652E-01	3.658E-01	8.935E-01
EU-152	1.813E+00	64.7	1.172E+00	1.176E+00	7.642E+00
EU-154	1.064E+01	23.1	2.456E+00	2.516E+00	5.613E+00
EU-155	-3.430E-01	377.4	1.295E+00	1.295E+00	5.369E+00
HF-181	7.670E-02	122.2	9.373E-02	9.381E-02	1.761E+00
Ta-182	2.180E+00	49.2	1.073E+00	1.079E+00	7.270E+00
Hg-203	0.000E+00	1.#INF	2.098E-01	2.098E-01	1.405E+00
TL-208	8.157E+00	7.7	6.283E-01	7.575E-01	6.765E-01
pm-146	-2.588E-01	595.2	1.540E+00	1.540E+00	3.287E+00
y-88	2.454E-01	40.8	1.002E-01	1.010E-01	1.180E+00
Cd-113m	-6.176E+03	98.9	6.108E+03	6.121E+03	2.046E+04
Cd-109	9.080E+00	163.7	1.486E+01	1.487E+01	4.958E+01
Cf-251	7.129E-01	265.6	1.893E+00	1.894E+00	5.155E+00
Cf-249	3.970E-01	126.4	5.017E-01	5.021E-01	1.708E+00
Sn-126	-4.544E+00	109.2	4.963E+00	4.969E+00	1.657E+01
PB-210	5.555E+00	165.4	9.185E+00	9.191E+00	2.921E+01
PB-212	2.469E+01	4.8	1.182E+00	1.987E+00	2.023E+00
PB-214	6.978E+00	13.0	9.089E-01	9.786E-01	2.297E+00
BI-207	-1.764E-02	1827.6	3.224E-01	3.224E-01	1.155E+00
BI-212	3.264E+01	15.2	4.978E+00	5.258E+00	6.790E+00
BI-214	8.784E+00	11.9	1.046E+00	1.141E+00	1.778E+00
BI-210M	-2.159E-01	338.3	7.305E-01	7.306E-01	2.496E+00
AC-228	2.174E+01	8.8	1.909E+00	2.208E+00	3.065E+00
TH-227	-5.893E-01	969.5	5.714E+00	5.714E+00	1.658E+01
TH-229	7.355E+00	92.1	6.771E+00	6.796E+00	1.919E+01
TH-234	8.068E+00	58.6	4.728E+00	4.747E+00	2.881E+01
PA-231	2.247E+00	401.3	9.018E+00	9.019E+00	5.780E+01
PA-233	3.323E-01	306.4	1.018E+00	1.019E+00	3.491E+00
PA-234	2.269E+00	93.3	2.118E+00	2.121E+00	7.454E+00
PA-234M	-1.580E+01	435.9	6.889E+01	6.890E+01	2.459E+02
U-235	-3.613E+00	74.0	2.673E+00	2.679E+00	1.136E+01
AM-241	-1.047E+00	133.9	1.401E+00	1.402E+00	3.967E+00
Np-237	0.000E+00	1.#INF	4.638E+00	4.638E+00	1.547E+01
Ir-192	3.054E-01	91.4	2.792E-01	2.797E-01	1.067E+00
Cs-136	5.093E-01	70.2	3.577E-01	3.589E-01	1.346E+00
Np-239	0.000E+00	1.#INF	9.934E-01	9.934E-01	5.048E+00
Nd-147	-4.134E+00	95.7	3.956E+00	3.963E+00	9.779E+00
Total	3.616E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-9-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161130.An1

Acquisition information
Start time: 9/1/2016 12:36:57 PM
Live time: 1800
Real time: 1844
Dead time: 2.39 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:36:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2016-08-18_0548.PBC 8/18/2016 5:48:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1251

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.65	9.	165.37	0.91	2.100E-02	46.54	4.250	PBC<MDA	PB210
63.56	59.	41.37	0.62	3.179E-02	63.29	3.810	PBC<MDA	TH234
74.79	166.	13.99	0.80	3.681E-02				
77.22	312.	8.14	0.80	3.766E-02				
87.32	102.	18.94	0.81	4.044E-02	86.54	30.700	4.598E+00	EU155
					86.94	9.040	1.558E+01	Sn126
					87.57	37.500	3.743E+00	Sn126
					88.04	3.790	3.694E+01	Cd109
89.82	66.	26.76	0.82	4.095E-02				
91.10	21.	195.81	0.82	4.119E-02	91.10	28.300	PBC<MDA	Nd147
92.55	23.	90.16	0.82	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.31	25.	159.15	0.82	4.156E-02	93.35	5.561	PBC<MDA	AC228
103.20	21.	118.95	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
123.10	6.	425.43	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
128.90	52.	41.78	0.63	4.232E-02				
131.29	20.	149.25	0.85	4.212E-02	131.29	18.000	PBC<MDA	PA234
133.02	3.	979.69	0.86	4.197E-02	133.02	43.300	PBC<MDA	HF181
145.44	21.	131.02	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
162.66	20.	114.99	0.88	3.813E-02	162.66	6.220	PBC<MDA	Ba140
163.38	5.	462.56	0.88	3.802E-02	163.38	5.080	PBC<MDA	U235
176.60	8.	265.56	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251
193.51	18.	107.71	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	14.	160.12	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
208.97	74.	23.26	0.66	3.273E-02				
210.85	15.	149.32	0.93	3.253E-02	210.85	2.990	PBC<MDA	TH229
238.51	575.	4.79	0.95	2.990E-02	238.63	43.300	2.469E+01	PB212
241.71	64.	24.71	0.96	2.963E-02	242.00	7.430	1.611E+01	PB214
277.77	32.	45.82	2.68	2.694E-02	277.28	6.310	PBC<MDA	TL208
295.15	58.	23.15	1.16	2.580E-02	295.09	19.300	6.464E+00	PB214
299.82	20.	45.80	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	6.	401.28	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.878E+00	PA231
					300.18	6.200	1.936E+00	PA233
302.64	7.	331.20	1.01	2.533E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	7.974E-01	BA133
312.01	5.	306.42	1.02	2.481E-02	312.01	36.000	PBC<MDA	PA233
316.49	13.	91.40	1.03	2.456E-02	316.49	87.040	PBC<MDA	Ir192
328.76	11.	157.14	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
338.15	144.	12.67	1.12	2.344E-02	338.32	12.010	2.842E+01	AC228
340.57	13.	177.61	1.05	2.333E-02	340.57	46.900	PBC<MDA	Cs136
345.83	13.	176.04	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.91	126.	14.06	1.28	2.279E-02	351.93	37.600	8.180E+00	PB214
383.76	10.	118.65	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
387.95	10.	126.37	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
427.88	5.	258.77	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
463.37	12.	104.45	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
468.06	4.	333.62	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	111.71	1.17	1.832E-02	477.60	10.520	PBC<MDA	BE7
487.02	9.	111.67	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
497.05	10.	115.62	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	85.	28.94	2.45	1.742E-02	511.86	20.000	1.355E+01	RH106
583.18	196.	7.70	1.15	1.584E-02	583.02	84.500	8.157E+00	TL208
600.50	12.	191.00	1.28	1.550E-02	600.50	17.860	PBC<MDA	SB125
602.73	6.	389.59	1.28	1.546E-02	602.73	98.260	PBC<MDA	SB124
609.30	112.	11.91	0.76	1.533E-02	609.31	46.090	8.784E+00	BI214
					610.30	5.750	7.050E+01	RU103
621.92	12.	165.41	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
696.54	9.	95.36	1.36	1.389E-02	696.54	99.000	PBC<MDA	PM144
702.63	8.	150.73	1.37	1.380E-02	702.63	97.900	PBC<MDA	NB94
727.46	60.	15.25	1.56	1.345E-02	727.17	7.550	3.264E+01	BI212
756.73	9.	111.82	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
765.79	14.	83.25	1.42	1.294E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	7.	133.23	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152
786.36	10.	93.61	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
795.87	24.	31.95	1.45	1.257E-02	795.87	85.530	1.257E+00	CS134
801.95	5.	212.92	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
810.78	9.	91.49	1.46	1.240E-02	810.78	99.460	PBC<MDA	CO58

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
818.50	9.	98.97	1.47	1.231E-02	818.50	100.000	PBC<MDA	Cs136
834.85	3.	389.11	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
846.77	1.	692.82	1.49	1.200E-02	846.77	99.935	PBC<MDA	Co56
860.66	10.	102.51	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
871.10	6.	39.41	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
873.23	28.	23.07	1.51	1.172E-02	873.23	12.270	1.064E+01	EU154
880.53	11.	66.93	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
883.24	7.	112.09	1.52	1.162E-02	883.24	9.600	PBC<MDA	PA234
889.28	8.	105.16	1.53	1.156E-02	889.28	99.984	PBC<MDA	Sc46
911.06	132.	10.26	1.27	1.135E-02	911.07	29.000	2.227E+01	AC228
964.11	12.	124.75	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.27	71.	14.26	1.68	1.083E-02	968.97	17.460	2.085E+01	AC228
1001.00	-3.	435.92	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	9.	114.16	1.62	1.054E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	8.	70.24	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1077.40	4.	218.66	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	2.	472.63	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	12.	85.81	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	12.	94.95	1.71	9.729E-03	1115.55	50.600	PBC<MDA	ZN65
1119.66	9.	137.30	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
1121.42	9.	136.64	1.72	9.691E-03	1121.30	34.900	PBC<MDA	Ta182
1221.41	13.	49.22	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	121.31	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	2.	291.55	1.84	8.779E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.597E-01	EU154
1332.50	7.	89.04	1.89	8.481E-03	1332.50	99.980	PBC<MDA	CO60
1460.95	276.	6.47	1.99	7.894E-03	1460.83	10.670	1.822E+02	K40
1690.98	8.	38.11	2.16	7.037E-03	1690.98	47.790	1.260E+00	SB124
1764.41	27.	20.88	2.21	6.804E-03	1764.49	15.400	1.454E+01	BI214
1836.06	6.	40.82	2.26	6.593E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.58	74.83	185.	166.	4.504E+03	13.99	0.802	-	D
308.27	77.25	166.	312.	8.284E+03	8.14	0.804	-	D
358.53	89.82	127.	63.	1.535E+03	28.30	0.816	-	D
514.92	128.90	120.	52.	1.229E+03	41.78	0.628	-	s
835.06	208.97	62.	74.	2.246E+03	23.26	0.656	-	s
965.41	241.69	139.	40.	1.340E+03	44.92	0.957	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.08	46.65	90.	9.	0.005	165.37	0.906
TH-227	200.03	50.14	132.	-2.	-0.001	969.54	0.778s
AM-241	237.59	59.54	246.	-20.	-0.011	133.88	0.787s
TH-234	252.59	63.29	165.	25.	0.014	74.88	0.791D
Sn-126	256.56	64.28	376.	-26.	-0.014	109.24	0.792s
BA-133	323.36	80.99	201.	-8.	-0.004	314.35	0.807
Np-237	345.35	86.49	957.	0.	0.000	175.43	0.813A
EU-155	345.56	86.54	931.	-25.	-0.014	173.10	0.813s
Sn-126	347.15	86.94	868.	13.	0.007	167.78	0.813D
Sn-126	349.67	87.57	809.	25.	0.014	86.34	0.814D
Cd-109	351.55	88.04	834.	25.	0.014	163.66	0.814A
Nd-147	363.79	91.10	825.	21.	0.012	195.81	0.817s
TH-234	369.74	92.59	209.	23.	0.013	90.16	0.818D
AC-228	372.78	93.35	788.	25.	0.014	159.15	0.819s
Gd-153	389.37	97.50	336.	-23.	-0.013	114.33	0.823s
Gd-153	412.16	103.20	312.	21.	0.012	118.95	0.828s
Np-239	414.16	103.70	352.	-23.	-0.013	118.88	0.829s
EU-155	420.61	105.31	332.	-6.	-0.003	377.43	0.830s
Np-239	423.88	106.13	337.	0.	0.000	1000.00	0.831s
EU-152	486.43	121.78	317.	-24.	-0.013	105.93	0.846s
CO-57	487.57	122.06	342.	-24.	-0.013	109.69	0.846s
EU-154	491.73	123.10	339.	6.	0.003	425.43	0.847s
PA-234	524.49	131.29	452.	20.	0.011	149.25	0.855s
HF-181	531.41	133.02	472.	3.	0.002	979.69	0.856s
CE-144	533.46	133.54	475.	0.	0.000	1000.00	0.857s
HF-181	544.50	136.30	475.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	475.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	394.	-22.	-0.012	127.97	0.863s
U-235	574.43	143.79	363.	-29.	-0.016	73.97	0.866
CE-141	581.05	145.44	372.	21.	0.012	131.02	0.868s
Ba-140	649.90	162.66	246.	20.	0.011	114.99	0.884s
U-235	652.78	163.38	270.	5.	0.003	462.56	0.885
CE-139	662.67	165.85	293.	-21.	-0.012	115.39	0.887s
Cf-251	705.64	176.60	140.	8.	0.004	265.56	0.897s
TH-229	773.25	193.51	114.	18.	0.010	107.71	0.913s
U-235	820.52	205.33	254.	14.	0.008	160.12	0.924s
TH-229	842.58	210.85	237.	15.	0.008	149.32	0.929s
Cf-251	907.16	227.00	120.	-20.	-0.011	101.60	0.944s
PB-212	953.67	238.63	91.	575.	0.320	4.79	0.954D
PB-214	967.13	242.00	915.	8.	0.004	555.68	0.958s
EU-152	977.91	244.69	923.	0.	0.000	1000.00	0.960s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	1024.08	256.24	94.	-18.	-0.010	156.74	0.971s
Cd-113m	1053.91	263.70	160.	-19.	-0.010	98.89	0.978
BI-210M	1062.44	265.83	164.	-5.	-0.003	338.26	0.979s
TL-208	1110.17	277.77	53.	32.	0.018	45.82	2.684s
Hg-203	1115.89	279.20	127.	0.	0.000	1000.00	0.992s
I-131	1136.28	284.30	84.	-7.	-0.004	237.17	0.996s
PB-214	1179.68	295.15	40.	58.	0.032	23.15	1.157
PB-212	1199.19	300.03	34.	20.	0.011	45.80	1.011D
PA-231	1199.35	300.07	241.	6.	0.003	401.28	1.011
PA-233	1199.79	300.18	247.	0.	0.000	1000.00	1.011
PA-231	1209.66	302.65	247.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	240.	7.	0.004	331.20	1.013s
Ir-192	1232.82	308.44	116.	-17.	-0.010	91.05	1.019s
PA-233	1247.10	312.01	131.	5.	0.003	306.42	1.022
Ir-192	1265.01	316.49	68.	13.	0.007	91.40	1.026
CR-51	1279.38	320.08	128.	-14.	-0.008	68.61	1.029s
La-140	1314.07	328.76	77.	11.	0.006	157.14	1.037s
Cf-249	1332.79	333.44	99.	-18.	-0.010	106.07	1.041
AC-228	1351.63	338.15	42.	144.	0.080	12.67	1.125s
Cs-136	1361.30	340.57	265.	13.	0.007	177.61	1.048s
EU-152	1376.16	344.29	307.	-16.	-0.009	161.90	1.051s
HF-181	1382.33	345.83	263.	13.	0.007	176.04	1.053s
PB-214	1406.74	351.93	49.	112.	0.062	13.03	1.058D
BA-133	1423.00	356.00	265.	-17.	-0.010	135.20	1.062s
I-131	1456.93	364.48	78.	-16.	-0.009	89.50	1.070s
BA-133	1534.34	383.84	65.	10.	0.006	118.65	1.087s
Cf-249	1550.77	387.95	75.	10.	0.006	126.37	1.091s
SN-113	1565.73	391.69	120.	-9.	-0.005	169.51	1.094
SB-125	1710.44	427.88	40.	5.	0.003	258.77	1.127s
AG-108M	1734.69	433.94	62.	-11.	-0.006	133.67	1.132s
pm-146	1814.44	453.88	76.	-17.	-0.010	100.85	1.150s
SB-125	1852.38	463.37	67.	12.	0.006	104.45	1.158
Ir-192	1871.15	468.06	91.	4.	0.002	333.62	1.163s
BE-7	1909.29	477.59	70.	11.	0.006	111.71	1.171s
HF-181	1926.89	482.00	88.	-8.	-0.004	169.56	1.175s
La-140	1946.98	487.02	24.	9.	0.005	111.67	1.180s
RU-103	1987.11	497.05	32.	10.	0.006	115.62	1.188s
RH-106	2046.35	511.86	80.	85.	0.047	28.94	2.452s
Nd-147	2122.88	531.00	60.	-16.	-0.009	95.68	1.219s
Ba-140	2147.92	537.26	37.	-11.	-0.006	109.52	1.224s
CS-134	2251.82	563.24	44.	-2.	-0.001	479.41	1.247
CS-134	2276.15	569.32	38.	-2.	-0.001	352.14	1.252s
PA-234	2276.75	569.47	40.	0.	0.000	1000.00	1.253s
TL-208	2331.58	583.18	8.	196.	0.109	7.70	1.153
SB-125	2400.86	600.50	247.	12.	0.007	191.00	1.280s
SB-124	2409.78	602.73	257.	6.	0.003	389.59	1.282s
BI-214	2436.05	609.30	18.	112.	0.062	11.91	0.762s
RU-103	2440.05	610.30	228.	-13.	-0.007	161.37	1.288s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2455.98	614.28	215.	-13.	-0.007	163.14	1.292s
PM-144	2471.11	618.06	202.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	191.	12.	0.007	165.41	1.299s
SB-125	2542.41	635.89	34.	-6.	-0.003	146.97	1.311s
I-131	2546.75	636.97	58.	-14.	-0.008	93.79	1.312s
AG-110M	2629.90	657.76	48.	-5.	-0.003	201.00	1.330s
CS-137	2645.49	661.66	80.	-14.	-0.008	93.25	1.333s
PM-144	2785.03	696.54	17.	9.	0.005	95.36	1.363s
NB-94	2809.38	702.63	35.	8.	0.005	150.73	1.368s
SB-124	2890.01	722.79	130.	-14.	-0.008	114.68	1.386
AG-108M	2890.61	722.94	116.	-14.	-0.008	108.47	1.386
EU-154	2892.29	723.36	101.	-5.	-0.003	274.26	1.386
BI-212	2908.71	727.46	4.	60.	0.033	15.25	1.557
pm-146	2941.74	735.72	35.	-6.	-0.003	208.27	1.397s
pm-146	2987.51	747.16	26.	-2.	-0.001	595.24	1.407
ZR-95	3025.79	756.73	22.	9.	0.005	111.82	1.415s
AG-110M	3054.64	763.94	60.	-16.	-0.009	75.38	1.421s
NB-95	3062.03	765.79	61.	14.	0.008	83.25	1.423s
PA-234M	3064.52	766.41	56.	-6.	-0.003	163.13	1.423s
EU-152	3114.56	778.92	17.	7.	0.004	133.23	1.434s
BI-212	3140.56	785.42	17.	10.	0.005	93.61	1.440s
CS-134	3182.35	795.87	9.	24.	0.014	31.95	1.448s
CS-134	3206.69	801.95	26.	5.	0.003	212.92	1.454s
CO-58	3241.99	810.78	28.	9.	0.005	91.49	1.461s
La-140	3261.97	815.77	41.	-4.	-0.002	209.38	1.465s
Cs-136	3272.90	818.50	34.	9.	0.005	98.97	1.467s
MN-54	3338.30	834.85	23.	3.	0.001	389.11	1.481s
Co-56	3385.99	846.77	19.	1.	0.001	692.82	1.491s
TL-208	3441.18	860.56	20.	10.	0.005	102.51	1.503s
NB-94	3483.32	871.10	0.	6.	0.004	39.41	1.512s
EU-154	3491.85	873.23	6.	28.	0.015	23.07	1.514s
PA-234	3521.06	880.53	21.	11.	0.006	66.93	1.520s
PA-234	3531.90	883.24	31.	7.	0.004	112.09	1.522s
AG-110M	3537.67	884.68	62.	-12.	-0.007	98.72	1.523s
Sc-46	3556.06	889.28	27.	8.	0.004	105.16	1.527s
AC-228	3643.19	911.06	11.	132.	0.073	10.26	1.272
AG-110M	3748.95	937.49	33.	-6.	-0.003	218.04	1.567s
PA-234	3783.07	946.02	19.	-5.	-0.003	201.78	1.574s
EU-152	3855.45	964.11	113.	12.	0.007	124.75	1.589s
AC-228	3876.08	969.27	7.	71.	0.039	14.26	1.683
EU-154	3984.36	996.33	51.	-9.	-0.005	119.00	1.616s
PA-234M	4003.04	1001.00	61.	-3.	-0.001	435.92	1.620s
EU-154	4018.15	1004.77	50.	9.	0.005	114.16	1.623s
Co-56	4150.45	1037.84	25.	-7.	-0.004	156.05	1.650s
Cs-136	4191.39	1048.07	12.	8.	0.005	70.24	1.658s
RH-106	4200.55	1050.36	35.	-9.	-0.005	100.40	1.661s
BI-207	4253.77	1063.66	20.	-2.	-0.001	496.66	1.671s
Ga-68	4308.74	1077.40	15.	4.	0.002	218.66	1.683s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.18	1099.25	15.	2.	0.001	472.63	1.700s
EU-152	4447.49	1112.07	46.	12.	0.007	85.81	1.711s
ZN-65	4461.38	1115.55	58.	12.	0.007	94.95	1.713s
BI-214	4480.35	1120.29	71.	9.	0.005	137.30	1.717s
Ta-182	4484.41	1121.30	80.	9.	0.005	136.64	1.718
CO-60	4692.24	1173.24	30.	-4.	-0.002	305.16	1.760s
Ta-182	4755.52	1189.05	25.	-4.	-0.002	296.41	1.772
Ta-182	4885.02	1221.41	6.	13.	0.007	49.22	1.798
Co-56	4952.53	1238.28	22.	9.	0.005	121.31	1.812s
NA-22	5097.60	1274.53	16.	2.	0.001	291.55	1.840s
EU-154	5097.66	1274.54	18.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	27.	-13.	-0.007	96.83	1.854s
CO-60	5329.61	1332.50	5.	7.	0.004	89.04	1.886s
AG-110M	5536.92	1384.30	22.	-7.	-0.004	168.21	1.926s
EU-152	5631.79	1408.00	11.	-2.	-0.001	452.11	1.944s
K-40	5843.73	1460.95	13.	276.	0.154	6.47	1.992
La-140	6385.15	1596.21	34.	-18.	-0.010	98.35	2.087s
SB-124	6764.55	1690.98	0.	8.	0.004	38.11	2.157s
BI-214	7058.84	1764.49	3.	27.	0.015	20.88	2.211s
Co-56	7086.31	1771.35	30.	0.	0.000	1000.00	2.216s
y-88	7345.39	1836.06	0.	6.	0.003	40.82	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.1714E+00					5.31E+01	
			477.60	3.171E+00	?(	1.202E+01	1.12E+02	1.05E+01 G
NA-22	C	1.2664E-01					9.50E+02	
			1274.53	1.266E-01	?(	1.352E+00	2.92E+02	9.99E+01 G
K-40	N	1.8224E+02					4.66E+11	
			1460.83	1.822E+02	(P	1.274E+01	6.47E+00	1.07E+01 G
Sc-46	F	3.6085E-01					8.38E+01	
			889.28	3.608E-01	&(	1.303E+00	1.05E+02	1.00E+02 G
			1120.55	-5.302E-02	%	2.688E+00	1.45E+03	1.00E+02 G
CR-51	F	-3.2212E+00					2.77E+01	
			320.08	-3.221E+00	?(P	1.272E+01	6.86E+01	9.94E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 1.2218E-01					3.12E+02	
		834.85	1.222E-01	?(	1.156E+00	3.89E+02	1.00E+02 G
FE-59	F 1.8285E-01					4.45E+01	
		1099.25	1.828E-01	?(P	2.085E+00	4.73E+02	5.65E+01 G
		1291.60	-1.875E+00	&	3.963E+00	9.68E+01	4.32E+01 G
Co-56	C 3.7470E-01					7.73E+01	
		846.77	6.177E-02	?(	1.058E+00	6.93E+02	9.99E+01 G
		1238.28	8.480E-01	(P	2.299E+00	1.21E+02	6.61E+01 G
		1037.84	-2.691E+00	+ P	9.952E+00	1.56E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.494E+01	1.00E+03	1.55E+01 A
CO-57	C -3.6805E-01					2.72E+02	
		122.06	-3.681E-01	?(	1.348E+00	1.10E+02	8.56E+01 G
		136.47	0.000E+00	+	1.303E+01	1.00E+03	1.07E+01 G
CO-58	C 3.9640E-01					7.09E+01	
		810.78	3.964E-01	(	1.233E+00	9.15E+01	9.95E+01 G
CO-60	F 4.2978E-01					1.93E+03	
		1332.50	4.298E-01	?(	8.827E-01	8.90E+01	1.00E+02 G
		1173.24	-2.377E-01	-	1.678E+00	3.05E+02	9.99E+01 G
ZN-65	F 1.3449E+00					2.44E+02	
		1115.55	1.345E+00	&(	4.313E+00	9.50E+01	5.06E+01 G
NB-94	I 3.2106E-01					7.41E+06	
		702.63	3.376E-01	?(P	1.242E+00	1.51E+02	9.79E+01 G
		871.10	3.049E-01	&(	3.490E-01	3.94E+01	9.99E+01 G
ZR-95	I 6.9918E-01					6.40E+01	
		756.73	6.992E-01	?(P	1.922E+00	1.12E+02	5.45E+01 G
		724.20	3.558E-07	%	4.511E+00	3.63E+08	4.42E+01 G
NB-95	I 6.0193E-01					6.40E+01	
		765.79	6.019E-01	?(	1.680E+00	8.33E+01	9.98E+01 G
RU-103	I 3.4237E-01					3.93E+01	
		497.05	3.424E-01	?(P	9.989E-01	1.16E+02	9.09E+01 G
		610.30	-8.477E+00	+	4.613E+01	1.61E+02	5.75E+00 GA
RH-106	I 4.4452E+00					3.74E+02	
		621.92	4.445E+00	(	2.486E+01	1.65E+02	9.93E+00 G
		1050.36	-3.084E+01	+	1.056E+02	1.00E+02	1.56E+00 G
		511.86	1.355E+01	?	7.079E+00	2.89E+01	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -3.5453E-01					1.53E+05	
		433.94	-3.545E-01	?(	1.236E+00	1.34E+02	9.05E+01 G
		722.94	-6.545E-01	+	2.392E+00	1.08E+02	9.08E+01 G
		614.28	-5.232E-01	+	2.881E+00	1.63E+02	8.98E+01 G
AG-110M	F -7.7989E-01					2.50E+02	
		884.68	-7.799E-01	&(	2.603E+00	9.87E+01	7.27E+01 G
		657.76	-2.026E-01	+	1.418E+00	2.01E+02	9.46E+01 G
		937.49	-8.247E-01	+	4.270E+00	2.18E+02	3.44E+01 G
		1384.30	-1.818E+00	+ P	6.762E+00	1.68E+02	2.43E+01 G
		763.94	-2.981E+00	+	7.493E+00	7.54E+01	2.23E+01 G
SN-113	F -3.5676E-01					1.15E+02	
		391.69	-3.568E-01	?(P	2.206E+00	1.70E+02	6.40E+01 G
SB-124	F 5.5629E-01					6.02E+01	
		602.73	2.142E-01	?(P	2.833E+00	3.90E+02	9.83E+01 G
		1690.98	1.260E+00	?(P	1.218E+00	3.81E+01	4.78E+01 G
		722.79	-5.498E+00	+	2.125E+01	1.15E+02	1.08E+01 G
SB-125	I 1.5442E+00					1.01E+03	
		427.88	4.417E-01	?(	3.058E+00	2.59E+02	2.96E+01 G
		600.50	2.363E+00	?(	1.524E+01	1.91E+02	1.79E+01 G
		635.89	-1.929E+00	+	9.857E+00	1.47E+02	1.13E+01 G
		463.37	3.265E+00	(P	1.154E+01	1.04E+02	1.05E+01 G
I-131	I -5.0098E-01					8.02E+00	
		364.48	-5.010E-01	?(P	1.345E+00	8.95E+01	8.17E+01 G
		284.30	-2.506E+00	&	1.555E+01	2.37E+02	6.14E+00 G
		636.97	-7.433E+00	+ P	1.993E+01	9.38E+01	7.17E+00 G
Gd-153	F -5.0180E-02					2.42E+02	
		97.50	-1.013E+00	?(	3.873E+00	1.14E+02	3.00E+01 G
		103.20	1.275E+00	?(	5.077E+00	1.19E+02	2.18E+01 G
Ga-68	C 7.9301E+00					4.71E-02	
		1077.40	7.930E+00	?(	4.115E+01	2.19E+02	3.30E+00 G
Tc-99m	I -3.4668E-01					2.51E-01	
		140.51	-3.467E-01	&(	1.484E+00	1.28E+02	8.93E+01 G
BA-133	F -3.4738E-01					3.85E+03	
		356.00	-6.856E-01	?(	3.113E+00	1.35E+02	6.20E+01 G
		302.85	7.974E-01	?(	8.967E+00	3.31E+02	1.83E+01 G
		383.84	2.899E+00	?	1.171E+01	1.19E+02	8.94E+00 GA
		80.99	-3.396E-01	+ P	2.889E+00	3.14E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	6.7636E-01					7.54E+02	
			604.71	-5.632E-07	%(	2.889E+00	1.50E+08	9.76E+01 G
			795.87	1.257E+00	?(	8.488E-01	3.20E+01	8.55E+01 G
			569.32	-5.603E-01	+	7.003E+00	3.52E+02	1.54E+01 G
			801.95	2.557E+00	?(	1.354E+01	2.13E+02	8.69E+00 G
			563.24	-9.938E-01	+ P	1.383E+01	4.79E+02	8.35E+00 G
CS-137	I	-6.4020E-01					1.10E+04	
			661.66	-6.402E-01	&(	2.008E+00	9.32E+01	8.52E+01 G
CE-139	F	-3.8822E-01					1.38E+02	
			165.85	-3.882E-01	?(	1.499E+00	1.15E+02	7.99E+01 G
Ba-140	I	-2.0556E-01					1.28E+01	
			537.26	-1.433E+00	?(P	4.185E+00	1.10E+02	2.44E+01 G
			162.66	4.608E+00	?(	1.775E+01	1.15E+02	6.22E+00 G
			304.85	-2.258E-01	% P	3.904E+01	2.15E+03	4.29E+00 G
La-140	I	-1.4395E+00					1.28E+01	
			1596.21	-1.439E+00	?(P	2.376E+00	9.84E+01	9.54E+01 G
			487.02	6.085E-01	+	1.727E+00	1.12E+02	4.55E+01 G
			328.76	1.221E+00	+ P	5.000E+00	1.57E+02	2.03E+01 G
			815.77	-8.635E-01	+	6.327E+00	2.09E+02	2.33E+01 G
CE-141	I	5.9956E-01					3.25E+01	
			145.44	5.996E-01	?(	2.629E+00	1.31E+02	4.82E+01 G
PM-144	C	3.8302E-01					3.63E+02	
			696.54	3.830E-01	&(	8.935E-01	9.54E+01	9.90E+01 G
			618.06	0.000E+00	-	2.547E+00	1.00E+03	9.91E+01 G
EU-152	F	1.8126E+00					4.94E+03	
			344.29	-1.404E+00	&(	7.642E+00	1.62E+02	2.65E+01 G
			1112.07	4.967E+00	&(	1.435E+01	8.58E+01	1.36E+01 G
			121.78	-1.101E+00	&	3.896E+00	1.06E+02	2.86E+01 G
			778.92	2.240E+00	?(	7.430E+00	1.33E+02	1.29E+01 G
			964.11	4.322E+00	?(	1.825E+01	1.25E+02	1.46E+01 G
			244.69	0.000E+00	-	3.600E+01	1.00E+03	7.58E+00 G
			1408.00	-5.426E-01	-	5.837E+00	4.52E+02	2.10E+01 GA
EU-154	I	1.0644E+01					3.14E+03	
			873.23	1.064E+01	?(	5.613E+00	2.31E+01	1.23E+01 G
			123.10	1.960E-01	&	2.822E+00	4.25E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.043E+00	1.00E+03	3.52E+01 G
			723.36	-1.069E+00	-	1.009E+01	2.74E+02	2.02E+01 G
			1004.77	2.683E+00	-	1.045E+01	1.14E+02	1.80E+01 G
			996.33	-4.364E+00	-	1.775E+01	1.19E+02	1.06E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	-3.4298E-01						1.81E+03	
			105.31	-3.430E-01		*(P	5.369E+00	3.77E+02	2.12E+01 G
			86.54	-1.128E+00		+	6.513E+00	1.73E+02	3.07E+01 G
HF-181	F	7.6697E-02						4.24E+01	
			482.00	-3.034E-01		?(	1.761E+00	1.70E+02	8.05E+01 G
			133.02	9.602E-02		+	3.177E+00	9.80E+02	4.33E+01 G
			345.83	2.107E+00		?(	1.251E+01	1.76E+02	1.51E+01 G
			136.30	0.000E+00		-	2.378E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.1800E+00						1.14E+02	
			1121.30	1.561E+00		(	7.270E+00	1.37E+02	3.49E+01 G
			1221.41	2.981E+00		(P	3.172E+00	4.92E+01	2.70E+01 G
			1189.05	-1.545E+00		+ P	9.660E+00	2.96E+02	1.62E+01 G
TL-208	N	8.1568E+00						6.98E+02	
			583.02	8.157E+00		(	6.765E-01	7.70E+00	8.45E+01 G
			277.28	1.050E+01		+ P	1.196E+01	4.58E+01	6.31E+00 G
			860.56	3.597E+00		- P	8.805E+00	1.03E+02	1.24E+01 G
pm-146	C	-2.5879E-01						2.02E+03	
			747.16	-2.588E-01		&(P	3.287E+00	5.95E+02	3.40E+01 G
			735.72	-1.103E+00		+ P	5.604E+00	2.08E+02	2.25E+01 G
			453.88	-7.836E-01		+	1.949E+00	1.01E+02	6.50E+01 G
y-88	F	2.4537E-01						1.07E+02	
			898.04	-3.444E-02		&(	1.180E+00	1.38E+03	9.37E+01 G
			1836.06	5.097E-01		?(	6.260E-01	4.08E+01	9.92E+01 G
Cd-113m		-6.1763E+03						5.33E+03	
			263.70	-6.176E+03		&(	2.046E+04	9.89E+01	6.00E-03 K
Cd-109	F	9.0797E+00						4.53E+02	
								Derived Ave Activity	
			88.04	9.080E+00		}(	4.958E+01	1.64E+02	3.79E+00 G
Cf-251	T	7.1286E-01						3.28E+05	
			176.60	7.129E-01		&(	5.155E+00	2.66E+02	1.70E+01 G
			227.00	-5.610E+00		&	1.533E+01	1.02E+02	6.30E+00 GA
Cf-249	T	3.9702E-01						1.28E+05	
			387.95	3.970E-01		?(	1.708E+00	1.26E+02	6.60E+01 G
			333.44	-2.723E+00		+	7.424E+00	1.06E+02	1.55E+01 G
Sn-126		-4.5437E+00						3.65E+07	
			87.57	9.194E-01		}	4.949E+00	8.63E+01	3.75E+01 GA
			64.28	-4.544E+00		?(	1.657E+01	1.09E+02	9.70E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                           86.94 2.015E+00 }   2.132E+01 1.68E+02 9.04E+00 GA

PB-210   N   5.5546E+00                                     8.14E+03
                           46.54 5.555E+00  (P 2.921E+01 1.65E+02 4.25E+00 G

PB-212   N   2.4689E+01                                     6.98E+02
                          238.63 2.469E+01  (P 2.023E+00 4.79E+00 4.33E+01 G
                          300.03 1.359E+01 - P 1.973E+01 4.58E+01 3.28E+00 GA

PB-214   N   6.9779E+00                                     5.84E+05
                          351.93 7.241E+00  (P 2.297E+00 1.30E+01 3.76E+01 G
                          295.09 6.464E+00  (P 3.594E+00 2.32E+01 1.93E+01 G
                          242.00 1.949E+00 -   3.630E+01 5.56E+02 7.43E+00 GA

BI-207   C  -1.7642E-02                                     1.18E+04
                          569.70-1.764E-02 &(  1.155E+00 1.83E+03 9.77E+01 G
                         1063.66-1.478E-01 +   1.740E+00 4.97E+02 7.45E+01 G

BI-212   N   3.2643E+01                                     6.98E+02
                          727.17 3.264E+01  (  6.790E+00 1.52E+01 7.55E+00 G
                          785.42 3.304E+01 &   7.558E+01 9.36E+01 1.28E+00 GA

BI-214   N   8.7843E+00                                     5.84E+05
                          609.31 8.784E+00  (P 1.778E+00 1.19E+01 4.61E+01 G
                         1120.29 3.412E+00 - P 1.597E+01 1.37E+02 1.51E+01 G
                         1764.49 1.454E+01 + P 5.402E+00 2.09E+01 1.54E+01 G

BI-210M  T  -2.1594E-01                                     1.10E+09
                          265.83-2.159E-01 ?(  2.496E+00 3.38E+02 5.00E+01 G
                          304.90-3.690E-02 % P 5.982E+00 2.03E+03 2.80E+01 G

AC-228   N   2.1738E+01                                     2.10E+03
                          911.07 2.227E+01  (  3.065E+00 1.03E+01 2.90E+01 G
                          968.97 2.085E+01  (  4.417E+00 1.43E+01 1.75E+01 G
                          338.32 2.842E+01 +   6.496E+00 1.27E+01 1.20E+01 G
                           93.35 6.042E+00 -   3.209E+01 1.59E+02 5.56E+00 XA

TH-227   N  -5.8935E-01                                     7.95E+03
                           50.14-5.893E-01 ?(  1.658E+01 9.70E+02 8.00E+00 G
                          256.24-4.904E+00 + P 1.333E+01 1.57E+02 7.00E+00 G

TH-229   N   7.3550E+00                                     2.68E+06
                          193.51 6.611E+00 *(P 1.919E+01 1.08E+02 4.40E+00 G
                          210.85 8.449E+00 &(  4.249E+01 1.49E+02 2.99E+00 G

TH-234   N   8.0679E+00                                     1.63E+12
                           63.29 1.165E+01  (P 2.881E+01 7.49E+01 3.81E+00 G
                           92.59 5.621E+00  (P 1.683E+01 9.02E+01 5.58E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	2.2474E+00					1.20E+07	
			302.65	0.000E+00	?(	5.780E+01	1.00E+03	2.88E+00 G
			300.07	4.878E+00	(	6.654E+01	4.01E+02	2.46E+00 G
PA-233	C	3.3234E-01					7.82E+08	
			312.01	3.323E-01	&(	3.491E+00	3.06E+02	3.60E+01 G
			300.18	0.000E+00	-	2.670E+01	1.00E+03	6.20E+00 G
PA-234	N	2.2690E+00					1.63E+12	
			131.29	1.492E+00	?(	7.454E+00	1.49E+02	1.80E+01 G
			946.02	-1.753E+00	+	8.583E+00	2.02E+02	1.34E+01 G
			569.47	0.000E+00	&	1.353E+01	1.00E+03	8.20E+00 G
			883.24	3.727E+00	?(	1.436E+01	1.12E+02	9.60E+00 G
			880.53	8.573E+00	&	1.899E+01	6.69E+01	6.00E+00 GA
PA-234M	N	-1.5804E+01					1.63E+12	
			1001.00	-1.580E+01	&(P	2.459E+02	4.36E+02	8.37E-01 G
			766.41	-9.037E+01	+ P	5.501E+02	1.63E+02	2.94E-01 G
U-235	N	-3.6129E+00					2.57E+11	
			143.79	-3.613E+00	?(P	1.136E+01	7.40E+01	1.10E+01 G
			205.33	4.784E+00	& P	2.579E+01	1.60E+02	5.01E+00 G
			163.38	1.454E+00	& P	2.280E+01	4.63E+02	5.08E+00 G
AM-241	T	-1.0467E+00					1.58E+05	
			59.54	-1.047E+00	?(	3.967E+00	1.34E+02	3.59E+01 G
Ir-192	F	3.0543E-01					7.40E+01	
			316.49	3.467E-01	(	1.067E+00	9.14E+01	8.70E+01 G
			468.06	2.361E-01	?(	2.723E+00	3.34E+02	5.18E+01 G
			308.44	-1.213E+00	+	3.701E+00	9.10E+01	3.18E+01 G
Cs-136	F	5.0931E-01					1.30E+01	
			818.50	3.989E-01	?(	1.346E+00	9.90E+01	1.00E+02 G
			1048.07	5.550E-01	?(	1.298E+00	7.02E+01	8.00E+01 G
			340.57	6.668E-01	?(	3.992E+00	1.78E+02	4.69E+01 G
Nd-147		-4.1343E+00					1.11E+01	
			531.00	-4.134E+00	?(	9.779E+00	9.57E+01	1.30E+01 G
			91.10	9.951E-01	+	6.509E+00	1.96E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	132.	-2.	-0.001	969.54	-5.893E-01	
AM-241	59.54	246.	-20.	-0.011	133.88	-1.047E+00	
EU-155	86.54	931.	-25.	-0.014	173.10	-1.128E+00	
Nd-147	91.10	825.	21.	0.012	195.81	9.951E-01	
Gd-153	97.50	336.	-23.	-0.013	114.33	-1.013E+00	
Gd-153	103.20	312.	21.	0.012	118.95	1.275E+00	
Np-239	103.70	352.	-23.	-0.013	118.88	-1.230E+00	
EU-155	105.31	332.	-6.	-0.003	377.43	-3.430E-01	P
EU-152	121.78	317.	-24.	-0.013	105.93	-1.101E+00	
CO-57	122.06	342.	-24.	-0.013	109.69	-3.681E-01	
PA-234	131.29	452.	20.	0.011	149.25	1.492E+00	
HF-181	133.02	472.	3.	0.002	979.69	9.602E-02	
Tc-99m	140.51	394.	-22.	-0.012	127.97	-3.467E-01	
U-235	143.79	363.	-29.	-0.016	73.97	-3.613E+00	P
CE-141	145.44	372.	21.	0.012	131.02	5.996E-01	
Ba-140	162.66	246.	20.	0.011	114.99	4.608E+00	
U-235	163.38	270.	5.	0.003	462.56	1.454E+00	P
CE-139	165.85	293.	-21.	-0.012	115.39	-3.882E-01	
Cf-251	176.60	140.	8.	0.004	265.56	7.129E-01	
TH-229	193.51	114.	18.	0.010	107.71	6.611E+00	P
U-235	205.33	254.	14.	0.008	160.12	4.784E+00	P
TH-229	210.85	237.	15.	0.008	149.32	8.449E+00	
Cf-251	227.00	120.	-20.	-0.011	101.60	-5.610E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	256.24	94.	-18.	-0.010	156.74	-4.904E+00	P
Cd-113m	263.70	160.	-19.	-0.010	98.89	-6.176E+03	
BI-210M	265.83	164.	-5.	-0.003	338.26	-2.159E-01	
I-131	284.30	84.	-7.	-0.004	237.17	-2.506E+00	
PA-231	300.07	241.	6.	0.003	401.28	4.878E+00	
Ir-192	308.44	116.	-17.	-0.010	91.05	-1.213E+00	
PA-233	312.01	131.	5.	0.003	306.42	3.323E-01	
Ir-192	316.49	68.	13.	0.007	91.40	3.467E-01	
CR-51	320.08	128.	-14.	-0.008	68.61	-3.221E+00	P
La-140	328.76	77.	11.	0.006	157.14	1.221E+00	P
Cf-249	333.44	99.	-18.	-0.010	106.07	-2.723E+00	
Cs-136	340.57	265.	13.	0.007	177.61	6.668E-01	
EU-152	344.29	307.	-16.	-0.009	161.90	-1.404E+00	
HF-181	345.83	263.	13.	0.007	176.04	2.107E+00	
I-131	364.48	78.	-16.	-0.009	89.50	-5.010E-01	P
Cf-249	387.95	75.	10.	0.006	126.37	3.970E-01	
SN-113	391.69	120.	-9.	-0.005	169.51	-3.568E-01	P
SB-125	427.88	40.	5.	0.003	258.77	4.417E-01	
AG-108M	433.94	62.	-11.	-0.006	133.67	-3.545E-01	
pm-146	453.88	76.	-17.	-0.010	100.85	-7.836E-01	
SB-125	463.37	67.	12.	0.006	104.45	3.265E+00	P
Ir-192	468.06	91.	4.	0.002	333.62	2.361E-01	
BE-7	477.59	70.	11.	0.006	111.71	3.171E+00	
HF-181	482.00	88.	-8.	-0.004	169.56	-3.034E-01	
La-140	487.02	24.	9.	0.005	111.67	6.085E-01	
RU-103	497.05	32.	10.	0.006	115.62	3.424E-01	P
RH-106	511.86	80.	85.	0.047	28.94	1.355E+01	
Nd-147	531.00	60.	-16.	-0.009	95.68	-4.134E+00	
Ba-140	537.26	37.	-11.	-0.006	109.52	-1.433E+00	P
CS-134	563.24	44.	-2.	-0.001	479.41	-9.938E-01	P
CS-134	569.32	38.	-2.	-0.001	352.14	-5.603E-01	
SB-125	600.50	247.	12.	0.007	191.00	2.363E+00	
SB-124	602.73	257.	6.	0.003	389.59	2.142E-01	P
RU-103	610.30	228.	-13.	-0.007	161.37	-8.477E+00	
AG-108M	614.28	215.	-13.	-0.007	163.14	-5.232E-01	
RH-106	621.92	191.	12.	0.007	165.41	4.445E+00	
SB-125	635.89	34.	-6.	-0.003	146.97	-1.929E+00	
I-131	636.97	58.	-14.	-0.008	93.79	-7.433E+00	P
AG-110M	657.76	48.	-5.	-0.003	201.00	-2.026E-01	
CS-137	661.66	80.	-14.	-0.008	93.25	-6.402E-01	
PM-144	696.54	17.	9.	0.005	95.36	3.830E-01	
NB-94	702.63	35.	8.	0.005	150.73	3.376E-01	P
SB-124	722.79	130.	-14.	-0.008	114.68	-5.498E+00	
AG-108M	722.94	116.	-14.	-0.008	108.47	-6.545E-01	
pm-146	735.72	35.	-6.	-0.003	208.27	-1.103E+00	P
pm-146	747.16	26.	-2.	-0.001	595.24	-2.588E-01	P
ZR-95	756.73	22.	9.	0.005	111.82	6.992E-01	P
AG-110M	763.94	60.	-16.	-0.009	75.38	-2.981E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-95	765.79	61.	14.	0.008	83.25	6.019E-01		
PA-234M	766.41	56.	-6.	-0.003	163.13	-9.037E+01		P
EU-152	778.92	17.	7.	0.004	133.23	2.240E+00		
CS-134	795.87	9.	24.	0.014	31.95	1.257E+00		
CS-134	801.95	26.	5.	0.003	212.92	2.557E+00		
CO-58	810.78	28.	9.	0.005	91.49	3.964E-01		
La-140	815.77	41.	-4.	-0.002	209.38	-8.635E-01		
Cs-136	818.50	34.	9.	0.005	98.97	3.989E-01		
MN-54	834.85	23.	3.	0.001	389.11	1.222E-01		
Co-56	846.77	19.	1.	0.001	692.82	6.177E-02		
NB-94	871.10	0.	6.	0.004	39.41	3.049E-01		
PA-234	880.53	21.	11.	0.006	66.93	8.573E+00		
PA-234	883.24	31.	7.	0.004	112.09	3.727E+00		
AG-110M	884.68	62.	-12.	-0.007	98.72	-7.799E-01		
Sc-46	889.28	27.	8.	0.004	105.16	3.608E-01		
AG-110M	937.49	33.	-6.	-0.003	218.04	-8.247E-01		
PA-234	946.02	19.	-5.	-0.003	201.78	-1.753E+00		
EU-152	964.11	113.	12.	0.007	124.75	4.322E+00		
PA-234M	1001.00	61.	-3.	-0.001	435.92	-1.580E+01		P
Co-56	1037.84	25.	-7.	-0.004	156.05	-2.691E+00		P
Cs-136	1048.07	12.	8.	0.005	70.24	5.550E-01		
RH-106	1050.36	35.	-9.	-0.005	100.40	-3.084E+01		
BI-207	1063.66	20.	-2.	-0.001	496.66	-1.478E-01		
Ga-68	1077.40	15.	4.	0.002	218.66	7.930E+00		
FE-59	1099.25	15.	2.	0.001	472.63	1.828E-01		P
EU-152	1112.07	46.	12.	0.007	85.81	4.967E+00		
ZN-65	1115.55	58.	12.	0.007	94.95	1.345E+00		
Ta-182	1121.30	80.	9.	0.005	136.64	1.561E+00		
CO-60	1173.24	30.	-4.	-0.002	305.16	-2.377E-01		
Ta-182	1189.05	25.	-4.	-0.002	296.41	-1.545E+00		P
Ta-182	1221.41	6.	13.	0.007	49.22	2.981E+00		P
Co-56	1238.28	22.	9.	0.005	121.31	8.480E-01		P
NA-22	1274.53	16.	2.	0.001	291.55	1.266E-01		
FE-59	1291.60	27.	-13.	-0.007	96.83	-1.875E+00		
CO-60	1332.50	5.	7.	0.004	89.04	4.298E-01		
AG-110M	1384.30	22.	-7.	-0.004	168.21	-1.818E+00		P
EU-152	1408.00	11.	-2.	-0.001	452.11	-5.426E-01		
La-140	1596.21	34.	-18.	-0.010	98.35	-1.439E+00		P
SB-124	1690.98	0.	8.	0.004	38.11	1.260E+00		P
y-88	1836.06	0.	6.	0.003	40.82	5.097E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.1714E+00	3.1714E+00	1.117E+02%	1.20E+01
NA-22	#A	1.2664E-01	1.2664E-01	2.915E+02%	1.35E+00
K-40		1.8224E+02	1.8224E+02	6.469E+00%	1.27E+01
Sc-46	#A	3.6085E-01	3.6085E-01	1.052E+02%	1.30E+00
CR-51	#A	-3.2211E+00	-3.2212E+00	6.861E+01%	1.27E+01
MN-54	#A	1.2218E-01	1.2218E-01	3.891E+02%	1.16E+00
FE-59	#A	1.8284E-01	1.8285E-01	4.726E+02%	2.08E+00
Co-56	#A	3.7470E-01	3.7470E-01	1.213E+02%	1.06E+00
CO-57	#A	-3.6805E-01	-3.6805E-01	1.097E+02%	1.35E+00
CO-58	#A	3.9640E-01	3.9640E-01	9.149E+01%	1.23E+00
CO-60	#A	4.2978E-01	4.2978E-01	8.904E+01%	8.83E-01
ZN-65	#A	1.3449E+00	1.3449E+00	9.495E+01%	4.31E+00
NB-94	#A	3.2106E-01	3.2106E-01	3.941E+01%	1.24E+00
ZR-95	#A	6.9918E-01	6.9918E-01	1.118E+02%	1.92E+00
NB-95	#A	6.0192E-01	6.0193E-01	8.325E+01%	1.68E+00
RU-103	#A	3.4237E-01	3.4237E-01	1.156E+02%	9.99E-01
RH-106	#A	4.4451E+00	4.4452E+00	1.654E+02%	2.49E+01
AG-108M	#A	-3.5453E-01	-3.5453E-01	1.337E+02%	1.24E+00
AG-110M	#A	-7.7989E-01	-7.7989E-01	9.872E+01%	2.60E+00
SN-113	#A	-3.5676E-01	-3.5676E-01	1.695E+02%	2.21E+00
SB-124	#A	5.5628E-01	5.5629E-01	3.811E+01%	2.83E+00
SB-125	#A	1.5442E+00	1.5442E+00	1.045E+02%	3.06E+00
I-131	#A	-5.0095E-01	-5.0098E-01	8.950E+01%	1.34E+00
Gd-153	#A	-5.0180E-02	-5.0180E-02	8.249E+01%	3.87E+00
Ga-68	#A	7.8535E+00	7.9301E+00	2.187E+02%	4.12E+01
Tc-99m	#A	-3.4605E-01	-3.4668E-01	1.280E+02%	1.48E+00
BA-133	#A	-3.4738E-01	-3.4738E-01	1.352E+02%	3.11E+00
CS-134	#A	6.7636E-01	6.7636E-01	3.195E+01%	2.89E+00
CS-137	#A	-6.4020E-01	-6.4020E-01	9.325E+01%	2.01E+00
CE-139	#A	-3.8822E-01	-3.8822E-01	1.154E+02%	1.50E+00
Ba-140	#A	-2.0555E-01	-2.0556E-01	7.940E+01%	4.19E+00
La-140	#A	-1.4394E+00	-1.4395E+00	9.835E+01%	2.38E+00
CE-141	#A	5.9955E-01	5.9956E-01	1.310E+02%	2.63E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+01
PM-144	#A	3.8302E-01	3.8302E-01	9.536E+01%	8.93E-01
EU-152	#A	1.8126E+00	1.8126E+00	6.466E+01%	7.64E+00
EU-154	#	1.0644E+01	1.0644E+01	2.307E+01%	5.61E+00
EU-155	#A	-3.4298E-01	-3.4298E-01	3.774E+02%	5.37E+00
HF-181	#A	7.6696E-02	7.6697E-02	1.222E+02%	1.76E+00
Ta-182	#A	2.1800E+00	2.1800E+00	4.922E+01%	7.27E+00
Hg-203	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.40E+00
TL-208		8.1568E+00	8.1568E+00	7.703E+00%	6.76E-01
pm-146	#A	-2.5879E-01	-2.5879E-01	5.952E+02%	3.29E+00

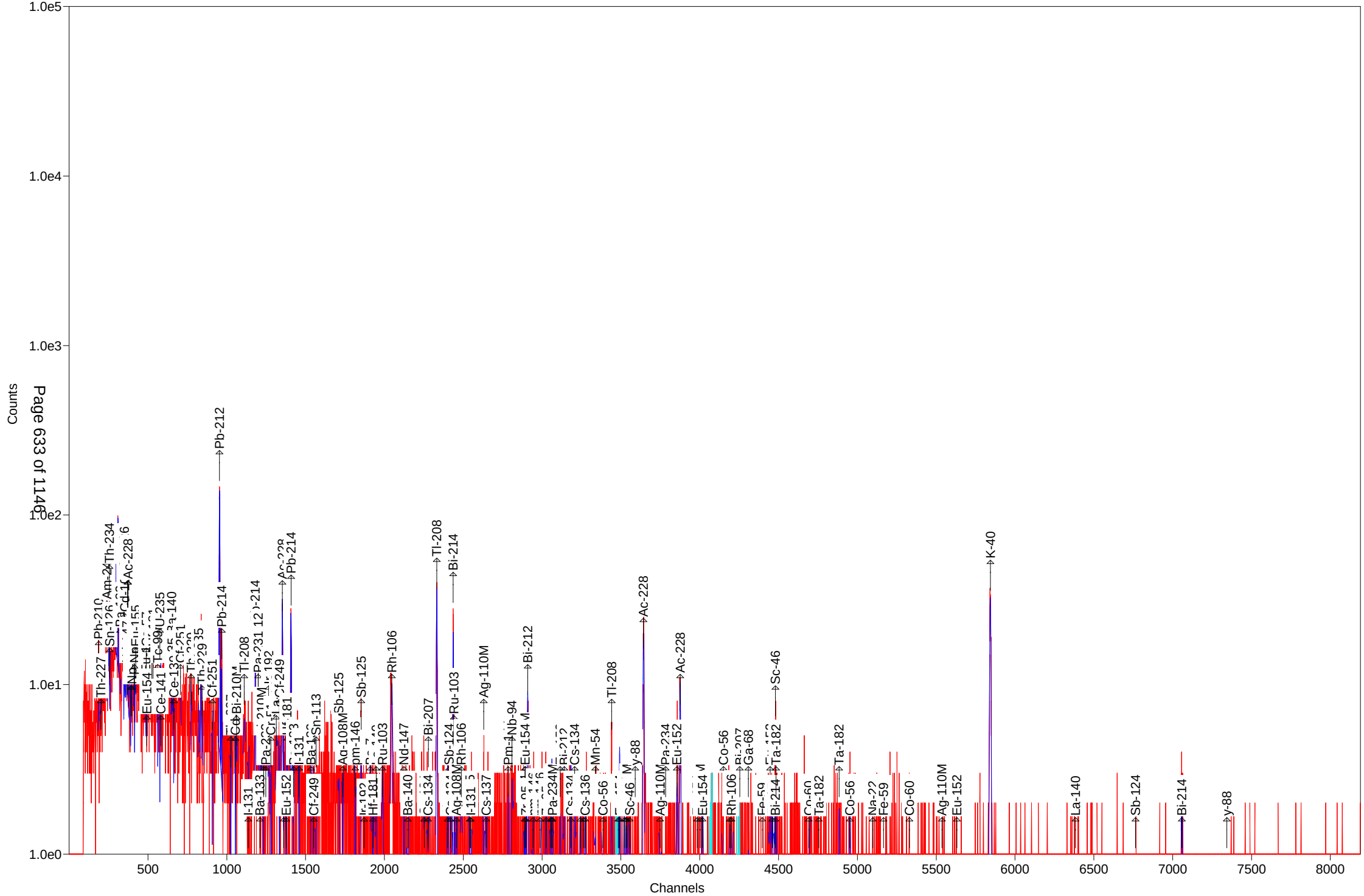
y-88 #A	2.4537E-01	2.4537E-01	4.082E+01%		1.18E+00
Cd-113m#A	-6.1763E+03	-6.1763E+03	9.889E+01%		2.05E+04
Cd-109 #A	9.0797E+00	9.0797E+00	1.637E+02%		4.96E+01
Cf-251 #A	7.1286E-01	7.1286E-01	2.656E+02%		5.15E+00
Cf-249 #A	3.9702E-01	3.9702E-01	1.264E+02%		1.71E+00
Sn-126 #A	-4.5437E+00	-4.5437E+00	1.092E+02%		1.66E+01
PB-210 A	5.5546E+00	5.5546E+00	1.654E+02%		2.92E+01
PB-212	2.4689E+01	2.4689E+01	4.788E+00%		2.02E+00
PB-214	6.9779E+00	6.9779E+00	1.303E+01%		2.30E+00
BI-207 #A	-1.7642E-02	-1.7642E-02	1.828E+03%		1.15E+00
BI-212	3.2643E+01	3.2643E+01	1.525E+01%		6.79E+00
BI-214	8.7843E+00	8.7843E+00	1.191E+01%		1.78E+00
BI-210M#A	-2.1594E-01	-2.1594E-01	3.383E+02%		2.50E+00
AC-228	2.1738E+01	2.1738E+01	8.783E+00%		3.07E+00
TH-227 #A	-5.8935E-01	-5.8935E-01	9.695E+02%		1.66E+01
TH-229 #A	7.3550E+00	7.3550E+00	9.206E+01%		1.92E+01
TH-234 A	8.0679E+00	8.0679E+00	5.860E+01%		2.88E+01
PA-231 #A	2.2474E+00	2.2474E+00	4.013E+02%		5.78E+01
PA-233 #A	3.3234E-01	3.3234E-01	3.064E+02%		3.49E+00
PA-234 #A	2.2690E+00	2.2690E+00	9.333E+01%		7.45E+00
PA-234M#A	-1.5804E+01	-1.5804E+01	4.359E+02%		2.46E+02
U-235 #A	-3.6129E+00	-3.6129E+00	7.397E+01%		1.14E+01
AM-241 #A	-1.0467E+00	-1.0467E+00	1.339E+02%		3.97E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.55E+01
Ir-192 #A	3.0543E-01	3.0543E-01	9.140E+01%		1.07E+00
Cs-136 #A	5.0930E-01	5.0931E-01	7.024E+01%		1.35E+00
Np-239 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.05E+00
Nd-147 #A	-4.1342E+00	-4.1343E+00	9.568E+01%		9.78E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.852E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 2.8523053E+02 Bq/Sample

264535_Gamma_160-18554-A-9-B. 17_Gamma_20161130.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161404

Sample Description: 264535_Gamma_160-18554-A-10-B
Detector: Detector # 8
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-10-B

Decay to Time: 9/1/2016 12:44 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:44:35 Real Time: 1847 sec
Analysis Time: 9/1/2016 13:16 Dead Time: 2.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev11.lib
Bkgd Correction File: 8_2016-08-08_1838.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.642E+00	104.8	4.864E+00	4.870E+00	1.640E+01
NA-22	-7.209E-01	94.9	6.844E-01	6.854E-01	2.329E+00
K-40	2.748E+02	5.6	1.541E+01	2.086E+01	9.713E+00
Sc-46	-9.812E-03	6941.3	6.811E-01	6.811E-01	2.402E+00
CR-51	-5.687E+00	53.7	3.052E+00	3.068E+00	1.687E+01
MN-54	1.302E+00	24.7	3.212E-01	3.281E-01	5.760E-01
FE-59	-6.274E-01	178.3	1.119E+00	1.119E+00	2.940E+00
Co-56	6.054E-01	103.1	6.240E-01	6.248E-01	1.300E+00
CO-57	-3.251E-01	113.2	3.679E-01	3.683E-01	1.232E+00
CO-58	-6.570E-01	95.0	6.242E-01	6.251E-01	2.108E+00
CO-60	8.777E-01	23.6	2.069E-01	2.115E-01	1.679E+00
ZN-65	-2.255E+00	106.0	2.391E+00	2.393E+00	8.037E+00
NB-94	-8.388E-01	96.5	8.092E-01	8.104E-01	1.854E+00
ZR-95	9.970E-01	92.0	9.176E-01	9.191E-01	2.156E+00
NB-95	5.895E-01	86.8	5.114E-01	5.123E-01	1.724E+00
RU-103	4.469E-01	98.0	4.381E-01	4.387E-01	1.063E+00
RH-106	4.240E-01	2438.3	1.034E+01	1.034E+01	3.523E+01
AG-108M	8.484E-01	42.6	3.617E-01	3.643E-01	1.020E+00
AG-110M	4.988E-01	75.0	3.743E-01	3.751E-01	3.310E+00
SN-113	5.558E-01	170.7	9.487E-01	9.491E-01	3.207E+00
SB-124	8.616E-03	58.7	5.056E-03	5.075E-03	3.886E+00
SB-125	1.857E+00	97.2	1.804E+00	1.807E+00	3.802E+00
I-131	9.581E-02	71.7	6.866E-02	6.884E-02	1.676E+00
Gd-153	-1.663E+00	162.6	2.704E+00	2.706E+00	8.987E+00
Ga-68	1.499E+01	90.4	1.354E+01	1.357E+01	3.233E+01
Tc-99m	0.000E+00	1.#INF	2.455E-01	2.455E-01	2.380E+00
BA-133	-1.815E-01	89.5	1.625E-01	1.628E-01	3.900E+00
CS-134	1.176E+00	27.0	3.179E-01	3.237E-01	3.828E+00
CS-137	-1.204E+00	70.9	8.537E-01	8.560E-01	2.513E+00
CE-139	-5.455E-01	92.9	5.067E-01	5.094E-01	1.687E+00
Ba-140	1.451E+00	178.0	2.582E+00	2.583E+00	5.311E+00
La-140	-8.165E-01	125.9	1.028E+00	1.029E+00	2.237E+00
CE-141	-9.423E-01	140.4	1.323E+00	1.324E+00	4.405E+00

CE-144	0.000E+00	1.#INF	8.420E-01	8.420E-01	1.817E+01
PM-144	2.784E-01	137.9	3.839E-01	3.842E-01	1.674E+00
EU-152	4.070E-01	82.0	3.336E-01	3.343E-01	1.105E+01
EU-154	-4.330E+00	102.0	4.419E+00	4.425E+00	1.506E+01
EU-155	1.769E+00	116.9	2.068E+00	2.070E+00	6.894E+00
HF-181	-2.512E-01	87.7	2.204E-01	2.208E-01	3.071E+00
Ta-182	4.968E+00	25.8	1.280E+00	1.303E+00	9.458E+00
Hg-203	-4.402E-01	121.3	5.338E-01	5.344E-01	1.797E+00
TL-208	1.133E+01	7.4	8.439E-01	1.028E+00	1.066E+00
pm-146	7.063E-01	108.6	7.669E-01	7.678E-01	3.772E+00
y-88	3.909E-01	131.6	5.144E-01	5.148E-01	1.598E+00
Cd-113m	-7.295E+03	94.3	6.882E+03	6.898E+03	2.302E+04
Cd-109	0.000E+00	1.#INF	2.376E+01	2.376E+01	7.895E+01
Cf-251	-1.732E+00	144.2	2.496E+00	2.501E+00	6.392E+00
Cf-249	-9.101E-01	95.7	8.711E-01	8.723E-01	2.914E+00
Sn-126	5.661E+00	109.9	6.219E+00	6.226E+00	2.071E+01
PB-210	1.507E+01	117.8	1.775E+01	1.777E+01	5.932E+01
PB-212	3.349E+01	4.1	1.379E+00	2.568E+00	2.029E+00
PB-214	1.252E+01	9.3	1.167E+00	1.336E+00	2.341E+00
BI-207	-3.393E-01	140.9	4.782E-01	4.786E-01	1.639E+00
BI-212	7.844E+00	95.0	7.451E+00	7.463E+00	2.516E+01
BI-214	1.254E+01	11.4	1.432E+00	1.573E+00	2.159E+00
BI-210M	6.523E-01	96.8	6.313E-01	6.325E-01	2.122E+00
AC-228	3.121E+01	7.2	2.242E+00	2.750E+00	3.054E+00
TH-227	7.719E+00	104.1	8.033E+00	8.044E+00	2.681E+01
TH-229	4.435E+00	216.4	9.600E+00	9.606E+00	2.475E+01
TH-234	1.334E+01	32.4	4.329E+00	4.385E+00	5.386E+01
PA-231	1.619E+01	135.4	2.192E+01	2.194E+01	9.803E+01
PA-233	1.016E+00	191.6	1.947E+00	1.948E+00	8.357E+00
PA-234	-2.296E+00	141.5	3.250E+00	3.252E+00	1.083E+01
PA-234M	-1.092E+01	636.8	6.953E+01	6.953E+01	2.514E+02
U-235	-8.440E-01	359.5	3.034E+00	3.035E+00	1.909E+01
AM-241	2.429E-01	765.1	1.858E+00	1.858E+00	6.253E+00
Np-237	3.141E+00	203.6	6.395E+00	6.397E+00	2.128E+01
Ir-192	5.210E-01	108.3	5.643E-01	5.652E-01	1.894E+00
Cs-136	4.935E-01	95.0	4.689E-01	4.697E-01	1.981E+00
Np-239	-4.383E-02	3218.4	1.411E+00	1.411E+00	4.803E+00
Nd-147	-4.030E+00	119.4	4.813E+00	4.818E+00	1.150E+01
Total	4.922E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-10-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161404.An1

Acquisition information
Start time: 9/1/2016 12:44:35 PM
Live time: 1800
Real time: 1847
Dead time: 2.55 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:44:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-08-08_1838.PBC 8/8/2016 6:38:16 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1560

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	23.	117.79	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
50.14	25.	104.06	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
59.54	5.	765.09	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.14	60.	45.98	0.77	3.085E-02	63.29	3.810	PBC<MDA	TH234
64.34	31.	109.86	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
74.80	312.	8.97	1.03	3.616E-02				
77.15	413.	6.77	1.04	3.699E-02				
79.21	24.	89.11	1.04	3.767E-02				
87.12	159.	13.77	1.04	3.973E-02	86.49	13.100	1.707E+01	Np237
					86.54	30.700	7.282E+00	EU155
					86.94	9.040	2.468E+01	Sn126
					87.57	37.500	5.929E+00	Sn126
					88.04	3.790	5.852E+01	Cd109
89.74	109.	19.85	1.05	4.025E-02				
92.96	178.	12.91	1.05	4.077E-02	92.59	5.584	3.068E+01	TH234
					93.35	5.561	4.356E+01	AC228
105.31	28.	116.88	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
121.78	28.	91.08	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.399E-01	CO57
123.10	27.	84.07	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
162.66	15.	177.97	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
185.76	65.	37.46	0.71	3.329E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	11.	216.43	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
203.95	30.	49.17	0.77	3.099E-02				
209.51	84.	26.88	0.65	3.035E-02				
238.65	637.	5.46	1.06	2.744E-02	238.63	43.300	2.977E+01	PB212
242.04	71.	23.35	1.16	2.714E-02	242.00	7.430	1.957E+01	PB214
265.83	15.	96.78	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
277.86	51.	33.89	1.56	2.440E-02	277.28	6.310	1.853E+01	TL208
295.20	138.	17.11	1.18	2.323E-02	295.09	19.300	1.716E+01	PB214
300.07	18.	188.65	1.20	2.293E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.750E+01	PA231
					300.18	6.200	6.945E+00	PA233
300.15	64.	18.35	1.20	2.294E-02	300.03	3.280	4.758E+01	PB212
					300.07	2.460	6.345E+01	PA231
					300.18	6.200	2.518E+01	PA233
300.18	18.	191.58	1.20	2.293E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.750E+01	PA231
					300.18	6.200	6.946E+00	PA233
302.65	18.	194.23	1.21	2.278E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.369E+00	BA133
302.85	18.	197.08	1.21	2.277E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.369E+00	BA133
304.85	14.	256.17	1.21	2.265E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.215E+00	BI210M
316.49	18.	108.32	1.22	2.199E-02	316.49	87.040	PBC<MDA	Ir192
338.35	149.	15.32	1.09	2.085E-02	338.32	12.010	3.298E+01	AC228
345.83	18.	143.80	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
351.92	174.	10.72	1.20	2.021E-02	351.93	37.600	1.275E+01	PB214
391.69	12.	170.68	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	274.95	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
433.94	25.	49.83	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	178.95	1.32	1.647E-02	453.88	65.000	PBC<MDA	pm146
463.37	17.	97.19	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
477.60	14.	104.78	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
497.05	11.	98.01	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	109.	21.31	2.61	1.494E-02	511.86	20.000	2.027E+01	RH106
563.24	8.	172.63	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.32	9.	95.03	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.620E+00	PA234
					569.70	97.740	3.878E-01	BI207
583.11	231.	7.45	1.33	1.342E-02	583.02	84.500	1.133E+01	TL208
609.25	135.	11.42	1.65	1.295E-02	609.31	46.090	1.254E+01	BI214
					610.30	5.750	1.007E+02	RU103
618.06	16.	137.92	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
636.97	12.	85.62	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
657.76	12.	75.02	1.45	1.215E-02	657.76	94.640	PBC<MDA	AG110M
722.79	15.	58.68	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	8.102E-01	AG108M
					723.36	20.220	3.641E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
722.94	15.	69.18	1.50	1.123E-02	722.79	10.810	6.808E+00	SB124
					722.94	90.840	8.102E-01	AG108M
					723.36	20.220	3.642E+00	EU154
723.36	10.	110.01	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.671E-01	AG108M
					723.36	20.220	2.549E+00	EU154
727.17	12.	94.99	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
747.16	9.	123.02	1.51	1.093E-02	747.16	34.000	PBC<MDA	pm146
756.73	11.	92.04	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	7.	141.11	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
765.79	11.	86.75	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	27.	38.88	1.54	1.048E-02	785.42	1.280	1.125E+02	BI212
795.87	39.	27.04	1.54	1.036E-02	795.87	85.530	2.424E+00	CS134
801.95	9.	133.55	1.55	1.030E-02	801.95	8.690	PBC<MDA	CS134
818.50	11.	98.29	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
835.31	23.	24.66	0.30	9.955E-03	834.85	99.980	1.302E+00	MN54
846.77	3.	307.59	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.77	37.	27.45	1.59	9.703E-03	860.56	12.420	1.684E+01	TL208
871.10	8.	81.09	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
898.04	5.	224.40	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.26	152.	8.84	1.05	9.245E-03	911.07	29.000	3.156E+01	AC228
964.11	8.	176.40	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.17	81.	12.30	1.32	8.776E-03	968.97	17.460	2.943E+01	AC228
996.33	5.	170.88	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1001.85	-1.	636.82	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	4.	162.63	1.70	8.209E-03	1048.07	80.000	PBC<MDA	Cs136
1077.40	6.	90.35	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1120.14	13.	104.01	1.74	7.748E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.398E-01	Sc46
					1121.30	34.900	2.694E+00	Ta182
1120.18	37.	19.26	1.74	7.754E-03	1120.29	15.100	1.739E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	7.531E+00	Ta182
1173.24	18.	23.57	1.77	7.453E-03	1173.24	99.900	1.343E+00	CO60
1221.77	28.	25.76	0.39	7.199E-03	1221.41	27.000	7.908E+00	Ta182
1238.28	11.	103.08	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	5.	165.42	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1460.87	325.	5.61	1.76	6.165E-03	1460.83	10.670	2.748E+02	K40
1764.42	25.	20.00	2.07	5.226E-03	1764.49	15.400	1.726E+01	BI214
1836.06	4.	137.50	2.10	5.046E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.01	74.78	237.	312.	8.637E+03	8.97	1.034	- sD
308.39	77.12	185.	413.	1.116E+04	6.77	1.036	- D
316.66	79.19	221.	24.	6.430E+02	89.11	1.038	- c
358.93	89.75	178.	109.	2.717E+03	19.73	1.046	- D
742.89	185.76	144.	65.	1.946E+03	37.46	0.706	- s
815.62	203.95	61.	30.	9.789E+02	49.17	0.767	- s
837.88	209.51	101.	84.	2.757E+03	26.88	0.655	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	359.	23.	0.013	117.79	1.012s
TH-227	200.37	50.14	331.	25.	0.014	104.06	1.015s
AM-241	237.95	59.54	595.	5.	0.003	765.09	1.022s
TH-234	252.96	63.29	573.	8.	0.004	447.36	1.025
Sn-126	256.93	64.28	568.	31.	0.017	109.86	1.026s
BA-133	323.77	80.99	1566.	-36.	-0.020	157.40	1.039
Np-237	345.77	86.49	1768.	29.	0.016	203.57	1.043A
EU-155	345.98	86.54	2276.	-37.	-0.020	184.01	1.043s
Sn-126	347.57	86.94	2112.	37.	0.020	68.18	1.044D
Sn-126	350.09	87.57	1998.	119.	0.066	20.21	1.044D
Cd-109	351.97	88.04	2076.	0.	0.000	175.60	1.044A
Nd-147	364.21	91.10	1961.	-37.	-0.021	170.34	1.047D
TH-234	370.17	92.59	310.	82.	0.045	32.44	1.048D
AC-228	373.21	93.35	1840.	-37.	-0.021	164.77	1.049s
Gd-153	389.81	97.50	1803.	-37.	-0.021	162.62	1.052s
Np-239	397.81	99.50	1766.	-28.	-0.015	216.17	1.053
EU-155	421.07	105.31	531.	28.	0.016	116.88	1.058s
EU-152	486.92	121.78	314.	28.	0.016	91.08	1.071s
CO-57	488.06	122.06	266.	-21.	-0.012	113.16	1.071s
EU-154	492.22	123.10	250.	27.	0.015	84.07	1.072
PA-234	525.00	131.29	899.	-30.	-0.017	141.53	1.078
HF-181	531.92	133.02	929.	-21.	-0.012	206.91	1.079s
CE-144	533.98	133.54	950.	0.	0.000	1000.00	1.080s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	545.02	136.30	950.	0.	0.000	1000.00	1.082s
CO-57	545.72	136.47	950.	0.	0.000	1000.00	1.082s
Tc-99m	561.86	140.51	950.	0.	0.000	1000.00	1.085
U-235	574.97	143.79	957.	-6.	-0.004	359.52	1.087
CE-141	581.59	145.44	973.	-32.	-0.018	140.40	1.089s
Ba-140	650.47	162.66	333.	15.	0.008	177.97	1.102s
CE-139	663.24	165.85	335.	-28.	-0.016	92.89	1.104s
Cf-251	706.23	176.60	194.	-18.	-0.010	144.16	1.112s
TH-229	773.87	193.51	169.	11.	0.006	216.43	1.125s
U-235	821.17	205.33	423.	-27.	-0.015	90.36	1.134s
TH-229	843.24	210.85	455.	-27.	-0.015	91.82	1.138s
Cf-251	907.84	227.00	192.	-28.	-0.015	99.72	1.151s
PB-212	954.37	238.63	76.	716.	0.398	4.12	1.159D
PB-214	967.84	242.00	102.	71.	0.039	23.35	1.162D
EU-152	978.62	244.69	1077.	-23.	-0.013	200.75	1.164s
TH-227	1024.81	256.24	144.	-24.	-0.014	98.18	1.172s
Cd-113m	1054.65	263.70	168.	-20.	-0.011	94.34	1.178s
BI-210M	1063.18	265.83	95.	15.	0.008	96.78	1.179s
TL-208	1111.30	277.86	61.	51.	0.029	33.89	1.557s
Hg-203	1116.66	279.20	173.	-16.	-0.009	121.28	1.189s
I-131	1137.05	284.30	104.	-10.	-0.006	170.11	1.193s
PB-214	1180.22	295.09	62.	97.	0.054	15.24	1.201D
PB-212	1199.98	300.03	38.	64.	0.036	18.35	1.205D
PA-231	1200.14	300.07	553.	18.	0.010	188.65	1.205s
PA-233	1200.58	300.18	571.	18.	0.010	191.58	1.205s
PA-231	1210.46	302.65	589.	18.	0.010	194.23	1.207s
BA-133	1211.27	302.85	606.	18.	0.010	197.08	1.207s
Ba-140	1219.26	304.85	624.	14.	0.008	256.17	1.208s
Ir-192	1233.62	308.44	638.	0.	0.000	1000.00	1.211s
Ir-192	1265.82	316.49	180.	18.	0.010	108.32	1.217s
CR-51	1280.20	320.08	183.	-22.	-0.012	53.68	1.219s
La-140	1314.91	328.76	581.	-22.	-0.012	53.27	1.226
Cf-249	1333.63	333.44	559.	-22.	-0.012	152.00	1.229s
AC-228	1353.26	338.35	65.	149.	0.083	15.32	1.087
Cs-136	1362.15	340.57	536.	-22.	-0.012	148.40	1.234s
EU-152	1377.01	344.29	514.	-22.	-0.012	145.03	1.237s
HF-181	1383.19	345.83	336.	18.	0.010	143.80	1.238s
PB-214	1407.56	351.92	40.	174.	0.097	10.72	1.204
BA-133	1423.87	356.00	329.	-21.	-0.012	89.52	1.245s
I-131	1457.81	364.48	96.	-16.	-0.009	114.94	1.252s
BA-133	1535.24	383.84	174.	-2.	-0.001	935.41	1.266s
Cf-249	1551.68	387.95	177.	-20.	-0.011	95.71	1.269
SN-113	1566.64	391.69	200.	12.	0.007	170.68	1.271s
SB-125	1711.39	427.88	48.	5.	0.003	274.95	1.297s
AG-108M	1735.64	433.94	30.	25.	0.014	49.83	1.301
pm-146	1815.41	453.88	43.	8.	0.004	178.95	1.315s
SB-125	1853.36	463.37	128.	17.	0.009	97.19	1.322s
BE-7	1910.28	477.60	99.	14.	0.008	104.78	1.332s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	1927.89	482.00	207.	-21.	-0.012	100.50	1.335s
RU-103	1988.12	497.05	26.	11.	0.006	98.01	1.346s
RH-106	2047.36	511.86	63.	109.	0.061	21.31	2.606s
Nd-147	2123.91	531.00	61.	-14.	-0.008	119.44	1.369s
Ba-140	2148.95	537.26	44.	-2.	-0.001	701.07	1.373s
CS-134	2252.86	563.24	48.	8.	0.005	172.63	1.391s
CS-134	2277.20	569.32	35.	9.	0.005	95.03	1.395s
PA-234	2277.80	569.47	59.	-11.	-0.006	104.64	1.395s
BI-207	2278.73	569.70	62.	-8.	-0.005	140.95	1.396s
TL-208	2332.38	583.11	17.	231.	0.128	7.45	1.329
SB-125	2401.92	600.50	366.	-17.	-0.009	160.44	1.416s
SB-124	2410.85	602.73	349.	-17.	-0.009	156.57	1.418s
CS-134	2418.76	604.71	332.	-17.	-0.009	152.65	1.419s
BI-214	2436.92	609.25	19.	135.	0.075	11.42	1.648s
RU-103	2441.12	610.30	315.	-17.	-0.010	148.38	1.423s
AG-108M	2457.05	614.28	298.	-13.	-0.007	195.18	1.426
PM-144	2472.18	618.06	227.	16.	0.009	137.92	1.428s
SB-125	2543.49	635.89	56.	-18.	-0.010	63.33	1.440s
I-131	2547.83	636.97	49.	12.	0.007	85.62	1.441s
AG-110M	2630.98	657.76	37.	12.	0.007	75.02	1.455s
CS-137	2646.58	661.66	89.	-22.	-0.012	70.89	1.457s
PM-144	2786.11	696.54	47.	-3.	-0.002	582.15	1.480s
NB-94	2810.46	702.63	56.	-17.	-0.009	96.48	1.484s
SB-124	2891.09	722.79	31.	15.	0.008	58.68	1.497s
AG-108M	2891.70	722.94	46.	15.	0.008	69.18	1.498s
EU-154	2893.37	723.36	60.	10.	0.006	110.01	1.498s
ZR-95	2896.74	724.20	216.	-29.	-0.016	74.00	1.498s
BI-212	2908.63	727.17	58.	12.	0.007	94.99	1.500
pm-146	2988.59	747.16	23.	9.	0.005	123.02	1.513s
ZR-95	3026.87	756.73	19.	11.	0.006	92.04	1.519
AG-110M	3055.73	763.94	50.	7.	0.004	141.11	1.524s
NB-95	3063.11	765.79	43.	11.	0.006	86.75	1.525s
PA-234M	3065.60	766.41	71.	-12.	-0.006	89.50	1.526
EU-152	3115.64	778.92	42.	-12.	-0.007	85.59	1.534s
BI-212	3141.64	785.42	19.	27.	0.015	38.88	1.538
CS-134	3183.43	795.87	35.	39.	0.021	27.04	1.544s
CS-134	3207.77	801.95	65.	9.	0.005	133.55	1.548s
CO-58	3243.06	810.78	59.	-12.	-0.007	95.01	1.554s
La-140	3263.04	815.77	71.	0.	0.000	1000.00	1.557s
Cs-136	3273.97	818.50	51.	11.	0.006	98.29	1.559s
MN-54	3341.21	835.31	3.	23.	0.013	24.66	0.301s
Co-56	3387.05	846.77	19.	3.	0.002	307.59	1.577s
TL-208	3442.23	860.56	14.	37.	0.020	27.45	1.585s
NB-94	3484.36	871.10	19.	8.	0.005	81.09	1.592s
EU-154	3492.89	873.23	39.	-9.	-0.005	102.05	1.593s
PA-234	3522.10	880.53	53.	-12.	-0.007	87.87	1.598s
PA-234	3532.94	883.24	66.	-2.	-0.001	603.59	1.599s
AG-110M	3538.71	884.68	68.	0.	0.000	1000.00	1.600s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
y-88	3592.14	898.04	23.	5.	0.003	224.40	1.608s
AC-228	3645.01	911.26	7.	152.	0.085	8.84	1.053s
AG-110M	3749.96	937.49	30.	-10.	-0.006	124.50	1.633s
PA-234	3784.07	946.02	35.	-9.	-0.005	107.01	1.638s
EU-152	3856.43	964.11	98.	8.	0.005	176.40	1.649s
AC-228	3876.66	969.17	4.	81.	0.045	12.30	1.315
EU-154	3985.31	996.33	34.	5.	0.003	170.88	1.668s
PA-234M	4003.99	1001.00	40.	-1.	-0.001	636.82	1.671s
EU-154	4019.10	1004.77	50.	-10.	-0.006	103.40	1.673s
Co-56	4151.36	1037.84	45.	-17.	-0.009	52.59	1.693s
Cs-136	4192.29	1048.07	23.	4.	0.002	162.63	1.698s
RH-106	4201.45	1050.36	37.	-7.	-0.004	131.30	1.700
BI-207	4254.65	1063.66	30.	-3.	-0.002	405.52	1.708s
Ga-68	4309.61	1077.40	5.	6.	0.003	90.35	1.716s
FE-59	4397.02	1099.25	20.	-5.	-0.003	178.32	1.728s
EU-152	4448.32	1112.07	152.	-16.	-0.009	111.88	1.736s
ZN-65	4462.20	1115.55	136.	-16.	-0.009	106.02	1.738s
BI-214	4481.17	1120.29	7.	37.	0.020	19.26	1.740D
Sc-46	4482.22	1120.55	94.	-14.	-0.008	104.71	1.740s
Ta-182	4485.22	1121.30	86.	13.	0.007	104.01	1.741s
CO-60	4692.97	1173.24	0.	18.	0.010	23.57	1.770s
Ta-182	4756.23	1189.05	45.	-8.	-0.005	40.18	1.779s
Ta-182	4887.11	1221.77	4.	28.	0.015	25.76	0.385s
Co-56	4953.16	1238.28	21.	11.	0.006	103.08	1.806s
NA-22	5098.16	1274.53	32.	-9.	-0.005	94.93	1.826s
EU-154	5098.22	1274.54	41.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	21.	-9.	-0.005	117.15	1.835s
CO-60	5330.06	1332.50	14.	5.	0.003	165.42	1.857s
EU-152	5632.07	1408.00	16.	-2.	-0.001	399.87	1.896s
K-40	5843.56	1460.87	4.	325.	0.181	5.61	1.765
La-140	6384.93	1596.21	17.	-8.	-0.004	125.93	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
BI-214	7058.07	1764.49	0.	25.	0.014	20.00	2.067s
Co-56	7085.51	1771.35	25.	0.	0.000	1000.00	2.070s
y-88	7344.36	1836.06	6.	4.	0.002	137.50	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.6423E+00				5.31E+01	
			477.60	4.642E+00	?(	1.640E+01	1.05E+02 1.05E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NA-22	C -7.2095E-01					9.50E+02	
		1274.53	-7.209E-01	?(	2.329E+00	9.49E+01	9.99E+01 G
K-40	N 2.7485E+02					4.66E+11	
		1460.83	2.748E+02	(P	9.713E+00	5.61E+00	1.07E+01 G
Sc-46	F -9.8119E-03					8.38E+01	
		889.28	-9.812E-03	%(	2.402E+00	6.94E+03	1.00E+02 G
		1120.55	-9.697E-01	+	3.425E+00	1.05E+02	1.00E+02 G
CR-51	F -5.6865E+00					2.77E+01	
		320.08	-5.687E+00	(P	1.687E+01	5.37E+01	9.94E+00 G
MN-54	C 1.3025E+00					3.12E+02	
		834.85	1.302E+00	(	5.760E-01	2.47E+01	1.00E+02 G
FE-59	F -6.2741E-01					4.45E+01	
		1099.25	-6.274E-01	?(P	2.940E+00	1.78E+02	5.65E+01 G
		1291.60	-1.750E+00	+	4.543E+00	1.17E+02	4.32E+01 G
Co-56	C 6.0535E-01					7.73E+01	
		846.77	1.721E-01	?(P	1.300E+00	3.08E+02	9.99E+01 G
		1238.28	1.261E+00	&(	2.864E+00	1.03E+02	6.61E+01 G
		1037.84	-8.088E+00	+ P	1.614E+01	5.26E+01	1.41E+01 G
		1771.35	0.000E+00	-	1.792E+01	1.00E+03	1.55E+01 A
CO-57	C -3.2513E-01					2.72E+02	
		122.06	-3.251E-01	&(	1.232E+00	1.13E+02	8.56E+01 G
		136.47	0.000E+00	+	1.904E+01	1.00E+03	1.07E+01 G
CO-58	C -6.5697E-01					7.09E+01	
		810.78	-6.570E-01	?(	2.108E+00	9.50E+01	9.95E+01 G
CO-60	F 8.7769E-01					1.93E+03	
		1332.50	4.126E-01	&(P	1.679E+00	1.65E+02	1.00E+02 G
		1173.24	1.343E+00	?(	5.499E-01	2.36E+01	9.99E+01 G
ZN-65	F -2.2549E+00					2.44E+02	
		1115.55	-2.255E+00	?(	8.037E+00	1.06E+02	5.06E+01 G
NB-94	I -8.3879E-01					7.41E+06	
		702.63	-8.388E-01	?(	1.854E+00	9.65E+01	9.79E+01 G
		871.10	4.826E-01	+	1.323E+00	8.11E+01	9.99E+01 G
ZR-95	I 9.9699E-01					6.40E+01	
		756.73	9.970E-01	?(	2.156E+00	9.20E+01	5.45E+01 G
		724.20	-3.255E+00	+	7.986E+00	7.40E+01	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-95	I	5.8950E-01					6.40E+01	
			765.79	5.895E-01	?(	1.724E+00	8.68E+01	9.98E+01 G
RU-103	I	4.4694E-01					3.93E+01	
			497.05	4.469E-01	(P	1.063E+00	9.80E+01	9.09E+01 G
			610.30	-1.281E+01	+	6.382E+01	1.48E+02	5.75E+00 GA
RH-106	I	4.2399E-01					3.74E+02	
			621.92	4.240E-01	%(	3.523E+01	2.44E+03	9.93E+00 G
			1050.36	-2.970E+01	+	1.347E+02	1.31E+02	1.56E+00 G
			511.86	2.027E+01	?	7.383E+00	2.13E+01	2.00E+01 GA
AG-108M	C	8.4840E-01					1.53E+05	
			433.94	8.867E-01	&(	1.020E+00	4.98E+01	9.05E+01 G
			722.94	8.102E-01	&(	1.860E+00	6.92E+01	9.08E+01 G
			614.28	-6.075E-01	&	3.996E+00	1.95E+02	8.98E+01 G
AG-110M	F	4.9884E-01					2.50E+02	
			884.68	0.000E+00	?(	3.310E+00	1.00E+03	7.27E+01 G
			657.76	5.986E-01	?(	1.500E+00	7.50E+01	9.46E+01 G
			937.49	-1.791E+00	+	5.058E+00	1.24E+02	3.44E+01 G
			1384.30	-2.782E-01	% P	6.378E+00	1.05E+03	2.43E+01 G
			763.94	1.703E+00	?(P	8.266E+00	1.41E+02	2.23E+01 G
SN-113	F	5.5582E-01					1.15E+02	
			391.69	5.558E-01	&(	3.207E+00	1.71E+02	6.40E+01 G
SB-124	F	8.6160E-03					6.02E+01	
			602.73	-7.393E-01	?(	3.886E+00	1.57E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.579E+00	1.00E+03	4.78E+01 G
			722.79	6.807E+00	&(	1.305E+01	5.87E+01	1.08E+01 G
SB-125	I	1.8565E+00					1.01E+03	
			427.88	5.432E-01	&(	3.802E+00	2.75E+02	2.96E+01 G
			600.50	-4.051E+00	+	2.181E+01	1.60E+02	1.79E+01 G
			635.89	-7.097E+00	+	1.482E+01	6.33E+01	1.13E+01 G
			463.37	5.569E+00	(	1.816E+01	9.72E+01	1.05E+01 G
I-131	I	9.5813E-02					8.02E+00	
			364.48	-5.646E-01	?(P	1.676E+00	1.15E+02	8.17E+01 G
			284.30	-3.876E+00	& P	1.902E+01	1.70E+02	6.14E+00 G
			636.97	7.621E+00	&(	2.195E+01	8.56E+01	7.17E+00 G
Gd-153	F	-1.6629E+00					2.42E+02	
			97.50	-1.663E+00	(	8.987E+00	1.63E+02	3.00E+01 G
			103.20	-2.328E-07	&	1.211E+01	1.56E+09	2.18E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C 1.4989E+01					4.71E-02	
		1077.40	1.499E+01	&(	3.233E+01	9.04E+01	3.30E+00 G
BA-133	F -1.8154E-01					3.85E+03	
		356.00	-9.351E-01	&(P	3.900E+00	8.95E+01	6.20E+01 G
		302.85	2.369E+00	?(	1.564E+01	1.97E+02	1.83E+01 G
		383.84	-6.592E-01	+	2.115E+01	9.35E+02	8.94E+00 GA
		80.99	-1.527E+00	&	7.989E+00	1.57E+02	3.41E+01 GA
CS-134	I 1.1757E+00					7.54E+02	
		604.71	-7.469E-01	?(	3.828E+00	1.53E+02	9.76E+01 G
		795.87	2.424E+00	?(	1.906E+00	2.70E+01	8.55E+01 G
		569.32	2.463E+00	&(	7.955E+00	9.50E+01	1.54E+01 G
		801.95	5.484E+00	?(	2.504E+01	1.34E+02	8.69E+00 G
		563.24	4.015E+00	?(	1.681E+01	1.73E+02	8.35E+00 G
CS-137	I -1.2042E+00					1.10E+04	
		661.66	-1.204E+00	(P	2.513E+00	7.09E+01	8.52E+01 G
CE-139	F -5.4552E-01					1.38E+02	
		165.85	-5.455E-01	?(	1.687E+00	9.29E+01	7.99E+01 G
Ba-140	I 1.4505E+00					1.28E+01	
		537.26	-2.490E-01	?(P	5.311E+00	7.01E+02	2.44E+01 G
		162.66	3.646E+00	?(	2.182E+01	1.78E+02	6.22E+00 G
		304.85	7.929E+00	?(	6.811E+01	2.56E+02	4.29E+00 G
La-140	I -8.1646E-01					1.28E+01	
		1596.21	-8.165E-01	?(	2.237E+00	1.26E+02	9.54E+01 G
		487.02	-8.902E-02	&	4.461E+00	1.45E+03	4.55E+01 G
		328.76	-2.875E+00	& P	1.476E+01	5.33E+01	2.03E+01 G
		815.77	0.000E+00	+	9.869E+00	1.00E+03	2.33E+01 G
CE-141	I -9.4225E-01					3.25E+01	
		145.44	-9.423E-01	&(	4.405E+00	1.40E+02	4.82E+01 G
PM-144	C 2.7835E-01					3.63E+02	
		696.54	-1.318E-01	?(P	1.674E+00	5.82E+02	9.90E+01 G
		618.06	6.881E-01	?(	3.193E+00	1.38E+02	9.91E+01 G
EU-152	F 4.0705E-01					4.94E+03	
		344.29	-2.278E+00	&(	1.105E+01	1.45E+02	2.65E+01 G
		1112.07	-8.330E+00	+	3.135E+01	1.12E+02	1.36E+01 G
		121.78	1.317E+00	&(	3.994E+00	9.11E+01	2.86E+01 G
		778.92	-4.978E+00	+ P	1.342E+01	8.56E+01	1.29E+01 G
		964.11	3.498E+00	?(	2.110E+01	1.76E+02	1.46E+01 G
		244.69	-6.330E+00	+	4.239E+01	2.01E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-8.558E-01	+ P	8.885E+00	4.00E+02	2.10E+01 GA
EU-154	I	-4.3304E+00					3.14E+03	
			873.23	-4.330E+00	?(	1.506E+01	1.02E+02	1.23E+01 G
			123.10	8.999E-01	+ P	2.516E+00	8.41E+01	4.08E+01 G
			1274.54	0.000E+00	+	7.405E+00	1.00E+03	3.52E+01 G
			723.36	2.549E+00	&	9.529E+00	1.10E+02	2.02E+01 G
			1004.77	-3.685E+00	+	1.295E+01	1.03E+02	1.80E+01 G
			996.33	3.058E+00	+	1.827E+01	1.71E+02	1.06E+01 G
EU-155	I	1.7691E+00					1.81E+03	
			105.31	1.769E+00	*(	6.894E+00	1.17E+02	2.12E+01 G
			86.54	-1.682E+00	+	1.028E+01	1.84E+02	3.07E+01 G
HF-181	F	-2.5125E-01					4.24E+01	
			482.00	-9.133E-01	?(	3.071E+00	1.00E+02	8.05E+01 G
			133.02	-6.653E-01	+	4.597E+00	2.07E+02	4.33E+01 G
			345.83	3.285E+00	&(	1.585E+01	1.44E+02	1.51E+01 G
			136.30	0.000E+00	+	3.474E+01	1.00E+03	5.85E+00 G
Ta-182	F	4.9681E+00					1.14E+02	
			1121.30	2.694E+00	&(	9.458E+00	1.04E+02	3.49E+01 G
			1221.41	7.908E+00	(	3.547E+00	2.58E+01	2.70E+01 G
			1189.05	-3.832E+00	- P	1.585E+01	4.02E+01	1.62E+01 G
Hg-203	F	-4.4018E-01					4.66E+01	
			279.20	-4.402E-01	?(	1.797E+00	1.21E+02	8.15E+01 G
TL-208	N	1.1328E+01					6.98E+02	
			583.02	1.133E+01	(P	1.066E+00	7.45E+00	8.45E+01 G
			277.28	1.853E+01	+ P	1.407E+01	3.39E+01	6.31E+00 G
			860.56	1.684E+01	+ P	9.421E+00	2.75E+01	1.24E+01 G
pm-146	C	7.0633E-01					2.02E+03	
			747.16	1.296E+00	?(	3.772E+00	1.23E+02	3.40E+01 G
			735.72	7.436E-02	%	6.546E+00	3.64E+03	2.25E+01 G
			453.88	3.978E-01	?(	1.732E+00	1.79E+02	6.50E+01 G
y-88	F	3.9094E-01					1.07E+02	
			898.04	2.956E-01	?(	1.598E+00	2.24E+02	9.37E+01 G
			1836.06	4.810E-01	?(	1.532E+00	1.37E+02	9.92E+01 G
Cd-113m		-7.2950E+03					5.33E+03	
			263.70	-7.295E+03	(	2.302E+04	9.43E+01	6.00E-03 K
Cf-251	T	-1.7317E+00					3.28E+05	
			176.60	-1.732E+00	?(	6.392E+00	1.44E+02	1.70E+01 G
			227.00	-8.567E+00	+	2.080E+01	9.97E+01	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-9.1008E-01					1.28E+05	
			387.95	-9.101E-01	&(	2.914E+00	9.57E+01	6.60E+01 G
			333.44	-3.770E+00	+	1.916E+01	1.52E+02	1.55E+01 G
Sn-126		5.6608E+00					3.65E+07	
			87.57	4.422E+00	}	7.849E+00	2.02E+01	3.75E+01 GA
			64.28	5.661E+00	?(	2.071E+01	1.10E+02	9.70E+00 G
			86.94	5.661E+00	}	3.358E+01	6.82E+01	9.04E+00 GA
PB-210	N	1.5069E+01					8.14E+03	
			46.54	1.507E+01	(P	5.932E+01	1.18E+02	4.25E+00 G
PB-212	N	3.3488E+01					6.98E+02	
			238.63	3.349E+01	(P	2.029E+00	4.12E+00	4.33E+01 G
			300.03	4.758E+01	+ P	2.309E+01	1.83E+01	3.28E+00 GA
PB-214	N	1.2522E+01					5.84E+05	
			351.93	1.275E+01	(P	2.341E+00	1.07E+01	3.76E+01 G
			295.09	1.207E+01	(	4.864E+00	1.52E+01	1.93E+01 G
			242.00	1.957E+01	+	1.371E+01	2.33E+01	7.43E+00 GA
BI-207	C	-3.3930E-01					1.18E+04	
			569.70	-3.393E-01	?(	1.639E+00	1.41E+02	9.77E+01 G
			1063.66	-2.760E-01	+	2.597E+00	4.06E+02	7.45E+01 G
BI-212	N	7.8440E+00					6.98E+02	
			727.17	7.844E+00	(P	2.516E+01	9.50E+01	7.55E+00 G
			785.42	1.125E+02	P	9.498E+01	3.89E+01	1.28E+00 GA
BI-214	N	1.2544E+01					5.84E+05	
			609.31	1.254E+01	(P	2.159E+00	1.14E+01	4.61E+01 G
			1120.29	1.739E+01	+ P	6.942E+00	1.93E+01	1.51E+01 G
			1764.49	1.726E+01	+	5.088E+00	2.00E+01	1.54E+01 G
BI-210M	T	6.5226E-01					1.10E+09	
			265.83	6.523E-01	?(P	2.122E+00	9.68E+01	5.00E+01 G
			304.90	2.674E-06	%	1.055E+01	1.17E+08	2.80E+01 G
AC-228	N	3.1214E+01					2.10E+03	
			911.07	3.156E+01	(	3.054E+00	8.84E+00	2.90E+01 G
			968.97	2.943E+01	(	4.290E+00	1.23E+01	1.75E+01 G
			338.32	3.298E+01	(	8.956E+00	1.53E+01	1.20E+01 G
			93.35	-9.053E+00	-	4.957E+01	1.65E+02	5.56E+00 XA
TH-227	N	7.7195E+00					7.95E+03	
			50.14	7.719E+00	(	2.681E+01	1.04E+02	8.00E+00 G
			256.24	-7.476E+00	+	1.792E+01	9.82E+01	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	4.4354E+00					2.68E+06	
			193.51	4.435E+00	?(	2.475E+01	2.16E+02	4.40E+00 G
			210.85	-1.633E+01	+ P	6.281E+01	9.18E+01	2.99E+00 G
TH-234	N	1.3344E+01					1.63E+12	
			63.29	3.581E+00	?(P	5.386E+01	4.47E+02	3.81E+00 G
			92.59	2.001E+01	(P	2.070E+01	3.24E+01	5.58E+00 G
PA-231	N	1.6189E+01					1.20E+07	
			302.65	1.507E+01	?(	9.803E+01	1.94E+02	2.88E+00 G
			300.07	1.750E+01	*(	1.106E+02	1.89E+02	2.46E+00 G
PA-233	C	1.0163E+00					7.82E+08	
			312.01	-4.852E-03	%(P	8.357E+00	1.69E+04	3.60E+01 G
			300.18	6.946E+00	*(	4.457E+01	1.92E+02	6.20E+00 G
PA-234	N	-2.2964E+00					1.63E+12	
			131.29	-2.296E+00	&(	1.083E+01	1.42E+02	1.80E+01 G
			946.02	-4.359E+00	+ P	1.409E+01	1.07E+02	1.34E+01 G
			569.47	-5.363E+00	+	1.904E+01	1.05E+02	8.20E+00 G
			883.24	-1.167E+00	+	2.469E+01	6.04E+02	9.60E+00 G
			880.53	-1.208E+01	+	3.575E+01	8.79E+01	6.00E+00 GA
PA-234M	N	-1.0918E+01					1.63E+12	
			1001.00	-1.092E+01	&(P	2.514E+02	6.37E+02	8.37E-01 G
			766.41	-2.061E+02	+ P	7.399E+02	8.95E+01	2.94E-01 G
U-235	N	-8.4402E-01					2.57E+11	
			143.79	-8.440E-01	&(P	1.909E+01	3.60E+02	1.10E+01 G
			205.33	-9.691E+00	+ P	3.546E+01	9.04E+01	5.01E+00 G
			163.38	-4.340E-01	& P	2.743E+01	1.65E+03	5.08E+00 G
AM-241	T	2.4286E-01					1.58E+05	
			59.54	2.429E-01	&(P	6.253E+00	7.65E+02	3.59E+01 G
Np-237	F	3.1413E+00					2.14E+06	
							Derived Ave Activity	
			86.49	3.141E+00	}(	2.128E+01	2.04E+02	1.31E+01 G
Ir-192	F	5.2101E-01					7.40E+01	
			316.49	5.210E-01	(	1.894E+00	1.08E+02	8.70E+01 G
			468.06	6.683E-02	%	3.826E+00	1.66E+03	5.18E+01 G
			308.44	0.000E+00	-	9.389E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.9345E-01					1.30E+01	
			818.50	5.949E-01	?(	1.981E+00	9.83E+01	1.00E+02 G
			1048.07	3.666E-01	?(	2.106E+00	1.63E+02	8.00E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          340.57-1.273E+00 +   6.317E+00 1.48E+02 4.69E+01 G

Np-239   T  -4.3828E-02                                     2.36E+00
                          103.70 6.341E-07 %   1.099E+01 5.19E+08 2.40E+01 X
                          106.13-4.383E-02 %(  4.803E+00 3.22E+03 2.27E+01 G
                           99.50-2.462E+00 &   1.771E+01 2.16E+02 1.50E+01 X

Nd-147      -4.0296E+00                                     1.11E+01
                          531.00-4.030E+00 ?(  1.150E+01 1.19E+02 1.30E+01 G
                           91.10-1.791E+00 +   1.014E+01 1.70E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
 PB-210      46.54       359.        23.     0.013   117.79   1.507E+01  P
 TH-227      50.14       331.        25.     0.014   104.06   7.719E+00
 AM-241      59.54       595.         5.     0.003   765.09   2.429E-01  P
 BA-133      80.99      1566.       -36.    -0.020   157.40  -1.527E+00
 EU-155      86.54      2276.       -37.    -0.020   184.01  -1.682E+00
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Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	91.10	1961.	-37.	-0.021	170.34	-1.791E+00	
Gd-153	97.50	1803.	-37.	-0.021	162.62	-1.663E+00	
Np-239	99.50	1766.	-28.	-0.015	216.17	-2.462E+00	
EU-155	105.31	531.	28.	0.016	116.88	1.769E+00	
EU-152	121.78	314.	28.	0.016	91.08	1.317E+00	
CO-57	122.06	266.	-21.	-0.012	113.16	-3.251E-01	
EU-154	123.10	250.	27.	0.015	84.07	8.999E-01	P
PA-234	131.29	899.	-30.	-0.017	141.53	-2.296E+00	
HF-181	133.02	929.	-21.	-0.012	206.91	-6.653E-01	
U-235	143.79	957.	-6.	-0.004	359.52	-8.440E-01	P
CE-141	145.44	973.	-32.	-0.018	140.40	-9.423E-01	
Ba-140	162.66	333.	15.	0.008	177.97	3.646E+00	
CE-139	165.85	335.	-28.	-0.016	92.89	-5.455E-01	
Cf-251	176.60	194.	-18.	-0.010	144.16	-1.732E+00	
TH-229	193.51	169.	11.	0.006	216.43	4.435E+00	
U-235	205.33	423.	-27.	-0.015	90.36	-9.691E+00	P
TH-229	210.85	455.	-27.	-0.015	91.82	-1.633E+01	P
Cf-251	227.00	192.	-28.	-0.015	99.72	-8.567E+00	
EU-152	244.69	1077.	-23.	-0.013	200.75	-6.330E+00	
TH-227	256.24	144.	-24.	-0.014	98.18	-7.476E+00	
Cd-113m	263.70	168.	-20.	-0.011	94.34	-7.295E+03	
BI-210M	265.83	95.	15.	0.008	96.78	6.523E-01	P
Hg-203	279.20	173.	-16.	-0.009	121.28	-4.402E-01	
I-131	284.30	104.	-10.	-0.006	170.11	-3.876E+00	P
PA-231	300.07	553.	18.	0.010	188.65	1.750E+01	
PA-233	300.18	571.	18.	0.010	191.58	6.946E+00	
PA-231	302.65	589.	18.	0.010	194.23	1.507E+01	
BA-133	302.85	606.	18.	0.010	197.08	2.369E+00	
Ba-140	304.85	624.	14.	0.008	256.17	7.929E+00	
Ir-192	316.49	180.	18.	0.010	108.32	5.210E-01	
CR-51	320.08	183.	-22.	-0.012	53.68	-5.687E+00	P
La-140	328.76	581.	-22.	-0.012	53.27	-2.875E+00	P
Cf-249	333.44	559.	-22.	-0.012	152.00	-3.770E+00	
Cs-136	340.57	536.	-22.	-0.012	148.40	-1.273E+00	
EU-152	344.29	514.	-22.	-0.012	145.03	-2.278E+00	
HF-181	345.83	336.	18.	0.010	143.80	3.285E+00	
BA-133	356.00	329.	-21.	-0.012	89.52	-9.351E-01	P
I-131	364.48	96.	-16.	-0.009	114.94	-5.646E-01	P
BA-133	383.84	174.	-2.	-0.001	935.41	-6.592E-01	
Cf-249	387.95	177.	-20.	-0.011	95.71	-9.101E-01	
SN-113	391.69	200.	12.	0.007	170.68	5.558E-01	
SB-125	427.88	48.	5.	0.003	274.95	5.432E-01	
AG-108M	433.94	30.	25.	0.014	49.83	8.867E-01	
pm-146	453.88	43.	8.	0.004	178.95	3.978E-01	
SB-125	463.37	128.	17.	0.009	97.19	5.569E+00	
BE-7	477.60	99.	14.	0.008	104.78	4.642E+00	
HF-181	482.00	207.	-21.	-0.012	100.50	-9.133E-01	
RU-103	497.05	26.	11.	0.006	98.01	4.469E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	511.86	63.	109.	0.061	21.31	2.027E+01	
Nd-147	531.00	61.	-14.	-0.008	119.44	-4.030E+00	
Ba-140	537.26	44.	-2.	-0.001	701.07	-2.490E-01	P
CS-134	563.24	48.	8.	0.005	172.63	4.015E+00	
CS-134	569.32	35.	9.	0.005	95.03	2.463E+00	
PA-234	569.47	59.	-11.	-0.006	104.64	-5.363E+00	
BI-207	569.70	62.	-8.	-0.005	140.95	-3.393E-01	
SB-125	600.50	366.	-17.	-0.009	160.44	-4.051E+00	
SB-124	602.73	349.	-17.	-0.009	156.57	-7.393E-01	
CS-134	604.71	332.	-17.	-0.009	152.65	-7.469E-01	
RU-103	610.30	315.	-17.	-0.010	148.38	-1.281E+01	
AG-108M	614.28	298.	-13.	-0.007	195.18	-6.075E-01	
PM-144	618.06	227.	16.	0.009	137.92	6.881E-01	
SB-125	635.89	56.	-18.	-0.010	63.33	-7.097E+00	
I-131	636.97	49.	12.	0.007	85.62	7.621E+00	
AG-110M	657.76	37.	12.	0.007	75.02	5.986E-01	
CS-137	661.66	89.	-22.	-0.012	70.89	-1.204E+00	P
PM-144	696.54	47.	-3.	-0.002	582.15	-1.318E-01	P
NB-94	702.63	56.	-17.	-0.009	96.48	-8.388E-01	
SB-124	722.79	31.	15.	0.008	58.68	6.807E+00	
AG-108M	722.94	46.	15.	0.008	69.18	8.102E-01	
EU-154	723.36	60.	10.	0.006	110.01	2.549E+00	
ZR-95	724.20	216.	-29.	-0.016	74.00	-3.255E+00	
pm-146	747.16	23.	9.	0.005	123.02	1.296E+00	
ZR-95	756.73	19.	11.	0.006	92.04	9.970E-01	
AG-110M	763.94	50.	7.	0.004	141.11	1.703E+00	P
NB-95	765.79	43.	11.	0.006	86.75	5.895E-01	
PA-234M	766.41	71.	-12.	-0.006	89.50	-2.061E+02	P
EU-152	778.92	42.	-12.	-0.007	85.59	-4.978E+00	P
CS-134	795.87	35.	39.	0.021	27.04	2.424E+00	
CS-134	801.95	65.	9.	0.005	133.55	5.484E+00	
CO-58	810.78	59.	-12.	-0.007	95.01	-6.570E-01	
Cs-136	818.50	51.	11.	0.006	98.29	5.949E-01	
Co-56	846.77	19.	3.	0.002	307.59	1.721E-01	P
NB-94	871.10	19.	8.	0.005	81.09	4.826E-01	
EU-154	873.23	39.	-9.	-0.005	102.05	-4.330E+00	
PA-234	880.53	53.	-12.	-0.007	87.87	-1.208E+01	
PA-234	883.24	66.	-2.	-0.001	603.59	-1.167E+00	
y-88	898.04	23.	5.	0.003	224.40	2.956E-01	
AG-110M	937.49	30.	-10.	-0.006	124.50	-1.791E+00	
PA-234	946.02	35.	-9.	-0.005	107.01	-4.359E+00	P
EU-152	964.11	98.	8.	0.005	176.40	3.498E+00	
EU-154	996.33	34.	5.	0.003	170.88	3.058E+00	
PA-234M	1001.00	40.	-1.	-0.001	636.82	-1.092E+01	P
EU-154	1004.77	50.	-10.	-0.006	103.40	-3.685E+00	
Co-56	1037.84	45.	-17.	-0.009	52.59	-8.088E+00	P
Cs-136	1048.07	23.	4.	0.002	162.63	3.666E-01	
RH-106	1050.36	37.	-7.	-0.004	131.30	-2.970E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-207	1063.66	30.	-3.	-0.002	405.52	-2.760E-01		
Ga-68	1077.40	5.	6.	0.003	90.35	1.499E+01		
FE-59	1099.25	20.	-5.	-0.003	178.32	-6.274E-01		P
EU-152	1112.07	152.	-16.	-0.009	111.88	-8.330E+00		
ZN-65	1115.55	136.	-16.	-0.009	106.02	-2.255E+00		
Sc-46	1120.55	94.	-14.	-0.008	104.71	-9.697E-01		
CO-60	1173.24	0.	18.	0.010	23.57	1.343E+00		
Co-56	1238.28	21.	11.	0.006	103.08	1.261E+00		
NA-22	1274.53	32.	-9.	-0.005	94.93	-7.209E-01		
FE-59	1291.60	21.	-9.	-0.005	117.15	-1.750E+00		
CO-60	1332.50	14.	5.	0.003	165.42	4.126E-01		P
EU-152	1408.00	16.	-2.	-0.001	399.87	-8.558E-01		P
La-140	1596.21	17.	-8.	-0.004	125.93	-8.165E-01		
y-88	1836.06	6.	4.	0.002	137.50	4.810E-01		

P - Peakbackground subtraction

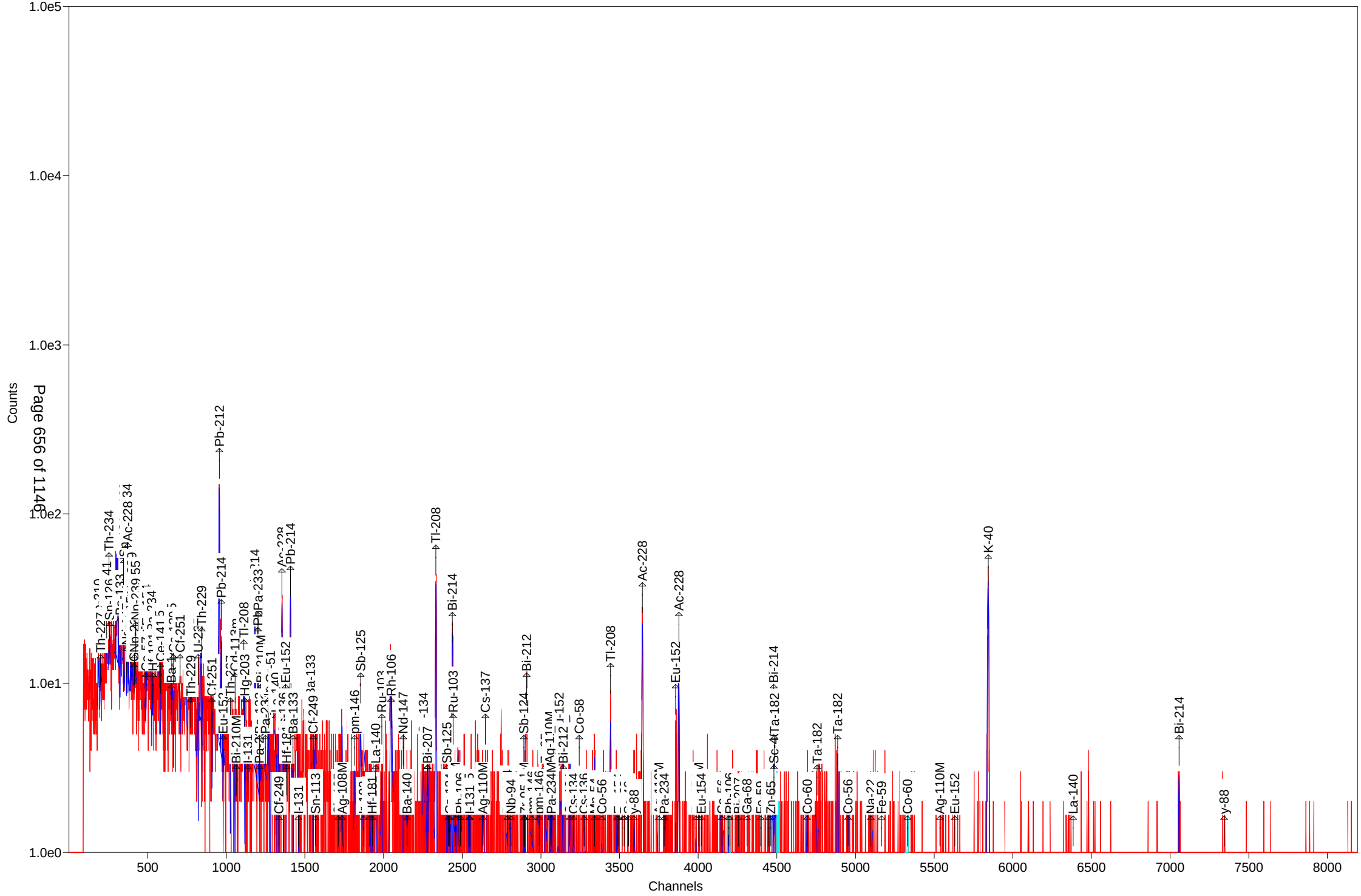
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	4.6423E+00	4.6423E+00	1.048E+02%	1.64E+01
NA-22	#A	-7.2095E-01	-7.2095E-01	9.493E+01%	2.33E+00
K-40		2.7485E+02	2.7485E+02	5.607E+00%	9.71E+00
Sc-46	#A	-9.8119E-03	-9.8119E-03	6.941E+03%	2.40E+00
CR-51	#A	-5.6865E+00	-5.6865E+00	5.368E+01%	1.69E+01
MN-54		1.3025E+00	1.3025E+00	2.466E+01%	5.76E-01
FE-59	#A	-6.2740E-01	-6.2741E-01	1.783E+02%	2.94E+00
Co-56	#A	6.0535E-01	6.0535E-01	1.031E+02%	1.30E+00
CO-57	#A	-3.2513E-01	-3.2513E-01	1.132E+02%	1.23E+00
CO-58	#A	-6.5697E-01	-6.5697E-01	9.501E+01%	2.11E+00
CO-60	#A	8.7769E-01	8.7769E-01	2.357E+01%	1.68E+00
ZN-65	#A	-2.2549E+00	-2.2549E+00	1.060E+02%	8.04E+00
NB-94	#A	-8.3879E-01	-8.3879E-01	9.648E+01%	1.85E+00
ZR-95	#A	9.9698E-01	9.9699E-01	9.204E+01%	2.16E+00
NB-95	#A	5.8950E-01	5.8950E-01	8.675E+01%	1.72E+00
RU-103	#A	4.4694E-01	4.4694E-01	9.801E+01%	1.06E+00
RH-106	#A	4.2399E-01	4.2399E-01	2.438E+03%	3.52E+01
AG-108M	#A	8.4840E-01	8.4840E-01	4.263E+01%	1.02E+00
AG-110M	#A	4.9884E-01	4.9884E-01	7.502E+01%	3.31E+00
SN-113	#A	5.5582E-01	5.5582E-01	1.707E+02%	3.21E+00
SB-124	#A	8.6159E-03	8.6160E-03	5.868E+01%	3.89E+00
SB-125	#A	1.8565E+00	1.8565E+00	9.719E+01%	3.80E+00
I-131	#A	9.5810E-02	9.5813E-02	7.166E+01%	1.68E+00
Gd-153	#A	-1.6629E+00	-1.6629E+00	1.626E+02%	8.99E+00
Ga-68	#A	1.4900E+01	1.4989E+01	9.035E+01%	3.23E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.38E+00

BA-133 #A	-1.8154E-01	-1.8154E-01	8.952E+01%	3.90E+00
CS-134 #A	1.1757E+00	1.1757E+00	2.704E+01%	3.83E+00
CS-137 #A	-1.2042E+00	-1.2042E+00	7.089E+01%	2.51E+00
CE-139 #A	-5.4552E-01	-5.4552E-01	9.289E+01%	1.69E+00
Ba-140 #A	1.4505E+00	1.4505E+00	1.780E+02%	5.31E+00
La-140 #A	-8.1645E-01	-8.1646E-01	1.259E+02%	2.24E+00
CE-141 #A	-9.4224E-01	-9.4225E-01	1.404E+02%	4.40E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.82E+01
PM-144 #A	2.7835E-01	2.7835E-01	1.379E+02%	1.67E+00
EU-152 #A	4.0705E-01	4.0705E-01	8.195E+01%	1.10E+01
EU-154 #A	-4.3304E+00	-4.3304E+00	1.020E+02%	1.51E+01
EU-155 #A	1.7691E+00	1.7691E+00	1.169E+02%	6.89E+00
HF-181 #A	-2.5124E-01	-2.5125E-01	8.772E+01%	3.07E+00
Ta-182 A	4.9681E+00	4.9681E+00	2.576E+01%	9.46E+00
Hg-203 #A	-4.4018E-01	-4.4018E-01	1.213E+02%	1.80E+00
TL-208	1.1328E+01	1.1328E+01	7.450E+00%	1.07E+00
pm-146 #A	7.0633E-01	7.0633E-01	1.086E+02%	3.77E+00
y-88 #A	3.9094E-01	3.9094E-01	1.316E+02%	1.60E+00
Cd-113m#A	-7.2950E+03	-7.2950E+03	9.434E+01%	2.30E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.90E+01
Cf-251 #A	-1.7317E+00	-1.7317E+00	1.442E+02%	6.39E+00
Cf-249 #A	-9.1008E-01	-9.1008E-01	9.571E+01%	2.91E+00
Sn-126 #A	5.6608E+00	5.6608E+00	1.099E+02%	2.07E+01
PB-210 #A	1.5069E+01	1.5069E+01	1.178E+02%	5.93E+01
PB-212	3.3488E+01	3.3488E+01	4.119E+00%	2.03E+00
PB-214	1.2522E+01	1.2522E+01	9.317E+00%	2.34E+00
BI-207 #A	-3.3930E-01	-3.3930E-01	1.409E+02%	1.64E+00
BI-212 A	7.8440E+00	7.8440E+00	9.499E+01%	2.52E+01
BI-214	1.2544E+01	1.2544E+01	1.142E+01%	2.16E+00
BI-210M#A	6.5226E-01	6.5226E-01	9.678E+01%	2.12E+00
AC-228	3.1214E+01	3.1214E+01	7.182E+00%	3.05E+00
TH-227 #A	7.7195E+00	7.7195E+00	1.041E+02%	2.68E+01
TH-229 #A	4.4354E+00	4.4354E+00	2.164E+02%	2.47E+01
TH-234 #A	1.3344E+01	1.3344E+01	3.244E+01%	5.39E+01
PA-231 #A	1.6189E+01	1.6189E+01	1.354E+02%	9.80E+01
PA-233 #A	1.0163E+00	1.0163E+00	1.916E+02%	8.36E+00
PA-234 #A	-2.2964E+00	-2.2964E+00	1.415E+02%	1.08E+01
PA-234M#A	-1.0918E+01	-1.0918E+01	6.368E+02%	2.51E+02
U-235 #A	-8.4402E-01	-8.4402E-01	3.595E+02%	1.91E+01
AM-241 #A	2.4286E-01	2.4286E-01	7.651E+02%	6.25E+00
Np-237 #A	3.1413E+00	3.1413E+00	2.036E+02%	2.13E+01
Ir-192 #A	5.2100E-01	5.2101E-01	1.083E+02%	1.89E+00
Cs-136 #A	4.9344E-01	4.9345E-01	9.501E+01%	1.98E+00
Np-239 #A	-4.3823E-02	-4.3828E-02	3.218E+03%	4.80E+00
Nd-147 #A	-4.0295E+00	-4.0296E+00	1.194E+02%	1.15E+01

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.5 to  2000.0 keV)     3.772E+02  Bq/Sample
Total Decayed Activity (   37.5 to  2000.0 keV) 3.7724713E+02  Bq/Sample
```

264535_Gamma_160-18554-A-10-B. 8_Gamma_20161404.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161669

Sample Description: 264535_Gamma_160-18554-A-11-B
Detector: Detector # 5
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-11-B

Decay to Time: 9/1/2016 12:42 Live Time: 1800 sec
Acquisition Time: 9/1/2016 12:42:59 Real Time: 1809 sec
Analysis Time: 9/1/2016 13:13 Dead Time: 0.50 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 5_2016-07-31_1355.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.216E+00	441.0	5.362E+00	5.362E+00	1.861E+01
NA-22	6.168E-01	64.9	4.006E-01	4.018E-01	1.308E+00
K-40	2.501E+02	6.5	1.623E+01	2.067E+01	1.207E+01
Sc-46	3.867E-01	125.4	4.850E-01	4.854E-01	1.695E+00
CR-51	-5.652E+00	101.6	5.741E+00	5.749E+00	1.925E+01
MN-54	1.565E+00	40.3	6.308E-01	6.360E-01	1.370E+00
FE-59	7.583E-01	201.7	1.529E+00	1.530E+00	3.572E+00
Co-56	1.073E+00	25.5	2.739E-01	2.794E-01	5.076E-01
CO-57	0.000E+00	1.#INF	2.159E-01	2.159E-01	1.391E+00
CO-58	6.895E-01	90.6	6.247E-01	6.258E-01	2.114E+00
CO-60	1.898E-01	43.4	8.229E-02	8.284E-02	2.169E+00
ZN-65	0.000E+00	1.#INF	8.042E-01	8.042E-01	6.906E+00
NB-94	5.536E-01	58.3	3.227E-01	3.240E-01	1.329E+00
ZR-95	6.518E-01	202.8	1.322E+00	1.322E+00	3.264E+00
NB-95	-1.012E+00	71.4	7.228E-01	7.247E-01	2.402E+00
RU-103	2.320E-01	221.9	5.147E-01	5.148E-01	1.332E+00
RH-106	6.285E+00	184.6	1.160E+01	1.161E+01	3.920E+01
AG-108M	1.387E-01	97.9	1.358E-01	1.360E-01	1.635E+00
AG-110M	6.085E-01	83.0	5.049E-01	5.059E-01	2.744E+00
SN-113	-1.184E-01	587.7	6.961E-01	6.962E-01	2.706E+00
SB-124	-2.147E-01	64.5	1.386E-01	1.390E-01	4.536E+00
SB-125	-9.912E-02	56.8	5.631E-02	5.654E-02	5.836E+00
I-131	3.906E-01	151.5	5.919E-01	5.922E-01	1.355E+00
Gd-153	5.694E-01	199.0	1.133E+00	1.134E+00	3.830E+00
Ga-68	-8.990E+00	405.5	3.646E+01	3.646E+01	8.461E+01
Tc-99m	-2.100E-01	239.2	5.024E-01	5.025E-01	1.693E+00
BA-133	-9.791E-01	137.7	1.348E+00	1.349E+00	4.522E+00
CS-134	2.538E-01	93.3	2.367E-01	2.371E-01	4.469E+00
CS-137	4.128E-01	163.3	6.741E-01	6.745E-01	2.323E+00
CE-139	4.843E-01	114.7	5.553E-01	5.572E-01	1.858E+00
Ba-140	7.846E-01	243.4	1.910E+00	1.910E+00	5.010E+00
La-140	6.841E-01	27.3	1.866E-01	1.901E-01	3.384E+00
CE-141	7.025E-01	122.8	8.630E-01	8.638E-01	2.890E+00

CE-144	4.577E+00	54.4	2.492E+00	2.503E+00	6.566E+00
PM-144	-5.903E-02	1278.7	7.548E-01	7.548E-01	1.878E+00
EU-152	2.568E+00	41.1	1.056E+00	1.064E+00	1.032E+01
EU-154	1.380E+00	74.8	1.032E+00	1.035E+00	1.679E+01
EU-155	-1.842E+00	151.7	2.793E+00	2.795E+00	9.321E+00
HF-181	7.964E-01	96.5	7.688E-01	7.699E-01	1.938E+00
Ta-182	2.991E+00	88.2	2.638E+00	2.643E+00	8.891E+00
Hg-203	3.645E-02	1495.9	5.453E-01	5.453E-01	1.883E+00
TL-208	2.529E+00	15.9	4.009E-01	4.219E-01	4.051E+00
pm-146	4.345E-01	138.2	6.006E-01	6.010E-01	5.516E+00
y-88	1.595E+00	38.3	6.109E-01	6.163E-01	1.308E+00
Cd-113m	-7.858E+03	99.4	7.808E+03	7.824E+03	2.617E+04
Cd-109	-1.016E+01	178.2	1.811E+01	1.812E+01	6.044E+01
Cf-251	8.788E-01	256.1	2.250E+00	2.252E+00	6.135E+00
Cf-249	4.999E-01	100.2	5.011E-01	5.017E-01	3.279E+00
Sn-126	5.312E+00	103.0	5.472E+00	5.479E+00	1.826E+01
PB-210	1.759E+00	823.1	1.448E+01	1.448E+01	4.247E+01
PB-212	2.905E+01	5.3	1.543E+00	2.432E+00	3.042E+00
PB-214	1.278E+01	13.2	1.690E+00	1.816E+00	3.324E+00
BI-207	5.271E-01	98.7	5.204E-01	5.212E-01	1.690E+00
BI-212	5.349E-01	1808.3	9.673E+00	9.673E+00	3.398E+01
BI-214	1.595E+01	11.3	1.797E+00	1.979E+00	2.859E+00
BI-210M	-8.320E-01	119.8	9.970E-01	9.982E-01	3.354E+00
AC-228	2.963E+01	8.7	2.563E+00	2.976E+00	3.870E+00
TH-227	2.071E+00	335.6	6.951E+00	6.952E+00	2.004E+01
TH-229	4.938E+00	187.2	9.241E+00	9.250E+00	2.587E+01
TH-234	5.862E+00	229.5	1.346E+01	1.346E+01	4.536E+01
PA-231	-1.679E+01	145.0	2.435E+01	2.437E+01	8.183E+01
PA-233	-1.516E+00	138.5	2.100E+00	2.101E+00	7.044E+00
PA-234	3.091E+00	71.6	2.214E+00	2.220E+00	8.635E+00
PA-234M	-1.203E+02	88.2	1.061E+02	1.063E+02	3.571E+02
U-235	1.779E+00	140.0	2.489E+00	2.491E+00	1.374E+01
AM-241	-1.535E+00	80.3	1.232E+00	1.235E+00	4.604E+00
Np-237	5.207E+00	49.1	2.555E+00	2.571E+00	8.327E+00
Ir-192	-3.826E-01	149.7	5.726E-01	5.730E-01	1.942E+00
Cs-136	7.102E-01	56.2	3.988E-01	4.009E-01	1.879E+00
Np-239	-1.686E+00	153.1	2.583E+00	2.584E+00	8.620E+00
Nd-147	-3.583E-01	1302.6	4.667E+00	4.667E+00	1.205E+01
Total	4.056E+02				

Analyst: kody Saulters

Sample description
264535_Gamma_160-18554-A-11-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161669.An1

Acquisition information
Start time: 9/1/2016 12:42:59 PM
Live time: 1800
Real time: 1809
Dead time: 0.50 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 12:42:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-31_1355.PBC 7/31/2016 1:55:22 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2154

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	2.	823.06	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	6.	335.62	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.29	11.	229.53	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.64	26.	103.00	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.89	142.	16.37	0.81	3.154E-02				
77.16	299.	8.78	0.82	3.221E-02				
86.36	42.	49.06	0.82	3.435E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.221E+00	EU155
87.44	22.	196.42	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
89.71	69.	26.77	0.83	3.489E-02				
92.79	84.	23.63	0.83	3.531E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.373E+01	AC228
97.50	11.	198.96	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
123.10	17.	124.24	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
128.96	79.	23.14	1.18	3.530E-02				
131.29	18.	158.97	0.87	3.509E-02	131.29	18.000	PBC<MDA	PA234
133.02	12.	250.21	0.87	3.492E-02	133.02	43.300	PBC<MDA	HF181
133.67	32.	54.45	0.49	3.487E-02	133.54	11.090	PBC<MDA	CE144
145.44	20.	122.84	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
165.85	22.	114.66	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
176.60	8.	256.07	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
193.51	7.	310.64	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	13.	139.95	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	11.	208.84	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
238.76	535.	6.36	1.12	2.318E-02	238.63	43.300	2.961E+01	PB212
242.12	45.	87.69	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
244.69	18.	226.86	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
277.88	7.	238.30	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
295.29	123.	14.63	0.94	1.944E-02	295.09	19.300	1.816E+01	PB214
300.42	54.	28.28	1.20	1.918E-02	300.03	3.280	4.797E+01	PB212
					300.07	2.460	6.396E+01	PA231
					300.18	6.200	PBC<MDA	PA233
305.03	3.	685.42	1.04	1.893E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	3.494E-01	BI210M
328.76	57.	27.28	1.07	1.778E-02	328.76	20.300	8.715E+00	La140
333.44	13.	100.24	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.66	112.	13.95	1.45	1.736E-02	338.32	12.010	2.987E+01	AC228
345.83	13.	164.42	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.13	151.	12.58	1.03	1.679E-02	351.93	37.600	1.278E+01	PB214
364.48	8.	151.52	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
453.88	8.	161.58	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.54	53.	20.89	0.79	1.336E-02	463.37	10.470	PBC<MDA	SB125
482.00	11.	96.54	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	2.	663.05	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	5.	221.85	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	101.	21.01	2.48	1.230E-02	511.86	20.000	2.274E+01	RH106
537.26	4.	243.43	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
569.32	6.	163.30	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.613E+00	PA234
					569.70	97.740	3.032E-01	BI207
569.70	6.	174.87	1.29	1.125E-02	569.32	15.380	1.765E+00	CS134
					569.47	8.200	3.312E+00	PA234
					569.70	97.740	2.780E-01	BI207
583.34	177.	8.22	1.52	1.103E-02	583.02	84.500	1.048E+01	TL208
609.45	141.	11.27	1.57	1.063E-02	609.31	46.090	1.595E+01	BI214
614.28	14.	166.68	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
621.92	12.	184.62	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
635.89	9.	72.07	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
636.97	1.	647.20	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	11.	82.98	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.66	6.	163.30	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
702.63	10.	92.98	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	10.	123.88	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.305E-01	AG108M
					723.36	20.220	2.834E+00	EU154
723.36	6.	212.42	1.42	9.211E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.650E-01	AG108M
					723.36	20.220	1.641E+00	EU154
735.72	6.	155.20	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
756.73	6.	202.79	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
763.94	2.	393.70	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
795.87	14.	93.28	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
801.95	2.	469.54	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
810.78	10.	90.61	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
818.50	9.	91.82	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
834.85	23.	40.32	1.51	8.168E-03	834.85	99.980	1.565E+00	MN54
846.77	16.	25.52	1.52	8.072E-03	846.77	99.935	1.089E+00	Co56
860.94	41.	15.86	1.13	7.963E-03	860.56	12.420	2.281E+01	TL208
871.10	7.	70.36	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
880.53	5.	93.32	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
883.24	5.	113.15	1.55	7.791E-03	883.24	9.600	PBC<MDA	PA234
889.28	5.	125.41	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
898.04	21.	38.30	1.56	7.684E-03	898.04	93.700	1.595E+00	y88
911.32	113.	10.55	1.32	7.591E-03	911.07	29.000	2.843E+01	AC228
946.02	8.	90.05	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
964.11	18.	41.12	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.81	71.	19.18	1.61	7.209E-03	968.97	17.460	3.145E+01	AC228
996.33	10.	85.62	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1004.77	4.	231.30	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	666.53	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	8.	64.67	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	8.	98.74	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	5.	201.66	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1120.35	13.	62.70	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.37	12.	88.22	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.991E+00	Ta182
1173.24	15.	43.35	1.76	6.138E-03	1173.24	99.900	1.317E+00	CO60
1238.28	2.	751.47	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	64.94	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.752E+00	EU154
1274.54	4.	121.96	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.190E+00	EU154
1384.30	7.	89.99	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1461.32	245.	6.49	2.03	5.103E-03	1460.83	10.670	2.501E+02	K40
1690.98	7.	37.80	2.08	4.511E-03	1690.98	47.790	PBC<MDA	SB124
1771.35	49.	17.67	2.12	4.337E-03	1771.35	15.480	4.068E+01	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.19	74.89	201.	142.	4.515E+03	16.37	0.813	-	D
308.27	77.16	195.	299.	9.285E+03	8.78	0.815	-	D
358.39	89.81	133.	82.	2.353E+03	22.72	0.828	-	D
370.72	92.89	187.	73.	2.075E+03	28.89	0.831	-	sD

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
515.66	128.96	80.	79.	2.233E+03	23.14	1.179	- s
1854.69	463.54	22.	53.	4.001E+03	20.89	0.791	- s
2334.03	583.34	7.	177.	1.602E+04	8.22	1.525	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	141.	2.	0.001	823.06	0.783s
TH-227	200.11	50.14	141.	6.	0.003	335.62	0.787s
AM-241	237.72	59.54	243.	-25.	-0.014	80.27	0.797s
TH-234	252.74	63.29	307.	11.	0.006	229.53	0.801s
Sn-126	256.71	64.28	334.	26.	0.014	103.00	0.802s
BA-133	323.61	80.99	268.	-26.	-0.015	99.71	0.819s
Np-237	345.63	86.49	193.	42.	0.023	49.06	0.825D
EU-155	345.84	86.54	1036.	-27.	-0.015	172.13	0.825s
Sn-126	347.43	86.94	1009.	-27.	-0.015	169.88	0.825
Sn-126	349.95	87.57	908.	22.	0.012	196.42	0.826s
Cd-109	351.83	88.04	903.	-24.	-0.013	178.24	0.826s
TH-234	370.05	92.59	877.	-6.	-0.003	695.33	0.831s
AC-228	373.09	93.35	229.	33.	0.018	67.40	0.832D
Gd-153	389.70	97.50	234.	11.	0.006	198.96	0.836s
Np-239	397.71	99.50	268.	-11.	-0.006	219.06	0.838s
Gd-153	412.52	103.20	391.	-24.	-0.013	118.37	0.842s
Np-239	414.52	103.70	415.	-20.	-0.011	146.80	0.842s
EU-155	420.98	105.31	731.	-25.	-0.014	151.65	0.844s
Np-239	424.25	106.13	717.	-25.	-0.014	153.14	0.845s
EU-152	486.88	121.78	237.	-16.	-0.009	139.73	0.861s
CO-57	488.03	122.06	253.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	204.	17.	0.009	124.24	0.862s
PA-234	524.99	131.29	420.	18.	0.010	158.97	0.871
HF-181	531.91	133.02	438.	12.	0.007	250.21	0.872s
CE-144	534.50	133.67	85.	32.	0.018	54.45	0.490s
HF-181	545.02	136.30	450.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	450.	0.	0.000	1000.00	0.876s
Tc-99m	561.88	140.51	351.	-11.	-0.006	239.21	0.880s
U-235	574.99	143.79	362.	0.	0.000	1000.00	0.883s
CE-141	581.61	145.44	304.	20.	0.011	122.84	0.885s
Ba-140	650.54	162.66	324.	-23.	-0.013	112.29	0.902s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	653.42	163.38	347.	-23.	-0.013	116.02	0.903s
CE-139	663.32	165.85	302.	22.	0.012	114.66	0.905s
Cf-251	706.34	176.60	130.	8.	0.004	256.07	0.916s
TH-229	774.03	193.51	133.	7.	0.004	310.64	0.933s
U-235	821.35	205.33	108.	13.	0.007	139.95	0.945s
TH-229	843.44	210.85	153.	11.	0.006	208.84	0.950s
Cf-251	908.08	227.00	120.	-20.	-0.011	99.18	0.966s
PB-212	954.64	238.63	126.	525.	0.292	5.31	0.978D
PB-214	968.10	242.00	742.	45.	0.025	87.69	0.981s
EU-152	978.89	244.69	842.	18.	0.010	226.86	0.984s
TH-227	1025.11	256.24	104.	-16.	-0.009	265.01	0.995s
Cd-113m	1054.97	263.70	153.	-18.	-0.010	99.36	1.002s
BI-210M	1063.50	265.83	173.	-16.	-0.009	119.82	1.005s
TL-208	1109.33	277.28	129.	7.	0.004	238.30	1.016s
I-131	1137.41	284.30	99.	-14.	-0.008	135.62	1.022
PB-214	1181.39	295.29	45.	123.	0.068	14.63	0.939s
PB-212	1201.93	300.42	46.	54.	0.030	28.28	1.195s
PA-231	1200.53	300.07	314.	-17.	-0.009	153.44	1.038s
PA-233	1200.97	300.18	297.	-17.	-0.009	149.44	1.038s
PA-231	1210.86	302.65	281.	-17.	-0.009	145.01	1.040s
BA-133	1211.66	302.85	264.	-9.	-0.005	252.85	1.040s
BI-210M	1219.85	304.90	259.	3.	0.002	685.42	1.042
Ir-192	1234.03	308.44	252.	-18.	-0.010	128.32	1.046s
PA-233	1248.32	312.01	310.	-18.	-0.010	138.47	1.049s
Ir-192	1266.25	316.49	130.	-11.	-0.006	149.66	1.053
CR-51	1280.63	320.08	165.	-18.	-0.010	101.59	1.057s
La-140	1315.35	328.76	52.	57.	0.031	27.28	1.065s
Cf-249	1334.08	333.44	44.	13.	0.007	100.24	1.070s
AC-228	1354.96	338.66	35.	112.	0.062	13.95	1.455s
Cs-136	1362.62	340.57	324.	-18.	-0.010	143.67	1.077s
EU-152	1377.49	344.29	306.	-18.	-0.010	139.32	1.080s
HF-181	1383.66	345.83	239.	13.	0.007	164.42	1.082s
PB-214	1408.88	352.13	57.	145.	0.081	13.23	1.027s
BA-133	1424.36	356.00	305.	-18.	-0.010	137.65	1.091s
I-131	1458.32	364.48	41.	8.	0.004	151.52	1.099s
Cf-249	1552.22	387.95	153.	0.	0.000	1000.00	1.121s
SN-113	1567.19	391.69	94.	-2.	-0.001	587.71	1.125s
SB-125	1711.99	427.88	80.	-14.	-0.008	87.84	1.158s
AG-108M	1736.25	433.94	56.	-12.	-0.007	102.84	1.164s
pm-146	1816.05	453.88	41.	8.	0.004	161.58	1.182s
Ir-192	1872.79	468.06	158.	-16.	-0.009	113.09	1.195s
BE-7	1910.94	477.59	86.	-3.	-0.002	440.96	1.204
HF-181	1928.56	482.00	52.	11.	0.006	96.54	1.208s
La-140	1948.65	487.02	28.	2.	0.001	663.05	1.212s
RU-103	1988.80	497.05	28.	5.	0.003	221.85	1.221s
RH-106	2048.06	511.86	53.	101.	0.056	21.01	2.485
Ba-140	2149.67	537.26	25.	4.	0.002	243.43	1.258s
CS-134	2253.60	563.24	48.	-12.	-0.007	116.67	1.280s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2277.94	569.32	45.	6.	0.003	163.30	1.286s
PA-234	2278.54	569.47	51.	0.	0.000	1000.00	1.286s
BI-207	2279.47	569.70	44.	6.	0.003	174.87	1.286s
TL-208	2332.76	583.02	196.	-8.	-0.005	123.30	1.298
SB-125	2402.69	600.50	335.	-15.	-0.008	172.81	1.313s
SB-124	2411.61	602.73	320.	-16.	-0.009	64.53	1.315s
CS-134	2419.53	604.71	305.	-15.	-0.008	164.52	1.317s
BI-214	2438.50	609.45	23.	141.	0.078	11.27	1.572s
RU-103	2441.89	610.30	289.	-15.	-0.008	159.90	1.322
AG-108M	2457.82	614.28	255.	14.	0.008	166.68	1.325s
PM-144	2472.94	618.06	269.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	229.	12.	0.007	184.62	1.332s
SB-125	2544.26	635.89	18.	9.	0.005	72.07	1.344s
I-131	2548.61	636.97	36.	1.	0.001	647.20	1.345s
AG-110M	2631.76	657.76	33.	11.	0.006	82.98	1.362s
CS-137	2647.36	661.66	49.	6.	0.003	163.30	1.366s
NB-94	2811.25	702.63	17.	10.	0.005	92.98	1.400s
SB-124	2891.88	722.79	64.	10.	0.005	123.88	1.417s
AG-108M	2892.48	722.94	74.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	66.	6.	0.003	212.42	1.418s
ZR-95	2897.53	724.20	71.	0.	0.000	1000.00	1.418s
pm-146	2943.61	735.72	22.	6.	0.004	155.20	1.428s
pm-146	2989.37	747.16	35.	-3.	-0.002	348.94	1.437s
ZR-95	3027.65	756.73	30.	6.	0.003	202.79	1.445s
AG-110M	3056.50	763.94	30.	2.	0.001	393.70	1.451s
NB-95	3063.89	765.79	57.	-16.	-0.009	71.39	1.453s
PA-234M	3066.38	766.41	84.	-16.	-0.009	84.61	1.453s
BI-212	3142.41	785.42	37.	-3.	-0.002	392.68	1.468s
CS-134	3184.19	795.87	33.	14.	0.008	93.28	1.477s
CS-134	3208.53	801.95	19.	2.	0.001	469.54	1.482s
CO-58	3243.82	810.78	39.	10.	0.006	90.61	1.489s
La-140	3263.80	815.77	51.	-10.	-0.006	104.33	1.493s
Cs-136	3274.72	818.50	30.	9.	0.005	91.82	1.495s
MN-54	3340.10	834.85	14.	23.	0.013	40.32	1.508s
Co-56	3387.78	846.77	0.	16.	0.009	25.52	1.518s
TL-208	3444.44	860.94	0.	41.	0.023	15.86	1.125s
NB-94	3485.08	871.10	10.	7.	0.004	70.36	1.537s
EU-154	3493.61	873.23	32.	-3.	-0.002	255.29	1.539s
PA-234	3522.80	880.53	10.	5.	0.003	93.32	1.544
PA-234	3533.64	883.24	16.	5.	0.003	113.15	1.547s
AG-110M	3539.41	884.68	29.	-1.	-0.001	408.02	1.547s
Sc-46	3557.79	889.28	20.	5.	0.003	125.41	1.551s
y-88	3592.83	898.04	9.	21.	0.011	38.30	1.558s
AC-228	3645.94	911.32	7.	113.	0.063	10.55	1.324s
AG-110M	3750.60	937.49	19.	-4.	-0.002	255.36	1.589s
PA-234	3784.70	946.02	9.	8.	0.004	90.05	1.595s
EU-152	3857.05	964.11	19.	18.	0.010	41.12	1.609s
AC-228	3876.48	968.97	58.	71.	0.040	19.18	1.612s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3985.88	996.33	30.	10.	0.005	85.62	1.633s
PA-234M	4004.55	1001.00	56.	-13.	-0.007	88.16	1.636s
EU-154	4019.65	1004.77	46.	4.	0.002	231.30	1.639s
Co-56	4151.87	1037.84	25.	2.	0.001	666.53	1.664s
Cs-136	4192.77	1048.07	10.	8.	0.005	64.67	1.671s
RH-106	4201.93	1050.36	35.	-4.	-0.002	317.34	1.673s
BI-207	4255.11	1063.66	10.	8.	0.004	98.74	1.682s
Ga-68	4310.04	1077.40	30.	-3.	-0.002	405.52	1.692s
FE-59	4397.41	1099.25	20.	5.	0.003	201.66	1.708s
EU-152	4448.68	1112.07	73.	-8.	-0.005	149.13	1.717s
ZN-65	4462.56	1115.55	65.	0.	0.000	1000.00	1.720s
BI-214	4481.51	1120.29	25.	13.	0.007	62.70	1.723D
Sc-46	4482.57	1120.55	65.	0.	0.000	1000.00	1.723s
Ta-182	4485.56	1121.30	50.	12.	0.007	88.22	1.724s
CO-60	4693.21	1173.24	5.	15.	0.008	43.35	1.760s
Ta-182	4756.42	1189.05	20.	-2.	-0.001	171.94	1.771s
Ta-182	4885.79	1221.41	32.	-4.	-0.002	78.60	1.793s
Co-56	4953.23	1238.28	32.	2.	0.001	751.47	1.804s
NA-22	5098.13	1274.53	5.	6.	0.004	64.94	1.828s
EU-154	5098.19	1274.54	12.	4.	0.002	121.96	1.828s
CO-60	5329.85	1332.50	16.	-9.	-0.005	139.61	1.866s
AG-110M	5536.88	1384.30	5.	7.	0.004	89.99	1.899s
K-40	5844.70	1461.32	4.	245.	0.136	6.49	2.034
La-140	6383.73	1596.21	28.	-8.	-0.005	153.75	2.024s
SB-124	6762.39	1690.98	0.	7.	0.004	37.80	2.076s
BI-214	7056.06	1764.49	51.	-15.	-0.008	37.30	2.114s
Co-56	7083.46	1771.35	13.	49.	0.027	17.67	2.117s
y-88	7341.96	1836.06	0.	0.	0.000	1000.00	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.2159E+00				5.31E+01	
			477.60	-1.216E+00	(	1.861E+01 4.41E+02 1.05E+01	G
NA-22	C	6.1681E-01				9.50E+02	
			1274.53	6.168E-01	?(	1.308E+00 6.49E+01 9.99E+01	G
K-40	N	2.5014E+02				4.66E+11	
			1460.83	2.501E+02	(P	1.207E+01 6.49E+00 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F	3.8674E-01					8.38E+01	
			889.28	3.867E-01	&(	1.695E+00	1.25E+02	1.00E+02 G
			1120.55	0.000E+00	-	3.508E+00	1.00E+03	1.00E+02 G
CR-51	F	-5.6515E+00					2.77E+01	
			320.08	-5.652E+00	?(	1.925E+01	1.02E+02	9.94E+00 G
MN-54	C	1.5646E+00					3.12E+02	
			834.85	1.565E+00	&(	1.370E+00	4.03E+01	1.00E+02 G
FE-59	F	7.5829E-01					4.45E+01	
			1099.25	7.583E-01	?(	3.572E+00	2.02E+02	5.65E+01 G
			1291.60	1.514E-01	%	5.505E+00	1.58E+03	4.32E+01 G
Co-56	C	1.0731E+00					7.73E+01	
			846.77	1.089E+00	?(P	5.076E-01	2.55E+01	9.99E+01 G
			1238.28	2.470E-01	- P	4.184E+00	7.51E+02	6.61E+01 G
			1037.84	9.623E-01	?(P	1.512E+01	6.67E+02	1.41E+01 G
			1771.35	4.068E+01	+	1.623E+01	1.77E+01	1.55E+01 A
CO-58	C	6.8949E-01					7.09E+01	
			810.78	6.895E-01	&(	2.114E+00	9.06E+01	9.95E+01 G
CO-60	F	1.8981E-01					1.93E+03	
			1332.50	-9.367E-01	?(P	2.169E+00	1.40E+02	1.00E+02 G
			1173.24	1.317E+00	?(P	1.232E+00	4.34E+01	9.99E+01 G
NB-94	I	5.5357E-01					7.41E+06	
			702.63	5.854E-01	?(	1.329E+00	9.30E+01	9.79E+01 G
			871.10	5.223E-01	?(P	1.222E+00	7.04E+01	9.99E+01 G
ZR-95	I	6.5175E-01					6.40E+01	
			756.73	6.518E-01	?(	3.264E+00	2.03E+02	5.45E+01 G
			724.20	0.000E+00	-	5.740E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.0124E+00					6.40E+01	
			765.79	-1.012E+00	?(	2.402E+00	7.14E+01	9.98E+01 G
RU-103	I	2.3200E-01					3.93E+01	
			497.05	2.320E-01	?(P	1.332E+00	2.22E+02	9.09E+01 G
			610.30	-1.387E+01	+	7.459E+01	1.60E+02	5.75E+00 GA
RH-106	I	6.2851E+00					3.74E+02	
			621.92	6.285E+00	?(P	3.920E+01	1.85E+02	9.93E+00 G
			1050.36	-1.855E+01	+ P	1.590E+02	3.17E+02	1.56E+00 G
			511.86	2.274E+01		8.299E+00	2.10E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	1.3868E-01					1.53E+05	
			433.94	-5.223E-01	?(P	1.635E+00	1.03E+02	9.05E+01 G
			722.94	0.000E+00	+	2.840E+00	1.00E+03	9.08E+01 G
			614.28	8.043E-01	?(	4.518E+00	1.67E+02	8.98E+01 G
AG-110M	F	6.0848E-01					2.50E+02	
			884.68	-1.263E-01	?(P	2.744E+00	4.08E+02	7.27E+01 G
			657.76	6.234E-01	?(	1.743E+00	8.30E+01	9.46E+01 G
			937.49	-7.999E-01	+	4.984E+00	2.55E+02	3.44E+01 G
			1384.30	2.787E+00	?(P	5.809E+00	9.00E+01	2.43E+01 G
			763.94	5.668E-01	?(	8.001E+00	3.94E+02	2.23E+01 G
SN-113	F	-1.1845E-01					1.15E+02	
			391.69	-1.184E-01	?(P	2.706E+00	5.88E+02	6.40E+01 G
SB-124	F	-2.1470E-01					6.02E+01	
			602.73	-8.211E-01	?(P	4.536E+00	6.45E+01	9.83E+01 G
			1690.98	1.804E+00	+	1.899E+00	3.78E+01	4.78E+01 G
			722.79	5.297E+00	?(	2.238E+01	1.24E+02	1.08E+01 G
SB-125	I	-9.9120E-02					1.01E+03	
			427.88	-1.846E+00	?(P	5.836E+00	8.78E+01	2.96E+01 G
			600.50	-4.377E+00	+	2.543E+01	1.73E+02	1.79E+01 G
			635.89	4.473E+00	?(	1.076E+01	7.21E+01	1.13E+01 G
			463.37	2.457E-01	% P	2.245E+01	2.64E+03	1.05E+01 G
I-131	I	3.9063E-01					8.02E+00	
			364.48	3.374E-01	?(P	1.355E+00	1.52E+02	8.17E+01 G
			284.30	-6.315E+00	+	2.214E+01	1.36E+02	6.14E+00 G
			636.97	9.971E-01	?(P	2.310E+01	6.47E+02	7.17E+00 G
Gd-153	F	5.6943E-01					2.42E+02	
			97.50	5.694E-01	?(	3.830E+00	1.99E+02	3.00E+01 G
			103.20	-1.692E+00	+	6.692E+00	1.18E+02	2.18E+01 G
Ga-68	C	-8.9901E+00					4.71E-02	
			1077.40	-8.990E+00	?(	8.461E+01	4.06E+02	3.30E+00 G
Tc-99m	I	-2.1001E-01					2.51E-01	
			140.51	-2.100E-01	*(	1.693E+00	2.39E+02	8.93E+01 G
BA-133	F	-9.7907E-01					3.85E+03	
			356.00	-9.791E-01	?(	4.522E+00	1.38E+02	6.20E+01 G
			302.85	-1.460E+00	+	1.249E+01	2.53E+02	1.83E+01 G
			383.84	-3.975E-01	%	2.392E+01	1.75E+03	8.94E+00 GA
			80.99	-1.296E+00	+ P	3.878E+00	9.97E+01	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	2.5376E-01					7.54E+02	
			604.71	-8.077E-01	?(	4.469E+00	1.65E+02	9.76E+01 G
			795.87	1.038E+00	*(	2.242E+00	9.33E+01	8.55E+01 G
			569.32	1.926E+00	?(	1.090E+01	1.63E+02	1.54E+01 G
			801.95	1.502E+00	?(P	1.743E+01	4.70E+02	8.69E+00 G
			563.24	-7.032E+00	+	2.051E+01	1.17E+02	8.35E+00 G
CS-137	I	4.1280E-01					1.10E+04	
			661.66	4.128E-01	(P	2.323E+00	1.63E+02	8.52E+01 G
CE-139	F	4.8432E-01					1.38E+02	
			165.85	4.843E-01	?(	1.858E+00	1.15E+02	7.99E+01 G
Ba-140	I	7.8455E-01					1.28E+01	
			537.26	7.846E-01	(P	5.010E+00	2.43E+02	2.44E+01 G
			162.66	-6.620E+00	+	2.485E+01	1.12E+02	6.22E+00 G
			304.85	-6.524E-07	%	5.286E+01	2.37E+09	4.29E+00 G
La-140	I	6.8406E-01					1.28E+01	
			1596.21	-1.025E+00	?(	3.384E+00	1.54E+02	9.54E+01 G
			487.02	1.506E-01	+ P	2.624E+00	6.63E+02	4.55E+01 G
			328.76	8.715E+00	&(P	5.609E+00	2.73E+01	2.03E+01 G
			815.77	-2.913E+00	+	1.033E+01	1.04E+02	2.33E+01 G
CE-141	I	7.0254E-01					3.25E+01	
			145.44	7.025E-01	&(	2.890E+00	1.23E+02	4.82E+01 G
CE-144	I	4.5771E+00					2.85E+02	
			133.54	4.577E+00	@(P	6.566E+00	5.44E+01	1.11E+01 G
PM-144	C	-5.9028E-02					3.63E+02	
			696.54	-5.903E-02	%(	1.878E+00	1.28E+03	9.90E+01 G
			618.06	0.000E+00	+	4.223E+00	1.00E+03	9.91E+01 G
EU-152	F	2.5680E+00					4.94E+03	
			344.29	-2.207E+00	&(	1.032E+01	1.39E+02	2.65E+01 G
			1112.07	-5.295E+00	+	2.703E+01	1.49E+02	1.36E+01 G
			121.78	-8.588E-01	&	4.037E+00	1.40E+02	2.86E+01 G
			778.92	-4.959E-01	&	1.357E+01	1.13E+03	1.29E+01 G
			964.11	9.519E+00	?(P	1.200E+01	4.11E+01	1.46E+01 G
			244.69	5.869E+00	?(P	4.451E+01	2.27E+02	7.58E+00 G
			1408.00	1.675E-01	%	9.008E+00	2.23E+03	2.10E+01 GA
EU-154	I	1.3799E+00					3.14E+03	
			873.23	-1.855E+00	?(	1.679E+01	2.55E+02	1.23E+01 G
			123.10	6.321E-01	?(P	2.639E+00	1.24E+02	4.08E+01 G
			1274.54	1.190E+00	?(	5.140E+00	1.22E+02	3.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			723.36	1.641E+00	?(	1.206E+01	2.12E+02	2.02E+01 G
			1004.77	1.862E+00	?(	1.507E+01	2.31E+02	1.80E+01 G
			996.33	7.316E+00	?(	2.117E+01	8.56E+01	1.06E+01 G
EU-155	I	-1.8418E+00					1.81E+03	
			105.31	-1.842E+00	*(	9.321E+00	1.52E+02	2.12E+01 G
			86.54	-1.402E+00	+	8.042E+00	1.72E+02	3.07E+01 G
HF-181	F	7.9638E-01					4.24E+01	
			482.00	5.932E-01	?(	1.938E+00	9.65E+01	8.05E+01 G
			133.02	4.376E-01	&(	3.683E+00	2.50E+02	4.33E+01 G
			345.83	2.913E+00	?(	1.615E+01	1.64E+02	1.51E+01 G
			136.30	0.000E+00	-	2.789E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.9908E+00					1.14E+02	
			1121.30	2.991E+00	?(	8.891E+00	8.82E+01	3.49E+01 G
			1221.41	-1.548E+00	- P	1.015E+01	7.86E+01	2.70E+01 G
			1189.05	-1.204E+00	- P	1.334E+01	1.72E+02	1.62E+01 G
Hg-203	F	3.6453E-02					4.66E+01	
			279.20	3.645E-02	%(P	1.883E+00	1.50E+03	8.15E+01 G
TL-208	N	2.5285E+00					6.98E+02	
			583.02	-4.832E-01	(P	4.051E+00	1.23E+02	8.45E+01 G
			277.28	2.938E+00	&(	2.393E+01	2.38E+02	6.31E+00 G
			860.56	2.281E+01	(P	4.140E+00	1.59E+01	1.24E+01 G
pm-146	C	4.3452E-01					2.02E+03	
			747.16	-5.380E-01	?(P	5.516E+00	3.49E+02	3.40E+01 G
			735.72	1.722E+00	?(	6.635E+00	1.55E+02	2.25E+01 G
			453.88	4.976E-01	(P	2.048E+00	1.62E+02	6.50E+01 G
y-88	F	1.5948E+00					1.07E+02	
			898.04	1.595E+00	&(	1.308E+00	3.83E+01	9.37E+01 G
			1836.06	0.000E+00	-	9.809E-01	1.00E+03	9.92E+01 G
Cd-113m		-7.8576E+03					5.33E+03	
			263.70	-7.858E+03	?(	2.617E+04	9.94E+01	6.00E-03 K
Cd-109	F	-1.0162E+01					4.53E+02	
			88.04	-1.016E+01	?(	6.044E+01	1.78E+02	3.79E+00 G
Cf-251	T	8.7885E-01					3.28E+05	
			176.60	8.788E-01	?(	6.135E+00	2.56E+02	1.70E+01 G
			227.00	-7.358E+00	+	1.961E+01	9.92E+01	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	4.9988E-01					1.28E+05	
			387.95	0.000E+00	*(	3.279E+00	1.00E+03	6.60E+01 G
			333.44	2.627E+00	?(	6.853E+00	1.00E+02	1.55E+01 G
Sn-126		5.3123E+00					3.65E+07	
			87.57	9.362E-01	-	6.140E+00	1.96E+02	3.75E+01 GA
			64.28	5.312E+00	?(	1.826E+01	1.03E+02	9.70E+00 G
			86.94	-4.752E+00	-	2.691E+01	1.70E+02	9.04E+00 GA
PB-210	N	1.7588E+00					8.14E+03	
			46.54	1.759E+00	*(P	4.247E+01	8.23E+02	4.25E+00 G
PB-212	N	2.9051E+01					6.98E+02	
			238.63	2.905E+01	(P	3.042E+00	5.31E+00	4.33E+01 G
			300.03	4.797E+01	+ P	3.020E+01	2.83E+01	3.28E+00 GA
PB-214	N	1.2777E+01					5.84E+05	
			351.93	1.278E+01	@(P	3.324E+00	1.32E+01	3.76E+01 G
			295.09	1.816E+01	+ P	5.043E+00	1.46E+01	1.93E+01 G
			242.00	1.454E+01	?	4.229E+01	8.77E+01	7.43E+00 GA
BI-207	C	5.2708E-01					1.18E+04	
			569.70	2.780E-01	&(	1.690E+00	1.75E+02	9.77E+01 G
			1063.66	8.539E-01	?(P	1.982E+00	9.87E+01	7.45E+01 G
BI-212	N	5.3493E-01					6.98E+02	
			727.17	5.349E-01	%(	3.398E+01	1.81E+03	7.55E+00 G
			785.42	-1.683E+01	+	1.574E+02	3.93E+02	1.28E+00 GA
BI-214	N	1.5946E+01					5.84E+05	
			609.31	1.595E+01	@(P	2.859E+00	1.13E+01	4.61E+01 G
			1120.29	7.270E+00	- P	1.497E+01	6.27E+01	1.51E+01 G
			1764.49	-1.268E+01	- P	2.991E+01	3.73E+01	1.54E+01 G
BI-210M	T	-8.3204E-01					1.10E+09	
			265.83	-8.320E-01	&(	3.354E+00	1.20E+02	5.00E+01 G
			304.90	3.494E-01	+	8.150E+00	6.85E+02	2.80E+01 G
AC-228	N	2.9627E+01					2.10E+03	
			911.07	2.843E+01	(P	3.870E+00	1.05E+01	2.90E+01 G
			968.97	3.145E+01	&(P	1.683E+01	1.92E+01	1.75E+01 G
			338.32	2.987E+01	(P	8.057E+00	1.39E+01	1.20E+01 G
			93.35	9.281E+00	-	2.068E+01	6.74E+01	5.56E+00 XA
TH-227	N	2.0712E+00					7.95E+03	
			50.14	2.071E+00	&(	2.004E+01	3.36E+02	8.00E+00 G
			256.24	-5.656E+00	& P	1.820E+01	2.65E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	4.9378E+00					2.68E+06	
			193.51	3.052E+00	?(	2.587E+01	3.11E+02	4.40E+00 G
			210.85	7.713E+00	&(	4.369E+01	2.09E+02	2.99E+00 G
TH-234	N	5.8623E+00					1.63E+12	
			63.29	5.862E+00	*(P	4.536E+01	2.30E+02	3.81E+00 G
			92.59	-1.697E+00	+ P	3.969E+01	6.95E+02	5.58E+00 G
PA-231	N	-1.6794E+01					1.20E+07	
			302.65	-1.679E+01	?(	8.183E+01	1.45E+02	2.88E+00 G
			300.07	-1.948E+01	+	1.004E+02	1.53E+02	2.46E+00 G
PA-233	C	-1.5163E+00					7.82E+08	
			312.01	-1.516E+00	?(	7.044E+00	1.38E+02	3.60E+01 G
			300.18	-7.730E+00	+	3.881E+01	1.49E+02	6.20E+00 G
PA-234	N	3.0907E+00					1.63E+12	
			131.29	1.620E+00	?(	8.635E+00	1.59E+02	1.80E+01 G
			946.02	4.419E+00	?(	9.552E+00	9.00E+01	1.34E+01 G
			569.47	0.000E+00	&	2.167E+01	1.00E+03	8.20E+00 G
			883.24	3.993E+00	?(	1.578E+01	1.13E+02	9.60E+00 G
			880.53	6.495E+00	?	2.097E+01	9.33E+01	6.00E+00 GA
PA-234M	N	-1.2034E+02					1.63E+12	
			1001.00	-1.203E+02	&(	3.571E+02	8.82E+01	8.37E-01 G
			766.41	-3.452E+02	+	9.779E+02	8.46E+01	2.94E-01 G
U-235	N	1.7788E+00					2.57E+11	
			143.79	0.000E+00	&(	1.374E+01	1.00E+03	1.10E+01 G
			205.33	5.670E+00	*(P	2.155E+01	1.40E+02	5.01E+00 G
			163.38	-8.137E+00	&	3.156E+01	1.16E+02	5.08E+00 G
AM-241	T	-1.5351E+00					1.58E+05	
			59.54	-1.535E+00	(P	4.604E+00	8.03E+01	3.59E+01 G
Np-237	F	5.2069E+00					2.14E+06	
			86.49	5.207E+00	(	8.327E+00	4.91E+01	1.31E+01 G
Ir-192	F	-3.8261E-01					7.40E+01	
			316.49	-3.826E-01	?(	1.942E+00	1.50E+02	8.70E+01 G
			468.06	-1.304E+00	+	4.960E+00	1.13E+02	5.18E+01 G
			308.44	-1.663E+00	+	7.164E+00	1.28E+02	3.18E+01 G
Cs-136	F	7.1023E-01					1.30E+01	
			818.50	6.023E-01	?(	1.879E+00	9.18E+01	1.00E+02 G
			1048.07	8.452E-01	?(	1.795E+00	6.47E+01	8.00E+01 G
			340.57	-1.232E+00	&	5.939E+00	1.44E+02	4.69E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-239	T -1.6863E+00					2.36E+00	
		103.70	-1.272E+00	&	6.255E+00	1.47E+02	2.40E+01 X
		106.13	-1.686E+00	?(	8.620E+00	1.53E+02	2.27E+01 G
		99.50	-1.100E+00	&	8.142E+00	2.19E+02	1.50E+01 X
Nd-147	-3.5831E-01					1.11E+01	
		531.00	-3.583E-01	%(	1.205E+01	1.30E+03	1.30E+01 G
		91.10	-8.539E-07	%	7.884E+00	2.75E+08	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	141.	2.	0.001	823.06	1.759E+00	P
TH-227	50.14	141.	6.	0.003	335.62	2.071E+00	
AM-241	59.54	243.	-25.	-0.014	80.27	-1.535E+00	P
TH-234	63.29	307.	11.	0.006	229.53	5.862E+00	P
BA-133	80.99	268.	-26.	-0.015	99.71	-1.296E+00	P
EU-155	86.54	1036.	-27.	-0.015	172.13	-1.402E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-109	88.04	903.	-24.	-0.013	178.24	-1.016E+01	
TH-234	92.59	877.	-6.	-0.003	695.33	-1.697E+00	P
Gd-153	97.50	234.	11.	0.006	198.96	5.694E-01	
Np-239	99.50	268.	-11.	-0.006	219.06	-1.100E+00	
Gd-153	103.20	391.	-24.	-0.013	118.37	-1.692E+00	
Np-239	103.70	415.	-20.	-0.011	146.80	-1.272E+00	
EU-155	105.31	731.	-25.	-0.014	151.65	-1.842E+00	
Np-239	106.13	717.	-25.	-0.014	153.14	-1.686E+00	
EU-152	121.78	237.	-16.	-0.009	139.73	-8.588E-01	
EU-154	123.10	204.	17.	0.009	124.24	6.321E-01	P
PA-234	131.29	420.	18.	0.010	158.97	1.620E+00	
HF-181	133.02	438.	12.	0.007	250.21	4.376E-01	
Tc-99m	140.51	351.	-11.	-0.006	239.21	-2.100E-01	
CE-141	145.44	304.	20.	0.011	122.84	7.025E-01	
Ba-140	162.66	324.	-23.	-0.013	112.29	-6.620E+00	
U-235	163.38	347.	-23.	-0.013	116.02	-8.137E+00	
CE-139	165.85	302.	22.	0.012	114.66	4.843E-01	
Cf-251	176.60	130.	8.	0.004	256.07	8.788E-01	
TH-229	193.51	133.	7.	0.004	310.64	3.052E+00	
U-235	205.33	108.	13.	0.007	139.95	5.670E+00	P
TH-229	210.85	153.	11.	0.006	208.84	7.713E+00	
Cf-251	227.00	120.	-20.	-0.011	99.18	-7.358E+00	
EU-152	244.69	842.	18.	0.010	226.86	5.869E+00	P
TH-227	256.24	104.	-16.	-0.009	265.01	-5.656E+00	P
Cd-113m	263.70	153.	-18.	-0.010	99.36	-7.858E+03	
I-131	284.30	99.	-14.	-0.008	135.62	-6.315E+00	
PA-231	300.07	314.	-17.	-0.009	153.44	-1.948E+01	
PA-233	300.18	297.	-17.	-0.009	149.44	-7.730E+00	
PA-231	302.65	281.	-17.	-0.009	145.01	-1.679E+01	
BA-133	302.85	264.	-9.	-0.005	252.85	-1.460E+00	
Ir-192	308.44	252.	-18.	-0.010	128.32	-1.663E+00	
PA-233	312.01	310.	-18.	-0.010	138.47	-1.516E+00	
Ir-192	316.49	130.	-11.	-0.006	149.66	-3.826E-01	
CR-51	320.08	165.	-18.	-0.010	101.59	-5.652E+00	
La-140	328.76	52.	57.	0.031	27.28	8.715E+00	P
Cf-249	333.44	44.	13.	0.007	100.24	2.627E+00	
Cs-136	340.57	324.	-18.	-0.010	143.67	-1.232E+00	
EU-152	344.29	306.	-18.	-0.010	139.32	-2.207E+00	
HF-181	345.83	239.	13.	0.007	164.42	2.913E+00	
BA-133	356.00	305.	-18.	-0.010	137.65	-9.791E-01	
I-131	364.48	41.	8.	0.004	151.52	3.374E-01	P
SN-113	391.69	94.	-2.	-0.001	587.71	-1.184E-01	P
SB-125	427.88	80.	-14.	-0.008	87.84	-1.846E+00	P
AG-108M	433.94	56.	-12.	-0.007	102.84	-5.223E-01	P
pm-146	453.88	41.	8.	0.004	161.58	4.976E-01	P
Ir-192	468.06	158.	-16.	-0.009	113.09	-1.304E+00	
BE-7	477.59	86.	-3.	-0.002	440.96	-1.216E+00	
HF-181	482.00	52.	11.	0.006	96.54	5.932E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	487.02	28.	2.	0.001	663.05	1.506E-01	P
RU-103	497.05	28.	5.	0.003	221.85	2.320E-01	P
RH-106	511.86	53.	101.	0.056	21.01	2.274E+01	
Ba-140	537.26	25.	4.	0.002	243.43	7.846E-01	P
CS-134	563.24	48.	-12.	-0.007	116.67	-7.032E+00	
CS-134	569.32	45.	6.	0.003	163.30	1.926E+00	
BI-207	569.70	44.	6.	0.003	174.87	2.780E-01	
SB-125	600.50	335.	-15.	-0.008	172.81	-4.377E+00	
SB-124	602.73	320.	-16.	-0.009	64.53	-8.211E-01	P
CS-134	604.71	305.	-15.	-0.008	164.52	-8.077E-01	
RU-103	610.30	289.	-15.	-0.008	159.90	-1.387E+01	
AG-108M	614.28	255.	14.	0.008	166.68	8.043E-01	
RH-106	621.92	229.	12.	0.007	184.62	6.285E+00	P
SB-125	635.89	18.	9.	0.005	72.07	4.473E+00	
I-131	636.97	36.	1.	0.001	647.20	9.971E-01	P
AG-110M	657.76	33.	11.	0.006	82.98	6.234E-01	
CS-137	661.66	49.	6.	0.003	163.30	4.128E-01	P
NB-94	702.63	17.	10.	0.005	92.98	5.854E-01	
SB-124	722.79	64.	10.	0.005	123.88	5.297E+00	
EU-154	723.36	66.	6.	0.003	212.42	1.641E+00	
pm-146	735.72	22.	6.	0.004	155.20	1.722E+00	
pm-146	747.16	35.	-3.	-0.002	348.94	-5.380E-01	P
ZR-95	756.73	30.	6.	0.003	202.79	6.518E-01	
AG-110M	763.94	30.	2.	0.001	393.70	5.668E-01	
NB-95	765.79	57.	-16.	-0.009	71.39	-1.012E+00	
PA-234M	766.41	84.	-16.	-0.009	84.61	-3.452E+02	
BI-212	785.42	37.	-3.	-0.002	392.68	-1.683E+01	
CS-134	795.87	33.	14.	0.008	93.28	1.038E+00	
CS-134	801.95	19.	2.	0.001	469.54	1.502E+00	P
CO-58	810.78	39.	10.	0.006	90.61	6.895E-01	
La-140	815.77	51.	-10.	-0.006	104.33	-2.913E+00	
Cs-136	818.50	30.	9.	0.005	91.82	6.023E-01	
NB-94	871.10	10.	7.	0.004	70.36	5.223E-01	P
EU-154	873.23	32.	-3.	-0.002	255.29	-1.855E+00	
PA-234	880.53	10.	5.	0.003	93.32	6.495E+00	
PA-234	883.24	16.	5.	0.003	113.15	3.993E+00	
AG-110M	884.68	29.	-1.	-0.001	408.02	-1.263E-01	P
Sc-46	889.28	20.	5.	0.003	125.41	3.867E-01	
AG-110M	937.49	19.	-4.	-0.002	255.36	-7.999E-01	
PA-234	946.02	9.	8.	0.004	90.05	4.419E+00	
EU-152	964.11	19.	18.	0.010	41.12	9.519E+00	P
EU-154	996.33	30.	10.	0.005	85.62	7.316E+00	
PA-234M	1001.00	56.	-13.	-0.007	88.16	-1.203E+02	
EU-154	1004.77	46.	4.	0.002	231.30	1.862E+00	
Cs-136	1048.07	10.	8.	0.005	64.67	8.452E-01	
RH-106	1050.36	35.	-4.	-0.002	317.34	-1.855E+01	P
BI-207	1063.66	10.	8.	0.004	98.74	8.539E-01	P
Ga-68	1077.40	30.	-3.	-0.002	405.52	-8.990E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1099.25	20.	5.	0.003	201.66	7.583E-01		
EU-152	1112.07	73.	-8.	-0.005	149.13	-5.295E+00		
CO-60	1173.24	5.	15.	0.008	43.35	1.317E+00		P
NA-22	1274.53	5.	6.	0.004	64.94	6.168E-01		
EU-154	1274.54	12.	4.	0.002	121.96	1.190E+00		
CO-60	1332.50	16.	-9.	-0.005	139.61	-9.367E-01		P
AG-110M	1384.30	5.	7.	0.004	89.99	2.787E+00		P
La-140	1596.21	28.	-8.	-0.005	153.75	-1.025E+00		
SB-124	1690.98	0.	7.	0.004	37.80	1.804E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-1.2159E+00	-1.2159E+00	4.410E+02%	1.86E+01
NA-22	#A	6.1681E-01	6.1681E-01	6.494E+01%	1.31E+00
K-40		2.5014E+02	2.5014E+02	6.490E+00%	1.21E+01
Sc-46	#A	3.8674E-01	3.8674E-01	1.254E+02%	1.70E+00
CR-51	#A	-5.6514E+00	-5.6515E+00	1.016E+02%	1.92E+01
MN-54	#	1.5646E+00	1.5646E+00	4.032E+01%	1.37E+00
FE-59	#A	7.5828E-01	7.5829E-01	2.017E+02%	3.57E+00
Co-56	#	1.0731E+00	1.0731E+00	2.552E+01%	5.08E-01
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.39E+00
CO-58	#A	6.8949E-01	6.8949E-01	9.061E+01%	2.11E+00
CO-60	#A	1.8981E-01	1.8981E-01	4.335E+01%	2.17E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.91E+00
NB-94	#A	5.5357E-01	5.5357E-01	5.830E+01%	1.33E+00
ZR-95	#A	6.5175E-01	6.5175E-01	2.028E+02%	3.26E+00
NB-95	#A	-1.0124E+00	-1.0124E+00	7.139E+01%	2.40E+00
RU-103	#A	2.3199E-01	2.3200E-01	2.219E+02%	1.33E+00
RH-106	#A	6.2850E+00	6.2851E+00	1.846E+02%	3.92E+01
AG-108M	#A	1.3868E-01	1.3868E-01	9.793E+01%	1.64E+00
AG-110M	#A	6.0847E-01	6.0848E-01	8.298E+01%	2.74E+00
SN-113	#A	-1.1845E-01	-1.1845E-01	5.877E+02%	2.71E+00
SB-124	#A	-2.1470E-01	-2.1470E-01	6.453E+01%	4.54E+00
SB-125	#A	-9.9120E-02	-9.9120E-02	5.681E+01%	5.84E+00
I-131	#A	3.9061E-01	3.9063E-01	1.515E+02%	1.35E+00
Gd-153	#A	5.6943E-01	5.6943E-01	1.990E+02%	3.83E+00
Ga-68	#A	-8.9002E+00	-8.9901E+00	4.055E+02%	8.46E+01
Tc-99m	#A	-2.0962E-01	-2.1001E-01	2.392E+02%	1.69E+00
BA-133	#A	-9.7907E-01	-9.7907E-01	1.377E+02%	4.52E+00
CS-134	#A	2.5376E-01	2.5376E-01	9.328E+01%	4.47E+00
CS-137	#A	4.1280E-01	4.1280E-01	1.633E+02%	2.32E+00
CE-139	#A	4.8432E-01	4.8432E-01	1.147E+02%	1.86E+00
Ba-140	#A	7.8453E-01	7.8455E-01	2.434E+02%	5.01E+00

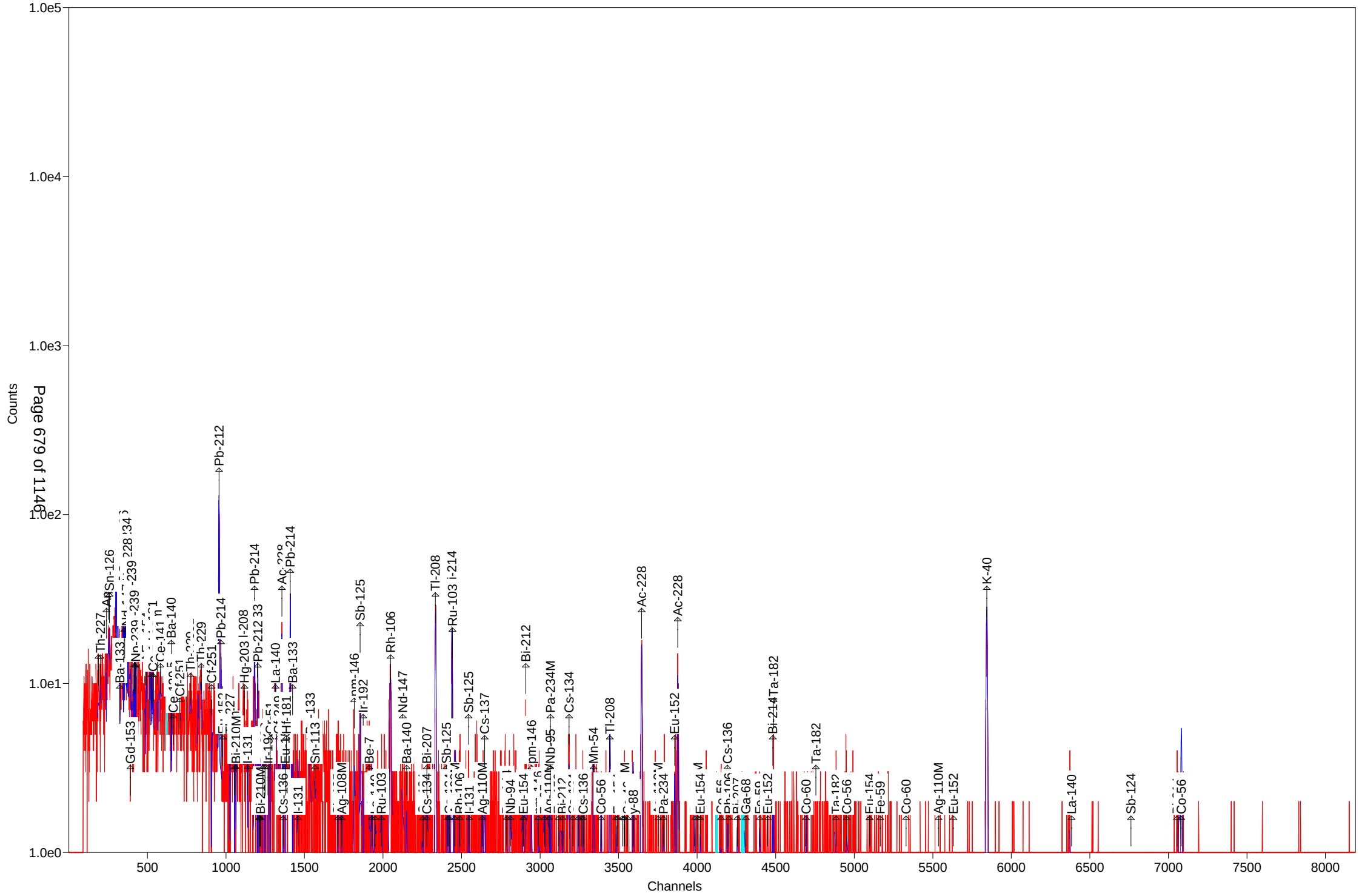
La-140 #A	6.8403E-01	6.8406E-01	2.728E+01%		3.38E+00
CE-141 #A	7.0253E-01	7.0254E-01	1.228E+02%		2.89E+00
CE-144 #A	4.5771E+00	4.5771E+00	5.445E+01%		6.57E+00
PM-144 #A	-5.9028E-02	-5.9028E-02	1.279E+03%		1.88E+00
EU-152 #A	2.5680E+00	2.5680E+00	4.112E+01%		1.03E+01
EU-154 #A	1.3799E+00	1.3799E+00	7.480E+01%		1.68E+01
EU-155 #A	-1.8418E+00	-1.8418E+00	1.517E+02%		9.32E+00
HF-181 #A	7.9637E-01	7.9638E-01	9.654E+01%		1.94E+00
Ta-182 #A	2.9908E+00	2.9908E+00	8.822E+01%		8.89E+00
Hg-203 #A	3.6453E-02	3.6453E-02	1.496E+03%		1.88E+00
TL-208 A	2.5285E+00	2.5285E+00	1.586E+01%		4.05E+00
pm-146 #A	4.3452E-01	4.3452E-01	1.382E+02%		5.52E+00
y-88 #	1.5948E+00	1.5948E+00	3.830E+01%		1.31E+00
Cd-113m#A	-7.8576E+03	-7.8576E+03	9.936E+01%		2.62E+04
Cd-109 #A	-1.0162E+01	-1.0162E+01	1.782E+02%		6.04E+01
Cf-251 #A	8.7885E-01	8.7885E-01	2.561E+02%		6.13E+00
Cf-249 #A	4.9988E-01	4.9988E-01	1.002E+02%		3.28E+00
Sn-126 #A	5.3123E+00	5.3123E+00	1.030E+02%		1.83E+01
PB-210 #A	1.7588E+00	1.7588E+00	8.231E+02%		4.25E+01
PB-212	2.9051E+01	2.9051E+01	5.311E+00%		3.04E+00
PB-214 #	1.2777E+01	1.2777E+01	1.323E+01%		3.32E+00
BI-207 #A	5.2708E-01	5.2708E-01	9.874E+01%		1.69E+00
BI-212 #A	5.3493E-01	5.3493E-01	1.808E+03%		3.40E+01
BI-214	1.5946E+01	1.5946E+01	1.127E+01%		2.86E+00
BI-210M#A	-8.3204E-01	-8.3204E-01	1.198E+02%		3.35E+00
AC-228	2.9627E+01	2.9627E+01	8.652E+00%		3.87E+00
TH-227 #A	2.0712E+00	2.0712E+00	3.356E+02%		2.00E+01
TH-229 #A	4.9378E+00	4.9378E+00	1.872E+02%		2.59E+01
TH-234 #A	5.8623E+00	5.8623E+00	2.295E+02%		4.54E+01
PA-231 #A	-1.6794E+01	-1.6794E+01	1.450E+02%		8.18E+01
PA-233 #A	-1.5163E+00	-1.5163E+00	1.385E+02%		7.04E+00
PA-234 #A	3.0907E+00	3.0907E+00	7.163E+01%		8.63E+00
PA-234M#A	-1.2034E+02	-1.2034E+02	8.816E+01%		3.57E+02
U-235 #A	1.7788E+00	1.7788E+00	1.400E+02%		1.37E+01
AM-241 #A	-1.5351E+00	-1.5351E+00	8.027E+01%		4.60E+00
Np-237 #A	5.2069E+00	5.2069E+00	4.906E+01%		8.33E+00
Ir-192 #A	-3.8260E-01	-3.8261E-01	1.497E+02%		1.94E+00
Cs-136 #A	7.1020E-01	7.1023E-01	5.615E+01%		1.88E+00
Np-239 #A	-1.6860E+00	-1.6863E+00	1.531E+02%		8.62E+00
Nd-147 #A	-3.5830E-01	-3.5831E-01	1.303E+03%		1.20E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 3.473E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 3.4732260E+02 Bq/Sample

264535_Gamma_160-18554-A-11-B. 5_Gamma_20161669.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161870

Sample Description: 264535_Gamma_160-18554-A-12-B
Detector: Detector #12
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-12-B

Decay to Time: 9/1/2016 13:09 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:09:42 Real Time: 1812 sec
Analysis Time: 9/1/2016 13:40 Dead Time: 0.66 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCanCal_90099_100212
Efficiency Cal Date: 10/4/2012 09:05
Energy Cal Date: 2/28/2012 13:26
Library: Client_Long_Rev11.lib
Bkgd Correction File: 12_2016-08-07_1353.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.941E+00	106.3	4.189E+00	4.194E+00	1.411E+01
NA-22	1.242E+00	30.6	3.803E-01	3.854E-01	1.044E+00
K-40	2.259E+02	5.3	1.191E+01	1.660E+01	8.496E+00
Sc-46	-4.485E-01	121.5	5.448E-01	5.453E-01	1.854E+00
CR-51	3.960E+00	155.6	6.161E+00	6.165E+00	2.065E+01
MN-54	4.086E-01	120.2	4.913E-01	4.917E-01	1.156E+00
FE-59	-1.497E+00	56.4	8.438E-01	8.471E-01	3.222E+00
Co-56	1.103E+00	45.2	4.991E-01	5.023E-01	1.469E+00
CO-57	-4.390E-01	79.6	3.496E-01	3.504E-01	1.161E+00
CO-58	4.166E-01	81.9	3.412E-01	3.419E-01	1.150E+00
CO-60	-5.890E-01	142.1	8.370E-01	8.375E-01	1.504E+00
ZN-65	-3.188E-01	543.5	1.733E+00	1.733E+00	5.959E+00
NB-94	3.708E-01	77.8	2.884E-01	2.891E-01	1.197E+00
ZR-95	4.264E-01	193.4	8.247E-01	8.250E-01	1.965E+00
NB-95	-1.078E+00	71.6	7.720E-01	7.740E-01	2.558E+00
RU-103	-6.573E-01	96.1	6.317E-01	6.326E-01	1.490E+00
RH-106	8.199E+00	73.6	6.031E+00	6.046E+00	3.727E+01
AG-108M	2.612E-01	239.0	6.244E-01	6.245E-01	1.118E+00
AG-110M	2.377E-01	93.5	2.223E-01	2.226E-01	2.328E+00
SN-113	-7.816E-01	106.3	8.309E-01	8.319E-01	2.781E+00
SB-124	3.655E-01	279.2	1.020E+00	1.021E+00	3.434E+00
SB-125	7.046E-01	112.5	7.927E-01	7.935E-01	3.869E+00
I-131	-5.707E-02	107.9	6.158E-02	6.165E-02	1.395E+00
Gd-153	8.997E-01	134.0	1.205E+00	1.207E+00	5.006E+00
Ga-68	-1.872E+01	138.0	2.583E+01	2.585E+01	5.650E+01
Tc-99m	0.000E+00	1.#INF	2.231E-01	2.232E-01	2.396E+00
BA-133	-6.821E-01	184.6	1.259E+00	1.260E+00	4.216E+00
CS-134	1.122E+00	28.8	3.234E-01	3.286E-01	3.504E+00
CS-137	1.883E-01	293.6	5.528E-01	5.529E-01	1.911E+00
CE-139	0.000E+00	1.#INF	2.256E-01	2.256E-01	1.570E+00
Ba-140	-1.994E+00	102.9	2.051E+00	2.054E+00	5.495E+00
La-140	5.716E-01	97.6	5.581E-01	5.590E-01	1.638E+00
CE-141	-8.262E-01	161.9	1.338E+00	1.338E+00	4.453E+00

CE-144	-1.153E-01	4765.3	5.495E+00	5.495E+00	1.841E+01
PM-144	-8.054E-01	98.4	7.924E-01	7.935E-01	1.645E+00
EU-152	1.078E+00	88.6	9.552E-01	9.568E-01	8.190E+00
EU-154	6.161E-01	168.0	1.035E+00	1.036E+00	1.068E+01
EU-155	0.000E+00	1.#INF	7.521E-01	7.521E-01	7.306E+00
HF-181	-6.073E-01	104.7	6.358E-01	6.366E-01	2.134E+00
Ta-182	1.225E-01	84.5	1.035E-01	1.036E-01	8.989E+00
Hg-203	-5.369E-01	92.7	4.976E-01	4.985E-01	1.661E+00
TL-208	9.040E+00	8.6	7.814E-01	9.113E-01	1.198E+00
pm-146	1.738E-01	101.8	1.769E-01	1.771E-01	3.931E+00
y-88	-7.126E-01	56.5	4.025E-01	4.042E-01	1.527E+00
Cd-113m	6.079E+03	91.3	5.551E+03	5.565E+03	1.856E+04
Cd-109	1.001E+01	163.8	1.639E+01	1.640E+01	5.460E+01
Cf-251	-1.304E+00	176.0	2.295E+00	2.298E+00	5.882E+00
Cf-249	-2.614E-01	274.7	7.181E-01	7.182E-01	2.443E+00
Sn-126	-5.343E+00	127.3	6.800E+00	6.806E+00	2.264E+01
PB-210	2.441E+01	56.3	1.375E+01	1.383E+01	3.652E+01
PB-212	2.529E+01	4.6	1.158E+00	2.004E+00	2.006E+00
PB-214	2.415E+01	6.7	1.628E+00	2.056E+00	2.690E+00
BI-207	3.756E-01	87.1	3.273E-01	3.279E-01	1.428E+00
BI-212	2.788E+01	20.9	5.820E+00	5.997E+00	1.115E+01
BI-214	2.480E+01	6.3	1.558E+00	2.022E+00	2.056E+00
BI-210M	5.654E-01	116.4	6.584E-01	6.593E-01	2.217E+00
AC-228	2.523E+01	7.1	1.785E+00	2.201E+00	2.921E+00
TH-227	-7.570E+00	120.2	9.098E+00	9.107E+00	3.035E+01
TH-229	7.705E+00	102.4	7.893E+00	7.917E+00	1.970E+01
TH-234	3.967E+01	27.7	1.101E+01	1.120E+01	2.836E+01
PA-231	0.000E+00	1.#INF	6.450E+00	6.450E+00	7.346E+01
PA-233	0.000E+00	1.#INF	3.544E-01	3.544E-01	6.001E+00
PA-234	-4.551E-01	125.9	5.729E-01	5.734E-01	1.152E+01
PA-234M	4.579E+01	111.7	5.113E+01	5.118E+01	2.341E+02
U-235	4.316E+00	104.1	4.495E+00	4.500E+00	1.795E+01
AM-241	1.372E+00	120.3	1.650E+00	1.651E+00	5.502E+00
Np-237	3.090E+00	153.5	4.742E+00	4.745E+00	1.579E+01
Ir-192	5.577E-01	94.7	5.280E-01	5.290E-01	2.384E+00
Cs-136	3.951E-01	108.3	4.280E-01	4.286E-01	1.458E+00
Np-239	-1.521E+00	137.6	2.093E+00	2.095E+00	6.979E+00
Nd-147	-3.860E-01	957.1	3.695E+00	3.695E+00	9.035E+00
Total	6.606E+03				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-12-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161870.An1

Acquisition information
Start time: 9/1/2016 1:09:42 PM
Live time: 1800
Real time: 1812
Dead time: 0.66 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:09:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2016-08-07_1353.PBC 8/7/2016 1:53:38 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1101

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.45	42.	56.34	1.81	2.229E-02	46.54	4.250	PBC<MDA	PB210
59.54	28.	120.27	0.90	3.122E-02	59.54	35.900	PBC<MDA	AM241
63.33	91.	27.74	0.84	3.340E-02	63.29	3.810	3.967E+01	TH234
74.85	271.	10.42	0.92	3.878E-02				
77.12	469.	6.48	0.92	3.963E-02				
86.68	31.	153.46	0.93	4.242E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.318E+00	EU155
					86.94	9.040	4.466E+00	Sn126
88.23	29.	163.80	0.93	4.278E-02	88.04	3.790	PBC<MDA	Cd109
89.76	108.	19.08	0.93	4.317E-02				
93.09	139.	16.82	0.93	4.379E-02	92.59	5.584	2.461E+01	TH234
					93.35	5.561	3.159E+01	AC228
97.50	27.	133.98	0.94	4.443E-02	97.50	30.000	PBC<MDA	Gd153
99.50	27.	136.45	0.94	4.467E-02	99.50	15.000	PBC<MDA	Np239
103.20	11.	353.57	0.94	4.502E-02	103.20	21.800	PBC<MDA	Gd153
123.10	16.	168.04	0.96	4.522E-02	123.10	40.790	PBC<MDA	EU154
128.73	55.	39.12	0.70	4.488E-02				
143.79	26.	179.88	0.98	4.338E-02	143.79	10.960	PBC<MDA	U235
186.06	161.	17.83	0.45	3.795E-02				
193.51	22.	102.44	1.03	3.699E-02	193.51	4.400	PBC<MDA	TH229
205.33	23.	105.02	1.04	3.557E-02	205.33	5.010	PBC<MDA	U235
210.85	15.	195.73	1.05	3.496E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.58	589.	5.64	1.00	3.220E-02	238.63	43.300	2.349E+01	PB212
241.98	145.	14.26	1.07	3.189E-02	242.00	7.430	3.399E+01	PB214
244.69	24.	198.32	1.08	3.166E-02	244.69	7.580	PBC<MDA	EU152
263.70	20.	91.32	1.09	3.010E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	15.	116.45	1.10	2.994E-02	265.83	50.000	PBC<MDA	BI210M
277.34	42.	33.33	1.87	2.910E-02	277.28	6.310	1.257E+01	TL208
295.17	286.	9.76	0.91	2.788E-02	295.09	19.300	2.949E+01	PB214
300.50	38.	42.12	0.52	2.757E-02	300.03	3.280	PBC<MDA	PB212
316.49	15.	201.49	1.14	2.658E-02	316.49	87.040	PBC<MDA	Ir192
320.08	19.	155.58	1.15	2.638E-02	320.08	9.940	PBC<MDA	CR51
328.76	19.	97.64	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
338.22	139.	14.01	1.24	2.539E-02	338.32	12.010	2.527E+01	AC228
351.84	404.	6.74	1.32	2.470E-02	351.93	37.600	2.415E+01	PB214
383.84	14.	143.35	1.20	2.325E-02	383.84	8.940	PBC<MDA	BA133
433.94	4.	382.43	1.25	2.132E-02	433.94	90.480	PBC<MDA	AG108M
463.37	13.	124.38	1.28	2.035E-02	463.37	10.470	PBC<MDA	SB125
468.06	17.	94.67	1.28	2.020E-02	468.06	51.750	PBC<MDA	Ir192
477.60	15.	106.29	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
511.86	42.	75.31	2.57	1.895E-02	511.86	20.000	PBC<MDA	RH106
563.24	2.	979.79	1.36	1.768E-02	563.24	8.350	PBC<MDA	CS134
569.70	4.	346.05	1.37	1.753E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.416E+00	PA234
					569.70	97.740	1.189E-01	BI207
583.21	237.	8.64	1.18	1.724E-02	583.02	84.500	9.040E+00	TL208
600.50	11.	276.23	1.40	1.687E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	279.20	1.40	1.683E-02	602.73	98.260	PBC<MDA	SB124
604.71	11.	282.12	1.40	1.679E-02	604.71	97.620	PBC<MDA	CS134
609.33	339.	6.28	1.19	1.669E-02	609.31	46.090	2.451E+01	BI214
					610.30	5.750	1.967E+02	RU103
614.28	11.	286.84	1.41	1.659E-02	614.28	89.850	PBC<MDA	AG108M
618.06	11.	289.34	1.41	1.652E-02	618.06	99.100	PBC<MDA	PM144
621.92	12.	270.40	1.42	1.644E-02	621.92	9.930	PBC<MDA	RH106
636.97	9.	127.17	1.43	1.616E-02	636.97	7.170	PBC<MDA	I131
657.76	11.	93.53	1.45	1.578E-02	657.76	94.640	PBC<MDA	AG110M
661.66	5.	293.64	1.45	1.571E-02	661.66	85.210	PBC<MDA	CS137
702.63	9.	144.85	1.49	1.503E-02	702.63	97.900	PBC<MDA	NB94
727.17	56.	20.88	1.18	1.465E-02	727.17	7.550	2.788E+01	BI212
735.72	11.	111.03	1.51	1.452E-02	735.72	22.500	PBC<MDA	pm146
756.73	6.	193.41	1.53	1.422E-02	756.73	54.460	PBC<MDA	ZR95
766.41	17.	111.66	1.54	1.409E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
784.38	8.	157.22	1.56	1.383E-02	785.42	1.280	PBC<MDA	BI212
795.87	36.	28.82	1.56	1.369E-02	795.87	85.530	1.685E+00	CS134
801.95	9.	143.47	1.57	1.362E-02	801.95	8.690	PBC<MDA	CS134
810.78	10.	81.90	1.58	1.351E-02	810.78	99.460	PBC<MDA	CO58
815.77	10.	98.33	1.58	1.344E-02	815.77	23.280	PBC<MDA	La140
818.50	10.	108.34	1.58	1.341E-02	818.50	100.000	PBC<MDA	Cs136
834.72	10.	120.23	1.60	1.321E-02	834.85	99.980	PBC<MDA	MN54

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
860.38	39.	25.99	1.52	1.291E-02	860.56	12.420	1.362E+01	TL208
871.10	9.	77.78	1.63	1.279E-02	871.10	99.890	PBC<MDA	NB94
873.23	2.	353.76	1.63	1.277E-02	873.23	12.270	PBC<MDA	EU154
880.53	11.	85.89	1.63	1.269E-02	880.53	6.000	PBC<MDA	PA234
883.24	6.	188.29	1.64	1.266E-02	883.24	9.600	PBC<MDA	PA234
911.26	171.	8.89	1.48	1.237E-02	911.07	29.000	2.649E+01	AC228
964.11	13.	124.74	1.70	1.184E-02	964.11	14.605	PBC<MDA	EU152
969.31	86.	13.24	2.23	1.180E-02	968.97	17.460	2.310E+01	AC228
996.33	2.	556.78	1.73	1.155E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-3.	290.61	1.73	1.151E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	18.	45.25	1.76	1.119E-02	1037.84	14.130	6.322E+00	Co56
1050.36	11.	73.56	1.77	1.109E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	10.	87.14	1.78	1.099E-02	1063.66	74.500	PBC<MDA	BI207
1120.44	73.	14.81	1.52	1.055E-02	1120.29	15.100	2.529E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	11.	84.49	1.91	9.870E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	25.	55.61	1.92	9.765E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	21.	30.62	1.95	9.547E-03	1274.53	99.940	1.242E+00	NA22
					1274.54	35.190	3.528E+00	EU154
1291.60	1.	841.87	1.96	9.448E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	3.	339.41	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1460.97	372.	5.27	2.09	8.576E-03	1460.83	10.670	2.259E+02	K40
1764.59	51.	19.30	2.30	7.376E-03	1764.49	15.400	2.518E+01	BI214
1771.35	8.	147.30	2.30	7.354E-03	1771.35	15.480	PBC<MDA	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.96	74.85	259.	276.	7.118E+03	10.21	0.917	-	D
308.03	77.11	217.	480.	1.212E+04	6.30	0.919	-	D
359.67	89.85	173.	109.	2.524E+03	19.56	0.931	-	D
514.30	128.73	136.	55.	1.226E+03	39.12	0.704	-	s
743.44	186.06	166.	161.	4.245E+03	17.83	0.450	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.43	46.45	163.	42.	0.023	56.34	1.807s
TH-227	200.19	50.14	521.	-27.	-0.015	120.19	0.893s
AM-241	237.74	59.54	540.	28.	0.015	120.27	0.902s
TH-234	252.90	63.33	178.	91.	0.050	27.74	0.839s
Sn-126	256.70	64.28	795.	-32.	-0.018	127.26	0.906
BA-133	323.48	80.99	1695.	-36.	-0.020	78.87	0.922s
Np-237	345.47	86.49	1109.	31.	0.017	153.46	0.928s
EU-155	345.68	86.54	1217.	-33.	-0.019	148.97	0.928s
Sn-126	347.27	86.94	1183.	-24.	-0.013	201.41	0.928
Sn-126	349.78	87.57	1159.	0.	0.000	1000.00	0.929
Cd-109	351.66	88.04	1130.	29.	0.016	163.80	0.929s
Nd-147	363.89	91.10	1159.	0.	0.000	1000.00	0.932s
TH-234	369.85	92.59	251.	85.	0.047	28.56	0.934D
AC-228	372.88	93.35	1075.	33.	0.019	139.85	0.934s
Gd-153	389.47	97.50	635.	27.	0.015	133.98	0.938s
Np-239	397.47	99.50	662.	27.	0.015	136.45	0.940s
Gd-153	412.25	103.20	688.	11.	0.006	353.57	0.944s
Np-239	414.25	103.70	699.	0.	0.000	1000.00	0.944s
EU-155	420.70	105.31	699.	0.	0.000	1000.00	0.946s
Np-239	423.96	106.13	734.	-28.	-0.016	137.65	0.946s
CO-57	487.64	122.06	282.	-31.	-0.017	79.64	0.962s
EU-154	491.79	123.10	337.	16.	0.009	168.04	0.963s
PA-234	524.55	131.29	1240.	-30.	-0.017	167.19	0.970s
HF-181	531.46	133.02	1210.	-30.	-0.017	164.94	0.972
HF-181	544.55	136.30	1191.	0.	0.000	1000.00	0.975s
CO-57	545.24	136.47	1191.	0.	0.000	1000.00	0.975s
Tc-99m	561.38	140.51	1191.	0.	0.000	1000.00	0.979s
U-235	574.47	143.79	1049.	26.	0.014	179.88	0.982s
CE-141	581.09	145.44	1240.	-31.	-0.017	161.92	0.984s
Ba-140	649.91	162.66	356.	-14.	-0.008	194.71	1.000s
CE-139	662.68	165.85	370.	0.	0.000	1000.00	1.003s
Cf-251	705.64	176.60	213.	-16.	-0.009	175.97	1.013s
TH-229	773.22	193.51	139.	22.	0.012	102.44	1.029
U-235	820.49	205.33	162.	23.	0.013	105.02	1.040s
TH-229	842.54	210.85	242.	15.	0.008	195.73	1.046s
Cf-251	907.10	227.00	139.	-4.	-0.002	511.87	1.061s
PB-212	953.60	238.63	104.	635.	0.353	4.58	1.071D
PB-214	967.05	242.00	141.	145.	0.081	14.26	1.075D
EU-152	977.83	244.69	1117.	24.	0.013	198.32	1.077s
Cd-113m	1053.81	263.70	153.	20.	0.011	91.32	1.095s
BI-210M	1062.33	265.83	150.	15.	0.008	116.45	1.097s
TL-208	1108.36	277.34	45.	42.	0.023	33.33	1.874s
Hg-203	1115.78	279.20	212.	-23.	-0.013	92.68	1.109s
PB-214	1179.62	295.17	101.	286.	0.159	9.76	0.908s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	1200.91	300.50	63.	38.	0.021	42.12	0.516s
PA-231	1199.21	300.07	494.	-18.	-0.010	181.11	1.128s
PA-233	1199.65	300.18	476.	0.	0.000	1000.00	1.128s
PA-231	1209.52	302.65	476.	0.	0.000	1000.00	1.131s
BA-133	1210.33	302.85	476.	0.	0.000	1000.00	1.131s
Ba-140	1218.32	304.85	476.	0.	0.000	1000.00	1.133s
BI-210M	1218.50	304.90	476.	0.	0.000	1000.00	1.133s
Ir-192	1232.67	308.44	476.	0.	0.000	1000.00	1.136s
PA-233	1246.95	312.01	476.	0.	0.000	1000.00	1.139s
Ir-192	1264.85	316.49	429.	15.	0.008	201.49	1.143s
CR-51	1279.22	320.08	413.	19.	0.010	155.58	1.147s
La-140	1313.91	328.76	157.	19.	0.010	97.64	1.155s
AC-228	1351.74	338.22	62.	139.	0.077	14.01	1.238s
Cs-136	1361.13	340.57	441.	-23.	-0.013	129.35	1.165s
EU-152	1375.98	344.29	418.	-23.	-0.013	125.62	1.169s
HF-181	1382.15	345.83	395.	-21.	-0.011	138.34	1.170
PB-214	1406.20	351.84	82.	404.	0.224	6.74	1.317
BA-133	1422.81	356.00	585.	-19.	-0.010	184.65	1.180s
I-131	1456.73	364.48	101.	-16.	-0.009	174.33	1.187s
BA-133	1534.13	383.84	180.	14.	0.007	143.35	1.205s
Cf-249	1550.56	387.95	190.	-7.	-0.004	274.68	1.209s
SN-113	1565.51	391.69	230.	-21.	-0.011	106.31	1.212s
SB-125	1710.19	427.88	80.	-12.	-0.007	148.76	1.245s
AG-108M	1734.43	433.94	60.	4.	0.002	382.43	1.250s
pm-146	1814.18	453.88	72.	-6.	-0.003	450.69	1.268s
SB-125	1852.11	463.37	128.	13.	0.007	124.38	1.277s
Ir-192	1870.88	468.06	121.	17.	0.009	94.67	1.281s
BE-7	1909.00	477.60	117.	15.	0.008	106.29	1.289s
HF-181	1926.61	482.00	157.	-17.	-0.010	104.69	1.293s
La-140	1946.69	487.02	158.	-4.	-0.002	401.43	1.298s
RU-103	1986.82	497.05	91.	-21.	-0.012	96.10	1.307s
RH-106	2046.04	511.86	147.	42.	0.023	75.31	2.570s
Nd-147	2122.56	531.00	61.	-2.	-0.001	957.08	1.337s
Ba-140	2147.60	537.26	79.	-16.	-0.009	102.89	1.342s
CS-134	2251.48	563.24	78.	2.	0.001	979.79	1.365s
CS-134	2275.81	569.32	74.	-7.	-0.004	186.15	1.370s
PA-234	2276.41	569.47	80.	0.	0.000	1000.00	1.370s
BI-207	2277.34	569.70	79.	4.	0.002	346.05	1.371s
TL-208	2331.37	583.21	38.	237.	0.132	8.64	1.182
SB-125	2400.51	600.50	445.	11.	0.006	276.23	1.398s
SB-124	2409.43	602.73	456.	11.	0.006	279.20	1.399s
CS-134	2417.34	604.71	467.	11.	0.006	282.12	1.401s
BI-214	2435.81	609.33	31.	339.	0.189	6.28	1.193
RU-103	2439.69	610.30	477.	11.	0.006	284.35	1.406s
AG-108M	2455.62	614.28	488.	11.	0.006	286.84	1.410s
PM-144	2470.74	618.06	499.	11.	0.006	289.34	1.413s
RH-106	2486.16	621.92	525.	12.	0.007	270.40	1.416s
SB-125	2542.05	635.89	62.	-11.	-0.006	105.63	1.428s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2546.39	636.97	61.	9.	0.005	127.17	1.429s
AG-110M	2629.52	657.76	50.	11.	0.006	93.53	1.447s
CS-137	2645.12	661.66	86.	5.	0.003	293.64	1.451s
PM-144	2784.64	696.54	80.	-22.	-0.012	98.39	1.481s
NB-94	2808.99	702.63	39.	9.	0.005	144.85	1.486s
SB-124	2889.61	722.79	123.	-5.	-0.003	316.86	1.503s
AG-108M	2890.22	722.94	118.	0.	0.000	1000.00	1.503s
EU-154	2891.89	723.36	118.	0.	0.000	1000.00	1.503s
ZR-95	2895.26	724.20	126.	-15.	-0.008	111.20	1.504s
BI-212	2907.13	727.17	18.	56.	0.031	20.88	1.182
pm-146	2941.34	735.72	33.	11.	0.006	111.03	1.514s
pm-146	2987.11	747.16	47.	-9.	-0.005	170.62	1.524s
ZR-95	3025.38	756.73	28.	6.	0.003	193.41	1.532s
AG-110M	3054.24	763.94	91.	-22.	-0.012	53.18	1.538s
NB-95	3061.63	765.79	177.	-27.	-0.015	71.63	1.539s
PA-234M	3064.12	766.41	169.	17.	0.009	111.66	1.540s
EU-152	3114.15	778.92	51.	-14.	-0.008	109.28	1.550s
BI-212	3140.15	785.42	38.	8.	0.005	157.22	1.556s
CS-134	3181.95	795.87	35.	36.	0.020	28.82	1.565s
CS-134	3206.28	801.95	88.	9.	0.005	143.47	1.570s
CO-58	3241.58	810.78	29.	10.	0.006	81.90	1.577s
La-140	3261.56	815.77	39.	10.	0.005	98.33	1.581s
Cs-136	3272.49	818.50	49.	10.	0.005	108.34	1.583s
MN-54	3337.89	834.85	28.	10.	0.005	120.23	1.597s
Co-56	3385.58	846.77	47.	-8.	-0.004	192.44	1.607s
TL-208	3440.01	860.38	13.	39.	0.022	25.99	1.522
NB-94	3482.90	871.10	20.	9.	0.005	77.78	1.627s
EU-154	3491.44	873.23	35.	2.	0.001	353.76	1.629s
PA-234	3520.64	880.53	42.	11.	0.006	85.89	1.635s
PA-234	3531.48	883.24	53.	6.	0.003	188.29	1.637s
AG-110M	3537.26	884.68	59.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	71.	-10.	-0.006	121.47	1.642s
y-88	3590.70	898.04	40.	-15.	-0.008	56.48	1.649s
AC-228	3643.58	911.26	12.	171.	0.095	8.89	1.482
AG-110M	3748.54	937.49	70.	-22.	-0.012	38.74	1.682s
PA-234	3782.66	946.02	50.	-19.	-0.010	86.88	1.688s
EU-152	3855.05	964.11	130.	13.	0.007	124.74	1.703s
AC-228	3875.84	969.31	8.	86.	0.048	13.24	2.231s
EU-154	3983.96	996.33	61.	2.	0.001	556.78	1.729s
PA-234M	4002.64	1001.00	66.	-3.	-0.002	290.61	1.733s
EU-154	4017.76	1004.77	151.	-23.	-0.013	79.84	1.736
Co-56	4150.07	1037.84	10.	18.	0.010	45.25	1.762s
Cs-136	4191.00	1048.07	50.	-6.	-0.003	171.59	1.771s
RH-106	4200.17	1050.36	26.	11.	0.006	73.56	1.772s
BI-207	4253.39	1063.66	15.	10.	0.006	87.14	1.783s
Ga-68	4308.37	1077.40	37.	-10.	-0.006	137.96	1.794s
FE-59	4395.81	1099.25	48.	-16.	-0.009	56.36	1.811s
EU-152	4447.13	1112.07	155.	-17.	-0.009	107.81	1.821s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.03	1115.55	138.	-3.	-0.002	543.49	1.824s
BI-214	4480.61	1120.44	11.	73.	0.040	14.81	1.523
Sc-46	4481.05	1120.55	135.	0.	0.000	1000.00	1.828
Ta-182	4484.05	1121.30	149.	-11.	-0.006	162.13	1.828
CO-60	4691.91	1173.24	32.	-6.	-0.003	173.23	1.869s
Ta-182	4755.20	1189.05	37.	-4.	-0.002	324.08	1.881
Ta-182	4884.72	1221.41	16.	11.	0.006	84.49	1.906
Co-56	4952.24	1238.28	33.	25.	0.014	55.61	1.919s
NA-22	5097.34	1274.53	11.	21.	0.012	30.62	1.946s
EU-154	5097.39	1274.54	32.	0.	0.000	1000.00	1.946s
FE-59	5165.65	1291.60	23.	1.	0.001	841.87	1.959s
CO-60	5329.39	1332.50	23.	-10.	-0.005	142.09	1.990s
AG-110M	5536.74	1384.30	23.	-5.	-0.003	243.70	2.029s
EU-152	5631.64	1408.00	23.	3.	0.002	339.41	2.046
K-40	5843.69	1460.97	6.	372.	0.207	5.27	2.088
La-140	6385.21	1596.21	18.	0.	0.000	1000.00	2.182s
SB-124	6764.73	1690.98	12.	0.	0.000	1000.00	2.247s
BI-214	7059.14	1764.49	24.	51.	0.029	19.30	2.297s
Co-56	7086.61	1771.35	66.	8.	0.004	147.30	2.302s
y-88	7345.80	1836.06	13.	-3.	-0.001	337.04	2.345s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.9412E+00				5.31E+01	
			477.60	3.941E+00	?(	1.411E+01 1.06E+02 1.05E+01	G
NA-22	C	1.2422E+00				9.50E+02	
			1274.53	1.242E+00	?(	1.044E+00 3.06E+01 9.99E+01	G
K-40	N	2.2594E+02				4.66E+11	
			1460.83	2.259E+02	(P	8.496E+00 5.27E+00 1.07E+01	G
Sc-46	F	-4.4850E-01				8.38E+01	
			889.28	-4.485E-01	(	1.854E+00 1.21E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.994E+00 1.00E+03 1.00E+02	G
CR-51	F	3.9603E+00				2.77E+01	
			320.08	3.960E+00	?(	2.065E+01 1.56E+02 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 4.0860E-01					3.12E+02	
		834.85	4.086E-01	?(P	1.156E+00	1.20E+02	1.00E+02 G
FE-59	F -1.4971E+00					4.45E+01	
		1099.25	-1.497E+00	?(P	3.222E+00	5.64E+01	5.65E+01 G
		1291.60	1.815E-01	+	3.389E+00	8.42E+02	4.32E+01 G
Co-56	C 1.1030E+00					7.73E+01	
		846.77	-3.261E-01	&(	1.469E+00	1.92E+02	9.99E+01 G
		1238.28	2.148E+00	(P	2.540E+00	5.56E+01	6.61E+01 G
		1037.84	6.322E+00	?(	6.127E+00	4.52E+01	1.41E+01 G
		1771.35	3.911E+00	?	1.975E+01	1.47E+02	1.55E+01 A
CO-57	C -4.3903E-01					2.72E+02	
		122.06	-4.390E-01	?(	1.161E+00	7.96E+01	8.56E+01 G
		136.47	0.000E+00	+	1.925E+01	1.00E+03	1.07E+01 G
CO-58	C 4.1665E-01					7.09E+01	
		810.78	4.166E-01	?(	1.150E+00	8.19E+01	9.95E+01 G
CO-60	F -5.8904E-01					1.93E+03	
		1332.50	-5.890E-01	?(P	1.504E+00	1.42E+02	1.00E+02 G
		1173.24	-3.398E-01	+ P	1.593E+00	1.73E+02	9.99E+01 G
ZN-65	F -3.1879E-01					2.44E+02	
		1115.55	-3.188E-01	?(	5.959E+00	5.43E+02	5.06E+01 G
NB-94	I 3.7082E-01					7.41E+06	
		702.63	3.500E-01	?(P	1.197E+00	1.45E+02	9.79E+01 G
		871.10	3.912E-01	&(	1.024E+00	7.78E+01	9.99E+01 G
ZR-95	I 4.2638E-01					6.40E+01	
		756.73	4.264E-01	?(P	1.965E+00	1.93E+02	5.45E+01 G
		724.20	-1.256E+00	+	4.705E+00	1.11E+02	4.42E+01 G
NB-95	I -1.0778E+00					6.40E+01	
		765.79	-1.078E+00	?(	2.558E+00	7.16E+01	9.98E+01 G
RU-103	I -6.5729E-01					3.93E+01	
		497.05	-6.573E-01	*(	1.490E+00	9.61E+01	9.09E+01 G
		610.30	6.334E+00	?	6.058E+01	2.84E+02	5.75E+00 GA
RH-106	I 8.1993E+00					3.74E+02	
		621.92	4.102E+00	&(	3.727E+01	2.70E+02	9.93E+00 G
		1050.36	3.428E+01	?(	8.425E+01	7.36E+01	1.56E+00 G
		511.86	6.142E+00	?	8.672E+00	7.53E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	2.6122E-01					1.53E+05	
			433.94	1.152E-01	?(	1.118E+00	3.82E+02	9.05E+01 G
			722.94	0.000E+00	-	2.217E+00	1.00E+03	9.08E+01 G
			614.28	4.083E-01	&(	3.938E+00	2.87E+02	8.98E+01 G
AG-110M	F	2.3769E-01					2.50E+02	
			884.68	0.000E+00	?(	2.328E+00	1.00E+03	7.27E+01 G
			657.76	4.202E-01	?(	1.329E+00	9.35E+01	9.46E+01 G
			937.49	-2.937E+00	+ P	5.576E+00	3.87E+01	3.44E+01 G
			1384.30	-1.193E+00	+	6.364E+00	2.44E+02	2.43E+01 G
			763.94	-3.831E+00	+ P	8.327E+00	5.32E+01	2.23E+01 G
SN-113	F	-7.8158E-01					1.15E+02	
			391.69	-7.816E-01	?(	2.781E+00	1.06E+02	6.40E+01 G
SB-124	F	3.6549E-01					6.02E+01	
			602.73	3.655E-01	?(	3.434E+00	2.79E+02	9.83E+01 G
			1690.98	0.000E+00	-	2.871E+00	1.00E+03	4.78E+01 G
			722.79	-1.746E+00	+	1.899E+01	3.17E+02	1.08E+01 G
SB-125	I	7.0462E-01					1.01E+03	
			427.88	-1.046E+00	?(	3.869E+00	1.49E+02	2.96E+01 G
			600.50	2.003E+00	?(	1.862E+01	2.76E+02	1.79E+01 G
			635.89	-3.340E+00	+	1.196E+01	1.06E+02	1.13E+01 G
			463.37	3.439E+00	(P	1.445E+01	1.24E+02	1.05E+01 G
I-131	I	-5.7071E-02					8.02E+00	
			364.48	-4.409E-01	?(P	1.395E+00	1.74E+02	8.17E+01 G
			284.30	-2.537E-02	% P	1.560E+01	2.33E+04	6.14E+00 G
			636.97	4.316E+00	?(	1.875E+01	1.27E+02	7.17E+00 G
Gd-153	F	8.9967E-01					2.42E+02	
			97.50	1.120E+00	?(	5.006E+00	1.34E+02	3.00E+01 G
			103.20	5.964E-01	?(	7.076E+00	3.54E+02	2.18E+01 G
Ga-68	C	-1.8722E+01					4.71E-02	
			1077.40	-1.872E+01	&(	5.650E+01	1.38E+02	3.30E+00 G
BA-133	F	-6.8208E-01					3.85E+03	
			356.00	-6.821E-01	&(	4.216E+00	1.85E+02	6.20E+01 G
			302.85	0.000E+00	&	1.155E+01	1.00E+03	1.83E+01 G
			383.84	3.609E+00	?	1.746E+01	1.43E+02	8.94E+00 GA
			80.99	-1.428E+00	+ P	7.757E+00	7.89E+01	3.41E+01 GA
CS-134	I	1.1220E+00					7.54E+02	
			604.71	3.692E-01	?(	3.504E+00	2.82E+02	9.76E+01 G
			795.87	1.685E+00	&(	1.430E+00	2.88E+01	8.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			569.32	-1.373E+00	+	8.794E+00	1.86E+02	1.54E+01 G
			801.95	4.445E+00	?(	2.174E+01	1.43E+02	8.69E+00 G
			563.24	6.949E-01	&(P	1.652E+01	9.80E+02	8.35E+00 G
CS-137	I	1.8826E-01					1.10E+04	
			661.66	1.883E-01	?(	1.911E+00	2.94E+02	8.52E+01 G
Ba-140	I	-1.9939E+00					1.28E+01	
			537.26	-1.994E+00	?(P	5.495E+00	1.03E+02	2.44E+01 G
			162.66	-3.034E+00	+	1.987E+01	1.95E+02	6.22E+00 G
			304.85	0.000E+00	+	4.956E+01	1.00E+03	4.29E+00 G
La-140	I	5.7164E-01					1.28E+01	
			1596.21	0.000E+00	?(	1.638E+00	1.00E+03	9.54E+01 G
			487.02	-2.769E-01	+	3.806E+00	4.01E+02	4.55E+01 G
			328.76	1.975E+00	?(P	6.457E+00	9.76E+01	2.03E+01 G
			815.77	1.691E+00	?(	5.652E+00	9.83E+01	2.33E+01 G
CE-141	I	-8.2620E-01					3.25E+01	
			145.44	-8.262E-01	?(	4.453E+00	1.62E+02	4.82E+01 G
CE-144	I	-1.1532E-01					2.85E+02	
			133.54	-1.153E-01	%(	1.841E+01	4.77E+03	1.11E+01 G
PM-144	C	-8.0542E-01					3.63E+02	
			696.54	-8.054E-01	&(P	1.645E+00	9.84E+01	9.90E+01 G
			618.06	3.727E-01	+	3.626E+00	2.89E+02	9.91E+01 G
EU-152	F	1.0779E+00					4.94E+03	
			344.29	-1.950E+00	?(	8.190E+00	1.26E+02	2.65E+01 G
			1112.07	-6.429E+00	+	2.328E+01	1.08E+02	1.36E+01 G
			121.78	8.587E-02	&	3.912E+00	1.34E+03	2.86E+01 G
			778.92	-4.422E+00	+	1.114E+01	1.09E+02	1.29E+01 G
			964.11	4.253E+00	?(	1.792E+01	1.25E+02	1.46E+01 G
			244.69	5.547E+00	&(	3.669E+01	1.98E+02	7.58E+00 G
			1408.00	9.986E-01	&	7.458E+00	3.39E+02	2.10E+01 GA
EU-154	I	6.1614E-01					3.14E+03	
			873.23	8.487E-01	?(P	1.068E+01	3.54E+02	1.23E+01 G
			123.10	4.705E-01	?(	2.657E+00	1.68E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.807E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	9.963E+00	1.00E+03	2.02E+01 G
			1004.77	-6.072E+00	+	1.614E+01	7.98E+01	1.80E+01 G
			996.33	9.075E-01	?(	1.774E+01	5.57E+02	1.06E+01 G
HF-181	F	-6.0731E-01					4.24E+01	
			482.00	-6.073E-01	?(	2.134E+00	1.05E+02	8.05E+01 G
			133.02	-8.647E-01	+	4.749E+00	1.65E+02	4.33E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          345.83-3.033E+00 +   1.405E+01 1.38E+02 1.51E+01 G
                          136.30 0.000E+00 +   3.512E+01 1.00E+03 5.85E+00 G

Ta-182   F   1.2246E-01                                     1.14E+02
                         1121.30-1.635E+00  (  8.989E+00 1.62E+02 3.49E+01 G
                         1221.41 2.394E+00  (  4.451E+00 8.45E+01 2.70E+01 G
                         1189.05-1.475E+00 +   1.061E+01 3.24E+02 1.62E+01 G

Hg-203   F  -5.3689E-01                                     4.66E+01
                          279.20-5.369E-01 ?(  1.661E+00 9.27E+01 8.15E+01 G

TL-208   N   9.0403E+00                                     6.98E+02
                          583.02 9.040E+00  (P 1.198E+00 8.64E+00 8.45E+01 G
                          277.28 1.257E+01 + P 1.033E+01 3.33E+01 6.31E+00 G
                          860.56 1.362E+01 + P 6.688E+00 2.60E+01 1.24E+01 G

pm-146   C   1.7376E-01                                     2.02E+03
                          747.16-9.863E-01 ?(  3.931E+00 1.71E+02 3.40E+01 G
                          735.72 1.927E+00 ?(  4.989E+00 1.11E+02 2.25E+01 G
                          453.88-2.503E-01 + P 1.749E+00 4.51E+02 6.50E+01 G

y-88     F  -7.1263E-01                                     1.07E+02
                          898.04-7.126E-01 ?(P 1.527E+00 5.65E+01 9.37E+01 G
                         1836.06-2.090E-01 +   1.513E+00 3.37E+02 9.92E+01 G

Cd-113m      6.0791E+03                                     5.33E+03
                          263.70 6.079E+03  (  1.856E+04 9.13E+01 6.00E-03   K

Cd-109   F   1.0008E+01                                     4.53E+02
                           88.04 1.001E+01 ?(  5.460E+01 1.64E+02 3.79E+00 G

Cf-251   T  -1.3041E+00                                     3.28E+05
                          176.60-1.304E+00 &(  5.882E+00 1.76E+02 1.70E+01 G
                          227.00-1.148E+00 +   1.529E+01 5.12E+02 6.30E+00 GA

Cf-249   T  -2.6144E-01                                     1.28E+05
                          387.95-2.614E-01 ?(  2.443E+00 2.75E+02 6.60E+01 G
                          333.44 2.808E-01 %   9.721E+00 1.01E+03 1.55E+01 G

Sn-126      -5.3432E+00                                     3.65E+07
                           87.57 0.000E+00 +   5.602E+00 1.00E+03 3.75E+01 GA
                           64.28-5.343E+00  (  2.264E+01 1.27E+02 9.70E+00 G
                           86.94-3.508E+00 +   2.356E+01 2.01E+02 9.04E+00 GA

PB-210   N   2.4414E+01                                     8.14E+03
                           46.54 2.441E+01 *(P 3.652E+01 5.63E+01 4.25E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.5287E+01					6.98E+02	
			238.63	2.529E+01	(P	2.006E+00	4.58E+00	4.33E+01 G
			300.03	2.342E+01	P	2.436E+01	4.21E+01	3.28E+00 GA
PB-214	N	2.4154E+01					5.84E+05	
			351.93	2.415E+01	(P	2.690E+00	6.74E+00	3.76E+01 G
			295.09	2.949E+01	+ P	5.120E+00	9.76E+00	1.93E+01 G
			242.00	3.399E+01	+ P	1.361E+01	1.43E+01	7.43E+00 GA
BI-207	C	3.7557E-01					1.18E+04	
			569.70	1.189E-01	?(	1.428E+00	3.46E+02	9.77E+01 G
			1063.66	7.123E-01	?(P	1.419E+00	8.71E+01	7.45E+01 G
BI-212	N	2.7876E+01					6.98E+02	
			727.17	2.788E+01	(	1.115E+01	2.09E+01	7.55E+00 G
			785.42	2.655E+01	& P	9.810E+01	1.57E+02	1.28E+00 GA
BI-214	N	2.4799E+01					5.84E+05	
			609.31	2.451E+01	(P	2.056E+00	6.28E+00	4.61E+01 G
			1120.29	2.529E+01	(P	6.439E+00	1.48E+01	1.51E+01 G
			1764.49	2.518E+01	?(P	1.238E+01	1.93E+01	1.54E+01 G
BI-210M	T	5.6541E-01					1.10E+09	
			265.83	5.654E-01	?(	2.217E+00	1.16E+02	5.00E+01 G
			304.90	0.000E+00	-	7.594E+00	1.00E+03	2.80E+01 G
AC-228	N	2.5227E+01					2.10E+03	
			911.07	2.649E+01	(	2.921E+00	8.89E+00	2.90E+01 G
			968.97	2.310E+01	(	4.358E+00	1.32E+01	1.75E+01 G
			338.32	2.527E+01	@(	7.198E+00	1.40E+01	1.20E+01 G
			93.35	7.618E+00	-	3.545E+01	1.40E+02	5.56E+00 XA
TH-227	N	-7.5695E+00					7.95E+03	
			50.14	-7.570E+00	?(	3.035E+01	1.20E+02	8.00E+00 G
			256.24	1.724E-01	%	1.375E+01	3.04E+03	7.00E+00 G
TH-229	N	7.7054E+00					2.68E+06	
			193.51	7.524E+00	&(	1.970E+01	1.02E+02	4.40E+00 G
			210.85	7.973E+00	?(	3.997E+01	1.96E+02	2.99E+00 G
TH-234	N	3.9674E+01					1.63E+12	
			63.29	3.967E+01	*(P	2.836E+01	2.77E+01	3.81E+00 G
			92.59	1.939E+01	- P	1.743E+01	2.86E+01	5.58E+00 G
PA-234	N	-4.5505E-01					1.63E+12	
			131.29	-2.070E+00	?(	1.152E+01	1.67E+02	1.80E+01 G
			946.02	-6.406E+00	+	1.230E+01	8.69E+01	1.34E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47 0.000E+00 +   1.718E+01 1.00E+03 8.20E+00 G
                          883.24 2.573E+00 ?(  1.680E+01 1.88E+02 9.60E+00 G
                          880.53 8.296E+00 ?   2.401E+01 8.59E+01 6.00E+00 GA

PA-234M  N   4.5794E+01                                      1.63E+12
                         1001.00-1.773E+01 ?(P 2.341E+02 2.91E+02 8.37E-01 G
                          766.41 2.267E+02 ?(P 8.501E+02 1.12E+02 2.94E-01 G

U-235    N   4.3162E+00                                      2.57E+11
                          143.79 2.994E+00  (P 1.795E+01 1.80E+02 1.10E+01 G
                          205.33 7.209E+00 *(P 1.934E+01 1.05E+02 5.01E+00 G
                          163.38-1.947E-01 % P 2.488E+01 6.38E+03 5.08E+00 G

AM-241   T   1.3716E+00                                      1.58E+05
                           59.54 1.372E+00 *(  5.502E+00 1.20E+02 3.59E+01 G

Np-237   F   3.0898E+00                                      2.14E+06
                           86.49 3.090E+00 &(  1.579E+01 1.53E+02 1.31E+01 G

Ir-192   F   5.5771E-01                                      7.40E+01
                          316.49 3.522E-01 ?(  2.384E+00 2.01E+02 8.70E+01 G
                          468.06 9.034E-01 ?(  2.868E+00 9.47E+01 5.18E+01 G
                          308.44 0.000E+00 -   6.751E+00 1.00E+03 3.18E+01 G

Cs-136   F   3.9507E-01                                      1.30E+01
                          818.50 3.951E-01 ?(  1.458E+00 1.08E+02 1.00E+02 G
                         1048.07-3.750E-01 +   2.229E+00 1.72E+02 8.00E+01 G
                          340.57-1.091E+00 &   4.716E+00 1.29E+02 4.69E+01 G

Np-239   T  -1.5208E+00                                      2.36E+00
                          103.70 0.000E+00 +   6.470E+00 1.00E+03 2.40E+01 X
                          106.13-1.521E+00 &(  6.979E+00 1.38E+02 2.27E+01 G
                           99.50 2.233E+00 &   1.016E+01 1.36E+02 1.50E+01 X

Nd-147      -3.8604E-01                                      1.11E+01
                          531.00-3.860E-01 &(  9.035E+00 9.57E+02 1.30E+01 G
                           91.10 0.000E+00 +   7.297E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
```

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	521.	-27.	-0.015	120.19	-7.570E+00	
AM-241	59.54	540.	28.	0.015	120.27	1.372E+00	
Sn-126	64.28	795.	-32.	-0.018	127.26	-5.343E+00	
BA-133	80.99	1695.	-36.	-0.020	78.87	-1.428E+00	P
EU-155	86.54	1217.	-33.	-0.019	148.97	-1.422E+00	
Sn-126	86.94	1183.	-24.	-0.013	201.41	-3.508E+00	
Gd-153	97.50	635.	27.	0.015	133.98	1.120E+00	
Np-239	99.50	662.	27.	0.015	136.45	2.233E+00	
Gd-153	103.20	688.	11.	0.006	353.57	5.964E-01	
Np-239	106.13	734.	-28.	-0.016	137.65	-1.521E+00	
CO-57	122.06	282.	-31.	-0.017	79.64	-4.390E-01	
EU-154	123.10	337.	16.	0.009	168.04	4.705E-01	
PA-234	131.29	1240.	-30.	-0.017	167.19	-2.070E+00	
HF-181	133.02	1210.	-30.	-0.017	164.94	-8.647E-01	
U-235	143.79	1049.	26.	0.014	179.88	2.994E+00	P
CE-141	145.44	1240.	-31.	-0.017	161.92	-8.262E-01	
Ba-140	162.66	356.	-14.	-0.008	194.71	-3.034E+00	
Cf-251	176.60	213.	-16.	-0.009	175.97	-1.304E+00	
TH-229	193.51	139.	22.	0.012	102.44	7.524E+00	
U-235	205.33	162.	23.	0.013	105.02	7.209E+00	P
TH-229	210.85	242.	15.	0.008	195.73	7.973E+00	
Cf-251	227.00	139.	-4.	-0.002	511.87	-1.148E+00	
EU-152	244.69	1117.	24.	0.013	198.32	5.547E+00	
Cd-113m	263.70	153.	20.	0.011	91.32	6.079E+03	
BI-210M	265.83	150.	15.	0.008	116.45	5.654E-01	
Hg-203	279.20	212.	-23.	-0.013	92.68	-5.369E-01	
PA-231	300.07	494.	-18.	-0.010	181.11	-1.433E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	316.49	429.	15.	0.008	201.49	3.522E-01	
CR-51	320.08	413.	19.	0.010	155.58	3.960E+00	
La-140	328.76	157.	19.	0.010	97.64	1.975E+00	P
Cs-136	340.57	441.	-23.	-0.013	129.35	-1.091E+00	
EU-152	344.29	418.	-23.	-0.013	125.62	-1.950E+00	
HF-181	345.83	395.	-21.	-0.011	138.34	-3.033E+00	
BA-133	356.00	585.	-19.	-0.010	184.65	-6.821E-01	
I-131	364.48	101.	-16.	-0.009	174.33	-4.409E-01	P
BA-133	383.84	180.	14.	0.007	143.35	3.609E+00	
Cf-249	387.95	190.	-7.	-0.004	274.68	-2.614E-01	
SN-113	391.69	230.	-21.	-0.011	106.31	-7.816E-01	
SB-125	427.88	80.	-12.	-0.007	148.76	-1.046E+00	
AG-108M	433.94	60.	4.	0.002	382.43	1.152E-01	
pm-146	453.88	72.	-6.	-0.003	450.69	-2.503E-01	P
SB-125	463.37	128.	13.	0.007	124.38	3.439E+00	P
Ir-192	468.06	121.	17.	0.009	94.67	9.034E-01	
BE-7	477.60	117.	15.	0.008	106.29	3.941E+00	
HF-181	482.00	157.	-17.	-0.010	104.69	-6.073E-01	
La-140	487.02	158.	-4.	-0.002	401.43	-2.769E-01	
RU-103	497.05	91.	-21.	-0.012	96.10	-6.573E-01	
RH-106	511.86	147.	42.	0.023	75.31	6.142E+00	
Nd-147	531.00	61.	-2.	-0.001	957.08	-3.860E-01	
Ba-140	537.26	79.	-16.	-0.009	102.89	-1.994E+00	P
CS-134	563.24	78.	2.	0.001	979.79	6.949E-01	P
CS-134	569.32	74.	-7.	-0.004	186.15	-1.373E+00	
BI-207	569.70	79.	4.	0.002	346.05	1.189E-01	
SB-125	600.50	445.	11.	0.006	276.23	2.003E+00	
SB-124	602.73	456.	11.	0.006	279.20	3.655E-01	
CS-134	604.71	467.	11.	0.006	282.12	3.692E-01	
RU-103	610.30	477.	11.	0.006	284.35	6.334E+00	
AG-108M	614.28	488.	11.	0.006	286.84	4.083E-01	
PM-144	618.06	499.	11.	0.006	289.34	3.727E-01	
RH-106	621.92	525.	12.	0.007	270.40	4.102E+00	
SB-125	635.89	62.	-11.	-0.006	105.63	-3.340E+00	
I-131	636.97	61.	9.	0.005	127.17	4.316E+00	
AG-110M	657.76	50.	11.	0.006	93.53	4.202E-01	
CS-137	661.66	86.	5.	0.003	293.64	1.883E-01	
PM-144	696.54	80.	-22.	-0.012	98.39	-8.054E-01	P
NB-94	702.63	39.	9.	0.005	144.85	3.500E-01	P
SB-124	722.79	123.	-5.	-0.003	316.86	-1.746E+00	
ZR-95	724.20	126.	-15.	-0.008	111.20	-1.256E+00	
pm-146	735.72	33.	11.	0.006	111.03	1.927E+00	
pm-146	747.16	47.	-9.	-0.005	170.62	-9.863E-01	
ZR-95	756.73	28.	6.	0.003	193.41	4.264E-01	P
AG-110M	763.94	91.	-22.	-0.012	53.18	-3.831E+00	P
NB-95	765.79	177.	-27.	-0.015	71.63	-1.078E+00	
PA-234M	766.41	169.	17.	0.009	111.66	2.267E+02	P
EU-152	778.92	51.	-14.	-0.008	109.28	-4.422E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.87	35.	36.	0.020	28.82	1.685E+00		
CS-134	801.95	88.	9.	0.005	143.47	4.445E+00		
CO-58	810.78	29.	10.	0.006	81.90	4.166E-01		
La-140	815.77	39.	10.	0.005	98.33	1.691E+00		
Cs-136	818.50	49.	10.	0.005	108.34	3.951E-01		
Co-56	846.77	47.	-8.	-0.004	192.44	-3.261E-01		
NB-94	871.10	20.	9.	0.005	77.78	3.912E-01		
EU-154	873.23	35.	2.	0.001	353.76	8.487E-01		P
PA-234	880.53	42.	11.	0.006	85.89	8.296E+00		
PA-234	883.24	53.	6.	0.003	188.29	2.573E+00		
Sc-46	889.28	71.	-10.	-0.006	121.47	-4.485E-01		
y-88	898.04	40.	-15.	-0.008	56.48	-7.126E-01		P
AG-110M	937.49	70.	-22.	-0.012	38.74	-2.937E+00		P
PA-234	946.02	50.	-19.	-0.010	86.88	-6.406E+00		
EU-152	964.11	130.	13.	0.007	124.74	4.253E+00		
EU-154	996.33	61.	2.	0.001	556.78	9.075E-01		
PA-234M	1001.00	66.	-3.	-0.002	290.61	-1.773E+01		P
EU-154	1004.77	151.	-23.	-0.013	79.84	-6.072E+00		
Co-56	1037.84	10.	18.	0.010	45.25	6.322E+00		
Cs-136	1048.07	50.	-6.	-0.003	171.59	-3.750E-01		
RH-106	1050.36	26.	11.	0.006	73.56	3.428E+01		
BI-207	1063.66	15.	10.	0.006	87.14	7.123E-01		P
Ga-68	1077.40	37.	-10.	-0.006	137.96	-1.872E+01		
FE-59	1099.25	48.	-16.	-0.009	56.36	-1.497E+00		P
EU-152	1112.07	155.	-17.	-0.009	107.81	-6.429E+00		
ZN-65	1115.55	138.	-3.	-0.002	543.49	-3.188E-01		
Ta-182	1121.30	149.	-11.	-0.006	162.13	-1.635E+00		
CO-60	1173.24	32.	-6.	-0.003	173.23	-3.398E-01		P
Ta-182	1189.05	37.	-4.	-0.002	324.08	-1.475E+00		
Ta-182	1221.41	16.	11.	0.006	84.49	2.394E+00		
Co-56	1238.28	33.	25.	0.014	55.61	2.148E+00		P
FE-59	1291.60	23.	1.	0.001	841.87	1.815E-01		
CO-60	1332.50	23.	-10.	-0.005	142.09	-5.890E-01		P
AG-110M	1384.30	23.	-5.	-0.003	243.70	-1.193E+00		
EU-152	1408.00	23.	3.	0.002	339.41	9.986E-01		
Co-56	1771.35	66.	8.	0.004	147.30	3.911E+00		
y-88	1836.06	13.	-3.	-0.001	337.04	-2.090E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.9412E+00	3.9412E+00	1.063E+02%	1.41E+01
NA-22	#	1.2422E+00	1.2422E+00	3.062E+01%	1.04E+00
K-40		2.2594E+02	2.2594E+02	5.269E+00%	8.50E+00
Sc-46	#A	-4.4850E-01	-4.4850E-01	1.215E+02%	1.85E+00
CR-51	#A	3.9602E+00	3.9603E+00	1.556E+02%	2.07E+01
MN-54	#A	4.0860E-01	4.0860E-01	1.202E+02%	1.16E+00
FE-59	#A	-1.4971E+00	-1.4971E+00	5.636E+01%	3.22E+00
Co-56	#A	1.1030E+00	1.1030E+00	4.525E+01%	1.47E+00
CO-57	#A	-4.3903E-01	-4.3903E-01	7.964E+01%	1.16E+00
CO-58	#A	4.1664E-01	4.1665E-01	8.190E+01%	1.15E+00
CO-60	#A	-5.8904E-01	-5.8904E-01	1.421E+02%	1.50E+00
ZN-65	#A	-3.1879E-01	-3.1879E-01	5.435E+02%	5.96E+00
NB-94	#A	3.7082E-01	3.7082E-01	7.778E+01%	1.20E+00
ZR-95	#A	4.2638E-01	4.2638E-01	1.934E+02%	1.96E+00
NB-95	#A	-1.0778E+00	-1.0778E+00	7.163E+01%	2.56E+00
RU-103	#A	-6.5728E-01	-6.5729E-01	9.610E+01%	1.49E+00
RH-106	#A	8.1993E+00	8.1993E+00	7.356E+01%	3.73E+01
AG-108M	#A	2.6122E-01	2.6122E-01	2.390E+02%	1.12E+00
AG-110M	#A	2.3769E-01	2.3769E-01	9.353E+01%	2.33E+00
SN-113	#A	-7.8158E-01	-7.8158E-01	1.063E+02%	2.78E+00
SB-124	#A	3.6549E-01	3.6549E-01	2.792E+02%	3.43E+00
SB-125	#A	7.0462E-01	7.0462E-01	1.125E+02%	3.87E+00
I-131	#A	-5.7069E-02	-5.7071E-02	1.079E+02%	1.40E+00
Gd-153	#A	8.9967E-01	8.9967E-01	1.340E+02%	5.01E+00
Ga-68	#A	-1.8589E+01	-1.8722E+01	1.380E+02%	5.65E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.40E+00
BA-133	#A	-6.8208E-01	-6.8208E-01	1.846E+02%	4.22E+00
CS-134	#A	1.1220E+00	1.1220E+00	2.882E+01%	3.50E+00
CS-137	#A	1.8826E-01	1.8826E-01	2.936E+02%	1.91E+00
CE-139	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.57E+00
Ba-140	#A	-1.9938E+00	-1.9939E+00	1.029E+02%	5.49E+00
La-140	#A	5.7163E-01	5.7164E-01	9.764E+01%	1.64E+00
CE-141	#A	-8.2619E-01	-8.2620E-01	1.619E+02%	4.45E+00
CE-144	#A	-1.1532E-01	-1.1532E-01	4.765E+03%	1.84E+01
PM-144	#A	-8.0542E-01	-8.0542E-01	9.839E+01%	1.65E+00
EU-152	#A	1.0779E+00	1.0779E+00	8.861E+01%	8.19E+00
EU-154	#A	6.1614E-01	6.1614E-01	1.680E+02%	1.07E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.31E+00
HF-181	#A	-6.0730E-01	-6.0731E-01	1.047E+02%	2.13E+00
Ta-182	#A	1.2246E-01	1.2246E-01	8.449E+01%	8.99E+00
Hg-203	#A	-5.3689E-01	-5.3689E-01	9.268E+01%	1.66E+00
TL-208		9.0403E+00	9.0403E+00	8.644E+00%	1.20E+00
pm-146	#A	1.7376E-01	1.7376E-01	1.018E+02%	3.93E+00

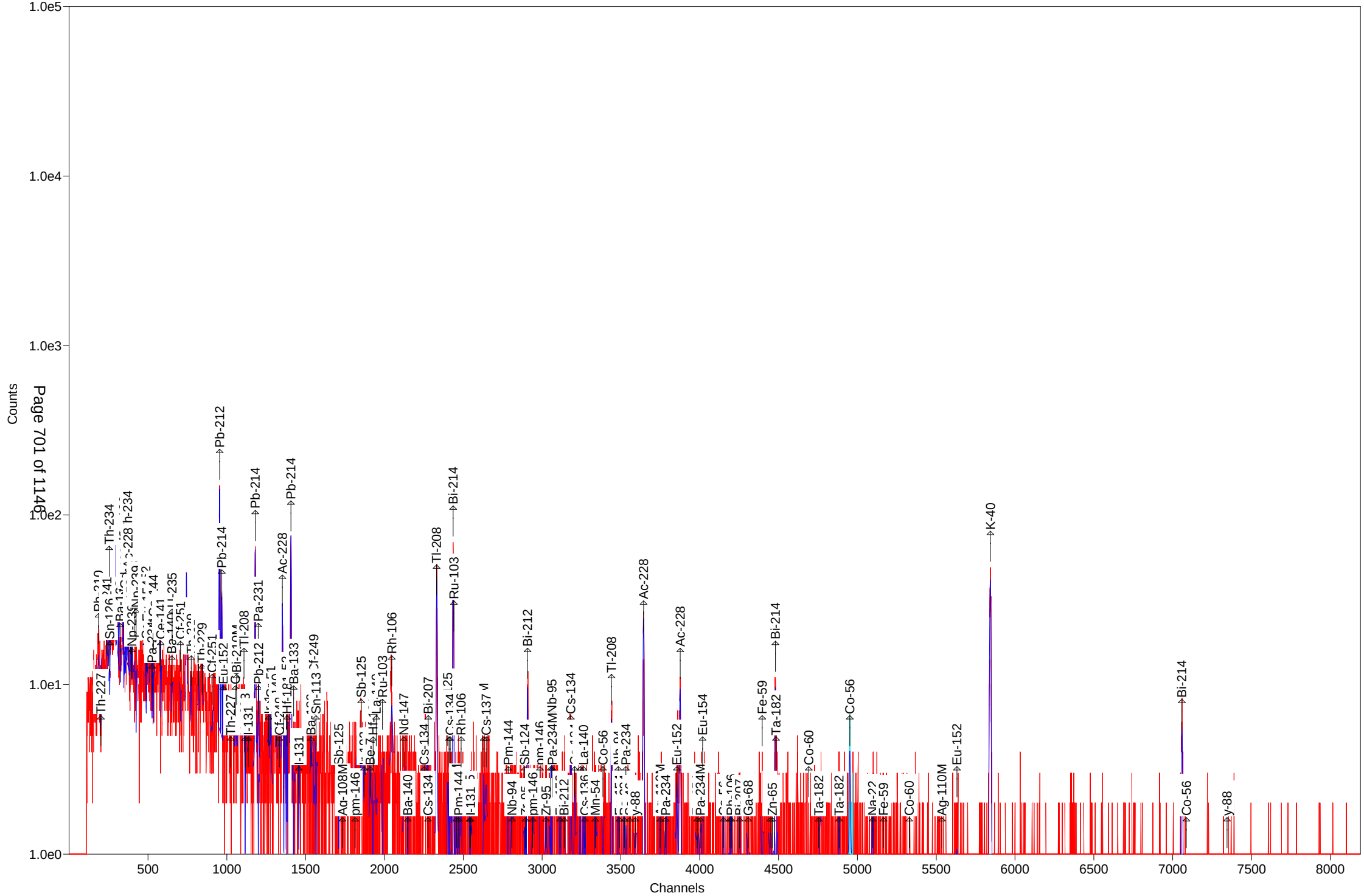
y-88	#A	-7.1262E-01	-7.1263E-01	5.648E+01%	1.53E+00
Cd-113m	#A	6.0791E+03	6.0791E+03	9.132E+01%	1.86E+04
Cd-109	#A	1.0008E+01	1.0008E+01	1.638E+02%	5.46E+01
Cf-251	#A	-1.3041E+00	-1.3041E+00	1.760E+02%	5.88E+00
Cf-249	#A	-2.6144E-01	-2.6144E-01	2.747E+02%	2.44E+00
Sn-126	#A	-5.3432E+00	-5.3432E+00	1.273E+02%	2.26E+01
PB-210	#A	2.4414E+01	2.4414E+01	5.634E+01%	3.65E+01
PB-212		2.5287E+01	2.5287E+01	4.580E+00%	2.01E+00
PB-214		2.4154E+01	2.4154E+01	6.740E+00%	2.69E+00
BI-207	#A	3.7557E-01	3.7557E-01	8.714E+01%	1.43E+00
BI-212		2.7876E+01	2.7876E+01	2.088E+01%	1.12E+01
BI-214		2.4799E+01	2.4799E+01	6.283E+00%	2.06E+00
BI-210M	#A	5.6541E-01	5.6541E-01	1.164E+02%	2.22E+00
AC-228		2.5227E+01	2.5227E+01	7.077E+00%	2.92E+00
TH-227	#A	-7.5695E+00	-7.5695E+00	1.202E+02%	3.03E+01
TH-229	#A	7.7054E+00	7.7054E+00	1.024E+02%	1.97E+01
TH-234	#	3.9674E+01	3.9674E+01	2.774E+01%	2.84E+01
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.35E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.00E+00
PA-234	#A	-4.5505E-01	-4.5505E-01	1.259E+02%	1.15E+01
PA-234M	#A	4.5794E+01	4.5794E+01	1.117E+02%	2.34E+02
U-235	#A	4.3162E+00	4.3162E+00	1.041E+02%	1.80E+01
AM-241	#A	1.3716E+00	1.3716E+00	1.203E+02%	5.50E+00
Np-237	#A	3.0898E+00	3.0898E+00	1.535E+02%	1.58E+01
Ir-192	#A	5.5771E-01	5.5771E-01	9.467E+01%	2.38E+00
Cs-136	#A	3.9506E-01	3.9507E-01	1.083E+02%	1.46E+00
Np-239	#A	-1.5206E+00	-1.5208E+00	1.376E+02%	6.98E+00
Nd-147	#A	-3.8603E-01	-3.8604E-01	9.571E+02%	9.03E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 4.264E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 4.2641626E+02 Bq/Sample

264535_Gamma_160-18554-A-12-B. 12_Gamma_20161870.spc.



Test America St. Louis Spectrum ID: 13_Gamma_20160733

Sample Description: 264535_Gamma_160-18554-A-13-B
Detector: Detector #13
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-13-B

Decay to Time: 9/1/2016 13:10 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:10:56 Real Time: 1808 sec
Analysis Time: 9/1/2016 13:41 Dead Time: 0.44 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 13_Soil_TunaCan.Clb
Efficiency Cal Desc: 13_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/29/2012 07:50
Energy Cal Date: 2/23/2012 09:31
Library: Client_Long_Rev11.lib
Bkgd Correction File: 13_2016-08-07_0547.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.924E+00	96.5	4.751E+00	4.758E+00	1.587E+01
NA-22	5.855E-01	56.5	3.309E-01	3.322E-01	1.070E+00
K-40	2.769E+02	4.5	1.233E+01	1.878E+01	8.853E+00
Sc-46	-5.505E-01	96.4	5.307E-01	5.314E-01	1.784E+00
CR-51	-1.657E+00	194.9	3.230E+00	3.232E+00	1.149E+01
MN-54	1.051E-01	495.0	5.201E-01	5.201E-01	1.190E+00
FE-59	-1.779E+00	81.2	1.444E+00	1.447E+00	3.070E+00
Co-56	4.096E-01	154.2	6.318E-01	6.321E-01	1.000E+00
CO-57	0.000E+00	1.#INF	2.434E-01	2.434E-01	1.142E+00
CO-58	-2.869E-02	1339.0	3.841E-01	3.841E-01	1.355E+00
CO-60	4.497E-01	84.9	3.820E-01	3.826E-01	1.140E+00
ZN-65	0.000E+00	1.#INF	1.226E-01	1.226E-01	4.511E+00
NB-94	5.801E-01	86.5	5.017E-01	5.026E-01	1.677E+00
ZR-95	-3.578E-01	286.7	1.026E+00	1.026E+00	2.314E+00
NB-95	-2.244E-01	224.1	5.030E-01	5.031E-01	1.722E+00
RU-103	-1.711E-01	252.1	4.313E-01	4.314E-01	1.085E+00
RH-106	-2.109E-01	2689.8	5.673E+00	5.673E+00	2.949E+01
AG-108M	3.482E-01	97.7	3.403E-01	3.408E-01	9.335E-01
AG-110M	4.568E-01	102.3	4.672E-01	4.678E-01	1.847E+00
SN-113	5.571E-01	113.5	6.321E-01	6.328E-01	2.121E+00
SB-124	7.600E-01	114.1	8.668E-01	8.677E-01	2.840E+00
SB-125	1.389E+00	67.1	9.320E-01	9.347E-01	3.234E+00
I-131	-2.268E-01	280.7	6.365E-01	6.366E-01	1.071E+00
Gd-153	-1.274E+00	178.3	2.271E+00	2.273E+00	7.545E+00
Ga-68	1.922E+01	87.5	1.682E+01	1.686E+01	3.678E+01
Tc-99m	0.000E+00	1.#INF	1.860E-01	1.860E-01	1.884E+00
BA-133	4.741E-01	195.8	9.282E-01	9.285E-01	3.059E+00
CS-134	6.303E-01	66.2	4.172E-01	4.185E-01	2.914E+00
CS-137	-4.362E-01	122.3	5.335E-01	5.339E-01	1.804E+00
CE-139	-5.771E-02	652.2	3.764E-01	3.764E-01	1.274E+00
Ba-140	2.768E+00	87.4	2.418E+00	2.422E+00	3.735E+00
La-140	-6.659E-01	102.7	6.840E-01	6.849E-01	1.929E+00
CE-141	-7.249E-01	138.5	1.004E+00	1.004E+00	3.464E+00

CE-144	2.908E+00	146.9	4.273E+00	4.276E+00	1.423E+01
PM-144	-6.633E-01	71.4	4.738E-01	4.751E-01	1.572E+00
EU-152	2.859E+00	63.4	1.811E+00	1.818E+00	4.852E+00
EU-154	1.206E+00	101.6	1.225E+00	1.226E+00	1.034E+01
EU-155	0.000E+00	1.#INF	8.782E-01	8.782E-01	1.059E+01
HF-181	-5.403E-01	100.7	5.442E-01	5.449E-01	2.187E+00
Ta-182	4.631E-01	38.2	1.769E-01	1.784E-01	7.486E+00
Hg-203	-4.829E-01	88.5	4.271E-01	4.280E-01	1.423E+00
TL-208	1.010E+01	6.6	6.667E-01	8.480E-01	8.400E-01
pm-146	6.968E-01	96.8	6.748E-01	6.758E-01	3.067E+00
y-88	-9.807E-02	603.2	5.916E-01	5.916E-01	1.037E+00
Cd-113m	1.134E+03	385.9	4.376E+03	4.376E+03	1.499E+04
Cd-109	0.000E+00	1.#INF	1.923E+01	1.923E+01	6.384E+01
Cf-251	-2.200E+00	100.4	2.209E+00	2.217E+00	5.360E+00
Cf-249	0.000E+00	1.#INF	1.124E-01	1.124E-01	2.200E+00
Sn-126	4.293E+00	127.5	5.473E+00	5.478E+00	1.823E+01
PB-210	2.593E+01	40.9	1.060E+01	1.071E+01	2.682E+01
PB-212	3.130E+01	3.6	1.125E+00	2.316E+00	1.717E+00
PB-214	1.438E+01	7.1	1.015E+00	1.260E+00	2.347E+00
BI-207	3.982E-01	76.7	3.053E-01	3.059E-01	1.060E+00
BI-212	3.158E+01	15.3	4.821E+00	5.093E+00	8.233E+00
BI-214	1.591E+01	7.6	1.209E+00	1.465E+00	1.663E+00
BI-210M	6.160E-01	89.7	5.527E-01	5.539E-01	1.846E+00
AC-228	2.613E+01	7.9	2.051E+00	2.446E+00	2.409E+00
TH-227	-2.099E+00	314.6	6.602E+00	6.603E+00	2.225E+01
TH-229	9.856E+00	74.4	7.333E+00	7.376E+00	1.893E+01
TH-234	2.494E+01	31.9	7.958E+00	8.064E+00	2.526E+01
PA-231	1.270E+01	135.0	1.715E+01	1.716E+01	7.637E+01
PA-233	7.552E-01	191.1	1.443E+00	1.444E+00	6.497E+00
PA-234	-1.930E+00	65.6	1.267E+00	1.271E+00	9.042E+00
PA-234M	5.570E+01	72.9	4.059E+01	4.069E+01	1.934E+02
U-235	2.325E+00	147.1	3.422E+00	3.424E+00	1.462E+01
AM-241	-1.609E+00	61.4	9.883E-01	9.918E-01	5.212E+00
Np-237	-3.121E+00	177.9	5.552E+00	5.555E+00	1.844E+01
Ir-192	5.760E-01	72.3	4.162E-01	4.176E-01	1.624E+00
Cs-136	-1.609E-01	246.2	3.962E-01	3.964E-01	1.376E+00
Np-239	1.344E+00	218.3	2.935E+00	2.936E+00	9.756E+00
Nd-147	7.664E-01	371.4	2.846E+00	2.847E+00	6.958E+00
Total	1.717E+03				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-13-B

Spectrum Filename: C:\User\SPC\Det13\13_Gamma_20160733.An1

Acquisition information

Start time:	9/1/2016 1:10:56 PM
Live time:	1800
Real time:	1808
Dead time:	0.44 %
Detector ID:	13

Detector system
Ge13 SN/10064006

Calibration

Filename:	13_Soil_TunaCan.Clb

13_Soil_TunaCan_90099_032712

Energy Calibration

Created:	2/23/2012 9:31:24 AM
Zero offset:	0.036 keV
Gain:	0.250 keV/channel
Quadratic:	-2.347E-08 keV/channel^2

Efficiency Calibration

Created:	3/29/2012 7:50:26 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.91 %
Log(Eff):	-5.308398E-01 + (-3.057754E-01*Log(E)) + (-3.437570E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.60 %
Log(Eff):	-2.292218E+01 + (8.455931E+00*Log(E)) + (-8.924057E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev11.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:10:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	13_2016-08-07_0547.PBC 8/7/2016 5:47:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1780

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.82	54.	40.89	0.79	2.705E-02	46.54	4.250	PBC<MDA	PB210
63.21	70.	31.90	1.03	4.068E-02	63.29	3.810	PBC<MDA	TH234
64.57	31.	127.50	1.03	4.135E-02	64.28	9.700	PBC<MDA	Sn126
74.66	352.	8.18	1.04	4.726E-02				
77.01	548.	5.89	1.05	4.834E-02				
87.02	152.	15.46	1.06	5.198E-02	86.49	13.100	1.246E+01	Np237
					86.54	30.700	5.315E+00	EU155
					86.94	9.040	1.801E+01	Sn126
					87.57	37.500	4.326E+00	Sn126
					88.04	3.790	4.270E+01	Cd109
89.84	118.	19.88	1.06	5.274E-02				
92.42	39.	64.40	1.06	5.337E-02	92.59	5.584	PBC<MDA	TH234
106.13	30.	218.32	1.07	5.524E-02	106.13	22.700	PBC<MDA	Np239
123.10	6.	471.50	1.09	5.523E-02	123.10	40.790	PBC<MDA	EU154
128.71	52.	31.22	0.94	5.480E-02				
134.28	32.	146.95	1.10	5.430E-02	133.54	11.090	PBC<MDA	CE144
136.30	5.	852.70	1.10	5.397E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	5.283E-01	CO57
144.03	31.	147.15	1.11	5.293E-02	143.79	10.960	PBC<MDA	U235
153.63	32.	43.34	0.45	5.131E-02				
162.66	19.	142.20	1.13	4.963E-02	162.66	6.220	PBC<MDA	Ba140
163.38	4.	664.14	1.13	4.950E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	27.	103.33	1.16	4.533E-02	193.51	4.400	PBC<MDA	TH229
210.85	31.	107.08	1.17	4.279E-02	210.85	2.990	PBC<MDA	TH229
227.00	8.	347.91	1.19	4.071E-02	227.00	6.300	PBC<MDA	Cf251
238.55	882.	4.68	1.09	3.936E-02	238.63	43.300	2.875E+01	PB212
241.92	130.	16.77	1.20	3.897E-02	242.00	7.430	2.502E+01	PB214
244.69	25.	213.58	1.20	3.868E-02	244.69	7.580	PBC<MDA	EU152
263.70	4.	385.86	1.22	3.674E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	20.	89.71	1.22	3.654E-02	265.83	50.000	PBC<MDA	BI210M
277.31	51.	34.11	2.12	3.549E-02	277.28	6.310	1.261E+01	TL208
295.09	207.	12.59	1.04	3.399E-02	295.09	19.300	1.751E+01	PB214
300.21	80.	23.96	0.72	3.358E-02	300.03	3.280	4.050E+01	PB212
					300.07	2.460	5.401E+01	PA231
					300.18	6.200	2.143E+01	PA233
302.65	20.	193.30	1.26	3.339E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.858E+00	BA133
302.85	20.	195.77	1.26	3.338E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.859E+00	BA133
304.94	20.	197.97	1.26	3.322E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.224E+00	BI210M
316.49	22.	114.00	1.27	3.236E-02	316.49	87.040	PBC<MDA	Ir192
328.76	21.	164.25	1.28	3.151E-02	328.76	20.300	PBC<MDA	La140
338.27	212.	13.46	0.90	3.088E-02	338.32	12.010	3.177E+01	AC228
344.29	34.	63.36	1.29	3.050E-02	344.29	26.500	PBC<MDA	EU152
351.92	285.	9.62	1.41	3.003E-02	351.93	37.600	1.401E+01	PB214
391.69	18.	113.46	1.34	2.782E-02	391.69	64.000	PBC<MDA	SN113
433.94	17.	97.72	1.37	2.585E-02	433.94	90.480	PBC<MDA	AG108M
453.88	20.	96.84	1.39	2.502E-02	453.88	65.000	PBC<MDA	pm146
463.37	21.	85.09	1.40	2.465E-02	463.37	10.470	PBC<MDA	SB125
468.06	19.	88.81	1.40	2.447E-02	468.06	51.750	PBC<MDA	Ir192
487.02	16.	138.58	1.42	2.377E-02	487.02	45.500	PBC<MDA	La140
511.86	146.	19.56	2.69	2.292E-02	511.86	20.000	1.770E+01	RH106
531.00	4.	371.37	1.46	2.230E-02	531.00	13.000	PBC<MDA	Nd147
534.75	16.	96.26	1.46	2.211E-02	537.26	24.390	PBC<MDA	Ba140
563.24	8.	204.26	1.49	2.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	2.	527.80	1.49	2.118E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.464E-01	PA234
					569.70	97.740	6.264E-02	BI207
569.70	10.	119.90	1.49	2.117E-02	569.32	15.380	1.648E+00	CS134
					569.47	8.200	3.092E+00	PA234
					569.70	97.740	2.595E-01	BI207
583.29	320.	6.60	1.48	2.081E-02	583.02	84.500	1.010E+01	TL208
600.50	14.	205.27	1.52	2.036E-02	600.50	17.860	PBC<MDA	SB125
602.73	16.	191.79	1.52	2.030E-02	602.73	98.260	PBC<MDA	SB124
604.71	6.	496.46	1.52	2.025E-02	604.71	97.620	PBC<MDA	CS134
609.47	264.	7.60	1.36	2.014E-02	609.31	46.090	1.580E+01	BI214
					610.30	5.750	1.268E+02	RU103
635.89	14.	72.39	1.55	1.951E-02	635.89	11.310	PBC<MDA	SB125
702.63	18.	86.48	1.60	1.809E-02	702.63	97.900	PBC<MDA	NB94

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
722.79	13.	123.51	1.62	1.771E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.352E-01	AG108M
					723.36	20.220	1.956E+00	EU154
722.94	9.	189.51	1.62	1.771E-02	722.79	10.810	2.485E+00	SB124
					722.94	90.840	2.958E-01	AG108M
					723.36	20.220	1.329E+00	EU154
727.52	76.	15.27	1.62	1.763E-02	727.17	7.550	3.158E+01	BI212
735.72	2.	649.12	1.63	1.747E-02	735.72	22.500	PBC<MDA	pm146
747.16	10.	138.28	1.64	1.727E-02	747.16	34.000	PBC<MDA	pm146
766.41	20.	72.88	1.66	1.694E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.227E+02	PA234M
785.68	34.	23.16	0.51	1.662E-02	785.42	1.280	8.963E+01	BI212
795.87	16.	66.20	1.68	1.646E-02	795.87	85.530	PBC<MDA	CS134
801.95	12.	91.33	1.69	1.636E-02	801.95	8.690	PBC<MDA	CS134
834.85	3.	494.97	1.71	1.587E-02	834.85	99.980	PBC<MDA	MN54
846.77	5.	244.95	1.72	1.569E-02	846.77	99.935	PBC<MDA	Co56
860.43	27.	55.00	1.73	1.550E-02	860.56	12.420	PBC<MDA	TL208
871.10	4.	165.44	1.74	1.536E-02	871.10	99.890	PBC<MDA	NB94
880.53	11.	81.88	1.75	1.523E-02	880.53	6.000	PBC<MDA	PA234
883.24	11.	92.63	1.75	1.519E-02	883.24	9.600	PBC<MDA	PA234
884.68	11.	102.28	1.75	1.517E-02	884.68	72.680	PBC<MDA	AG110M
911.17	202.	7.85	1.82	1.483E-02	911.07	29.000	2.613E+01	AC228
937.49	3.	524.40	1.80	1.451E-02	937.49	34.360	PBC<MDA	AG110M
969.30	180.	8.15	1.99	1.414E-02	968.97	17.460	4.040E+01	AC228
996.33	11.	101.55	1.84	1.384E-02	996.33	10.600	PBC<MDA	EU154
1004.77	4.	275.10	1.85	1.374E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	7.	187.54	1.88	1.340E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	10.	95.53	1.90	1.315E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	13.	87.52	1.91	1.301E-02	1077.40	3.300	PBC<MDA	Ga68
1120.34	49.	21.14	1.52	1.262E-02	1120.29	15.100	1.431E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	15.	84.94	1.98	1.217E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	24.	38.21	1.99	1.204E-02	1189.05	16.200	6.968E+00	Ta182
1221.41	7.	210.08	2.02	1.179E-02	1221.41	27.000	PBC<MDA	Ta182
1274.53	12.	56.52	2.06	1.139E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.663E+00	EU154
1332.50	4.	258.37	2.10	1.100E-02	1332.50	99.980	PBC<MDA	CO60
1460.82	543.	4.45	1.75	1.021E-02	1460.83	10.670	2.769E+02	K40
1764.19	43.	16.27	1.22	8.758E-03	1764.49	15.400	1.778E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.37	74.68	238.	352.	7.442E+03	8.18	1.045	- sD
307.73	77.02	247.	548.	1.135E+04	5.89	1.047	- D

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
358.44	89.86	232.	119.	2.253E+03	20.31	1.059	- D
514.45	128.71	89.	52.	9.428E+02	31.22	0.935	- s
614.09	153.63	72.	32.	6.172E+02	43.34	0.450	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	187.04	46.82	128.	54.	0.030	40.89	0.794
TH-227	200.32	50.14	411.	-9.	-0.005	314.57	1.021s
AM-241	237.89	59.54	723.	-40.	-0.022	61.43	1.030s
TH-234	252.89	63.29	211.	70.	0.039	31.90	1.034D
Sn-126	256.85	64.28	765.	31.	0.017	127.50	1.035s
BA-133	323.66	80.99	1861.	-39.	-0.022	57.06	1.051
Np-237	345.65	86.49	2282.	-38.	-0.021	177.90	1.056
EU-155	345.86	86.54	2410.	-41.	-0.023	172.01	1.056
Sn-126	347.45	86.94	2369.	-41.	-0.023	170.54	1.056
Sn-126	349.97	87.57	2163.	104.	0.058	24.88	1.057D
Cd-109	351.85	88.04	2329.	0.	0.000	168.90	1.057A
Nd-147	364.09	91.10	2122.	-41.	-0.023	160.87	1.060D
TH-234	370.04	92.59	301.	39.	0.022	64.40	1.061D
AC-228	373.08	93.35	2157.	-41.	-0.023	161.85	1.062s
Gd-153	389.67	97.50	2198.	-37.	-0.021	178.33	1.066s
Np-239	397.67	99.50	2235.	0.	0.000	1000.00	1.068
Gd-153	412.46	103.20	2235.	0.	0.000	1000.00	1.071s
Np-239	414.46	103.70	2235.	0.	0.000	1000.00	1.072s
EU-155	420.91	105.31	2235.	0.	0.000	1000.00	1.074s
Np-239	424.18	106.13	2178.	30.	0.017	218.32	1.074s
EU-152	486.74	121.78	407.	-5.	-0.003	572.36	1.089s
CO-57	487.88	122.06	412.	0.	0.000	1000.00	1.089s
EU-154	492.03	123.10	334.	6.	0.003	471.50	1.090s
PA-234	524.80	131.29	1136.	-34.	-0.019	65.64	1.098s
HF-181	531.71	133.02	1102.	-8.	-0.005	573.24	1.100s
CE-144	533.77	133.54	1057.	32.	0.018	146.95	1.100s
HF-181	544.81	136.30	1089.	5.	0.003	852.70	1.103
CO-57	545.50	136.47	1094.	0.	0.000	1000.00	1.103
Tc-99m	561.64	140.51	1094.	0.	0.000	1000.00	1.106
U-235	574.74	143.79	1036.	31.	0.017	147.15	1.110
CE-141	581.36	145.44	1115.	-33.	-0.018	138.47	1.111s
Ba-140	650.21	162.66	352.	19.	0.011	142.20	1.127s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	653.08	163.38	367.	4.	0.002	664.14	1.128s
CE-139	662.98	165.85	367.	-4.	-0.002	652.21	1.130s
Cf-251	705.95	176.60	268.	-32.	-0.018	100.39	1.140s
TH-229	773.56	193.51	196.	27.	0.015	103.33	1.156s
U-235	820.84	205.33	248.	-24.	-0.014	46.57	1.167s
TH-229	842.90	210.85	272.	31.	0.017	107.08	1.172s
Cf-251	907.48	227.00	200.	8.	0.004	347.91	1.186s
PB-212	953.99	238.63	115.	960.	0.533	3.59	1.197D
PB-214	967.44	242.00	174.	130.	0.072	16.77	1.200D
EU-152	978.22	244.69	1409.	25.	0.014	213.58	1.203s
TH-227	1024.40	256.24	168.	-27.	-0.015	94.83	1.213
Cd-113m	1054.23	263.70	148.	4.	0.002	385.86	1.220s
BI-210M	1062.75	265.83	155.	20.	0.011	89.71	1.222s
TL-208	1108.66	277.31	65.	51.	0.028	34.11	2.117s
Hg-203	1116.21	279.20	232.	-25.	-0.014	88.46	1.234s
I-131	1136.60	284.30	132.	-6.	-0.003	377.12	1.239s
PB-214	1179.75	295.09	79.	178.	0.099	10.33	1.249D
PB-212	1199.51	300.03	67.	72.	0.040	19.81	1.253D
PA-231	1199.67	300.07	731.	20.	0.011	188.52	1.253s
PA-233	1200.11	300.18	752.	20.	0.011	191.10	1.253s
PA-231	1209.98	302.65	772.	20.	0.011	193.30	1.255s
BA-133	1210.79	302.85	793.	20.	0.011	195.77	1.256s
Ba-140	1218.78	304.85	813.	20.	0.011	197.97	1.257
Ir-192	1233.14	308.44	837.	0.	0.000	1000.00	1.261s
Ir-192	1265.33	316.49	292.	22.	0.012	114.00	1.268s
CR-51	1279.70	320.08	185.	-10.	-0.005	194.91	1.271s
La-140	1314.40	328.76	601.	21.	0.012	164.25	1.279
AC-228	1352.42	338.27	101.	212.	0.118	13.46	0.901s
EU-152	1376.48	344.29	212.	34.	0.019	63.36	1.293
HF-181	1382.65	345.83	152.	-17.	-0.009	107.87	1.294s
PB-214	1407.02	351.92	93.	285.	0.158	9.62	1.414
I-131	1457.25	364.48	87.	-10.	-0.005	280.67	1.311s
BA-133	1534.67	383.84	214.	-16.	-0.009	135.71	1.328s
Cf-249	1551.10	387.95	229.	0.	0.000	1000.00	1.332s
SN-113	1566.06	391.69	196.	18.	0.010	113.46	1.335s
SB-125	1710.77	427.88	82.	-14.	-0.008	131.89	1.367s
AG-108M	1735.01	433.94	62.	17.	0.009	97.72	1.373s
pm-146	1814.77	453.88	82.	20.	0.011	96.84	1.390s
SB-125	1852.71	463.37	152.	21.	0.012	85.09	1.399s
Ir-192	1871.48	468.06	131.	19.	0.010	88.81	1.403s
BE-7	1909.62	477.60	224.	-22.	-0.012	96.49	1.411s
HF-181	1927.22	482.00	246.	-23.	-0.013	100.73	1.415s
La-140	1947.31	487.02	224.	16.	0.009	138.58	1.419s
RU-103	1987.44	497.05	70.	-7.	-0.004	252.11	1.428s
RH-106	2046.68	511.86	98.	146.	0.081	19.56	2.691s
Nd-147	2123.21	531.00	52.	4.	0.002	371.37	1.458s
Ba-140	2148.25	537.26	52.	16.	0.009	96.26	1.463
CS-134	2252.15	563.24	56.	8.	0.004	204.26	1.486s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2276.48	569.32	75.	2.	0.001	527.80	1.491s
PA-234	2277.07	569.47	77.	0.	0.000	1000.00	1.491s
BI-207	2278.00	569.70	62.	10.	0.005	119.90	1.491s
TL-208	2332.36	583.29	26.	320.	0.178	6.60	1.481s
SB-125	2401.19	600.50	404.	14.	0.008	205.27	1.518s
SB-124	2410.11	602.73	454.	16.	0.009	191.79	1.519
CS-134	2418.03	604.71	470.	6.	0.003	496.46	1.521s
BI-214	2437.05	609.47	29.	264.	0.147	7.60	1.364
RU-103	2440.38	610.30	476.	0.	0.000	1000.00	1.526s
AG-108M	2456.31	614.28	476.	0.	0.000	1000.00	1.529s
PM-144	2471.43	618.06	532.	-19.	-0.011	171.31	1.533s
SB-125	2542.74	635.89	47.	14.	0.008	72.39	1.548s
AG-110M	2630.23	657.76	88.	-11.	-0.006	181.72	1.566s
CS-137	2645.82	661.66	114.	-13.	-0.007	122.30	1.570s
PM-144	2785.35	696.54	108.	-22.	-0.012	71.43	1.599
NB-94	2809.70	702.63	119.	18.	0.010	86.48	1.604s
SB-124	2890.33	722.79	115.	13.	0.007	123.51	1.621s
AG-108M	2890.93	722.94	127.	9.	0.005	189.51	1.621s
ZR-95	2895.98	724.20	143.	-8.	-0.004	218.70	1.622s
BI-212	2909.27	727.52	13.	76.	0.042	15.27	1.622
pm-146	2942.07	735.72	51.	2.	0.001	649.12	1.632s
pm-146	2987.83	747.16	41.	10.	0.006	138.28	1.641s
ZR-95	3026.11	756.73	60.	-6.	-0.003	286.74	1.649s
AG-110M	3054.97	763.94	70.	-9.	-0.005	135.63	1.655s
NB-95	3062.35	765.79	114.	-7.	-0.004	224.10	1.657s
PA-234M	3064.84	766.41	96.	20.	0.011	72.88	1.657s
BI-212	3140.88	785.42	56.	-3.	-0.002	495.13	1.673s
CS-134	3182.67	795.87	45.	16.	0.009	66.20	1.682s
CS-134	3207.01	801.95	52.	12.	0.007	91.33	1.687s
La-140	3262.29	815.77	45.	-8.	-0.005	121.12	1.698s
Cs-136	3273.21	818.50	64.	-5.	-0.003	246.20	1.700s
MN-54	3338.61	834.85	45.	3.	0.002	494.97	1.714s
Co-56	3386.31	846.77	30.	5.	0.003	244.95	1.723s
TL-208	3441.49	860.56	41.	27.	0.015	55.00	1.735s
NB-94	3483.63	871.10	17.	4.	0.002	165.44	1.743s
EU-154	3492.16	873.23	48.	-3.	-0.002	326.95	1.745s
PA-234	3521.37	880.53	32.	11.	0.006	81.88	1.751s
PA-234	3532.21	883.24	43.	11.	0.006	92.63	1.753s
AG-110M	3537.98	884.68	53.	11.	0.006	102.28	1.754s
Sc-46	3556.37	889.28	97.	-15.	-0.008	96.40	1.758s
y-88	3591.42	898.04	25.	-2.	-0.001	603.24	1.765s
AC-228	3643.94	911.17	12.	202.	0.112	7.85	1.817
AG-110M	3749.25	937.49	37.	3.	0.001	524.40	1.797s
PA-234	3783.37	946.02	43.	-9.	-0.005	169.23	1.803s
EU-152	3855.75	964.11	268.	-19.	-0.011	82.95	1.818s
AC-228	3876.49	969.30	5.	180.	0.100	8.15	1.989s
EU-154	3984.66	996.33	53.	11.	0.006	101.55	1.844s
EU-154	4018.45	1004.77	27.	4.	0.002	275.10	1.850s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4150.74	1037.84	32.	7.	0.004	187.54	1.876s
Cs-136	4191.67	1048.07	40.	-5.	-0.003	184.39	1.884s
RH-106	4200.83	1050.36	46.	-2.	-0.001	484.77	1.886s
BI-207	4254.05	1063.66	17.	10.	0.006	95.53	1.896s
Ga-68	4309.03	1077.40	21.	13.	0.007	87.52	1.907s
FE-59	4396.46	1099.25	64.	-23.	-0.013	81.16	1.924s
EU-152	4447.77	1112.07	118.	-6.	-0.004	240.07	1.934s
ZN-65	4461.66	1115.55	112.	0.	0.000	1000.00	1.937s
BI-214	4480.85	1120.34	13.	49.	0.027	21.14	1.515
Sc-46	4481.68	1120.55	112.	0.	0.000	1000.00	1.941
Ta-182	4484.68	1121.30	148.	-20.	-0.011	87.67	1.941
CO-60	4692.51	1173.24	28.	15.	0.009	84.94	1.981s
Ta-182	4755.78	1189.05	12.	24.	0.014	38.21	1.993
Ta-182	4885.27	1221.41	40.	7.	0.004	210.08	2.017
Co-56	4952.78	1238.28	74.	-3.	-0.002	462.55	2.030s
NA-22	5097.85	1274.53	17.	12.	0.007	56.52	2.057s
EU-154	5097.90	1274.54	29.	0.	0.000	1000.00	2.057s
CO-60	5329.84	1332.50	18.	4.	0.002	258.37	2.100s
AG-110M	5537.14	1384.30	24.	-2.	-0.001	595.82	2.138s
EU-152	5632.00	1408.00	19.	-3.	-0.001	377.89	2.155s
K-40	5843.40	1460.82	10.	543.	0.302	4.45	1.754
La-140	6385.31	1596.21	38.	-20.	-0.011	123.42	2.288s
SB-124	6764.67	1690.98	0.	0.	0.000	1000.00	2.353s
BI-214	7057.72	1764.19	3.	43.	0.024	16.27	1.215s
Co-56	7086.40	1771.35	46.	0.	0.000	1000.00	2.407s
y-88	7345.46	1836.06	7.	-2.	-0.001	402.49	2.449s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.9244E+00				5.31E+01	
			477.60	-4.924E+00	?(	1.587E+01 9.65E+01 1.05E+01	G
NA-22	C	5.8552E-01				9.50E+02	
			1274.53	5.855E-01	?(	1.070E+00 5.65E+01 9.99E+01	G
K-40	N	2.7691E+02				4.66E+11	
			1460.83	2.769E+02	(P	8.853E+00 4.45E+00 1.07E+01	G
Sc-46	F	-5.5049E-01				8.38E+01	
			889.28	-5.505E-01	?(	1.784E+00 9.64E+01 1.00E+02	G
			1120.55	0.000E+00	+	2.291E+00 1.00E+03 1.00E+02	G

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F -1.6573E+00					2.77E+01	
		320.08	-1.657E+00	?(P	1.149E+01	1.95E+02	9.94E+00 G
MN-54	C 1.0507E-01					3.12E+02	
		834.85	1.051E-01	?(	1.190E+00	4.95E+02	1.00E+02 G
FE-59	F -1.7792E+00					4.45E+01	
		1099.25	-1.779E+00	?(	3.070E+00	8.12E+01	5.65E+01 G
		1291.60	-3.803E-02	%	3.139E+00	3.75E+03	4.32E+01 G
Co-56	C 4.0958E-01					7.73E+01	
		846.77	1.771E-01	?(	1.000E+00	2.45E+02	9.99E+01 G
		1238.28	-2.351E-01	& P	3.092E+00	4.63E+02	6.61E+01 G
		1037.84	2.054E+00	?(	8.529E+00	1.88E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.411E+01	1.00E+03	1.55E+01 A
CO-58	C -2.8687E-02					7.09E+01	
		810.78	-2.869E-02	&(	1.355E+00	1.34E+03	9.95E+01 G
CO-60	F 4.4967E-01					1.93E+03	
		1332.50	1.954E-01	?(P	1.140E+00	2.58E+02	1.00E+02 G
		1173.24	7.041E-01	?(	1.258E+00	8.49E+01	9.99E+01 G
NB-94	I 5.8012E-01					7.41E+06	
		702.63	5.801E-01	?(	1.677E+00	8.65E+01	9.79E+01 G
		871.10	1.344E-01	-	7.941E-01	1.65E+02	9.99E+01 G
ZR-95	I -3.5785E-01					6.40E+01	
		756.73	-3.578E-01	?(	2.314E+00	2.87E+02	5.45E+01 G
		724.20	-5.574E-01	+	4.156E+00	2.19E+02	4.42E+01 G
NB-95	I -2.2444E-01					6.40E+01	
		765.79	-2.244E-01	?(	1.722E+00	2.24E+02	9.98E+01 G
RU-103	I -1.7107E-01					3.93E+01	
		497.05	-1.711E-01	?(P	1.085E+00	2.52E+02	9.09E+01 G
		610.30	0.000E+00	+	5.013E+01	1.00E+03	5.75E+00 GA
RH-106	I -2.1090E-01					3.74E+02	
		621.92	-2.109E-01	&(P	2.949E+01	2.69E+03	9.93E+00 G
		1050.36	-5.365E+00	+	9.205E+01	4.85E+02	1.56E+00 G
		511.86	1.770E+01	?	5.921E+00	1.96E+01	2.00E+01 GA
AG-108M	C 3.4824E-01					1.53E+05	
		433.94	4.009E-01	&(P	9.335E-01	9.77E+01	9.05E+01 G
		722.94	2.958E-01	&(	1.910E+00	1.90E+02	9.08E+01 G
		614.28	0.000E+00	-	3.224E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	4.5680E-01					2.50E+02	
			884.68	5.322E-01	?(	1.847E+00	1.02E+02	7.27E+01 G
			657.76	-3.419E-01	- P	1.434E+00	1.82E+02	9.46E+01 G
			937.49	2.972E-01	?(	3.475E+00	5.24E+02	3.44E+01 G
			1384.30	-4.290E-01	-	5.478E+00	5.96E+02	2.43E+01 G
			763.94	-1.322E+00	+	6.123E+00	1.36E+02	2.23E+01 G
SN-113	F	5.5711E-01					1.15E+02	
			391.69	5.571E-01	?(P	2.121E+00	1.13E+02	6.40E+01 G
SB-124	F	7.5997E-01					6.02E+01	
			602.73	4.413E-01	?(	2.840E+00	1.92E+02	9.83E+01 G
			1690.98	0.000E+00	-	9.448E-01	1.00E+03	4.78E+01 G
			722.79	3.657E+00	?(	1.528E+01	1.24E+02	1.08E+01 G
SB-125	I	1.3891E+00					1.01E+03	
			427.88	-1.030E+00	?(	3.234E+00	1.32E+02	2.96E+01 G
			600.50	2.132E+00	?(	1.472E+01	2.05E+02	1.79E+01 G
			635.89	3.609E+00	?(	8.698E+00	7.24E+01	1.13E+01 G
			463.37	4.563E+00	(	1.295E+01	8.51E+01	1.05E+01 G
I-131	I	-2.2679E-01					8.02E+00	
			364.48	-2.268E-01	&(P	1.071E+00	2.81E+02	8.17E+01 G
			284.30	-1.557E+00	+	1.459E+01	3.77E+02	6.14E+00 G
			636.97	1.326E-01	%	1.632E+01	3.49E+03	7.17E+00 G
Gd-153	F	-1.2736E+00					2.42E+02	
			97.50	-1.274E+00	?(	7.545E+00	1.78E+02	3.00E+01 G
			103.20	0.000E+00	+	1.033E+01	1.00E+03	2.18E+01 G
Ga-68	C	1.9222E+01					4.71E-02	
			1077.40	1.922E+01	&(	3.678E+01	8.75E+01	3.30E+00 G
BA-133	F	4.7412E-01					3.85E+03	
			356.00	6.513E-02	%(	3.059E+00	1.39E+03	6.20E+01 G
			302.85	1.859E+00	?(	1.216E+01	1.96E+02	1.83E+01 G
			383.84	-3.412E+00	&	1.558E+01	1.36E+02	8.94E+00 GA
			80.99	-1.272E+00	+ P	6.651E+00	5.71E+01	3.41E+01 GA
CS-134	I	6.3025E-01					7.54E+02	
			604.71	1.741E-01	&(	2.914E+00	4.96E+02	9.76E+01 G
			795.87	6.124E-01	?(	1.341E+00	6.62E+01	8.55E+01 G
			569.32	3.979E-01	?(	7.328E+00	5.28E+02	1.54E+01 G
			801.95	4.583E+00	?(	1.413E+01	9.13E+01	8.69E+00 G
			563.24	2.462E+00	?(P	1.172E+01	2.04E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	-4.3617E-01					1.10E+04	
			661.66	-4.362E-01	?(	1.804E+00	1.22E+02	8.52E+01 G
CE-139	F	-5.7710E-02					1.38E+02	
			165.85	-5.771E-02	&(	1.274E+00	6.52E+02	7.99E+01 G
Ba-140	I	2.7679E+00					1.28E+01	
			537.26	1.687E+00	&(P	3.735E+00	9.63E+01	2.44E+01 G
			162.66	3.403E+00	&(	1.622E+01	1.42E+02	6.22E+00 G
			304.85	7.990E+00	&(	5.285E+01	1.98E+02	4.29E+00 G
La-140	I	-6.6585E-01					1.28E+01	
			1596.21	-1.201E+00	?(P	1.929E+00	1.23E+02	9.54E+01 G
			487.02	7.974E-01	&	3.719E+00	1.39E+02	4.55E+01 G
			328.76	1.851E+00	&(P	1.016E+01	1.64E+02	2.03E+01 G
			815.77	-1.207E+00	+	5.011E+00	1.21E+02	2.33E+01 G
CE-141	I	-7.2490E-01					3.25E+01	
			145.44	-7.249E-01	&(P	3.464E+00	1.38E+02	4.82E+01 G
CE-144	I	2.9079E+00					2.85E+02	
			133.54	2.908E+00	&(	1.423E+01	1.47E+02	1.11E+01 G
PM-144	C	-6.6334E-01					3.63E+02	
			696.54	-6.633E-01	?(	1.572E+00	7.14E+01	9.90E+01 G
			618.06	-5.404E-01	&	3.100E+00	1.71E+02	9.91E+01 G
EU-152	F	2.8588E+00					4.94E+03	
			344.29	2.323E+00	(P	4.852E+00	6.34E+01	2.65E+01 G
			1112.07	-2.085E+00	-	1.714E+01	2.40E+02	1.36E+01 G
			121.78	-1.758E-01	&	3.400E+00	5.72E+02	2.86E+01 G
			778.92	-1.711E-01	%	1.117E+01	1.86E+03	1.29E+01 G
			964.11	-5.161E+00	- P	2.119E+01	8.30E+01	1.46E+01 G
			244.69	4.731E+00	?(P	3.366E+01	2.14E+02	7.58E+00 G
			1408.00	-6.700E-01	- P	5.743E+00	3.78E+02	2.10E+01 GA
EU-154	I	1.2061E+00					3.14E+03	
			873.23	-8.996E-01	?(	1.034E+01	3.27E+02	1.23E+01 G
			123.10	1.356E-01	&	2.166E+00	4.72E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.853E+00	1.00E+03	3.52E+01 G
			723.36	1.184E-06	&	8.856E+00	2.16E+08	2.02E+01 G
			1004.77	9.725E-01	?(	6.009E+00	2.75E+02	1.80E+01 G
			996.33	4.041E+00	?(	1.392E+01	1.02E+02	1.06E+01 G
HF-181	F	-5.4026E-01					4.24E+01	
			482.00	-6.496E-01	?(	2.187E+00	1.01E+02	8.05E+01 G
			133.02	-1.937E-01	+	3.716E+00	5.73E+02	4.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			345.83	-2.010E+00	+	7.285E+00	1.08E+02	1.51E+01 G
			136.30	9.640E-01	?(	2.753E+01	8.53E+02	5.85E+00 G
Ta-182	F	4.6307E-01					1.14E+02	
			1121.30	-2.556E+00	(	7.486E+00	8.77E+01	3.49E+01 G
			1221.41	1.249E+00	+ P	5.609E+00	2.10E+02	2.70E+01 G
			1189.05	6.968E+00	(P	5.281E+00	3.82E+01	1.62E+01 G
Hg-203	F	-4.8288E-01					4.66E+01	
			279.20	-4.829E-01	?(	1.423E+00	8.85E+01	8.15E+01 G
TL-208	N	1.0100E+01					6.98E+02	
			583.02	1.010E+01	@(P	8.400E-01	6.60E+00	8.45E+01 G
			277.28	1.261E+01	+	1.000E+01	3.41E+01	6.31E+00 G
			860.56	7.826E+00	- P	9.381E+00	5.50E+01	1.24E+01 G
pm-146	C	6.9683E-01					2.02E+03	
			747.16	9.800E-01	&(P	3.067E+00	1.38E+02	3.40E+01 G
			735.72	3.410E-01	?(P	5.066E+00	6.49E+02	2.25E+01 G
			453.88	6.719E-01	?(	1.537E+00	9.68E+01	6.50E+01 G
y-88	F	-9.8071E-02					1.07E+02	
			898.04	-9.807E-02	?(P	1.037E+00	6.03E+02	9.37E+01 G
			1836.06	-1.101E-01	+	9.740E-01	4.02E+02	9.92E+01 G
Cd-113m		1.1340E+03					5.33E+03	
			263.70	1.134E+03	?(	1.499E+04	3.86E+02	6.00E-03 K
Cf-251	T	-2.2001E+00					3.28E+05	
			176.60	-2.200E+00	(	5.360E+00	1.00E+02	1.70E+01 G
			227.00	1.733E+00	+	1.486E+01	3.48E+02	6.30E+00 GA
Sn-126		4.2926E+00					3.65E+07	
			87.57	2.969E+00	}	6.236E+00	2.49E+01	3.75E+01 GA
			64.28	4.293E+00	?(	1.823E+01	1.27E+02	9.70E+00 G
			86.94	-4.796E+00	+	2.716E+01	1.71E+02	9.04E+00 GA
PB-210	N	2.5932E+01					8.14E+03	
			46.54	2.593E+01	(	2.682E+01	4.09E+01	4.25E+00 G
PB-212	N	3.1304E+01					6.98E+02	
			238.63	3.130E+01	(	1.717E+00	3.59E+00	4.33E+01 G
			300.03	3.649E+01	+	2.054E+01	1.98E+01	3.28E+00 GA
PB-214	N	1.4380E+01					5.84E+05	
			351.93	1.401E+01	(P	2.347E+00	9.62E+00	3.76E+01 G
			295.09	1.509E+01	(P	3.733E+00	1.03E+01	1.93E+01 G
			242.00	2.502E+01	+ P	1.230E+01	1.68E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	3.9824E-01					1.18E+04	
			569.70	2.595E-01	?(	1.060E+00	1.20E+02	9.77E+01 G
			1063.66	5.803E-01	?(P	1.250E+00	9.55E+01	7.45E+01 G
BI-212	N	3.1581E+01					6.98E+02	
			727.17	3.158E+01	(	8.233E+00	1.53E+01	7.55E+00 G
			785.42	-8.702E+00	-	9.784E+01	4.95E+02	1.28E+00 GA
BI-214	N	1.5906E+01					5.84E+05	
			609.31	1.580E+01	(P	1.663E+00	7.60E+00	4.61E+01 G
			1120.29	1.431E+01	(P	5.671E+00	2.11E+01	1.51E+01 G
			1764.49	1.778E+01	(P	4.347E+00	1.63E+01	1.54E+01 G
BI-210M	T	6.1605E-01					1.10E+09	
			265.83	6.160E-01	?(P	1.846E+00	8.97E+01	5.00E+01 G
			304.90	2.035E-01	&	8.197E+00	1.20E+03	2.80E+01 G
AC-228	N	2.6128E+01					2.10E+03	
			911.07	2.613E+01	(P	2.409E+00	7.85E+00	2.90E+01 G
			968.97	4.040E+01	+ P	3.065E+00	8.15E+00	1.75E+01 G
			338.32	3.177E+01	+ P	7.418E+00	1.35E+01	1.20E+01 G
			93.35	-7.609E+00	-	4.089E+01	1.62E+02	5.56E+00 XA
TH-227	N	-2.0987E+00					7.95E+03	
			50.14	-2.099E+00	?(	2.225E+01	3.15E+02	8.00E+00 G
			256.24	-5.786E+00	+	1.337E+01	9.48E+01	7.00E+00 G
TH-229	N	9.8565E+00					2.68E+06	
			193.51	7.521E+00	(	1.893E+01	1.03E+02	4.40E+00 G
			210.85	1.329E+01	?(P	3.457E+01	1.07E+02	2.99E+00 G
TH-234	N	2.4943E+01					1.63E+12	
			63.29	2.494E+01	(P	2.526E+01	3.19E+01	3.81E+00 G
			92.59	7.329E+00	-	1.557E+01	6.44E+01	5.58E+00 G
PA-231	N	1.2702E+01					1.20E+07	
			302.65	1.182E+01	?(	7.637E+01	1.93E+02	2.88E+00 G
			300.07	1.373E+01	(	8.654E+01	1.89E+02	2.46E+00 G
PA-233	C	7.5522E-01					7.82E+08	
			312.01	-5.336E-02	%(P	6.497E+00	1.64E+03	3.60E+01 G
			300.18	5.450E+00	(	3.481E+01	1.91E+02	6.20E+00 G
PA-234	N	-1.9296E+00					1.63E+12	
			131.29	-1.930E+00	?(P	9.042E+00	6.56E+01	1.80E+01 G
			946.02	-2.711E+00	+ P	9.617E+00	1.69E+02	1.34E+01 G
			569.47	0.000E+00	+	1.395E+01	1.00E+03	8.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          883.24 4.022E+00 +   1.261E+01 9.26E+01 9.60E+00 G
                          880.53 6.411E+00 ?   1.768E+01 8.19E+01 6.00E+00 GA

PA-234M  N   5.5698E+01                                     1.63E+12
                         1001.00-2.956E+00 %(P 1.934E+02 2.39E+03 8.37E-01 G
                          766.41 2.227E+02 ?(  5.391E+02 7.29E+01 2.94E-01 G

U-235    N   2.3255E+00                                     2.57E+11
                          143.79 2.984E+00 ?(P 1.462E+01 1.47E+02 1.10E+01 G
                          205.33-6.210E+00 + P 1.939E+01 4.66E+01 5.01E+00 G
                          163.38 9.037E-01 ?(  2.032E+01 6.64E+02 5.08E+00 G

AM-241   T  -1.6089E+00                                     1.58E+05
                           59.54-1.609E+00 ?(P 5.212E+00 6.14E+01 3.59E+01 G

Np-237   F  -3.1210E+00                                     2.14E+06
                           86.49-3.121E+00 &(  1.844E+01 1.78E+02 1.31E+01 G

Ir-192   F   5.7596E-01                                     7.40E+01
                          316.49 4.257E-01 ?(  1.624E+00 1.14E+02 8.70E+01 G
                          468.06 8.286E-01 ?(  2.461E+00 8.88E+01 5.18E+01 G
                          308.44 0.000E+00 -   7.303E+00 1.00E+03 3.18E+01 G

Cs-136   F  -1.6095E-01                                     1.30E+01
                          818.50-1.609E-01 ?(  1.376E+00 2.46E+02 1.00E+02 G
                         1048.07-2.611E-01 +   1.681E+00 1.84E+02 8.00E+01 G
                          340.57-8.131E-02 %   3.915E+00 1.42E+03 4.69E+01 G

Np-239   T   1.3441E+00                                     2.36E+00
                          103.70 0.000E+00 &   9.380E+00 1.00E+03 2.40E+01 X
                          106.13 1.344E+00 &(  9.756E+00 2.18E+02 2.27E+01 G
                           99.50 0.000E+00 -   1.514E+01 1.00E+03 1.50E+01 X

Nd-147       7.6643E-01                                     1.11E+01
                          531.00 7.664E-01 ?(  6.958E+00 3.71E+02 1.30E+01 G
                           91.10-1.506E+00 +   8.047E+00 1.61E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	411.	-9.	-0.005	314.57	-2.099E+00	
AM-241	59.54	723.	-40.	-0.022	61.43	-1.609E+00	P
BA-133	80.99	1861.	-39.	-0.022	57.06	-1.272E+00	P
Np-237	86.49	2282.	-38.	-0.021	177.90	-3.121E+00	
EU-155	86.54	2410.	-41.	-0.023	172.01	-1.415E+00	
Nd-147	91.10	2122.	-41.	-0.023	160.87	-1.506E+00	
Gd-153	97.50	2198.	-37.	-0.021	178.33	-1.274E+00	
Np-239	106.13	2178.	30.	0.017	218.32	1.344E+00	
EU-152	121.78	407.	-5.	-0.003	572.36	-1.758E-01	
EU-154	123.10	334.	6.	0.003	471.50	1.356E-01	
PA-234	131.29	1136.	-34.	-0.019	65.64	-1.930E+00	P
HF-181	133.02	1102.	-8.	-0.005	573.24	-1.937E-01	
HF-181	136.30	1089.	5.	0.003	852.70	9.640E-01	
CE-141	145.44	1115.	-33.	-0.018	138.47	-7.249E-01	P
CE-139	165.85	367.	-4.	-0.002	652.21	-5.771E-02	
Cf-251	176.60	268.	-32.	-0.018	100.39	-2.200E+00	
TH-229	193.51	196.	27.	0.015	103.33	7.521E+00	
TH-229	210.85	272.	31.	0.017	107.08	1.329E+01	P
Cf-251	227.00	200.	8.	0.004	347.91	1.733E+00	
EU-152	244.69	1409.	25.	0.014	213.58	4.731E+00	P
TH-227	256.24	168.	-27.	-0.015	94.83	-5.786E+00	
Cd-113m	263.70	148.	4.	0.002	385.86	1.134E+03	
BI-210M	265.83	155.	20.	0.011	89.71	6.160E-01	P
Hg-203	279.20	232.	-25.	-0.014	88.46	-4.829E-01	
I-131	284.30	132.	-6.	-0.003	377.12	-1.557E+00	
PA-231	300.07	731.	20.	0.011	188.52	1.373E+01	
PA-233	300.18	752.	20.	0.011	191.10	5.450E+00	
PA-231	302.65	772.	20.	0.011	193.30	1.182E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	302.85	793.	20.	0.011	195.77	1.859E+00	
Ir-192	316.49	292.	22.	0.012	114.00	4.257E-01	
CR-51	320.08	185.	-10.	-0.005	194.91	-1.657E+00	P
La-140	328.76	601.	21.	0.012	164.25	1.851E+00	P
EU-152	344.29	212.	34.	0.019	63.36	2.323E+00	P
HF-181	345.83	152.	-17.	-0.009	107.87	-2.010E+00	
I-131	364.48	87.	-10.	-0.005	280.67	-2.268E-01	P
BA-133	383.84	214.	-16.	-0.009	135.71	-3.412E+00	
SN-113	391.69	196.	18.	0.010	113.46	5.571E-01	P
SB-125	427.88	82.	-14.	-0.008	131.89	-1.030E+00	
AG-108M	433.94	62.	17.	0.009	97.72	4.009E-01	P
pm-146	453.88	82.	20.	0.011	96.84	6.719E-01	
SB-125	463.37	152.	21.	0.012	85.09	4.563E+00	
Ir-192	468.06	131.	19.	0.010	88.81	8.286E-01	
BE-7	477.60	224.	-22.	-0.012	96.49	-4.924E+00	
HF-181	482.00	246.	-23.	-0.013	100.73	-6.496E-01	
La-140	487.02	224.	16.	0.009	138.58	7.974E-01	
RU-103	497.05	70.	-7.	-0.004	252.11	-1.711E-01	P
RH-106	511.86	98.	146.	0.081	19.56	1.770E+01	
Nd-147	531.00	52.	4.	0.002	371.37	7.664E-01	
CS-134	563.24	56.	8.	0.004	204.26	2.462E+00	P
CS-134	569.32	75.	2.	0.001	527.80	3.979E-01	
BI-207	569.70	62.	10.	0.005	119.90	2.595E-01	
SB-125	600.50	404.	14.	0.008	205.27	2.132E+00	
SB-124	602.73	454.	16.	0.009	191.79	4.413E-01	
CS-134	604.71	470.	6.	0.003	496.46	1.741E-01	
PM-144	618.06	532.	-19.	-0.011	171.31	-5.404E-01	
SB-125	635.89	47.	14.	0.008	72.39	3.609E+00	
AG-110M	657.76	88.	-11.	-0.006	181.72	-3.419E-01	P
CS-137	661.66	114.	-13.	-0.007	122.30	-4.362E-01	
PM-144	696.54	108.	-22.	-0.012	71.43	-6.633E-01	
NB-94	702.63	119.	18.	0.010	86.48	5.801E-01	
SB-124	722.79	115.	13.	0.007	123.51	3.657E+00	
AG-108M	722.94	127.	9.	0.005	189.51	2.958E-01	
ZR-95	724.20	143.	-8.	-0.004	218.70	-5.574E-01	
pm-146	735.72	51.	2.	0.001	649.12	3.410E-01	P
pm-146	747.16	41.	10.	0.006	138.28	9.800E-01	P
ZR-95	756.73	60.	-6.	-0.003	286.74	-3.578E-01	
AG-110M	763.94	70.	-9.	-0.005	135.63	-1.322E+00	
NB-95	765.79	114.	-7.	-0.004	224.10	-2.244E-01	
PA-234M	766.41	96.	20.	0.011	72.88	2.227E+02	
CS-134	795.87	45.	16.	0.009	66.20	6.124E-01	
CS-134	801.95	52.	12.	0.007	91.33	4.583E+00	
La-140	815.77	45.	-8.	-0.005	121.12	-1.207E+00	
Cs-136	818.50	64.	-5.	-0.003	246.20	-1.609E-01	
MN-54	834.85	45.	3.	0.002	494.97	1.051E-01	
Co-56	846.77	30.	5.	0.003	244.95	1.771E-01	
NB-94	871.10	17.	4.	0.002	165.44	1.344E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	873.23	48.	-3.	-0.002	326.95	-8.996E-01		
PA-234	880.53	32.	11.	0.006	81.88	6.411E+00		
PA-234	883.24	43.	11.	0.006	92.63	4.022E+00		
AG-110M	884.68	53.	11.	0.006	102.28	5.322E-01		
Sc-46	889.28	97.	-15.	-0.008	96.40	-5.505E-01		
y-88	898.04	25.	-2.	-0.001	603.24	-9.807E-02		P
AG-110M	937.49	37.	3.	0.001	524.40	2.972E-01		
PA-234	946.02	43.	-9.	-0.005	169.23	-2.711E+00		P
EU-152	964.11	268.	-19.	-0.011	82.95	-5.161E+00		P
EU-154	996.33	53.	11.	0.006	101.55	4.041E+00		
EU-154	1004.77	27.	4.	0.002	275.10	9.725E-01		
Co-56	1037.84	32.	7.	0.004	187.54	2.054E+00		
Cs-136	1048.07	40.	-5.	-0.003	184.39	-2.611E-01		
RH-106	1050.36	46.	-2.	-0.001	484.77	-5.365E+00		
BI-207	1063.66	17.	10.	0.006	95.53	5.803E-01		P
Ga-68	1077.40	21.	13.	0.007	87.52	1.922E+01		
FE-59	1099.25	64.	-23.	-0.013	81.16	-1.779E+00		
EU-152	1112.07	118.	-6.	-0.004	240.07	-2.085E+00		
Ta-182	1121.30	148.	-20.	-0.011	87.67	-2.556E+00		
CO-60	1173.24	28.	15.	0.009	84.94	7.041E-01		
Ta-182	1189.05	12.	24.	0.014	38.21	6.968E+00		P
Ta-182	1221.41	40.	7.	0.004	210.08	1.249E+00		P
Co-56	1238.28	74.	-3.	-0.002	462.55	-2.351E-01		P
NA-22	1274.53	17.	12.	0.007	56.52	5.855E-01		
CO-60	1332.50	18.	4.	0.002	258.37	1.954E-01		P
AG-110M	1384.30	24.	-2.	-0.001	595.82	-4.290E-01		
EU-152	1408.00	19.	-3.	-0.001	377.89	-6.700E-01		P
La-140	1596.21	38.	-20.	-0.011	123.42	-1.201E+00		P
y-88	1836.06	7.	-2.	-0.001	402.49	-1.101E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.9244E+00	-4.9244E+00	9.649E+01%	1.59E+01
NA-22	#A	5.8551E-01	5.8552E-01	5.652E+01%	1.07E+00
K-40		2.7691E+02	2.7691E+02	4.454E+00%	8.85E+00
Sc-46	#A	-5.5049E-01	-5.5049E-01	9.640E+01%	1.78E+00
CR-51	#A	-1.6573E+00	-1.6573E+00	1.949E+02%	1.15E+01
MN-54	#A	1.0507E-01	1.0507E-01	4.950E+02%	1.19E+00
FE-59	#A	-1.7792E+00	-1.7792E+00	8.116E+01%	3.07E+00
Co-56	#A	4.0958E-01	4.0958E-01	1.542E+02%	1.00E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.14E+00
CO-58	#A	-2.8686E-02	-2.8687E-02	1.339E+03%	1.35E+00
CO-60	#A	4.4967E-01	4.4967E-01	8.494E+01%	1.14E+00

ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.51E+00
NB-94	#A	5.8012E-01	5.8012E-01	8.648E+01%	1.68E+00
ZR-95	#A	-3.5784E-01	-3.5785E-01	2.867E+02%	2.31E+00
NB-95	#A	-2.2444E-01	-2.2444E-01	2.241E+02%	1.72E+00
RU-103	#A	-1.7107E-01	-1.7107E-01	2.521E+02%	1.09E+00
RH-106	#A	-2.1090E-01	-2.1090E-01	2.690E+03%	2.95E+01
AG-108M	#A	3.4824E-01	3.4824E-01	9.772E+01%	9.34E-01
AG-110M	#A	4.5680E-01	4.5680E-01	1.023E+02%	1.85E+00
SN-113	#A	5.5711E-01	5.5711E-01	1.135E+02%	2.12E+00
SB-124	#A	7.5996E-01	7.5997E-01	1.141E+02%	2.84E+00
SB-125	#A	1.3891E+00	1.3891E+00	6.709E+01%	3.23E+00
I-131	#A	-2.2678E-01	-2.2679E-01	2.807E+02%	1.07E+00
Gd-153	#A	-1.2736E+00	-1.2736E+00	1.783E+02%	7.54E+00
Ga-68	#A	1.9040E+01	1.9222E+01	8.752E+01%	3.68E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.88E+00
BA-133	#A	4.7412E-01	4.7412E-01	1.958E+02%	3.06E+00
CS-134	#A	6.3025E-01	6.3025E-01	6.620E+01%	2.91E+00
CS-137	#A	-4.3617E-01	-4.3617E-01	1.223E+02%	1.80E+00
CE-139	#A	-5.7710E-02	-5.7710E-02	6.522E+02%	1.27E+00
Ba-140	#A	2.7678E+00	2.7679E+00	8.736E+01%	3.73E+00
La-140	#A	-6.6583E-01	-6.6585E-01	1.027E+02%	1.93E+00
CE-141	#A	-7.2489E-01	-7.2490E-01	1.385E+02%	3.46E+00
CE-144	#A	2.9079E+00	2.9079E+00	1.469E+02%	1.42E+01
PM-144	#A	-6.6333E-01	-6.6334E-01	7.143E+01%	1.57E+00
EU-152	#A	2.8588E+00	2.8588E+00	6.336E+01%	4.85E+00
EU-154	#A	1.2061E+00	1.2061E+00	1.016E+02%	1.03E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.06E+01
HF-181	#A	-5.4026E-01	-5.4026E-01	1.007E+02%	2.19E+00
Ta-182	#A	4.6307E-01	4.6307E-01	3.821E+01%	7.49E+00
Hg-203	#A	-4.8288E-01	-4.8288E-01	8.846E+01%	1.42E+00
TL-208	#	1.0100E+01	1.0100E+01	6.601E+00%	8.40E-01
pm-146	#A	6.9683E-01	6.9683E-01	9.684E+01%	3.07E+00
y-88	#A	-9.8071E-02	-9.8071E-02	6.032E+02%	1.04E+00
Cd-113m	#A	1.1340E+03	1.1340E+03	3.859E+02%	1.50E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.38E+01
Cf-251	#A	-2.2001E+00	-2.2001E+00	1.004E+02%	5.36E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.20E+00
Sn-126	#A	4.2926E+00	4.2926E+00	1.275E+02%	1.82E+01
PB-210	A	2.5932E+01	2.5932E+01	4.089E+01%	2.68E+01
PB-212		3.1304E+01	3.1304E+01	3.593E+00%	1.72E+00
PB-214		1.4380E+01	1.4380E+01	7.059E+00%	2.35E+00
BI-207	#A	3.9824E-01	3.9824E-01	7.665E+01%	1.06E+00
BI-212		3.1581E+01	3.1581E+01	1.527E+01%	8.23E+00
BI-214		1.5906E+01	1.5906E+01	7.603E+00%	1.66E+00
BI-210M	#A	6.1605E-01	6.1605E-01	8.971E+01%	1.85E+00
AC-228		2.6128E+01	2.6128E+01	7.851E+00%	2.41E+00
TH-227	#A	-2.0987E+00	-2.0987E+00	3.146E+02%	2.23E+01
TH-229	#A	9.8565E+00	9.8565E+00	7.440E+01%	1.89E+01
TH-234	A	2.4943E+01	2.4943E+01	3.190E+01%	2.53E+01

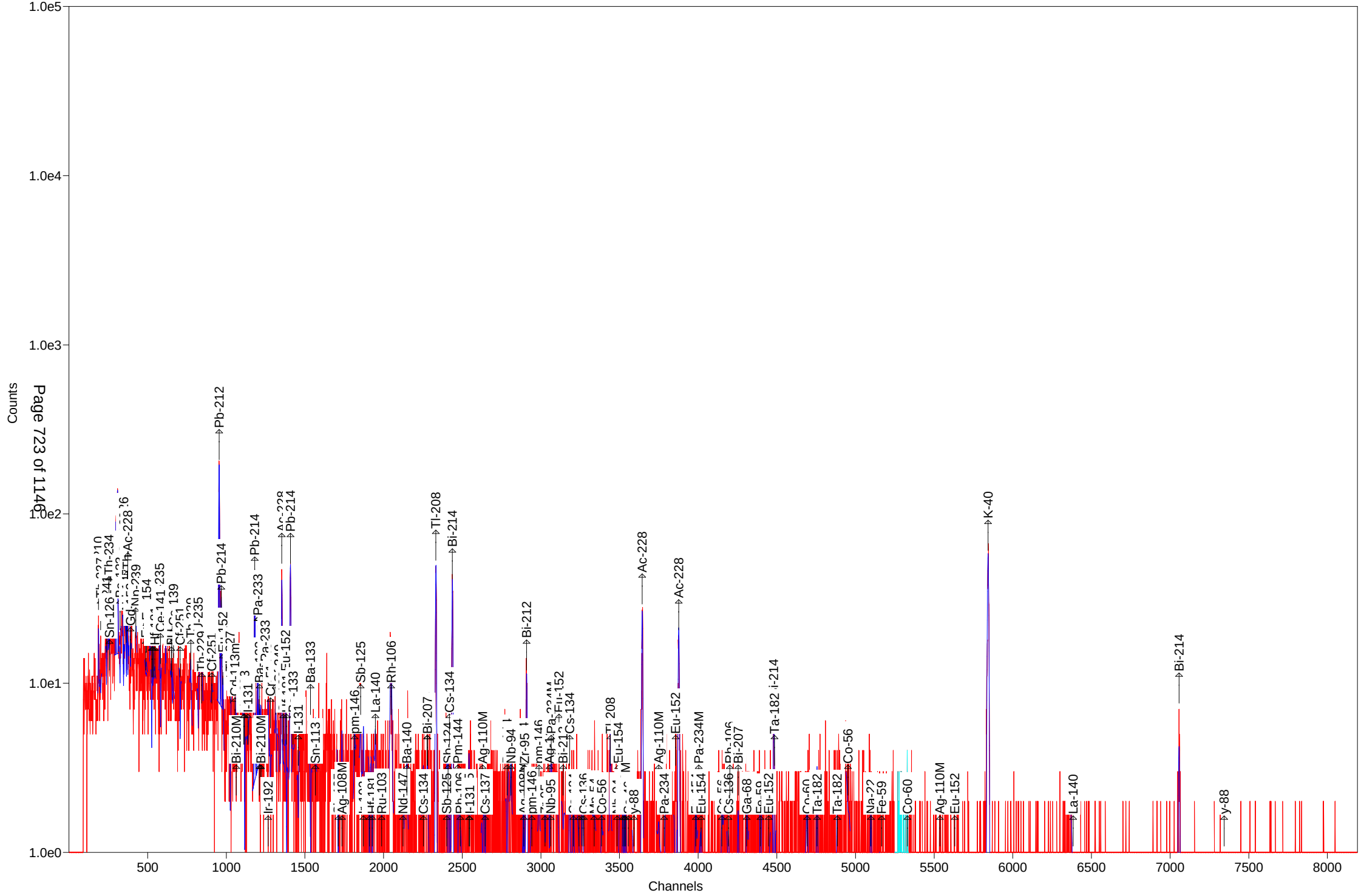
PA-231 #A	1.2702E+01	1.2702E+01	1.350E+02%	7.64E+01
PA-233 #A	7.5522E-01	7.5522E-01	1.911E+02%	6.50E+00
PA-234 #A	-1.9296E+00	-1.9296E+00	6.564E+01%	9.04E+00
PA-234M#A	5.5698E+01	5.5698E+01	7.288E+01%	1.93E+02
U-235 #A	2.3255E+00	2.3255E+00	1.471E+02%	1.46E+01
AM-241 #A	-1.6089E+00	-1.6089E+00	6.143E+01%	5.21E+00
Np-237 #A	-3.1210E+00	-3.1210E+00	1.779E+02%	1.84E+01
Ir-192 #A	5.7596E-01	5.7596E-01	7.226E+01%	1.62E+00
Cs-136 #A	-1.6094E-01	-1.6095E-01	2.462E+02%	1.38E+00
Np-239 #A	1.3439E+00	1.3441E+00	2.183E+02%	9.76E+00
Nd-147 #A	7.6640E-01	7.6643E-01	3.714E+02%	6.96E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 4.572E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.5718701E+02 Bq/Sample

264535_Gamma_160-18554-A-13-B. 13_Gamma_20160733.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20162251

Sample Description: 264535_Gamma_160-18554-A-14-B
Detector: Detector #14
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-14-B

Decay to Time: 9/1/2016 13:11 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:11:50 Real Time: 1808 sec
Analysis Time: 9/1/2016 13:42 Dead Time: 0.45 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev11.lib
Bkgd Correction File: 14_2016-08-07_0544.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.635E+00	134.9	3.555E+00	3.557E+00	1.217E+01
NA-22	4.597E-01	64.8	2.979E-01	2.988E-01	9.725E-01
K-40	2.892E+02	5.2	1.499E+01	2.107E+01	9.895E+00
Sc-46	5.937E-01	89.2	5.295E-01	5.304E-01	2.053E+00
CR-51	0.000E+00	1.#INF	2.688E+00	2.688E+00	1.390E+01
MN-54	5.701E-01	112.8	6.430E-01	6.437E-01	1.502E+00
FE-59	-3.499E-01	244.8	8.566E-01	8.568E-01	2.946E+00
Co-56	8.781E-01	103.8	9.116E-01	9.128E-01	1.321E+00
CO-57	-2.959E-01	124.1	3.671E-01	3.674E-01	1.258E+00
CO-58	5.041E-01	92.5	4.663E-01	4.670E-01	1.579E+00
CO-60	-1.017E-01	680.9	6.926E-01	6.926E-01	1.379E+00
ZN-65	-1.714E+00	116.5	1.997E+00	1.999E+00	6.743E+00
NB-94	3.832E-01	163.0	6.246E-01	6.249E-01	1.518E+00
ZR-95	1.760E+00	36.9	6.503E-01	6.567E-01	1.422E+00
NB-95	6.684E-02	1047.0	6.998E-01	6.998E-01	2.427E+00
RU-103	4.067E-01	99.0	4.028E-01	4.033E-01	1.013E+00
RH-106	1.797E+00	79.0	1.419E+00	1.422E+00	3.568E+01
AG-108M	-1.782E-01	255.0	4.544E-01	4.545E-01	1.206E+00
AG-110M	6.012E-01	123.6	7.429E-01	7.435E-01	2.547E+00
SN-113	-3.558E-01	252.7	8.990E-01	8.992E-01	3.052E+00
SB-124	4.391E-01	219.4	9.635E-01	9.638E-01	3.253E+00
SB-125	1.366E+00	129.7	1.772E+00	1.773E+00	3.764E+00
I-131	2.624E-01	90.1	2.364E-01	2.368E-01	1.318E+00
Gd-153	5.470E-01	224.4	1.227E+00	1.228E+00	4.128E+00
Ga-68	1.339E+01	147.7	1.977E+01	1.979E+01	4.632E+01
Tc-99m	3.178E-01	130.7	4.154E-01	4.158E-01	1.391E+00
BA-133	-6.114E-01	181.9	1.112E+00	1.113E+00	3.740E+00
CS-134	7.532E-01	54.2	4.079E-01	4.098E-01	3.344E+00
CS-137	-1.177E-01	647.5	7.621E-01	7.621E-01	2.633E+00
CE-139	3.353E-01	119.0	3.990E-01	4.002E-01	1.338E+00
Ba-140	-2.880E+00	94.2	2.714E+00	2.718E+00	6.669E+00
La-140	2.612E-01	102.4	2.676E-01	2.679E-01	1.702E+00
CE-141	5.899E-01	132.7	7.826E-01	7.832E-01	2.620E+00

CE-144	-3.255E+00	136.7	4.449E+00	4.452E+00	1.484E+01
PM-144	3.721E-01	124.3	4.624E-01	4.628E-01	1.184E+00
EU-152	1.416E+00	114.0	1.614E+00	1.616E+00	8.391E+00
EU-154	1.359E+00	88.5	1.203E+00	1.205E+00	1.713E+01
EU-155	-1.640E+00	166.7	2.733E+00	2.734E+00	5.894E+00
HF-181	-2.652E-01	196.7	5.218E-01	5.219E-01	1.795E+00
Ta-182	2.942E+00	84.1	2.476E+00	2.480E+00	8.289E+00
Hg-203	2.175E-01	240.3	5.226E-01	5.227E-01	1.775E+00
TL-208	1.136E+01	8.7	9.891E-01	1.151E+00	1.421E+00
pm-146	-6.404E-01	261.7	1.676E+00	1.676E+00	4.137E+00
y-88	1.049E+00	43.1	4.526E-01	4.558E-01	1.002E+00
Cd-113m	5.744E+03	98.5	5.660E+03	5.672E+03	1.900E+04
Cd-109	5.067E+00	320.1	1.622E+01	1.622E+01	5.422E+01
Cf-251	-9.442E-01	241.8	2.283E+00	2.285E+00	6.170E+00
Cf-249	-2.696E-01	305.9	8.247E-01	8.248E-01	2.808E+00
Sn-126	1.454E+00	362.9	5.276E+00	5.277E+00	1.777E+01
PB-210	2.366E+01	45.9	1.087E+01	1.096E+01	2.979E+01
PB-212	3.050E+01	4.4	1.355E+00	2.394E+00	2.446E+00
PB-214	1.486E+01	8.9	1.327E+00	1.535E+00	2.653E+00
BI-207	3.568E-01	93.5	3.335E-01	3.340E-01	1.622E+00
BI-212	4.959E+01	13.8	6.868E+00	7.335E+00	1.008E+01
BI-214	1.391E+01	9.9	1.374E+00	1.553E+00	2.142E+00
BI-210M	-6.126E-01	208.5	1.277E+00	1.278E+00	2.486E+00
AC-228	3.151E+01	6.6	2.079E+00	2.628E+00	2.273E+00
TH-227	3.339E+00	188.5	6.293E+00	6.296E+00	1.798E+01
TH-229	2.402E-01	239.0	5.741E-01	5.744E-01	2.247E+01
TH-234	1.503E+01	65.4	9.826E+00	9.857E+00	3.232E+01
PA-231	-6.600E+00	319.6	2.110E+01	2.110E+01	7.125E+01
PA-233	-1.165E+00	151.3	1.763E+00	1.764E+00	5.914E+00
PA-234	1.931E-01	94.8	1.830E-01	1.833E-01	8.734E+00
PA-234M	1.064E+02	69.3	7.379E+01	7.399E+01	2.354E+02
U-235	3.251E+00	93.0	3.022E+00	3.027E+00	1.144E+01
AM-241	-2.019E-01	723.3	1.461E+00	1.461E+00	4.171E+00
Np-237	0.000E+00	1.#INF	5.294E+00	5.294E+00	1.763E+01
Ir-192	4.558E-01	137.3	6.256E-01	6.262E-01	1.545E+00
Cs-136	3.650E-01	123.5	4.510E-01	4.514E-01	1.554E+00
Np-239	-7.550E-02	2220.4	1.676E+00	1.676E+00	5.671E+00
Nd-147	-2.729E+00	139.3	3.801E+00	3.804E+00	9.550E+00
Total	6.381E+03				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-14-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20162251.An1

Acquisition information
Start time: 9/1/2016 1:11:50 PM
Live time: 1800
Real time: 1808
Dead time: 0.45 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:11:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2016-08-07_0544.PBC 8/7/2016 5:44:13 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1734

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
47.00	39.	45.94	1.58	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	12.	188.50	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
63.29	34.	65.36	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
64.28	8.	362.93	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.85	237.	11.23	0.78	3.815E-02				
77.25	398.	7.36	0.78	3.901E-02				
87.29	151.	15.48	0.79	4.180E-02	86.54	30.700	6.545E+00	EU155
					86.94	9.040	2.218E+01	Sn126
					87.57	37.500	5.329E+00	Sn126
					88.04	3.790	5.261E+01	Cd109
90.06	109.	19.55	0.79	4.236E-02				
91.10	28.	162.17	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
93.19	123.	16.76	0.80	4.288E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.864E+01	AC228
97.50	13.	224.38	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
121.78	22.	113.98	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
123.10	14.	179.28	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
140.51	21.	130.72	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	20.	142.09	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
145.44	21.	132.68	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
162.66	10.	217.53	0.87	3.853E-02	162.66	6.220	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
163.38	18.	119.88	0.87	3.841E-02	163.38	5.080	PBC<MDA	U235
165.85	19.	118.99	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
208.66	66.	29.44	1.10	3.250E-02				
210.85	7.	361.26	0.92	3.224E-02	210.85	2.990	PBC<MDA	TH229
227.00	19.	102.73	0.93	3.046E-02	227.00	6.300	PBC<MDA	Cf251
238.23	721.	4.79	1.07	2.935E-02	238.63	43.300	3.117E+01	PB212
241.61	21.	220.98	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	20.	223.86	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
263.70	17.	98.54	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m
275.43	24.	71.01	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
279.20	8.	240.27	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
284.30	10.	186.29	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.85	145.	14.15	0.87	2.488E-02	295.09	19.300	1.637E+01	PB214
299.80	41.	37.27	1.40	2.455E-02	300.03	3.280	2.829E+01	PB212
					300.07	2.460	3.772E+01	PA231
					300.18	6.200	1.497E+01	PA233
308.44	18.	137.26	1.01	2.403E-02	308.44	31.750	PBC<MDA	Ir192
316.49	5.	311.87	1.02	2.355E-02	316.49	87.040	PBC<MDA	Ir192
328.76	18.	102.43	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
337.94	160.	12.69	1.42	2.238E-02	338.32	12.010	3.311E+01	AC228
351.56	209.	10.34	1.19	2.169E-02	351.93	37.600	1.381E+01	PB214
427.88	11.	129.68	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
462.84	50.	28.74	0.93	1.747E-02	463.37	10.470	PBC<MDA	SB125
477.60	8.	134.91	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
497.05	11.	99.05	1.19	1.650E-02	497.05	90.900	PBC<MDA	RU103
511.86	73.	39.17	2.46	1.612E-02	511.86	20.000	1.255E+01	RH106
563.24	2.	752.76	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.70	3.	404.15	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.372E+00	PA234
					569.70	97.740	1.152E-01	BI207
583.00	251.	8.71	1.33	1.453E-02	583.02	84.500	1.136E+01	TL208
600.50	10.	228.96	1.29	1.419E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	219.45	1.29	1.415E-02	602.73	98.260	PBC<MDA	SB124
604.71	9.	283.20	1.29	1.412E-02	604.71	97.620	PBC<MDA	CS134
608.98	166.	9.21	1.14	1.404E-02	609.31	46.090	1.360E+01	BI214
618.06	9.	265.18	1.30	1.387E-02	618.06	99.100	PBC<MDA	PM144
635.89	2.	447.21	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
636.97	9.	101.23	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
696.54	9.	124.28	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
702.63	8.	162.99	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
726.91	82.	13.85	1.68	1.217E-02	727.17	7.550	4.959E+01	BI212
756.73	20.	36.95	1.43	1.179E-02	756.73	54.460	1.760E+00	ZR95
766.41	14.	86.30	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.284E+02	PA234M
778.92	1.	905.54	1.44	1.151E-02	778.92	12.940	PBC<MDA	EU152
784.99	2.	418.72	1.45	1.144E-02	785.42	1.280	PBC<MDA	BI212
795.87	21.	54.15	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
810.78	10.	92.50	1.47	1.115E-02	810.78	99.460	PBC<MDA	CO58

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
815.77	7.	150.12	1.48	1.109E-02	815.77	23.280	PBC<MDA	La140
818.50	7.	123.54	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136
834.85	11.	112.80	1.49	1.088E-02	834.85	99.980	PBC<MDA	MN54
846.77	4.	268.12	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
860.45	37.	23.10	1.26	1.062E-02	860.56	12.420	1.573E+01	TL208
873.23	4.	285.04	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
880.53	11.	90.17	1.53	1.042E-02	880.53	6.000	PBC<MDA	PA234
883.24	8.	136.42	1.53	1.040E-02	883.24	9.600	PBC<MDA	PA234
884.68	8.	123.57	1.53	1.038E-02	884.68	72.680	PBC<MDA	AG110M
889.28	3.	363.62	1.54	1.034E-02	889.28	99.984	PBC<MDA	Sc46
898.04	18.	43.13	1.54	1.026E-02	898.04	93.700	1.049E+00	y88
911.06	169.	8.13	1.44	1.014E-02	911.07	29.000	3.193E+01	AC228
964.11	12.	151.97	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.95	90.	12.83	2.16	9.642E-03	968.97	17.460	2.970E+01	AC228
996.33	10.	88.48	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1001.00	9.	108.57	1.63	9.389E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	9.	105.95	1.65	9.116E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	12.	78.96	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	93.48	1.67	8.934E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	6.	147.67	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1120.41	15.	101.60	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	16.	89.20	1.72	8.561E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.026E+00	Sc46
					1121.30	34.900	2.941E+00	Ta182
1121.30	16.	84.14	1.72	8.556E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.942E+00	Ta182
1238.28	12.	117.89	1.80	7.886E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	64.82	1.83	7.700E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.306E+00	EU154
1274.54	5.	101.10	1.83	7.700E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.086E+00	EU154
1460.82	382.	5.19	1.37	6.879E-03	1460.83	10.670	2.892E+02	K40
1764.63	24.	27.40	2.14	5.878E-03	1764.49	15.400	1.483E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.77	74.87	233.	237.	6.201E+03	11.23	0.777	-	sD
308.36	77.27	230.	398.	1.020E+04	7.36	0.780	-	sD
359.39	90.05	178.	108.	2.542E+03	20.00	0.793	-	sD
833.90	208.66	88.	66.	2.015E+03	29.44	1.105	-	s
1850.50	462.84	37.	50.	2.882E+03	28.74	0.925	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	187.41	47.00	101.	39.	0.022	45.94	1.578s
TH-227	199.98	50.14	168.	12.	0.007	188.50	0.751s
AM-241	237.55	59.54	294.	-4.	-0.002	723.27	0.761s
TH-234	252.55	63.29	226.	34.	0.019	65.36	0.765D
Sn-126	256.52	64.28	468.	8.	0.005	362.93	0.766s
BA-133	323.33	80.99	307.	-10.	-0.006	260.83	0.784s
Np-237	345.33	86.49	1336.	0.	0.000	180.59	0.789A
EU-155	345.54	86.54	1254.	-29.	-0.016	176.60	0.790D
Sn-126	347.13	86.94	1179.	10.	0.005	255.91	0.790D
Sn-126	349.65	87.57	1042.	41.	0.023	60.07	0.791D
Cd-109	351.53	88.04	1071.	15.	0.008	320.11	0.791A
Nd-147	363.77	91.10	1048.	28.	0.016	162.17	0.794s
AC-228	372.76	93.35	1023.	29.	0.016	154.81	0.797s
Gd-153	389.36	97.50	408.	13.	0.007	224.38	0.801s
Np-239	397.36	99.50	429.	-27.	-0.015	108.80	0.803s
Gd-153	412.15	103.20	448.	-13.	-0.007	237.89	0.807s
Np-239	414.15	103.70	460.	0.	0.000	1000.00	0.807s
EU-155	420.60	105.31	427.	-28.	-0.015	166.67	0.809
EU-152	486.43	121.78	295.	22.	0.012	113.98	0.826s
CO-57	487.58	122.06	311.	-20.	-0.011	124.05	0.826s
EU-154	491.73	123.10	293.	14.	0.008	179.28	0.828
PA-234	524.50	131.29	652.	-28.	-0.015	131.67	0.836s
HF-181	531.42	133.02	680.	-28.	-0.015	134.13	0.838s
CE-144	533.47	133.54	708.	-28.	-0.015	136.71	0.838s
HF-181	544.52	136.30	735.	-28.	-0.015	138.81	0.841
Tc-99m	561.35	140.51	358.	21.	0.012	130.72	0.845s
U-235	574.45	143.79	380.	20.	0.011	142.09	0.849
CE-141	581.07	145.44	382.	21.	0.012	132.68	0.850s
Ba-140	649.93	162.66	209.	10.	0.005	217.53	0.868s
U-235	652.81	163.38	220.	18.	0.010	119.88	0.869
CE-139	662.70	165.85	237.	19.	0.010	118.99	0.871s
Cf-251	705.68	176.60	207.	-11.	-0.006	241.78	0.882
TH-229	773.30	193.51	158.	-7.	-0.004	313.13	0.899s
U-235	820.58	205.33	410.	-22.	-0.012	96.52	0.912s
TH-229	842.65	210.85	359.	7.	0.004	361.26	0.917
Cf-251	907.23	227.00	117.	19.	0.011	102.73	0.933s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	953.75	238.63	130.	697.	0.387	4.44	0.945D
PB-214	967.21	242.00	1024.	21.	0.011	220.98	0.948s
EU-152	977.99	244.69	1030.	20.	0.011	223.86	0.951s
Cd-113m	1054.01	263.70	129.	17.	0.009	98.54	0.970s
BI-210M	1062.53	265.83	153.	-15.	-0.008	208.49	0.972s
TL-208	1108.33	277.28	130.	24.	0.013	71.01	0.983s
Hg-203	1115.99	279.20	194.	8.	0.005	240.27	0.985s
I-131	1136.39	284.30	103.	10.	0.006	186.29	0.990s
PB-214	1178.83	294.91	70.	146.	0.081	14.24	0.878s
PB-212	1198.40	299.80	55.	41.	0.023	37.27	1.404s
PA-231	1199.46	300.07	389.	-19.	-0.010	149.94	1.006s
PA-233	1199.90	300.18	370.	-19.	-0.010	146.32	1.006s
PA-231	1209.78	302.65	351.	-8.	-0.005	319.61	1.008s
BA-133	1210.59	302.85	353.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	353.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	353.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	295.	18.	0.010	137.26	1.014s
PA-233	1247.22	312.01	361.	-18.	-0.010	151.34	1.018s
Ir-192	1265.13	316.49	136.	5.	0.003	311.87	1.022
CR-51	1279.51	320.08	141.	0.	0.000	1000.00	1.026
La-140	1314.21	328.76	92.	18.	0.010	102.43	1.034s
Cf-249	1332.92	333.44	103.	-18.	-0.010	109.90	1.039s
AC-228	1350.91	337.94	56.	160.	0.089	12.69	1.418s
Cs-136	1361.44	340.57	407.	-19.	-0.010	155.73	1.045s
EU-152	1376.30	344.29	337.	-5.	-0.003	524.07	1.049s
HF-181	1382.47	345.83	384.	-19.	-0.010	150.54	1.050s
PB-214	1405.37	351.56	60.	203.	0.113	10.78	1.187
BA-133	1423.15	356.00	349.	-15.	-0.008	181.93	1.060
I-131	1457.08	364.48	67.	-13.	-0.007	167.67	1.069s
BA-133	1534.50	383.84	173.	-17.	-0.009	112.80	1.087s
Cf-249	1550.94	387.95	190.	-6.	-0.004	305.93	1.091s
SN-113	1565.90	391.69	209.	-8.	-0.005	252.68	1.095s
SB-125	1710.63	427.88	55.	11.	0.006	129.68	1.129s
AG-108M	1734.87	433.94	51.	-5.	-0.003	255.03	1.135s
pm-146	1814.64	453.88	57.	-4.	-0.002	541.70	1.154s
SB-125	1852.59	463.37	158.	-16.	-0.009	138.43	1.163s
Ir-192	1871.36	468.06	142.	-4.	-0.002	406.55	1.167s
BE-7	1909.50	477.60	62.	8.	0.005	134.91	1.176s
HF-181	1927.10	482.00	78.	-6.	-0.004	196.72	1.180
La-140	1947.19	487.02	52.	-8.	-0.004	179.99	1.185s
RU-103	1987.33	497.05	28.	11.	0.006	99.05	1.194s
RH-106	2046.57	511.86	114.	73.	0.040	39.17	2.458s
Nd-147	2123.11	531.00	48.	-10.	-0.006	139.28	1.225s
Ba-140	2148.15	537.26	84.	-20.	-0.011	94.23	1.231
CS-134	2252.06	563.24	53.	2.	0.001	752.76	1.255
CS-134	2276.40	569.32	58.	-3.	-0.002	328.63	1.260s
PA-234	2276.99	569.47	68.	-4.	-0.002	323.08	1.261s
BI-207	2277.92	569.70	72.	3.	0.002	404.15	1.261

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	2331.11	583.00	38.	251.	0.139	8.71	1.327
SB-125	2401.12	600.50	258.	10.	0.006	228.96	1.289s
SB-124	2410.04	602.73	285.	11.	0.006	219.45	1.291s
CS-134	2417.96	604.71	296.	9.	0.005	283.20	1.292s
BI-214	2435.02	608.98	23.	158.	0.088	9.88	1.140
RU-103	2440.31	610.30	305.	0.	0.000	1000.00	1.297s
AG-108M	2456.25	614.28	305.	0.	0.000	1000.00	1.301s
PM-144	2471.37	618.06	267.	9.	0.005	265.18	1.304s
RH-106	2486.79	621.92	335.	-13.	-0.007	185.60	1.308s
SB-125	2542.69	635.89	39.	2.	0.001	447.21	1.320s
I-131	2547.03	636.97	37.	9.	0.005	101.23	1.321s
AG-110M	2630.18	657.76	107.	-19.	-0.010	81.76	1.339s
CS-137	2645.77	661.66	117.	-2.	-0.001	647.46	1.343s
PM-144	2785.32	696.54	26.	9.	0.005	124.28	1.374s
NB-94	2809.67	702.63	44.	8.	0.005	162.99	1.379s
SB-124	2890.31	722.79	134.	-13.	-0.007	130.31	1.396
AG-108M	2890.91	722.94	121.	-7.	-0.004	231.07	1.397
EU-154	2892.59	723.36	114.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	114.	0.	0.000	1000.00	1.398s
BI-212	2906.80	726.91	9.	82.	0.046	13.85	1.677
pm-146	2942.05	735.72	52.	-12.	-0.007	126.01	1.408s
pm-146	2987.81	747.16	35.	-5.	-0.003	261.67	1.417s
ZR-95	3026.09	756.73	9.	20.	0.011	36.95	1.426s
AG-110M	3054.96	763.94	99.	-21.	-0.012	70.09	1.432s
PA-234M	3064.83	766.41	67.	14.	0.008	86.30	1.434s
EU-152	3114.87	778.92	35.	1.	0.001	905.54	1.444s
BI-212	3140.88	785.42	17.	2.	0.001	418.72	1.450s
CS-134	3182.67	795.87	26.	21.	0.012	54.15	1.459s
CS-134	3207.01	801.95	37.	-14.	-0.008	94.21	1.464s
CO-58	3242.31	810.77	38.	10.	0.006	92.50	1.471s
La-140	3262.30	815.77	48.	7.	0.004	150.12	1.475s
Cs-136	3273.22	818.50	37.	7.	0.004	123.54	1.478s
MN-54	3338.63	834.85	33.	11.	0.006	112.80	1.492
Co-56	3386.32	846.77	24.	4.	0.002	268.12	1.501s
TL-208	3441.04	860.45	8.	37.	0.021	23.10	1.257
NB-94	3483.65	871.10	51.	-15.	-0.008	72.11	1.522s
EU-154	3492.19	873.23	63.	4.	0.002	285.04	1.523s
PA-234	3521.39	880.53	41.	11.	0.006	90.17	1.529
PA-234	3532.24	883.24	51.	8.	0.004	136.42	1.531s
AG-110M	3538.01	884.68	47.	8.	0.005	123.57	1.533s
Sc-46	3556.40	889.28	58.	3.	0.002	363.62	1.536s
y-88	3591.45	898.04	10.	18.	0.010	43.13	1.543s
AC-228	3643.56	911.06	4.	169.	0.094	8.13	1.437s
PA-234	3783.42	946.02	47.	-9.	-0.005	170.62	1.582s
EU-152	3855.80	964.11	151.	12.	0.006	151.97	1.597s
AC-228	3875.17	968.95	10.	90.	0.050	12.83	2.157s
EU-154	3984.71	996.33	32.	10.	0.005	88.48	1.622s
PA-234M	4003.39	1001.00	43.	9.	0.005	108.57	1.626s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4018.51	1004.77	62.	-4.	-0.002	315.62	1.629
Co-56	4150.81	1037.84	15.	9.	0.005	105.95	1.655s
Cs-136	4191.74	1048.07	30.	-10.	-0.006	83.67	1.663s
RH-106	4200.91	1050.36	36.	12.	0.006	78.96	1.665s
BI-207	4254.12	1063.66	10.	8.	0.004	93.48	1.675s
Ga-68	4309.10	1077.40	15.	6.	0.003	147.67	1.685s
FE-59	4396.54	1099.25	25.	-3.	-0.002	244.82	1.702s
EU-152	4447.85	1112.07	131.	-16.	-0.009	105.88	1.712s
ZN-65	4461.74	1115.55	115.	-13.	-0.007	116.49	1.714s
BI-214	4480.72	1120.29	108.	15.	0.008	101.60	1.718s
Sc-46	4481.77	1120.55	92.	16.	0.009	89.20	1.718s
Ta-182	4484.77	1121.30	81.	16.	0.009	84.14	1.719s
CO-60	4692.60	1173.24	41.	-15.	-0.008	103.13	1.757s
Ta-182	4755.88	1189.05	35.	-12.	-0.007	112.17	1.769s
Ta-182	4885.38	1221.41	48.	-17.	-0.010	87.61	1.792s
Co-56	4952.89	1238.28	38.	12.	0.007	117.89	1.805s
NA-22	5097.96	1274.53	5.	6.	0.004	64.82	1.831s
EU-154	5098.01	1274.54	12.	5.	0.003	101.10	1.831s
CO-60	5329.96	1332.50	11.	-1.	-0.001	680.91	1.871s
EU-152	5632.13	1408.00	21.	-11.	-0.006	97.28	1.923s
K-40	5843.53	1460.82	5.	382.	0.212	5.19	1.366s
La-140	6385.44	1596.21	12.	-5.	-0.003	417.77	2.044s
SB-124	6764.81	1690.98	0.	0.	0.000	1000.00	2.102s
BI-214	7059.07	1764.49	10.	24.	0.013	27.40	2.145s
y-88	7345.59	1836.06	12.	-4.	-0.002	215.06	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.6348E+00				5.31E+01	
			477.60	2.635E+00	?(	1.217E+01	1.35E+02 1.05E+01 G
NA-22	C	4.5968E-01				9.50E+02	
			1274.53	4.597E-01	?(	9.725E-01	6.48E+01 9.99E+01 G
K-40	N	2.8919E+02				4.66E+11	
			1460.83	2.892E+02	(P	9.895E+00	5.19E+00 1.07E+01 G
Sc-46	F	5.9366E-01				8.38E+01	
			889.28	1.612E-01	&(	2.053E+00	3.64E+02 1.00E+02 G
			1120.55	1.026E+00	?(	3.069E+00	8.92E+01 1.00E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 5.7007E-01					3.12E+02	
		834.85	5.701E-01	?(P	1.502E+00	1.13E+02	1.00E+02 G
FE-59	F -3.4990E-01					4.45E+01	
		1099.25	-3.499E-01	?(P	2.946E+00	2.45E+02	5.65E+01 G
		1291.60	1.399E-01	% P	3.622E+00	1.11E+03	4.32E+01 G
Co-56	C 8.7808E-01					7.73E+01	
		846.77	2.026E-01	&(P	1.321E+00	2.68E+02	9.99E+01 G
		1238.28	1.299E+00	?(P	3.345E+00	1.18E+02	6.61E+01 G
		1037.84	3.688E+00	&(P	9.069E+00	1.06E+02	1.41E+01 G
		1771.35	-5.104E-01	%	1.851E+01	1.01E+03	1.55E+01 A
CO-57	C -2.9589E-01					2.72E+02	
		122.06	-2.959E-01	?(P	1.258E+00	1.24E+02	8.56E+01 G
		136.47	-3.880E-01	%	1.549E+01	1.19E+03	1.07E+01 G
CO-58	C 5.0406E-01					7.09E+01	
		810.78	5.041E-01	&(P	1.579E+00	9.25E+01	9.95E+01 G
CO-60	F -1.0171E-01					1.93E+03	
		1332.50	-1.017E-01	?(P	1.379E+00	6.81E+02	1.00E+02 G
		1173.24	-9.995E-01	+ P	2.191E+00	1.03E+02	9.99E+01 G
ZN-65	F -1.7144E+00					2.44E+02	
		1115.55	-1.714E+00	&(	6.743E+00	1.16E+02	5.06E+01 G
NB-94	I 3.8323E-01					7.41E+06	
		702.63	3.832E-01	(P	1.518E+00	1.63E+02	9.79E+01 G
		871.10	-7.934E-01	+	1.904E+00	7.21E+01	9.99E+01 G
ZR-95	I 1.7600E+00					6.40E+01	
		756.73	1.760E+00	&(	1.422E+00	3.69E+01	5.45E+01 G
		724.20	0.000E+00	-	5.406E+00	1.00E+03	4.42E+01 G
NB-95	I 6.6836E-02					6.40E+01	
		765.79	6.684E-02	&(P	2.427E+00	1.05E+03	9.98E+01 G
RU-103	I 4.0667E-01					3.93E+01	
		497.05	4.067E-01	?(	1.013E+00	9.90E+01	9.09E+01 G
		610.30	0.000E+00	-	5.799E+01	1.00E+03	5.75E+00 GA
RH-106	I 1.7973E+00					3.74E+02	
		621.92	-5.096E+00	?(P	3.568E+01	1.86E+02	9.93E+00 G
		1050.36	4.568E+01	?(	1.210E+02	7.90E+01	1.56E+00 G
		511.86	1.255E+01	? P	9.045E+00	3.92E+01	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -1.7817E-01					1.53E+05	
		433.94	-1.782E-01	?(	1.206E+00	2.55E+02	9.05E+01 G
		722.94	-3.412E-01	+	2.697E+00	2.31E+02	9.08E+01 G
		614.28	0.000E+00	+	3.730E+00	1.00E+03	8.98E+01 G
AG-110M	F 6.0118E-01					2.50E+02	
		884.68	6.012E-01	?(	2.547E+00	1.24E+02	7.27E+01 G
		657.76	-8.288E-01	+	2.262E+00	8.18E+01	9.46E+01 G
		937.49	-1.088E-01	%	3.729E+00	1.38E+03	3.44E+01 G
		1384.30	1.060E-01	%	5.702E+00	2.23E+03	2.43E+01 G
		763.94	-4.503E+00	+	1.046E+01	7.01E+01	2.23E+01 G
SN-113	F -3.5577E-01					1.15E+02	
		391.69	-3.558E-01	?(	3.052E+00	2.53E+02	6.40E+01 G
SB-124	F 4.3907E-01					6.02E+01	
		602.73	4.391E-01	(	3.253E+00	2.19E+02	9.83E+01 G
		1690.98	0.000E+00	-	1.407E+00	1.00E+03	4.78E+01 G
		722.79	-5.398E+00	+	2.378E+01	1.30E+02	1.08E+01 G
SB-125	I 1.3660E+00					1.01E+03	
		427.88	1.111E+00	?(	3.764E+00	1.30E+02	2.96E+01 G
		600.50	2.195E+00	?(	1.700E+01	2.29E+02	1.79E+01 G
		635.89	7.246E-01	&(	1.153E+01	4.47E+02	1.13E+01 G
		463.37	-4.827E+00	+ P	1.864E+01	1.38E+02	1.05E+01 G
I-131	I 2.6237E-01					8.02E+00	
		364.48	-4.212E-01	?(P	1.318E+00	1.68E+02	8.17E+01 G
		284.30	3.650E+00	?(P	1.765E+01	1.86E+02	6.14E+00 G
		636.97	5.151E+00	?(	1.777E+01	1.01E+02	7.17E+00 G
Gd-153	F 5.4701E-01					2.42E+02	
		97.50	5.470E-01	?(	4.128E+00	2.24E+02	3.00E+01 G
		103.20	-7.349E-01	+	5.878E+00	2.38E+02	2.18E+01 G
Ga-68	C 1.3389E+01					4.71E-02	
		1077.40	1.339E+01	?(	4.632E+01	1.48E+02	3.30E+00 G
Tc-99m	I 3.1778E-01					2.51E-01	
		140.51	3.178E-01	?(	1.391E+00	1.31E+02	8.93E+01 G
BA-133	F -6.1138E-01					3.85E+03	
		356.00	-6.114E-01	?(	3.740E+00	1.82E+02	6.20E+01 G
		302.85	0.000E+00	&	1.123E+01	1.00E+03	1.83E+01 G
		383.84	-5.188E+00	&	1.966E+01	1.13E+02	8.94E+00 GA
		80.99	-4.143E-01	+ P	3.424E+00	2.61E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	7.5322E-01				7.54E+02		
			604.71	3.491E-01	?(	3.344E+00	2.83E+02	9.76E+01 G
			795.87	1.206E+00	&(	1.520E+00	5.42E+01	8.55E+01 G
			569.32	-8.128E-01	+	9.340E+00	3.29E+02	1.54E+01 G
			801.95	-8.149E+00	+	1.773E+01	9.42E+01	8.69E+00 G
			563.24	8.443E-01	?(P	1.633E+01	7.53E+02	8.35E+00 G
CS-137	I	-1.1771E-01				1.10E+04		
			661.66	-1.177E-01	?(	2.633E+00	6.47E+02	8.52E+01 G
CE-139	F	3.3527E-01				1.38E+02		
			165.85	3.353E-01	&(	1.338E+00	1.19E+02	7.99E+01 G
Ba-140	I	-2.8798E+00				1.28E+01		
			537.26	-2.880E+00	(	6.669E+00	9.42E+01	2.44E+01 G
			162.66	2.207E+00	+ P	1.626E+01	2.18E+02	6.22E+00 G
			304.85	0.000E+00	+	4.821E+01	1.00E+03	4.29E+00 G
La-140	I	2.6122E-01				1.28E+01		
			1596.21	-4.326E-01	?(P	1.702E+00	4.18E+02	9.54E+01 G
			487.02	-5.823E-01	+	2.643E+00	1.80E+02	4.55E+01 G
			328.76	2.151E+00	?(	5.666E+00	1.02E+02	2.03E+01 G
			815.77	1.456E+00	&(	7.547E+00	1.50E+02	2.33E+01 G
CE-141	I	5.8986E-01				3.25E+01		
			145.44	5.899E-01	&(	2.620E+00	1.33E+02	4.82E+01 G
CE-144	I	-3.2546E+00				2.85E+02		
			133.54	-3.255E+00	(	1.484E+01	1.37E+02	1.11E+01 G
PM-144	C	3.7207E-01				3.63E+02		
			696.54	3.890E-01	*(P	1.184E+00	1.24E+02	9.90E+01 G
			618.06	3.551E-01	?(P	3.187E+00	2.65E+02	9.91E+01 G
EU-152	F	1.4163E+00				4.94E+03		
			344.29	-4.727E-01	&(	8.391E+00	5.24E+02	2.65E+01 G
			1112.07	-7.445E+00	+	2.651E+01	1.06E+02	1.36E+01 G
			121.78	9.634E-01	&(P	3.673E+00	1.14E+02	2.86E+01 G
			778.92	4.972E-01	(	1.124E+01	9.06E+02	1.29E+01 G
			964.11	4.584E+00	?(	2.359E+01	1.52E+02	1.46E+01 G
			244.69	5.194E+00	&(	3.882E+01	2.24E+02	7.58E+00 G
			1408.00	-4.227E+00	+	9.038E+00	9.73E+01	2.10E+01 GA
EU-154	I	1.3594E+00				3.14E+03		
			873.23	1.726E+00	?(	1.713E+01	2.85E+02	1.23E+01 G
			123.10	4.258E-01	(	2.571E+00	1.79E+02	4.08E+01 G
			1274.54	1.086E+00	?(	3.824E+00	1.01E+02	3.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			723.36	0.000E+00	-	1.179E+01	1.00E+03	2.02E+01 G
			1004.77	-1.175E+00	&	1.294E+01	3.16E+02	1.80E+01 G
			996.33	5.434E+00	(	1.628E+01	8.85E+01	1.06E+01 G
EU-155	I	-1.6397E+00					1.81E+03	
			105.31	-1.640E+00	(P	5.894E+00	1.67E+02	2.12E+01 G
			86.54	-1.240E+00	+	7.290E+00	1.77E+02	3.07E+01 G
HF-181	F	-2.6523E-01					4.24E+01	
			482.00	-2.652E-01	&(	1.795E+00	1.97E+02	8.05E+01 G
			133.02	-8.320E-01	+	3.721E+00	1.34E+02	4.33E+01 G
			345.83	-3.124E+00	+	1.577E+01	1.51E+02	1.51E+01 G
			136.30	-6.239E+00	+	2.888E+01	1.39E+02	5.85E+00 G
Ta-182	F	2.9423E+00					1.14E+02	
			1121.30	2.942E+00	?(	8.289E+00	8.41E+01	3.49E+01 G
			1221.41	-4.511E+00	+ P	9.071E+00	8.76E+01	2.70E+01 G
			1189.05	-5.047E+00	+	1.274E+01	1.12E+02	1.62E+01 G
Hg-203	F	2.1750E-01					4.66E+01	
			279.20	2.175E-01	&(	1.775E+00	2.40E+02	8.15E+01 G
TL-208	N	1.1356E+01					6.98E+02	
			583.02	1.136E+01	(P	1.421E+00	8.71E+00	8.45E+01 G
			277.28	8.002E+00	&	1.884E+01	7.10E+01	6.31E+00 G
			860.56	1.573E+01	+	6.576E+00	2.31E+01	1.24E+01 G
pm-146	C	-6.4039E-01					2.02E+03	
			747.16	-6.404E-01	?(	4.137E+00	2.62E+02	3.40E+01 G
			735.72	-2.458E+00	&	7.437E+00	1.26E+02	2.25E+01 G
			453.88	-1.953E-01	+ P	1.827E+00	5.42E+02	6.50E+01 G
y-88	F	1.0495E+00					1.07E+02	
			898.04	1.049E+00	?(P	1.002E+00	4.31E+01	9.37E+01 G
			1836.06	-3.940E-01	-	1.857E+00	2.15E+02	9.92E+01 G
Cd-113m		5.7439E+03					5.33E+03	
			263.70	5.744E+03	?(	1.900E+04	9.85E+01	6.00E-03 K
Cd-109	F	5.0674E+00					4.53E+02	
							Derived Ave Activity	
			88.04	5.067E+00	}(	5.422E+01	3.20E+02	3.79E+00 G
Cf-251	T	-9.4424E-01					3.28E+05	
			176.60	-9.442E-01	(	6.170E+00	2.42E+02	1.70E+01 G
			227.00	5.555E+00		1.535E+01	1.03E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-2.6956E-01					1.28E+05	
			387.95	-2.696E-01	?(	2.808E+00	3.06E+02	6.60E+01 G
			333.44	-2.799E+00	&	7.910E+00	1.10E+02	1.55E+01 G
Sn-126		1.4538E+00					3.65E+07	
			87.57	1.454E+00	}	5.420E+00	6.01E+01	3.75E+01 GA
			64.28	1.454E+00	&(	1.777E+01	3.63E+02	9.70E+00 G
			86.94	1.454E+00	}	2.397E+01	2.56E+02	9.04E+00 GA
PB-210	N	2.3658E+01					8.14E+03	
			46.54	2.366E+01	*(P	2.979E+01	4.59E+01	4.25E+00 G
PB-212	N	3.0498E+01					6.98E+02	
			238.63	3.050E+01	(P	2.446E+00	4.44E+00	4.33E+01 G
			300.03	2.829E+01		2.571E+01	3.73E+01	3.28E+00 GA
PB-214	N	1.4857E+01					5.84E+05	
			351.93	1.381E+01	(P	2.653E+00	1.08E+01	3.76E+01 G
			295.09	1.689E+01	@(P	4.830E+00	1.42E+01	1.93E+01 G
			242.00	5.307E+00	-	3.915E+01	2.21E+02	7.43E+00 GA
BI-207	C	3.5679E-01					1.18E+04	
			569.70	1.152E-01	&(	1.622E+00	4.04E+02	9.77E+01 G
			1063.66	6.738E-01	?(P	1.466E+00	9.35E+01	7.45E+01 G
BI-212	N	4.9592E+01					6.98E+02	
			727.17	4.959E+01	(P	1.008E+01	1.38E+01	7.55E+00 G
			785.42	7.812E+00	-	8.392E+01	4.19E+02	1.28E+00 GA
BI-214	N	1.3906E+01					5.84E+05	
			609.31	1.360E+01	(P	2.142E+00	9.88E+00	4.61E+01 G
			1120.29	6.435E+00	- P	2.199E+01	1.02E+02	1.51E+01 G
			1764.49	1.483E+01	?(	1.063E+01	2.74E+01	1.54E+01 G
BI-210M	T	-6.1264E-01					1.10E+09	
			265.83	-6.126E-01	?(P	2.486E+00	2.08E+02	5.00E+01 G
			304.90	0.000E+00	+	7.387E+00	1.00E+03	2.80E+01 G
AC-228	N	3.1508E+01					2.10E+03	
			911.07	3.193E+01	(	2.273E+00	8.13E+00	2.90E+01 G
			968.97	2.970E+01	(	5.757E+00	1.28E+01	1.75E+01 G
			338.32	3.311E+01	@(	7.777E+00	1.27E+01	1.20E+01 G
			93.35	6.853E+00	-	3.534E+01	1.55E+02	5.56E+00 XA
TH-227	N	3.3387E+00					7.95E+03	
			50.14	3.339E+00	?(P	1.798E+01	1.88E+02	8.00E+00 G
			256.24	-2.861E-01	%	1.538E+01	1.95E+03	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	2.4016E-01					2.68E+06	
			193.51	-2.515E+00	?(P	2.247E+01	3.13E+02	4.40E+00 G
			210.85	4.294E+00	&(	5.242E+01	3.61E+02	2.99E+00 G
TH-234	N	1.5032E+01					1.63E+12	
			63.29	1.503E+01	(P	3.232E+01	6.54E+01	3.81E+00 G
			92.59	9.155E-01	& P	3.571E+01	1.17E+03	5.58E+00 G
PA-231	N	-6.6003E+00					1.20E+07	
			302.65	-6.600E+00	?(	7.125E+01	3.20E+02	2.88E+00 G
			300.07	-1.732E+01	+	8.705E+01	1.50E+02	2.46E+00 G
PA-233	C	-1.1649E+00					7.82E+08	
			312.01	-1.165E+00	(	5.914E+00	1.51E+02	3.60E+01 G
			300.18	-6.876E+00	+	3.373E+01	1.46E+02	6.20E+00 G
PA-234	N	1.9306E-01					1.63E+12	
			131.29	-1.989E+00	?(	8.734E+00	1.32E+02	1.80E+01 G
			946.02	-3.654E+00	+	1.457E+01	1.71E+02	1.34E+01 G
			569.47	-1.677E+00	+	1.886E+01	3.23E+02	8.20E+00 G
			883.24	4.285E+00	?(	2.009E+01	1.36E+02	9.60E+00 G
			880.53	9.447E+00	&	2.880E+01	9.02E+01	6.00E+00 GA
PA-234M	N	1.0641E+02					1.63E+12	
			1001.00	6.355E+01	?(P	2.354E+02	1.09E+02	8.37E-01 G
			766.41	2.284E+02	?(	6.618E+02	8.63E+01	2.94E-01 G
U-235	N	3.2515E+00					2.57E+11	
			143.79	2.403E+00	(P	1.144E+01	1.42E+02	1.10E+01 G
			205.33	-7.511E+00	+ P	3.271E+01	9.65E+01	5.01E+00 G
			163.38	5.081E+00	(P	2.044E+01	1.20E+02	5.08E+00 G
AM-241	T	-2.0195E-01					1.58E+05	
			59.54	-2.019E-01	?(	4.171E+00	7.23E+02	3.59E+01 G
Ir-192	F	4.5580E-01					7.40E+01	
			316.49	1.446E-01	?(	1.545E+00	3.12E+02	8.70E+01 G
			468.06	-2.591E-01	+	3.614E+00	4.07E+02	5.18E+01 G
			308.44	1.309E+00	&(	6.030E+00	1.37E+02	3.18E+01 G
Cs-136	F	3.6503E-01					1.30E+01	
			818.50	3.650E-01	?(	1.554E+00	1.24E+02	1.00E+02 G
			1048.07	-7.680E-01	+	2.168E+00	8.37E+01	8.00E+01 G
			340.57	-9.870E-01	+	5.152E+00	1.56E+02	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -7.5503E-02                                      2.36E+00
                          103.70 0.000E+00 +   5.410E+00 1.00E+03 2.40E+01 X
                          106.13-7.550E-02 %(  5.671E+00 2.22E+03 2.27E+01 G
                           99.50-2.321E+00 &   8.420E+00 1.09E+02 1.50E+01 X

Nd-147      -2.7291E+00                                      1.11E+01
                          531.00-2.729E+00 ?(  9.550E+00 1.39E+02 1.30E+01 G
                           91.10 1.312E+00 +   7.086E+00 1.62E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	168.	12.	0.007	188.50	3.339E+00	P
AM-241	59.54	294.	-4.	-0.002	723.27	-2.019E-01	
BA-133	80.99	307.	-10.	-0.006	260.83	-4.143E-01	P
EU-155	86.54	1254.	-29.	-0.016	176.60	-1.240E+00	
Nd-147	91.10	1048.	28.	0.016	162.17	1.312E+00	
Gd-153	97.50	408.	13.	0.007	224.38	5.470E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	99.50	429.	-27.	-0.015	108.80	-2.321E+00	
Gd-153	103.20	448.	-13.	-0.007	237.89	-7.349E-01	
EU-155	105.31	427.	-28.	-0.015	166.67	-1.640E+00	P
EU-152	121.78	295.	22.	0.012	113.98	9.634E-01	P
CO-57	122.06	311.	-20.	-0.011	124.05	-2.959E-01	P
EU-154	123.10	293.	14.	0.008	179.28	4.258E-01	
PA-234	131.29	652.	-28.	-0.015	131.67	-1.989E+00	
HF-181	133.02	680.	-28.	-0.015	134.13	-8.320E-01	
CE-144	133.54	708.	-28.	-0.015	136.71	-3.255E+00	
HF-181	136.30	735.	-28.	-0.015	138.81	-6.239E+00	
Tc-99m	140.51	358.	21.	0.012	130.72	3.178E-01	
U-235	143.79	380.	20.	0.011	142.09	2.403E+00	P
CE-141	145.44	382.	21.	0.012	132.68	5.899E-01	
Ba-140	162.66	209.	10.	0.005	217.53	2.207E+00	P
U-235	163.38	220.	18.	0.010	119.88	5.081E+00	P
CE-139	165.85	237.	19.	0.010	118.99	3.353E-01	
Cf-251	176.60	207.	-11.	-0.006	241.78	-9.442E-01	
TH-229	193.51	158.	-7.	-0.004	313.13	-2.515E+00	P
U-235	205.33	410.	-22.	-0.012	96.52	-7.511E+00	P
TH-229	210.85	359.	7.	0.004	361.26	4.294E+00	
Cf-251	227.00	117.	19.	0.011	102.73	5.555E+00	
EU-152	244.69	1030.	20.	0.011	223.86	5.194E+00	
Cd-113m	263.70	129.	17.	0.009	98.54	5.744E+03	
BI-210M	265.83	153.	-15.	-0.008	208.49	-6.126E-01	P
Hg-203	279.20	194.	8.	0.005	240.27	2.175E-01	
I-131	284.30	103.	10.	0.006	186.29	3.650E+00	P
PA-231	300.07	389.	-19.	-0.010	149.94	-1.732E+01	
PA-233	300.18	370.	-19.	-0.010	146.32	-6.876E+00	
PA-231	302.65	351.	-8.	-0.005	319.61	-6.600E+00	
Ir-192	308.44	295.	18.	0.010	137.26	1.309E+00	
PA-233	312.01	361.	-18.	-0.010	151.34	-1.165E+00	
Ir-192	316.49	136.	5.	0.003	311.87	1.446E-01	
La-140	328.76	92.	18.	0.010	102.43	2.151E+00	
Cf-249	333.44	103.	-18.	-0.010	109.90	-2.799E+00	
Cs-136	340.57	407.	-19.	-0.010	155.73	-9.870E-01	
EU-152	344.29	337.	-5.	-0.003	524.07	-4.727E-01	
HF-181	345.83	384.	-19.	-0.010	150.54	-3.124E+00	
BA-133	356.00	349.	-15.	-0.008	181.93	-6.114E-01	
I-131	364.48	67.	-13.	-0.007	167.67	-4.212E-01	P
BA-133	383.84	173.	-17.	-0.009	112.80	-5.188E+00	
Cf-249	387.95	190.	-6.	-0.004	305.93	-2.696E-01	
SN-113	391.69	209.	-8.	-0.005	252.68	-3.558E-01	
SB-125	427.88	55.	11.	0.006	129.68	1.111E+00	
AG-108M	433.94	51.	-5.	-0.003	255.03	-1.782E-01	
pm-146	453.88	57.	-4.	-0.002	541.70	-1.953E-01	P
SB-125	463.37	158.	-16.	-0.009	138.43	-4.827E+00	P
Ir-192	468.06	142.	-4.	-0.002	406.55	-2.591E-01	
BE-7	477.60	62.	8.	0.005	134.91	2.635E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	482.00	78.	-6.	-0.004	196.72	-2.652E-01	
La-140	487.02	52.	-8.	-0.004	179.99	-5.823E-01	
RU-103	497.05	28.	11.	0.006	99.05	4.067E-01	
RH-106	511.86	114.	73.	0.040	39.17	1.255E+01	P
Nd-147	531.00	48.	-10.	-0.006	139.28	-2.729E+00	
Ba-140	537.26	84.	-20.	-0.011	94.23	-2.880E+00	
CS-134	563.24	53.	2.	0.001	752.76	8.443E-01	P
CS-134	569.32	58.	-3.	-0.002	328.63	-8.128E-01	
PA-234	569.47	68.	-4.	-0.002	323.08	-1.677E+00	
BI-207	569.70	72.	3.	0.002	404.15	1.152E-01	
SB-125	600.50	258.	10.	0.006	228.96	2.195E+00	
SB-124	602.73	285.	11.	0.006	219.45	4.391E-01	
CS-134	604.71	296.	9.	0.005	283.20	3.491E-01	
PM-144	618.06	267.	9.	0.005	265.18	3.551E-01	P
RH-106	621.92	335.	-13.	-0.007	185.60	-5.096E+00	P
SB-125	635.89	39.	2.	0.001	447.21	7.246E-01	
I-131	636.97	37.	9.	0.005	101.23	5.151E+00	
AG-110M	657.76	107.	-19.	-0.010	81.76	-8.288E-01	
CS-137	661.66	117.	-2.	-0.001	647.46	-1.177E-01	
PM-144	696.54	26.	9.	0.005	124.28	3.890E-01	P
NB-94	702.63	44.	8.	0.005	162.99	3.832E-01	P
SB-124	722.79	134.	-13.	-0.007	130.31	-5.398E+00	
AG-108M	722.94	121.	-7.	-0.004	231.07	-3.412E-01	
pm-146	735.72	52.	-12.	-0.007	126.01	-2.458E+00	
pm-146	747.16	35.	-5.	-0.003	261.67	-6.404E-01	
AG-110M	763.94	99.	-21.	-0.012	70.09	-4.503E+00	
PA-234M	766.41	67.	14.	0.008	86.30	2.284E+02	
EU-152	778.92	35.	1.	0.001	905.54	4.972E-01	
CS-134	795.87	26.	21.	0.012	54.15	1.206E+00	
CS-134	801.95	37.	-14.	-0.008	94.21	-8.149E+00	
CO-58	810.77	38.	10.	0.006	92.50	5.041E-01	P
La-140	815.77	48.	7.	0.004	150.12	1.456E+00	
Cs-136	818.50	37.	7.	0.004	123.54	3.650E-01	
MN-54	834.85	33.	11.	0.006	112.80	5.701E-01	P
Co-56	846.77	24.	4.	0.002	268.12	2.026E-01	P
NB-94	871.10	51.	-15.	-0.008	72.11	-7.934E-01	
EU-154	873.23	63.	4.	0.002	285.04	1.726E+00	
PA-234	880.53	41.	11.	0.006	90.17	9.447E+00	
PA-234	883.24	51.	8.	0.004	136.42	4.285E+00	
AG-110M	884.68	47.	8.	0.005	123.57	6.012E-01	
Sc-46	889.28	58.	3.	0.002	363.62	1.612E-01	
PA-234	946.02	47.	-9.	-0.005	170.62	-3.654E+00	
EU-152	964.11	151.	12.	0.006	151.97	4.584E+00	
EU-154	996.33	32.	10.	0.005	88.48	5.434E+00	
PA-234M	1001.00	43.	9.	0.005	108.57	6.355E+01	P
EU-154	1004.77	62.	-4.	-0.002	315.62	-1.175E+00	
Co-56	1037.84	15.	9.	0.005	105.95	3.688E+00	P
Cs-136	1048.07	30.	-10.	-0.006	83.67	-7.680E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
RH-106	1050.36	36.	12.	0.006	78.96	4.568E+01		
BI-207	1063.66	10.	8.	0.004	93.48	6.738E-01		P
Ga-68	1077.40	15.	6.	0.003	147.67	1.339E+01		
FE-59	1099.25	25.	-3.	-0.002	244.82	-3.499E-01		P
EU-152	1112.07	131.	-16.	-0.009	105.88	-7.445E+00		
ZN-65	1115.55	115.	-13.	-0.007	116.49	-1.714E+00		
Sc-46	1120.55	92.	16.	0.009	89.20	1.026E+00		
Ta-182	1121.30	81.	16.	0.009	84.14	2.942E+00		
CO-60	1173.24	41.	-15.	-0.008	103.13	-9.995E-01		P
Ta-182	1189.05	35.	-12.	-0.007	112.17	-5.047E+00		
Ta-182	1221.41	48.	-17.	-0.010	87.61	-4.511E+00		P
Co-56	1238.28	38.	12.	0.007	117.89	1.299E+00		P
NA-22	1274.53	5.	6.	0.004	64.82	4.597E-01		
EU-154	1274.54	12.	5.	0.003	101.10	1.086E+00		
CO-60	1332.50	11.	-1.	-0.001	680.91	-1.017E-01		P
EU-152	1408.00	21.	-11.	-0.006	97.28	-4.227E+00		
La-140	1596.21	12.	-5.	-0.003	417.77	-4.326E-01		P

P - Peakbackground subtraction

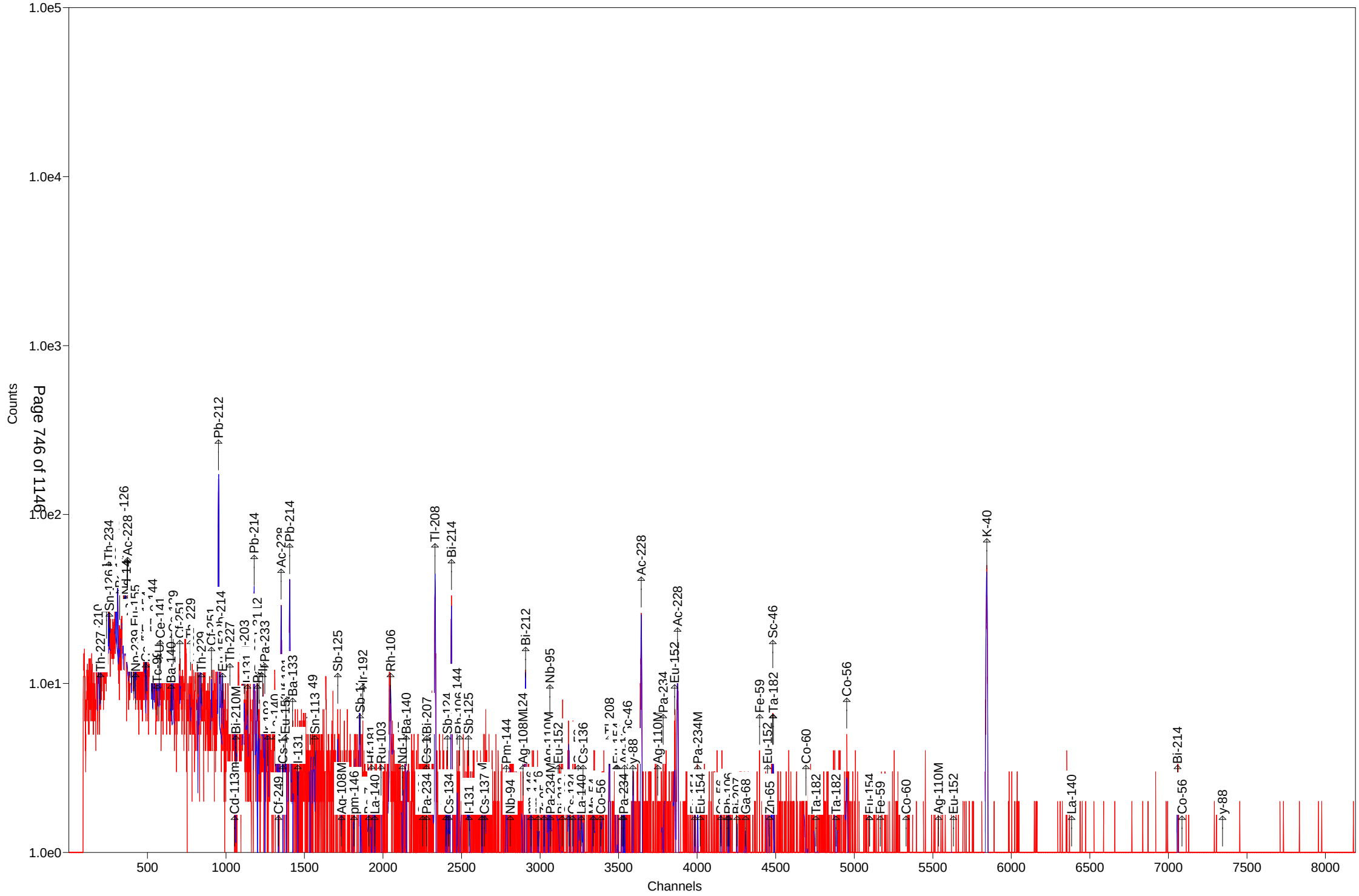
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.6348E+00	2.6348E+00	1.349E+02%	1.22E+01
NA-22	#A	4.5968E-01	4.5968E-01	6.482E+01%	9.73E-01
K-40		2.8919E+02	2.8919E+02	5.185E+00%	9.89E+00
Sc-46	#A	5.9366E-01	5.9366E-01	8.920E+01%	2.05E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.39E+01
MN-54	#A	5.7007E-01	5.7007E-01	1.128E+02%	1.50E+00
FE-59	#A	-3.4990E-01	-3.4990E-01	2.448E+02%	2.95E+00
Co-56	#A	8.7807E-01	8.7808E-01	1.038E+02%	1.32E+00
CO-57	#A	-2.9589E-01	-2.9589E-01	1.241E+02%	1.26E+00
CO-58	#A	5.0406E-01	5.0406E-01	9.250E+01%	1.58E+00
CO-60	#A	-1.0171E-01	-1.0171E-01	6.809E+02%	1.38E+00
ZN-65	#A	-1.7144E+00	-1.7144E+00	1.165E+02%	6.74E+00
NB-94	#A	3.8323E-01	3.8323E-01	1.630E+02%	1.52E+00
ZR-95	#	1.7600E+00	1.7600E+00	3.695E+01%	1.42E+00
NB-95	#A	6.6835E-02	6.6836E-02	1.047E+03%	2.43E+00
RU-103	#A	4.0667E-01	4.0667E-01	9.905E+01%	1.01E+00
RH-106	#A	1.7973E+00	1.7973E+00	7.896E+01%	3.57E+01
AG-108M	#A	-1.7817E-01	-1.7817E-01	2.550E+02%	1.21E+00
AG-110M	#A	6.0118E-01	6.0118E-01	1.236E+02%	2.55E+00
SN-113	#A	-3.5577E-01	-3.5577E-01	2.527E+02%	3.05E+00
SB-124	#A	4.3907E-01	4.3907E-01	2.194E+02%	3.25E+00
SB-125	#A	1.3660E+00	1.3660E+00	1.297E+02%	3.76E+00
I-131	#A	2.6236E-01	2.6237E-01	9.010E+01%	1.32E+00

Gd-153	#A	5.4700E-01	5.4701E-01	2.244E+02%	4.13E+00
Ga-68	#A	1.3275E+01	1.3389E+01	1.477E+02%	4.63E+01
Tc-99m	#A	3.1727E-01	3.1778E-01	1.307E+02%	1.39E+00
BA-133	#A	-6.1138E-01	-6.1138E-01	1.819E+02%	3.74E+00
CS-134	#A	7.5322E-01	7.5322E-01	5.415E+01%	3.34E+00
CS-137	#A	-1.1771E-01	-1.1771E-01	6.475E+02%	2.63E+00
CE-139	#A	3.3527E-01	3.3527E-01	1.190E+02%	1.34E+00
Ba-140	#A	-2.8797E+00	-2.8798E+00	9.423E+01%	6.67E+00
La-140	#A	2.6121E-01	2.6122E-01	1.024E+02%	1.70E+00
CE-141	#A	5.8985E-01	5.8986E-01	1.327E+02%	2.62E+00
CE-144	#A	-3.2546E+00	-3.2546E+00	1.367E+02%	1.48E+01
PM-144	#A	3.7207E-01	3.7207E-01	1.243E+02%	1.18E+00
EU-152	#A	1.4163E+00	1.4163E+00	1.140E+02%	8.39E+00
EU-154	#A	1.3594E+00	1.3594E+00	8.848E+01%	1.71E+01
EU-155	#A	-1.6397E+00	-1.6397E+00	1.667E+02%	5.89E+00
HF-181	#A	-2.6523E-01	-2.6523E-01	1.967E+02%	1.80E+00
Ta-182	#A	2.9423E+00	2.9423E+00	8.414E+01%	8.29E+00
Hg-203	#A	2.1750E-01	2.1750E-01	2.403E+02%	1.78E+00
TL-208		1.1356E+01	1.1356E+01	8.710E+00%	1.42E+00
pm-146	#A	-6.4039E-01	-6.4039E-01	2.617E+02%	4.14E+00
y-88	#	1.0495E+00	1.0495E+00	4.313E+01%	1.00E+00
Cd-113m	#A	5.7439E+03	5.7439E+03	9.854E+01%	1.90E+04
Cd-109	#A	5.0674E+00	5.0674E+00	3.201E+02%	5.42E+01
Cf-251	#A	-9.4424E-01	-9.4424E-01	2.418E+02%	6.17E+00
Cf-249	#A	-2.6956E-01	-2.6956E-01	3.059E+02%	2.81E+00
Sn-126	#A	1.4538E+00	1.4538E+00	3.629E+02%	1.78E+01
PB-210	#A	2.3658E+01	2.3658E+01	4.594E+01%	2.98E+01
PB-212		3.0498E+01	3.0498E+01	4.444E+00%	2.45E+00
PB-214		1.4857E+01	1.4857E+01	8.930E+00%	2.65E+00
BI-207	#A	3.5679E-01	3.5679E-01	9.348E+01%	1.62E+00
BI-212		4.9592E+01	4.9592E+01	1.385E+01%	1.01E+01
BI-214		1.3906E+01	1.3906E+01	9.883E+00%	2.14E+00
BI-210M	#A	-6.1264E-01	-6.1264E-01	2.085E+02%	2.49E+00
AC-228		3.1508E+01	3.1508E+01	6.597E+00%	2.27E+00
TH-227	#A	3.3387E+00	3.3387E+00	1.885E+02%	1.80E+01
TH-229	#A	2.4016E-01	2.4016E-01	2.390E+02%	2.25E+01
TH-234	#A	1.5032E+01	1.5032E+01	6.536E+01%	3.23E+01
PA-231	#A	-6.6003E+00	-6.6003E+00	3.196E+02%	7.12E+01
PA-233	#A	-1.1649E+00	-1.1649E+00	1.513E+02%	5.91E+00
PA-234	#A	1.9306E-01	1.9306E-01	9.480E+01%	8.73E+00
PA-234M	#A	1.0641E+02	1.0641E+02	6.935E+01%	2.35E+02
U-235	#A	3.2515E+00	3.2515E+00	9.295E+01%	1.14E+01
AM-241	#A	-2.0195E-01	-2.0195E-01	7.233E+02%	4.17E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.76E+01
Ir-192	#A	4.5580E-01	4.5580E-01	1.373E+02%	1.54E+00
Cs-136	#A	3.6502E-01	3.6503E-01	1.235E+02%	1.55E+00
Np-239	#A	-7.5490E-02	-7.5503E-02	2.220E+03%	5.67E+00
Nd-147	#A	-2.7290E+00	-2.7291E+00	1.393E+02%	9.55E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     4.646E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.5 keV) 4.6456219E+02  Bq/Sample
```

264535_Gamma_160-18554-A-14-B. 14_Gamma_20162251.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161066

Sample Description: 264535_Gamma_160-18554-A-15-B
Detector: Detector #15
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-15-B

Decay to Time: 9/1/2016 13:12 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:12:22 Real Time: 1803 sec
Analysis Time: 9/1/2016 13:42 Dead Time: 0.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev11.lib
Bkgd Correction File: 15_2016-08-07_0540.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.997E+00	125.4	5.011E+00	5.015E+00	1.698E+01
NA-22	-3.943E-01	163.2	6.435E-01	6.438E-01	2.262E+00
K-40	2.121E+02	6.6	1.398E+01	1.770E+01	1.033E+01
Sc-46	-6.383E-01	105.6	6.738E-01	6.746E-01	2.289E+00
CR-51	4.945E+00	155.8	7.705E+00	7.709E+00	2.583E+01
MN-54	3.329E-01	90.8	3.024E-01	3.028E-01	7.478E-01
FE-59	1.394E-01	999.5	1.393E+00	1.393E+00	3.221E+00
Co-56	3.248E-01	113.3	3.679E-01	3.682E-01	1.495E+00
CO-57	0.000E+00	1.#INF	2.492E-01	2.492E-01	1.311E+00
CO-58	-8.367E-01	85.3	7.135E-01	7.149E-01	2.393E+00
CO-60	-1.757E-01	460.1	8.084E-01	8.084E-01	1.876E+00
ZN-65	0.000E+00	1.#INF	5.143E-01	5.143E-01	5.294E+00
NB-94	4.124E-01	35.0	1.443E-01	1.459E-01	1.516E+00
ZR-95	1.051E+00	91.7	9.639E-01	9.654E-01	2.265E+00
NB-95	-4.969E-01	165.0	8.198E-01	8.202E-01	2.794E+00
RU-103	-4.604E-01	137.2	6.315E-01	6.319E-01	1.520E+00
RH-106	2.071E+00	110.1	2.281E+00	2.283E+00	1.388E+01
AG-108M	4.824E-01	89.1	4.299E-01	4.306E-01	1.156E+00
AG-110M	2.862E-02	683.7	1.957E-01	1.957E-01	2.814E+00
SN-113	-5.152E-01	98.6	5.077E-01	5.084E-01	2.903E+00
SB-124	7.706E-01	82.6	6.364E-01	6.376E-01	3.393E+00
SB-125	1.791E+00	96.2	1.723E+00	1.725E+00	3.712E+00
I-131	6.719E-01	85.6	5.750E-01	5.761E-01	9.368E-01
Gd-153	-1.521E+00	170.8	2.596E+00	2.598E+00	8.640E+00
Ga-68	3.604E+01	44.1	1.591E+01	1.603E+01	3.380E+01
Tc-99m	-5.228E-01	146.6	7.663E-01	7.669E-01	2.553E+00
BA-133	-9.123E-01	79.6	7.259E-01	7.274E-01	3.824E+00
CS-134	7.859E-01	92.0	7.233E-01	7.245E-01	3.454E+00
CS-137	5.254E-01	90.4	4.747E-01	4.755E-01	1.609E+00
CE-139	9.071E-02	574.6	5.213E-01	5.213E-01	1.767E+00
Ba-140	-2.007E+00	119.2	2.392E+00	2.394E+00	5.819E+00
La-140	-8.750E-01	193.7	1.694E+00	1.695E+00	2.377E+00
CE-141	-9.672E-01	144.9	1.401E+00	1.402E+00	4.667E+00

CE-144	0.000E+00	1.#INF	1.208E+00	1.209E+00	1.617E+01
PM-144	5.286E-01	93.3	4.930E-01	4.938E-01	1.159E+00
EU-152	2.171E+00	72.8	1.581E+00	1.585E+00	9.027E+00
EU-154	1.549E+00	90.2	1.397E+00	1.400E+00	1.334E+01
EU-155	0.000E+00	1.#INF	1.167E+00	1.167E+00	1.226E+01
HF-181	3.708E-01	179.9	6.668E-01	6.671E-01	2.357E+00
Ta-182	2.210E+00	73.4	1.623E+00	1.626E+00	6.945E+00
Hg-203	1.482E-02	3159.1	4.683E-01	4.683E-01	1.622E+00
TL-208	8.210E+00	9.2	7.516E-01	8.639E-01	1.008E+00
pm-146	-1.098E+00	149.5	1.641E+00	1.642E+00	4.289E+00
y-88	4.819E-01	39.0	1.878E-01	1.895E-01	1.380E+00
Cd-113m	6.667E+03	90.5	6.035E+03	6.050E+03	2.022E+04
Cd-109	0.000E+00	1.#INF	2.234E+01	2.234E+01	7.432E+01
Cf-251	-7.060E-01	333.8	2.357E+00	2.357E+00	6.106E+00
Cf-249	0.000E+00	1.#INF	4.434E-01	4.434E-01	2.734E+00
Sn-126	5.200E+00	111.4	5.792E+00	5.798E+00	1.932E+01
PB-210	-2.764E+01	36.6	1.011E+01	1.024E+01	5.331E+01
PB-212	2.487E+01	4.9	1.226E+00	2.023E+00	1.853E+00
PB-214	1.126E+01	10.5	1.184E+00	1.321E+00	2.051E+00
BI-207	7.251E-03	6622.6	4.802E-01	4.802E-01	1.699E+00
BI-212	-6.392E-02	11272.1	7.205E+00	7.205E+00	3.063E+01
BI-214	1.097E+01	12.1	1.325E+00	1.442E+00	2.272E+00
BI-210M	1.442E-03	50818.5	7.326E-01	7.326E-01	2.540E+00
AC-228	2.364E+01	7.2	1.701E+00	2.085E+00	3.262E+00
TH-227	5.824E+00	138.2	8.048E+00	8.054E+00	2.700E+01
TH-229	-9.167E+00	107.7	9.870E+00	9.897E+00	2.523E+01
TH-234	-1.916E+01	43.1	8.247E+00	8.307E+00	5.401E+01
PA-231	-1.749E+01	150.3	2.629E+01	2.631E+01	8.808E+01
PA-233	0.000E+00	1.#INF	6.454E-01	6.454E-01	7.512E+00
PA-234	1.528E+00	148.3	2.266E+00	2.268E+00	9.669E+00
PA-234M	4.497E+01	112.3	5.047E+01	5.053E+01	3.129E+02
U-235	-4.207E+00	73.8	3.103E+00	3.111E+00	2.010E+01
AM-241	3.842E-01	445.4	1.711E+00	1.711E+00	5.771E+00
Np-237	0.000E+00	1.#INF	6.774E+00	6.774E+00	2.253E+01
Ir-192	3.777E-01	96.6	3.647E-01	3.654E-01	3.141E+00
Cs-136	6.365E-01	106.9	6.802E-01	6.812E-01	2.307E+00
Np-239	1.951E+00	171.4	3.344E+00	3.346E+00	1.113E+01
Nd-147	-1.235E+00	322.6	3.984E+00	3.985E+00	9.823E+00
Total	7.081E+03				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-15-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161066.An1

Acquisition information
Start time: 9/1/2016 1:12:22 PM
Live time: 1800
Real time: 1803
Dead time: 0.15 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:12:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2016-08-07_0540.PBC 8/7/2016 5:40:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1108

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	18.	138.19	0.95	2.192E-02	50.14	8.000	PBC<MDA	TH227
59.54	7.	445.37	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
64.28	27.	111.37	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.95	186.	12.96	0.97	3.385E-02				
77.22	277.	9.46	0.97	3.455E-02				
87.35	102.	19.31	0.98	3.694E-02	86.54	30.700	5.039E+00	EU155
					86.94	9.040	1.708E+01	Sn126
					87.57	37.500	4.104E+00	Sn126
					88.04	3.790	4.052E+01	Cd109
90.01	51.	32.89	0.99	3.739E-02				
93.19	111.	18.44	0.99	3.785E-02	93.35	5.561	2.923E+01	AC228
106.13	31.	171.36	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
121.78	24.	93.51	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
131.29	24.	148.34	1.02	3.775E-02	131.29	18.000	PBC<MDA	PA234
133.02	7.	502.83	1.03	3.759E-02	133.02	43.300	PBC<MDA	HF181
165.85	4.	574.64	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
208.84	69.	27.35	0.84	2.864E-02				
210.85	6.	370.49	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229
227.00	4.	416.13	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.70	481.	5.61	1.15	2.591E-02	238.63	43.300	2.383E+01	PB212
242.13	41.	36.20	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
263.70	17.	90.52	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
277.50	31.	44.35	1.62	2.313E-02	277.28	6.310	PBC<MDA	TL208
284.30	12.	137.61	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.01	117.	16.57	1.49	2.205E-02	295.09	19.300	1.521E+01	PB214
300.23	54.	22.87	1.17	2.177E-02	300.03	3.280	4.163E+01	PB212
					300.07	2.460	5.551E+01	PA231
					300.18	6.200	2.203E+01	PA233
320.08	18.	155.81	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
338.27	105.	13.23	0.99	1.983E-02	338.32	12.010	2.449E+01	AC228
344.29	17.	144.46	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
345.83	14.	179.85	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.83	147.	10.52	1.25	1.923E-02	351.93	37.600	1.126E+01	PB214
364.48	10.	101.81	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
383.84	14.	113.72	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
433.94	6.	200.00	1.29	1.629E-02	433.94	90.480	PBC<MDA	AG108M
463.37	15.	96.18	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	14.	96.56	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	125.37	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
511.86	130.	13.79	2.60	1.426E-02	511.86	20.000	2.532E+01	RH106
563.24	13.	92.05	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
583.31	160.	9.15	1.27	1.282E-02	583.02	84.500	8.194E+00	TL208
600.50	11.	190.71	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
602.73	4.	515.27	1.43	1.247E-02	602.73	98.260	PBC<MDA	SB124
609.31	112.	12.08	1.31	1.236E-02	609.31	46.090	1.097E+01	BI214
					610.30	5.750	8.802E+01	RU103
635.89	7.	123.09	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
657.76	1.	932.74	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
661.66	9.	90.36	1.47	1.155E-02	661.66	85.210	PBC<MDA	CS137
696.54	10.	93.26	1.50	1.106E-02	696.54	99.000	PBC<MDA	PM144
722.79	13.	82.58	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	PBC<MDA	AG108M
					723.36	20.220	PBC<MDA	EU154
722.94	13.	89.10	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.377E-01	AG108M
					723.36	20.220	3.316E+00	EU154
756.73	11.	91.72	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
766.41	9.	112.25	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.730E+02	PA234M
785.42	21.	43.64	1.57	9.998E-03	785.42	1.280	9.116E+01	BI212
795.87	10.	100.76	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
801.95	8.	116.17	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
818.50	11.	106.87	1.59	9.655E-03	818.50	100.000	PBC<MDA	Cs136
834.85	6.	90.83	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
859.72	17.	45.12	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
871.10	14.	34.99	1.63	9.156E-03	871.10	99.890	8.504E-01	NB94
880.53	10.	87.22	1.64	9.072E-03	880.53	6.000	PBC<MDA	PA234
883.24	1.	803.25	1.64	9.048E-03	883.24	9.600	PBC<MDA	PA234
898.04	2.	431.57	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.38	104.	11.49	1.20	8.811E-03	911.07	29.000	2.262E+01	AC228
964.11	10.	134.68	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
969.21	65.	12.62	2.17	8.357E-03	968.97	17.460	2.473E+01	AC228
1004.77	10.	90.18	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1050.36	7.	110.10	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	14.	44.13	1.77	7.623E-03	1077.40	3.300	3.604E+01	Ga68
1099.25	1.	999.48	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1120.55	5.	203.52	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.616E-01	Sc46
					1121.30	34.900	1.037E+00	Ta182
1120.62	12.	92.97	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1121.30	11.	87.59	1.80	7.362E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.194E-01	Sc46
					1121.30	34.900	2.349E+00	Ta182
1221.41	7.	117.87	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	113.27	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1461.10	237.	6.59	1.86	5.828E-03	1460.83	10.670	2.121E+02	K40
1764.76	5.	114.29	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	7.	38.98	2.22	4.741E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.38	74.96	198.	186.	5.498E+03	12.96	0.973	-	D
308.46	77.23	206.	277.	8.026E+03	9.46	0.975	-	D
358.94	90.01	125.	78.	2.088E+03	23.19	0.986	-	sD
834.61	208.84	70.	69.	2.421E+03	27.35	0.837	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	274.	-41.	-0.023	36.58	0.946s
TH-227	200.23	50.14	313.	18.	0.010	138.19	0.950s
AM-241	237.79	59.54	455.	7.	0.004	445.37	0.958s
TH-234	252.78	63.29	513.	-38.	-0.021	43.05	0.962s
Sn-126	256.75	64.28	438.	27.	0.015	111.37	0.963
BA-133	323.54	80.99	1274.	-36.	-0.020	46.14	0.978s
Np-237	345.53	86.49	1710.	0.	0.000	194.72	0.983A
EU-155	345.74	86.54	1725.	-31.	-0.017	189.60	0.983s
Sn-126	349.84	87.57	1462.	69.	0.038	30.78	0.984D
Cd-109	351.72	88.04	1579.	0.	0.000	181.22	0.985A
Nd-147	363.95	91.10	1431.	-31.	-0.017	172.12	0.987D
TH-234	369.91	92.59	1423.	-54.	-0.030	33.61	0.989s
AC-228	372.95	93.35	153.	111.	0.062	18.44	0.989D
Gd-153	389.54	97.50	1426.	-31.	-0.017	170.76	0.993
Np-239	397.53	99.50	1457.	-11.	-0.006	481.34	0.995s
Gd-153	412.32	103.20	1468.	0.	0.000	1000.00	0.998s
Np-239	414.32	103.70	1468.	0.	0.000	1000.00	0.999s
EU-155	420.77	105.31	1468.	0.	0.000	1000.00	1.001s
Np-239	424.03	106.13	1388.	31.	0.017	171.36	1.001s
EU-152	486.57	121.78	235.	24.	0.013	93.51	1.016s
CO-57	487.72	122.06	259.	0.	0.000	1000.00	1.016s
EU-154	491.87	123.10	240.	-7.	-0.004	315.26	1.017
PA-234	524.63	131.29	615.	24.	0.013	148.34	1.024s
HF-181	531.54	133.02	639.	7.	0.004	502.83	1.026s
CE-144	533.60	133.54	646.	0.	0.000	1000.00	1.026s
HF-181	544.63	136.30	646.	0.	0.000	1000.00	1.029s
CO-57	545.33	136.47	646.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	953.	-30.	-0.017	146.59	1.032s
U-235	574.56	143.79	923.	-30.	-0.017	73.76	1.036s
CE-141	581.17	145.44	952.	-30.	-0.017	144.89	1.037s
Ba-140	650.01	162.66	338.	-26.	-0.015	100.50	1.053s
U-235	652.88	163.38	364.	-26.	-0.015	104.14	1.053s
CE-139	662.77	165.85	321.	4.	0.002	574.64	1.055s
Cf-251	705.73	176.60	154.	-7.	-0.004	333.81	1.065s
TH-229	773.33	193.51	154.	-22.	-0.012	107.66	1.080s
U-235	820.60	205.33	295.	-22.	-0.012	113.57	1.091
TH-229	842.65	210.85	253.	6.	0.003	370.49	1.096s
Cf-251	907.22	227.00	92.	4.	0.002	416.13	1.110
PB-212	953.72	238.63	56.	502.	0.279	4.93	1.120D
PB-214	967.17	242.00	90.	41.	0.023	36.20	1.123D
EU-152	977.95	244.69	794.	-22.	-0.012	181.38	1.126s
TH-227	1024.12	256.24	103.	-18.	-0.010	109.90	1.136s
Cd-113m	1053.94	263.70	114.	17.	0.010	90.52	1.142s
TL-208	1109.11	277.50	43.	31.	0.017	44.35	1.622s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.30	284.30	68.	12.	0.007	137.61	1.160s
PB-214	1179.13	295.01	48.	117.	0.065	16.57	1.495s
PB-212	1200.01	300.23	28.	54.	0.030	22.87	1.174
PA-231	1199.35	300.07	464.	-20.	-0.011	157.28	1.174
PA-233	1199.79	300.18	444.	-20.	-0.011	153.97	1.174
PA-231	1209.66	302.65	425.	-20.	-0.011	150.34	1.176s
BA-133	1210.47	302.85	415.	-20.	-0.011	148.75	1.176s
Ba-140	1218.46	304.85	435.	-20.	-0.011	151.92	1.178s
BI-210M	1218.64	304.90	455.	-7.	-0.004	452.20	1.178s
Ir-192	1232.81	308.44	461.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	461.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	461.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	398.	18.	0.010	155.81	1.191s
La-140	1314.06	328.76	432.	-20.	-0.011	141.09	1.199s
Cf-249	1332.77	333.44	411.	-19.	-0.011	151.48	1.203s
AC-228	1352.07	338.27	24.	105.	0.058	13.23	0.995
Cs-136	1361.28	340.57	392.	-19.	-0.011	147.26	1.209s
EU-152	1376.13	344.29	306.	17.	0.010	144.46	1.212s
HF-181	1382.30	345.83	327.	14.	0.008	179.85	1.213s
PB-214	1406.28	351.83	26.	147.	0.081	10.52	1.253
BA-133	1422.97	356.00	285.	-19.	-0.011	79.57	1.222s
I-131	1456.89	364.48	24.	10.	0.006	101.81	1.229s
BA-133	1534.29	383.84	126.	14.	0.008	113.72	1.246s
Cf-249	1550.72	387.95	140.	0.	0.000	1000.00	1.249
SN-113	1565.67	391.69	146.	-10.	-0.006	98.55	1.253s
SB-125	1710.36	427.88	41.	-3.	-0.002	338.92	1.283
AG-108M	1734.60	433.94	36.	6.	0.003	200.00	1.288s
pm-146	1814.35	453.88	39.	-2.	-0.001	641.29	1.304s
SB-125	1852.29	463.37	100.	15.	0.008	96.18	1.312s
Ir-192	1871.05	468.06	90.	14.	0.008	96.56	1.316s
BE-7	1909.18	477.60	97.	11.	0.006	125.37	1.324s
HF-181	1926.79	482.00	108.	0.	0.000	1000.00	1.328s
La-140	1946.87	487.02	162.	-18.	-0.010	81.43	1.332s
RU-103	1987.00	497.05	52.	-11.	-0.006	137.17	1.340s
RH-106	2046.22	511.86	28.	130.	0.072	13.79	2.602s
Nd-147	2122.75	531.00	39.	-4.	-0.002	322.59	1.368
Ba-140	2147.78	537.26	48.	-12.	-0.007	119.21	1.373s
CS-134	2251.67	563.24	30.	13.	0.007	92.05	1.394s
CS-134	2276.00	569.32	43.	-5.	-0.003	179.84	1.399s
PA-234	2276.59	569.47	55.	-4.	-0.002	256.06	1.399s
TL-208	2331.95	583.31	13.	160.	0.089	9.15	1.273
SB-125	2400.69	600.50	212.	11.	0.006	190.71	1.424s
SB-124	2409.62	602.73	240.	4.	0.002	515.27	1.425s
CS-134	2417.53	604.71	244.	0.	0.000	1000.00	1.427s
BI-214	2435.92	609.31	20.	112.	0.062	12.08	1.306
RU-103	2439.88	610.30	244.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	244.	0.	0.000	1000.00	1.435s
RH-106	2486.35	621.92	35.	-6.	-0.003	216.21	1.440

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2542.23	635.89	30.	7.	0.004	123.09	1.451s
I-131	2546.57	636.97	43.	-3.	-0.002	332.03	1.452s
AG-110M	2629.71	657.76	43.	1.	0.001	932.74	1.469s
CS-137	2645.30	661.66	31.	9.	0.005	90.36	1.472s
PM-144	2784.82	696.54	19.	10.	0.006	93.26	1.499s
SB-124	2889.79	722.79	47.	13.	0.007	82.58	1.519s
AG-108M	2890.40	722.94	60.	13.	0.007	89.10	1.519s
EU-154	2892.07	723.36	86.	-6.	-0.003	227.19	1.519s
pm-146	2941.53	735.72	37.	-12.	-0.007	84.72	1.529s
pm-146	2987.29	747.16	28.	-7.	-0.004	149.48	1.537
ZR-95	3025.56	756.73	19.	11.	0.006	91.72	1.544s
AG-110M	3054.42	763.94	102.	-22.	-0.012	67.70	1.550s
NB-95	3061.80	765.79	109.	-9.	-0.005	164.97	1.551s
PA-234M	3064.30	766.41	50.	9.	0.005	112.25	1.552s
EU-152	3114.33	778.92	23.	-2.	-0.001	444.01	1.561s
BI-212	3140.33	785.42	14.	21.	0.012	43.64	1.566
CS-134	3182.12	795.87	44.	10.	0.005	100.76	1.574s
CS-134	3206.46	801.95	44.	8.	0.005	116.17	1.578s
CO-58	3241.75	810.78	70.	-15.	-0.008	85.28	1.585s
La-140	3261.74	815.77	85.	-10.	-0.006	128.60	1.589s
Cs-136	3272.66	818.50	64.	11.	0.006	106.87	1.591
MN-54	3338.05	834.85	5.	6.	0.003	90.83	1.603
Co-56	3385.75	846.77	23.	-4.	-0.002	241.30	1.612s
TL-208	3440.93	860.56	10.	17.	0.010	45.12	1.622s
NB-94	3483.06	871.10	5.	14.	0.008	34.99	1.629s
EU-154	3491.60	873.23	27.	-4.	-0.002	190.39	1.631s
PA-234	3520.80	880.53	32.	10.	0.005	87.22	1.636s
PA-234	3531.64	883.24	42.	1.	0.001	803.25	1.638s
AG-110M	3537.42	884.68	43.	0.	0.000	1000.00	1.639s
Sc-46	3555.81	889.28	54.	-10.	-0.006	105.57	1.642s
y-88	3590.85	898.04	15.	2.	0.001	431.57	1.649s
AC-228	3644.22	911.38	7.	104.	0.058	11.49	1.197s
AG-110M	3748.69	937.49	50.	-18.	-0.010	87.46	1.677s
PA-234	3782.81	946.02	26.	-11.	-0.006	110.98	1.683s
EU-152	3855.18	964.11	90.	10.	0.006	134.68	1.696s
AC-228	3875.59	969.21	1.	65.	0.036	12.62	2.175s
EU-154	3984.09	996.33	52.	-7.	-0.004	157.32	1.718s
PA-234M	4002.77	1001.00	58.	0.	0.000	1000.00	1.722s
EU-154	4017.88	1004.77	39.	10.	0.006	90.18	1.724s
Co-56	4150.18	1037.84	30.	-8.	-0.004	101.58	1.747s
RH-106	4200.27	1050.36	11.	7.	0.004	110.10	1.755s
BI-207	4253.49	1063.66	26.	-10.	-0.005	80.95	1.765s
Ga-68	4308.47	1077.40	5.	14.	0.008	44.13	1.774s
FE-59	4395.90	1099.25	22.	1.	0.001	999.48	1.789s
EU-152	4447.22	1112.07	62.	-12.	-0.007	97.18	1.797s
ZN-65	4461.11	1115.55	50.	0.	0.000	1000.00	1.800s
BI-214	4480.08	1120.29	57.	12.	0.007	92.97	1.803
Sc-46	4481.13	1120.55	45.	5.	0.003	203.52	1.803

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.13	1121.30	40.	11.	0.006	87.59	1.803
CO-60	4691.97	1173.24	32.	-9.	-0.005	119.67	1.838s
Ta-182	4755.25	1189.05	21.	-4.	-0.002	246.99	1.848s
Ta-182	4884.75	1221.41	11.	7.	0.004	117.87	1.869s
Co-56	4952.26	1238.28	21.	10.	0.005	113.27	1.879s
NA-22	5097.34	1274.53	27.	-5.	-0.003	163.20	1.902s
EU-154	5097.40	1274.54	31.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	21.	-6.	-0.004	170.46	1.913s
CO-60	5329.36	1332.50	16.	-2.	-0.001	460.07	1.938s
AG-110M	5536.68	1384.30	6.	-2.	-0.001	400.56	1.970s
EU-152	5631.56	1408.00	17.	-10.	-0.006	101.73	1.984s
K-40	5844.12	1461.10	4.	237.	0.132	6.59	1.865
La-140	6384.98	1596.21	17.	-8.	-0.004	193.65	2.092s
SB-124	6764.43	1690.98	12.	-6.	-0.003	145.30	2.142s
BI-214	7058.76	1764.49	13.	5.	0.003	114.29	2.181
Co-56	7086.23	1771.35	8.	0.	0.000	1000.00	2.184s
y-88	7345.35	1836.06	0.	7.	0.004	38.98	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.9972E+00				5.31E+01	
			477.60	3.997E+00	&(P	1.698E+01 1.25E+02 1.05E+01	G
NA-22	C	-3.9431E-01				9.50E+02	
			1274.53	-3.943E-01	?(	2.262E+00 1.63E+02 9.99E+01	G
K-40	N	2.1210E+02				4.66E+11	
			1460.83	2.121E+02	(P	1.033E+01 6.59E+00 1.07E+01	G
Sc-46	F	-6.3826E-01				8.38E+01	
			889.28	-6.383E-01	?(	2.289E+00 1.06E+02 1.00E+02	G
			1120.55	3.616E-01	+	2.568E+00 2.04E+02 1.00E+02	G
CR-51	F	4.9449E+00				2.77E+01	
			320.08	4.945E+00	?(P	2.583E+01 1.56E+02 9.94E+00	G
MN-54	C	3.3287E-01				3.12E+02	
			834.85	3.329E-01	(	7.478E-01 9.08E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	1.3939E-01					4.45E+01	
			1099.25	1.394E-01	?(P	3.221E+00	9.99E+02	5.65E+01 G
			1291.60	-1.253E+00	+	4.793E+00	1.70E+02	4.32E+01 G
Co-56	C	3.2477E-01					7.73E+01	
			846.77	-2.568E-01	&(	1.495E+00	2.41E+02	9.99E+01 G
			1238.28	1.204E+00	?(	3.020E+00	1.13E+02	6.61E+01 G
			1037.84	-4.042E+00	+ P	1.412E+01	1.02E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.139E+01	1.00E+03	1.55E+01 A
CO-58	C	-8.3675E-01					7.09E+01	
			810.78	-8.367E-01	?(	2.393E+00	8.53E+01	9.95E+01 G
CO-60	F	-1.7571E-01					1.93E+03	
			1332.50	-1.757E-01	?(	1.876E+00	4.60E+02	1.00E+02 G
			1173.24	-7.419E-01	+ P	2.299E+00	1.20E+02	9.99E+01 G
NB-94	I	4.1243E-01					7.41E+06	
			702.63	-3.445E-02	%(	1.516E+00	1.82E+03	9.79E+01 G
			871.10	8.504E-01	?(	7.976E-01	3.50E+01	9.99E+01 G
ZR-95	I	1.0510E+00					6.40E+01	
			756.73	1.051E+00	?(P	2.265E+00	9.17E+01	5.45E+01 G
			724.20	-4.750E-02	& P	5.230E+00	2.58E+03	4.42E+01 G
NB-95	I	-4.9694E-01					6.40E+01	
			765.79	-4.969E-01	?(	2.794E+00	1.65E+02	9.98E+01 G
RU-103	I	-4.6037E-01					3.93E+01	
			497.05	-4.604E-01	?(	1.520E+00	1.37E+02	9.09E+01 G
			610.30	0.000E+00	+	5.909E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.0715E+00					3.74E+02	
			621.92	-2.608E+00	?(	1.388E+01	2.16E+02	9.93E+00 G
			1050.36	3.186E+01	?(P	8.310E+01	1.10E+02	1.56E+00 G
			511.86	2.532E+01	?	5.331E+00	1.38E+01	2.00E+01 GA
AG-108M	C	4.8245E-01					1.53E+05	
			433.94	2.261E-01	&(	1.156E+00	2.00E+02	9.05E+01 G
			722.94	7.377E-01	?(	2.212E+00	8.91E+01	9.08E+01 G
			614.28	0.000E+00	-	3.802E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.8618E-02					2.50E+02	
			884.68	0.000E+00	?(	2.814E+00	1.00E+03	7.27E+01 G
			657.76	5.060E-02	?(	1.683E+00	9.33E+02	9.46E+01 G
			937.49	-3.468E+00	+	6.706E+00	8.75E+01	3.44E+01 G
			1384.30	-7.468E-01	+ P	5.282E+00	4.01E+02	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	-5.412E+00	+	1.213E+01	6.77E+01	2.23E+01 G
SN-113	F	-5.1516E-01					1.15E+02	
			391.69	-5.152E-01	?(P	2.903E+00	9.86E+01	6.40E+01 G
SB-124	F	7.7063E-01					6.02E+01	
			602.73	1.935E-01	(	3.393E+00	5.15E+02	9.83E+01 G
			1690.98	-1.365E+00	+	4.290E+00	1.45E+02	4.78E+01 G
			722.79	6.017E+00	?(P	1.667E+01	8.26E+01	1.08E+01 G
SB-125	I	1.7911E+00					1.01E+03	
			427.88	-3.520E-01	&(P	3.712E+00	3.39E+02	2.96E+01 G
			600.50	2.721E+00	?(P	1.755E+01	1.91E+02	1.79E+01 G
			635.89	2.744E+00	&(	1.168E+01	1.23E+02	1.13E+01 G
			463.37	5.235E+00	&(P	1.691E+01	9.62E+01	1.05E+01 G
I-131	I	6.7186E-01					8.02E+00	
			364.48	3.627E-01	*(P	9.368E-01	1.02E+02	8.17E+01 G
			284.30	4.786E+00	&(	1.641E+01	1.38E+02	6.14E+00 G
			636.97	-1.842E+00	&	2.159E+01	3.32E+02	7.17E+00 G
Gd-153	F	-1.5205E+00					2.42E+02	
			97.50	-1.521E+00	?(	8.640E+00	1.71E+02	3.00E+01 G
			103.20	0.000E+00	+	1.194E+01	1.00E+03	2.18E+01 G
Ga-68	C	3.6044E+01					4.71E-02	
			1077.40	3.604E+01	?(	3.380E+01	4.41E+01	3.30E+00 G
Tc-99m	I	-5.2276E-01					2.51E-01	
			140.51	-5.228E-01	?(	2.553E+00	1.47E+02	8.93E+01 G
BA-133	F	-9.1230E-01					3.85E+03	
			356.00	-9.123E-01	&(P	3.824E+00	7.96E+01	6.20E+01 G
			302.85	-2.749E+00	+	1.370E+01	1.49E+02	1.83E+01 G
			383.84	4.960E+00	?	1.901E+01	1.14E+02	8.94E+00 GA
			80.99	-1.652E+00	+ P	7.751E+00	4.61E+01	3.41E+01 GA
CS-134	I	7.8586E-01					7.54E+02	
			604.71	0.000E+00	?(	3.454E+00	1.00E+03	9.76E+01 G
			795.87	6.460E-01	?(	2.213E+00	1.01E+02	8.55E+01 G
			569.32	-1.474E+00	+	9.225E+00	1.80E+02	1.54E+01 G
			801.95	5.532E+00	?(	2.199E+01	1.16E+02	8.69E+00 G
			563.24	6.467E+00	?(	1.431E+01	9.20E+01	8.35E+00 G
CS-137	I	5.2537E-01					1.10E+04	
			661.66	5.254E-01	&(P	1.609E+00	9.04E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	9.0714E-02					1.38E+02	
			165.85	9.071E-02	?(	1.767E+00	5.75E+02	7.99E+01 G
Ba-140	I	-2.0065E+00					1.28E+01	
			537.26	-2.007E+00	(P	5.819E+00	1.19E+02	2.44E+01 G
			162.66	-6.974E+00	+	2.337E+01	1.00E+02	6.22E+00 G
			304.85	-1.182E+01	+	6.017E+01	1.52E+02	4.29E+00 G
La-140	I	-8.7500E-01					1.28E+01	
			1596.21	-8.750E-01	?(P	2.377E+00	1.94E+02	9.54E+01 G
			487.02	-1.449E+00	+ P	5.095E+00	8.14E+01	4.55E+01 G
			328.76	-2.735E+00	+ P	1.343E+01	1.41E+02	2.03E+01 G
			815.77	-2.568E+00	+	1.123E+01	1.29E+02	2.33E+01 G
CE-141	I	-9.6717E-01					3.25E+01	
			145.44	-9.672E-01	?(	4.667E+00	1.45E+02	4.82E+01 G
PM-144	C	5.2863E-01					3.63E+02	
			696.54	5.286E-01	*(	1.159E+00	9.33E+01	9.90E+01 G
			618.06	-4.883E-03	% P	3.465E+00	1.28E+04	9.91E+01 G
EU-152	F	2.1709E+00					4.94E+03	
			344.29	1.861E+00	&(P	9.027E+00	1.44E+02	2.65E+01 G
			1112.07	-6.589E+00	&	2.164E+01	9.72E+01	1.36E+01 G
			121.78	1.202E+00	?(P	3.747E+00	9.35E+01	2.86E+01 G
			778.92	-9.949E-01	+	1.075E+01	4.44E+02	1.29E+01 G
			964.11	4.629E+00	?(	2.121E+01	1.35E+02	1.46E+01 G
			244.69	-6.376E+00	+	3.863E+01	1.81E+02	7.58E+00 G
			1408.00	-4.392E+00	+	9.628E+00	1.02E+02	2.10E+01 GA
EU-154	I	1.5494E+00					3.14E+03	
			873.23	-1.982E+00	?(	1.334E+01	1.90E+02	1.23E+01 G
			123.10	-2.483E-01	&	2.657E+00	3.15E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.910E+00	1.00E+03	3.52E+01 G
			723.36	-1.504E+00	+	1.177E+01	2.27E+02	2.02E+01 G
			1004.77	3.955E+00	?(	1.207E+01	9.02E+01	1.80E+01 G
			996.33	-4.283E+00	+	2.326E+01	1.57E+02	1.06E+01 G
HF-181	F	3.7076E-01					4.24E+01	
			482.00	0.000E+00	?(	2.357E+00	1.00E+03	8.05E+01 G
			133.02	2.433E-01	?(	4.113E+00	5.03E+02	4.33E+01 G
			345.83	2.717E+00	?(P	1.644E+01	1.80E+02	1.51E+01 G
			136.30	0.000E+00	-	3.089E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.2100E+00					1.14E+02	
			1121.30	2.349E+00	?(	6.945E+00	8.76E+01	3.49E+01 G
			1221.41	2.031E+00	?(P	5.527E+00	1.18E+02	2.70E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1189.05	-2.125E+00	-	1.188E+01	2.47E+02	1.62E+01 G
Hg-203	F	1.4823E-02					4.66E+01	
			279.20	1.482E-02	&(	1.622E+00	3.16E+03	8.15E+01 G
TL-208	N	8.2102E+00					6.98E+02	
			583.02	8.194E+00	(P	1.008E+00	9.15E+00	8.45E+01 G
			277.28	1.198E+01	+ P	1.260E+01	4.44E+01	6.31E+00 G
			860.56	8.318E+00	&(P	8.362E+00	4.51E+01	1.24E+01 G
pm-146	C	-1.0981E+00					2.02E+03	
			747.16	-1.098E+00	?(P	4.289E+00	1.49E+02	3.40E+01 G
			735.72	-2.886E+00	+ P	7.289E+00	8.47E+01	2.25E+01 G
			453.88	-1.088E-01	+	1.730E+00	6.41E+02	6.50E+01 G
y-88	F	4.8191E-01					1.07E+02	
			898.04	1.329E-01	?(	1.380E+00	4.32E+02	9.37E+01 G
			1836.06	8.115E-01	?(P	8.706E-01	3.90E+01	9.92E+01 G
Cd-113m		6.6668E+03					5.33E+03	
			263.70	6.667E+03	(	2.022E+04	9.05E+01	6.00E-03 K
Cf-251	T	-7.0597E-01					3.28E+05	
			176.60	-7.060E-01	?(	6.106E+00	3.34E+02	1.70E+01 G
			227.00	1.420E+00		1.551E+01	4.16E+02	6.30E+00 GA
Sn-126		5.2004E+00					3.65E+07	
			87.57	2.759E+00	}	7.248E+00	3.08E+01	3.75E+01 GA
			64.28	5.200E+00	(	1.932E+01	1.11E+02	9.70E+00 G
			86.94	0.000E+00	}	3.186E+01	2.25E+03	9.04E+00 GA
PB-210	N	-2.7642E+01					8.14E+03	
			46.54	-2.764E+01	(P	5.331E+01	3.66E+01	4.25E+00 G
PB-212	N	2.4875E+01					6.98E+02	
			238.63	2.487E+01	(	1.853E+00	4.93E+00	4.33E+01 G
			300.03	4.163E+01	+	2.112E+01	2.29E+01	3.28E+00 GA
PB-214	N	1.1259E+01					5.84E+05	
			351.93	1.126E+01	(P	2.051E+00	1.05E+01	3.76E+01 G
			295.09	1.521E+01	+ P	4.590E+00	1.66E+01	1.93E+01 G
			242.00	1.197E+01		1.367E+01	3.62E+01	7.43E+00 GA
BI-207	C	7.2506E-03					1.18E+04	
			569.70	7.251E-03	%(	1.699E+00	6.62E+03	9.77E+01 G
			1063.66	-9.288E-01	+ P	2.543E+00	8.09E+01	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	-6.3923E-02					6.98E+02	
			727.17	-6.392E-02	%(P	3.063E+01	1.13E+04	7.55E+00 G
			785.42	9.116E+01	?	8.746E+01	4.36E+01	1.28E+00 GA
BI-214	N	1.0967E+01					5.84E+05	
			609.31	1.097E+01	(P	2.272E+00	1.21E+01	4.61E+01 G
			1120.29	6.043E+00	- P	1.894E+01	9.30E+01	1.51E+01 G
			1764.49	3.551E+00	- P	1.420E+01	1.14E+02	1.54E+01 G
BI-210M	T	1.4416E-03					1.10E+09	
			265.83	1.442E-03	%(	2.540E+00	5.08E+04	5.00E+01 G
			304.90	-6.177E-01	+	9.420E+00	4.52E+02	2.80E+01 G
AC-228	N	2.3636E+01					2.10E+03	
			911.07	2.262E+01	(P	3.262E+00	1.15E+01	2.90E+01 G
			968.97	2.473E+01	(P	2.842E+00	1.26E+01	1.75E+01 G
			338.32	2.449E+01	(	5.957E+00	1.32E+01	1.20E+01 G
			93.35	2.923E+01		1.594E+01	1.84E+01	5.56E+00 XA
TH-227	N	5.8237E+00					7.95E+03	
			50.14	5.824E+00	?(	2.700E+01	1.38E+02	8.00E+00 G
			256.24	-5.709E+00	+	1.613E+01	1.10E+02	7.00E+00 G
TH-229	N	-9.1672E+00					2.68E+06	
			193.51	-9.167E+00	?(	2.523E+01	1.08E+02	4.40E+00 G
			210.85	3.990E+00	+	5.019E+01	3.70E+02	2.99E+00 G
TH-234	N	-1.9156E+01					1.63E+12	
			63.29	-1.916E+01	(P	5.401E+01	4.31E+01	3.81E+00 G
			92.59	-1.431E+01	+ P	4.704E+01	3.36E+01	5.58E+00 G
PA-231	N	-1.7490E+01					1.20E+07	
			302.65	-1.749E+01	?(	8.808E+01	1.50E+02	2.88E+00 G
			300.07	-2.030E+01	+	1.069E+02	1.57E+02	2.46E+00 G
PA-234	N	1.5279E+00					1.63E+12	
			131.29	1.952E+00	(	9.669E+00	1.48E+02	1.80E+01 G
			946.02	-5.272E+00	+ P	1.283E+01	1.11E+02	1.34E+01 G
			569.47	-2.160E+00	+	1.929E+01	2.56E+02	8.20E+00 G
			883.24	7.334E-01	?(	2.101E+01	8.03E+02	9.60E+00 G
			880.53	1.006E+01	?	2.967E+01	8.72E+01	6.00E+00 GA
PA-234M	N	4.4966E+01					1.63E+12	
			1001.00	0.000E+00	&(	3.129E+02	1.00E+03	8.37E-01 G
			766.41	1.730E+02	?(	6.622E+02	1.12E+02	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N  -4.2075E+00                                      2.57E+11
                         143.79-4.207E+00  (P 2.010E+01 7.38E+01 1.10E+01 G
                         205.33-8.325E+00 &   3.163E+01 1.14E+02 5.01E+00 G
                         163.38-8.571E+00 &   2.977E+01 1.04E+02 5.08E+00 G

AM-241   T   3.8424E-01                                      1.58E+05
                          59.54 3.842E-01 &(  5.771E+00 4.45E+02 3.59E+01 G

Ir-192   F   3.7774E-01                                      7.40E+01
                         316.49 0.000E+00 ?(  3.141E+00 1.00E+03 8.70E+01 G
                         468.06 1.013E+00 ?(  3.291E+00 9.66E+01 5.18E+01 G
                         308.44 0.000E+00 -   8.442E+00 1.00E+03 3.18E+01 G

Cs-136   F   6.3650E-01                                      1.30E+01
                         818.50 6.365E-01 ?(  2.307E+00 1.07E+02 1.00E+02 G
                        1048.07 4.447E-02 &   1.925E+00 1.16E+03 8.00E+01 G
                         340.57-1.156E+00 +   5.704E+00 1.47E+02 4.69E+01 G

Np-239   T   1.9513E+00                                      2.36E+00
                         103.70 0.000E+00 -   1.084E+01 1.00E+03 2.40E+01 X
                         106.13 1.951E+00 &(  1.113E+01 1.71E+02 2.27E+01 G
                          99.50-1.082E+00 &   1.739E+01 4.81E+02 1.50E+01 X

Nd-147      -1.2352E+00                                      1.11E+01
                         531.00-1.235E+00 ?(  9.823E+00 3.23E+02 1.30E+01 G
                          91.10-1.634E+00 +   9.358E+00 1.72E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
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F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	274.	-41.	-0.023	36.58	-2.764E+01	P
TH-227	50.14	313.	18.	0.010	138.19	5.824E+00	
AM-241	59.54	455.	7.	0.004	445.37	3.842E-01	
TH-234	63.29	513.	-38.	-0.021	43.05	-1.916E+01	P
BA-133	80.99	1274.	-36.	-0.020	46.14	-1.652E+00	P
EU-155	86.54	1725.	-31.	-0.017	189.60	-1.531E+00	
Nd-147	91.10	1431.	-31.	-0.017	172.12	-1.634E+00	
TH-234	92.59	1423.	-54.	-0.030	33.61	-1.431E+01	P
Gd-153	97.50	1426.	-31.	-0.017	170.76	-1.521E+00	
Np-239	99.50	1457.	-11.	-0.006	481.34	-1.082E+00	
Np-239	106.13	1388.	31.	0.017	171.36	1.951E+00	
EU-152	121.78	235.	24.	0.013	93.51	1.202E+00	P
EU-154	123.10	240.	-7.	-0.004	315.26	-2.483E-01	
PA-234	131.29	615.	24.	0.013	148.34	1.952E+00	
HF-181	133.02	639.	7.	0.004	502.83	2.433E-01	
Tc-99m	140.51	953.	-30.	-0.017	146.59	-5.228E-01	
U-235	143.79	923.	-30.	-0.017	73.76	-4.207E+00	P
CE-141	145.44	952.	-30.	-0.017	144.89	-9.672E-01	
Ba-140	162.66	338.	-26.	-0.015	100.50	-6.974E+00	
U-235	163.38	364.	-26.	-0.015	104.14	-8.571E+00	
CE-139	165.85	321.	4.	0.002	574.64	9.071E-02	
TH-229	193.51	154.	-22.	-0.012	107.66	-9.167E+00	
U-235	205.33	295.	-22.	-0.012	113.57	-8.325E+00	
TH-229	210.85	253.	6.	0.003	370.49	3.990E+00	
EU-152	244.69	794.	-22.	-0.012	181.38	-6.376E+00	
TH-227	256.24	103.	-18.	-0.010	109.90	-5.709E+00	
Cd-113m	263.70	114.	17.	0.010	90.52	6.667E+03	
I-131	284.30	68.	12.	0.007	137.61	4.786E+00	
PA-231	300.07	464.	-20.	-0.011	157.28	-2.030E+01	
PA-233	300.18	444.	-20.	-0.011	153.97	-8.058E+00	
PA-231	302.65	425.	-20.	-0.011	150.34	-1.749E+01	
BA-133	302.85	415.	-20.	-0.011	148.75	-2.749E+00	
Ba-140	304.85	435.	-20.	-0.011	151.92	-1.182E+01	
BI-210M	304.90	455.	-7.	-0.004	452.20	-6.177E-01	
CR-51	320.08	398.	18.	0.010	155.81	4.945E+00	P
La-140	328.76	432.	-20.	-0.011	141.09	-2.735E+00	P
Cf-249	333.44	411.	-19.	-0.011	151.48	-3.421E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	340.57	392.	-19.	-0.011	147.26	-1.156E+00	
EU-152	344.29	306.	17.	0.010	144.46	1.861E+00	P
HF-181	345.83	327.	14.	0.008	179.85	2.717E+00	P
BA-133	356.00	285.	-19.	-0.011	79.57	-9.123E-01	P
I-131	364.48	24.	10.	0.006	101.81	3.627E-01	P
BA-133	383.84	126.	14.	0.008	113.72	4.960E+00	
SN-113	391.69	146.	-10.	-0.006	98.55	-5.152E-01	P
SB-125	427.88	41.	-3.	-0.002	338.92	-3.520E-01	P
AG-108M	433.94	36.	6.	0.003	200.00	2.261E-01	
pm-146	453.88	39.	-2.	-0.001	641.29	-1.088E-01	
SB-125	463.37	100.	15.	0.008	96.18	5.235E+00	P
Ir-192	468.06	90.	14.	0.008	96.56	1.013E+00	
BE-7	477.60	97.	11.	0.006	125.37	3.997E+00	P
La-140	487.02	162.	-18.	-0.010	81.43	-1.449E+00	P
RU-103	497.05	52.	-11.	-0.006	137.17	-4.604E-01	
RH-106	511.86	28.	130.	0.072	13.79	2.532E+01	
Nd-147	531.00	39.	-4.	-0.002	322.59	-1.235E+00	
Ba-140	537.26	48.	-12.	-0.007	119.21	-2.007E+00	P
CS-134	563.24	30.	13.	0.007	92.05	6.467E+00	
CS-134	569.32	43.	-5.	-0.003	179.84	-1.474E+00	
PA-234	569.47	55.	-4.	-0.002	256.06	-2.160E+00	
SB-125	600.50	212.	11.	0.006	190.71	2.721E+00	P
SB-124	602.73	240.	4.	0.002	515.27	1.935E-01	
RH-106	621.92	35.	-6.	-0.003	216.21	-2.608E+00	
SB-125	635.89	30.	7.	0.004	123.09	2.744E+00	
I-131	636.97	43.	-3.	-0.002	332.03	-1.842E+00	
AG-110M	657.76	43.	1.	0.001	932.74	5.060E-02	
CS-137	661.66	31.	9.	0.005	90.36	5.254E-01	P
PM-144	696.54	19.	10.	0.006	93.26	5.286E-01	
SB-124	722.79	47.	13.	0.007	82.58	6.017E+00	P
AG-108M	722.94	60.	13.	0.007	89.10	7.377E-01	
EU-154	723.36	86.	-6.	-0.003	227.19	-1.504E+00	
pm-146	735.72	37.	-12.	-0.007	84.72	-2.886E+00	P
pm-146	747.16	28.	-7.	-0.004	149.48	-1.098E+00	P
ZR-95	756.73	19.	11.	0.006	91.72	1.051E+00	P
AG-110M	763.94	102.	-22.	-0.012	67.70	-5.412E+00	
NB-95	765.79	109.	-9.	-0.005	164.97	-4.969E-01	
PA-234M	766.41	50.	9.	0.005	112.25	1.730E+02	
EU-152	778.92	23.	-2.	-0.001	444.01	-9.949E-01	
BI-212	785.42	14.	21.	0.012	43.64	9.116E+01	
CS-134	795.87	44.	10.	0.005	100.76	6.460E-01	
CS-134	801.95	44.	8.	0.005	116.17	5.532E+00	
CO-58	810.78	70.	-15.	-0.008	85.28	-8.367E-01	
La-140	815.77	85.	-10.	-0.006	128.60	-2.568E+00	
Cs-136	818.50	64.	11.	0.006	106.87	6.365E-01	
Co-56	846.77	23.	-4.	-0.002	241.30	-2.568E-01	
NB-94	871.10	5.	14.	0.008	34.99	8.504E-01	
EU-154	873.23	27.	-4.	-0.002	190.39	-1.982E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	880.53	32.	10.	0.005	87.22	1.006E+01		
PA-234	883.24	42.	1.	0.001	803.25	7.334E-01		
Sc-46	889.28	54.	-10.	-0.006	105.57	-6.383E-01		
y-88	898.04	15.	2.	0.001	431.57	1.329E-01		
AG-110M	937.49	50.	-18.	-0.010	87.46	-3.468E+00		
PA-234	946.02	26.	-11.	-0.006	110.98	-5.272E+00		P
EU-152	964.11	90.	10.	0.006	134.68	4.629E+00		
EU-154	996.33	52.	-7.	-0.004	157.32	-4.283E+00		
EU-154	1004.77	39.	10.	0.006	90.18	3.955E+00		
Co-56	1037.84	30.	-8.	-0.004	101.58	-4.042E+00		P
RH-106	1050.36	11.	7.	0.004	110.10	3.186E+01		P
BI-207	1063.66	26.	-10.	-0.005	80.95	-9.288E-01		P
FE-59	1099.25	22.	1.	0.001	999.48	1.394E-01		P
EU-152	1112.07	62.	-12.	-0.007	97.18	-6.589E+00		
Sc-46	1120.55	45.	5.	0.003	203.52	3.616E-01		
Ta-182	1121.30	40.	11.	0.006	87.59	2.349E+00		
CO-60	1173.24	32.	-9.	-0.005	119.67	-7.419E-01		P
Ta-182	1189.05	21.	-4.	-0.002	246.99	-2.125E+00		
Ta-182	1221.41	11.	7.	0.004	117.87	2.031E+00		P
Co-56	1238.28	21.	10.	0.005	113.27	1.204E+00		
NA-22	1274.53	27.	-5.	-0.003	163.20	-3.943E-01		
FE-59	1291.60	21.	-6.	-0.004	170.46	-1.253E+00		
CO-60	1332.50	16.	-2.	-0.001	460.07	-1.757E-01		
AG-110M	1384.30	6.	-2.	-0.001	400.56	-7.468E-01		P
EU-152	1408.00	17.	-10.	-0.006	101.73	-4.392E+00		
La-140	1596.21	17.	-8.	-0.004	193.65	-8.750E-01		P
SB-124	1690.98	12.	-6.	-0.003	145.30	-1.365E+00		
y-88	1836.06	0.	7.	0.004	38.98	8.115E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	3.9972E+00	3.9972E+00	1.254E+02%	1.70E+01
NA-22	#A	-3.9431E-01	-3.9431E-01	1.632E+02%	2.26E+00
K-40		2.1210E+02	2.1210E+02	6.593E+00%	1.03E+01
Sc-46	#A	-6.3826E-01	-6.3826E-01	1.056E+02%	2.29E+00
CR-51	#A	4.9448E+00	4.9449E+00	1.558E+02%	2.58E+01
MN-54	A	3.3287E-01	3.3287E-01	9.083E+01%	7.48E-01
FE-59	#A	1.3939E-01	1.3939E-01	9.995E+02%	3.22E+00
Co-56	#A	3.2477E-01	3.2477E-01	1.133E+02%	1.49E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.31E+00
CO-58	#A	-8.3674E-01	-8.3675E-01	8.528E+01%	2.39E+00
CO-60	#A	-1.7571E-01	-1.7571E-01	4.601E+02%	1.88E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.29E+00

NB-94	#A	4.1243E-01	4.1243E-01	3.499E+01%	1.52E+00
ZR-95	#A	1.0510E+00	1.0510E+00	9.172E+01%	2.26E+00
NB-95	#A	-4.9694E-01	-4.9694E-01	1.650E+02%	2.79E+00
RU-103	#A	-4.6037E-01	-4.6037E-01	1.372E+02%	1.52E+00
RH-106	#A	2.0715E+00	2.0715E+00	1.101E+02%	1.39E+01
AG-108M	#A	4.8245E-01	4.8245E-01	8.910E+01%	1.16E+00
AG-110M	#A	2.8618E-02	2.8618E-02	6.837E+02%	2.81E+00
SN-113	#A	-5.1516E-01	-5.1516E-01	9.855E+01%	2.90E+00
SB-124	#A	7.7063E-01	7.7063E-01	8.258E+01%	3.39E+00
SB-125	#A	1.7911E+00	1.7911E+00	9.618E+01%	3.71E+00
I-131	#A	6.7185E-01	6.7186E-01	8.559E+01%	9.37E-01
Gd-153	#A	-1.5205E+00	-1.5205E+00	1.708E+02%	8.64E+00
Ga-68	#	3.5909E+01	3.6044E+01	4.413E+01%	3.38E+01
Tc-99m	#A	-5.2239E-01	-5.2276E-01	1.466E+02%	2.55E+00
BA-133	#A	-9.1230E-01	-9.1230E-01	7.957E+01%	3.82E+00
CS-134	#A	7.8586E-01	7.8586E-01	9.205E+01%	3.45E+00
CS-137	#A	5.2537E-01	5.2537E-01	9.036E+01%	1.61E+00
CE-139	#A	9.0714E-02	9.0714E-02	5.746E+02%	1.77E+00
Ba-140	#A	-2.0065E+00	-2.0065E+00	1.192E+02%	5.82E+00
La-140	#A	-8.7499E-01	-8.7500E-01	1.937E+02%	2.38E+00
CE-141	#A	-9.6716E-01	-9.6717E-01	1.449E+02%	4.67E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.62E+01
PM-144	#A	5.2863E-01	5.2863E-01	9.326E+01%	1.16E+00
EU-152	#A	2.1709E+00	2.1709E+00	7.284E+01%	9.03E+00
EU-154	#A	1.5494E+00	1.5494E+00	9.018E+01%	1.33E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.23E+01
HF-181	#A	3.7076E-01	3.7076E-01	1.799E+02%	2.36E+00
Ta-182	#A	2.2100E+00	2.2100E+00	7.343E+01%	6.95E+00
Hg-203	#A	1.4823E-02	1.4823E-02	3.159E+03%	1.62E+00
TL-208		8.2102E+00	8.2102E+00	9.155E+00%	1.01E+00
pm-146	#A	-1.0981E+00	-1.0981E+00	1.495E+02%	4.29E+00
y-88	#A	4.8191E-01	4.8191E-01	3.898E+01%	1.38E+00
Cd-113m	#A	6.6668E+03	6.6668E+03	9.052E+01%	2.02E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.43E+01
Cf-251	A	-7.0597E-01	-7.0597E-01	3.338E+02%	6.11E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.73E+00
Sn-126	A	5.2004E+00	5.2004E+00	1.114E+02%	1.93E+01
PB-210	#A	-2.7642E+01	-2.7642E+01	3.658E+01%	5.33E+01
PB-212		2.4875E+01	2.4875E+01	4.929E+00%	1.85E+00
PB-214		1.1259E+01	1.1259E+01	1.052E+01%	2.05E+00
BI-207	#A	7.2506E-03	7.2506E-03	6.623E+03%	1.70E+00
BI-212	#A	-6.3923E-02	-6.3923E-02	1.127E+04%	3.06E+01
BI-214		1.0967E+01	1.0967E+01	1.208E+01%	2.27E+00
BI-210M	#A	1.4416E-03	1.4416E-03	5.082E+04%	2.54E+00
AC-228		2.3636E+01	2.3636E+01	7.198E+00%	3.26E+00
TH-227	#A	5.8237E+00	5.8237E+00	1.382E+02%	2.70E+01
TH-229	#A	-9.1672E+00	-9.1672E+00	1.077E+02%	2.52E+01
TH-234	#A	-1.9156E+01	-1.9156E+01	4.305E+01%	5.40E+01
PA-231	#A	-1.7490E+01	-1.7490E+01	1.503E+02%	8.81E+01

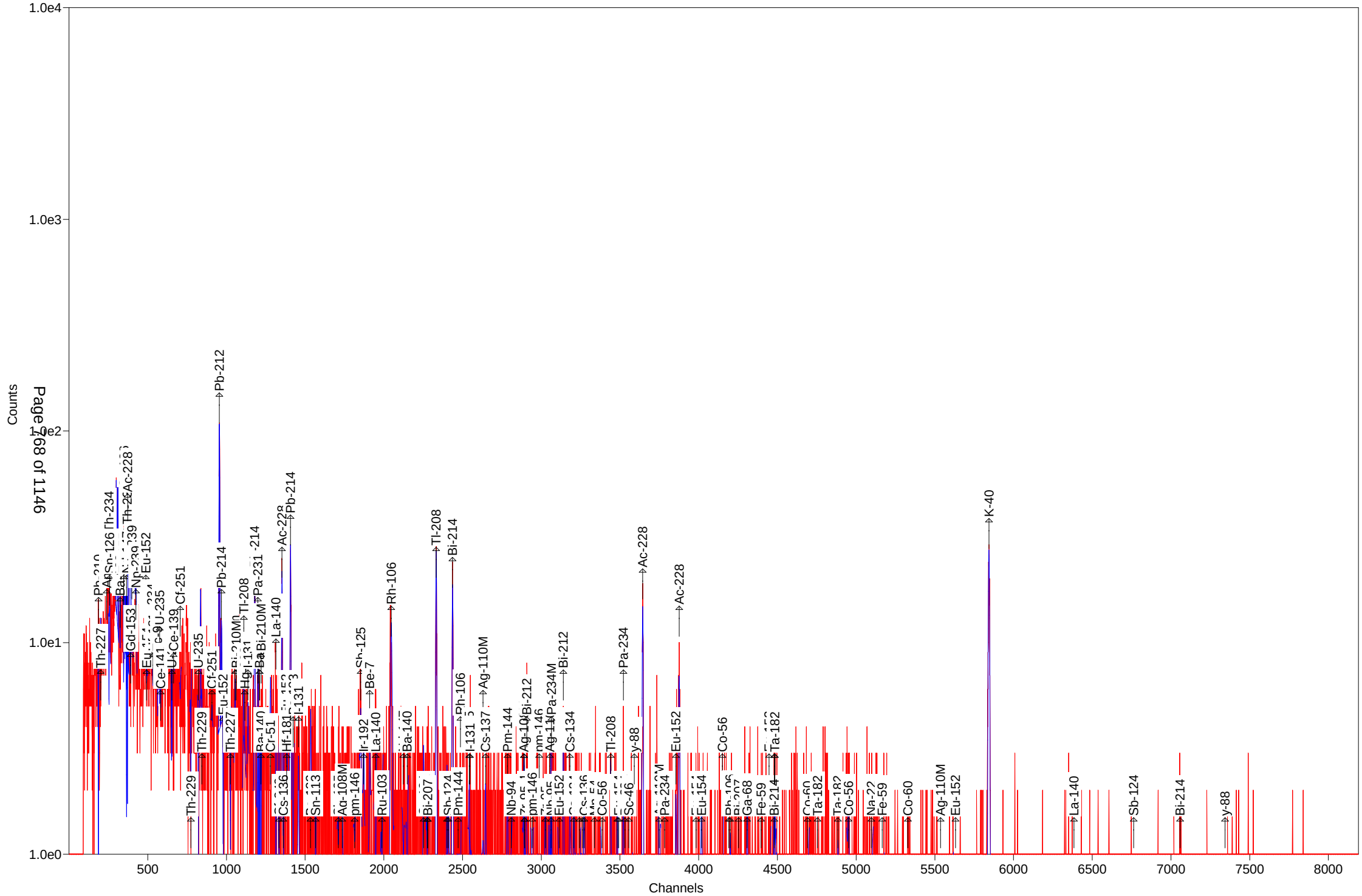
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.51E+00
PA-234 #A	1.5279E+00	1.5279E+00	1.483E+02%		9.67E+00
PA-234M#A	4.4966E+01	4.4966E+01	1.123E+02%		3.13E+02
U-235 #A	-4.2075E+00	-4.2075E+00	7.376E+01%		2.01E+01
AM-241 #A	3.8424E-01	3.8424E-01	4.454E+02%		5.77E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.25E+01
Ir-192 #A	3.7774E-01	3.7774E-01	9.656E+01%		3.14E+00
Cs-136 #A	6.3649E-01	6.3650E-01	1.069E+02%		2.31E+00
Np-239 #A	1.9512E+00	1.9513E+00	1.714E+02%		1.11E+01
Nd-147 #A	-1.2351E+00	-1.2352E+00	3.226E+02%		9.82E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.914E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 2.9137537E+02 Bq/Sample

264535_Gamma_160-18554-A-15-B. 15_Gamma_20161066.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162108

Sample Description: 264535_Gamma_160-18554-A-16-B
Detector: Detector #16
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-16-B

Decay to Time: 9/1/2016 13:12 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:13:22 Real Time: 1821 sec
Analysis Time: 9/1/2016 13:43 Dead Time: 1.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Soil_TunaCan.Clb
Efficiency Cal Desc: 16_TunaCan_90099_071012
Efficiency Cal Date: 7/13/2012 09:47
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 16_2016-08-07_0542.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.539E+00	110.9	3.925E+00	3.929E+00	1.324E+01
NA-22	9.650E-01	32.2	3.108E-01	3.145E-01	8.155E-01
K-40	2.312E+02	5.3	1.225E+01	1.703E+01	1.085E+01
Sc-46	4.748E-01	81.9	3.890E-01	3.898E-01	2.177E+00
CR-51	0.000E+00	1.#INF	1.545E+00	1.545E+00	2.736E+01
MN-54	-5.586E-01	128.4	7.175E-01	7.181E-01	1.601E+00
FE-59	1.023E+00	88.9	9.093E-01	9.108E-01	2.018E+00
Co-56	-9.010E-03	189.6	1.708E-02	1.709E-02	1.315E+00
CO-57	1.253E-02	2675.3	3.353E-01	3.353E-01	1.141E+00
CO-58	4.181E-01	84.5	3.533E-01	3.540E-01	1.193E+00
CO-60	5.294E-01	97.2	5.147E-01	5.154E-01	1.124E+00
ZN-65	-1.846E+00	99.4	1.835E+00	1.838E+00	6.156E+00
NB-94	3.505E-01	178.0	6.240E-01	6.242E-01	2.125E+00
ZR-95	-8.554E-01	127.6	1.092E+00	1.093E+00	2.533E+00
NB-95	0.000E+00	1.#INF	1.142E-01	1.142E-01	1.649E+00
RU-103	-2.420E-01	193.7	4.689E-01	4.690E-01	1.216E+00
RH-106	8.115E-01	647.6	5.255E+00	5.256E+00	1.817E+01
AG-108M	-5.377E-01	111.2	5.979E-01	5.985E-01	1.414E+00
AG-110M	9.725E-01	72.6	7.062E-01	7.080E-01	2.345E+00
SN-113	-8.625E-01	88.9	7.665E-01	7.678E-01	2.867E+00
SB-124	-7.195E-01	153.5	1.104E+00	1.105E+00	3.695E+00
SB-125	-1.947E+00	90.9	1.770E+00	1.773E+00	4.372E+00
I-131	9.035E-01	72.6	6.563E-01	6.579E-01	1.183E+00
Gd-153	1.469E+00	140.4	2.063E+00	2.065E+00	6.857E+00
Ga-68	-2.479E+00	1045.2	2.591E+01	2.591E+01	5.797E+01
Tc-99m	-4.565E-01	148.5	6.780E-01	6.785E-01	2.257E+00
BA-133	-7.503E-01	160.1	1.201E+00	1.202E+00	4.021E+00
CS-134	-4.896E-01	156.0	7.637E-01	7.641E-01	3.447E+00
CS-137	3.792E-01	161.8	6.136E-01	6.139E-01	2.091E+00
CE-139	3.904E-02	1120.6	4.375E-01	4.375E-01	1.484E+00
Ba-140	3.800E-02	159.0	6.042E-02	6.045E-02	5.147E+00
La-140	6.321E-02	64.7	4.088E-02	4.102E-02	1.922E+00
CE-141	-8.476E-01	141.9	1.203E+00	1.203E+00	4.003E+00

CE-144	2.626E+00	179.1	4.702E+00	4.704E+00	1.569E+01
PM-144	-7.616E-01	74.0	5.636E-01	5.649E-01	1.873E+00
EU-152	1.317E+00	228.9	3.015E+00	3.016E+00	9.099E+00
EU-154	4.082E+00	66.4	2.709E+00	2.717E+00	7.878E+00
EU-155	-2.077E+00	171.9	3.571E+00	3.573E+00	1.186E+01
HF-181	6.032E-01	92.8	5.595E-01	5.604E-01	1.848E+00
Ta-182	3.342E+00	46.9	1.568E+00	1.577E+00	6.795E+00
Hg-203	-3.511E-01	134.8	4.733E-01	4.737E-01	1.595E+00
TL-208	8.120E+00	8.9	7.227E-01	8.365E-01	1.118E+00
pm-146	5.320E-01	105.3	5.603E-01	5.610E-01	2.344E+00
y-88	1.867E-01	40.8	7.621E-02	7.681E-02	1.268E+00
Cd-113m	7.727E+02	712.7	5.507E+03	5.507E+03	1.891E+04
Cd-109	0.000E+00	1.#INF	2.186E+01	2.186E+01	7.259E+01
Cf-251	-1.041E+00	222.7	2.318E+00	2.319E+00	5.950E+00
Cf-249	0.000E+00	1.#INF	1.816E-01	1.816E-01	2.550E+00
Sn-126	-3.574E+00	175.7	6.278E+00	6.281E+00	2.097E+01
PB-210	-1.324E+01	104.8	1.387E+01	1.389E+01	4.789E+01
PB-212	2.221E+01	5.0	1.102E+00	1.811E+00	1.979E+00
PB-214	2.089E+01	5.6	1.180E+00	1.603E+00	2.293E+00
BI-207	1.280E-01	206.7	2.646E-01	2.647E-01	1.483E+00
BI-212	3.456E+01	18.5	6.397E+00	6.644E+00	1.145E+01
BI-214	1.650E+01	8.1	1.340E+00	1.591E+00	2.004E+00
BI-210M	6.558E-01	86.6	5.676E-01	5.690E-01	1.899E+00
AC-228	2.738E+01	7.5	2.053E+00	2.483E+00	2.183E+00
TH-227	1.138E+00	603.4	6.867E+00	6.867E+00	2.327E+01
TH-229	1.467E+00	598.1	8.774E+00	8.774E+00	2.270E+01
TH-234	1.204E+01	39.9	4.802E+00	4.843E+00	2.937E+01
PA-231	-1.641E+01	150.6	2.472E+01	2.473E+01	8.259E+01
PA-233	8.625E-01	254.1	2.192E+00	2.192E+00	7.341E+00
PA-234	2.867E+00	86.1	2.467E+00	2.472E+00	9.314E+00
PA-234M	3.078E+01	81.8	2.520E+01	2.524E+01	3.145E+02
U-235	-3.800E+00	73.5	2.791E+00	2.798E+00	1.777E+01
AM-241	1.024E+00	169.6	1.737E+00	1.738E+00	5.798E+00
Np-237	0.000E+00	1.#INF	6.144E+00	6.144E+00	2.042E+01
Ir-192	5.129E-01	88.6	4.546E-01	4.556E-01	3.099E+00
Cs-136	6.444E-02	727.0	4.685E-01	4.685E-01	1.649E+00
Np-239	1.854E+00	174.4	3.233E+00	3.235E+00	1.074E+01
Nd-147	-2.839E+00	140.1	3.978E+00	3.981E+00	9.528E+00
Total	1.212E+03				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-16-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162108.An1

Acquisition information
Start time: 9/1/2016 1:13:22 PM
Live time: 1800
Real time: 1821
Dead time: 1.15 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Soil_TunaCan.Clb
16_TunaCan_90099_071012

Energy Calibration
Created: 2/28/2012 9:35:31 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: -2.285E-08 keV/channel^2

Efficiency Calibration
Created: 7/13/2012 9:47:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.17 %
Log(Eff): -2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.64keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:12:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-08-07_0542.PBC 8/7/2016 5:42:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 33 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1866

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-24.	104.75	0.96	2.352E-02	46.54	4.250	PBC<MDA	PB210
50.14	4.	603.39	0.96	2.644E-02	50.14	8.000	PBC<MDA	TH227
59.54	22.	169.59	0.97	3.327E-02	59.54	35.900	PBC<MDA	AM241
63.24	38.	57.74	0.97	3.561E-02	63.29	3.810	PBC<MDA	TH234
74.77	269.	10.48	0.99	4.136E-02				
77.27	393.	7.57	0.99	4.233E-02				
87.18	139.	15.35	1.00	4.532E-02	86.49	13.100	1.303E+01	Np237
					86.54	30.700	5.559E+00	EU155
					86.94	9.040	1.884E+01	Sn126
					87.57	37.500	4.527E+00	Sn126
					88.04	3.790	4.468E+01	Cd109
89.95	100.	19.00	1.00	4.591E-02				
92.57	45.	55.06	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
97.50	37.	140.39	1.01	4.707E-02	97.50	30.000	PBC<MDA	Gd153
106.13	36.	174.37	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
123.10	26.	95.35	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154
131.29	28.	147.95	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	28.	150.08	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.089E+00	CE144
133.54	24.	179.07	1.04	4.612E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.626E+00	CE144
162.66	14.	187.08	1.07	4.136E-02	162.66	6.220	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.13	4.	598.07	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
208.92	64.	33.95	0.46	3.534E-02				
227.00	7.	320.25	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.60	572.	5.24	1.39	3.217E-02	238.63	43.300	2.280E+01	PB212
241.98	134.	12.98	1.14	3.185E-02	242.00	7.430	3.136E+01	PB214
244.69	19.	232.62	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
263.70	2.	712.74	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	18.	86.56	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
277.68	21.	78.17	1.17	2.890E-02	277.28	6.310	PBC<MDA	TL208
284.30	17.	115.75	1.18	2.839E-02	284.30	6.140	PBC<MDA	I131
295.12	214.	8.67	1.48	2.764E-02	295.09	19.300	2.233E+01	PB214
299.63	73.	22.75	1.24	2.732E-02	300.03	3.280	4.551E+01	PB212
					300.07	2.460	6.069E+01	PA231
					300.18	6.200	2.409E+01	PA233
308.44	21.	175.59	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
310.48	15.	254.13	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
338.28	162.	13.87	1.15	2.507E-02	338.32	12.010	2.996E+01	AC228
351.72	332.	7.24	1.41	2.437E-02	351.93	37.600	2.015E+01	PB214
364.48	5.	305.17	1.25	2.375E-02	364.48	81.700	PBC<MDA	I131
383.84	8.	259.72	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
453.88	8.	203.07	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
463.37	5.	298.80	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
468.06	15.	88.64	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
477.60	13.	110.88	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
482.00	14.	109.05	1.35	1.939E-02	482.00	80.500	PBC<MDA	HF181
487.02	14.	113.68	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
511.86	146.	20.68	2.63	1.856E-02	511.86	20.000	2.185E+01	RH106
563.24	4.	381.89	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
583.30	209.	8.90	1.14	1.686E-02	583.02	84.500	8.142E+00	TL208
609.39	224.	8.12	1.93	1.633E-02	609.31	46.090	1.650E+01	BI214
					610.30	5.750	1.324E+02	RU103
621.92	2.	647.60	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106
635.89	2.	572.01	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
636.97	12.	72.63	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
661.66	9.	161.79	1.51	1.537E-02	661.66	85.210	PBC<MDA	CS137
702.63	9.	178.01	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
727.50	67.	18.51	2.09	1.433E-02	727.17	7.550	3.456E+01	BI212
747.16	8.	105.33	1.59	1.404E-02	747.16	34.000	PBC<MDA	pm146
763.94	12.	96.24	1.60	1.381E-02	763.94	22.280	PBC<MDA	AG110M
766.41	14.	81.85	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	5.	228.91	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
786.18	14.	88.55	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
810.78	10.	84.51	1.64	1.322E-02	810.78	99.460	PBC<MDA	CO58
815.77	10.	95.49	1.65	1.316E-02	815.77	23.280	PBC<MDA	La140
818.50	2.	727.01	1.65	1.312E-02	818.50	100.000	PBC<MDA	Cs136
859.35	23.	53.79	1.69	1.264E-02	860.56	12.420	PBC<MDA	TL208
873.23	9.	100.38	1.70	1.251E-02	873.23	12.270	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
884.68	10.	108.78	1.71	1.238E-02	884.68	72.680	PBC<MDA	AG110M
911.47	167.	8.56	1.78	1.211E-02	911.07	29.000	2.646E+01	AC228
946.02	12.	87.92	1.76	1.178E-02	946.02	13.400	PBC<MDA	PA234
964.11	6.	242.16	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152
969.43	99.	15.50	1.77	1.157E-02	968.97	17.460	2.714E+01	AC228
1004.77	17.	86.82	1.81	1.126E-02	1004.77	18.010	PBC<MDA	EU154
1063.66	5.	206.73	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1099.25	11.	88.86	1.89	1.052E-02	1099.25	56.500	PBC<MDA	FE59
1120.55	18.	81.93	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.395E-01	Sc46
					1121.30	34.900	2.693E+00	Ta182
1120.59	14.	108.89	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1121.47	18.	75.72	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.398E-01	Sc46
					1121.30	34.900	2.694E+00	Ta182
1189.05	6.	180.72	1.96	9.916E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	23.	46.93	1.99	9.717E-03	1221.41	27.000	4.870E+00	Ta182
1238.28	5.	357.38	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	16.	32.20	2.03	9.409E-03	1274.53	99.940	9.650E-01	NA22
					1274.54	35.190	2.741E+00	EU154
1332.50	9.	97.22	2.08	9.097E-03	1332.50	99.980	PBC<MDA	CO60
1461.06	377.	5.30	1.18	8.481E-03	1460.83	10.670	2.312E+02	K40
1690.98	1.	945.38	2.37	7.585E-03	1690.98	47.790	PBC<MDA	SB124
1764.89	9.	84.53	2.43	7.342E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	31.	23.87	2.43	7.320E-03	1771.35	15.480	1.523E+01	Co56
1836.06	6.	40.82	2.48	7.121E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.75	74.75	257.	272.	6.583E+03	10.32	0.985	- D
308.73	77.25	239.	399.	9.420E+03	7.44	0.988	- D
359.50	89.99	170.	79.	1.715E+03	25.97	0.999	- D
835.97	208.90	79.	59.	1.665E+03	25.05	1.109	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.54	321.	-24.	-0.013	104.75	0.959s
TH-227	200.26	50.14	340.	4.	0.002	603.39	0.963s
AM-241	237.83	59.54	684.	22.	0.012	169.59	0.971s
TH-234	252.82	63.29	219.	38.	0.021	57.74	0.975D
Sn-126	256.79	64.28	776.	-23.	-0.013	175.67	0.976s
BA-133	323.60	80.99	1535.	-35.	-0.019	159.40	0.991
Np-237	345.59	86.49	2121.	0.	0.000	188.89	0.996A
EU-155	345.80	86.54	2445.	-39.	-0.021	182.08	0.996s
Sn-126	347.39	86.94	2321.	-39.	-0.021	177.40	0.997s
Sn-126	349.91	87.57	2181.	-39.	-0.021	171.91	0.997s
Cd-109	351.79	88.04	2282.	0.	0.000	175.73	0.998A
Nd-147	364.02	91.10	2143.	-39.	-0.022	169.85	1.001s
TH-234	369.98	92.59	279.	45.	0.025	55.06	1.002D
AC-228	373.02	93.35	2171.	-39.	-0.022	170.60	1.003s
Gd-153	389.61	97.50	1356.	37.	0.021	140.39	1.007s
Np-239	397.61	99.50	1950.	-38.	-0.021	167.00	1.008
Gd-153	412.40	103.20	1988.	-38.	-0.021	168.05	1.012s
Np-239	414.40	103.70	2053.	-38.	-0.021	170.67	1.012s
EU-155	420.85	105.31	2090.	-38.	-0.021	171.94	1.014s
Np-239	424.11	106.13	1965.	36.	0.020	174.37	1.014s
EU-152	486.67	121.78	373.	-30.	-0.017	93.16	1.029s
EU-154	491.96	123.10	287.	26.	0.014	95.35	1.030
PA-234	524.73	131.29	868.	28.	0.016	147.95	1.038s
HF-181	531.64	133.02	896.	28.	0.016	150.08	1.039s
CE-144	533.70	133.54	925.	24.	0.013	179.07	1.040s
HF-181	544.74	136.30	949.	0.	0.000	1000.00	1.042s
CO-57	545.43	136.47	949.	0.	0.000	1000.00	1.042s
Tc-99m	561.57	140.51	1121.	-32.	-0.018	148.53	1.046s
U-235	574.67	143.79	1090.	-33.	-0.019	73.45	1.049
CE-141	581.29	145.44	1057.	-33.	-0.018	141.88	1.050s
Ba-140	650.14	162.66	336.	14.	0.008	187.08	1.066s
U-235	653.01	163.38	350.	0.	0.000	1000.00	1.067s
Cf-251	705.88	176.60	224.	-13.	-0.007	222.67	1.079s
TH-229	773.49	193.51	191.	4.	0.002	598.07	1.094s
U-235	820.76	205.33	485.	-28.	-0.016	110.88	1.105s
TH-229	842.82	210.85	398.	-28.	-0.016	50.43	1.110s
Cf-251	907.40	227.00	128.	7.	0.004	320.25	1.125
PB-212	953.91	238.63	101.	557.	0.309	4.96	1.136D
PB-214	967.37	242.00	83.	134.	0.074	12.98	1.139D
EU-152	978.14	244.69	965.	19.	0.011	232.62	1.141s
TH-227	1024.32	256.24	140.	-16.	-0.009	167.79	1.152s
Cd-113m	1054.15	263.70	158.	2.	0.001	712.74	1.158s
BI-210M	1062.67	265.83	107.	18.	0.010	86.56	1.160s
TL-208	1108.46	277.28	126.	21.	0.012	78.17	1.171

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1116.13	279.20	192.	-15.	-0.008	134.79	1.173s
I-131	1136.52	284.30	92.	17.	0.009	115.75	1.177s
PB-214	1179.81	295.12	38.	214.	0.119	8.67	1.481s
PB-212	1197.82	299.63	46.	73.	0.041	22.75	1.245
PA-231	1199.58	300.07	640.	-23.	-0.013	156.52	1.192
PA-233	1200.02	300.18	617.	-23.	-0.013	153.72	1.192
PA-231	1209.90	302.65	594.	-23.	-0.013	150.59	1.194
BA-133	1210.70	302.85	570.	-23.	-0.013	147.66	1.194
Ba-140	1218.69	304.85	579.	-23.	-0.013	148.51	1.196s
BI-210M	1218.88	304.90	602.	-23.	-0.013	151.40	1.196s
Ir-192	1233.05	308.44	685.	21.	0.012	175.59	1.199
PA-233	1247.34	312.01	704.	15.	0.008	254.13	1.202s
Ir-192	1265.24	316.49	719.	0.	0.000	1000.00	1.206s
CR-51	1279.62	320.08	719.	0.	0.000	1000.00	1.210s
La-140	1314.31	328.76	565.	-22.	-0.012	157.35	1.217s
Cf-249	1333.02	333.44	544.	-22.	-0.012	153.83	1.222s
AC-228	1352.37	338.28	67.	162.	0.090	13.87	1.148
Cs-136	1361.54	340.57	522.	-18.	-0.010	179.97	1.228s
HF-181	1382.56	345.83	104.	-21.	-0.012	176.01	1.233
PB-214	1406.12	351.72	57.	332.	0.185	7.24	1.407
BA-133	1423.24	356.00	515.	-20.	-0.011	160.12	1.242
I-131	1457.16	364.48	69.	5.	0.003	305.17	1.250
BA-133	1534.57	383.84	193.	8.	0.004	259.72	1.267
Cf-249	1551.01	387.95	201.	0.	0.000	1000.00	1.271s
SN-113	1565.96	391.69	237.	-22.	-0.012	88.87	1.274s
SB-125	1710.67	427.88	100.	-22.	-0.012	90.89	1.307s
AG-108M	1734.91	433.94	95.	-18.	-0.010	111.19	1.312s
pm-146	1814.67	453.88	56.	8.	0.004	203.07	1.330s
SB-125	1852.61	463.37	131.	5.	0.003	298.80	1.338
Ir-192	1871.38	468.06	86.	15.	0.009	88.64	1.342s
BE-7	1909.51	477.60	99.	13.	0.007	110.88	1.351s
HF-181	1927.12	482.00	112.	14.	0.008	109.05	1.355s
La-140	1947.21	487.02	123.	14.	0.008	113.68	1.359s
RU-103	1987.33	497.05	57.	-8.	-0.004	193.72	1.368
RH-106	2046.57	511.86	112.	146.	0.081	20.68	2.631s
Nd-147	2123.10	531.00	65.	-12.	-0.007	140.15	1.398s
Ba-140	2148.14	537.26	66.	-6.	-0.003	257.08	1.404s
CS-134	2252.03	563.24	52.	4.	0.002	381.89	1.427s
CS-134	2276.36	569.32	68.	-12.	-0.006	105.25	1.432s
PA-234	2276.96	569.47	79.	0.	0.000	1000.00	1.432
BI-207	2277.89	569.70	82.	-2.	-0.001	855.05	1.432s
TL-208	2332.29	583.30	31.	209.	0.116	8.90	1.141
SB-125	2401.07	600.50	527.	-21.	-0.012	156.77	1.460s
SB-124	2409.99	602.73	506.	-21.	-0.012	153.48	1.462
CS-134	2417.91	604.71	431.	-19.	-0.011	155.97	1.463
BI-214	2436.61	609.39	28.	224.	0.124	8.12	1.934s
RU-103	2440.26	610.30	412.	-8.	-0.004	356.25	1.468s
PM-144	2471.31	618.06	74.	-18.	-0.010	72.71	1.475s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2486.73	621.92	113.	2.	0.001	647.60	1.479s
SB-125	2542.62	635.89	45.	2.	0.001	572.01	1.491s
I-131	2546.96	636.97	30.	12.	0.006	72.63	1.492s
AG-110M	2630.10	657.76	95.	-19.	-0.011	76.50	1.510s
CS-137	2645.69	661.66	100.	9.	0.005	161.79	1.513s
PM-144	2785.22	696.54	100.	-20.	-0.011	73.99	1.544s
NB-94	2809.57	702.63	126.	9.	0.005	178.01	1.549s
SB-124	2890.19	722.79	120.	-3.	-0.002	519.62	1.567s
AG-108M	2890.80	722.94	117.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	117.	0.	0.000	1000.00	1.567s
ZR-95	2895.84	724.20	156.	-18.	-0.010	100.50	1.568s
BI-212	2909.06	727.50	18.	67.	0.037	18.51	2.091s
pm-146	2941.93	735.72	51.	-18.	-0.010	86.77	1.578s
pm-146	2987.69	747.16	14.	8.	0.004	105.33	1.588s
ZR-95	3025.97	756.73	47.	-12.	-0.006	127.62	1.596s
AG-110M	3054.82	763.94	56.	12.	0.006	96.24	1.602s
NB-95	3062.21	765.79	67.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	56.	14.	0.008	81.85	1.605s
EU-152	3114.73	778.92	28.	5.	0.003	228.91	1.615s
BI-212	3140.74	785.42	33.	14.	0.008	88.55	1.621
CS-134	3182.53	795.87	106.	-10.	-0.006	149.00	1.630s
CO-58	3242.16	810.78	30.	10.	0.005	84.51	1.643s
La-140	3262.14	815.77	40.	10.	0.006	95.49	1.647s
Cs-136	3273.06	818.50	60.	2.	0.001	727.01	1.649s
MN-54	3338.46	834.85	55.	-13.	-0.007	128.45	1.663s
Co-56	3386.15	846.77	35.	-7.	-0.004	189.61	1.674s
TL-208	3441.33	860.56	26.	23.	0.013	53.79	1.685s
EU-154	3492.00	873.23	17.	9.	0.005	100.38	1.696s
PA-234	3521.21	880.53	85.	-17.	-0.009	81.76	1.703s
PA-234	3532.05	883.24	102.	-14.	-0.008	108.59	1.705s
AG-110M	3537.82	884.68	57.	10.	0.006	108.78	1.706s
y-88	3591.26	898.04	25.	-2.	-0.001	397.18	1.718s
AC-228	3644.98	911.47	6.	167.	0.093	8.56	1.779
AG-110M	3749.09	937.49	50.	-15.	-0.008	106.81	1.751s
PA-234	3783.21	946.02	20.	12.	0.007	87.92	1.759s
EU-152	3855.58	964.11	108.	6.	0.003	242.16	1.774s
AC-228	3876.84	969.43	21.	99.	0.055	15.50	1.769
EU-154	3984.48	996.33	96.	-19.	-0.010	77.27	1.801s
PA-234M	4003.15	1001.00	119.	-4.	-0.002	261.36	1.805s
EU-154	4018.27	1004.77	96.	17.	0.009	86.82	1.808
Co-56	4150.56	1037.84	54.	-21.	-0.012	52.24	1.836
Cs-136	4191.49	1048.07	47.	-13.	-0.007	81.28	1.845s
BI-207	4253.86	1063.66	22.	5.	0.003	206.73	1.858s
FE-59	4396.27	1099.25	16.	11.	0.006	88.86	1.888s
EU-152	4447.58	1112.07	160.	-17.	-0.010	105.15	1.899s
ZN-65	4461.46	1115.55	143.	-17.	-0.010	99.41	1.901
BI-214	4480.43	1120.29	115.	14.	0.008	108.89	1.906
Sc-46	4481.49	1120.55	94.	18.	0.010	81.93	1.906

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.49	1121.30	79.	18.	0.010	75.72	1.906
Ta-182	4755.57	1189.05	23.	6.	0.004	180.72	1.963
Ta-182	4885.06	1221.41	17.	23.	0.013	46.93	1.990
Co-56	4952.57	1238.28	58.	5.	0.003	357.38	2.004s
NA-22	5097.62	1274.53	6.	16.	0.009	32.20	2.034
EU-154	5097.68	1274.54	22.	0.	0.000	1000.00	2.034
FE-59	5165.91	1291.60	23.	-3.	-0.002	645.81	2.048s
CO-60	5329.61	1332.50	11.	9.	0.005	97.22	2.081s
AG-110M	5536.89	1384.30	24.	-3.	-0.002	398.61	2.124s
EU-152	5631.75	1408.00	30.	-4.	-0.002	430.63	2.143s
K-40	5844.10	1461.06	10.	377.	0.209	5.30	1.179s
La-140	6385.02	1596.21	25.	-10.	-0.006	124.89	2.294s
SB-124	6764.37	1690.98	6.	1.	0.000	945.38	2.369s
BI-214	7058.61	1764.49	24.	9.	0.005	84.53	2.427
Co-56	7086.08	1771.35	12.	31.	0.017	23.87	2.433s
y-88	7345.12	1836.06	0.	6.	0.003	40.82	2.483s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.5394E+00				5.31E+01	
			477.60	3.539E+00	?(P	1.324E+01 1.11E+02	1.05E+01 G
NA-22	C	9.6502E-01				9.50E+02	
			1274.53	9.650E-01	?(	8.155E-01 3.22E+01	9.99E+01 G
K-40	N	2.3123E+02				4.66E+11	
			1460.83	2.312E+02	(P	1.085E+01 5.30E+00	1.07E+01 G
Sc-46	F	4.7479E-01				8.38E+01	
			889.28	1.009E-02	%(	2.177E+00 6.19E+03	1.00E+02 G
			1120.55	9.395E-01	?(	2.571E+00 8.19E+01	1.00E+02 G
MN-54	C	-5.5860E-01				3.12E+02	
			834.85	-5.586E-01	?(	1.601E+00 1.28E+02	1.00E+02 G
FE-59	F	1.0233E+00				4.45E+01	
			1099.25	1.023E+00	?(P	2.018E+00 8.89E+01	5.65E+01 G
			1291.60	-3.825E-01	- P	3.444E+00 6.46E+02	4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C -9.0099E-03					7.73E+01	
		846.77	-3.041E-01	?(	1.315E+00	1.90E+02	9.99E+01 G
		1238.28	4.374E-01	@(P	3.340E+00	3.57E+02	6.61E+01 G
		1037.84	-7.560E+00	+ P	1.325E+01	5.22E+01	1.41E+01 G
		1771.35	1.523E+01	?	9.225E+00	2.39E+01	1.55E+01 A
CO-57	C 1.2532E-02					2.72E+02	
		122.06	1.253E-02	&(	1.141E+00	2.68E+03	8.56E+01 G
		136.47	0.000E+00	-	1.664E+01	1.00E+03	1.07E+01 G
CO-58	C 4.1808E-01					7.09E+01	
		810.78	4.181E-01	?(	1.193E+00	8.45E+01	9.95E+01 G
CO-60	F 5.2941E-01					1.93E+03	
		1332.50	5.294E-01	?(	1.124E+00	9.72E+01	1.00E+02 G
		1173.24	2.418E-02	& P	1.693E+00	3.17E+03	9.99E+01 G
ZN-65	F -1.8461E+00					2.44E+02	
		1115.55	-1.846E+00	?(	6.156E+00	9.94E+01	5.06E+01 G
NB-94	I 3.5052E-01					7.41E+06	
		702.63	3.505E-01	?(	2.125E+00	1.78E+02	9.79E+01 G
		871.10	-3.700E-02	&	1.442E+00	1.09E+03	9.99E+01 G
ZR-95	I -8.5544E-01					6.40E+01	
		756.73	-8.554E-01	(	2.533E+00	1.28E+02	5.45E+01 G
		724.20	-1.583E+00	+	5.333E+00	1.00E+02	4.42E+01 G
RU-103	I -2.4204E-01					3.93E+01	
		497.05	-2.420E-01	&(P	1.216E+00	1.94E+02	9.09E+01 G
		610.30	-4.797E+00	+	5.764E+01	3.56E+02	5.75E+00 GA
RH-106	I 8.1151E-01					3.74E+02	
		621.92	8.115E-01	?(	1.817E+01	6.48E+02	9.93E+00 G
		1050.36	2.180E+00	&	1.352E+02	1.76E+03	1.56E+00 G
		511.86	2.185E+01	?	7.787E+00	2.07E+01	2.00E+01 GA
AG-108M	C -5.3771E-01					1.53E+05	
		433.94	-5.377E-01	?(	1.414E+00	1.11E+02	9.05E+01 G
		722.94	0.000E+00	+	2.257E+00	1.00E+03	9.08E+01 G
		614.28	5.812E-07	%	3.671E+00	1.86E+08	8.98E+01 G
AG-110M	F 9.7247E-01					2.50E+02	
		884.68	6.343E-01	?(	2.345E+00	1.09E+02	7.27E+01 G
		657.76	-7.197E-01	+	1.834E+00	7.65E+01	9.46E+01 G
		937.49	-2.045E+00	+	4.862E+00	1.07E+02	3.44E+01 G
		1384.30	-7.765E-01	+	6.610E+00	3.99E+02	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	2.076E+00	?(	6.755E+00	9.62E+01	2.23E+01 G
SN-113	F	-8.6251E-01					1.15E+02	
			391.69	-8.625E-01	?(P	2.867E+00	8.89E+01	6.40E+01 G
SB-124	F	-7.1948E-01					6.02E+01	
			602.73	-7.195E-01	?(	3.695E+00	1.53E+02	9.83E+01 G
			1690.98	1.022E-01	+	2.213E+00	9.45E+02	4.78E+01 G
			722.79	-1.071E+00	+	1.919E+01	5.20E+02	1.08E+01 G
SB-125	I	-1.9473E+00					1.01E+03	
			427.88	-1.947E+00	?(P	4.372E+00	9.09E+01	2.96E+01 G
			600.50	-3.942E+00	+	2.068E+01	1.57E+02	1.79E+01 G
			635.89	5.224E-01	+ P	1.058E+01	5.72E+02	1.13E+01 G
			463.37	1.454E+00	+ P	1.487E+01	2.99E+02	1.05E+01 G
I-131	I	9.0351E-01					8.02E+00	
			364.48	1.535E-01	?(P	1.183E+00	3.05E+02	8.17E+01 G
			284.30	5.300E+00	&(P	1.514E+01	1.16E+02	6.14E+00 G
			636.97	5.685E+00	&(	1.377E+01	7.26E+01	7.17E+00 G
Gd-153	F	1.4692E+00					2.42E+02	
			97.50	1.469E+00	?(	6.857E+00	1.40E+02	3.00E+01 G
			103.20	-2.020E+00	+	1.128E+01	1.68E+02	2.18E+01 G
Ga-68	C	-2.4785E+00					4.71E-02	
			1077.40	-2.479E+00	%(	5.797E+01	1.05E+03	3.30E+00 G
Tc-99m	I	-4.5648E-01					2.51E-01	
			140.51	-4.565E-01	?(	2.257E+00	1.49E+02	8.93E+01 G
BA-133	F	-7.5026E-01					3.85E+03	
			356.00	-7.503E-01	(	4.021E+00	1.60E+02	6.20E+01 G
			302.85	-2.581E+00	+	1.273E+01	1.48E+02	1.83E+01 G
			383.84	2.078E+00	P	1.833E+01	2.60E+02	8.94E+00 GA
			80.99	-1.307E+00	+	6.930E+00	1.59E+02	3.41E+01 GA
CS-134	I	-4.8962E-01					7.54E+02	
			604.71	-6.596E-01	&(	3.447E+00	1.56E+02	9.76E+01 G
			795.87	-4.847E-01	+	2.457E+00	1.49E+02	8.55E+01 G
			569.32	-2.420E+00	+	8.626E+00	1.05E+02	1.54E+01 G
			801.95	4.798E-01	%	2.559E+01	1.54E+03	8.69E+00 G
			563.24	1.497E+00	?(P	1.398E+01	3.82E+02	8.35E+00 G
CS-137	I	3.7923E-01					1.10E+04	
			661.66	3.792E-01	?(P	2.091E+00	1.62E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.9041E-02					1.38E+02	
			165.85	3.904E-02	&(	1.484E+00	1.12E+03	7.99E+01 G
Ba-140	I	3.8003E-02					1.28E+01	
			537.26	-7.233E-01	?(P	5.147E+00	2.57E+02	2.44E+01 G
			162.66	3.023E+00	&(	1.903E+01	1.87E+02	6.22E+00 G
			304.85	-1.110E+01	&	5.506E+01	1.49E+02	4.29E+00 G
La-140	I	6.3213E-02					1.28E+01	
			1596.21	-7.591E-01	?(	1.922E+00	1.25E+02	9.54E+01 G
			487.02	8.992E-01	?(	3.447E+00	1.14E+02	4.55E+01 G
			328.76	-2.308E+00	&	1.214E+01	1.57E+02	2.03E+01 G
			815.77	1.799E+00	?(	5.831E+00	9.55E+01	2.33E+01 G
CE-141	I	-8.4765E-01					3.25E+01	
			145.44	-8.476E-01	&(	4.003E+00	1.42E+02	4.82E+01 G
CE-144	I	2.6258E+00					2.85E+02	
			133.54	2.626E+00	&(	1.569E+01	1.79E+02	1.11E+01 G
PM-144	C	-7.6164E-01					3.63E+02	
			696.54	-7.616E-01	?(	1.873E+00	7.40E+01	9.90E+01 G
			618.06	-6.129E-01	+	1.481E+00	7.27E+01	9.91E+01 G
EU-152	F	1.3172E+00					4.94E+03	
			344.29	-7.964E-02	%(P	9.099E+00	4.02E+03	2.65E+01 G
			1112.07	-6.821E+00	+	2.407E+01	1.05E+02	1.36E+01 G
			121.78	-1.229E+00	&	3.811E+00	9.32E+01	2.86E+01 G
			778.92	1.576E+00	(	8.629E+00	2.29E+02	1.29E+01 G
			964.11	2.021E+00	?(	1.679E+01	2.42E+02	1.46E+01 G
			244.69	4.402E+00	&(	3.421E+01	2.33E+02	7.58E+00 G
			1408.00	-1.261E+00	+ P	8.581E+00	4.31E+02	2.10E+01 GA
EU-154	I	4.0822E+00					3.14E+03	
			873.23	3.383E+00	&(P	7.878E+00	1.00E+02	1.23E+01 G
			123.10	7.413E-01	- P	2.355E+00	9.54E+01	4.08E+01 G
			1274.54	0.000E+00	-	4.122E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.014E+01	1.00E+03	2.02E+01 G
			1004.77	4.559E+00	?(	1.325E+01	8.68E+01	1.80E+01 G
			996.33	-8.693E+00	+	2.238E+01	7.73E+01	1.06E+01 G
EU-155	I	-2.0771E+00					1.81E+03	
			105.31	-2.077E+00	?(	1.186E+01	1.72E+02	2.12E+01 G
			86.54	-1.545E+00	+	9.342E+00	1.82E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	6.0320E-01					4.24E+01	
			482.00	5.027E-01	&(	1.848E+00	1.09E+02	8.05E+01 G
			133.02	7.900E-01	&(	3.951E+00	1.50E+02	4.33E+01 G
			345.83	-3.208E+00	+ P	7.522E+00	1.76E+02	1.51E+01 G
			136.30	0.000E+00	-	3.036E+01	1.00E+03	5.85E+00 G
Ta-182	F	3.3418E+00					1.14E+02	
			1121.30	2.694E+00	(	6.795E+00	7.57E+01	3.49E+01 G
			1221.41	4.870E+00	(	4.642E+00	4.69E+01	2.70E+01 G
			1189.05	2.190E+00	(	8.610E+00	1.81E+02	1.62E+01 G
Hg-203	F	-3.5113E-01					4.66E+01	
			279.20	-3.511E-01	?(	1.595E+00	1.35E+02	8.15E+01 G
TL-208	N	8.1195E+00					6.98E+02	
			583.02	8.142E+00	(P	1.118E+00	8.90E+00	8.45E+01 G
			277.28	6.440E+00	-	1.676E+01	7.82E+01	6.31E+00 G
			860.56	7.966E+00	&(P	9.444E+00	5.38E+01	1.24E+01 G
pm-146	C	5.3198E-01					2.02E+03	
			747.16	9.307E-01	?(	2.344E+00	1.05E+02	3.40E+01 G
			735.72	-3.162E+00	+	6.274E+00	8.68E+01	2.25E+01 G
			453.88	3.234E-01	?(	1.590E+00	2.03E+02	6.50E+01 G
y-88	F	1.8669E-01					1.07E+02	
			898.04	-1.152E-01	&(P	1.268E+00	3.97E+02	9.37E+01 G
			1836.06	4.719E-01	?(	5.796E-01	4.08E+01	9.92E+01 G
Cd-113m		7.7267E+02					5.33E+03	
			263.70	7.727E+02	*(	1.891E+04	7.13E+02	6.00E-03 K
Cf-251	T	-1.0409E+00					3.28E+05	
			176.60	-1.041E+00	?(	5.950E+00	2.23E+02	1.70E+01 G
			227.00	1.764E+00		1.469E+01	3.20E+02	6.30E+00 GA
Sn-126		-3.5735E+00					3.65E+07	
			87.57	-1.259E+00	}	7.191E+00	1.72E+02	3.75E+01 GA
			64.28	-3.574E+00	&(	2.097E+01	1.76E+02	9.70E+00 G
			86.94	-5.237E+00	}	3.086E+01	1.77E+02	9.04E+00 GA
PB-210	N	-1.3237E+01					8.14E+03	
			46.54	-1.324E+01	(P	4.789E+01	1.05E+02	4.25E+00 G
PB-212	N	2.2207E+01					6.98E+02	
			238.63	2.221E+01	(P	1.979E+00	4.96E+00	4.33E+01 G
			300.03	4.551E+01	+ P	2.119E+01	2.27E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	2.0892E+01					5.84E+05	
			351.93	2.015E+01	(P	2.293E+00	7.24E+00	3.76E+01 G
			295.09	2.233E+01	(	3.253E+00	8.67E+00	1.93E+01 G
			242.00	3.136E+01	+	1.063E+01	1.30E+01	7.43E+00 GA
BI-207	C	1.2801E-01					1.18E+04	
			569.70	-4.969E-02	?(	1.483E+00	8.55E+02	9.77E+01 G
			1063.66	3.611E-01	?(P	1.691E+00	2.07E+02	7.45E+01 G
BI-212	N	3.4564E+01					6.98E+02	
			727.17	3.456E+01	*(P	1.145E+01	1.85E+01	7.55E+00 G
			785.42	4.620E+01	? P	9.477E+01	8.85E+01	1.28E+00 GA
BI-214	N	1.6496E+01					5.84E+05	
			609.31	1.650E+01	(P	2.004E+00	8.12E+00	4.61E+01 G
			1120.29	5.103E+00	- P	1.870E+01	1.09E+02	1.51E+01 G
			1764.49	4.374E+00	- P	1.248E+01	8.45E+01	1.54E+01 G
BI-210M	T	6.5578E-01					1.10E+09	
			265.83	6.558E-01	?(	1.899E+00	8.66E+01	5.00E+01 G
			304.90	-1.700E+00	&	8.600E+00	1.51E+02	2.80E+01 G
AC-228	N	2.7382E+01					2.10E+03	
			911.07	2.646E+01	(	2.183E+00	8.56E+00	2.90E+01 G
			968.97	2.714E+01	(	6.665E+00	1.55E+01	1.75E+01 G
			338.32	2.996E+01	(	7.523E+00	1.39E+01	1.20E+01 G
			93.35	-8.334E+00	-	4.722E+01	1.71E+02	5.56E+00 XA
TH-227	N	1.1380E+00					7.95E+03	
			50.14	1.138E+00	&(	2.327E+01	6.03E+02	8.00E+00 G
			256.24	-4.279E+00	+ P	1.504E+01	1.68E+02	7.00E+00 G
TH-229	N	1.4670E+00					2.68E+06	
			193.51	1.467E+00	?(	2.270E+01	5.98E+02	4.40E+00 G
			210.85	-1.499E+01	& P	5.064E+01	5.04E+01	2.99E+00 G
TH-234	N	1.2036E+01					1.63E+12	
			63.29	1.554E+01	(P	2.937E+01	5.77E+01	3.81E+00 G
			92.59	9.645E+00	(P	1.726E+01	5.51E+01	5.58E+00 G
PA-231	N	-1.6413E+01					1.20E+07	
			302.65	-1.641E+01	(	8.259E+01	1.51E+02	2.88E+00 G
			300.07	-1.906E+01	+	9.967E+01	1.57E+02	2.46E+00 G
PA-233	C	8.6251E-01					7.82E+08	
			312.01	8.625E-01	&(P	7.341E+00	2.54E+02	3.60E+01 G
			300.18	-7.565E+00	+	3.886E+01	1.54E+02	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   2.8674E+00                                     1.63E+12
                          131.29 1.889E+00 ?(  9.314E+00 1.48E+02 1.80E+01 G
                          946.02 4.182E+00  (P 8.312E+00 8.79E+01 1.34E+01 G
                          569.47 0.000E+00 &   1.742E+01 1.00E+03 8.20E+00 G
                          883.24-6.342E+00 +   2.324E+01 1.09E+02 9.60E+00 G
                          880.53-1.248E+01 +   3.409E+01 8.18E+01 6.00E+00 GA

PA-234M  N   3.0782E+01                                     1.63E+12
                         1001.00-2.459E+01 ?(P 3.145E+02 2.61E+02 8.37E-01 G
                          766.41 1.884E+02 ?(P 5.164E+02 8.18E+01 2.94E-01 G

U-235    N  -3.7999E+00                                     2.57E+11
                          143.79-3.800E+00 ?(P 1.777E+01 7.35E+01 1.10E+01 G
                          205.33-8.832E+00 +   3.265E+01 1.11E+02 5.01E+00 G
                          163.38 0.000E+00 &   2.385E+01 1.00E+03 5.08E+00 G

AM-241   T   1.0241E+00                                     1.58E+05
                           59.54 1.024E+00 ?(P 5.798E+00 1.70E+02 3.59E+01 G

Ir-192   F   5.1286E-01                                     7.40E+01
                          316.49 0.000E+00  (  3.099E+00 1.00E+03 8.70E+01 G
                          468.06 8.384E-01 ?(  2.493E+00 8.86E+01 5.18E+01 G
                          308.44 1.388E+00 &(  8.147E+00 1.76E+02 3.18E+01 G

Cs-136   F   6.4444E-02                                     1.30E+01
                          818.50 6.444E-02 ?(  1.649E+00 7.27E+02 1.00E+02 G
                         1048.07-8.066E-01 +   2.200E+00 8.13E+01 8.00E+01 G
                          340.57-8.601E-01 +   5.185E+00 1.80E+02 4.69E+01 G

Np-239   T   1.8542E+00                                     2.36E+00
                          103.70-1.835E+00 +   1.041E+01 1.71E+02 2.40E+01 X
                          106.13 1.854E+00 &(  1.074E+01 1.74E+02 2.27E+01 G
                           99.50-2.945E+00 +   1.634E+01 1.67E+02 1.50E+01 X

Nd-147      -2.8385E+00                                     1.11E+01
                          531.00-2.839E+00 ?(  9.528E+00 1.40E+02 1.30E+01 G
                           91.10-1.648E+00 +   9.297E+00 1.70E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
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failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	321.	-24.	-0.013	104.75	-1.324E+01	P
TH-227	50.14	340.	4.	0.002	603.39	1.138E+00	
AM-241	59.54	684.	22.	0.012	169.59	1.024E+00	P
Sn-126	64.28	776.	-23.	-0.013	175.67	-3.574E+00	
EU-155	86.54	2445.	-39.	-0.021	182.08	-1.545E+00	
Sn-126	86.94	2321.	-39.	-0.021	177.40	-5.237E+00	
Sn-126	87.57	2181.	-39.	-0.021	171.91	-1.259E+00	
Nd-147	91.10	2143.	-39.	-0.022	169.85	-1.648E+00	
Gd-153	97.50	1356.	37.	0.021	140.39	1.469E+00	
Gd-153	103.20	1988.	-38.	-0.021	168.05	-2.020E+00	
EU-155	105.31	2090.	-38.	-0.021	171.94	-2.077E+00	
EU-152	121.78	373.	-30.	-0.017	93.16	-1.229E+00	
EU-154	123.10	287.	26.	0.014	95.35	7.413E-01	P
PA-234	131.29	868.	28.	0.016	147.95	1.889E+00	
HF-181	133.02	896.	28.	0.016	150.08	7.900E-01	
CE-144	133.54	925.	24.	0.013	179.07	2.626E+00	
Tc-99m	140.51	1121.	-32.	-0.018	148.53	-4.565E-01	
U-235	143.79	1090.	-33.	-0.019	73.45	-3.800E+00	P
CE-141	145.44	1057.	-33.	-0.018	141.88	-8.476E-01	
Ba-140	162.66	336.	14.	0.008	187.08	3.023E+00	
U-235	205.33	485.	-28.	-0.016	110.88	-8.832E+00	
EU-152	244.69	965.	19.	0.011	232.62	4.402E+00	
TH-227	256.24	140.	-16.	-0.009	167.79	-4.279E+00	P
Cd-113m	263.70	158.	2.	0.001	712.74	7.727E+02	
BI-210M	265.83	107.	18.	0.010	86.56	6.558E-01	
Hg-203	279.20	192.	-15.	-0.008	134.79	-3.511E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	284.30	92.	17.	0.009	115.75	5.300E+00	P
PA-231	300.07	640.	-23.	-0.013	156.52	-1.906E+01	
PA-231	302.65	594.	-23.	-0.013	150.59	-1.641E+01	
Ba-140	304.85	579.	-23.	-0.013	148.51	-1.110E+01	
BI-210M	304.90	602.	-23.	-0.013	151.40	-1.700E+00	
Ir-192	308.44	685.	21.	0.012	175.59	1.388E+00	
La-140	328.76	565.	-22.	-0.012	157.35	-2.308E+00	
Cf-249	333.44	544.	-22.	-0.012	153.83	-3.062E+00	
Cs-136	340.57	522.	-18.	-0.010	179.97	-8.601E-01	
HF-181	345.83	104.	-21.	-0.012	176.01	-3.208E+00	P
I-131	364.48	69.	5.	0.003	305.17	1.535E-01	P
SN-113	391.69	237.	-22.	-0.012	88.87	-8.625E-01	P
SB-125	427.88	100.	-22.	-0.012	90.89	-1.947E+00	P
AG-108M	433.94	95.	-18.	-0.010	111.19	-5.377E-01	
pm-146	453.88	56.	8.	0.004	203.07	3.234E-01	
SB-125	463.37	131.	5.	0.003	298.80	1.454E+00	P
Ir-192	468.06	86.	15.	0.009	88.64	8.384E-01	
BE-7	477.60	99.	13.	0.007	110.88	3.539E+00	P
HF-181	482.00	112.	14.	0.008	109.05	5.027E-01	
La-140	487.02	123.	14.	0.008	113.68	8.992E-01	
RU-103	497.05	57.	-8.	-0.004	193.72	-2.420E-01	P
RH-106	511.86	112.	146.	0.081	20.68	2.185E+01	
Nd-147	531.00	65.	-12.	-0.007	140.15	-2.839E+00	
Ba-140	537.26	66.	-6.	-0.003	257.08	-7.233E-01	P
CS-134	563.24	52.	4.	0.002	381.89	1.497E+00	P
CS-134	569.32	68.	-12.	-0.006	105.25	-2.420E+00	
BI-207	569.70	82.	-2.	-0.001	855.05	-4.969E-02	
SB-125	600.50	527.	-21.	-0.012	156.77	-3.942E+00	
SB-124	602.73	506.	-21.	-0.012	153.48	-7.195E-01	
CS-134	604.71	431.	-19.	-0.011	155.97	-6.596E-01	
RU-103	610.30	412.	-8.	-0.004	356.25	-4.797E+00	
PM-144	618.06	74.	-18.	-0.010	72.71	-6.129E-01	
RH-106	621.92	113.	2.	0.001	647.60	8.115E-01	
SB-125	635.89	45.	2.	0.001	572.01	5.224E-01	P
I-131	636.97	30.	12.	0.006	72.63	5.685E+00	
AG-110M	657.76	95.	-19.	-0.011	76.50	-7.197E-01	
CS-137	661.66	100.	9.	0.005	161.79	3.792E-01	P
PM-144	696.54	100.	-20.	-0.011	73.99	-7.616E-01	
NB-94	702.63	126.	9.	0.005	178.01	3.505E-01	
SB-124	722.79	120.	-3.	-0.002	519.62	-1.071E+00	
ZR-95	724.20	156.	-18.	-0.010	100.50	-1.583E+00	
pm-146	735.72	51.	-18.	-0.010	86.77	-3.162E+00	
pm-146	747.16	14.	8.	0.004	105.33	9.307E-01	
ZR-95	756.73	47.	-12.	-0.006	127.62	-8.554E-01	
AG-110M	763.94	56.	12.	0.006	96.24	2.076E+00	
PA-234M	766.41	56.	14.	0.008	81.85	1.884E+02	P
EU-152	778.92	28.	5.	0.003	228.91	1.576E+00	
CS-134	795.87	106.	-10.	-0.006	149.00	-4.847E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.78	30.	10.	0.005	84.51	4.181E-01		
La-140	815.77	40.	10.	0.006	95.49	1.799E+00		
Cs-136	818.50	60.	2.	0.001	727.01	6.444E-02		
MN-54	834.85	55.	-13.	-0.007	128.45	-5.586E-01		
Co-56	846.77	35.	-7.	-0.004	189.61	-3.041E-01		
EU-154	873.23	17.	9.	0.005	100.38	3.383E+00		P
PA-234	880.53	85.	-17.	-0.009	81.76	-1.248E+01		
PA-234	883.24	102.	-14.	-0.008	108.59	-6.342E+00		
AG-110M	884.68	57.	10.	0.006	108.78	6.343E-01		
y-88	898.04	25.	-2.	-0.001	397.18	-1.152E-01		P
AG-110M	937.49	50.	-15.	-0.008	106.81	-2.045E+00		
PA-234	946.02	20.	12.	0.007	87.92	4.182E+00		P
EU-152	964.11	108.	6.	0.003	242.16	2.021E+00		
EU-154	996.33	96.	-19.	-0.010	77.27	-8.693E+00		
PA-234M	1001.00	119.	-4.	-0.002	261.36	-2.459E+01		P
EU-154	1004.77	96.	17.	0.009	86.82	4.559E+00		
Co-56	1037.84	54.	-21.	-0.012	52.24	-7.560E+00		P
Cs-136	1048.07	47.	-13.	-0.007	81.28	-8.066E-01		
BI-207	1063.66	22.	5.	0.003	206.73	3.611E-01		P
FE-59	1099.25	16.	11.	0.006	88.86	1.023E+00		P
EU-152	1112.07	160.	-17.	-0.010	105.15	-6.821E+00		
ZN-65	1115.55	143.	-17.	-0.010	99.41	-1.846E+00		
Sc-46	1120.55	94.	18.	0.010	81.93	9.395E-01		
Ta-182	1121.30	79.	18.	0.010	75.72	2.694E+00		
Ta-182	1189.05	23.	6.	0.004	180.72	2.190E+00		
Ta-182	1221.41	17.	23.	0.013	46.93	4.870E+00		
Co-56	1238.28	58.	5.	0.003	357.38	4.374E-01		P
FE-59	1291.60	23.	-3.	-0.002	645.81	-3.825E-01		P
CO-60	1332.50	11.	9.	0.005	97.22	5.294E-01		
AG-110M	1384.30	24.	-3.	-0.002	398.61	-7.765E-01		
EU-152	1408.00	30.	-4.	-0.002	430.63	-1.261E+00		P
La-140	1596.21	25.	-10.	-0.006	124.89	-7.591E-01		
SB-124	1690.98	6.	1.	0.000	945.38	1.022E-01		
Co-56	1771.35	12.	31.	0.017	23.87	1.523E+01		
y-88	1836.06	0.	6.	0.003	40.82	4.719E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	3.5393E+00	3.5394E+00	1.109E+02%		1.32E+01
NA-22	#	9.6502E-01	9.6502E-01	3.220E+01%		8.16E-01
K-40		2.3123E+02	2.3123E+02	5.299E+00%		1.08E+01
Sc-46	#A	4.7479E-01	4.7479E-01	8.193E+01%		2.18E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%		2.74E+01

MN-54	#A	-5.5860E-01	-5.5860E-01	1.284E+02%	1.60E+00
FE-59	#A	1.0233E+00	1.0233E+00	8.886E+01%	2.02E+00
Co-56	#A	-9.0098E-03	-9.0099E-03	1.896E+02%	1.32E+00
CO-57	#A	1.2532E-02	1.2532E-02	2.675E+03%	1.14E+00
CO-58	#A	4.1808E-01	4.1808E-01	8.451E+01%	1.19E+00
CO-60	#A	5.2941E-01	5.2941E-01	9.722E+01%	1.12E+00
ZN-65	#A	-1.8461E+00	-1.8461E+00	9.941E+01%	6.16E+00
NB-94	#A	3.5052E-01	3.5052E-01	1.780E+02%	2.12E+00
ZR-95	#A	-8.5543E-01	-8.5544E-01	1.276E+02%	2.53E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.65E+00
RU-103	#A	-2.4203E-01	-2.4204E-01	1.937E+02%	1.22E+00
RH-106	#A	8.1151E-01	8.1151E-01	6.476E+02%	1.82E+01
AG-108M	#A	-5.3771E-01	-5.3771E-01	1.112E+02%	1.41E+00
AG-110M	#A	9.7246E-01	9.7247E-01	7.262E+01%	2.35E+00
SN-113	#A	-8.6251E-01	-8.6251E-01	8.887E+01%	2.87E+00
SB-124	#A	-7.1947E-01	-7.1948E-01	1.535E+02%	3.69E+00
SB-125	#A	-1.9473E+00	-1.9473E+00	9.089E+01%	4.37E+00
I-131	#A	9.0344E-01	9.0351E-01	7.263E+01%	1.18E+00
Gd-153	#A	1.4692E+00	1.4692E+00	1.404E+02%	6.86E+00
Ga-68	#A	-2.4442E+00	-2.4785E+00	1.045E+03%	5.80E+01
Tc-99m	#A	-4.5529E-01	-4.5648E-01	1.485E+02%	2.26E+00
BA-133	A	-7.5026E-01	-7.5026E-01	1.601E+02%	4.02E+00
CS-134	#A	-4.8962E-01	-4.8962E-01	1.560E+02%	3.45E+00
CS-137	#A	3.7923E-01	3.7923E-01	1.618E+02%	2.09E+00
CE-139	#A	3.9041E-02	3.9041E-02	1.121E+03%	1.48E+00
Ba-140	#A	3.8001E-02	3.8003E-02	1.590E+02%	5.15E+00
La-140	#A	6.3210E-02	6.3213E-02	6.467E+01%	1.92E+00
CE-141	#A	-8.4763E-01	-8.4765E-01	1.419E+02%	4.00E+00
CE-144	#A	2.6258E+00	2.6258E+00	1.791E+02%	1.57E+01
PM-144	#A	-7.6164E-01	-7.6164E-01	7.399E+01%	1.87E+00
EU-152	#A	1.3172E+00	1.3172E+00	2.289E+02%	9.10E+00
EU-154	#A	4.0822E+00	4.0822E+00	6.636E+01%	7.88E+00
EU-155	#A	-2.0771E+00	-2.0771E+00	1.719E+02%	1.19E+01
HF-181	#A	6.0319E-01	6.0320E-01	9.276E+01%	1.85E+00
Ta-182	#A	3.3418E+00	3.3418E+00	4.693E+01%	6.79E+00
Hg-203	#A	-3.5113E-01	-3.5113E-01	1.348E+02%	1.59E+00
TL-208		8.1195E+00	8.1195E+00	8.901E+00%	1.12E+00
pm-146	#A	5.3198E-01	5.3198E-01	1.053E+02%	2.34E+00
y-88	#A	1.8669E-01	1.8669E-01	4.082E+01%	1.27E+00
Cd-113m	#A	7.7267E+02	7.7267E+02	7.127E+02%	1.89E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.26E+01
Cf-251	A	-1.0409E+00	-1.0409E+00	2.227E+02%	5.95E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.55E+00
Sn-126	#A	-3.5735E+00	-3.5735E+00	1.757E+02%	2.10E+01
PB-210	#A	-1.3237E+01	-1.3237E+01	1.048E+02%	4.79E+01
PB-212		2.2207E+01	2.2207E+01	4.963E+00%	1.98E+00
PB-214		2.0892E+01	2.0892E+01	5.648E+00%	2.29E+00
BI-207	#A	1.2801E-01	1.2801E-01	2.067E+02%	1.48E+00
BI-212	#	3.4564E+01	3.4564E+01	1.851E+01%	1.15E+01

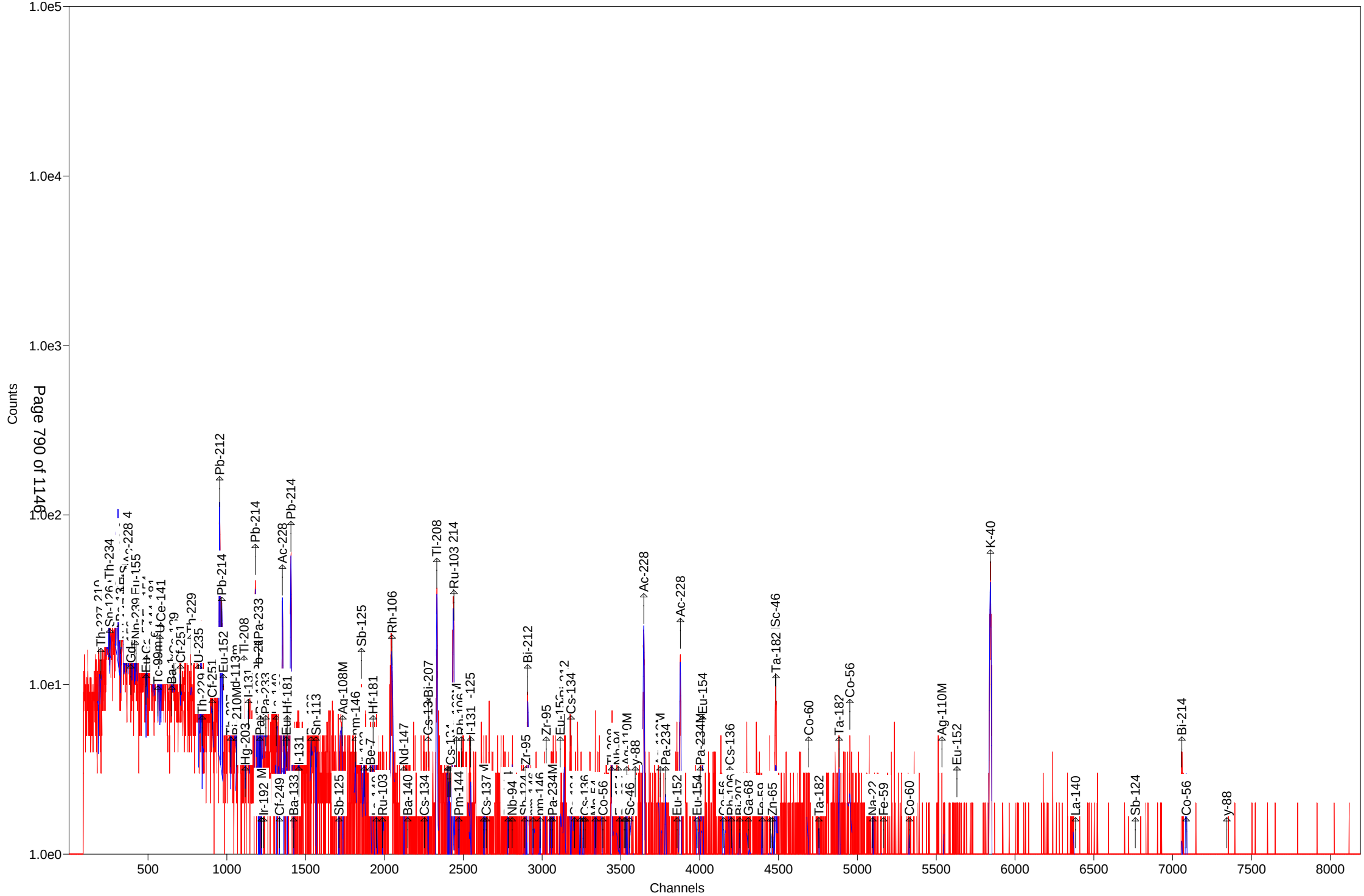
BI-214	1.6496E+01	1.6496E+01	8.124E+00%	2.00E+00
BI-210M#A	6.5578E-01	6.5578E-01	8.656E+01%	1.90E+00
AC-228	2.7382E+01	2.7382E+01	7.496E+00%	2.18E+00
TH-227 #A	1.1380E+00	1.1380E+00	6.034E+02%	2.33E+01
TH-229 #A	1.4670E+00	1.4670E+00	5.981E+02%	2.27E+01
TH-234 A	1.2036E+01	1.2036E+01	3.989E+01%	2.94E+01
PA-231 #A	-1.6413E+01	-1.6413E+01	1.506E+02%	8.26E+01
PA-233 #A	8.6251E-01	8.6251E-01	2.541E+02%	7.34E+00
PA-234 #A	2.8674E+00	2.8674E+00	8.605E+01%	9.31E+00
PA-234M#A	3.0782E+01	3.0782E+01	8.185E+01%	3.15E+02
U-235 #A	-3.7999E+00	-3.7999E+00	7.345E+01%	1.78E+01
AM-241 #A	1.0241E+00	1.0241E+00	1.696E+02%	5.80E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.04E+01
Ir-192 #A	5.1286E-01	5.1286E-01	8.864E+01%	3.10E+00
Cs-136 #A	6.4441E-02	6.4444E-02	7.270E+02%	1.65E+00
Np-239 #A	1.8537E+00	1.8542E+00	1.744E+02%	1.07E+01
Nd-147 #A	-2.8383E+00	-2.8385E+00	1.401E+02%	9.53E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 3.729E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 3.7292108E+02 Bq/Sample

264535_Gamma_160-18554-A-16-B. 16_Gamma_20162108.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161131

Sample Description: 264535_Gamma_160-18554-A-17-B
Detector: Detector #17
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-17-B

Decay to Time: 9/1/2016 13:13 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:14:22 Real Time: 1843 sec
Analysis Time: 9/1/2016 13:45 Dead Time: 2.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev11.lib
Bkgd Correction File: 17_2016-08-18_0548.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.979E+00	95.0	4.731E+00	4.738E+00	1.586E+01
NA-22	2.111E-01	225.8	4.767E-01	4.768E-01	1.695E+00
K-40	3.073E+02	4.7	1.449E+01	2.138E+01	1.049E+01
Sc-46	-5.772E-01	105.3	6.078E-01	6.085E-01	2.056E+00
CR-51	-2.761E+00	181.2	5.004E+00	5.006E+00	1.367E+01
MN-54	9.469E-01	54.2	5.136E-01	5.159E-01	1.156E+00
FE-59	-1.316E+00	63.1	8.302E-01	8.328E-01	3.033E+00
Co-56	1.322E+00	28.2	3.723E-01	3.785E-01	1.360E+00
CO-57	1.364E-01	301.2	4.110E-01	4.110E-01	1.387E+00
CO-58	2.253E-01	216.3	4.873E-01	4.875E-01	1.693E+00
CO-60	4.298E-01	89.0	3.827E-01	3.833E-01	8.827E-01
ZN-65	0.000E+00	1.#INF	5.293E-01	5.293E-01	5.720E+00
NB-94	5.125E-01	94.7	4.854E-01	4.861E-01	1.169E+00
ZR-95	9.410E-01	86.8	8.166E-01	8.181E-01	2.230E+00
NB-95	5.593E-01	105.2	5.883E-01	5.891E-01	1.987E+00
RU-103	-5.506E-01	114.7	6.316E-01	6.322E-01	1.333E+00
RH-106	-5.017E+00	219.2	1.100E+01	1.100E+01	3.696E+01
AG-108M	8.321E-02	139.9	1.164E-01	1.165E-01	1.269E+00
AG-110M	7.799E-01	95.0	7.406E-01	7.417E-01	2.502E+00
SN-113	6.175E-01	122.1	7.538E-01	7.544E-01	2.538E+00
SB-124	6.808E-01	38.1	2.594E-01	2.618E-01	3.269E+00
SB-125	3.971E-01	142.8	5.670E-01	5.674E-01	3.739E+00
I-131	7.101E-01	100.6	7.145E-01	7.155E-01	1.253E+00
Gd-153	9.818E-01	114.4	1.123E+00	1.125E+00	3.756E+00
Ga-68	2.330E+01	89.0	2.072E+01	2.077E+01	4.688E+01
Tc-99m	-4.159E-02	1133.7	4.715E-01	4.715E-01	1.594E+00
BA-133	-7.308E-01	155.1	1.134E+00	1.134E+00	3.801E+00
CS-134	1.205E+00	26.7	3.214E-01	3.274E-01	3.349E+00
CS-137	1.130E-01	574.1	6.486E-01	6.486E-01	1.594E+00
CE-139	-1.363E-01	358.9	4.893E-01	4.895E-01	1.653E+00
Ba-140	-1.298E+00	202.3	2.625E+00	2.626E+00	5.281E+00
La-140	-9.867E-01	105.0	1.036E+00	1.037E+00	2.376E+00
CE-141	6.352E-01	104.5	6.640E-01	6.648E-01	2.220E+00

CE-144	2.824E+00	147.7	4.169E+00	4.172E+00	1.393E+01
PM-144	5.073E-01	93.5	4.743E-01	4.750E-01	1.285E+00
EU-152	1.192E+00	115.0	1.371E+00	1.372E+00	8.524E+00
EU-154	6.458E-01	89.2	5.762E-01	5.772E-01	1.618E+01
EU-155	-6.716E-02	2143.8	1.440E+00	1.440E+00	5.736E+00
HF-181	5.879E-01	149.0	8.759E-01	8.765E-01	2.166E+00
Ta-182	-2.404E+00	111.2	2.672E+00	2.675E+00	9.004E+00
Hg-203	-1.526E-01	340.8	5.200E-01	5.201E-01	1.770E+00
TL-208	1.063E+01	6.9	7.379E-01	9.211E-01	8.617E-01
pm-146	5.078E-01	101.3	5.145E-01	5.152E-01	3.742E+00
y-88	2.184E-01	44.7	9.768E-02	9.831E-02	1.414E+00
Cd-113m	-6.766E+03	140.4	9.501E+03	9.511E+03	3.181E+04
Cd-109	1.606E+00	1236.1	1.985E+01	1.985E+01	6.635E+01
Cf-251	-5.940E-02	3745.3	2.225E+00	2.225E+00	6.065E+00
Cf-249	-2.459E-01	100.7	2.477E-01	2.480E-01	2.586E+00
Sn-126	-5.522E+00	102.3	5.649E+00	5.657E+00	1.881E+01
PB-210	-1.102E+01	138.3	1.523E+01	1.525E+01	4.549E+01
PB-212	3.200E+01	4.1	1.320E+00	2.455E+00	2.112E+00
PB-214	1.548E+01	7.0	1.090E+00	1.354E+00	2.532E+00
BI-207	1.117E-01	304.3	3.400E-01	3.400E-01	1.197E+00
BI-212	4.115E+01	12.2	5.028E+00	5.463E+00	6.960E+00
BI-214	1.511E+01	8.4	1.266E+00	1.489E+00	2.311E+00
BI-210M	-8.180E-01	136.6	1.118E+00	1.119E+00	3.743E+00
AC-228	3.415E+01	5.4	1.859E+00	2.548E+00	1.244E+00
TH-227	1.177E+00	320.6	3.773E+00	3.773E+00	1.983E+01
TH-229	-4.555E+00	188.2	8.570E+00	8.578E+00	2.391E+01
TH-234	1.314E+01	43.8	5.750E+00	5.791E+00	3.098E+01
PA-231	0.000E+00	1.#INF	5.049E+00	5.049E+00	7.065E+01
PA-233	-1.169E+00	101.9	1.191E+00	1.193E+00	3.992E+00
PA-234	2.380E+00	95.6	2.275E+00	2.279E+00	8.447E+00
PA-234M	7.903E+01	81.2	6.418E+01	6.430E+01	1.812E+02
U-235	5.595E-01	89.6	5.012E-01	5.020E-01	1.051E+01
AM-241	-1.460E+00	108.2	1.580E+00	1.582E+00	4.450E+00
Np-237	4.906E-01	1180.7	5.792E+00	5.792E+00	1.936E+01
Ir-192	1.947E-01	256.9	5.002E-01	5.004E-01	1.481E+00
Cs-136	3.987E-01	122.5	4.885E-01	4.891E-01	1.670E+00
Np-239	-1.540E+00	115.8	1.784E+00	1.786E+00	5.950E+00
Nd-147	3.541E+00	96.2	3.406E+00	3.412E+00	8.472E+00
Total	5.998E+02				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-17-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161131.An1

Acquisition information
Start time: 9/1/2016 1:14:22 PM
Live time: 1800
Real time: 1843
Dead time: 2.33 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:13:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2016-08-18_0548.PBC 8/18/2016 5:48:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1575

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.73	38.	47.15	0.58	2.114E-02	46.54	4.250	PBC<MDA	PB210
50.14	3.	779.60	0.78	2.357E-02	50.14	8.000	PBC<MDA	TH227
63.62	64.	34.13	0.75	3.182E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	1.146E+01	Sn126
74.75	291.	9.37	0.80	3.678E-02				
77.18	428.	6.64	0.80	3.764E-02				
84.43	44.	45.90	0.81	3.975E-02				
87.33	147.	15.34	0.81	4.044E-02	86.49	13.100	1.546E+01	Np237
					86.54	30.700	6.597E+00	EU155
					86.94	9.040	2.235E+01	Sn126
					87.57	37.500	5.370E+00	Sn126
					88.04	3.790	5.301E+01	Cd109
89.99	104.	20.36	0.82	4.098E-02				
91.10	7.	774.73	0.82	4.119E-02	91.10	28.300	PBC<MDA	Nd147
92.98	124.	17.40	0.82	4.150E-02	92.59	5.584	1.933E+01	TH234
					93.35	5.561	2.977E+01	AC228
97.50	22.	114.39	0.82	4.213E-02	97.50	30.000	PBC<MDA	Gd153
99.50	23.	112.62	0.82	4.234E-02	99.50	15.000	PBC<MDA	Np239
119.44	16.	73.08	0.71	4.283E-02				
121.78	4.	707.32	0.85	4.277E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.831E-02	CO57
122.06	9.	301.24	0.85	4.276E-02	121.78	28.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					122.06	85.600	1.364E-01	CO57
129.00	56.	37.15	0.41	4.231E-02				
131.29	24.	146.41	0.85	4.212E-02	131.29	18.000	PBC<MDA	PA234
132.93	24.	147.66	0.86	4.192E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.824E+00	CE144
133.02	24.	148.99	0.86	4.197E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.822E+00	CE144
136.30	20.	181.91	0.86	4.165E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.439E+00	CO57
146.05	22.	104.53	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
185.61	90.	25.95	1.07	3.547E-02				
205.33	20.	120.23	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
238.48	726.	4.74	0.95	2.990E-02	238.63	43.300	3.115E+01	PB212
241.89	22.	212.70	0.96	2.960E-02	242.00	7.430	PBC<MDA	PB214
244.69	20.	230.47	0.96	2.938E-02	244.69	7.580	PBC<MDA	EU152
256.24	5.	320.63	0.97	2.846E-02	256.24	7.000	PBC<MDA	TH227
269.89	112.	16.72	1.05	2.745E-02				
295.03	147.	10.58	1.04	2.580E-02	295.09	19.300	1.643E+01	PB214
299.95	74.	29.21	1.52	2.550E-02	300.03	3.280	4.935E+01	PB212
					300.07	2.460	6.581E+01	PA231
					300.18	6.200	PBC<MDA	PA233
308.44	6.	342.38	1.02	2.501E-02	308.44	31.750	PBC<MDA	Ir192
316.49	4.	383.15	1.03	2.456E-02	316.49	87.040	PBC<MDA	Ir192
328.76	10.	171.76	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	10.	165.56	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.33	174.	9.66	0.48	2.344E-02	338.32	12.010	3.428E+01	AC228
345.83	11.	224.30	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.85	231.	9.30	1.13	2.280E-02	351.93	37.600	1.499E+01	PB214
364.48	10.	162.21	1.07	2.223E-02	364.48	81.700	PBC<MDA	I131
383.84	24.	63.33	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
391.69	15.	122.06	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
453.88	15.	101.32	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
462.86	44.	25.16	0.68	1.872E-02	463.37	10.470	PBC<MDA	SB125
510.61	121.	16.03	0.73	1.745E-02	511.86	20.000	1.924E+01	RH106
531.00	14.	96.21	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
569.32	2.	668.33	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.307E-01	PA234
					569.70	97.740	5.293E-02	BI207
569.70	3.	304.26	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.331E+00	PA234
					569.70	97.740	1.117E-01	BI207
583.26	256.	6.94	1.21	1.583E-02	583.02	84.500	1.063E+01	TL208
600.50	12.	221.23	1.28	1.550E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	242.87	1.28	1.546E-02	602.73	98.260	PBC<MDA	SB124
604.71	12.	228.13	1.28	1.542E-02	604.71	97.620	PBC<MDA	CS134
609.29	202.	8.37	1.36	1.533E-02	609.31	46.090	1.591E+01	BI214
					610.30	5.750	1.277E+02	RU103
614.32	12.	232.87	1.29	1.524E-02	614.28	89.850	PBC<MDA	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
618.06	12.	235.87	1.30	1.517E-02	618.06	99.100	PBC<MDA	PM144
636.97	10.	119.11	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
661.66	2.	574.07	1.33	1.443E-02	661.66	85.210	PBC<MDA	CS137
696.54	14.	93.50	1.36	1.389E-02	696.54	99.000	PBC<MDA	PM144
702.63	12.	94.70	1.37	1.380E-02	702.63	97.900	PBC<MDA	NB94
724.20	13.	119.47	1.39	1.349E-02	724.20	44.150	PBC<MDA	ZR95
727.42	75.	12.22	1.39	1.345E-02	727.17	7.550	4.115E+01	BI212
735.72	2.	594.01	1.40	1.333E-02	735.72	22.500	PBC<MDA	pm146
747.16	2.	539.86	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	9.	125.90	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
765.79	13.	105.19	1.42	1.294E-02	765.79	99.790	PBC<MDA	NB95
766.89	15.	81.21	1.42	1.293E-02	766.41	0.294	PBC<MDA	PA234M
785.73	11.	90.01	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
795.87	43.	26.67	1.45	1.257E-02	795.87	85.530	2.239E+00	CS134
810.78	5.	216.33	1.46	1.240E-02	810.78	99.460	PBC<MDA	CO58
818.50	9.	122.54	1.47	1.231E-02	818.50	100.000	PBC<MDA	Cs136
834.85	21.	54.24	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
846.77	2.	523.72	1.49	1.200E-02	846.77	99.935	PBC<MDA	Co56
860.43	66.	15.97	1.71	1.185E-02	860.56	12.420	2.494E+01	TL208
884.68	12.	94.96	1.52	1.161E-02	884.68	72.680	PBC<MDA	AG110M
911.41	201.	7.05	1.32	1.135E-02	911.07	29.000	3.392E+01	AC228
946.02	9.	123.02	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	11.	158.53	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.06	117.	11.12	1.29	1.083E-02	968.97	17.460	3.446E+01	AC228
996.33	8.	89.22	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1000.51	5.	172.67	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	2.	619.10	1.62	1.054E-02	1004.77	18.010	PBC<MDA	EU154
1077.40	12.	88.96	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	4.	332.55	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1120.96	51.	22.72	1.81	9.697E-03	1120.29	15.100	1.924E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.331E+00	Ta182
1238.28	34.	28.16	1.81	8.977E-03	1238.28	66.070	3.159E+00	Co56
1274.53	3.	225.83	1.84	8.779E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	5.995E-01	EU154
1291.60	10.	96.26	1.85	8.689E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	7.	89.04	1.89	8.481E-03	1332.50	99.980	PBC<MDA	CO60
1460.83	466.	4.72	1.79	7.894E-03	1460.83	10.670	3.073E+02	K40
1690.98	8.	38.11	2.16	7.037E-03	1690.98	47.790	1.260E+00	SB124
1764.51	35.	18.03	2.21	6.804E-03	1764.49	15.400	1.878E+01	BI214
1836.06	5.	44.72	2.26	6.593E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.42	74.76	225.	291.	7.904E+03	9.37	0.802	- D
308.14	77.18	189.	428.	1.138E+04	6.64	0.804	- D
337.20	84.38	182.	44.	1.117E+03	45.64	0.811	- sD
348.81	87.29	190.	144.	3.559E+03	15.92	0.813	- sD
359.43	89.94	178.	104.	2.547E+03	20.54	0.816	- sD
477.08	120.40	60.	16.	1.416E+03	73.08	0.706	- lc
480.95	120.40	128.	28.	6.422E+02	61.32	0.844	- sD
515.32	129.00	134.	56.	1.327E+03	37.15	0.415	- s
741.65	185.61	134.	90.	2.539E+03	25.95	1.072	- s
1078.67	269.89	52.	112.	4.062E+03	16.72	1.050	-
1850.36	463.31	24.	44.	2.359E+03	24.77	0.677	- s
2041.34	510.61	83.	121.	6.913E+03	16.03	0.726	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.63	46.54	228.	-18.	-0.010	138.28	0.775
TH-227	200.03	50.14	192.	3.	0.002	779.60	0.778s
AM-241	237.59	59.54	312.	-28.	-0.015	108.24	0.787s
TH-234	253.91	63.62	192.	29.	0.016	77.82	0.755
Sn-126	256.56	64.28	488.	-31.	-0.017	102.32	0.792
BA-133	323.36	80.99	1543.	-27.	-0.015	104.17	0.807s
EU-155	345.56	86.54	1514.	0.	0.000	1000.00	0.813s
Sn-126	347.15	86.94	1514.	0.	0.000	1000.00	0.813
Sn-126	349.67	87.57	1514.	0.	0.000	1000.00	0.814
Nd-147	363.79	91.10	1467.	7.	0.004	774.73	0.817s
TH-234	369.74	92.59	247.	54.	0.030	43.76	0.818D
AC-228	372.78	93.35	1471.	28.	0.015	197.50	0.819s
Gd-153	389.37	97.50	315.	22.	0.012	114.39	0.823
Np-239	397.37	99.50	312.	23.	0.013	112.62	0.825s
Gd-153	412.16	103.20	436.	-8.	-0.005	356.18	0.828s
Np-239	414.16	103.70	445.	0.	0.000	1000.00	0.829s
Np-239	423.88	106.13	473.	-27.	-0.015	115.81	0.831s
EU-152	486.43	121.78	367.	4.	0.002	707.32	0.846s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	487.57	122.06	362.	9.	0.005	301.24	0.846s
EU-154	491.73	123.10	371.	0.	0.000	1000.00	0.847s
PA-234	524.49	131.29	584.	24.	0.013	146.41	0.855s
HF-181	531.41	133.02	607.	24.	0.013	148.99	0.856s
CE-144	533.46	133.54	597.	24.	0.013	147.66	0.857s
HF-181	544.50	136.30	620.	20.	0.011	181.91	0.859s
CO-57	545.20	136.47	640.	0.	0.000	1000.00	0.859
U-235	574.43	143.79	309.	-18.	-0.010	132.81	0.866
CE-141	581.05	145.44	262.	22.	0.012	104.53	0.868
Ba-140	649.90	162.66	354.	-23.	-0.013	117.55	0.884s
U-235	652.78	163.38	381.	-4.	-0.002	563.47	0.885s
CE-139	662.67	165.85	358.	-8.	-0.004	358.89	0.887s
TH-229	773.25	193.51	180.	-12.	-0.007	188.16	0.913s
U-235	820.52	205.33	175.	20.	0.011	120.23	0.924s
TH-229	842.58	210.85	243.	-11.	-0.006	246.73	0.929s
PB-212	953.67	238.63	100.	745.	0.414	4.13	0.954D
PB-214	967.13	242.00	1116.	22.	0.012	212.70	0.958s
EU-152	977.91	244.69	1054.	20.	0.011	230.47	0.960s
TH-227	1024.08	256.24	94.	5.	0.003	320.63	0.971s
Cd-113m	1053.91	263.70	400.	-20.	-0.011	140.42	0.978s
BI-210M	1062.44	265.83	379.	-20.	-0.011	136.63	0.979
TL-208	1108.23	277.28	190.	-11.	-0.006	145.96	0.990s
Hg-203	1115.89	279.20	206.	-6.	-0.003	340.75	0.992s
I-131	1136.28	284.30	106.	-2.	-0.001	829.37	0.996
PB-214	1179.20	295.03	35.	147.	0.082	10.58	1.039
PB-212	1198.88	299.95	86.	74.	0.041	29.21	1.523s
PA-231	1199.35	300.07	392.	-18.	-0.010	158.09	1.011s
PA-231	1209.66	302.65	374.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	374.	0.	0.000	1000.00	1.013s
Ir-192	1232.82	308.44	208.	6.	0.003	342.38	1.019s
PA-233	1247.10	312.01	174.	-19.	-0.010	101.92	1.022s
Ir-192	1265.01	316.49	136.	4.	0.002	383.15	1.026
CR-51	1279.38	320.08	149.	-12.	-0.007	181.24	1.029s
La-140	1314.07	328.76	81.	10.	0.006	171.76	1.037s
Cf-249	1332.79	333.44	81.	10.	0.006	165.56	1.041s
AC-228	1352.34	338.33	29.	174.	0.096	9.66	0.483s
Cs-136	1361.30	340.57	403.	-19.	-0.010	154.71	1.048s
EU-152	1376.16	344.29	385.	-19.	-0.010	150.70	1.051
HF-181	1382.33	345.83	310.	11.	0.006	224.30	1.053s
PB-214	1406.40	351.85	61.	231.	0.128	9.30	1.128
BA-133	1423.00	356.00	400.	-18.	-0.010	155.13	1.062s
I-131	1456.93	364.48	67.	10.	0.005	162.21	1.070s
BA-133	1534.34	383.84	103.	24.	0.013	63.33	1.087
Cf-249	1550.77	387.95	181.	-17.	-0.009	114.68	1.091s
SN-113	1565.73	391.69	161.	15.	0.008	122.06	1.094s
SB-125	1710.44	427.88	62.	-8.	-0.005	180.60	1.127s
AG-108M	1734.69	433.94	66.	-10.	-0.006	155.24	1.132s
pm-146	1814.44	453.88	56.	15.	0.008	101.32	1.150s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1852.38	463.37	169.	-17.	-0.010	107.10	1.158s
Ir-192	1871.15	468.06	178.	-19.	-0.010	104.52	1.163s
BE-7	1909.29	477.59	126.	-17.	-0.010	95.01	1.171
La-140	1946.98	487.02	68.	-4.	-0.002	406.71	1.180s
RU-103	1987.11	497.05	60.	-16.	-0.009	114.70	1.188s
RH-106	2046.35	511.86	243.	-18.	-0.010	126.95	2.452s
Nd-147	2122.88	531.00	44.	14.	0.008	96.21	1.219s
Ba-140	2147.92	537.26	61.	-10.	-0.005	202.29	1.224s
CS-134	2276.15	569.32	50.	2.	0.001	668.33	1.252s
PA-234	2276.75	569.47	51.	0.	0.000	1000.00	1.253s
BI-207	2277.67	569.70	45.	3.	0.002	304.26	1.253s
TL-208	2331.89	583.26	15.	256.	0.142	6.94	1.215
SB-125	2400.86	600.50	333.	12.	0.007	221.23	1.280s
SB-124	2409.78	602.73	346.	11.	0.006	242.87	1.282s
CS-134	2417.70	604.71	357.	12.	0.007	228.13	1.284s
BI-214	2436.10	609.31	33.	192.	0.107	8.38	1.288D
RU-103	2440.05	610.30	369.	12.	0.007	230.95	1.288s
AG-108M	2455.98	614.28	377.	12.	0.007	232.87	1.292s
PM-144	2471.11	618.06	389.	12.	0.007	235.87	1.295
RH-106	2486.52	621.92	434.	-14.	-0.008	219.18	1.299s
SB-125	2542.41	635.89	61.	-15.	-0.008	79.51	1.311s
I-131	2546.75	636.97	72.	10.	0.006	119.11	1.312s
CS-137	2645.49	661.66	49.	2.	0.001	574.07	1.333s
PM-144	2785.03	696.54	39.	14.	0.008	93.50	1.363s
NB-94	2809.38	702.63	30.	12.	0.007	94.70	1.368s
SB-124	2890.01	722.79	193.	-19.	-0.011	104.38	1.386s
AG-108M	2890.61	722.94	168.	-19.	-0.011	97.77	1.386s
EU-154	2892.29	723.36	149.	-19.	-0.011	92.30	1.386s
ZR-95	2895.66	724.20	113.	13.	0.007	119.47	1.387s
BI-212	2907.54	727.17	5.	75.	0.042	12.22	1.390D
pm-146	2941.74	735.72	35.	2.	0.001	594.01	1.397s
pm-146	2987.51	747.16	35.	2.	0.001	539.86	1.407s
ZR-95	3025.79	756.73	31.	9.	0.005	125.90	1.415s
AG-110M	3054.64	763.94	76.	-18.	-0.010	70.37	1.421
NB-95	3062.03	765.79	87.	13.	0.007	105.19	1.423s
PA-234M	3064.52	766.41	66.	15.	0.008	81.21	1.423s
EU-152	3114.56	778.92	35.	-5.	-0.003	261.67	1.434s
BI-212	3140.56	785.42	22.	11.	0.006	90.01	1.440s
CS-134	3182.35	795.87	22.	43.	0.024	26.67	1.448s
CS-134	3206.69	801.95	35.	-5.	-0.003	261.67	1.454
CO-58	3241.99	810.78	56.	5.	0.003	216.33	1.461s
La-140	3261.97	815.77	61.	0.	0.000	1000.00	1.465s
Cs-136	3272.90	818.50	54.	9.	0.005	122.54	1.467s
MN-54	3338.30	834.85	23.	21.	0.011	54.24	1.481s
Co-56	3385.99	846.77	33.	2.	0.001	523.72	1.491s
TL-208	3440.63	860.43	11.	66.	0.037	15.97	1.713s
NB-94	3483.32	871.10	51.	-9.	-0.005	117.06	1.512s
EU-154	3491.85	873.23	71.	-6.	-0.003	213.96	1.514s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3521.06	880.53	72.	-12.	-0.007	101.59	1.520s
PA-234	3531.90	883.24	85.	0.	0.000	1000.00	1.522s
AG-110M	3537.67	884.68	57.	12.	0.007	94.96	1.523s
Sc-46	3556.06	889.28	74.	-12.	-0.007	105.31	1.527s
y-88	3591.11	898.04	28.	0.	0.000	1000.00	1.534s
AC-228	3644.59	911.41	0.	201.	0.112	7.05	1.317
AG-110M	3748.95	937.49	51.	-18.	-0.010	87.31	1.567s
PA-234	3783.07	946.02	23.	9.	0.005	123.02	1.574s
EU-152	3855.45	964.11	148.	11.	0.006	158.53	1.589s
AC-228	3875.24	969.06	13.	117.	0.065	11.12	1.288
EU-154	3984.36	996.33	21.	8.	0.004	89.22	1.616s
PA-234M	4003.04	1001.00	31.	5.	0.003	172.67	1.620s
EU-154	4018.15	1004.77	47.	2.	0.001	619.10	1.623s
Co-56	4150.45	1037.84	30.	-4.	-0.002	204.93	1.650s
Cs-136	4191.39	1048.07	38.	-2.	-0.001	356.65	1.658s
RH-106	4200.55	1050.36	62.	-16.	-0.009	76.47	1.661s
BI-207	4253.77	1063.66	50.	-18.	-0.010	87.74	1.671s
Ga-68	4308.74	1077.40	20.	12.	0.007	88.96	1.683s
FE-59	4396.18	1099.25	35.	-13.	-0.007	63.07	1.700s
EU-152	4447.49	1112.07	102.	4.	0.002	332.55	1.711s
ZN-65	4461.38	1115.55	106.	0.	0.000	1000.00	1.713s
BI-214	4483.06	1120.96	14.	51.	0.028	22.72	1.812s
Sc-46	4481.41	1120.55	106.	0.	0.000	1000.00	1.717s
Ta-182	4484.41	1121.30	125.	-15.	-0.008	111.15	1.718s
CO-60	4692.24	1173.24	40.	-10.	-0.006	142.59	1.760s
Ta-182	4755.52	1189.05	45.	-2.	-0.001	531.30	1.772s
Ta-182	4885.02	1221.41	43.	-6.	-0.003	187.41	1.798s
Co-56	4952.53	1238.28	11.	34.	0.019	28.16	1.812
NA-22	5097.60	1274.53	27.	3.	0.002	225.83	1.840s
EU-154	5097.66	1274.54	30.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	16.	10.	0.006	96.26	1.854s
CO-60	5329.61	1332.50	5.	7.	0.004	89.04	1.886s
AG-110M	5536.92	1384.30	16.	-6.	-0.003	153.36	1.926s
EU-152	5631.79	1408.00	32.	-8.	-0.004	164.57	1.944s
K-40	5843.23	1460.83	8.	466.	0.259	4.72	1.791
La-140	6385.15	1596.21	34.	-18.	-0.010	120.83	2.087s
SB-124	6764.55	1690.98	0.	8.	0.004	38.11	2.157s
BI-214	7058.84	1764.49	3.	35.	0.020	18.03	2.211s
Co-56	7086.31	1771.35	48.	-8.	-0.004	132.73	2.216s
y-88	7345.39	1836.06	0.	5.	0.003	44.72	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.9794E+00				5.31E+01	
			477.60	-4.979E+00	(	1.586E+01 9.50E+01 1.05E+01	G
NA-22	C	2.1107E-01				9.50E+02	
			1274.53	2.111E-01	?(	1.695E+00 2.26E+02 9.99E+01	G
K-40	N	3.0734E+02				4.66E+11	
			1460.83	3.073E+02	(P	1.049E+01 4.72E+00 1.07E+01	G
Sc-46	F	-5.7715E-01				8.38E+01	
			889.28	-5.772E-01	?(	2.056E+00 1.05E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.905E+00 1.00E+03 1.00E+02	G
CR-51	F	-2.7607E+00				2.77E+01	
			320.08	-2.761E+00	(P	1.367E+01 1.81E+02 9.94E+00	G
MN-54	C	9.4689E-01				3.12E+02	
			834.85	9.469E-01	?(	1.156E+00 5.42E+01 1.00E+02	G
FE-59	F	-1.3162E+00				4.45E+01	
			1099.25	-1.316E+00	?(P	3.033E+00 6.31E+01 5.65E+01	G
			1291.60	1.480E+00	+	3.160E+00 9.63E+01 4.32E+01	G
Co-56	C	1.3222E+00				7.73E+01	
			846.77	1.081E-01	?(	1.360E+00 5.24E+02 9.99E+01	G
			1238.28	3.159E+00	(P	1.720E+00 2.82E+01 6.61E+01	G
			1037.84	-1.544E+00	+ P	1.080E+01 2.05E+02 1.41E+01	G
			1771.35	-4.079E+00	+	1.860E+01 1.33E+02 1.55E+01	A
CO-57	C	1.3643E-01				2.72E+02	
			122.06	1.364E-01	&(	1.387E+00 3.01E+02 8.56E+01	G
			136.47	0.000E+00	-	1.507E+01 1.00E+03 1.07E+01	G
CO-58	C	2.2527E-01				7.09E+01	
			810.78	2.253E-01	?(	1.693E+00 2.16E+02 9.95E+01	G
CO-60	F	4.2978E-01				1.93E+03	
			1332.50	4.298E-01	?(	8.827E-01 8.90E+01 1.00E+02	G
			1173.24	-5.942E-01	+	1.912E+00 1.43E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	5.1253E-01					7.41E+06	
			702.63	5.125E-01	(P	1.169E+00	9.47E+01	9.79E+01 G
			871.10	-4.262E-01	-	1.704E+00	1.17E+02	9.99E+01 G
ZR-95	I	9.4098E-01					6.40E+01	
			756.73	7.252E-01	?(P	2.230E+00	1.26E+02	5.45E+01 G
			724.20	1.207E+00	?(	4.874E+00	1.19E+02	4.42E+01 G
NB-95	I	5.5932E-01					6.40E+01	
			765.79	5.593E-01	?(	1.987E+00	1.05E+02	9.98E+01 G
RU-103	I	-5.5064E-01					3.93E+01	
			497.05	-5.506E-01	?(P	1.333E+00	1.15E+02	9.09E+01 G
			610.30	7.476E+00	?	5.815E+01	2.31E+02	5.75E+00 GA
RH-106	I	-5.0168E+00					3.74E+02	
			621.92	-5.017E+00	?(	3.696E+01	2.19E+02	9.93E+00 G
			1050.36	-5.418E+01	&	1.382E+02	7.65E+01	1.56E+00 G
			511.86	-2.817E+00	+	1.201E+01	1.27E+02	2.00E+01 GA
AG-108M	C	8.3208E-02					1.53E+05	
			433.94	-3.128E-01	?(	1.269E+00	1.55E+02	9.05E+01 G
			722.94	-8.727E-01	+	2.857E+00	9.78E+01	9.08E+01 G
			614.28	4.820E-01	?(	3.780E+00	2.33E+02	8.98E+01 G
AG-110M	F	7.7989E-01					2.50E+02	
			884.68	7.799E-01	(	2.502E+00	9.50E+01	7.27E+01 G
			657.76	-4.726E-02	%	1.746E+00	1.06E+03	9.46E+01 G
			937.49	-2.631E+00	+	5.253E+00	8.73E+01	3.44E+01 G
			1384.30	-1.725E+00	+ P	5.965E+00	1.53E+02	2.43E+01 G
			763.94	-3.559E+00	+	8.310E+00	7.04E+01	2.23E+01 G
SN-113	F	6.1754E-01					1.15E+02	
			391.69	6.175E-01	?(P	2.538E+00	1.22E+02	6.40E+01 G
SB-124	F	6.8082E-01					6.02E+01	
			602.73	3.993E-01	?(P	3.269E+00	2.43E+02	9.83E+01 G
			1690.98	1.260E+00	?(P	1.218E+00	3.81E+01	4.78E+01 G
			722.79	-7.331E+00	+	2.564E+01	1.04E+02	1.08E+01 G
SB-125	I	3.9707E-01					1.01E+03	
			427.88	-7.888E-01	?(	3.739E+00	1.81E+02	2.96E+01 G
			600.50	2.363E+00	&(	1.762E+01	2.21E+02	1.79E+01 G
			635.89	-4.849E+00	+	1.290E+01	7.95E+01	1.13E+01 G
			463.37	-4.864E+00	+ P	1.796E+01	1.07E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	7.1010E-01					8.02E+00	
			364.48	2.943E-01	?(P	1.253E+00	1.62E+02	8.17E+01 G
			284.30	-7.975E-01	+	1.735E+01	8.29E+02	6.14E+00 G
			636.97	5.448E+00	?(P	2.205E+01	1.19E+02	7.17E+00 G
Gd-153	F	9.8175E-01					2.42E+02	
			97.50	9.818E-01	?(	3.756E+00	1.14E+02	3.00E+01 G
			103.20	-4.979E-01	-	5.978E+00	3.56E+02	2.18E+01 G
Ga-68	C	2.3297E+01					4.71E-02	
			1077.40	2.330E+01	?(	4.688E+01	8.90E+01	3.30E+00 G
Tc-99m	I	-4.1588E-02					2.51E-01	
			140.51	-4.159E-02	%(	1.594E+00	1.13E+03	8.93E+01 G
BA-133	F	-7.3082E-01					3.85E+03	
			356.00	-7.308E-01	?(	3.801E+00	1.55E+02	6.20E+01 G
			302.85	0.000E+00	+	1.111E+01	1.00E+03	1.83E+01 G
			383.84	6.933E+00		1.448E+01	6.33E+01	8.94E+00 GA
			80.99	-1.146E+00	+ P	7.802E+00	1.04E+02	3.41E+01 GA
CS-134	I	1.2049E+00					7.54E+02	
			604.71	4.357E-01	&(	3.349E+00	2.28E+02	9.76E+01 G
			795.87	2.239E+00	?(	1.261E+00	2.67E+01	8.55E+01 G
			569.32	3.362E-01	?(	7.955E+00	6.68E+02	1.54E+01 G
			801.95	-2.387E+00	+	1.542E+01	2.62E+02	8.69E+00 G
			563.24	2.349E-01	% P	1.325E+01	2.17E+03	8.35E+00 G
CS-137	I	1.1298E-01					1.10E+04	
			661.66	1.130E-01	&(	1.594E+00	5.74E+02	8.52E+01 G
CE-139	F	-1.3633E-01					1.38E+02	
			165.85	-1.363E-01	?(	1.653E+00	3.59E+02	7.99E+01 G
Ba-140	I	-1.2976E+00					1.28E+01	
			537.26	-1.298E+00	?(P	5.281E+00	2.02E+02	2.44E+01 G
			162.66	-5.387E+00	&	2.117E+01	1.18E+02	6.22E+00 G
			304.85	-2.258E-01	& P	4.770E+01	4.94E+03	4.29E+00 G
La-140	I	-9.8673E-01					1.28E+01	
			1596.21	-1.439E+00	?(P	2.376E+00	1.21E+02	9.54E+01 G
			487.02	-2.705E-01	+	2.781E+00	4.07E+02	4.55E+01 G
			328.76	1.141E+00	?(P	5.110E+00	1.72E+02	2.03E+01 G
			815.77	0.000E+00	&	7.563E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	6.3521E-01					3.25E+01	
			145.44	6.352E-01	&(	2.220E+00	1.05E+02	4.82E+01 G
CE-144	I	2.8237E+00					2.85E+02	
			133.54	2.824E+00	&(	1.393E+01	1.48E+02	1.11E+01 G
PM-144	C	5.0729E-01					3.63E+02	
			696.54	5.745E-01	?(	1.285E+00	9.35E+01	9.90E+01 G
			618.06	4.401E-01	?(	3.495E+00	2.36E+02	9.91E+01 G
EU-152	F	1.1920E+00					4.94E+03	
			344.29	-1.687E+00	&(	8.524E+00	1.51E+02	2.65E+01 G
			1112.07	1.809E+00	?(	2.075E+01	3.33E+02	1.36E+01 G
			121.78	1.746E-01	+	4.181E+00	7.07E+02	2.86E+01 G
			778.92	-1.568E+00	+	1.013E+01	2.62E+02	1.29E+01 G
			964.11	3.866E+00	?(	2.077E+01	1.59E+02	1.46E+01 G
			244.69	4.995E+00	&(	3.843E+01	2.30E+02	7.58E+00 G
			1408.00	-2.604E+00	+	9.464E+00	1.65E+02	2.10E+01 GA
EU-154	I	6.4583E-01					3.14E+03	
			873.23	-2.188E+00	?(	1.618E+01	2.14E+02	1.23E+01 G
			123.10	0.000E+00	+	2.949E+00	1.00E+03	4.08E+01 G
			1274.54	0.000E+00	+	5.077E+00	1.00E+03	3.52E+01 G
			723.36	-3.923E+00	+	1.211E+01	9.23E+01	2.02E+01 G
			1004.77	4.642E-01	+	1.018E+01	6.19E+02	1.80E+01 G
			996.33	3.927E+00	&(	1.193E+01	8.92E+01	1.06E+01 G
EU-155	I	-6.7161E-02					1.81E+03	
			105.31	-6.716E-02	&(P	5.736E+00	2.14E+03	2.12E+01 G
			86.54	0.000E+00	+	8.270E+00	1.00E+03	3.07E+01 G
HF-181	F	5.8792E-01					4.24E+01	
			482.00	1.028E-02	%(	2.166E+00	6.10E+03	8.05E+01 G
			133.02	7.220E-01	(	3.593E+00	1.49E+02	4.33E+01 G
			345.83	1.789E+00	?(	1.354E+01	2.24E+02	1.51E+01 G
			136.30	4.450E+00	(	2.709E+01	1.82E+02	5.85E+00 G
Ta-182	F	-2.4041E+00					1.14E+02	
			1121.30	-2.404E+00	?(	9.004E+00	1.11E+02	3.49E+01 G
			1221.41	-1.404E+00	+ P	7.560E+00	1.87E+02	2.70E+01 G
			1189.05	-8.047E-01	+ P	1.260E+01	5.31E+02	1.62E+01 G
Hg-203	F	-1.5262E-01					4.66E+01	
			279.20	-1.526E-01	?(	1.770E+00	3.41E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.0627E+01					6.98E+02	
			583.02	1.063E+01	(	8.617E-01	6.94E+00	8.45E+01 G
			277.28	-3.712E+00	& P	2.190E+01	1.46E+02	6.31E+00 G
			860.56	2.494E+01	+ P	6.833E+00	1.60E+01	1.24E+01 G
pm-146	C	5.0780E-01					2.02E+03	
			747.16	2.784E-01	&(P	3.742E+00	5.40E+02	3.40E+01 G
			735.72	3.783E-01	?(P	5.604E+00	5.94E+02	2.25E+01 G
			453.88	6.726E-01	&(	1.690E+00	1.01E+02	6.50E+01 G
y-88	F	2.1842E-01					1.07E+02	
			898.04	0.000E+00	?(	1.414E+00	1.00E+03	9.37E+01 G
			1836.06	4.247E-01	?(	6.260E-01	4.47E+01	9.92E+01 G
Cd-113m		-6.7658E+03					5.33E+03	
			263.70	-6.766E+03	?(	3.181E+04	1.40E+02	6.00E-03 K
Cd-109	F	1.6062E+00					4.53E+02	
			88.04	1.606E+00	%(	6.635E+01	1.24E+03	3.79E+00 G
Cf-251	T	-5.9405E-02					3.28E+05	
			176.60	-5.940E-02	&(	6.065E+00	3.75E+03	1.70E+01 G
			227.00	4.752E-01	%	1.611E+01	1.24E+03	6.30E+00 GA
Cf-249	T	-2.4594E-01					1.28E+05	
			387.95	-6.711E-01	?(	2.586E+00	1.15E+02	6.60E+01 G
			333.44	1.563E+00	?(	6.742E+00	1.66E+02	1.55E+01 G
Sn-126		-5.5216E+00					3.65E+07	
			87.57	0.000E+00	+	6.732E+00	1.00E+03	3.75E+01 GA
			64.28	-5.522E+00	(	1.881E+01	1.02E+02	9.70E+00 G
			86.94	0.000E+00	+	2.802E+01	1.00E+03	9.04E+00 GA
PB-210	N	-1.1017E+01					8.14E+03	
			46.54	-1.102E+01	?(P	4.549E+01	1.38E+02	4.25E+00 G
PB-212	N	3.2001E+01					6.98E+02	
			238.63	3.200E+01	(P	2.112E+00	4.13E+00	4.33E+01 G
			300.03	4.935E+01	+ P	3.046E+01	2.92E+01	3.28E+00 GA
PB-214	N	1.5477E+01					5.84E+05	
			351.93	1.499E+01	(P	2.532E+00	9.30E+00	3.76E+01 G
			295.09	1.643E+01	(P	3.367E+00	1.06E+01	1.93E+01 G
			242.00	5.639E+00	-	4.001E+01	2.13E+02	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C 1.1173E-01					1.18E+04	
		569.70	1.117E-01	?(	1.197E+00	3.04E+02	9.77E+01 G
		1063.66	-1.358E+00	&	2.635E+00	8.77E+01	7.45E+01 G
BI-212	N 4.1151E+01					6.98E+02	
		727.17	4.115E+01	(	6.960E+00	1.22E+01	7.55E+00 G
		785.42	3.826E+01	?	8.341E+01	9.00E+01	1.28E+00 GA
BI-214	N 1.5110E+01					5.84E+05	
		609.31	1.511E+01	(P	2.311E+00	8.38E+00	4.61E+01 G
		1120.29	1.924E+01	+ P	7.710E+00	2.27E+01	1.51E+01 G
		1764.49	1.878E+01	+ P	5.402E+00	1.80E+01	1.54E+01 G
BI-210M	T -8.1798E-01					1.10E+09	
		265.83	-8.180E-01	(	3.743E+00	1.37E+02	5.00E+01 G
		304.90	-3.690E-02	& P	7.309E+00	4.64E+03	2.80E+01 G
AC-228	N 3.4152E+01					2.10E+03	
		911.07	3.392E+01	(	1.244E+00	7.05E+00	2.90E+01 G
		968.97	3.446E+01	(	5.666E+00	1.11E+01	1.75E+01 G
		338.32	3.428E+01	@(	5.517E+00	9.66E+00	1.20E+01 G
		93.35	6.633E+00	-	4.362E+01	1.97E+02	5.56E+00 XA
TH-227	N 1.1766E+00					7.95E+03	
		50.14	8.840E-01	?(	1.983E+01	7.80E+02	8.00E+00 G
		256.24	1.511E+00	(P	1.333E+01	3.21E+02	7.00E+00 G
TH-229	N -4.5546E+00					2.68E+06	
		193.51	-4.555E+00	?(P	2.391E+01	1.88E+02	4.40E+00 G
		210.85	-6.473E+00	&	4.307E+01	2.47E+02	2.99E+00 G
TH-234	N 1.3140E+01					1.63E+12	
		63.29	1.352E+01	(P	3.098E+01	7.78E+01	3.81E+00 G
		92.59	1.288E+01	(P	1.823E+01	4.38E+01	5.58E+00 G
PA-233	C -1.1689E+00					7.82E+08	
		312.01	-1.169E+00	*(	3.992E+00	1.02E+02	3.60E+01 G
		300.18	-3.052E-02	%	3.264E+01	3.15E+04	6.20E+00 G
PA-234	N 2.3797E+00					1.63E+12	
		131.29	1.727E+00	?(	8.447E+00	1.46E+02	1.80E+01 G
		946.02	3.256E+00	?(	9.476E+00	1.23E+02	1.34E+01 G
		569.47	0.000E+00	-	1.513E+01	1.00E+03	8.20E+00 G
		883.24	0.000E+00	-	2.270E+01	1.00E+03	9.60E+00 G
		880.53	-9.802E+00	+	3.365E+01	1.02E+02	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   7.9032E+01                                      1.63E+12
                         1001.00 3.004E+01 ?(P 1.812E+02 1.73E+02 8.37E-01 G
                          766.41 2.185E+02 ?(P 5.936E+02 8.12E+01 2.94E-01 G

U-235    N   5.5950E-01                                      2.57E+11
                          143.79-2.231E+00  (P 1.051E+01 1.33E+02 1.10E+01 G
                          205.33 6.664E+00 &(P 2.155E+01 1.20E+02 5.01E+00 G
                          163.38-1.230E+00 + P 2.695E+01 5.63E+02 5.08E+00 G

AM-241   T  -1.4600E+00                                      1.58E+05
                           59.54-1.460E+00 ?(  4.450E+00 1.08E+02 3.59E+01 G

Np-237   F   4.9060E-01                                      2.14E+06
                           86.49 4.906E-01 %(  1.936E+01 1.18E+03 1.31E+01 G

Ir-192   F   1.9471E-01                                      7.40E+01
                          316.49 1.126E-01 ?(  1.481E+00 3.83E+02 8.70E+01 G
                          468.06-1.070E+00 +   3.748E+00 1.05E+02 5.18E+01 G
                          308.44 4.198E-01 *(  4.892E+00 3.42E+02 3.18E+01 G

Cs-136   F   3.9868E-01                                      1.30E+01
                          818.50 3.987E-01 ?(  1.670E+00 1.23E+02 1.00E+02 G
                         1048.07-1.701E-01 -   2.152E+00 3.57E+02 8.00E+01 G
                          340.57-9.430E-01 +   4.890E+00 1.55E+02 4.69E+01 G

Np-239   T  -1.5400E+00                                      2.36E+00
                          103.70 0.000E+00 +   5.477E+00 1.00E+03 2.40E+01 X
                          106.13-1.540E+00 &(  5.950E+00 1.16E+02 2.27E+01 G
                           99.50 1.975E+00     7.435E+00 1.13E+02 1.50E+01 X

Nd-147       3.5405E+00                                      1.11E+01
                          531.00 3.541E+00 ?(  8.472E+00 9.62E+01 1.30E+01 G
                           91.10 3.336E-01 -   8.636E+00 7.75E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
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& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	228.	-18.	-0.010	138.28	-1.102E+01	P
TH-227	50.14	192.	3.	0.002	779.60	8.840E-01	
AM-241	59.54	312.	-28.	-0.015	108.24	-1.460E+00	
Sn-126	64.28	488.	-31.	-0.017	102.32	-5.522E+00	
BA-133	80.99	1543.	-27.	-0.015	104.17	-1.146E+00	P
Nd-147	91.10	1467.	7.	0.004	774.73	3.336E-01	
Gd-153	97.50	315.	22.	0.012	114.39	9.818E-01	
Np-239	99.50	312.	23.	0.013	112.62	1.975E+00	
Gd-153	103.20	436.	-8.	-0.005	356.18	-4.979E-01	
Np-239	106.13	473.	-27.	-0.015	115.81	-1.540E+00	
EU-152	121.78	367.	4.	0.002	707.32	1.746E-01	
PA-234	131.29	584.	24.	0.013	146.41	1.727E+00	
HF-181	133.02	607.	24.	0.013	148.99	7.220E-01	
HF-181	136.30	620.	20.	0.011	181.91	4.450E+00	
U-235	143.79	309.	-18.	-0.010	132.81	-2.231E+00	P
Ba-140	162.66	354.	-23.	-0.013	117.55	-5.387E+00	
U-235	163.38	381.	-4.	-0.002	563.47	-1.230E+00	P
CE-139	165.85	358.	-8.	-0.004	358.89	-1.363E-01	
TH-229	193.51	180.	-12.	-0.007	188.16	-4.555E+00	P
U-235	205.33	175.	20.	0.011	120.23	6.664E+00	P
TH-229	210.85	243.	-11.	-0.006	246.73	-6.473E+00	
EU-152	244.69	1054.	20.	0.011	230.47	4.995E+00	
TH-227	256.24	94.	5.	0.003	320.63	1.511E+00	P
Cd-113m	263.70	400.	-20.	-0.011	140.42	-6.766E+03	
BI-210M	265.83	379.	-20.	-0.011	136.63	-8.180E-01	
Hg-203	279.20	206.	-6.	-0.003	340.75	-1.526E-01	
I-131	284.30	106.	-2.	-0.001	829.37	-7.975E-01	
PA-231	300.07	392.	-18.	-0.010	158.09	-1.587E+01	
Ir-192	308.44	208.	6.	0.003	342.38	4.198E-01	
PA-233	312.01	174.	-19.	-0.010	101.92	-1.169E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	316.49	136.	4.	0.002	383.15	1.126E-01	
CR-51	320.08	149.	-12.	-0.007	181.24	-2.761E+00	P
La-140	328.76	81.	10.	0.006	171.76	1.141E+00	P
Cf-249	333.44	81.	10.	0.006	165.56	1.563E+00	
Cs-136	340.57	403.	-19.	-0.010	154.71	-9.430E-01	
EU-152	344.29	385.	-19.	-0.010	150.70	-1.687E+00	
HF-181	345.83	310.	11.	0.006	224.30	1.789E+00	
BA-133	356.00	400.	-18.	-0.010	155.13	-7.308E-01	
I-131	364.48	67.	10.	0.005	162.21	2.943E-01	P
BA-133	383.84	103.	24.	0.013	63.33	6.933E+00	
Cf-249	387.95	181.	-17.	-0.009	114.68	-6.711E-01	
SN-113	391.69	161.	15.	0.008	122.06	6.175E-01	P
SB-125	427.88	62.	-8.	-0.005	180.60	-7.888E-01	
pm-146	453.88	56.	15.	0.008	101.32	6.726E-01	
SB-125	463.37	169.	-17.	-0.010	107.10	-4.864E+00	P
Ir-192	468.06	178.	-19.	-0.010	104.52	-1.070E+00	
BE-7	477.59	126.	-17.	-0.010	95.01	-4.979E+00	
La-140	487.02	68.	-4.	-0.002	406.71	-2.705E-01	
RU-103	497.05	60.	-16.	-0.009	114.70	-5.506E-01	P
RH-106	511.86	243.	-18.	-0.010	126.95	-2.817E+00	
Nd-147	531.00	44.	14.	0.008	96.21	3.541E+00	
Ba-140	537.26	61.	-10.	-0.005	202.29	-1.298E+00	P
CS-134	569.32	50.	2.	0.001	668.33	3.362E-01	
BI-207	569.70	45.	3.	0.002	304.26	1.117E-01	
SB-125	600.50	333.	12.	0.007	221.23	2.363E+00	
SB-124	602.73	346.	11.	0.006	242.87	3.993E-01	P
CS-134	604.71	357.	12.	0.007	228.13	4.357E-01	
RU-103	610.30	369.	12.	0.007	230.95	7.476E+00	
PM-144	618.06	389.	12.	0.007	235.87	4.401E-01	
RH-106	621.92	434.	-14.	-0.008	219.18	-5.017E+00	
SB-125	635.89	61.	-15.	-0.008	79.51	-4.849E+00	
I-131	636.97	72.	10.	0.006	119.11	5.448E+00	P
CS-137	661.66	49.	2.	0.001	574.07	1.130E-01	
PM-144	696.54	39.	14.	0.008	93.50	5.745E-01	
NB-94	702.63	30.	12.	0.007	94.70	5.125E-01	P
SB-124	722.79	193.	-19.	-0.011	104.38	-7.331E+00	
EU-154	723.36	149.	-19.	-0.011	92.30	-3.923E+00	
ZR-95	724.20	113.	13.	0.007	119.47	1.207E+00	
pm-146	735.72	35.	2.	0.001	594.01	3.783E-01	P
pm-146	747.16	35.	2.	0.001	539.86	2.784E-01	P
ZR-95	756.73	31.	9.	0.005	125.90	7.252E-01	P
AG-110M	763.94	76.	-18.	-0.010	70.37	-3.559E+00	
NB-95	765.79	87.	13.	0.007	105.19	5.593E-01	
EU-152	778.92	35.	-5.	-0.003	261.67	-1.568E+00	
CS-134	795.87	22.	43.	0.024	26.67	2.239E+00	
CS-134	801.95	35.	-5.	-0.003	261.67	-2.387E+00	
CO-58	810.78	56.	5.	0.003	216.33	2.253E-01	
Cs-136	818.50	54.	9.	0.005	122.54	3.987E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
MN-54	834.85	23.	21.	0.011	54.24	9.469E-01		
Co-56	846.77	33.	2.	0.001	523.72	1.081E-01		
NB-94	871.10	51.	-9.	-0.005	117.06	-4.262E-01		
EU-154	873.23	71.	-6.	-0.003	213.96	-2.188E+00		
PA-234	880.53	72.	-12.	-0.007	101.59	-9.802E+00		
AG-110M	884.68	57.	12.	0.007	94.96	7.799E-01		
Sc-46	889.28	74.	-12.	-0.007	105.31	-5.772E-01		
AG-110M	937.49	51.	-18.	-0.010	87.31	-2.631E+00		
PA-234	946.02	23.	9.	0.005	123.02	3.256E+00		
EU-152	964.11	148.	11.	0.006	158.53	3.866E+00		
EU-154	996.33	21.	8.	0.004	89.22	3.927E+00		
EU-154	1004.77	47.	2.	0.001	619.10	4.642E-01		
Co-56	1037.84	30.	-4.	-0.002	204.93	-1.544E+00		P
Cs-136	1048.07	38.	-2.	-0.001	356.65	-1.701E-01		
RH-106	1050.36	62.	-16.	-0.009	76.47	-5.418E+01		
BI-207	1063.66	50.	-18.	-0.010	87.74	-1.358E+00		
Ga-68	1077.40	20.	12.	0.007	88.96	2.330E+01		
FE-59	1099.25	35.	-13.	-0.007	63.07	-1.316E+00		P
EU-152	1112.07	102.	4.	0.002	332.55	1.809E+00		
Ta-182	1121.30	125.	-15.	-0.008	111.15	-2.404E+00		
CO-60	1173.24	40.	-10.	-0.006	142.59	-5.942E-01		
Ta-182	1189.05	45.	-2.	-0.001	531.30	-8.047E-01		P
Ta-182	1221.41	43.	-6.	-0.003	187.41	-1.404E+00		P
Co-56	1238.28	11.	34.	0.019	28.16	3.159E+00		P
NA-22	1274.53	27.	3.	0.002	225.83	2.111E-01		
FE-59	1291.60	16.	10.	0.006	96.26	1.480E+00		
CO-60	1332.50	5.	7.	0.004	89.04	4.298E-01		
AG-110M	1384.30	16.	-6.	-0.003	153.36	-1.725E+00		P
EU-152	1408.00	32.	-8.	-0.004	164.57	-2.604E+00		
La-140	1596.21	34.	-18.	-0.010	120.83	-1.439E+00		P
SB-124	1690.98	0.	8.	0.004	38.11	1.260E+00		P
Co-56	1771.35	48.	-8.	-0.004	132.73	-4.079E+00		
y-88	1836.06	0.	5.	0.003	44.72	4.247E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.9794E+00	-4.9794E+00	9.501E+01%	1.59E+01
NA-22	#A	2.1107E-01	2.1107E-01	2.258E+02%	1.70E+00
K-40		3.0734E+02	3.0734E+02	4.715E+00%	1.05E+01
Sc-46	#A	-5.7715E-01	-5.7715E-01	1.053E+02%	2.06E+00
CR-51	#A	-2.7607E+00	-2.7607E+00	1.812E+02%	1.37E+01
MN-54	#A	9.4689E-01	9.4689E-01	5.424E+01%	1.16E+00
FE-59	#A	-1.3161E+00	-1.3162E+00	6.307E+01%	3.03E+00

Co-56	#A	1.3222E+00	1.3222E+00	2.816E+01%	1.36E+00
CO-57	#A	1.3643E-01	1.3643E-01	3.012E+02%	1.39E+00
CO-58	#A	2.2527E-01	2.2527E-01	2.163E+02%	1.69E+00
CO-60	#A	4.2978E-01	4.2978E-01	8.904E+01%	8.83E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.72E+00
NB-94	#A	5.1253E-01	5.1253E-01	9.470E+01%	1.17E+00
ZR-95	#A	9.4097E-01	9.4098E-01	8.678E+01%	2.23E+00
NB-95	#A	5.5931E-01	5.5932E-01	1.052E+02%	1.99E+00
RU-103	#A	-5.5063E-01	-5.5064E-01	1.147E+02%	1.33E+00
RH-106	#A	-5.0168E+00	-5.0168E+00	2.192E+02%	3.70E+01
AG-108M	#A	8.3208E-02	8.3208E-02	1.399E+02%	1.27E+00
AG-110M	#A	7.7989E-01	7.7989E-01	9.496E+01%	2.50E+00
SN-113	#A	6.1754E-01	6.1754E-01	1.221E+02%	2.54E+00
SB-124	#A	6.8081E-01	6.8082E-01	3.811E+01%	3.27E+00
SB-125	#A	3.9707E-01	3.9707E-01	1.428E+02%	3.74E+00
I-131	#A	7.1005E-01	7.1010E-01	1.006E+02%	1.25E+00
Gd-153	#A	9.8175E-01	9.8175E-01	1.144E+02%	3.76E+00
Ga-68	#A	2.2974E+01	2.3297E+01	8.896E+01%	4.69E+01
Tc-99m	#A	-4.1479E-02	-4.1588E-02	1.134E+03%	1.59E+00
BA-133	#A	-7.3082E-01	-7.3082E-01	1.551E+02%	3.80E+00
CS-134	#A	1.2049E+00	1.2049E+00	2.667E+01%	3.35E+00
CS-137	#A	1.1298E-01	1.1298E-01	5.741E+02%	1.59E+00
CE-139	#A	-1.3633E-01	-1.3633E-01	3.589E+02%	1.65E+00
Ba-140	#A	-1.2975E+00	-1.2976E+00	2.023E+02%	5.28E+00
La-140	#A	-9.8668E-01	-9.8673E-01	1.050E+02%	2.38E+00
CE-141	#A	6.3519E-01	6.3521E-01	1.045E+02%	2.22E+00
CE-144	A	2.8237E+00	2.8237E+00	1.477E+02%	1.39E+01
PM-144	#A	5.0729E-01	5.0729E-01	9.350E+01%	1.29E+00
EU-152	#A	1.1920E+00	1.1920E+00	1.150E+02%	8.52E+00
EU-154	#A	6.4583E-01	6.4583E-01	8.922E+01%	1.62E+01
EU-155	#A	-6.7161E-02	-6.7161E-02	2.144E+03%	5.74E+00
HF-181	#A	5.8791E-01	5.8792E-01	1.490E+02%	2.17E+00
Ta-182	#A	-2.4041E+00	-2.4041E+00	1.112E+02%	9.00E+00
Hg-203	#A	-1.5262E-01	-1.5262E-01	3.408E+02%	1.77E+00
TL-208		1.0627E+01	1.0627E+01	6.944E+00%	8.62E-01
pm-146	#A	5.0780E-01	5.0780E-01	1.013E+02%	3.74E+00
y-88	#A	2.1842E-01	2.1842E-01	4.472E+01%	1.41E+00
Cd-113m	#A	-6.7658E+03	-6.7658E+03	1.404E+02%	3.18E+04
Cd-109	#A	1.6062E+00	1.6062E+00	1.236E+03%	6.64E+01
Cf-251	#A	-5.9405E-02	-5.9405E-02	3.745E+03%	6.06E+00
Cf-249	#A	-2.4594E-01	-2.4594E-01	1.007E+02%	2.59E+00
Sn-126	#A	-5.5216E+00	-5.5216E+00	1.023E+02%	1.88E+01
PB-210	#A	-1.1017E+01	-1.1017E+01	1.383E+02%	4.55E+01
PB-212		3.2001E+01	3.2001E+01	4.126E+00%	2.11E+00
PB-214		1.5477E+01	1.5477E+01	7.041E+00%	2.53E+00
BI-207	#A	1.1173E-01	1.1173E-01	3.043E+02%	1.20E+00
BI-212		4.1151E+01	4.1151E+01	1.222E+01%	6.96E+00
BI-214		1.5110E+01	1.5110E+01	8.376E+00%	2.31E+00
BI-210M	#A	-8.1798E-01	-8.1798E-01	1.366E+02%	3.74E+00

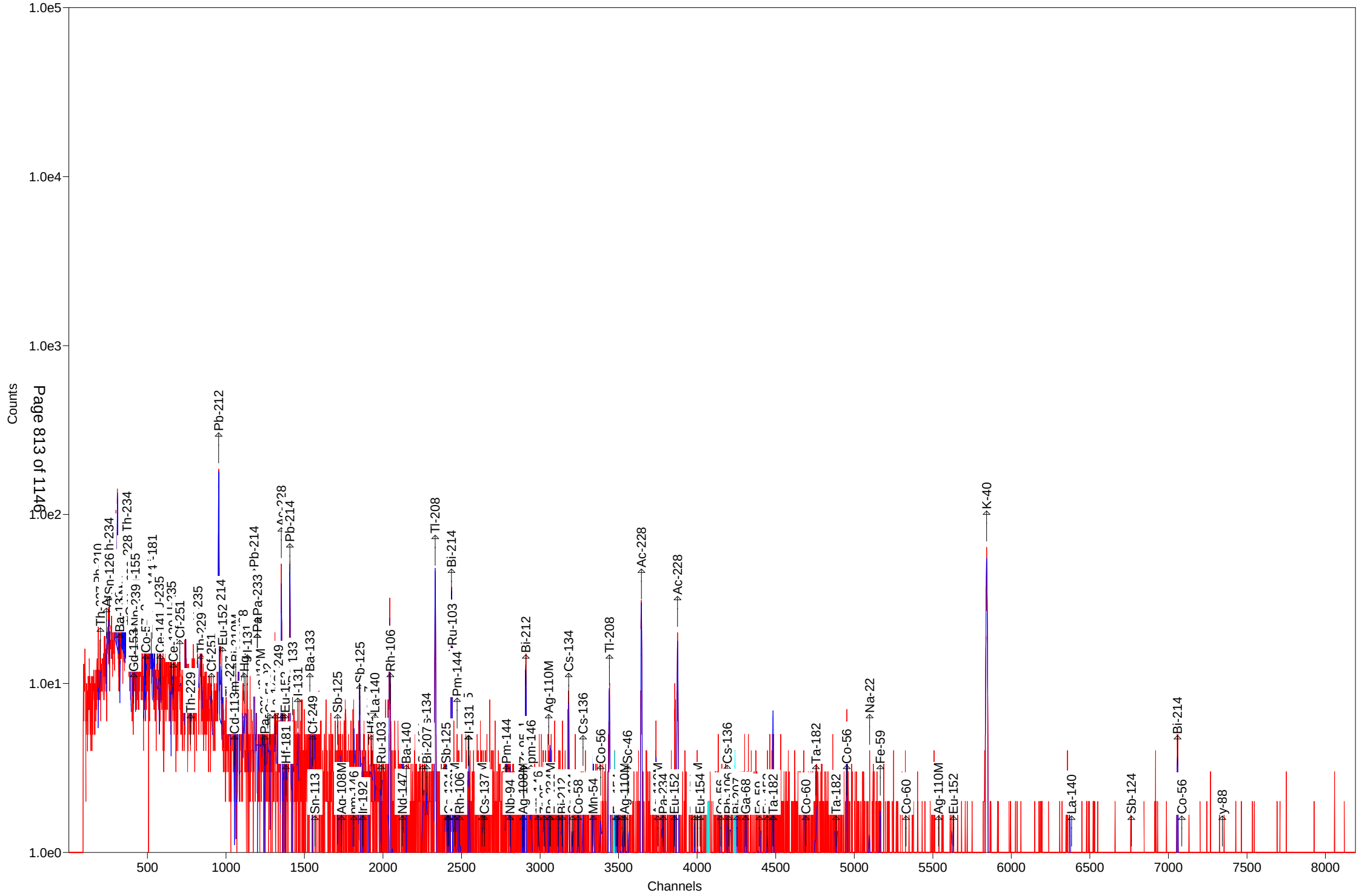
AC-228	3.4152E+01	3.4152E+01	5.442E+00%	1.24E+00
TH-227 #A	1.1766E+00	1.1766E+00	3.206E+02%	1.98E+01
TH-229 #A	-4.5546E+00	-4.5546E+00	1.882E+02%	2.39E+01
TH-234 A	1.3140E+01	1.3140E+01	4.376E+01%	3.10E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.07E+01
PA-233 #A	-1.1689E+00	-1.1689E+00	1.019E+02%	3.99E+00
PA-234 #A	2.3797E+00	2.3797E+00	9.561E+01%	8.45E+00
PA-234M#A	7.9032E+01	7.9032E+01	8.121E+01%	1.81E+02
U-235 #A	5.5950E-01	5.5950E-01	8.957E+01%	1.05E+01
AM-241 #A	-1.4600E+00	-1.4600E+00	1.082E+02%	4.45E+00
Np-237 #A	4.9060E-01	4.9060E-01	1.181E+03%	1.94E+01
Ir-192 #A	1.9470E-01	1.9471E-01	2.569E+02%	1.48E+00
Cs-136 #A	3.9866E-01	3.9868E-01	1.225E+02%	1.67E+00
Np-239 #A	-1.5396E+00	-1.5400E+00	1.158E+02%	5.95E+00
Nd-147 #A	3.5403E+00	3.5405E+00	9.621E+01%	8.47E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 4.559E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.5585480E+02 Bq/Sample

264535_Gamma_160-18554-A-17-B. 17_Gamma_20161131.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161670

Sample Description: 264535_Gamma_160-18554-A-18-B
Detector: Detector # 5
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-18-B

Decay to Time: 9/1/2016 13:24 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:24:30 Real Time: 1809 sec
Analysis Time: 9/1/2016 13:55 Dead Time: 0.51 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 5_2016-07-31_1355.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-6.787E+00	93.7	6.358E+00	6.367E+00	2.132E+01
NA-22	6.150E-01	83.1	5.107E-01	5.117E-01	1.741E+00
K-40	2.284E+02	7.3	1.663E+01	2.032E+01	1.716E+01
Sc-46	-1.023E+00	89.9	9.202E-01	9.217E-01	3.092E+00
CR-51	-6.687E+00	102.3	6.844E+00	6.853E+00	2.288E+01
MN-54	-6.803E-02	1126.9	7.666E-01	7.666E-01	1.862E+00
FE-59	-2.381E+00	86.6	2.062E+00	2.065E+00	4.592E+00
Co-56	6.194E-01	89.8	5.561E-01	5.570E-01	2.026E+00
CO-57	0.000E+00	1.#INF	1.057E-01	1.057E-01	1.391E+00
CO-58	5.116E-01	133.2	6.816E-01	6.821E-01	2.343E+00
CO-60	6.234E-01	94.8	5.911E-01	5.919E-01	1.387E+00
ZN-65	1.449E+00	143.6	2.081E+00	2.082E+00	7.122E+00
NB-94	4.654E-02	68.2	3.172E-02	3.182E-02	2.007E+00
ZR-95	2.684E-01	412.4	1.107E+00	1.107E+00	2.806E+00
NB-95	-8.307E-02	1025.8	8.522E-01	8.522E-01	2.970E+00
RU-103	-2.529E-01	273.5	6.919E-01	6.920E-01	1.701E+00
RH-106	9.392E+00	70.9	6.662E+00	6.680E+00	1.946E+01
AG-108M	2.608E-01	200.2	5.222E-01	5.224E-01	1.334E+00
AG-110M	2.067E-01	241.4	4.990E-01	4.991E-01	3.272E+00
SN-113	7.315E-01	117.1	8.568E-01	8.577E-01	2.895E+00
SB-124	-8.211E-01	116.1	9.534E-01	9.544E-01	4.725E+00
SB-125	2.336E+00	98.8	2.307E+00	2.310E+00	4.232E+00
I-131	-3.710E-01	212.9	7.897E-01	7.899E-01	1.782E+00
Gd-153	-2.588E-01	469.5	1.215E+00	1.215E+00	4.126E+00
Ga-68	5.368E+01	45.2	2.429E+01	2.447E+01	5.202E+01
Tc-99m	-4.071E-01	133.4	5.430E-01	5.434E-01	1.817E+00
BA-133	5.201E-01	257.7	1.340E+00	1.340E+00	4.527E+00
CS-134	4.250E-01	97.9	4.160E-01	4.166E-01	4.522E+00
CS-137	-1.365E+00	54.4	7.422E-01	7.456E-01	3.082E+00
CE-139	0.000E+00	1.#INF	3.292E-01	3.292E-01	1.908E+00
Ba-140	1.706E+00	105.7	1.804E+00	1.806E+00	4.634E+00
La-140	4.906E-01	30.4	1.490E-01	1.512E-01	3.062E+00
CE-141	0.000E+00	1.#INF	5.694E-01	5.694E-01	3.411E+00

CE-144	-2.912E+00	104.4	3.039E+00	3.042E+00	1.619E+01
PM-144	3.072E-01	153.4	4.712E-01	4.715E-01	1.563E+00
EU-152	2.690E+00	135.3	3.640E+00	3.643E+00	9.284E+00
EU-154	-4.079E+00	131.8	5.377E+00	5.381E+00	1.854E+01
EU-155	-1.878E+00	151.1	2.837E+00	2.839E+00	9.466E+00
HF-181	6.269E-01	120.2	7.533E-01	7.540E-01	2.553E+00
Ta-182	3.744E-01	855.3	3.202E+00	3.202E+00	1.118E+01
Hg-203	-1.937E-02	6978.9	1.352E+00	1.352E+00	1.761E+00
TL-208	1.196E+01	9.0	1.076E+00	1.242E+00	1.501E+00
pm-146	2.386E+00	64.8	1.546E+00	1.551E+00	4.849E+00
y-88	-7.974E-01	129.2	1.030E+00	1.031E+00	2.406E+00
Cd-113m	-3.180E+03	212.1	6.746E+03	6.750E+03	2.307E+04
Cd-109	0.000E+00	1.#INF	1.784E+01	1.784E+01	5.993E+01
Cf-251	1.981E+00	104.6	2.072E+00	2.080E+00	5.585E+00
Cf-249	1.717E+00	44.2	7.587E-01	7.638E-01	2.970E+00
Sn-126	4.986E+00	110.6	5.515E+00	5.521E+00	1.842E+01
PB-210	2.698E+01	53.6	1.448E+01	1.456E+01	3.884E+01
PB-212	2.774E+01	5.5	1.531E+00	2.359E+00	3.106E+00
PB-214	1.666E+01	8.6	1.431E+00	1.672E+00	3.019E+00
BI-207	9.646E-01	48.5	4.683E-01	4.709E-01	1.224E+00
BI-212	5.082E+01	15.2	7.706E+00	8.145E+00	1.183E+01
BI-214	1.685E+01	9.3	1.561E+00	1.790E+00	2.237E+00
BI-210M	-7.859E-02	1062.1	8.347E-01	8.347E-01	2.884E+00
AC-228	3.251E+01	7.5	2.426E+00	2.938E+00	4.702E+00
TH-227	1.036E+00	696.4	7.212E+00	7.212E+00	2.083E+01
TH-229	6.350E+00	134.7	8.555E+00	8.570E+00	2.707E+01
TH-234	2.233E+01	46.2	1.032E+01	1.039E+01	3.343E+01
PA-231	-1.832E+01	144.6	2.650E+01	2.652E+01	8.891E+01
PA-233	-1.688E+00	101.1	1.708E+00	1.710E+00	4.375E+00
PA-234	8.636E-01	75.3	6.503E-01	6.518E-01	9.458E+00
PA-234M	0.000E+00	1.#INF	4.438E+01	4.438E+01	3.546E+02
U-235	1.779E+00	152.0	2.703E+00	2.705E+00	1.491E+01
AM-241	2.863E+00	44.1	1.261E+00	1.270E+00	3.388E+00
Np-237	0.000E+00	1.#INF	5.805E+00	5.805E+00	1.935E+01
Ir-192	-2.417E-02	71.7	1.734E-02	1.740E-02	2.468E+00
Cs-136	-9.835E-01	93.1	9.157E-01	9.174E-01	3.078E+00
Np-239	-1.732E+00	152.4	2.640E+00	2.642E+00	8.808E+00
Nd-147	-5.375E+00	94.0	5.055E+00	5.064E+00	1.254E+01
Total	5.370E+02				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-18-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161670.An1

Acquisition information
Start time: 9/1/2016 1:24:30 PM
Live time: 1800
Real time: 1809
Dead time: 0.51 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:24:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-31_1355.PBC 7/31/2016 1:55:22 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2762

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.55	37.	53.65	0.90	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	3.	696.42	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.50	47.	44.05	2.01	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.51	42.	46.22	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.50	24.	110.61	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.60	179.	14.05	0.81	3.144E-02				
77.20	301.	8.89	0.82	3.221E-02				
87.31	136.	15.98	0.83	3.449E-02	86.54	30.700	7.159E+00	EU155
					86.94	9.040	2.426E+01	Sn126
					87.57	37.500	5.830E+00	Sn126
					88.04	3.790	5.756E+01	Cd109
89.92	66.	28.70	0.83	3.490E-02				
91.10	28.	153.31	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
93.03	101.	20.38	0.83	3.532E-02	92.59	5.584	2.274E+01	TH234
					93.35	5.561	2.857E+01	AC228
103.70	13.	195.87	0.84	3.614E-02	103.70	24.000	PBC<MDA	Np239
123.10	4.	537.63	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
176.60	18.	104.62	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
193.51	4.	499.65	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
205.33	13.	151.98	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	18.	134.73	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
238.76	528.	5.84	1.17	2.318E-02	238.63	43.300	2.920E+01	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
242.14	67.	25.30	0.98	2.293E-02	242.00	7.430	2.177E+01	PB214
244.69	18.	229.44	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
277.90	10.	137.45	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
295.46	103.	14.28	1.40	1.945E-02	295.09	19.300	1.520E+01	PB214
300.25	64.	22.54	1.59	1.918E-02	300.03	3.280	5.694E+01	PB212
					300.07	2.460	7.593E+01	PA231
					300.18	6.200	3.014E+01	PA233
328.76	47.	30.36	1.07	1.778E-02	328.76	20.300	7.227E+00	La140
333.44	28.	44.18	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.44	117.	12.57	1.41	1.736E-02	338.32	12.010	3.107E+01	AC228
340.57	14.	161.97	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
344.29	9.	244.15	1.08	1.711E-02	344.29	26.500	PBC<MDA	EU152
352.02	198.	9.55	1.03	1.680E-02	351.93	37.600	1.741E+01	PB214
356.00	10.	257.65	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
387.95	14.	115.30	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
391.69	13.	117.14	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	13.	101.59	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
433.94	6.	200.24	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
463.37	14.	98.79	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	14.	102.14	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
482.00	12.	120.17	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
511.86	85.	27.98	2.48	1.230E-02	511.86	20.000	1.912E+01	RH106
537.26	9.	105.75	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
563.24	7.	162.67	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.47	13.	79.32	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.617E+00	PA234
					569.70	97.740	6.392E-01	BI207
569.70	9.	80.30	1.29	1.125E-02	569.32	15.380	2.871E+00	CS134
					569.47	8.200	5.386E+00	PA234
					569.70	97.740	4.520E-01	BI207
583.47	202.	8.95	1.60	1.102E-02	583.02	84.500	1.196E+01	TL208
609.61	154.	8.79	1.32	1.063E-02	609.31	46.090	1.685E+01	BI214
					610.30	5.750	1.401E+02	RU103
618.06	4.	385.89	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
621.92	12.	91.77	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
635.89	2.	380.79	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
657.76	4.	241.38	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
696.54	7.	153.42	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
727.49	63.	15.16	1.24	9.170E-03	727.17	7.550	5.082E+01	BI212
735.72	10.	91.29	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
747.16	12.	92.01	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
756.73	2.	412.43	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
795.87	12.	97.89	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
810.78	8.	133.23	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
860.61	44.	15.29	1.40	7.963E-03	860.56	12.420	2.450E+01	TL208
871.10	9.	68.17	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
880.53	2.	551.00	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
911.50	129.	10.85	1.48	7.588E-03	911.07	29.000	3.238E+01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
964.11	3.	532.77	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.40	76.	14.93	1.83	7.209E-03	968.97	17.460	3.370E+01	AC228
1037.84	3.	326.84	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	8.	64.67	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	108.19	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	15.	54.59	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	18.	45.25	1.69	6.594E-03	1077.40	3.300	5.368E+01	Ga68
1112.07	8.	135.33	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	8.	143.62	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1120.04	17.	53.87	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	2.	594.60	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.840E-01	Sc46
					1121.30	34.900	5.276E-01	Ta182
1121.05	1.	855.26	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.744E-01	Ta182
1238.28	14.	89.77	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	83.05	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.747E+00	EU154
1332.50	6.	94.81	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	2.	482.02	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	5.	145.77	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.47	235.	6.52	2.14	5.101E-03	1460.83	10.670	2.359E+02	K40
1763.45	27.	20.81	2.11	4.351E-03	1764.49	15.400	2.228E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.04	74.58	225.	179.	5.682E+03	14.05	0.812	- sD
308.44	77.18	208.	301.	9.355E+03	8.89	0.815	- sD
359.06	89.86	151.	70.	1.996E+03	27.70	0.828	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.72	46.55	117.	37.	0.021	53.65	0.902
TH-227	200.11	50.14	153.	3.	0.002	696.42	0.787s
AM-241	237.56	59.50	128.	47.	0.026	44.05	2.008s
TH-234	252.74	63.29	163.	42.	0.023	46.22	0.801D
Sn-126	256.71	64.28	340.	24.	0.013	110.61	0.802s
BA-133	323.61	80.99	294.	-15.	-0.008	176.23	0.819
Np-237	345.63	86.49	1092.	0.	0.000	176.68	0.825A
EU-155	345.84	86.54	1047.	-28.	-0.016	164.69	0.825D
Sn-126	347.43	86.94	953.	28.	0.016	86.96	0.825D
Sn-126	349.95	87.57	860.	96.	0.053	23.69	0.826D
Cd-109	351.83	88.04	888.	0.	0.000	1000.00	0.826A
Nd-147	364.08	91.10	916.	28.	0.016	153.31	0.829s
TH-234	370.05	92.59	235.	33.	0.018	69.00	0.831D
AC-228	373.09	93.35	933.	29.	0.016	151.95	0.832s
Gd-153	389.70	97.50	273.	-5.	-0.003	469.47	0.836
Np-239	397.71	99.50	341.	-25.	-0.014	107.44	0.838
Gd-153	412.52	103.20	362.	-23.	-0.013	118.44	0.842s
Np-239	414.52	103.70	338.	13.	0.007	195.87	0.842s
EU-155	420.98	105.31	754.	-26.	-0.014	151.05	0.844s
Np-239	424.25	106.13	749.	-26.	-0.014	152.37	0.845
EU-152	486.88	121.78	237.	-16.	-0.009	139.73	0.861s
CO-57	488.03	122.06	253.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	221.	4.	0.002	537.63	0.862
PA-234	524.99	131.29	506.	-25.	-0.014	128.01	0.871s
HF-181	531.91	133.02	531.	-25.	-0.014	130.81	0.872s
CE-144	533.97	133.54	557.	-20.	-0.011	104.35	0.873s
HF-181	545.02	136.30	576.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	589.	-27.	-0.015	130.68	0.876s
Tc-99m	561.88	140.51	407.	-22.	-0.012	133.37	0.880s
U-235	574.99	143.79	428.	0.	0.000	1000.00	0.883
CE-141	581.61	145.44	428.	0.	0.000	1000.00	0.885s
Ba-140	650.54	162.66	318.	-23.	-0.013	112.31	0.902s
U-235	653.42	163.38	306.	-14.	-0.008	180.99	0.903s
CE-139	663.32	165.85	319.	0.	0.000	1000.00	0.905s
Cf-251	706.34	176.60	107.	18.	0.010	104.62	0.916s
TH-229	774.03	193.51	147.	4.	0.002	499.65	0.933s
U-235	821.35	205.33	128.	13.	0.007	151.98	0.945
TH-229	843.44	210.85	173.	18.	0.010	134.73	0.950s
Cf-251	908.08	227.00	110.	-2.	-0.001	935.86	0.966s
PB-212	954.64	238.63	131.	502.	0.279	5.52	0.978D
PB-214	968.10	242.00	109.	67.	0.037	25.30	0.981D
EU-152	978.89	244.69	804.	18.	0.010	229.44	0.984s
TH-227	1025.11	256.24	107.	-20.	-0.011	206.34	0.995s
Cd-113m	1054.97	263.70	117.	-7.	-0.004	212.13	1.002s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1109.33	277.28	80.	10.	0.005	137.45	1.016s
PB-214	1182.08	295.46	28.	103.	0.057	14.28	1.400s
PB-212	1201.23	300.25	36.	64.	0.036	22.54	1.585s
PA-231	1200.53	300.07	369.	-18.	-0.010	152.41	1.038s
PA-233	1200.97	300.18	351.	-18.	-0.010	148.73	1.038s
PA-231	1210.86	302.65	333.	-18.	-0.010	144.63	1.040s
BA-133	1211.66	302.85	315.	-12.	-0.007	208.69	1.040s
PA-233	1248.32	312.01	115.	-20.	-0.011	101.14	1.049s
Ir-192	1266.25	316.49	214.	-21.	-0.012	100.79	1.053s
CR-51	1280.63	320.08	237.	-22.	-0.012	102.34	1.057s
La-140	1315.35	328.76	45.	47.	0.026	30.36	1.065s
Cf-249	1334.08	333.44	37.	28.	0.016	44.18	1.070s
AC-228	1354.11	338.44	28.	117.	0.065	12.57	1.412s
Cs-136	1362.62	340.57	232.	14.	0.008	161.97	1.077s
EU-152	1377.49	344.29	246.	9.	0.005	244.15	1.080s
HF-181	1383.66	345.83	255.	0.	0.000	1000.00	1.082s
PB-214	1408.45	352.02	46.	198.	0.110	9.55	1.030s
BA-133	1424.36	356.00	305.	10.	0.005	257.65	1.091
I-131	1458.32	364.48	74.	-9.	-0.005	212.86	1.099s
BA-133	1535.78	383.84	162.	-16.	-0.009	114.91	1.117s
Cf-249	1552.22	387.95	124.	14.	0.008	115.30	1.121s
SN-113	1567.19	391.69	109.	13.	0.007	117.14	1.125s
SB-125	1711.99	427.88	40.	13.	0.007	101.59	1.158s
AG-108M	1736.25	433.94	36.	6.	0.003	200.24	1.164s
pm-146	1816.05	453.88	65.	-8.	-0.004	149.68	1.182s
SB-125	1854.01	463.37	94.	14.	0.008	98.79	1.191s
Ir-192	1872.79	468.06	101.	14.	0.008	102.14	1.195s
BE-7	1910.94	477.59	115.	-17.	-0.009	93.68	1.204s
HF-181	1928.56	482.00	94.	12.	0.007	120.17	1.208s
La-140	1948.65	487.02	68.	-18.	-0.010	80.02	1.212s
RU-103	1988.80	497.05	48.	-5.	-0.003	273.54	1.221s
RH-106	2048.06	511.86	73.	85.	0.047	27.98	2.485s
Nd-147	2124.62	531.00	48.	-15.	-0.008	94.04	1.252s
Ba-140	2149.67	537.26	21.	9.	0.005	105.75	1.258s
CS-134	2253.60	563.24	32.	7.	0.004	162.67	1.280s
CS-134	2277.94	569.32	52.	-8.	-0.004	132.29	1.286s
PA-234	2278.54	569.47	44.	13.	0.007	79.32	1.286s
BI-207	2279.47	569.70	21.	9.	0.005	80.30	1.286s
TL-208	2334.56	583.47	23.	201.	0.112	9.00	1.599s
SB-125	2402.69	600.50	363.	-15.	-0.008	179.77	1.313s
SB-124	2411.61	602.73	348.	-16.	-0.009	116.12	1.315s
CS-134	2419.53	604.71	312.	-6.	-0.003	416.71	1.317s
BI-214	2439.15	609.61	13.	149.	0.083	9.26	1.317
PM-144	2472.94	618.06	104.	4.	0.002	385.89	1.328s
RH-106	2488.37	621.92	52.	12.	0.007	91.77	1.332s
SB-125	2544.26	635.89	28.	2.	0.001	380.79	1.344s
I-131	2548.61	636.97	44.	-10.	-0.005	110.10	1.345s
AG-110M	2631.76	657.76	37.	4.	0.002	241.38	1.362s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2647.36	661.66	90.	-21.	-0.012	54.37	1.366s
PM-144	2786.90	696.54	26.	7.	0.004	153.42	1.395s
NB-94	2811.25	702.63	43.	-9.	-0.005	147.64	1.400s
SB-124	2891.88	722.79	108.	-11.	-0.006	133.23	1.417s
AG-108M	2892.48	722.94	97.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	97.	0.	0.000	1000.00	1.418s
BI-212	2910.69	727.49	7.	63.	0.035	15.16	1.243
pm-146	2943.61	735.72	17.	10.	0.006	91.29	1.428s
pm-146	2989.37	747.16	26.	12.	0.007	92.01	1.437s
ZR-95	3027.65	756.73	22.	2.	0.001	412.43	1.445s
AG-110M	3056.50	763.94	63.	-18.	-0.010	65.94	1.451s
PA-234M	3066.38	766.41	113.	-12.	-0.007	130.23	1.453s
EU-152	3116.41	778.92	56.	-18.	-0.010	93.19	1.463s
BI-212	3142.41	785.42	42.	-5.	-0.003	278.57	1.468s
CS-134	3184.19	795.87	28.	12.	0.007	97.89	1.477s
CS-134	3208.53	801.95	28.	-3.	-0.002	329.69	1.482s
CO-58	3243.82	810.78	48.	8.	0.004	133.23	1.489s
La-140	3263.80	815.77	56.	0.	0.000	1000.00	1.493s
Cs-136	3274.72	818.50	86.	-15.	-0.008	93.10	1.495s
Co-56	3387.78	846.77	33.	-6.	-0.003	188.90	1.518s
TL-208	3443.14	860.61	0.	44.	0.024	15.29	1.396s
NB-94	3485.08	871.10	15.	9.	0.005	68.17	1.537s
EU-154	3493.61	873.23	40.	-7.	-0.004	131.81	1.539s
PA-234	3522.80	880.53	41.	2.	0.001	551.00	1.544s
PA-234	3533.64	883.24	43.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	75.	-14.	-0.008	89.93	1.551s
y-88	3592.83	898.04	37.	-10.	-0.006	129.23	1.558s
AC-228	3646.64	911.50	12.	128.	0.071	10.96	1.475
AG-110M	3750.60	937.49	33.	-9.	-0.005	143.96	1.589s
PA-234	3784.70	946.02	28.	-10.	-0.006	116.62	1.595s
EU-152	3857.05	964.11	114.	3.	0.002	532.77	1.609s
AC-228	3878.20	969.40	10.	76.	0.042	14.93	1.828
EU-154	3985.88	996.33	53.	-2.	-0.001	447.44	1.633s
PA-234M	4004.55	1001.00	56.	0.	0.000	1000.00	1.636s
EU-154	4019.65	1004.77	56.	0.	0.000	1000.00	1.639s
Co-56	4151.87	1037.84	15.	3.	0.001	326.84	1.664s
Cs-136	4192.77	1048.07	10.	8.	0.005	64.67	1.671s
RH-106	4201.93	1050.36	15.	6.	0.003	108.19	1.673s
BI-207	4255.11	1063.66	10.	15.	0.008	54.59	1.682s
Ga-68	4310.04	1077.40	10.	18.	0.010	45.25	1.692s
FE-59	4397.41	1099.25	35.	-16.	-0.009	86.59	1.708s
EU-152	4448.68	1112.07	61.	8.	0.005	135.33	1.717s
ZN-65	4462.56	1115.55	69.	8.	0.005	143.62	1.720s
BI-214	4481.51	1120.29	33.	17.	0.009	53.87	1.723D
Sc-46	4482.57	1120.55	78.	2.	0.001	594.60	1.723s
Ta-182	4485.56	1121.30	82.	1.	0.001	855.26	1.724s
CO-60	4693.21	1173.24	25.	-3.	-0.002	264.87	1.760s
Ta-182	4756.42	1189.05	25.	-11.	-0.006	82.56	1.771s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4885.79	1221.41	32.	-4.	-0.002	207.11	1.793s
Co-56	4953.23	1238.28	27.	14.	0.008	89.77	1.804s
NA-22	5098.13	1274.53	11.	6.	0.004	83.05	1.828s
EU-154	5098.19	1274.54	17.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	16.	-4.	-0.002	232.74	1.840s
CO-60	5329.85	1332.50	6.	6.	0.003	94.81	1.866s
AG-110M	5536.88	1384.30	16.	2.	0.001	482.02	1.899s
EU-152	5631.62	1408.00	11.	5.	0.003	145.77	1.914s
K-40	5845.07	1461.41	9.	224.	0.124	7.28	2.134
La-140	6383.73	1596.21	23.	-8.	-0.004	150.05	2.024s
SB-124	6762.39	1690.98	11.	-4.	-0.002	188.42	2.076s
BI-214	7056.06	1764.49	2.	27.	0.015	20.81	2.114s
Co-56	7083.46	1771.35	29.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	6.	-2.	-0.001	304.14	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-6.7869E+00					5.31E+01
			477.60	-6.787E+00	?(	2.132E+01	9.37E+01 1.05E+01 G
NA-22	C	6.1497E-01					9.50E+02
			1274.53	6.150E-01	?(	1.741E+00	8.31E+01 9.99E+01 G
K-40	N	2.2837E+02					4.66E+11
			1460.83	2.284E+02	(P	1.716E+01	7.28E+00 1.07E+01 G
Sc-46	F	-1.0232E+00					8.38E+01
			889.28	-1.023E+00	?(	3.092E+00	8.99E+01 1.00E+02 G
			1120.55	1.840E-01	+	3.818E+00	5.95E+02 1.00E+02 G
CR-51	F	-6.6869E+00					2.77E+01
			320.08	-6.687E+00	?(	2.288E+01	1.02E+02 9.94E+00 G
MN-54	C	-6.8026E-02					3.12E+02
			834.85	-6.803E-02	%(	1.862E+00	1.13E+03 1.00E+02 G
FE-59	F	-2.3815E+00					4.45E+01
			1099.25	-2.381E+00	?(	4.592E+00	8.66E+01 5.65E+01 G
			1291.60	-9.087E-01	+	4.850E+00	2.33E+02 4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 6.1944E-01					7.73E+01	
		846.77	-4.035E-01	?(P	2.026E+00	1.89E+02	9.99E+01 G
		1238.28	1.970E+00	?(P	3.856E+00	8.98E+01	6.61E+01 G
		1037.84	1.540E+00	?(P	1.211E+01	3.27E+02	1.41E+01 G
		1771.35	0.000E+00	-	2.301E+01	1.00E+03	1.55E+01 A
CO-58	C 5.1156E-01					7.09E+01	
		810.78	5.116E-01	?(	2.343E+00	1.33E+02	9.95E+01 G
CO-60	F 6.2343E-01					1.93E+03	
		1332.50	6.234E-01	?(P	1.387E+00	9.48E+01	1.00E+02 G
		1173.24	-3.136E-01	- P	2.376E+00	2.65E+02	9.99E+01 G
ZN-65	F 1.4489E+00					2.44E+02	
		1115.55	1.449E+00	?(	7.122E+00	1.44E+02	5.06E+01 G
NB-94	I 4.6536E-02					7.41E+06	
		702.63	-5.612E-01	?(	2.007E+00	1.48E+02	9.79E+01 G
		871.10	6.422E-01	&(P	1.450E+00	6.82E+01	9.99E+01 G
ZR-95	I 2.6837E-01					6.40E+01	
		756.73	2.684E-01	?(	2.806E+00	4.12E+02	5.45E+01 G
		724.20	-1.367E-01	%	6.614E+00	1.39E+03	4.42E+01 G
NB-95	I -8.3074E-02					6.40E+01	
		765.79	-8.307E-02	%(	2.970E+00	1.03E+03	9.98E+01 G
RU-103	I -2.5294E-01					3.93E+01	
		497.05	-2.529E-01	?(P	1.701E+00	2.74E+02	9.09E+01 G
		610.30	-6.942E-06	%	7.664E+01	3.24E+08	5.75E+00 GA
RH-106	I 9.3918E+00					3.74E+02	
		621.92	6.285E+00	*(P	1.946E+01	9.18E+01	9.93E+00 G
		1050.36	2.917E+01	&(P	1.098E+02	1.08E+02	1.56E+00 G
		511.86	1.912E+01	?	9.626E+00	2.80E+01	2.00E+01 GA
AG-108M	C 2.6080E-01					1.53E+05	
		433.94	2.608E-01	?(P	1.334E+00	2.00E+02	9.05E+01 G
		722.94	0.000E+00	-	3.226E+00	1.00E+03	9.08E+01 G
		614.28	-4.467E-07	%	4.931E+00	3.24E+08	8.98E+01 G
AG-110M	F 2.0671E-01					2.50E+02	
		884.68	-9.519E-03	%(P	3.272E+00	6.43E+03	7.27E+01 G
		657.76	2.158E-01	?(	1.835E+00	2.41E+02	9.46E+01 G
		937.49	-1.891E+00	+	6.402E+00	1.44E+02	3.44E+01 G
		1384.30	8.183E-01	?(P	9.167E+00	4.82E+02	2.43E+01 G
		763.94	-5.155E+00	+	1.124E+01	6.59E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	7.3147E-01					1.15E+02	
			391.69	7.315E-01	?(P	2.895E+00	1.17E+02	6.40E+01 G
SB-124	F	-8.2107E-01					6.02E+01	
			602.73	-8.211E-01	?(P	4.725E+00	1.16E+02	9.83E+01 G
			1690.98	-1.117E+00	+	4.742E+00	1.88E+02	4.78E+01 G
			722.79	-6.319E+00	+	2.856E+01	1.33E+02	1.08E+01 G
SB-125	I	2.3357E+00					1.01E+03	
			427.88	1.668E+00	?(P	4.232E+00	1.02E+02	2.96E+01 G
			600.50	-4.377E+00	+	2.644E+01	1.80E+02	1.79E+01 G
			635.89	9.575E-01	?(	1.310E+01	3.81E+02	1.13E+01 G
			463.37	5.712E+00	@(P	1.899E+01	9.88E+01	1.05E+01 G
I-131	I	-3.7099E-01					8.02E+00	
			364.48	-3.710E-01	?(P	1.782E+00	2.13E+02	8.17E+01 G
			284.30	6.014E-01	%	1.732E+01	1.08E+03	6.14E+00 G
			636.97	-7.441E+00	& P	2.539E+01	1.10E+02	7.17E+00 G
Gd-153	F	-2.5883E-01					2.42E+02	
			97.50	-2.588E-01	?(	4.126E+00	4.69E+02	3.00E+01 G
			103.20	-1.628E+00	+	6.445E+00	1.18E+02	2.18E+01 G
Ga-68	C	5.3676E+01					4.71E-02	
			1077.40	5.368E+01	?(	5.202E+01	4.52E+01	3.30E+00 G
Tc-99m	I	-4.0711E-01					2.51E-01	
			140.51	-4.071E-01	?(	1.817E+00	1.33E+02	8.93E+01 G
BA-133	F	5.2007E-01					3.85E+03	
			356.00	5.201E-01	&(	4.527E+00	2.58E+02	6.20E+01 G
			302.85	-1.934E+00	+	1.360E+01	2.09E+02	1.83E+01 G
			383.84	-6.370E+00	+	2.462E+01	1.15E+02	8.94E+00 GA
			80.99	-7.478E-01	& P	4.060E+00	1.76E+02	3.41E+01 GA
CS-134	I	4.2497E-01					7.54E+02	
			604.71	-3.204E-01	?(	4.522E+00	4.17E+02	9.76E+01 G
			795.87	9.167E-01	?(	2.091E+00	9.79E+01	8.55E+01 G
			569.32	-2.568E+00	&	1.166E+01	1.32E+02	1.54E+01 G
			801.95	-2.534E+00	+ P	2.083E+01	3.30E+02	8.69E+00 G
			563.24	4.102E+00	?(	1.703E+01	1.63E+02	8.35E+00 G
CS-137	I	-1.3652E+00					1.10E+04	
			661.66	-1.365E+00	?(P	3.082E+00	5.44E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	1.7060E+00					1.28E+01	
			537.26	1.706E+00	?(P	4.634E+00	1.06E+02	2.44E+01 G
			162.66	-6.558E+00	+	2.462E+01	1.12E+02	6.22E+00 G
			304.85	-5.708E-07	%	5.756E+01	2.96E+09	4.29E+00 G
La-140	I	4.9058E-01					1.28E+01	
			1596.21	-9.428E-01	?(	3.062E+00	1.50E+02	9.54E+01 G
			487.02	-1.696E+00	+ P	3.930E+00	8.00E+01	4.55E+01 G
			328.76	7.227E+00	(P	5.232E+00	3.04E+01	2.03E+01 G
			815.77	0.000E+00	-	1.077E+01	1.00E+03	2.33E+01 G
CE-144	I	-2.9118E+00					2.85E+02	
			133.54	-2.912E+00	?(P	1.619E+01	1.04E+02	1.11E+01 G
PM-144	C	3.0715E-01					3.63E+02	
			696.54	4.132E-01	?(	1.563E+00	1.53E+02	9.90E+01 G
			618.06	2.012E-01	?(	2.680E+00	3.86E+02	9.91E+01 G
EU-152	F	2.6900E+00					4.94E+03	
			344.29	1.123E+00	?(	9.284E+00	2.44E+02	2.65E+01 G
			1112.07	5.352E+00	?(	2.480E+01	1.35E+02	1.36E+01 G
			121.78	-8.588E-01	+	4.037E+00	1.40E+02	2.86E+01 G
			778.92	-8.738E+00	+	1.864E+01	9.32E+01	1.29E+01 G
			964.11	1.500E+00	?(P	2.759E+01	5.33E+02	1.46E+01 G
			244.69	5.670E+00	?(P	4.351E+01	2.29E+02	7.58E+00 G
			1408.00	2.680E+00	?	9.008E+00	1.46E+02	2.10E+01 GA
EU-154	I	-4.0791E+00					3.14E+03	
			873.23	-4.079E+00	?(	1.854E+01	1.32E+02	1.23E+01 G
			123.10	1.496E-01	+ P	2.741E+00	5.38E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.046E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.450E+01	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	&	1.653E+01	1.00E+03	1.80E+01 G
			996.33	-1.737E+00	+	2.735E+01	4.47E+02	1.06E+01 G
EU-155	I	-1.8783E+00					1.81E+03	
			105.31	-1.878E+00	(	9.466E+00	1.51E+02	2.12E+01 G
			86.54	-1.473E+00	+	8.084E+00	1.65E+02	3.07E+01 G
HF-181	F	6.2689E-01					4.24E+01	
			482.00	6.269E-01	?(	2.553E+00	1.20E+02	8.05E+01 G
			133.02	-9.262E-01	+	4.045E+00	1.31E+02	4.33E+01 G
			345.83	0.000E+00	-	1.668E+01	1.00E+03	1.51E+01 G
			136.30	0.000E+00	&	3.146E+01	1.00E+03	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	3.7438E-01					1.14E+02	
			1121.30	3.744E-01	?(	1.118E+01	8.55E+02	3.49E+01 G
			1221.41	-1.548E+00	+ P	1.015E+01	2.07E+02	2.70E+01 G
			1189.05	-6.289E+00	+ P	1.473E+01	8.26E+01	1.62E+01 G
Hg-203	F	-1.9368E-02					4.66E+01	
			279.20	-1.937E-02	%(P	1.761E+00	6.98E+03	8.15E+01 G
TL-208	N	1.1963E+01					6.98E+02	
			583.02	1.196E+01	*(P	1.501E+00	9.00E+00	8.45E+01 G
			277.28	4.084E+00	&	1.914E+01	1.37E+02	6.31E+00 G
			860.56	2.450E+01	+ P	4.140E+00	1.53E+01	1.24E+01 G
pm-146	C	2.3862E+00					2.02E+03	
			747.16	2.179E+00	?(P	4.849E+00	9.20E+01	3.40E+01 G
			735.72	2.700E+00	?(	6.012E+00	9.13E+01	2.25E+01 G
			453.88	-5.083E-01	- P	2.534E+00	1.50E+02	6.50E+01 G
y-88	F	-7.9738E-01					1.07E+02	
			898.04	-7.974E-01	?(	2.406E+00	1.29E+02	9.37E+01 G
			1836.06	-2.662E-01	+	1.880E+00	3.04E+02	9.92E+01 G
Cd-113m		-3.1803E+03					5.33E+03	
			263.70	-3.180E+03	?(	2.307E+04	2.12E+02	6.00E-03 K
Cf-251	T	1.9807E+00					3.28E+05	
			176.60	1.981E+00	?(	5.585E+00	1.05E+02	1.70E+01 G
			227.00	-7.296E-01	-	1.882E+01	9.36E+02	6.30E+00 GA
Cf-249	T	1.7174E+00					1.28E+05	
			387.95	7.638E-01	&(	2.970E+00	1.15E+02	6.60E+01 G
			333.44	5.775E+00	&(	6.304E+00	4.42E+01	1.55E+01 G
Sn-126		4.9860E+00					3.65E+07	
			87.57	4.128E+00	}	5.976E+00	2.37E+01	3.75E+01 GA
			64.28	4.986E+00	&(	1.842E+01	1.11E+02	9.70E+00 G
			86.94	4.986E+00	}	2.616E+01	8.70E+01	9.04E+00 GA
PB-210	N	2.6981E+01					8.14E+03	
			46.54	2.698E+01	(P	3.884E+01	5.36E+01	4.25E+00 G
PB-212	N	2.7744E+01					6.98E+02	
			238.63	2.774E+01	(P	3.106E+00	5.52E+00	4.33E+01 G
			300.03	5.694E+01	+ P	2.691E+01	2.25E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.6660E+01					5.84E+05	
			351.93	1.741E+01	*(P	3.019E+00	9.55E+00	3.76E+01 G
			295.09	1.520E+01	*(P	4.069E+00	1.43E+01	1.93E+01 G
			242.00	2.177E+01	+	1.677E+01	2.53E+01	7.43E+00 GA
BI-207	C	9.6458E-01					1.18E+04	
			569.70	4.520E-01	&(	1.224E+00	8.03E+01	9.77E+01 G
			1063.66	1.637E+00	?(P	1.982E+00	5.46E+01	7.45E+01 G
BI-212	N	5.0819E+01					6.98E+02	
			727.17	5.082E+01	(	1.183E+01	1.52E+01	7.55E+00 G
			785.42	-2.524E+01	-	1.661E+02	2.79E+02	1.28E+00 GA
BI-214	N	1.6853E+01					5.84E+05	
			609.31	1.685E+01	(P	2.237E+00	9.26E+00	4.61E+01 G
			1120.29	9.746E+00	- P	1.699E+01	5.39E+01	1.51E+01 G
			1764.49	2.228E+01	+ P	7.878E+00	2.08E+01	1.54E+01 G
BI-210M	T	-7.8585E-02					1.10E+09	
			265.83	-7.859E-02	%(	2.884E+00	1.06E+03	5.00E+01 G
			304.90	-8.747E-08	%	8.820E+00	2.96E+09	2.80E+01 G
AC-228	N	3.2506E+01					2.10E+03	
			911.07	3.238E+01	(P	4.702E+00	1.10E+01	2.90E+01 G
			968.97	3.370E+01	(P	7.588E+00	1.49E+01	1.75E+01 G
			338.32	3.107E+01	(P	7.339E+00	1.26E+01	1.20E+01 G
			93.35	8.093E+00	-	4.098E+01	1.52E+02	5.56E+00 XA
TH-227	N	1.0356E+00					7.95E+03	
			50.14	1.036E+00	?(	2.083E+01	6.96E+02	8.00E+00 G
			256.24	-7.099E+00	+ P	1.850E+01	2.06E+02	7.00E+00 G
TH-229	N	6.3499E+00					2.68E+06	
			193.51	1.984E+00	&(	2.707E+01	5.00E+02	4.40E+00 G
			210.85	1.278E+01	&(	4.633E+01	1.35E+02	2.99E+00 G
TH-234	N	2.2331E+01					1.63E+12	
			63.29	2.233E+01	(P	3.343E+01	4.62E+01	3.81E+00 G
			92.59	9.183E+00	- P	2.091E+01	6.90E+01	5.58E+00 G
PA-231	N	-1.8324E+01					1.20E+07	
			302.65	-1.832E+01	?(	8.891E+01	1.45E+02	2.88E+00 G
			300.07	-2.125E+01	+	1.086E+02	1.52E+02	2.46E+00 G
PA-233	C	-1.6884E+00					7.82E+08	
			312.01	-1.688E+00	?(	4.375E+00	1.01E+02	3.60E+01 G
			300.18	-8.434E+00	+	4.208E+01	1.49E+02	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   8.6361E-01                                     1.63E+12
                         131.29-2.213E+00 &(  9.458E+00 1.28E+02 1.80E+01 G
                         946.02-5.637E+00 +   1.543E+01 1.17E+02 1.34E+01 G
                         569.47 7.617E+00 &(  2.025E+01 7.93E+01 8.20E+00 G
                         883.24 0.000E+00 -   2.471E+01 1.00E+03 9.60E+00 G
                         880.53 1.976E+00 ?   3.872E+01 5.51E+02 6.00E+00 GA

U-235    N   1.7788E+00                                     2.57E+11
                         143.79 0.000E+00 &(  1.491E+01 1.00E+03 1.10E+01 G
                         205.33 5.670E+00 ?(P 2.337E+01 1.52E+02 5.01E+00 G
                         163.38-4.869E+00 +   2.967E+01 1.81E+02 5.08E+00 G

AM-241   T   2.8632E+00                                     1.58E+05
                          59.54 2.863E+00 *(P 3.388E+00 4.41E+01 3.59E+01 G

Ir-192   F  -2.4174E-02                                     7.40E+01
                         316.49-7.321E-01 ?(  2.468E+00 1.01E+02 8.70E+01 G
                         468.06 1.166E+00 &(  4.012E+00 1.02E+02 5.18E+01 G
                         308.44-1.089E-01 %   7.838E+00 2.12E+03 3.18E+01 G

Cs-136   F  -9.8351E-01                                     1.30E+01
                         818.50-9.835E-01 ?(  3.078E+00 9.31E+01 1.00E+02 G
                        1048.07 8.451E-01 +   1.795E+00 6.47E+01 8.00E+01 G
                         340.57 9.262E-01 +   5.059E+00 1.62E+02 4.69E+01 G

Np-239   T  -1.7324E+00                                     2.36E+00
                         103.70 8.585E-01 &   5.660E+00 1.96E+02 2.40E+01 X
                         106.13-1.732E+00  (  8.808E+00 1.52E+02 2.27E+01 G
                          99.50-2.552E+00 +   9.153E+00 1.07E+02 1.50E+01 X

Nd-147      -5.3746E+00                                     1.11E+01
                         531.00-5.375E+00 ?(  1.254E+01 9.40E+01 1.30E+01 G
                          91.10 1.574E+00 +   8.043E+00 1.53E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
```

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	153.	3.	0.002	696.42	1.036E+00	
BA-133	80.99	294.	-15.	-0.008	176.23	-7.478E-01	P
EU-155	86.54	1047.	-28.	-0.016	164.69	-1.473E+00	
Nd-147	91.10	916.	28.	0.016	153.31	1.574E+00	
Gd-153	97.50	273.	-5.	-0.003	469.47	-2.588E-01	
Np-239	99.50	341.	-25.	-0.014	107.44	-2.552E+00	
Gd-153	103.20	362.	-23.	-0.013	118.44	-1.628E+00	
Np-239	103.70	338.	13.	0.007	195.87	8.585E-01	
EU-155	105.31	754.	-26.	-0.014	151.05	-1.878E+00	
Np-239	106.13	749.	-26.	-0.014	152.37	-1.732E+00	
EU-152	121.78	237.	-16.	-0.009	139.73	-8.588E-01	
EU-154	123.10	221.	4.	0.002	537.63	1.496E-01	P
PA-234	131.29	506.	-25.	-0.014	128.01	-2.213E+00	
HF-181	133.02	531.	-25.	-0.014	130.81	-9.262E-01	
CE-144	133.54	557.	-20.	-0.011	104.35	-2.912E+00	P
CO-57	136.47	589.	-27.	-0.015	130.68	-3.998E+00	
Tc-99m	140.51	407.	-22.	-0.012	133.37	-4.071E-01	
Ba-140	162.66	318.	-23.	-0.013	112.31	-6.558E+00	
U-235	163.38	306.	-14.	-0.008	180.99	-4.869E+00	
Cf-251	176.60	107.	18.	0.010	104.62	1.981E+00	
TH-229	193.51	147.	4.	0.002	499.65	1.984E+00	
U-235	205.33	128.	13.	0.007	151.98	5.670E+00	P
TH-229	210.85	173.	18.	0.010	134.73	1.278E+01	
Cf-251	227.00	110.	-2.	-0.001	935.86	-7.296E-01	
EU-152	244.69	804.	18.	0.010	229.44	5.670E+00	P
TH-227	256.24	107.	-20.	-0.011	206.34	-7.099E+00	P
Cd-113m	263.70	117.	-7.	-0.004	212.13	-3.180E+03	
PA-231	300.07	369.	-18.	-0.010	152.41	-2.125E+01	
PA-233	300.18	351.	-18.	-0.010	148.73	-8.434E+00	
PA-231	302.65	333.	-18.	-0.010	144.63	-1.832E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	302.85	315.	-12.	-0.007	208.69	-1.934E+00	
PA-233	312.01	115.	-20.	-0.011	101.14	-1.688E+00	
Ir-192	316.49	214.	-21.	-0.012	100.79	-7.321E-01	
CR-51	320.08	237.	-22.	-0.012	102.34	-6.687E+00	
La-140	328.76	45.	47.	0.026	30.36	7.227E+00	P
Cf-249	333.44	37.	28.	0.016	44.18	5.775E+00	
Cs-136	340.57	232.	14.	0.008	161.97	9.262E-01	
EU-152	344.29	246.	9.	0.005	244.15	1.123E+00	
BA-133	356.00	305.	10.	0.005	257.65	5.201E-01	
I-131	364.48	74.	-9.	-0.005	212.86	-3.710E-01	P
BA-133	383.84	162.	-16.	-0.009	114.91	-6.370E+00	
Cf-249	387.95	124.	14.	0.008	115.30	7.638E-01	
SN-113	391.69	109.	13.	0.007	117.14	7.315E-01	P
SB-125	427.88	40.	13.	0.007	101.59	1.668E+00	P
AG-108M	433.94	36.	6.	0.003	200.24	2.608E-01	P
pm-146	453.88	65.	-8.	-0.004	149.68	-5.083E-01	P
SB-125	463.37	94.	14.	0.008	98.79	5.712E+00	P
Ir-192	468.06	101.	14.	0.008	102.14	1.166E+00	
BE-7	477.59	115.	-17.	-0.009	93.68	-6.787E+00	
HF-181	482.00	94.	12.	0.007	120.17	6.269E-01	
La-140	487.02	68.	-18.	-0.010	80.02	-1.696E+00	P
RU-103	497.05	48.	-5.	-0.003	273.54	-2.529E-01	P
RH-106	511.86	73.	85.	0.047	27.98	1.912E+01	
Nd-147	531.00	48.	-15.	-0.008	94.04	-5.375E+00	
Ba-140	537.26	21.	9.	0.005	105.75	1.706E+00	P
CS-134	563.24	32.	7.	0.004	162.67	4.102E+00	
CS-134	569.32	52.	-8.	-0.004	132.29	-2.568E+00	
PA-234	569.47	44.	13.	0.007	79.32	7.617E+00	
BI-207	569.70	21.	9.	0.005	80.30	4.520E-01	
SB-125	600.50	363.	-15.	-0.008	179.77	-4.377E+00	
SB-124	602.73	348.	-16.	-0.009	116.12	-8.211E-01	P
CS-134	604.71	312.	-6.	-0.003	416.71	-3.204E-01	
PM-144	618.06	104.	4.	0.002	385.89	2.012E-01	
RH-106	621.92	52.	12.	0.007	91.77	6.285E+00	P
SB-125	635.89	28.	2.	0.001	380.79	9.575E-01	
I-131	636.97	44.	-10.	-0.005	110.10	-7.441E+00	P
AG-110M	657.76	37.	4.	0.002	241.38	2.158E-01	
CS-137	661.66	90.	-21.	-0.012	54.37	-1.365E+00	P
PM-144	696.54	26.	7.	0.004	153.42	4.132E-01	
NB-94	702.63	43.	-9.	-0.005	147.64	-5.612E-01	
SB-124	722.79	108.	-11.	-0.006	133.23	-6.319E+00	
pm-146	735.72	17.	10.	0.006	91.29	2.700E+00	
pm-146	747.16	26.	12.	0.007	92.01	2.179E+00	P
ZR-95	756.73	22.	2.	0.001	412.43	2.684E-01	
AG-110M	763.94	63.	-18.	-0.010	65.94	-5.155E+00	
PA-234M	766.41	113.	-12.	-0.007	130.23	-2.548E+02	
EU-152	778.92	56.	-18.	-0.010	93.19	-8.738E+00	
CS-134	795.87	28.	12.	0.007	97.89	9.167E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	801.95	28.	-3.	-0.002	329.69	-2.534E+00	P
CO-58	810.78	48.	8.	0.004	133.23	5.116E-01	
Cs-136	818.50	86.	-15.	-0.008	93.10	-9.835E-01	
Co-56	846.77	33.	-6.	-0.003	188.90	-4.035E-01	P
NB-94	871.10	15.	9.	0.005	68.17	6.422E-01	P
EU-154	873.23	40.	-7.	-0.004	131.81	-4.079E+00	
PA-234	880.53	41.	2.	0.001	551.00	1.976E+00	
Sc-46	889.28	75.	-14.	-0.008	89.93	-1.023E+00	
y-88	898.04	37.	-10.	-0.006	129.23	-7.974E-01	
AG-110M	937.49	33.	-9.	-0.005	143.96	-1.891E+00	
PA-234	946.02	28.	-10.	-0.006	116.62	-5.637E+00	
EU-152	964.11	114.	3.	0.002	532.77	1.500E+00	P
EU-154	996.33	53.	-2.	-0.001	447.44	-1.737E+00	
Co-56	1037.84	15.	3.	0.001	326.84	1.540E+00	P
Cs-136	1048.07	10.	8.	0.005	64.67	8.451E-01	
RH-106	1050.36	15.	6.	0.003	108.19	2.917E+01	P
BI-207	1063.66	10.	15.	0.008	54.59	1.637E+00	P
FE-59	1099.25	35.	-16.	-0.009	86.59	-2.381E+00	
EU-152	1112.07	61.	8.	0.005	135.33	5.352E+00	
ZN-65	1115.55	69.	8.	0.005	143.62	1.449E+00	
Sc-46	1120.55	78.	2.	0.001	594.60	1.840E-01	
CO-60	1173.24	25.	-3.	-0.002	264.87	-3.136E-01	P
Co-56	1238.28	27.	14.	0.008	89.77	1.970E+00	P
NA-22	1274.53	11.	6.	0.004	83.05	6.150E-01	
FE-59	1291.60	16.	-4.	-0.002	232.74	-9.087E-01	
CO-60	1332.50	6.	6.	0.003	94.81	6.234E-01	P
AG-110M	1384.30	16.	2.	0.001	482.02	8.183E-01	P
EU-152	1408.00	11.	5.	0.003	145.77	2.680E+00	
La-140	1596.21	23.	-8.	-0.004	150.05	-9.428E-01	
SB-124	1690.98	11.	-4.	-0.002	188.42	-1.117E+00	
y-88	1836.06	6.	-2.	-0.001	304.14	-2.662E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-6.7869E+00	-6.7869E+00	9.368E+01%	2.13E+01
NA-22	#A	6.1497E-01	6.1497E-01	8.305E+01%	1.74E+00
K-40		2.2837E+02	2.2837E+02	7.281E+00%	1.72E+01
Sc-46	#A	-1.0232E+00	-1.0232E+00	8.993E+01%	3.09E+00
CR-51	#A	-6.6869E+00	-6.6869E+00	1.023E+02%	2.29E+01
MN-54	#A	-6.8026E-02	-6.8026E-02	1.127E+03%	1.86E+00
FE-59	#A	-2.3815E+00	-2.3815E+00	8.659E+01%	4.59E+00
Co-56	#A	6.1944E-01	6.1944E-01	8.977E+01%	2.03E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.39E+00

CO-58	#A	5.1155E-01	5.1156E-01	1.332E+02%	2.34E+00
CO-60	#A	6.2343E-01	6.2343E-01	9.481E+01%	1.39E+00
ZN-65	#A	1.4489E+00	1.4489E+00	1.436E+02%	7.12E+00
NB-94	#A	4.6536E-02	4.6536E-02	6.817E+01%	2.01E+00
ZR-95	#A	2.6837E-01	2.6837E-01	4.124E+02%	2.81E+00
NB-95	#A	-8.3074E-02	-8.3074E-02	1.026E+03%	2.97E+00
RU-103	#A	-2.5294E-01	-2.5294E-01	2.735E+02%	1.70E+00
RH-106	#A	9.3918E+00	9.3918E+00	7.093E+01%	1.95E+01
AG-108M	#A	2.6080E-01	2.6080E-01	2.002E+02%	1.33E+00
AG-110M	#A	2.0671E-01	2.0671E-01	2.414E+02%	3.27E+00
SN-113	#A	7.3147E-01	7.3147E-01	1.171E+02%	2.90E+00
SB-124	#A	-8.2107E-01	-8.2107E-01	1.161E+02%	4.73E+00
SB-125	#A	2.3357E+00	2.3357E+00	9.879E+01%	4.23E+00
I-131	#A	-3.7098E-01	-3.7099E-01	2.129E+02%	1.78E+00
Gd-153	#A	-2.5883E-01	-2.5883E-01	4.695E+02%	4.13E+00
Ga-68	#	5.3402E+01	5.3676E+01	4.525E+01%	5.20E+01
Tc-99m	#A	-4.0672E-01	-4.0711E-01	1.334E+02%	1.82E+00
BA-133	#A	5.2007E-01	5.2007E-01	2.577E+02%	4.53E+00
CS-134	#A	4.2497E-01	4.2497E-01	9.789E+01%	4.52E+00
CS-137	#A	-1.3652E+00	-1.3652E+00	5.437E+01%	3.08E+00
CE-139	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.91E+00
Ba-140	#A	1.7060E+00	1.7060E+00	1.057E+02%	4.63E+00
La-140	#A	4.9057E-01	4.9058E-01	3.036E+01%	3.06E+00
CE-141	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.41E+00
CE-144	#A	-2.9118E+00	-2.9118E+00	1.044E+02%	1.62E+01
PM-144	#A	3.0715E-01	3.0715E-01	1.534E+02%	1.56E+00
EU-152	#A	2.6900E+00	2.6900E+00	1.353E+02%	9.28E+00
EU-154	#A	-4.0791E+00	-4.0791E+00	1.318E+02%	1.85E+01
EU-155	#A	-1.8783E+00	-1.8783E+00	1.511E+02%	9.47E+00
HF-181	#A	6.2689E-01	6.2689E-01	1.202E+02%	2.55E+00
Ta-182	#A	3.7438E-01	3.7438E-01	8.553E+02%	1.12E+01
Hg-203	#A	-1.9368E-02	-1.9368E-02	6.979E+03%	1.76E+00
TL-208		1.1963E+01	1.1963E+01	8.998E+00%	1.50E+00
pm-146	#A	2.3862E+00	2.3862E+00	6.481E+01%	4.85E+00
y-88	#A	-7.9738E-01	-7.9738E-01	1.292E+02%	2.41E+00
Cd-113m	#A	-3.1803E+03	-3.1803E+03	2.121E+02%	2.31E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.99E+01
Cf-251	#A	1.9807E+00	1.9807E+00	1.046E+02%	5.58E+00
Cf-249	#A	1.7174E+00	1.7174E+00	4.418E+01%	2.97E+00
Sn-126	#A	4.9860E+00	4.9860E+00	1.106E+02%	1.84E+01
PB-210	A	2.6981E+01	2.6981E+01	5.365E+01%	3.88E+01
PB-212	#	2.7744E+01	2.7744E+01	5.517E+00%	3.11E+00
PB-214		1.6660E+01	1.6660E+01	8.589E+00%	3.02E+00
BI-207	#A	9.6458E-01	9.6458E-01	4.855E+01%	1.22E+00
BI-212		5.0819E+01	5.0819E+01	1.516E+01%	1.18E+01
BI-214		1.6853E+01	1.6853E+01	9.263E+00%	2.24E+00
BI-210M	#A	-7.8585E-02	-7.8585E-02	1.062E+03%	2.88E+00
AC-228		3.2506E+01	3.2506E+01	7.463E+00%	4.70E+00
TH-227	#A	1.0356E+00	1.0356E+00	6.964E+02%	2.08E+01

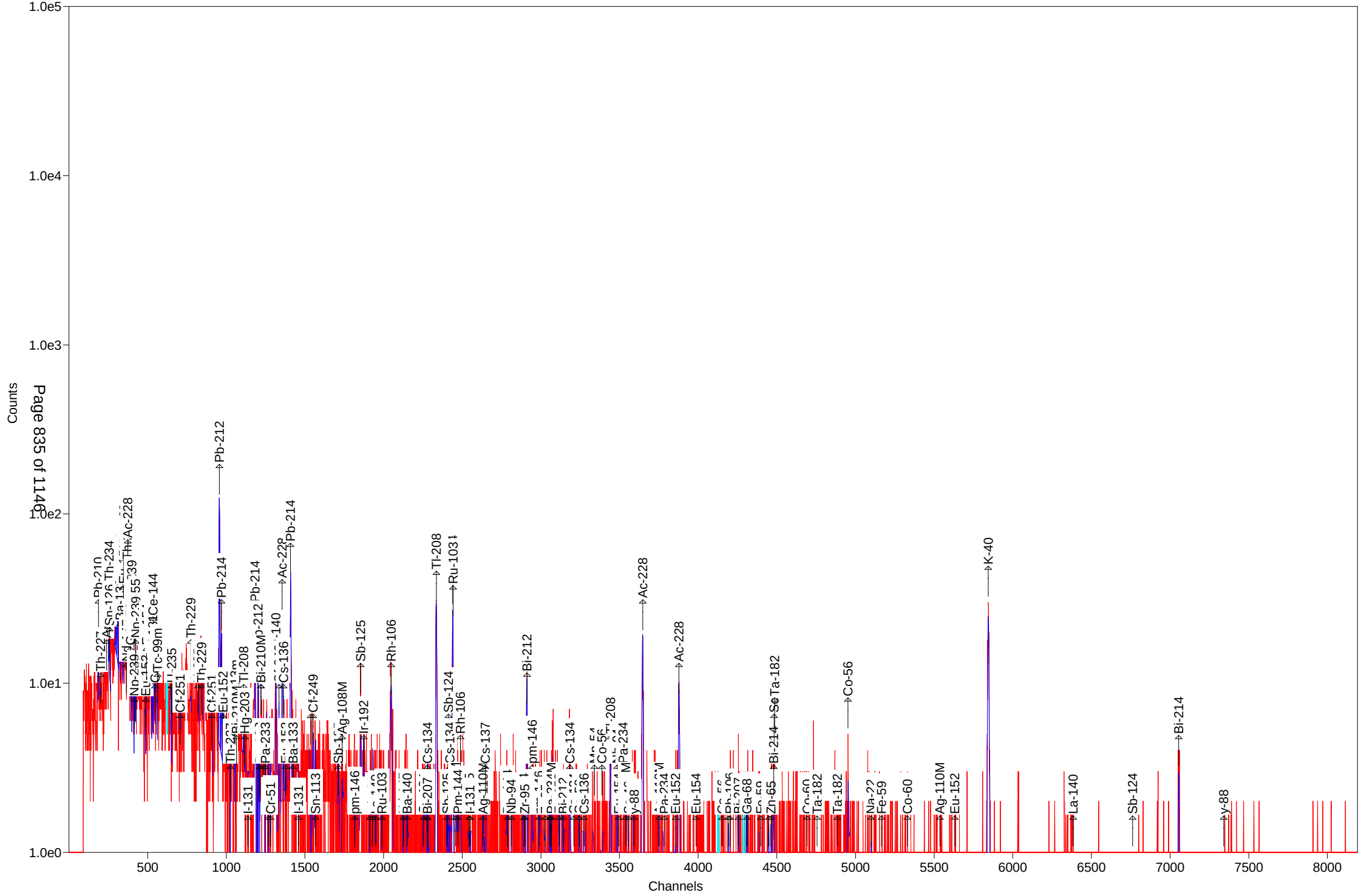
TH-229 #A	6.3499E+00	6.3499E+00	1.347E+02%		2.71E+01
TH-234 A	2.2331E+01	2.2331E+01	4.622E+01%		3.34E+01
PA-231 #A	-1.8324E+01	-1.8324E+01	1.446E+02%		8.89E+01
PA-233 #A	-1.6884E+00	-1.6884E+00	1.011E+02%		4.38E+00
PA-234 #A	8.6361E-01	8.6361E-01	7.530E+01%		9.46E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		3.55E+02
U-235 #A	1.7788E+00	1.7788E+00	1.520E+02%		1.49E+01
AM-241 #A	2.8632E+00	2.8632E+00	4.405E+01%		3.39E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.93E+01
Ir-192 #A	-2.4174E-02	-2.4174E-02	7.175E+01%		2.47E+00
Cs-136 #A	-9.8350E-01	-9.8351E-01	9.310E+01%		3.08E+00
Np-239 #A	-1.7322E+00	-1.7324E+00	1.524E+02%		8.81E+00
Nd-147 #A	-5.3745E+00	-5.3746E+00	9.404E+01%		1.25E+01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 4.371E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 4.3709070E+02 Bq/Sample

264535_Gamma_160-18554-A-18-B. 5_Gamma_20161670.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20162142

Sample Description: 264535_Gamma_160-18554-A-19-B
Detector: Detector # 7
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-19-B

Decay to Time: 9/1/2016 13:25 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:25:19 Real Time: 1829 sec
Analysis Time: 9/1/2016 13:56 Dead Time: 1.56 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-31_1448.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.964E+00	175.2	3.441E+00	3.442E+00	1.565E+01
NA-22	-2.238E-02	2264.9	5.068E-01	5.068E-01	1.847E+00
K-40	2.171E+02	5.8	1.258E+01	1.678E+01	7.938E+00
Sc-46	-7.615E-01	78.7	5.995E-01	6.008E-01	2.174E+00
CR-51	-1.025E-02	29979.9	3.074E+00	3.074E+00	1.944E+01
MN-54	3.322E-01	134.9	4.480E-01	4.483E-01	1.096E+00
FE-59	-7.266E-01	187.5	1.363E+00	1.363E+00	3.018E+00
Co-56	8.211E-01	87.0	7.147E-01	7.159E-01	7.953E-01
CO-57	8.491E-02	335.3	2.847E-01	2.847E-01	9.638E-01
CO-58	-2.956E-02	2739.4	8.099E-01	8.099E-01	1.579E+00
CO-60	5.720E-01	77.6	4.439E-01	4.448E-01	1.294E+00
ZN-65	-1.682E+00	110.1	1.851E+00	1.853E+00	6.240E+00
NB-94	3.877E-01	160.5	6.222E-01	6.225E-01	1.448E+00
ZR-95	7.701E-02	1378.4	1.061E+00	1.061E+00	2.534E+00
NB-95	5.154E-01	111.9	5.768E-01	5.774E-01	1.952E+00
RU-103	5.427E-02	868.6	4.714E-01	4.714E-01	1.160E+00
RH-106	4.288E+00	222.5	9.542E+00	9.544E+00	3.214E+01
AG-108M	3.460E-01	90.5	3.130E-01	3.135E-01	7.780E-01
AG-110M	5.120E-01	27.7	1.420E-01	1.444E-01	2.439E+00
SN-113	5.519E-01	117.9	6.508E-01	6.514E-01	2.192E+00
SB-124	5.198E-01	80.5	4.185E-01	4.194E-01	3.315E+00
SB-125	2.727E+00	34.1	9.301E-01	9.405E-01	3.145E+00
I-131	-8.124E-02	571.9	4.646E-01	4.646E-01	1.174E+00
Gd-153	-9.137E-01	140.7	1.285E+00	1.286E+00	4.286E+00
Ga-68	1.815E+01	89.8	1.630E+01	1.634E+01	3.654E+01
Tc-99m	2.931E-01	120.5	3.531E-01	3.535E-01	1.180E+00
BA-133	-2.446E-01	424.0	1.037E+00	1.037E+00	3.498E+00
CS-134	4.585E-01	81.2	3.723E-01	3.730E-01	3.357E+00
CS-137	-4.857E-01	139.8	6.790E-01	6.795E-01	2.304E+00
CE-139	3.276E-01	111.2	3.642E-01	3.655E-01	1.217E+00
Ba-140	5.924E-01	278.0	1.647E+00	1.647E+00	4.058E+00
La-140	1.496E-01	110.5	1.653E-01	1.655E-01	1.630E+00
CE-141	-4.562E-01	126.0	5.746E-01	5.751E-01	1.541E+00

CE-144	-2.705E+00	120.1	3.249E+00	3.252E+00	1.083E+01
PM-144	-6.559E-02	994.4	6.522E-01	6.522E-01	1.535E+00
EU-152	6.181E-01	101.2	6.258E-01	6.266E-01	7.759E+00
EU-154	2.808E+00	75.8	2.129E+00	2.134E+00	1.366E+01
EU-155	0.000E+00	1.#INF	9.389E-01	9.389E-01	6.294E+00
HF-181	-5.437E-01	83.5	4.542E-01	4.551E-01	2.099E+00
Ta-182	-1.939E+00	135.0	2.617E+00	2.619E+00	8.877E+00
Hg-203	3.732E-01	98.4	3.673E-01	3.679E-01	1.232E+00
TL-208	7.847E+00	8.9	7.010E-01	8.106E-01	9.614E-01
pm-146	6.364E-01	90.9	5.786E-01	5.796E-01	3.815E+00
y-88	3.855E-01	40.8	1.574E-01	1.586E-01	1.237E+00
Cd-113m	-5.779E+03	79.3	4.585E+03	4.600E+03	1.527E+04
Cd-109	2.800E+00	456.2	1.277E+01	1.277E+01	4.274E+01
Cf-251	-1.710E+00	107.5	1.837E+00	1.844E+00	4.686E+00
Cf-249	8.475E-01	77.2	6.543E-01	6.557E-01	2.020E+00
Sn-126	3.383E+00	116.3	3.935E+00	3.939E+00	1.315E+01
PB-210	2.970E+01	34.8	1.033E+01	1.048E+01	2.652E+01
PB-212	2.470E+01	4.3	1.057E+00	1.916E+00	1.694E+00
PB-214	1.874E+01	6.7	1.252E+00	1.586E+00	2.186E+00
BI-207	2.819E-01	161.3	4.548E-01	4.550E-01	1.170E+00
BI-212	6.313E+00	99.9	6.307E+00	6.316E+00	2.133E+01
BI-214	1.723E+01	8.0	1.381E+00	1.646E+00	1.968E+00
BI-210M	5.764E-01	99.3	5.722E-01	5.732E-01	1.919E+00
AC-228	2.429E+01	6.5	1.587E+00	2.013E+00	3.590E+00
TH-227	-5.667E+00	129.6	7.345E+00	7.352E+00	2.455E+01
TH-229	3.627E+00	192.6	6.984E+00	6.990E+00	1.800E+01
TH-234	1.607E+01	24.7	3.965E+00	4.053E+00	2.208E+01
PA-231	0.000E+00	1.#INF	2.451E+00	2.451E+00	6.471E+01
PA-233	0.000E+00	1.#INF	4.235E-01	4.235E-01	5.252E+00
PA-234	7.393E-01	75.6	5.588E-01	5.601E-01	6.647E+00
PA-234M	1.037E+02	57.8	5.990E+01	6.013E+01	2.000E+02
U-235	1.830E+00	114.0	2.086E+00	2.088E+00	9.739E+00
AM-241	-1.257E+00	65.4	8.222E-01	8.248E-01	3.673E+00
Np-237	2.733E-01	1368.7	3.740E+00	3.740E+00	1.253E+01
Ir-192	2.769E-01	108.2	2.997E-01	3.002E-01	2.199E+00
Cs-136	2.579E-01	78.7	2.031E-01	2.036E-01	1.347E+00
Np-239	1.177E+00	144.8	1.704E+00	1.705E+00	5.683E+00
Nd-147	-2.123E+00	185.9	3.947E+00	3.949E+00	9.503E+00
Total	5.183E+02				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-19-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20162142.An1

Acquisition information
Start time: 9/1/2016 1:25:19 PM
Live time: 1800
Real time: 1829
Dead time: 1.56 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:25:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-31_1448.PBC 7/31/2016 2:48:35 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1210

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.49	56.	34.79	0.83	2.477E-02	46.54	4.250	2.970E+01	PB210
63.56	81.	29.86	0.63	4.025E-02	63.29	3.810	2.268E+01	TH234
					64.28	9.700	1.137E+01	Sn126
74.77	284.	9.62	0.87	4.765E-02				
77.12	475.	6.38	0.87	4.889E-02				
87.23	148.	18.70	1.14	5.303E-02	86.49	13.100	1.186E+01	Np237
					86.54	30.700	5.060E+00	EU155
					86.94	9.040	1.714E+01	Sn126
					87.57	37.500	4.117E+00	Sn126
					88.04	3.790	4.062E+01	Cd109
93.03	200.	16.31	1.48	5.461E-02	92.59	5.584	3.216E+01	TH234
					93.35	5.561	3.653E+01	AC228
106.13	27.	144.82	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
121.78	24.	101.20	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.740E-01	CO57
122.06	7.	335.31	0.92	5.606E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	8.491E-02	CO57
140.51	24.	120.48	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	23.	111.16	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
185.61	94.	26.88	0.99	4.446E-02				
193.51	12.	192.59	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	21.	114.01	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.65	690.	4.61	1.08	3.602E-02	238.63	43.300	2.458E+01	PB212
242.03	117.	15.57	1.04	3.560E-02	242.00	7.430	2.449E+01	PB214
244.69	21.	219.17	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
265.83	17.	99.27	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.28	30.	42.16	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208
279.20	17.	98.42	1.08	3.154E-02	279.20	81.460	PBC<MDA	Hg203
295.21	212.	10.96	1.23	3.008E-02	295.09	19.300	2.026E+01	PB214
300.34	56.	27.46	0.77	2.966E-02	300.03	3.280	3.207E+01	PB212
					300.07	2.460	4.277E+01	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	14.	110.52	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	104.84	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.53	139.	11.50	1.16	2.676E-02	338.32	12.010	2.402E+01	AC228
352.00	315.	7.64	1.28	2.587E-02	351.93	37.600	1.797E+01	PB214
383.84	15.	107.65	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
387.95	15.	113.34	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	15.	117.91	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
433.94	6.	177.43	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
453.88	12.	111.44	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
463.37	36.	34.11	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	14.	108.24	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
497.05	2.	868.63	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	127.	18.60	2.56	1.870E-02	511.86	20.000	1.891E+01	RH106
537.26	5.	277.96	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
569.47	7.	161.97	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.718E+00	PA234
					569.70	97.740	2.281E-01	BI207
569.70	4.	261.09	1.37	1.703E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.525E+00	PA234
					569.70	97.740	1.279E-01	BI207
583.09	198.	8.93	1.12	1.668E-02	583.02	84.500	7.814E+00	TL208
600.50	14.	201.83	1.40	1.626E-02	600.50	17.860	PBC<MDA	SB125
609.39	225.	8.02	1.46	1.605E-02	609.31	46.090	1.687E+01	BI214
					610.30	5.750	1.354E+02	RU103
621.92	12.	222.53	1.42	1.576E-02	621.92	9.930	PBC<MDA	RH106
635.89	12.	70.65	1.43	1.546E-02	635.89	11.310	PBC<MDA	SB125
702.63	10.	160.48	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
722.79	12.	80.50	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.207E-01	AG108M
					723.36	20.220	2.340E+00	EU154
722.94	12.	90.46	1.51	1.380E-02	722.79	10.810	4.375E+00	SB124
					722.94	90.840	5.207E-01	AG108M
					723.36	20.220	2.340E+00	EU154
727.32	12.	99.90	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
735.72	13.	90.91	1.52	1.358E-02	735.72	22.500	PBC<MDA	pm146
765.79	12.	111.91	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.751E+02	PA234M
766.41	14.	75.74	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	2.057E+02	PA234M
795.87	12.	81.19	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
801.95	8.	151.72	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
815.77	2.	369.01	1.59	1.239E-02	815.77	23.280	PBC<MDA	La140
834.85	7.	134.86	1.61	1.213E-02	834.85	99.980	PBC<MDA	MN54
846.77	4.	157.77	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
858.49	30.	41.15	1.63	1.181E-02	860.56	12.420	1.131E+01	TL208
873.23	6.	184.08	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
880.53	10.	85.40	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
883.24	7.	133.40	1.65	1.154E-02	883.24	9.600	PBC<MDA	PA234
898.04	4.	272.30	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.26	144.	10.11	1.46	1.122E-02	911.07	29.000	2.451E+01	AC228
937.49	6.	168.87	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
964.11	8.	165.94	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.12	78.	13.43	1.49	1.062E-02	968.97	17.460	2.353E+01	AC228
996.33	11.	75.80	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1001.00	11.	87.27	1.75	1.031E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	177.93	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	10.	78.74	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	6.	189.55	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	9.	89.84	1.81	9.646E-03	1077.40	3.300	PBC<MDA	Ga68
1120.14	75.	14.79	1.71	9.311E-03	1120.29	15.100	2.944E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	11.	87.71	1.89	8.929E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	18.	87.04	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	6.	128.05	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	13.	27.74	2.04	7.678E-03	1384.30	24.290	3.872E+00	AG110M
1408.00	7.	88.65	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1460.89	305.	5.80	2.32	7.309E-03	1460.83	10.670	2.171E+02	K40
1764.56	31.	22.43	2.29	6.141E-03	1764.49	15.400	1.831E+01	BI214
1836.06	6.	40.82	2.33	5.919E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.63	74.79	229.	284.	5.949E+03	9.62	0.867	- sD
308.06	77.14	222.	475.	9.724E+03	6.38	0.869	- sD
742.06	185.61	146.	94.	2.111E+03	26.88	0.989	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.50	46.49	105.	56.	0.031	34.79	0.825s
TH-227	200.12	50.14	440.	-23.	-0.013	129.62	0.840
AM-241	237.70	59.54	334.	-30.	-0.017	65.39	0.850
TH-234	252.71	63.29	155.	51.	0.028	37.62	0.854D
Sn-126	256.68	64.28	381.	24.	0.013	116.30	0.856s
BA-133	323.52	80.99	350.	-31.	-0.017	96.71	0.874s
EU-155	345.74	86.54	1155.	-30.	-0.017	158.93	0.880s
Sn-126	347.33	86.94	1065.	29.	0.016	80.23	0.880D
Sn-126	349.85	87.57	1042.	95.	0.053	23.56	0.881D
Cd-109	351.73	88.04	1073.	10.	0.006	456.20	0.881A
Nd-147	363.97	91.10	1084.	0.	0.000	1000.00	0.885s
TH-234	369.93	92.59	280.	79.	0.044	31.93	0.886D
AC-228	372.97	93.35	1052.	25.	0.014	182.83	0.887s
Gd-153	389.57	97.50	728.	-27.	-0.015	140.66	0.892
Np-239	397.57	99.50	755.	-27.	-0.015	142.89	0.894s
Gd-153	412.38	103.20	783.	-28.	-0.015	144.81	0.898s
EU-155	420.83	105.31	811.	0.	0.000	1000.00	0.900s
Np-239	424.10	106.13	758.	27.	0.015	144.82	0.901s
EU-152	486.69	121.78	275.	24.	0.013	101.20	0.918s
CO-57	487.83	122.06	299.	7.	0.004	335.31	0.918s
EU-154	491.98	123.10	285.	-25.	-0.014	97.75	0.919s
PA-234	524.77	131.29	615.	-30.	-0.016	85.94	0.928s
HF-181	531.68	133.02	644.	-29.	-0.016	123.99	0.930
CE-144	533.74	133.54	612.	-29.	-0.016	120.11	0.930s
HF-181	544.79	136.30	641.	-30.	-0.016	122.52	0.933s
Tc-99m	561.63	140.51	420.	24.	0.014	120.48	0.938s
CE-141	581.35	145.44	209.	-21.	-0.012	125.95	0.943s
Ba-140	650.24	162.66	456.	-28.	-0.016	108.12	0.961s
U-235	653.11	163.38	486.	-30.	-0.017	100.91	0.962s
CE-139	663.01	165.85	315.	23.	0.013	111.16	0.965s
Cf-251	706.00	176.60	187.	-24.	-0.013	107.48	0.976s
TH-229	773.64	193.51	158.	12.	0.007	192.59	0.994
U-235	820.94	205.33	159.	21.	0.012	114.01	1.007s
TH-229	843.01	210.85	242.	-29.	-0.016	82.98	1.012s
PB-212	954.15	238.63	93.	693.	0.385	4.28	1.041D
PB-214	967.61	242.00	106.	117.	0.065	15.57	1.045D
EU-152	978.39	244.69	1087.	21.	0.012	219.17	1.048s
Cd-113m	1054.43	263.70	124.	-21.	-0.011	79.34	1.067
BI-210M	1062.96	265.83	135.	17.	0.009	99.27	1.070s
TL-208	1108.77	277.28	64.	30.	0.017	42.16	1.081D
Hg-203	1116.44	279.20	136.	17.	0.010	98.42	1.083s
I-131	1136.83	284.30	93.	-3.	-0.002	435.30	1.089s
PB-214	1180.49	295.21	70.	212.	0.118	10.96	1.227
PB-212	1201.00	300.34	46.	56.	0.031	27.46	0.769s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1199.92	300.07	460.	-18.	-0.010	166.21	1.105s
PA-233	1200.36	300.18	441.	-16.	-0.009	186.39	1.105s
PA-231	1210.24	302.65	425.	0.	0.000	1000.00	1.107s
Ba-140	1219.04	304.85	415.	0.	0.000	1000.00	1.110s
BI-210M	1219.23	304.90	415.	0.	0.000	1000.00	1.110s
Ir-192	1233.41	308.44	415.	0.	0.000	1000.00	1.113
PA-233	1247.69	312.01	415.	0.	0.000	1000.00	1.117s
Ir-192	1265.61	316.49	415.	0.	0.000	1000.00	1.122s
La-140	1314.69	328.76	116.	14.	0.008	110.52	1.134s
Cf-249	1333.41	333.44	144.	17.	0.009	104.84	1.139s
AC-228	1352.93	338.32	33.	144.	0.080	10.08	1.144D
Cs-136	1361.93	340.57	437.	-23.	-0.013	132.89	1.146s
EU-152	1376.80	344.29	415.	-23.	-0.013	129.08	1.150s
HF-181	1382.97	345.83	311.	-12.	-0.007	206.27	1.151s
PB-214	1407.67	352.00	58.	315.	0.175	7.64	1.280s
BA-133	1423.66	356.00	437.	-7.	-0.004	424.02	1.162s
I-131	1457.59	364.48	76.	-3.	-0.002	571.87	1.170s
BA-133	1535.03	383.84	121.	15.	0.008	107.65	1.189s
Cf-249	1551.47	387.95	136.	15.	0.008	113.34	1.193s
SN-113	1566.43	391.69	149.	15.	0.008	117.91	1.197s
AG-108M	1735.43	433.94	28.	6.	0.003	177.43	1.239s
pm-146	1815.20	453.88	40.	12.	0.006	111.44	1.258s
SB-125	1853.15	463.37	57.	36.	0.020	34.11	1.268s
Ir-192	1871.93	468.06	108.	14.	0.008	108.24	1.272s
BE-7	1910.07	477.60	145.	-7.	-0.004	175.18	1.282s
HF-181	1927.68	482.00	151.	-16.	-0.009	83.54	1.286s
La-140	1947.77	487.02	188.	-5.	-0.003	267.35	1.291s
RU-103	1987.91	497.05	52.	2.	0.001	868.63	1.301s
RH-106	2047.15	511.86	67.	127.	0.071	18.60	2.565s
Nd-147	2123.70	531.00	65.	-9.	-0.005	185.87	1.333s
Ba-140	2148.74	537.26	39.	5.	0.003	277.96	1.339s
CS-134	2252.65	563.24	70.	-18.	-0.010	74.05	1.364s
CS-134	2276.99	569.32	56.	-8.	-0.005	132.00	1.369s
PA-234	2277.59	569.47	58.	7.	0.004	161.97	1.370s
BI-207	2278.51	569.70	48.	4.	0.002	261.09	1.370s
TL-208	2332.05	583.09	22.	198.	0.110	8.93	1.124
SB-125	2401.71	600.50	378.	14.	0.008	201.83	1.399s
CS-134	2418.55	604.71	395.	0.	0.000	1000.00	1.403s
BI-214	2437.27	609.39	25.	225.	0.125	8.02	1.460s
RU-103	2440.91	610.30	395.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	395.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	395.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	355.	12.	0.007	222.53	1.419s
SB-125	2543.28	635.89	31.	12.	0.007	70.65	1.432s
I-131	2547.62	636.97	64.	-13.	-0.007	92.21	1.433s
AG-110M	2630.77	657.76	108.	-20.	-0.011	78.34	1.452s
CS-137	2646.36	661.66	115.	-11.	-0.006	139.80	1.455
PM-144	2785.90	696.54	61.	-2.	-0.001	994.38	1.487

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	2810.25	702.63	51.	10.	0.005	160.48	1.493s
SB-124	2890.87	722.79	39.	12.	0.007	80.50	1.511s
AG-108M	2891.48	722.94	51.	12.	0.007	90.46	1.511s
EU-154	2893.15	723.36	157.	-25.	-0.014	74.63	1.511s
ZR-95	2896.52	724.20	132.	-25.	-0.014	68.94	1.512s
BI-212	2908.41	727.17	63.	12.	0.007	99.90	1.515s
pm-146	2942.61	735.72	28.	13.	0.007	90.91	1.523s
AG-110M	3055.51	763.94	79.	-20.	-0.011	66.41	1.548s
NB-95	3062.89	765.79	86.	12.	0.007	111.91	1.549s
PA-234M	3065.38	766.41	51.	14.	0.008	75.74	1.550s
EU-152	3115.41	778.92	47.	-12.	-0.006	127.62	1.561s
BI-212	3141.41	785.42	61.	-18.	-0.010	101.14	1.567
CS-134	3183.20	795.87	43.	12.	0.007	81.19	1.576
CS-134	3207.54	801.95	65.	8.	0.004	151.72	1.581s
La-140	3262.82	815.77	24.	2.	0.001	369.01	1.593s
Cs-136	3273.74	818.50	34.	-2.	-0.001	387.53	1.596s
MN-54	3339.13	834.85	21.	7.	0.004	134.86	1.610s
Co-56	3386.82	846.77	10.	4.	0.002	157.77	1.620s
TL-208	3442.00	860.56	25.	30.	0.017	41.15	1.632s
NB-94	3484.13	871.10	48.	-3.	-0.002	331.66	1.641s
EU-154	3492.66	873.23	48.	6.	0.003	184.08	1.643s
PA-234	3521.86	880.53	31.	10.	0.006	85.40	1.649s
PA-234	3532.70	883.24	41.	7.	0.004	133.40	1.652s
AG-110M	3538.47	884.68	53.	-12.	-0.007	103.74	1.653s
Sc-46	3556.86	889.28	82.	-16.	-0.009	78.73	1.657s
y-88	3591.90	898.04	20.	4.	0.002	272.30	1.664s
AC-228	3644.79	911.26	15.	144.	0.080	10.11	1.455
AG-110M	3749.71	937.49	20.	6.	0.003	168.87	1.697s
EU-152	3856.18	964.11	94.	8.	0.005	165.94	1.719s
AC-228	3876.23	969.12	8.	78.	0.044	13.43	1.494
EU-154	3985.06	996.33	26.	11.	0.006	75.80	1.746s
PA-234M	4003.73	1001.00	37.	11.	0.006	87.27	1.750
EU-154	4018.84	1004.77	53.	6.	0.003	177.93	1.753s
Co-56	4151.10	1037.84	20.	0.	0.000	1000.00	1.780s
Cs-136	4192.02	1048.07	26.	10.	0.006	78.74	1.788
BI-207	4254.38	1063.66	27.	6.	0.004	189.55	1.801
Ga-68	4309.34	1077.40	11.	9.	0.005	89.84	1.812s
FE-59	4396.74	1099.25	32.	-7.	-0.004	187.54	1.829s
EU-152	4448.04	1112.07	131.	-14.	-0.008	116.42	1.839s
ZN-65	4461.92	1115.55	117.	-14.	-0.008	110.08	1.842s
BI-214	4480.28	1120.14	6.	75.	0.041	14.79	1.709
Sc-46	4481.94	1120.55	103.	-4.	-0.002	388.65	1.846
Ta-182	4484.94	1121.30	111.	-11.	-0.006	134.97	1.846
CO-60	4692.68	1173.24	16.	11.	0.006	87.71	1.886s
Ta-182	4755.93	1189.05	53.	-21.	-0.012	82.49	1.899
Co-56	4952.84	1238.28	43.	18.	0.010	87.04	1.936s
EU-154	5097.89	1274.54	29.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	46.	-20.	-0.011	78.99	1.975s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.71	1332.50	12.	6.	0.004	128.05	2.005s
AG-110M	5536.89	1384.30	0.	13.	0.007	27.74	2.042s
EU-152	5631.70	1408.00	6.	7.	0.004	88.65	2.059s
K-40	5843.26	1460.89	3.	305.	0.169	5.80	2.322
La-140	6384.49	1596.21	12.	-2.	-0.001	424.26	2.185s
SB-124	6763.55	1690.98	12.	-1.	-0.001	842.61	2.245s
BI-214	7057.56	1764.49	9.	31.	0.017	22.43	2.290
Co-56	7084.99	1771.35	43.	-3.	-0.002	252.15	2.294s
y-88	7343.81	1836.06	0.	6.	0.003	40.82	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.9641E+00				5.31E+01	
			477.60	-1.964E+00	?(P	1.565E+01 1.75E+02 1.05E+01	G
NA-22	C	-2.2378E-02				9.50E+02	
			1274.53	-2.238E-02	%(	1.847E+00 2.26E+03 9.99E+01	G
K-40	N	2.1709E+02				4.66E+11	
			1460.83	2.171E+02	(P	7.938E+00 5.80E+00 1.07E+01	G
Sc-46	F	-7.6148E-01				8.38E+01	
			889.28	-7.615E-01	?(P	2.174E+00 7.87E+01 1.00E+02	G
			1120.55	-2.221E-01	+	2.981E+00 3.89E+02 1.00E+02	G
CR-51	F	-1.0253E-02				2.77E+01	
			320.08	-1.025E-02	%(P	1.944E+01 3.00E+04 9.94E+00	G
MN-54	C	3.3218E-01				3.12E+02	
			834.85	3.322E-01	?(P	1.096E+00 1.35E+02 1.00E+02	G
FE-59	F	-7.2664E-01				4.45E+01	
			1099.25	-7.266E-01	?(	3.018E+00 1.88E+02 5.65E+01	G
			1291.60	-3.082E+00	& P	5.368E+00 7.90E+01 4.32E+01	G
Co-56	C	8.2107E-01				7.73E+01	
			846.77	2.015E-01	?(P	7.953E-01 1.58E+02 9.99E+01	G
			1238.28	1.758E+00	?(P	3.298E+00 8.70E+01 6.61E+01	G
			1037.84	0.000E+00	-	9.280E+00 1.00E+03 1.41E+01	G
			1771.35	-1.637E+00	+ P	1.947E+01 2.52E+02 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	8.4906E-02					2.72E+02	
			122.06	8.491E-02	*(	9.638E-01	3.35E+02	8.56E+01 G
			136.47	-1.731E-01	%	1.187E+01	2.04E+03	1.07E+01 G
CO-58	C	-2.9565E-02					7.09E+01	
			810.78	-2.956E-02	%(P	1.579E+00	2.74E+03	9.95E+01 G
CO-60	F	5.7196E-01					1.93E+03	
			1332.50	4.541E-01	?(P	1.294E+00	1.28E+02	1.00E+02 G
			1173.24	6.899E-01	?(P	1.340E+00	8.77E+01	9.99E+01 G
ZN-65	F	-1.6817E+00					2.44E+02	
			1115.55	-1.682E+00	?(	6.240E+00	1.10E+02	5.06E+01 G
NB-94	I	3.8767E-01					7.41E+06	
			702.63	3.877E-01	?(	1.448E+00	1.60E+02	9.79E+01 G
			871.10	-1.428E-01	-	1.666E+00	3.32E+02	9.99E+01 G
ZR-95	I	7.7008E-02					6.40E+01	
			756.73	7.701E-02	&(	2.534E+00	1.38E+03	5.45E+01 G
			724.20	-2.253E+00	+	5.142E+00	6.89E+01	4.42E+01 G
NB-95	I	5.1540E-01					6.40E+01	
			765.79	5.154E-01	?(	1.952E+00	1.12E+02	9.98E+01 G
RU-103	I	5.4269E-02					3.93E+01	
			497.05	5.427E-02	?(P	1.160E+00	8.69E+02	9.09E+01 G
			610.30	0.000E+00	-	5.746E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.2878E+00					3.74E+02	
			621.92	4.288E+00	?(	3.214E+01	2.23E+02	9.93E+00 G
			1050.36	-1.203E+00	%	1.125E+02	2.60E+03	1.56E+00 G
			511.86	1.891E+01	?	6.053E+00	1.86E+01	2.00E+01 GA
AG-108M	C	3.4598E-01					1.53E+05	
			433.94	1.706E-01	?(	7.780E-01	1.77E+02	9.05E+01 G
			722.94	5.207E-01	?(	1.589E+00	9.05E+01	9.08E+01 G
			614.28	0.000E+00	-	3.699E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.1200E-01					2.50E+02	
			884.68	-7.884E-01	?(P	2.439E+00	1.04E+02	7.27E+01 G
			657.76	-7.650E-01	+	1.997E+00	7.83E+01	9.46E+01 G
			937.49	8.871E-01	?(	3.482E+00	1.69E+02	3.44E+01 G
			1384.30	3.872E+00	?(	2.195E+00	2.77E+01	2.43E+01 G
			763.94	-3.822E+00	+	8.394E+00	6.64E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	5.5194E-01					1.15E+02	
			391.69	5.519E-01	?(	2.192E+00	1.18E+02	6.40E+01 G
SB-124	F	5.1985E-01					6.02E+01	
			602.73	9.575E-02	%(	3.315E+00	1.02E+03	9.83E+01 G
			1690.98	-1.820E-01	+	3.431E+00	8.43E+02	4.78E+01 G
			722.79	4.375E+00	?(	1.182E+01	8.05E+01	1.08E+01 G
SB-125	I	2.7271E+00					1.01E+03	
			427.88	7.602E-05	%(P	3.145E+00	1.60E+06	2.96E+01 G
			600.50	2.632E+00	?(	1.786E+01	2.02E+02	1.79E+01 G
			635.89	3.874E+00	?(	9.106E+00	7.07E+01	1.13E+01 G
			463.37	9.360E+00	(	9.882E+00	3.41E+01	1.05E+01 G
I-131	I	-8.1239E-02					8.02E+00	
			364.48	-8.124E-02	@(	1.174E+00	5.72E+02	8.17E+01 G
			284.30	-8.497E-01	+ P	1.388E+01	4.35E+02	6.14E+00 G
			636.97	-6.455E+00	&	2.006E+01	9.22E+01	7.17E+00 G
Gd-153	F	-9.1366E-01					2.42E+02	
			97.50	-9.137E-01	(	4.286E+00	1.41E+02	3.00E+01 G
			103.20	-1.250E+00	+	6.034E+00	1.45E+02	2.18E+01 G
Ga-68	C	1.8149E+01					4.71E-02	
			1077.40	1.815E+01	?(	3.654E+01	8.98E+01	3.30E+00 G
Tc-99m	I	2.9311E-01					2.51E-01	
			140.51	2.931E-01	?(	1.180E+00	1.20E+02	8.93E+01 G
BA-133	F	-2.4458E-01					3.85E+03	
			356.00	-2.446E-01	?(	3.498E+00	4.24E+02	6.20E+01 G
			302.85	1.545E-01	&	1.004E+01	1.92E+03	1.83E+01 G
			383.84	3.858E+00	?	1.398E+01	1.08E+02	8.94E+00 GA
			80.99	-1.009E+00	+ P	2.893E+00	9.67E+01	3.41E+01 GA
CS-134	I	4.5854E-01					7.54E+02	
			604.71	0.000E+00	&(	3.357E+00	1.00E+03	9.76E+01 G
			795.87	6.283E-01	?(	1.712E+00	8.12E+01	8.55E+01 G
			569.32	-1.767E+00	+	7.989E+00	1.32E+02	1.54E+01 G
			801.95	3.939E+00	?(	2.051E+01	1.52E+02	8.69E+00 G
			563.24	-6.783E+00	+ P	1.608E+01	7.41E+01	8.35E+00 G
CS-137	I	-4.8567E-01					1.10E+04	
			661.66	-4.857E-01	(	2.304E+00	1.40E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.2761E-01					1.38E+02	
			165.85	3.276E-01	?(	1.217E+00	1.11E+02	7.99E+01 G
Ba-140	I	5.9236E-01					1.28E+01	
			537.26	5.924E-01	@(P	4.058E+00	2.78E+02	2.44E+01 G
			162.66	-5.230E+00	+	1.885E+01	1.08E+02	6.22E+00 G
			304.85	0.000E+00	-	4.321E+01	1.00E+03	4.29E+00 G
La-140	I	1.4960E-01					1.28E+01	
			1596.21	-1.729E-01	?(	1.630E+00	4.24E+02	9.54E+01 G
			487.02	-3.045E-01	& P	4.162E+00	2.67E+02	4.55E+01 G
			328.76	1.415E+00	&(P	5.273E+00	1.11E+02	2.03E+01 G
			815.77	3.673E-01	?(P	4.898E+00	3.69E+02	2.33E+01 G
CE-141	I	-4.5622E-01					3.25E+01	
			145.44	-4.562E-01	&(	1.541E+00	1.26E+02	4.82E+01 G
CE-144	I	-2.7047E+00					2.85E+02	
			133.54	-2.705E+00	?(	1.083E+01	1.20E+02	1.11E+01 G
PM-144	C	-6.5589E-02					3.63E+02	
			696.54	-6.559E-02	&(	1.535E+00	9.94E+02	9.90E+01 G
			618.06	0.000E+00	+	3.372E+00	1.00E+03	9.91E+01 G
EU-152	F	6.1814E-01					4.94E+03	
			344.29	-1.798E+00	&(	7.759E+00	1.29E+02	2.65E+01 G
			1112.07	-6.210E+00	+	2.438E+01	1.16E+02	1.36E+01 G
			121.78	8.203E-01	&	2.772E+00	1.01E+02	2.86E+01 G
			778.92	-3.880E+00	+	1.149E+01	1.28E+02	1.29E+01 G
			964.11	3.016E+00	?(	1.710E+01	1.66E+02	1.46E+01 G
			244.69	4.444E+00	?(P	3.250E+01	2.19E+02	7.58E+00 G
			1408.00	2.449E+00	? P	4.882E+00	8.87E+01	2.10E+01 GA
EU-154	I	2.8083E+00					3.14E+03	
			873.23	2.136E+00	&(	1.366E+01	1.84E+02	1.23E+01 G
			123.10	-6.075E-01	-	1.981E+00	9.77E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.274E+00	1.00E+03	3.52E+01 G
			723.36	-4.911E+00	+	1.217E+01	7.46E+01	2.02E+01 G
			1004.77	1.786E+00	?(	1.100E+01	1.78E+02	1.80E+01 G
			996.33	5.323E+00	?(	1.352E+01	7.58E+01	1.06E+01 G
HF-181	F	-5.4369E-01					4.24E+01	
			482.00	-5.437E-01	?(P	2.099E+00	8.35E+01	8.05E+01 G
			133.02	-6.871E-01	+	2.839E+00	1.24E+02	4.33E+01 G
			345.83	-1.714E+00	+	1.192E+01	2.06E+02	1.51E+01 G
			136.30	-5.187E+00	+	2.118E+01	1.23E+02	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	-1.9392E+00					1.14E+02	
			1121.30	-1.939E+00	(	8.877E+00	1.35E+02	3.49E+01 G
			1221.41	1.594E-01	%	7.454E+00	2.09E+03	2.70E+01 G
			1189.05	-8.115E+00	+	1.428E+01	8.25E+01	1.62E+01 G
Hg-203	F	3.7321E-01					4.66E+01	
			279.20	3.732E-01	?(	1.232E+00	9.84E+01	8.15E+01 G
TL-208	N	7.8470E+00					6.98E+02	
			583.02	7.814E+00	(	9.614E-01	8.93E+00	8.45E+01 G
			277.28	8.282E+00	(P	1.111E+01	4.22E+01	6.31E+00 G
			860.56	1.131E+01	& P	9.875E+00	4.11E+01	1.24E+01 G
pm-146	C	6.3644E-01					2.02E+03	
			747.16	-1.948E-01	&(P	3.815E+00	1.13E+03	3.40E+01 G
			735.72	2.357E+00	&(	4.975E+00	9.09E+01	2.25E+01 G
			453.88	4.756E-01	*(P	1.331E+00	1.11E+02	6.50E+01 G
y-88	F	3.8548E-01					1.07E+02	
			898.04	1.926E-01	?(P	1.237E+00	2.72E+02	9.37E+01 G
			1836.06	5.677E-01	?(	6.973E-01	4.08E+01	9.92E+01 G
Cd-113m		-5.7786E+03					5.33E+03	
			263.70	-5.779E+03	?(	1.527E+04	7.93E+01	6.00E-03 K
Cd-109	F	2.7999E+00					4.53E+02	
								Derived Ave Activity
			88.04	2.800E+00	}(	4.274E+01	4.56E+02	3.79E+00 G
Cf-251	T	-1.7096E+00					3.28E+05	
			176.60	-1.710E+00	(	4.686E+00	1.07E+02	1.70E+01 G
			227.00	7.825E-02	%	1.338E+01	6.54E+03	6.30E+00 GA
Cf-249	T	8.4754E-01					1.28E+05	
			387.95	5.291E-01	?(	2.020E+00	1.13E+02	6.60E+01 G
			333.44	2.202E+00	?(	7.756E+00	1.05E+02	1.55E+01 G
Sn-126		3.3834E+00					3.65E+07	
			87.57	2.649E+00	}	4.269E+00	2.36E+01	3.75E+01 GA
			64.28	3.383E+00	?(	1.315E+01	1.16E+02	9.70E+00 G
			86.94	3.383E+00	}	1.797E+01	8.02E+01	9.04E+00 GA
PB-210	N	2.9699E+01					8.14E+03	
			46.54	2.970E+01	(P	2.652E+01	3.48E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.4698E+01					6.98E+02	
			238.63	2.470E+01	(P	1.694E+00	4.28E+00	4.33E+01 G
			300.03	3.207E+01	+ P	1.956E+01	2.75E+01	3.28E+00 GA
PB-214	N	1.8744E+01					5.84E+05	
			351.93	1.797E+01	@(P	2.186E+00	7.64E+00	3.76E+01 G
			295.09	2.026E+01	(P	3.996E+00	1.10E+01	1.93E+01 G
			242.00	2.449E+01	+	1.067E+01	1.56E+01	7.43E+00 GA
BI-207	C	2.8194E-01					1.18E+04	
			569.70	1.279E-01	?(	1.170E+00	2.61E+02	9.77E+01 G
			1063.66	4.840E-01	&(	2.046E+00	1.90E+02	7.45E+01 G
BI-212	N	6.3134E+00					6.98E+02	
			727.17	6.313E+00	?(	2.133E+01	9.99E+01	7.55E+00 G
			785.42	-6.041E+01	+ P	1.323E+02	1.01E+02	1.28E+00 GA
BI-214	N	1.7228E+01					5.84E+05	
			609.31	1.687E+01	*(P	1.968E+00	8.02E+00	4.61E+01 G
			1120.29	2.944E+01	+ P	5.764E+00	1.48E+01	1.51E+01 G
			1764.49	1.831E+01	?(P	9.725E+00	2.24E+01	1.54E+01 G
BI-210M	T	5.7639E-01					1.10E+09	
			265.83	5.764E-01	&(P	1.919E+00	9.93E+01	5.00E+01 G
			304.90	0.000E+00	-	6.621E+00	1.00E+03	2.80E+01 G
AC-228	N	2.4288E+01					2.10E+03	
			911.07	2.451E+01	(P	3.590E+00	1.01E+01	2.90E+01 G
			968.97	2.353E+01	(	4.884E+00	1.34E+01	1.75E+01 G
			338.32	2.486E+01	(	5.108E+00	1.01E+01	1.20E+01 G
			93.35	4.609E+00	-	2.810E+01	1.83E+02	5.56E+00 XA
TH-227	N	-5.6668E+00					7.95E+03	
			50.14	-5.667E+00	&(	2.455E+01	1.30E+02	8.00E+00 G
			256.24	-7.800E-02	%	1.299E+01	6.36E+03	7.00E+00 G
TH-229	N	3.6266E+00					2.68E+06	
			193.51	3.627E+00	?(	1.800E+01	1.93E+02	4.40E+00 G
			210.85	-1.345E+01	+ P	3.499E+01	8.30E+01	2.99E+00 G
TH-234	N	1.6072E+01					1.63E+12	
			63.29	1.839E+01	(P	2.208E+01	3.76E+01	3.81E+00 G
			92.59	1.449E+01	(P	1.474E+01	3.19E+01	5.58E+00 G
PA-234	N	7.3930E-01					1.63E+12	
			131.29	-1.659E+00	&(P	6.647E+00	8.59E+01	1.80E+01 G
			946.02	-3.822E-01	%	1.079E+01	1.21E+03	1.34E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47 2.718E+00 ?(  1.517E+01 1.62E+02 8.20E+00 G
                          883.24 3.546E+00 ?(  1.631E+01 1.33E+02 9.60E+00 G
                          880.53 7.948E+00 ?   2.293E+01 8.54E+01 6.00E+00 GA

PA-234M  N   1.0367E+02                                      1.63E+12
                         1001.00 6.784E+01 ?(  2.000E+02 8.73E+01 8.37E-01 G
                          766.41 2.057E+02 ?(  5.200E+02 7.57E+01 2.94E-01 G

U-235    N   1.8297E+00                                      2.57E+11
                          143.79 5.574E-02 &(P 9.739E+00 5.17E+03 1.10E+01 G
                          205.33 5.711E+00  (P 1.668E+01 1.14E+02 5.01E+00 G
                          163.38-6.736E+00 + P 2.389E+01 1.01E+02 5.08E+00 G

AM-241   T  -1.2573E+00                                      1.58E+05
                           59.54-1.257E+00  (P 3.673E+00 6.54E+01 3.59E+01 G

Np-237   F   2.7327E-01                                      2.14E+06
                                                           Derived Ave Activity
                           86.49 2.733E-01 }(  1.253E+01 1.37E+03 1.31E+01 G

Ir-192   F   2.7689E-01                                      7.40E+01
                          316.49 0.000E+00 ?(  2.199E+00 1.00E+03 8.70E+01 G
                          468.06 7.426E-01 ?(  2.711E+00 1.08E+02 5.18E+01 G
                          308.44 0.000E+00 &   5.897E+00 1.00E+03 3.18E+01 G

Cs-136   F   2.5794E-01                                      1.30E+01
                          818.50-9.746E-02 ?(  1.347E+00 3.88E+02 1.00E+02 G
                         1048.07 7.022E-01  (  1.859E+00 7.87E+01 8.00E+01 G
                          340.57-1.003E+00 +   4.457E+00 1.33E+02 4.69E+01 G

Np-239   T   1.1766E+00                                      2.36E+00
                          103.70-2.500E-02 %   5.570E+00 6.63E+03 2.40E+01 X
                          106.13 1.177E+00 *(  5.683E+00 1.45E+02 2.27E+01 G
                           99.50-1.822E+00 +   8.682E+00 1.43E+02 1.50E+01 X

Nd-147      -2.1234E+00                                      1.11E+01
                          531.00-2.123E+00 &(  9.503E+00 1.86E+02 1.30E+01 G
                           91.10 0.000E+00 +   5.660E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
```

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	440.	-23.	-0.013	129.62	-5.667E+00	
AM-241	59.54	334.	-30.	-0.017	65.39	-1.257E+00	P
BA-133	80.99	350.	-31.	-0.017	96.71	-1.009E+00	P
EU-155	86.54	1155.	-30.	-0.017	158.93	-1.043E+00	
Gd-153	97.50	728.	-27.	-0.015	140.66	-9.137E-01	
Np-239	99.50	755.	-27.	-0.015	142.89	-1.822E+00	
Gd-153	103.20	783.	-28.	-0.015	144.81	-1.250E+00	
Np-239	106.13	758.	27.	0.015	144.82	1.177E+00	
EU-152	121.78	275.	24.	0.013	101.20	8.203E-01	
CO-57	122.06	299.	7.	0.004	335.31	8.491E-02	
EU-154	123.10	285.	-25.	-0.014	97.75	-6.075E-01	
PA-234	131.29	615.	-30.	-0.016	85.94	-1.659E+00	P
HF-181	133.02	644.	-29.	-0.016	123.99	-6.871E-01	
CE-144	133.54	612.	-29.	-0.016	120.11	-2.705E+00	
HF-181	136.30	641.	-30.	-0.016	122.52	-5.187E+00	
Tc-99m	140.51	420.	24.	0.014	120.48	2.931E-01	
CE-141	145.44	209.	-21.	-0.012	125.95	-4.562E-01	
Ba-140	162.66	456.	-28.	-0.016	108.12	-5.230E+00	
U-235	163.38	486.	-30.	-0.017	100.91	-6.736E+00	P
CE-139	165.85	315.	23.	0.013	111.16	3.276E-01	
Cf-251	176.60	187.	-24.	-0.013	107.48	-1.710E+00	
TH-229	193.51	158.	12.	0.007	192.59	3.627E+00	
U-235	205.33	159.	21.	0.012	114.01	5.711E+00	P
TH-229	210.85	242.	-29.	-0.016	82.98	-1.345E+01	P
EU-152	244.69	1087.	21.	0.012	219.17	4.444E+00	P
Cd-113m	263.70	124.	-21.	-0.011	79.34	-5.779E+03	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	135.	17.	0.009	99.27	5.764E-01	P
I-131	284.30	93.	-3.	-0.002	435.30	-8.497E-01	P
PA-231	300.07	460.	-18.	-0.010	166.21	-1.402E+01	
PA-233	300.18	441.	-16.	-0.009	186.39	-4.859E+00	
La-140	328.76	116.	14.	0.008	110.52	1.415E+00	P
Cf-249	333.44	144.	17.	0.009	104.84	2.202E+00	
EU-152	344.29	415.	-23.	-0.013	129.08	-1.798E+00	
HF-181	345.83	311.	-12.	-0.007	206.27	-1.714E+00	
BA-133	356.00	437.	-7.	-0.004	424.02	-2.446E-01	
I-131	364.48	76.	-3.	-0.002	571.87	-8.124E-02	
BA-133	383.84	121.	15.	0.008	107.65	3.858E+00	
Cf-249	387.95	136.	15.	0.008	113.34	5.291E-01	
SN-113	391.69	149.	15.	0.008	117.91	5.519E-01	
AG-108M	433.94	28.	6.	0.003	177.43	1.706E-01	
pm-146	453.88	40.	12.	0.006	111.44	4.756E-01	P
SB-125	463.37	57.	36.	0.020	34.11	9.360E+00	
Ir-192	468.06	108.	14.	0.008	108.24	7.426E-01	
BE-7	477.60	145.	-7.	-0.004	175.18	-1.964E+00	P
HF-181	482.00	151.	-16.	-0.009	83.54	-5.437E-01	P
La-140	487.02	188.	-5.	-0.003	267.35	-3.045E-01	P
RU-103	497.05	52.	2.	0.001	868.63	5.427E-02	P
RH-106	511.86	67.	127.	0.071	18.60	1.891E+01	
Nd-147	531.00	65.	-9.	-0.005	185.87	-2.123E+00	
Ba-140	537.26	39.	5.	0.003	277.96	5.924E-01	P
CS-134	563.24	70.	-18.	-0.010	74.05	-6.783E+00	P
CS-134	569.32	56.	-8.	-0.005	132.00	-1.767E+00	
PA-234	569.47	58.	7.	0.004	161.97	2.718E+00	
BI-207	569.70	48.	4.	0.002	261.09	1.279E-01	
SB-125	600.50	378.	14.	0.008	201.83	2.632E+00	
RH-106	621.92	355.	12.	0.007	222.53	4.288E+00	
SB-125	635.89	31.	12.	0.007	70.65	3.874E+00	
I-131	636.97	64.	-13.	-0.007	92.21	-6.455E+00	
AG-110M	657.76	108.	-20.	-0.011	78.34	-7.650E-01	
CS-137	661.66	115.	-11.	-0.006	139.80	-4.857E-01	
PM-144	696.54	61.	-2.	-0.001	994.38	-6.559E-02	
NB-94	702.63	51.	10.	0.005	160.48	3.877E-01	
SB-124	722.79	39.	12.	0.007	80.50	4.375E+00	
AG-108M	722.94	51.	12.	0.007	90.46	5.207E-01	
EU-154	723.36	157.	-25.	-0.014	74.63	-4.911E+00	
ZR-95	724.20	132.	-25.	-0.014	68.94	-2.253E+00	
pm-146	735.72	28.	13.	0.007	90.91	2.357E+00	
AG-110M	763.94	79.	-20.	-0.011	66.41	-3.822E+00	
NB-95	765.79	86.	12.	0.007	111.91	5.154E-01	
PA-234M	766.41	51.	14.	0.008	75.74	2.057E+02	
EU-152	778.92	47.	-12.	-0.006	127.62	-3.880E+00	
CS-134	795.87	43.	12.	0.007	81.19	6.283E-01	
CS-134	801.95	65.	8.	0.004	151.72	3.939E+00	
La-140	815.77	24.	2.	0.001	369.01	3.673E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
MN-54	834.85	21.	7.	0.004	134.86	3.322E-01	P
NB-94	871.10	48.	-3.	-0.002	331.66	-1.428E-01	
EU-154	873.23	48.	6.	0.003	184.08	2.136E+00	
PA-234	880.53	31.	10.	0.006	85.40	7.948E+00	
PA-234	883.24	41.	7.	0.004	133.40	3.546E+00	
AG-110M	884.68	53.	-12.	-0.007	103.74	-7.884E-01	P
Sc-46	889.28	82.	-16.	-0.009	78.73	-7.615E-01	P
y-88	898.04	20.	4.	0.002	272.30	1.926E-01	P
AG-110M	937.49	20.	6.	0.003	168.87	8.871E-01	
EU-152	964.11	94.	8.	0.005	165.94	3.016E+00	
EU-154	996.33	26.	11.	0.006	75.80	5.323E+00	
PA-234M	1001.00	37.	11.	0.006	87.27	6.784E+01	
EU-154	1004.77	53.	6.	0.003	177.93	1.786E+00	
BI-207	1063.66	27.	6.	0.004	189.55	4.840E-01	
Ga-68	1077.40	11.	9.	0.005	89.84	1.815E+01	
FE-59	1099.25	32.	-7.	-0.004	187.54	-7.266E-01	
EU-152	1112.07	131.	-14.	-0.008	116.42	-6.210E+00	
ZN-65	1115.55	117.	-14.	-0.008	110.08	-1.682E+00	
Sc-46	1120.55	103.	-4.	-0.002	388.65	-2.221E-01	
Ta-182	1121.30	111.	-11.	-0.006	134.97	-1.939E+00	
CO-60	1173.24	16.	11.	0.006	87.71	6.899E-01	P
Ta-182	1189.05	53.	-21.	-0.012	82.49	-8.115E+00	
FE-59	1291.60	46.	-20.	-0.011	78.99	-3.082E+00	P
CO-60	1332.50	12.	6.	0.004	128.05	4.541E-01	P
AG-110M	1384.30	0.	13.	0.007	27.74	3.872E+00	
EU-152	1408.00	6.	7.	0.004	88.65	2.449E+00	P
La-140	1596.21	12.	-2.	-0.001	424.26	-1.729E-01	
SB-124	1690.98	12.	-1.	-0.001	842.61	-1.820E-01	
y-88	1836.06	0.	6.	0.003	40.82	5.677E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-1.9641E+00	-1.9641E+00	1.752E+02%	1.57E+01
NA-22	#A	-2.2378E-02	-2.2378E-02	2.265E+03%	1.85E+00
K-40		2.1709E+02	2.1709E+02	5.795E+00%	7.94E+00
Sc-46	#A	-7.6147E-01	-7.6148E-01	7.873E+01%	2.17E+00
CR-51	#A	-1.0253E-02	-1.0253E-02	2.998E+04%	1.94E+01
MN-54	#A	3.3218E-01	3.3218E-01	1.349E+02%	1.10E+00
FE-59	#A	-7.2664E-01	-7.2664E-01	1.875E+02%	3.02E+00
Co-56	#C	8.2107E-01	8.2107E-01	8.704E+01%	7.95E-01
CO-57	#A	8.4906E-02	8.4906E-02	3.353E+02%	9.64E-01
CO-58	#A	-2.9565E-02	-2.9565E-02	2.739E+03%	1.58E+00
CO-60	#A	5.7196E-01	5.7196E-01	7.760E+01%	1.29E+00

ZN-65	#A	-1.6817E+00	-1.6817E+00	1.101E+02%	6.24E+00
NB-94	#A	3.8767E-01	3.8767E-01	1.605E+02%	1.45E+00
ZR-95	#A	7.7007E-02	7.7008E-02	1.378E+03%	2.53E+00
NB-95	#A	5.1540E-01	5.1540E-01	1.119E+02%	1.95E+00
RU-103	#A	5.4268E-02	5.4269E-02	8.686E+02%	1.16E+00
RH-106	#A	4.2878E+00	4.2878E+00	2.225E+02%	3.21E+01
AG-108M	#A	3.4598E-01	3.4598E-01	9.046E+01%	7.78E-01
AG-110M	#A	5.1200E-01	5.1200E-01	2.774E+01%	2.44E+00
SN-113	#A	5.5194E-01	5.5194E-01	1.179E+02%	2.19E+00
SB-124	#A	5.1985E-01	5.1985E-01	8.050E+01%	3.31E+00
SB-125	#A	2.7271E+00	2.7271E+00	3.411E+01%	3.14E+00
I-131	#A	-8.1238E-02	-8.1239E-02	5.719E+02%	1.17E+00
Gd-153	#A	-9.1366E-01	-9.1366E-01	1.407E+02%	4.29E+00
Ga-68	#A	1.8090E+01	1.8149E+01	8.984E+01%	3.65E+01
Tc-99m	#A	2.9294E-01	2.9311E-01	1.205E+02%	1.18E+00
BA-133	#A	-2.4458E-01	-2.4458E-01	4.240E+02%	3.50E+00
CS-134	#A	4.5854E-01	4.5854E-01	8.119E+01%	3.36E+00
CS-137	#A	-4.8567E-01	-4.8567E-01	1.398E+02%	2.30E+00
CE-139	#A	3.2761E-01	3.2761E-01	1.112E+02%	1.22E+00
Ba-140	#A	5.9235E-01	5.9236E-01	2.780E+02%	4.06E+00
La-140	#A	1.4959E-01	1.4960E-01	1.105E+02%	1.63E+00
CE-141	#A	-4.5622E-01	-4.5622E-01	1.260E+02%	1.54E+00
CE-144	#A	-2.7047E+00	-2.7047E+00	1.201E+02%	1.08E+01
PM-144	#A	-6.5589E-02	-6.5589E-02	9.944E+02%	1.54E+00
EU-152	#A	6.1814E-01	6.1814E-01	1.012E+02%	7.76E+00
EU-154	#A	2.8083E+00	2.8083E+00	7.580E+01%	1.37E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.29E+00
HF-181	#A	-5.4369E-01	-5.4369E-01	8.354E+01%	2.10E+00
Ta-182	#A	-1.9392E+00	-1.9392E+00	1.350E+02%	8.88E+00
Hg-203	#A	3.7321E-01	3.7321E-01	9.842E+01%	1.23E+00
TL-208		7.8470E+00	7.8470E+00	8.933E+00%	9.61E-01
pm-146	#A	6.3644E-01	6.3644E-01	9.091E+01%	3.82E+00
y-88	#A	3.8548E-01	3.8548E-01	4.082E+01%	1.24E+00
Cd-113m	#A	-5.7786E+03	-5.7786E+03	7.934E+01%	1.53E+04
Cd-109	#A	2.7999E+00	2.7999E+00	4.562E+02%	4.27E+01
Cf-251	#A	-1.7096E+00	-1.7096E+00	1.075E+02%	4.69E+00
Cf-249	#A	8.4754E-01	8.4754E-01	7.720E+01%	2.02E+00
Sn-126	#A	3.3834E+00	3.3834E+00	1.163E+02%	1.31E+01
PB-210	#	2.9699E+01	2.9699E+01	3.479E+01%	2.65E+01
PB-212		2.4698E+01	2.4698E+01	4.278E+00%	1.69E+00
PB-214		1.8744E+01	1.8744E+01	6.680E+00%	2.19E+00
BI-207	#A	2.8194E-01	2.8194E-01	1.613E+02%	1.17E+00
BI-212	#A	6.3134E+00	6.3134E+00	9.990E+01%	2.13E+01
BI-214		1.7228E+01	1.7228E+01	8.018E+00%	1.97E+00
BI-210M	#A	5.7639E-01	5.7639E-01	9.927E+01%	1.92E+00
AC-228		2.4288E+01	2.4288E+01	6.533E+00%	3.59E+00
TH-227	#A	-5.6668E+00	-5.6668E+00	1.296E+02%	2.46E+01
TH-229	#A	3.6266E+00	3.6266E+00	1.926E+02%	1.80E+01
TH-234	#A	1.6072E+01	1.6072E+01	2.467E+01%	2.21E+01

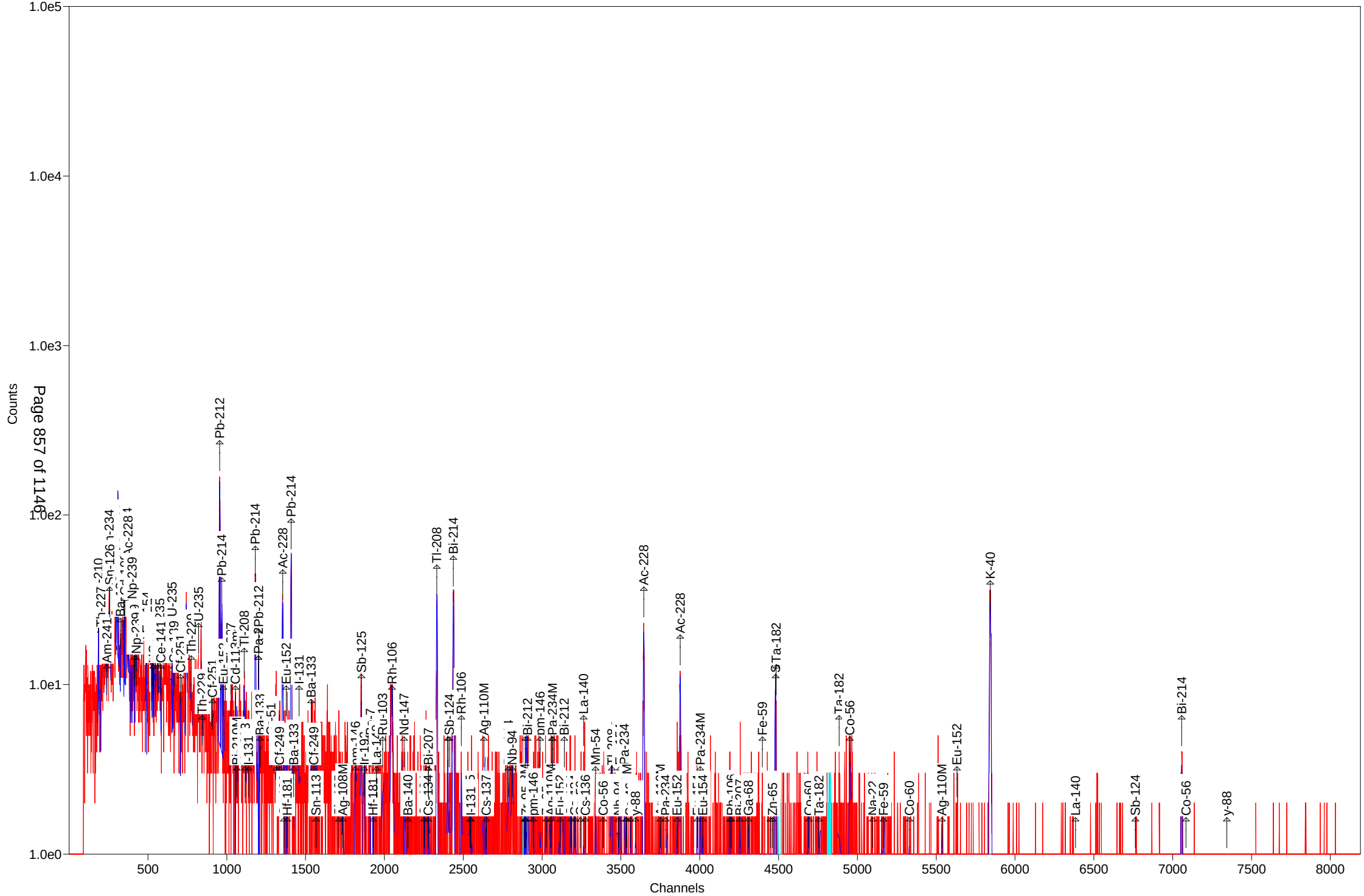
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.47E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.25E+00
PA-234 #A	7.3930E-01	7.3930E-01	7.558E+01%	6.65E+00
PA-234M#A	1.0367E+02	1.0367E+02	5.778E+01%	2.00E+02
U-235 #A	1.8297E+00	1.8297E+00	1.140E+02%	9.74E+00
AM-241 #A	-1.2573E+00	-1.2573E+00	6.539E+01%	3.67E+00
Np-237 #A	2.7327E-01	2.7327E-01	1.369E+03%	1.25E+01
Ir-192 #A	2.7689E-01	2.7689E-01	1.082E+02%	2.20E+00
Cs-136 A	2.5793E-01	2.5794E-01	7.874E+01%	1.35E+00
Np-239 #A	1.1765E+00	1.1766E+00	1.448E+02%	5.68E+00
Nd-147 #A	-2.1234E+00	-2.1234E+00	1.859E+02%	9.50E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 3.557E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.5566156E+02 Bq/Sample

264535_Gamma_160-18554-A-19-B. 7_Gamma_20162142.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161405

Sample Description: 264535_Gamma_160-18554-A-20-B
Detector: Detector # 8
Batch ID: 264535
Work Order Number: Gamma
Lot Number: 160-18554-A-20-B

Decay to Time: 9/1/2016 13:26 Live Time: 1800 sec
Acquisition Time: 9/1/2016 13:26:42 Real Time: 1847 sec
Analysis Time: 9/1/2016 13:57 Dead Time: 2.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev11.lib
Bkgd Correction File: 8_2016-08-08_1838.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.790E+00	105.6	4.001E+00	4.006E+00	1.356E+01
NA-22	7.192E-01	64.6	4.646E-01	4.660E-01	1.528E+00
K-40	2.951E+02	5.4	1.596E+01	2.197E+01	9.713E+00
Sc-46	-1.038E+00	87.7	9.101E-01	9.116E-01	3.046E+00
CR-51	-4.075E+00	224.8	9.162E+00	9.164E+00	1.600E+01
MN-54	5.210E-01	103.5	5.393E-01	5.399E-01	1.275E+00
FE-59	-1.750E+00	75.9	1.329E+00	1.332E+00	3.779E+00
Co-56	2.317E-01	232.9	5.395E-01	5.397E-01	1.300E+00
CO-57	4.080E-01	82.5	3.366E-01	3.373E-01	1.120E+00
CO-58	4.836E-01	117.2	5.668E-01	5.673E-01	1.937E+00
CO-60	3.186E-01	84.8	2.702E-01	2.707E-01	1.932E+00
ZN-65	-2.254E+00	87.2	1.965E+00	1.968E+00	6.584E+00
NB-94	3.269E-01	120.2	3.930E-01	3.934E-01	1.624E+00
ZR-95	2.170E+00	53.1	1.152E+00	1.157E+00	2.583E+00
NB-95	1.214E-01	550.5	6.681E-01	6.682E-01	2.327E+00
RU-103	1.623E-01	300.7	4.880E-01	4.881E-01	1.209E+00
RH-106	0.000E+00	1.#INF	1.243E+00	1.243E+00	3.541E+01
AG-108M	-7.273E-01	96.5	7.020E-01	7.030E-01	1.657E+00
AG-110M	7.472E-01	68.6	5.129E-01	5.143E-01	3.683E+00
SN-113	0.000E+00	1.#INF	4.390E-01	4.390E-01	3.239E+00
SB-124	8.171E-02	427.6	3.494E-01	3.494E-01	3.489E+00
SB-125	2.442E+00	64.2	1.569E+00	1.574E+00	3.158E+00
I-131	3.728E-01	275.1	1.025E+00	1.026E+00	1.346E+00
Gd-153	-1.687E+00	135.8	2.291E+00	2.294E+00	7.617E+00
Ga-68	0.000E+00	1.#INF	7.795E+00	7.795E+00	5.805E+01
Tc-99m	-5.382E-01	147.1	7.918E-01	7.924E-01	2.635E+00
BA-133	-1.382E-01	85.7	1.184E-01	1.187E-01	4.156E+00
CS-134	9.072E-01	84.8	7.693E-01	7.708E-01	3.519E+00
CS-137	-3.072E-01	200.5	6.159E-01	6.161E-01	2.214E+00
CE-139	-5.976E-01	91.4	5.461E-01	5.491E-01	1.817E+00
Ba-140	2.514E+00	140.7	3.538E+00	3.540E+00	5.311E+00
La-140	-9.185E-01	112.5	1.033E+00	1.034E+00	2.237E+00
CE-141	-1.026E+00	150.3	1.543E+00	1.544E+00	5.131E+00

CE-144	-4.168E+00	145.3	6.058E+00	6.062E+00	2.016E+01
PM-144	-5.194E-01	106.7	5.541E-01	5.548E-01	1.674E+00
EU-152	0.000E+00	1.#INF	9.883E-01	9.883E-01	1.069E+01
EU-154	5.157E+00	50.6	2.610E+00	2.623E+00	1.203E+01
EU-155	3.075E+00	37.6	1.157E+00	1.169E+00	3.696E+00
HF-181	5.002E-01	113.3	5.670E-01	5.675E-01	1.922E+00
Ta-182	5.672E+00	30.6	1.737E+00	1.760E+00	8.325E+00
Hg-203	-5.572E-01	92.8	5.172E-01	5.182E-01	1.730E+00
TL-208	1.115E+01	7.9	8.790E-01	1.052E+00	1.237E+00
pm-146	5.850E-01	93.6	5.476E-01	5.485E-01	4.093E+00
y-88	-6.757E-01	139.3	9.410E-01	9.416E-01	2.188E+00
Cd-113m	3.648E+02	1734.9	6.328E+03	6.328E+03	2.181E+04
Cd-109	0.000E+00	1.#INF	1.795E+01	1.795E+01	5.969E+01
Cf-251	-1.669E+00	139.6	2.329E+00	2.334E+00	5.972E+00
Cf-249	-3.222E-01	279.6	9.008E-01	9.009E-01	3.064E+00
Sn-126	-1.018E+00	642.5	6.540E+00	6.540E+00	2.200E+01
PB-210	-1.908E+01	51.0	9.722E+00	9.787E+00	5.936E+01
PB-212	3.493E+01	3.9	1.363E+00	2.639E+00	1.677E+00
PB-214	1.651E+01	6.8	1.116E+00	1.408E+00	1.954E+00
BI-207	5.263E-01	89.8	4.725E-01	4.733E-01	1.591E+00
BI-212	5.989E+01	11.8	7.040E+00	7.696E+00	8.665E+00
BI-214	1.349E+01	9.6	1.299E+00	1.476E+00	1.711E+00
BI-210M	3.289E-01	266.5	8.764E-01	8.766E-01	2.188E+00
AC-228	3.231E+01	7.0	2.272E+00	2.807E+00	3.997E+00
TH-227	-9.622E-02	46.4	4.466E-02	4.497E-02	3.082E+01
TH-229	1.266E+01	69.6	8.812E+00	8.870E+00	2.369E+01
TH-234	1.267E+01	73.8	9.353E+00	9.377E+00	3.097E+01
PA-231	2.058E+00	638.4	1.314E+01	1.314E+01	1.030E+02
PA-233	-4.852E-03	51066.8	2.478E+00	2.478E+00	8.363E+00
PA-234	-5.624E-01	103.5	5.820E-01	5.827E-01	1.215E+01
PA-234M	9.530E+01	84.7	8.067E+01	8.082E+01	2.852E+02
U-235	-5.157E+00	67.7	3.490E+00	3.499E+00	2.141E+01
AM-241	-4.572E-01	425.2	1.944E+00	1.944E+00	6.569E+00
Np-237	0.000E+00	1.#INF	5.751E+00	5.751E+00	1.912E+01
Ir-192	4.718E-01	95.6	4.510E-01	4.519E-01	1.497E+00
Cs-136	-8.414E-01	90.0	7.572E-01	7.588E-01	2.541E+00
Np-239	-9.402E-01	359.0	3.376E+00	3.376E+00	1.125E+01
Nd-147	1.423E+00	154.2	2.194E+00	2.196E+00	8.889E+00
Total	9.849E+02				

Analyst: Rachel Mueller

Sample description
264535_Gamma_160-18554-A-20-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161405.An1

Acquisition information
Start time: 9/1/2016 1:26:42 PM
Live time: 1800
Real time: 1847
Dead time: 2.55 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/1/2016 1:26:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-08-08_1838.PBC 8/8/2016 6:38:16 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 34 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1805

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.40	27.	62.48	0.32	1.995E-02	46.54	4.250	PBC<MDA	PB210
59.54	-9.	425.17	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.40	27.	73.80	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
74.80	263.	10.46	1.03	3.617E-02				
77.11	409.	7.07	1.04	3.699E-02				
87.18	115.	19.28	1.04	3.974E-02	86.49	13.100	1.231E+01	Np237
					86.54	30.700	5.252E+00	EU155
					86.94	9.040	1.780E+01	Sn126
					87.57	37.500	4.276E+00	Sn126
					88.04	3.790	4.221E+01	Cd109
89.90	97.	21.33	1.05	4.027E-02				
91.10	31.	154.18	1.05	4.048E-02	91.10	28.300	PBC<MDA	Nd147
92.98	149.	15.34	1.05	4.077E-02	92.59	5.584	2.367E+01	TH234
					93.35	5.561	3.654E+01	AC228
105.18	49.	37.61	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
122.06	26.	82.50	1.07	4.146E-02	121.78	28.580	1.221E+00	EU152
					122.06	85.600	4.080E-01	CO57
163.38	5.	434.04	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
193.51	25.	93.69	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
210.85	27.	103.02	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
238.62	672.	5.21	0.94	2.744E-02	238.63	43.300	3.144E+01	PB212
242.02	80.	21.83	1.16	2.714E-02	242.00	7.430	2.200E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
255.69	28.	46.41	1.83	2.596E-02	256.24	7.000	PBC<MDA	TH227
265.83	7.	266.51	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
277.59	40.	37.40	1.76	2.440E-02	277.28	6.310	1.450E+01	TL208
284.30	7.	275.08	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.30	152.	13.60	0.91	2.323E-02	295.09	19.300	1.889E+01	PB214
300.07	5.	793.80	1.20	2.293E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.468E+00	PA231
					300.18	6.200	1.773E+00	PA233
300.15	19.	188.03	1.20	2.294E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
302.85	19.	181.35	1.21	2.277E-02	302.65	2.880	1.628E+01	PA231
					302.85	18.330	2.559E+00	BA133
304.85	19.	183.97	1.21	2.265E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.686E+00	BI210M
316.49	5.	300.00	1.22	2.199E-02	316.49	87.040	PBC<MDA	Ir192
338.52	146.	14.72	1.13	2.085E-02	338.32	12.010	3.235E+01	AC228
351.89	220.	8.12	1.21	2.021E-02	351.93	37.600	1.612E+01	PB214
427.88	13.	91.25	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
453.88	12.	97.27	1.32	1.647E-02	453.88	65.000	PBC<MDA	pm146
463.37	17.	90.43	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
468.06	15.	95.60	1.33	1.606E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	105.55	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	11.	113.34	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
497.05	4.	300.74	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	85.	29.08	2.61	1.494E-02	511.86	20.000	1.581E+01	RH106
531.00	4.	281.48	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
537.26	6.	212.98	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
563.24	13.	101.90	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.38	13.	89.78	1.40	1.368E-02	569.32	15.380	3.343E+00	CS134
					569.47	8.200	6.271E+00	PA234
					569.70	97.740	5.263E-01	BI207
569.47	8.	149.29	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.795E+00	PA234
					569.70	97.740	3.185E-01	BI207
583.17	228.	7.88	1.17	1.342E-02	583.02	84.500	1.115E+01	TL208
609.07	143.	9.63	1.25	1.295E-02	609.31	46.090	1.329E+01	BI214
					610.30	5.750	1.067E+02	RU103
636.97	4.	290.11	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
657.76	12.	74.15	1.45	1.215E-02	657.76	94.640	PBC<MDA	AG110M
661.66	-6.	200.47	1.46	1.209E-02	661.66	85.210	PBC<MDA	CS137
702.63	7.	200.00	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
724.20	8.	211.38	1.50	1.121E-02	724.20	44.150	PBC<MDA	ZR95
727.50	91.	11.75	0.82	1.118E-02	727.17	7.550	5.989E+01	BI212
735.72	9.	93.62	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
756.73	23.	53.07	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
765.79	2.	550.51	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	13.	84.65	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.87	12.	84.81	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
801.95	12.	92.65	1.55	1.030E-02	801.95	8.690	PBC<MDA	CS134
810.78	9.	117.19	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
834.85	9.	103.51	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
846.77	4.	232.86	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.37	5.	307.93	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
871.10	5.	133.46	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
873.23	5.	140.68	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
884.68	12.	115.53	1.60	9.480E-03	884.68	72.680	PBC<MDA	AG110M
911.29	150.	9.48	1.23	9.247E-03	911.07	29.000	3.115E+01	AC228
969.09	94.	11.77	1.64	8.776E-03	968.97	17.460	3.420E+01	AC228
996.33	18.	50.61	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	172.69	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	10.	113.05	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1048.07	7.	97.94	1.70	8.209E-03	1048.07	80.000	PBC<MDA	Cs136
1120.26	30.	23.76	1.74	7.754E-03	1120.29	15.100	1.411E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	12.	102.50	1.74	7.752E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.362E-01	Sc46
					1121.30	34.900	2.397E+00	Ta182
1121.00	10.	117.14	1.74	7.748E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.287E-01	Sc46
					1121.30	34.900	2.089E+00	Ta182
1173.24	12.	84.81	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1189.41	29.	30.63	1.78	7.367E-03	1189.05	16.200	1.339E+01	Ta182
1238.28	2.	646.79	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	9.	64.61	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.043E+00	EU154
1408.00	7.	89.58	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1460.77	349.	5.41	1.85	6.165E-03	1460.83	10.670	2.951E+02	K40
1690.98	1.	427.57	2.03	5.425E-03	1690.98	47.790	PBC<MDA	SB124
1765.00	7.	93.15	2.07	5.226E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.00	74.80	247.	263.	7.279E+03	10.46	1.034	- D
308.27	77.12	215.	409.	1.107E+04	7.07	1.036	- sD
359.18	89.90	181.	92.	2.291E+03	23.09	1.046	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	360.	-29.	-0.016	50.97	1.012s
TH-227	200.37	50.14	441.	-25.	-0.014	121.73	1.015
AM-241	237.95	59.54	659.	-9.	-0.005	425.17	1.022s
TH-234	252.96	63.29	183.	27.	0.015	73.80	1.025D
Sn-126	256.93	64.28	643.	-6.	-0.003	642.45	1.026s
BA-133	323.77	80.99	1574.	-37.	-0.020	153.19	1.039
Np-237	345.77	86.49	1424.	0.	0.000	151.07	1.043A
EU-155	345.98	86.54	1319.	37.	0.021	66.82	1.043D
Sn-126	347.57	86.94	1212.	-36.	-0.020	139.50	1.044s
Sn-126	350.09	87.57	1071.	36.	0.020	68.09	1.044D
Cd-109	351.97	88.04	1177.	0.	0.000	137.36	1.044A
Nd-147	364.21	91.10	1106.	31.	0.017	154.18	1.047s
TH-234	370.17	92.59	341.	18.	0.010	145.49	1.048D
AC-228	373.21	93.35	1031.	36.	0.020	128.23	1.049s
Gd-153	389.81	97.50	1289.	-38.	-0.021	135.82	1.052s
Np-239	397.81	99.50	1847.	-36.	-0.020	169.32	1.053
Gd-153	412.62	103.20	1714.	-36.	-0.020	162.72	1.056s
Np-239	414.62	103.70	1648.	-36.	-0.020	159.55	1.057s
EU-155	421.07	105.31	146.	49.	0.027	37.61	1.058D
Np-239	424.34	106.13	1659.	-16.	-0.009	359.03	1.058s
EU-152	486.92	121.78	363.	-30.	-0.017	90.94	1.071s
CO-57	488.06	122.06	218.	26.	0.014	82.50	1.071s
EU-154	492.22	123.10	256.	-11.	-0.006	244.41	1.072s
PA-234	525.00	131.29	1137.	-34.	-0.019	143.31	1.078s
HF-181	531.92	133.02	1110.	-34.	-0.019	141.44	1.079s
CE-144	533.98	133.54	1174.	-34.	-0.019	145.35	1.080s
HF-181	545.02	136.30	1207.	-34.	-0.019	147.10	1.082s
CO-57	545.72	136.47	1241.	-34.	-0.019	149.08	1.082s
Tc-99m	561.86	140.51	1169.	-33.	-0.018	147.11	1.085
U-235	574.97	143.79	1209.	-40.	-0.022	67.66	1.087s
CE-141	581.59	145.44	1327.	-34.	-0.019	150.35	1.089
Ba-140	650.47	162.66	353.	-12.	-0.007	217.41	1.102s
U-235	653.35	163.38	256.	5.	0.003	434.04	1.102s
CE-139	663.24	165.85	391.	-31.	-0.017	91.39	1.104s
Cf-251	706.23	176.60	169.	-18.	-0.010	139.57	1.112s
TH-229	773.87	193.51	154.	25.	0.014	93.69	1.125s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	821.17	205.33	189.	-22.	-0.012	105.37	1.134s
TH-229	843.24	210.85	197.	27.	0.015	103.02	1.138s
Cf-251	907.84	227.00	148.	-7.	-0.004	342.36	1.151
PB-212	954.37	238.63	51.	747.	0.415	3.90	1.159D
PB-214	967.84	242.00	112.	80.	0.044	21.83	1.162D
TH-227	1022.61	255.69	43.	28.	0.015	46.41	1.833s
BI-210M	1063.18	265.83	102.	7.	0.004	266.51	1.179
TL-208	1110.22	277.59	45.	40.	0.022	37.40	1.761s
Hg-203	1116.66	279.20	160.	-20.	-0.011	92.82	1.189s
I-131	1137.05	284.30	88.	7.	0.004	275.08	1.193s
PB-214	1180.22	295.09	44.	140.	0.078	10.81	1.201D
PB-212	1199.98	300.03	627.	19.	0.011	188.03	1.205
PA-231	1200.14	300.07	646.	5.	0.003	793.80	1.205
PA-233	1200.58	300.18	651.	0.	0.000	1000.00	1.205
PA-231	1210.46	302.65	651.	0.	0.000	1000.00	1.207s
BA-133	1211.27	302.85	598.	19.	0.011	181.35	1.207s
Ba-140	1219.26	304.85	617.	19.	0.011	183.97	1.208s
Ir-192	1233.62	308.44	639.	0.	0.000	1000.00	1.211s
Ir-192	1265.82	316.49	110.	5.	0.003	300.00	1.217s
CR-51	1280.20	320.08	164.	-16.	-0.009	224.82	1.219s
Cf-249	1333.63	333.44	481.	0.	0.000	1000.00	1.229s
AC-228	1353.97	338.52	65.	146.	0.081	14.72	1.130s
Cs-136	1362.15	340.57	481.	0.	0.000	1000.00	1.234s
EU-152	1377.01	344.29	481.	0.	0.000	1000.00	1.237s
HF-181	1383.19	345.83	388.	-19.	-0.011	146.56	1.238s
PB-214	1407.44	351.89	27.	220.	0.122	8.12	1.213
BA-133	1423.87	356.00	375.	-21.	-0.012	85.67	1.245
BA-133	1535.24	383.84	181.	-19.	-0.011	101.89	1.266s
Cf-249	1551.68	387.95	197.	-7.	-0.004	279.58	1.269s
SN-113	1566.64	391.69	204.	0.	0.000	1000.00	1.271s
SB-125	1711.39	427.88	32.	13.	0.007	91.25	1.297s
AG-108M	1735.64	433.94	87.	-20.	-0.011	96.51	1.301s
pm-146	1815.41	453.88	30.	12.	0.007	97.27	1.315s
SB-125	1853.36	463.37	104.	17.	0.009	90.43	1.322
Ir-192	1872.14	468.06	99.	15.	0.008	95.60	1.325s
BE-7	1910.28	477.60	66.	11.	0.006	105.55	1.332s
HF-181	1927.89	482.00	77.	11.	0.006	113.34	1.335s
La-140	1947.98	487.02	119.	-8.	-0.004	203.00	1.339s
RU-103	1988.12	497.05	35.	4.	0.002	300.74	1.346s
RH-106	2047.36	511.86	77.	85.	0.047	29.08	2.606s
Nd-147	2123.91	531.00	35.	4.	0.002	281.48	1.369s
Ba-140	2148.95	537.26	44.	6.	0.004	212.98	1.373s
CS-134	2252.86	563.24	39.	13.	0.007	101.90	1.391s
CS-134	2277.20	569.32	68.	-15.	-0.008	83.51	1.395s
PA-234	2277.80	569.47	62.	8.	0.004	149.29	1.395s
BI-207	2278.73	569.70	58.	13.	0.007	89.78	1.396s
TL-208	2332.58	583.17	23.	228.	0.126	7.88	1.168
SB-125	2401.92	600.50	293.	-14.	-0.008	175.95	1.416s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2418.76	604.71	279.	0.	0.000	1000.00	1.419s
BI-214	2436.19	609.07	11.	143.	0.079	9.63	1.253
RU-103	2441.12	610.30	279.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	279.	0.	0.000	1000.00	1.426s
PM-144	2472.18	618.06	279.	0.	0.000	1000.00	1.428s
RH-106	2487.60	621.92	279.	0.	0.000	1000.00	1.431s
SB-125	2543.49	635.89	48.	-14.	-0.008	76.39	1.440s
I-131	2547.83	636.97	65.	4.	0.002	290.11	1.441s
AG-110M	2630.98	657.76	36.	12.	0.007	74.15	1.455s
CS-137	2646.58	661.66	68.	-6.	-0.003	200.47	1.457s
PM-144	2786.11	696.54	47.	-11.	-0.006	106.70	1.480s
NB-94	2810.46	702.63	42.	7.	0.004	200.00	1.484s
SB-124	2891.09	722.79	168.	-16.	-0.009	120.17	1.497s
AG-108M	2891.70	722.94	153.	-10.	-0.005	182.73	1.498s
EU-154	2893.37	723.36	143.	0.	0.000	1000.00	1.498s
ZR-95	2896.74	724.20	133.	8.	0.004	211.38	1.498s
BI-212	2909.95	727.50	5.	91.	0.051	11.75	0.824s
pm-146	2942.83	735.72	14.	9.	0.005	93.62	1.506
pm-146	2988.59	747.16	28.	-3.	-0.002	378.59	1.513s
ZR-95	3026.87	756.73	28.	23.	0.013	53.07	1.519s
AG-110M	3055.73	763.94	52.	-12.	-0.006	91.92	1.524s
NB-95	3063.11	765.79	81.	2.	0.001	550.51	1.525s
PA-234M	3065.60	766.41	54.	13.	0.007	84.65	1.526s
EU-152	3115.64	778.92	33.	-7.	-0.004	160.37	1.534s
BI-212	3141.64	785.42	47.	-3.	-0.002	226.36	1.538s
CS-134	3183.43	795.87	46.	12.	0.007	84.81	1.544
CS-134	3207.77	801.95	56.	12.	0.007	92.65	1.548s
CO-58	3243.06	810.78	49.	9.	0.005	117.19	1.554s
La-140	3263.04	815.77	58.	0.	0.000	1000.00	1.557
Cs-136	3273.97	818.50	88.	-15.	-0.009	90.00	1.559
MN-54	3339.36	834.85	19.	9.	0.005	103.51	1.569s
Co-56	3387.05	846.77	19.	4.	0.002	232.86	1.577s
TL-208	3442.23	860.56	42.	5.	0.003	307.93	1.585
NB-94	3484.36	871.10	23.	5.	0.003	133.46	1.592s
EU-154	3492.89	873.23	24.	5.	0.003	140.68	1.593s
PA-234	3522.10	880.53	85.	-16.	-0.009	86.90	1.598s
PA-234	3532.94	883.24	101.	-2.	-0.001	879.09	1.599s
AG-110M	3538.71	884.68	85.	12.	0.006	115.53	1.600s
Sc-46	3557.10	889.28	111.	-18.	-0.010	87.71	1.603
y-88	3592.14	898.04	47.	-11.	-0.006	139.26	1.608s
AC-228	3645.16	911.29	13.	150.	0.084	9.48	1.233s
AG-110M	3749.96	937.49	25.	0.	0.000	1000.00	1.633s
PA-234	3784.07	946.02	25.	-2.	-0.001	578.81	1.638s
AC-228	3876.36	969.09	7.	94.	0.052	11.77	1.643
EU-154	3985.31	996.33	32.	18.	0.010	50.61	1.668s
PA-234M	4003.99	1001.00	53.	6.	0.003	172.69	1.671s
EU-154	4019.10	1004.77	60.	10.	0.006	113.05	1.673
Co-56	4151.36	1037.84	30.	-3.	-0.002	351.44	1.693s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	4192.29	1048.07	20.	7.	0.004	97.94	1.698s
RH-106	4201.45	1050.36	46.	-11.	-0.006	92.26	1.700s
BI-207	4254.65	1063.66	25.	0.	0.000	1000.00	1.708
Ga-68	4309.61	1077.40	20.	0.	0.000	1000.00	1.716s
FE-59	4397.02	1099.25	35.	-14.	-0.008	75.93	1.728s
EU-152	4448.32	1112.07	105.	-16.	-0.009	94.14	1.736s
ZN-65	4462.20	1115.55	89.	-16.	-0.009	87.17	1.738
BI-214	4481.17	1120.29	10.	30.	0.017	23.76	1.740D
Sc-46	4482.22	1120.55	66.	12.	0.006	102.50	1.740
Ta-182	4485.22	1121.30	66.	10.	0.006	117.14	1.741s
CO-60	4692.97	1173.24	20.	12.	0.007	84.81	1.770s
Ta-182	4756.23	1189.05	10.	29.	0.016	30.63	1.779
Ta-182	4885.67	1221.41	43.	-7.	-0.004	226.05	1.797
Co-56	4953.16	1238.28	32.	2.	0.001	646.79	1.806s
NA-22	5098.16	1274.53	12.	9.	0.005	64.61	1.826s
EU-154	5098.22	1274.54	36.	-10.	-0.005	93.28	1.826s
FE-59	5166.43	1291.60	16.	-2.	-0.001	460.07	1.835s
CO-60	5330.06	1332.50	19.	-3.	-0.002	273.64	1.857s
AG-110M	5537.25	1384.30	16.	-7.	-0.004	129.99	1.884s
EU-152	5632.07	1408.00	5.	7.	0.004	89.58	1.896s
K-40	5843.15	1460.77	4.	349.	0.194	5.41	1.846
La-140	6384.93	1596.21	17.	-9.	-0.005	112.49	1.990s
SB-124	6764.03	1690.98	6.	1.	0.001	427.57	2.034s
BI-214	7058.07	1764.49	20.	7.	0.004	93.15	2.067s
Co-56	7085.51	1771.35	28.	-1.	-0.001	754.98	2.070s
y-88	7344.36	1836.06	23.	-13.	-0.007	92.52	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.7904E+00				5.31E+01	
			477.60	3.790E+00	?(	1.356E+01 1.06E+02 1.05E+01	G
NA-22	C	7.1919E-01				9.50E+02	
			1274.53	7.192E-01	&(	1.528E+00 6.46E+01 9.99E+01	G
K-40	N	2.9512E+02				4.66E+11	
			1460.83	2.951E+02	(P	9.713E+00 5.41E+00 1.07E+01	G
Sc-46	F	-1.0375E+00				8.38E+01	
			889.28	-1.038E+00	?(	3.046E+00 8.77E+01 1.00E+02	G
			1120.55	8.362E-01	+	2.901E+00 1.02E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-4.0752E+00					2.77E+01	
			320.08	-4.075E+00	&(P	1.600E+01	2.25E+02	9.94E+00 G
MN-54	C	5.2099E-01					3.12E+02	
			834.85	5.210E-01	?(	1.275E+00	1.04E+02	1.00E+02 G
FE-59	F	-1.7503E+00					4.45E+01	
			1099.25	-1.750E+00	?(P	3.779E+00	7.59E+01	5.65E+01 G
			1291.60	-3.749E-01	+	4.002E+00	4.60E+02	4.32E+01 G
Co-56	C	2.3170E-01					7.73E+01	
			846.77	2.286E-01	&(P	1.300E+00	2.33E+02	9.99E+01 G
			1238.28	2.364E-01	?(	3.436E+00	6.47E+02	6.61E+01 G
			1037.84	-1.438E+00	+ P	1.342E+01	3.51E+02	1.41E+01 G
			1771.35	-6.891E-01	+	1.886E+01	7.55E+02	1.55E+01 A
CO-57	C	4.0797E-01					2.72E+02	
			122.06	4.080E-01	?(	1.120E+00	8.25E+01	8.56E+01 G
			136.47	-4.376E+00	+	2.171E+01	1.49E+02	1.07E+01 G
CO-58	C	4.8361E-01					7.09E+01	
			810.78	4.836E-01	?(	1.937E+00	1.17E+02	9.95E+01 G
CO-60	F	3.1859E-01					1.93E+03	
			1332.50	-2.808E-01	?(P	1.932E+00	2.74E+02	1.00E+02 G
			1173.24	9.185E-01	&(	1.757E+00	8.48E+01	9.99E+01 G
ZN-65	F	-2.2539E+00					2.44E+02	
			1115.55	-2.254E+00	?(	6.584E+00	8.72E+01	5.06E+01 G
NB-94	I	3.2693E-01					7.41E+06	
			702.63	3.454E-01	&(	1.624E+00	2.00E+02	9.79E+01 G
			871.10	3.088E-01	?(	1.442E+00	1.33E+02	9.99E+01 G
ZR-95	I	2.1704E+00					6.40E+01	
			756.73	2.170E+00	?(	2.583E+00	5.31E+01	5.45E+01 G
			724.20	8.789E-01	&	6.338E+00	2.11E+02	4.42E+01 G
NB-95	I	1.2137E-01					6.40E+01	
			765.79	1.214E-01	&(	2.327E+00	5.51E+02	9.98E+01 G
RU-103	I	1.6227E-01					3.93E+01	
			497.05	1.623E-01	?(P	1.209E+00	3.01E+02	9.09E+01 G
			610.30	0.000E+00	-	6.020E+01	1.00E+03	5.75E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -7.2734E-01				1.53E+05		
		433.94	-7.273E-01	?(	1.657E+00	9.65E+01	9.05E+01 G
		722.94	-5.290E-01	+	3.283E+00	1.83E+02	9.08E+01 G
		614.28	0.000E+00	+	3.874E+00	1.00E+03	8.98E+01 G
AG-110M	F 7.4721E-01				2.50E+02		
		884.68	9.407E-01	?(	3.683E+00	1.16E+02	7.27E+01 G
		657.76	5.986E-01	?(	1.482E+00	7.42E+01	9.46E+01 G
		937.49	0.000E+00	-	4.660E+00	1.00E+03	3.44E+01 G
		1384.30	-2.520E+00	+ P	7.583E+00	1.30E+02	2.43E+01 G
		763.94	-2.715E+00	& P	8.419E+00	9.19E+01	2.23E+01 G
SB-124	F 8.1708E-02				6.02E+01		
		602.73	-1.752E-02	%(	3.489E+00	5.84E+03	9.83E+01 G
		1690.98	2.857E-01	?(	2.958E+00	4.28E+02	4.78E+01 G
		722.79	-7.146E+00	+	2.890E+01	1.20E+02	1.08E+01 G
SB-125	I 2.4420E+00				1.01E+03		
		427.88	1.386E+00	(	3.158E+00	9.12E+01	2.96E+01 G
		600.50	-3.307E+00	+	1.959E+01	1.76E+02	1.79E+01 G
		635.89	-5.373E+00	+	1.371E+01	7.64E+01	1.13E+01 G
		463.37	5.429E+00	(	1.646E+01	9.04E+01	1.05E+01 G
I-131	I 3.7279E-01				8.02E+00		
		364.48	2.371E-02	%(P	1.346E+00	2.22E+03	8.17E+01 G
		284.30	2.552E+00	?(P	1.758E+01	2.75E+02	6.14E+00 G
		636.97	2.484E+00	?(	2.507E+01	2.90E+02	7.17E+00 G
Gd-153	F -1.6870E+00				2.42E+02		
		97.50	-1.687E+00	?(	7.617E+00	1.36E+02	3.00E+01 G
		103.20	-2.207E+00	+	1.194E+01	1.63E+02	2.18E+01 G
Tc-99m	I -5.3824E-01				2.51E-01		
		140.51	-5.382E-01	?(	2.635E+00	1.47E+02	8.93E+01 G
BA-133	F -1.3825E-01				3.85E+03		
		356.00	-9.351E-01	(P	4.156E+00	8.57E+01	6.20E+01 G
		302.85	2.559E+00	&(	1.553E+01	1.81E+02	1.83E+01 G
		383.84	-6.321E+00	+	2.158E+01	1.02E+02	8.94E+00 GA
		80.99	-1.573E+00	+	8.009E+00	1.53E+02	3.41E+01 GA
CS-134	I 9.0717E-01				7.54E+02		
		604.71	0.000E+00	?(	3.519E+00	1.00E+03	9.76E+01 G
		795.87	7.525E-01	&(	2.147E+00	8.48E+01	8.55E+01 G
		569.32	-3.870E+00	+	1.083E+01	8.35E+01	1.54E+01 G
		801.95	7.473E+00	&(	2.337E+01	9.27E+01	8.69E+00 G
		563.24	6.263E+00	&(	1.533E+01	1.02E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	-3.0722E-01					1.10E+04	
			661.66	-3.072E-01	&(P	2.214E+00	2.00E+02	8.52E+01 G
CE-139	F	-5.9759E-01					1.38E+02	
			165.85	-5.976E-01	?(	1.817E+00	9.14E+01	7.99E+01 G
Ba-140	I	2.5141E+00					1.28E+01	
			537.26	1.020E+00	?(P	5.311E+00	2.13E+02	2.44E+01 G
			162.66	-3.066E+00	+	2.245E+01	2.17E+02	6.22E+00 G
			304.85	1.101E+01	?(	6.775E+01	1.84E+02	4.29E+00 G
La-140	I	-9.1853E-01					1.28E+01	
			1596.21	-9.185E-01	?(	2.237E+00	1.12E+02	9.54E+01 G
			487.02	-6.055E-01	&	4.199E+00	2.03E+02	4.55E+01 G
			328.76	-1.409E-01	& P	1.347E+01	3.25E+03	2.03E+01 G
			815.77	0.000E+00	+	8.981E+00	1.00E+03	2.33E+01 G
CE-141	I	-1.0260E+00					3.25E+01	
			145.44	-1.026E+00	&(	5.131E+00	1.50E+02	4.82E+01 G
CE-144	I	-4.1680E+00					2.85E+02	
			133.54	-4.168E+00	?(	2.016E+01	1.45E+02	1.11E+01 G
PM-144	C	-5.1935E-01					3.63E+02	
			696.54	-5.194E-01	?(P	1.674E+00	1.07E+02	9.90E+01 G
			618.06	0.000E+00	+	3.530E+00	1.00E+03	9.91E+01 G
EU-154	I	5.1567E+00					3.14E+03	
			873.23	2.441E+00	&(	1.203E+01	1.41E+02	1.23E+01 G
			123.10	-3.573E-01	- P	2.544E+00	2.44E+02	4.08E+01 G
			1274.54	-2.194E+00	&	6.946E+00	9.33E+01	3.52E+01 G
			723.36	0.000E+00	&	1.430E+01	1.00E+03	2.02E+01 G
			1004.77	3.652E+00	?(	1.405E+01	1.13E+02	1.80E+01 G
			996.33	1.086E+01	&(	1.765E+01	5.06E+01	1.06E+01 G
EU-155	I	3.0754E+00					1.81E+03	
			105.31	3.075E+00	(	3.696E+00	3.76E+01	2.12E+01 G
			86.54	1.698E+00	}	7.856E+00	6.68E+01	3.07E+01 G
HF-181	F	5.0023E-01					4.24E+01	
			482.00	5.002E-01	?(	1.922E+00	1.13E+02	8.05E+01 G
			133.02	-1.066E+00	+	5.015E+00	1.41E+02	4.33E+01 G
			345.83	-3.463E+00	+	1.701E+01	1.47E+02	1.51E+01 G
			136.30	-7.984E+00	&	3.907E+01	1.47E+02	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	5.6719E+00					1.14E+02	
			1121.30	2.089E+00	?(	8.325E+00	1.17E+02	3.49E+01 G
			1221.41	-1.905E+00	+	9.475E+00	2.26E+02	2.70E+01 G
			1189.05	1.339E+01	?(P	8.200E+00	3.06E+01	1.62E+01 G
Hg-203	F	-5.5721E-01					4.66E+01	
			279.20	-5.572E-01	?(	1.730E+00	9.28E+01	8.15E+01 G
TL-208	N	1.1148E+01					6.98E+02	
			583.02	1.115E+01	(P	1.237E+00	7.88E+00	8.45E+01 G
			277.28	1.450E+01	+ P	1.223E+01	3.74E+01	6.31E+00 G
			860.56	2.088E+00	- P	1.525E+01	3.08E+02	1.24E+01 G
pm-146	C	5.8495E-01					2.02E+03	
			747.16	-4.486E-01	&(	4.093E+00	3.79E+02	3.40E+01 G
			735.72	2.023E+00	?(	4.494E+00	9.36E+01	2.25E+01 G
			453.88	6.278E-01	&(	1.472E+00	9.73E+01	6.50E+01 G
y-88	F	-6.7567E-01					1.07E+02	
			898.04	-6.757E-01	&(	2.188E+00	1.39E+02	9.37E+01 G
			1836.06	-1.406E+00	+	2.763E+00	9.25E+01	9.92E+01 G
Cd-113m		3.6475E+02					5.33E+03	
			263.70	3.648E+02	%(	2.181E+04	1.73E+03	6.00E-03 K
Cf-251	T	-1.6687E+00					3.28E+05	
			176.60	-1.669E+00	?(	5.972E+00	1.40E+02	1.70E+01 G
			227.00	-2.164E+00	+	1.836E+01	3.42E+02	6.30E+00 GA
Cf-249	T	-3.2219E-01					1.28E+05	
			387.95	-3.222E-01	?(	3.064E+00	2.80E+02	6.60E+01 G
			333.44	0.000E+00	+	1.781E+01	1.00E+03	1.55E+01 G
Sn-126		-1.0180E+00					3.65E+07	
			87.57	1.323E+00	}	5.773E+00	6.81E+01	3.75E+01 GA
			64.28	-1.018E+00	&(	2.200E+01	6.42E+02	9.70E+00 G
			86.94	-5.505E+00	}	2.554E+01	1.39E+02	9.04E+00 GA
PB-210	N	-1.9076E+01					8.14E+03	
			46.54	-1.908E+01	?(P	5.936E+01	5.10E+01	4.25E+00 G
PB-212	N	3.4935E+01					6.98E+02	
			238.63	3.493E+01	(P	1.677E+00	3.90E+00	4.33E+01 G
			300.03	1.402E+01	- P	8.820E+01	1.88E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.6513E+01					5.84E+05	
			351.93	1.612E+01	(P	1.954E+00	8.12E+00	3.76E+01 G
			295.09	1.728E+01	(	4.161E+00	1.08E+01	1.93E+01 G
			242.00	2.200E+01	+	1.434E+01	2.18E+01	7.43E+00 GA
BI-207	C	5.2625E-01					1.18E+04	
			569.70	5.263E-01	?(	1.591E+00	8.98E+01	9.77E+01 G
			1063.66	0.000E+00	-	2.393E+00	1.00E+03	7.45E+01 G
BI-212	N	5.9893E+01					6.98E+02	
			727.17	5.989E+01	@(P	8.665E+00	1.18E+01	7.55E+00 G
			785.42	-1.172E+01	- P	1.433E+02	2.26E+02	1.28E+00 GA
BI-214	N	1.3490E+01					5.84E+05	
			609.31	1.329E+01	(P	1.711E+00	9.63E+00	4.61E+01 G
			1120.29	1.411E+01	(P	8.294E+00	2.38E+01	1.51E+01 G
			1764.49	5.063E+00	-	1.614E+01	9.32E+01	1.54E+01 G
BI-210M	T	3.2885E-01					1.10E+09	
			265.83	3.289E-01	?(P	2.188E+00	2.67E+02	5.00E+01 G
			304.90	2.067E-01	%	1.054E+01	1.51E+03	2.80E+01 G
AC-228	N	3.2305E+01					2.10E+03	
			911.07	3.115E+01	(	3.997E+00	9.48E+00	2.90E+01 G
			968.97	3.420E+01	(	5.345E+00	1.18E+01	1.75E+01 G
			338.32	3.235E+01	@(	8.946E+00	1.47E+01	1.20E+01 G
			93.35	8.740E+00	-	3.728E+01	1.28E+02	5.56E+00 XA
TH-227	N	-9.6225E-02					7.95E+03	
			50.14	-7.581E+00	?(	3.082E+01	1.22E+02	8.00E+00 G
			256.24	8.458E+00	(	1.021E+01	4.64E+01	7.00E+00 G
TH-229	N	1.2655E+01					2.68E+06	
			193.51	9.923E+00	*(	2.369E+01	9.37E+01	4.40E+00 G
			210.85	1.668E+01	?(P	4.186E+01	1.03E+02	2.99E+00 G
TH-234	N	1.2673E+01					1.63E+12	
			63.29	1.267E+01	(P	3.097E+01	7.38E+01	3.81E+00 G
			92.59	4.454E+00	- P	2.168E+01	1.45E+02	5.58E+00 G
PA-231	N	2.0585E+00					1.20E+07	
			302.65	0.000E+00	&(	1.030E+02	1.00E+03	2.88E+00 G
			300.07	4.468E+00	?(	1.193E+02	7.94E+02	2.46E+00 G
PA-233	C	-4.8517E-03					7.82E+08	
			312.01	-4.852E-03	%(P	8.363E+00	5.11E+04	3.60E+01 G
			300.18	0.000E+00	+	4.753E+01	1.00E+03	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -5.6245E-01                                     1.63E+12
                          131.29-2.548E+00 ?(  1.215E+01 1.43E+02 1.80E+01 G
                          946.02-1.118E+00 + P 1.213E+01 5.79E+02 1.34E+01 G
                          569.47 3.795E+00 ?(  1.946E+01 1.49E+02 8.20E+00 G
                          883.24-9.898E-01 +   3.021E+01 8.79E+02 9.60E+00 G
                          880.53-1.528E+01 +   4.452E+01 8.69E+01 6.00E+00 GA

PA-234M  N   9.5297E+01                                     1.63E+12
                         1001.00 4.787E+01 &(P 2.852E+02 1.73E+02 8.37E-01 G
                          766.41 2.303E+02 &(P 6.547E+02 8.47E+01 2.94E-01 G

U-235    N  -5.1575E+00                                     2.57E+11
                          143.79-5.157E+00  (P 2.141E+01 6.77E+01 1.10E+01 G
                          205.33-7.803E+00 + P 2.400E+01 1.05E+02 5.01E+00 G
                          163.38 1.602E+00 + P 2.362E+01 4.34E+02 5.08E+00 G

AM-241   T  -4.5720E-01                                     1.58E+05
                           59.54-4.572E-01 ?(P 6.569E+00 4.25E+02 3.59E+01 G

Ir-192   F   4.7180E-01                                     7.40E+01
                          316.49 1.451E-01 ?(  1.497E+00 3.00E+02 8.70E+01 G
                          468.06 1.021E+00 ?(  3.281E+00 9.56E+01 5.18E+01 G
                          308.44 0.000E+00 &   9.396E+00 1.00E+03 3.18E+01 G

Cs-136   F  -8.4137E-01                                     1.30E+01
                          818.50-8.414E-01 ?(  2.541E+00 9.00E+01 1.00E+02 G
                         1048.07 5.922E-01 +   1.992E+00 9.79E+01 8.00E+01 G
                          340.57 0.000E+00 +   5.991E+00 1.00E+03 4.69E+01 G

Np-239   T  -9.4018E-01                                     2.36E+00
                          103.70-2.005E+00 +   1.063E+01 1.60E+02 2.40E+01 X
                          106.13-9.402E-01 ?(  1.125E+01 3.59E+02 2.27E+01 G
                           99.50-3.218E+00 +   1.811E+01 1.69E+02 1.50E+01 X

Nd-147       1.4230E+00                                     1.11E+01
                          531.00 1.278E+00 &(  8.889E+00 2.81E+02 1.30E+01 G
                           91.10 1.490E+00 ?(  7.648E+00 1.54E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
```

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	360.	-29.	-0.016	50.97	-1.908E+01	P
AM-241	59.54	659.	-9.	-0.005	425.17	-4.572E-01	P
BA-133	80.99	1574.	-37.	-0.020	153.19	-1.573E+00	
Nd-147	91.10	1106.	31.	0.017	154.18	1.490E+00	
Gd-153	97.50	1289.	-38.	-0.021	135.82	-1.687E+00	
Np-239	99.50	1847.	-36.	-0.020	169.32	-3.218E+00	
Gd-153	103.20	1714.	-36.	-0.020	162.72	-2.207E+00	
Np-239	103.70	1648.	-36.	-0.020	159.55	-2.005E+00	
Np-239	106.13	1659.	-16.	-0.009	359.03	-9.402E-01	
EU-152	121.78	363.	-30.	-0.017	90.94	-1.417E+00	
CO-57	122.06	218.	26.	0.014	82.50	4.080E-01	
EU-154	123.10	256.	-11.	-0.006	244.41	-3.573E-01	P
PA-234	131.29	1137.	-34.	-0.019	143.31	-2.548E+00	
HF-181	133.02	1110.	-34.	-0.019	141.44	-1.066E+00	
CE-144	133.54	1174.	-34.	-0.019	145.35	-4.168E+00	
HF-181	136.30	1207.	-34.	-0.019	147.10	-7.984E+00	
CO-57	136.47	1241.	-34.	-0.019	149.08	-4.376E+00	
Tc-99m	140.51	1169.	-33.	-0.018	147.11	-5.382E-01	
U-235	143.79	1209.	-40.	-0.022	67.66	-5.157E+00	P
CE-141	145.44	1327.	-34.	-0.019	150.35	-1.026E+00	
Ba-140	162.66	353.	-12.	-0.007	217.41	-3.066E+00	
U-235	163.38	256.	5.	0.003	434.04	1.602E+00	P
CE-139	165.85	391.	-31.	-0.017	91.39	-5.976E-01	
Cf-251	176.60	169.	-18.	-0.010	139.57	-1.669E+00	
TH-229	193.51	154.	25.	0.014	93.69	9.923E+00	
U-235	205.33	189.	-22.	-0.012	105.37	-7.803E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	210.85	197.	27.	0.015	103.02	1.668E+01	P
Cf-251	227.00	148.	-7.	-0.004	342.36	-2.164E+00	
BI-210M	265.83	102.	7.	0.004	266.51	3.289E-01	P
Hg-203	279.20	160.	-20.	-0.011	92.82	-5.572E-01	
I-131	284.30	88.	7.	0.004	275.08	2.552E+00	P
PA-231	300.07	646.	5.	0.003	793.80	4.468E+00	
BA-133	302.85	598.	19.	0.011	181.35	2.559E+00	
Ba-140	304.85	617.	19.	0.011	183.97	1.101E+01	
Ir-192	316.49	110.	5.	0.003	300.00	1.451E-01	
CR-51	320.08	164.	-16.	-0.009	224.82	-4.075E+00	P
HF-181	345.83	388.	-19.	-0.011	146.56	-3.463E+00	
BA-133	356.00	375.	-21.	-0.012	85.67	-9.351E-01	P
BA-133	383.84	181.	-19.	-0.011	101.89	-6.321E+00	
Cf-249	387.95	197.	-7.	-0.004	279.58	-3.222E-01	
SB-125	427.88	32.	13.	0.007	91.25	1.386E+00	
AG-108M	433.94	87.	-20.	-0.011	96.51	-7.273E-01	
pm-146	453.88	30.	12.	0.007	97.27	6.278E-01	
SB-125	463.37	104.	17.	0.009	90.43	5.429E+00	
Ir-192	468.06	99.	15.	0.008	95.60	1.021E+00	
BE-7	477.60	66.	11.	0.006	105.55	3.790E+00	
HF-181	482.00	77.	11.	0.006	113.34	5.002E-01	
La-140	487.02	119.	-8.	-0.004	203.00	-6.055E-01	
RU-103	497.05	35.	4.	0.002	300.74	1.623E-01	P
RH-106	511.86	77.	85.	0.047	29.08	1.581E+01	
Nd-147	531.00	35.	4.	0.002	281.48	1.278E+00	
Ba-140	537.26	44.	6.	0.004	212.98	1.020E+00	P
CS-134	563.24	39.	13.	0.007	101.90	6.263E+00	
CS-134	569.32	68.	-15.	-0.008	83.51	-3.870E+00	
PA-234	569.47	62.	8.	0.004	149.29	3.795E+00	
SB-125	600.50	293.	-14.	-0.008	175.95	-3.307E+00	
SB-125	635.89	48.	-14.	-0.008	76.39	-5.373E+00	
I-131	636.97	65.	4.	0.002	290.11	2.484E+00	
AG-110M	657.76	36.	12.	0.007	74.15	5.986E-01	
CS-137	661.66	68.	-6.	-0.003	200.47	-3.072E-01	P
PM-144	696.54	47.	-11.	-0.006	106.70	-5.194E-01	P
NB-94	702.63	42.	7.	0.004	200.00	3.454E-01	
SB-124	722.79	168.	-16.	-0.009	120.17	-7.146E+00	
AG-108M	722.94	153.	-10.	-0.005	182.73	-5.290E-01	
ZR-95	724.20	133.	8.	0.004	211.38	8.789E-01	
pm-146	735.72	14.	9.	0.005	93.62	2.023E+00	
pm-146	747.16	28.	-3.	-0.002	378.59	-4.486E-01	
ZR-95	756.73	28.	23.	0.013	53.07	2.170E+00	
AG-110M	763.94	52.	-12.	-0.006	91.92	-2.715E+00	P
NB-95	765.79	81.	2.	0.001	550.51	1.214E-01	
PA-234M	766.41	54.	13.	0.007	84.65	2.303E+02	P
EU-152	778.92	33.	-7.	-0.004	160.37	-2.808E+00	P
CS-134	795.87	46.	12.	0.007	84.81	7.525E-01	
CS-134	801.95	56.	12.	0.007	92.65	7.473E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.78	49.	9.	0.005	117.19	4.836E-01		
Cs-136	818.50	88.	-15.	-0.009	90.00	-8.414E-01		
MN-54	834.85	19.	9.	0.005	103.51	5.210E-01		
Co-56	846.77	19.	4.	0.002	232.86	2.286E-01		P
NB-94	871.10	23.	5.	0.003	133.46	3.088E-01		
EU-154	873.23	24.	5.	0.003	140.68	2.441E+00		
PA-234	880.53	85.	-16.	-0.009	86.90	-1.528E+01		
PA-234	883.24	101.	-2.	-0.001	879.09	-9.898E-01		
AG-110M	884.68	85.	12.	0.006	115.53	9.407E-01		
Sc-46	889.28	111.	-18.	-0.010	87.71	-1.038E+00		
y-88	898.04	47.	-11.	-0.006	139.26	-6.757E-01		
PA-234	946.02	25.	-2.	-0.001	578.81	-1.118E+00		P
EU-154	996.33	32.	18.	0.010	50.61	1.086E+01		
PA-234M	1001.00	53.	6.	0.003	172.69	4.787E+01		P
EU-154	1004.77	60.	10.	0.006	113.05	3.652E+00		
Co-56	1037.84	30.	-3.	-0.002	351.44	-1.438E+00		P
Cs-136	1048.07	20.	7.	0.004	97.94	5.922E-01		
RH-106	1050.36	46.	-11.	-0.006	92.26	-4.781E+01		
FE-59	1099.25	35.	-14.	-0.008	75.93	-1.750E+00		P
EU-152	1112.07	105.	-16.	-0.009	94.14	-8.330E+00		
ZN-65	1115.55	89.	-16.	-0.009	87.17	-2.254E+00		
Sc-46	1120.55	66.	12.	0.006	102.50	8.362E-01		
CO-60	1173.24	20.	12.	0.007	84.81	9.185E-01		
Co-56	1238.28	32.	2.	0.001	646.79	2.364E-01		
NA-22	1274.53	12.	9.	0.005	64.61	7.192E-01		
EU-154	1274.54	36.	-10.	-0.005	93.28	-2.194E+00		
FE-59	1291.60	16.	-2.	-0.001	460.07	-3.749E-01		
CO-60	1332.50	19.	-3.	-0.002	273.64	-2.808E-01		P
AG-110M	1384.30	16.	-7.	-0.004	129.99	-2.520E+00		P
EU-152	1408.00	5.	7.	0.004	89.58	2.715E+00		P
La-140	1596.21	17.	-9.	-0.005	112.49	-9.185E-01		
SB-124	1690.98	6.	1.	0.001	427.57	2.857E-01		
Co-56	1771.35	28.	-1.	-0.001	754.98	-6.891E-01		
y-88	1836.06	23.	-13.	-0.007	92.52	-1.406E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.7904E+00	3.7904E+00	1.056E+02%	1.36E+01
NA-22	#A	7.1919E-01	7.1919E-01	6.461E+01%	1.53E+00
K-40		2.9512E+02	2.9512E+02	5.406E+00%	9.71E+00
Sc-46	#A	-1.0375E+00	-1.0375E+00	8.771E+01%	3.05E+00
CR-51	#A	-4.0751E+00	-4.0752E+00	2.248E+02%	1.60E+01
MN-54	#A	5.2099E-01	5.2099E-01	1.035E+02%	1.28E+00

FE-59	#A	-1.7503E+00	-1.7503E+00	7.593E+01%	3.78E+00
Co-56	#A	2.3170E-01	2.3170E-01	2.329E+02%	1.30E+00
CO-57	#A	4.0797E-01	4.0797E-01	8.250E+01%	1.12E+00
CO-58	#A	4.8360E-01	4.8361E-01	1.172E+02%	1.94E+00
CO-60	#A	3.1859E-01	3.1859E-01	8.481E+01%	1.93E+00
ZN-65	#A	-2.2539E+00	-2.2539E+00	8.717E+01%	6.58E+00
NB-94	#A	3.2693E-01	3.2693E-01	1.202E+02%	1.62E+00
ZR-95	#A	2.1704E+00	2.1704E+00	5.307E+01%	2.58E+00
NB-95	#A	1.2137E-01	1.2137E-01	5.505E+02%	2.33E+00
RU-103	#A	1.6227E-01	1.6227E-01	3.007E+02%	1.21E+00
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.54E+01
AG-108M	#A	-7.2734E-01	-7.2734E-01	9.651E+01%	1.66E+00
AG-110M	#A	7.4720E-01	7.4721E-01	6.864E+01%	3.68E+00
SN-113	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.24E+00
SB-124	#A	8.1708E-02	8.1708E-02	4.276E+02%	3.49E+00
SB-125	#A	2.4420E+00	2.4420E+00	6.423E+01%	3.16E+00
I-131	#A	3.7277E-01	3.7279E-01	2.751E+02%	1.35E+00
Gd-153	#A	-1.6870E+00	-1.6870E+00	1.358E+02%	7.62E+00
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.81E+01
Tc-99m	#A	-5.3752E-01	-5.3824E-01	1.471E+02%	2.63E+00
BA-133	#A	-1.3825E-01	-1.3825E-01	8.567E+01%	4.16E+00
CS-134	#A	9.0717E-01	9.0717E-01	8.481E+01%	3.52E+00
CS-137	#A	-3.0722E-01	-3.0722E-01	2.005E+02%	2.21E+00
CE-139	#A	-5.9759E-01	-5.9759E-01	9.139E+01%	1.82E+00
Ba-140	#A	2.5140E+00	2.5141E+00	1.407E+02%	5.31E+00
La-140	#A	-9.1850E-01	-9.1853E-01	1.125E+02%	2.24E+00
CE-141	#A	-1.0260E+00	-1.0260E+00	1.503E+02%	5.13E+00
CE-144	#A	-4.1680E+00	-4.1680E+00	1.453E+02%	2.02E+01
PM-144	#A	-5.1935E-01	-5.1935E-01	1.067E+02%	1.67E+00
EU-152	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.07E+01
EU-154	#A	5.1567E+00	5.1567E+00	5.061E+01%	1.20E+01
EU-155	A	3.0754E+00	3.0754E+00	3.761E+01%	3.70E+00
HF-181	#A	5.0023E-01	5.0023E-01	1.133E+02%	1.92E+00
Ta-182	#A	5.6719E+00	5.6719E+00	3.063E+01%	8.33E+00
Hg-203	#A	-5.5720E-01	-5.5721E-01	9.282E+01%	1.73E+00
TL-208		1.1148E+01	1.1148E+01	7.885E+00%	1.24E+00
pm-146	#A	5.8495E-01	5.8495E-01	9.362E+01%	4.09E+00
y-88	#A	-6.7566E-01	-6.7567E-01	1.393E+02%	2.19E+00
Cd-113m	#B	3.6475E+02	3.6475E+02	1.735E+03%	2.18E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.97E+01
Cf-251	#A	-1.6687E+00	-1.6687E+00	1.396E+02%	5.97E+00
Cf-249	#A	-3.2219E-01	-3.2219E-01	2.796E+02%	3.06E+00
Sn-126	#A	-1.0180E+00	-1.0180E+00	6.425E+02%	2.20E+01
PB-210	#A	-1.9076E+01	-1.9076E+01	5.097E+01%	5.94E+01
PB-212		3.4935E+01	3.4935E+01	3.902E+00%	1.68E+00
PB-214		1.6513E+01	1.6513E+01	6.759E+00%	1.95E+00
BI-207	#A	5.2625E-01	5.2625E-01	8.978E+01%	1.59E+00
BI-212	#	5.9893E+01	5.9893E+01	1.175E+01%	8.66E+00
BI-214		1.3490E+01	1.3490E+01	9.629E+00%	1.71E+00

BI-210M#A	3.2885E-01	3.2885E-01	2.665E+02%	2.19E+00
AC-228	3.2305E+01	3.2305E+01	7.032E+00%	4.00E+00
TH-227 #A	-9.6225E-02	-9.6225E-02	4.641E+01%	3.08E+01
TH-229 #A	1.2655E+01	1.2655E+01	6.963E+01%	2.37E+01
TH-234 A	1.2673E+01	1.2673E+01	7.380E+01%	3.10E+01
PA-231 #A	2.0585E+00	2.0585E+00	6.384E+02%	1.03E+02
PA-233 #A	-4.8517E-03	-4.8517E-03	5.107E+04%	8.36E+00
PA-234 #A	-5.6245E-01	-5.6245E-01	1.035E+02%	1.21E+01
PA-234M#A	9.5297E+01	9.5297E+01	8.465E+01%	2.85E+02
U-235 #A	-5.1575E+00	-5.1575E+00	6.766E+01%	2.14E+01
AM-241 #A	-4.5720E-01	-4.5720E-01	4.252E+02%	6.57E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.91E+01
Ir-192 #A	4.7180E-01	4.7180E-01	9.560E+01%	1.50E+00
Cs-136 #A	-8.4135E-01	-8.4137E-01	9.000E+01%	2.54E+00
Np-239 #A	-9.4005E-01	-9.4018E-01	3.590E+02%	1.13E+01
Nd-147 #A	1.4230E+00	1.4230E+00	1.542E+02%	8.89E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 4.665E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 4.6647717E+02 Bq/Sample

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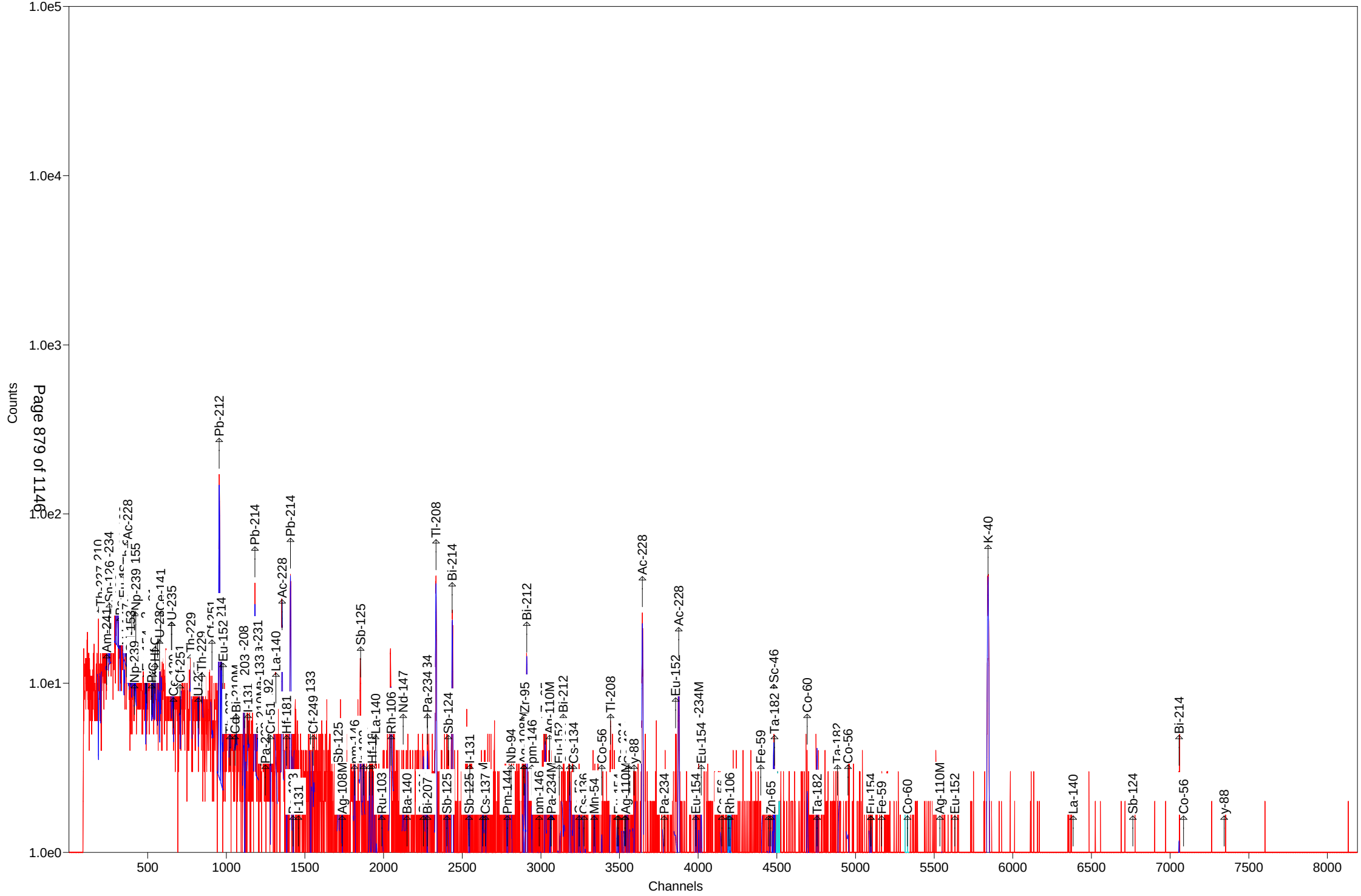
264535_Gamma_160-18554-A-20-B. 8_Gamma_20161405.spc.



Daily Checks

Test America
St. Louis
Background Check

Spectrum: 5_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:22:56 AM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.48	1.55	1.60	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 5_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 9/1/2016 5:54:21 AM
Detector: Detector # 5
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.91	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-1.60	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.43	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-0.81	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.90	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.98	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-1.74	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 7_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:23:40 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.28	1.40	1.45	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 7_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 9/1/2016 5:58:21 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.88	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	1.17	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.46	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.19	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.60	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.97	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-0.74	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 8_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:24:53 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.55	1.68	1.74	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 8_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 9/1/2016 6:01:22 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.51	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.84	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-0.36	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.34	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	0.95	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.62	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.81	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.50	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 12_20160901001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 9/1/2016 12:48:28 AM
Detector: Detector #12
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.87	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.76	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.47	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	0.39	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.68	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	1.98	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	1.44	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 12_20160901002_BG
Description: Background Contamination Check
Acquired: 9/1/2016 5:20:52 AM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.08	1.93	1.98	2.08	2.18	2.23	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 13_20160901001_QCAsLeft
Description: Quality control Check (QC Source 'I') Post Stabilization
Acquired: 9/1/2016 12:50:31 AM
Detector: Detector #13
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	1.02	0.00	0.00	0.85	2.12	2.22	PASS
ActivityDiff	638.00	-5.00	-4.00	1.83	4.00	5.00	PASS
QA-662							
FWHM	1.57	0.00	0.00	1.49	3.27	3.37	PASS
ActivityDiff	609.00	-5.00	-4.00	2.24	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.53	1333.01	1333.26	PASS
FWHM	2.08	0.00	0.00	2.11	4.28	4.38	PASS
ActivityDiff	1176.00	-5.00	-4.00	0.96	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 13_20160901002_BG
Description: Background Contamination Check
Acquired: 9/1/2016 5:21:34 AM
Detector: Detector #13
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.71	1.77	1.74	2.04	2.10	Low OOT

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 14_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:23:58 AM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.78	1.90	1.94	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 14_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 9/1/2016 5:48:04 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.68	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.88	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	0.95	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.43	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	0.34	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.43	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.89	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	1.28	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 15_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:24:43 AM
Detector: Detector #15
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.68	1.59	1.62	1.68	1.74	1.77	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 15_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'F') Post Stabilization
Acquired: 9/1/2016 5:48:11 AM
Detector: Detector #15
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.95	0.00	0.00	0.92	2.05	2.15	PASS
ActivityDiff	670.56	-5.00	-4.00	1.30	4.00	5.00	PASS
QA-662							
FWHM	1.51	0.00	0.00	1.48	3.21	3.31	PASS
ActivityDiff	668.76	-5.00	-4.00	0.49	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.75	1333.01	1333.26	PASS
FWHM	1.99	0.00	0.00	1.94	4.19	4.29	PASS
ActivityDiff	1277.79	-5.00	-4.00	1.69	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 16_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:26:09 AM
Detector: Detector #16
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.68	2.51	2.56	2.67	2.80	2.86	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 16_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'G') Post Stabilization
Acquired: 9/1/2016 5:48:23 AM
Detector: Detector #16
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	0.96	0.00	0.00	0.98	2.06	2.16	PASS
ActivityDiff	602.10	-5.00	-4.00	2.32	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.54	3.23	3.33	PASS
ActivityDiff	571.13	-5.00	-4.00	-2.49	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.78	1333.01	1333.26	PASS
FWHM	2.09	0.00	0.00	2.07	4.29	4.39	PASS
ActivityDiff	1139.05	-5.00	-4.00	0.22	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 17_20160901001_BG
Description: Background Contamination Check
Acquired: 9/1/2016 12:28:05 AM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.26	2.42	2.46	PASS

Analyst: Aaron Schroder Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 17_20160901002_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 9/1/2016 5:57:33 AM
Detector: Detector #17
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.61	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.79	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	2.73	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.37	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	0.40	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.57	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.88	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.26	4.00	5.00	PASS

Analyst: kody Saulters Reviewer: kody Saulters

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14353	96.2
Am-241	2037	418	0.3590	1163	1230.2	105.7
Cd-109	2881	591	0.0361	16363	16101	98.4
Co-57	1511	310	0.8560	362	347.72	96.1
Ce-139	2139	439	0.7990	549	538.4	98.1
Hg-203	4651	954	0.8146	1171	1208.4	103.2
Sn-113	3015	618	0.6400	966	972.07	100.6
Cs-137	1938	397	0.8510	467	462.35	99.0
Y-88	7264	1489	0.9370	1589	1559.3	98.1
Co-60	3580	734	0.9997	734	722.51	98.4
Co-60	3581	734	0.9999	734	739.67	100.7
Y-88	7690	1577	0.9920	1589	1613.8	101.5

Reviewed By: Jody Watson

Date: 3/27/2012

Calibration Data from file: 5_Soil_TunaCan.Clb
Energy Calibration Date: 3/27/2012 Time: 5:20:02 PM
Efficiency Calibration Date: 3/27/2012 Time: 5:20:37 PM

Calibration Description:
5_Soil_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1351 +0.249831*Channel +2.72022e-008*Channel**2
FWHM (ch) = 2.8138 +0.001050*Channel -2.57606e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.61	-0.15%	0.74	0.75	-1.17%
237.86	59.54	59.56	-0.04%	0.74	0.77	-4.07%
351.46	88.03	87.95	0.10%	0.80	0.79	1.28%
487.52	122.06	121.94	0.10%	0.85	0.83	2.66%
663.26	165.85	165.85	0.00%	0.88	0.87	0.98%
1116.90	279.17	279.20	-0.01%	0.97	0.99	-2.35%
1567.36	391.69	391.78	-0.02%	1.12	1.10	1.78%
2647.45	661.66	661.74	-0.01%	1.38	1.35	1.91%
3592.51	898.02	898.01	0.00%	1.55	1.56	-1.11%
4692.96	1173.24	1173.18	0.00%	1.77	1.79	-1.18%
5329.72	1332.50	1332.44	0.00%	1.93	1.92	0.31%
7342.77	1836.01	1836.05	-0.00%	2.29	2.29	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8682 %
Ln(Eff) = 0.6466 -0.783045*Ln(Eng) -0.0041175*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4296 %
Ln(Eff) = -24.6225 +9.075211*Ln(Eng) -0.966442*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7205E-002	1.7882E-002	-3.93%
59.54	2.6619E-002	2.5335E-002	4.82%
88.03	3.4045E-002	3.4617E-002	-1.68%
122.06	3.4394E-002	3.5819E-002	-4.15%
165.85	========== Knee ==========		
165.85	3.0704E-002	3.1331E-002	-2.04%
279.17	2.1030E-002	2.0365E-002	3.17%
391.69	1.5475E-002	1.5370E-002	0.68%
661.66	9.8486E-003	9.9244E-003	-0.77%
898.02	7.5404E-003	7.6837E-003	-1.90%
1173.24	6.0360E-003	6.1381E-003	-1.69%
1332.50	5.5560E-003	5.5144E-003	0.75%
1836.01	4.2722E-003	4.2078E-003	1.51%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/27/2012 5:22:03 PM
TestAmerica                      Spectrum name: 5_TunaCan_20120810.An1

Sample description
     5_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan_20120810.An1

Acquisition information
       Start time:                 3/26/2012 3:05:42 PM
       Live time:               3600
       Real time:               3652
       Dead time:                  1.44 %
       Detector ID:                   5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0527

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.61	38986.	0.74	0.74	1.793E-02	46.54	4.250	1.435E+04	Pb210
59.56	40041.	0.74	0.74	2.535E-02	59.54	35.700	1.230E+03	AM241
70.85	1493.	9.22	0.78	3.019E-02				
72.87	2354.	5.96	0.78	3.089E-02				
87.95	63754.	0.53	0.80	3.460E-02	88.03	3.610	1.610E+04	CD109
121.94	30888.	0.76	0.85	3.583E-02	122.06	85.600	3.477E+02	CO57
136.41	3768.	3.80	0.89	3.457E-02				
165.85	31597.	0.74	0.88	3.066E-02	165.85	79.900	5.384E+02	Ce139
279.20	20358.	0.87	0.97	2.036E-02	279.17	81.500	1.208E+03	Hg203
391.78	20611.	0.93	1.12	1.537E-02	391.69	64.000	9.721E+02	SN113
661.74	14000.	1.10	1.38	9.923E-03	661.66	85.210	4.623E+02	CS137
898.01	23228.	0.82	1.55	7.684E-03	898.02	93.700	1.559E+03	Y898
1173.18	15468.	0.93	1.77	6.138E-03	1173.24	99.900	7.225E+02	Co1173
1332.44	14238.	0.98	1.93	5.515E-03	1332.50	99.982	7.397E+02	Co1332
1836.04	13938.	0.87	2.30	4.208E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.16	72.88	8722.	2253.	7.295E+04	7.09	0.801	-
545.44	136.41	5274.	3768.	1.090E+05	3.80	0.888	-

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	12895.	38986.	10.829	0.74	0.743
AM-241	237.86	59.56	13293.	40041.	11.122	0.74	0.735
CD-109	351.46	87.95	12894.	63754.	17.710	0.53	0.805
CO-57	487.52	121.94	6935.	30888.	8.580	0.76	0.852
Ce-139	663.26	165.85	5616.	31597.	8.777	0.74	0.883
Hg-203	1116.90	279.20	2848.	20358.	5.655	0.87	0.966
SN-113	1567.36	391.78	3046.	20611.	5.725	0.93	1.119
CS-137	2647.45	661.74	1982.	14000.	3.889	1.10	1.380
Y-898	3592.51	898.01	1944.	23228.	6.452	0.82	1.547
Co-1173	4692.96	1173.18	847.	15468.	4.297	0.93	1.774
Co-1332	5329.75	1332.44	693.	14238.	3.955	0.98	1.927
Y-1836	7342.72	1836.04	102.	13938.	3.872	0.87	2.295

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4353E+04					8.15E+03
			46.54	1.435E+04	(	1.958E+02 7.44E-01 4.25E+00 G	
AM-241		1.2302E+03					1.58E+05
			59.54	1.230E+03	(	1.659E+01 7.44E-01 3.57E+01 G	
CD-109		1.6101E+04					4.63E+02
			88.03	1.610E+04	(	1.343E+02 5.28E-01 3.61E+00 G	
CO-57		3.4772E+02					2.72E+02
			122.06	3.477E+02	(	4.399E+00 7.60E-01 8.56E+01 G	

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3840E+02					1.38E+02	
		165.85	5.384E+02	(	5.997E+00	7.36E-01	7.99E+01 G
Hg-203	1.2084E+03					4.66E+01	
		279.17	1.208E+03	(	1.492E+01	8.69E-01	8.15E+01 G
SN-113	9.7207E+02					1.15E+02	
		391.69	9.721E+02	(	1.226E+01	9.31E-01	6.40E+01 G
CS-137	4.6235E+02					1.10E+04	
		661.66	4.623E+02	(	6.941E+00	1.10E+00	8.52E+01 G
Y-898	1.5593E+03					1.07E+02	
		898.02	1.559E+03	(	1.397E+01	8.19E-01	9.37E+01 G
Co-1173	7.2251E+02					1.93E+03	
		1173.24	7.225E+02	(	6.463E+00	9.30E-01	9.99E+01 G
Co-1332	7.3967E+02					1.93E+03	
		1332.50	7.397E+02	(	6.515E+00	9.82E-01	1.00E+02 G
Y-1836	1.6138E+03					1.07E+02	
		1836.01	1.614E+03	(	5.776E+00	8.71E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4250E+04	1.4353E+04	7.439E-01%	1.96E+02
AM-241	1.2297E+03	1.2302E+03	7.442E-01%	1.66E+01
CD-109	1.4172E+04	1.6101E+04	5.277E-01%	1.34E+02
CO-57	2.7983E+02	3.4772E+02	7.604E-01%	4.40E+00
Ce-139	3.5061E+02	5.3840E+02	7.359E-01%	6.00E+00
Hg-203	3.4071E+02	1.2084E+03	8.687E-01%	1.49E+01
SN-113	5.8200E+02	9.7207E+02	9.315E-01%	1.23E+01
CS-137	4.5987E+02	4.6235E+02	1.097E+00%	6.94E+00
Y-898	8.9620E+02	1.5593E+03	8.189E-01%	1.40E+01
Co-1173	7.0069E+02	7.2251E+02	9.300E-01%	6.46E+00
Co-1332	7.1733E+02	7.3967E+02	9.821E-01%	6.52E+00
Y-1836	9.2756E+02	1.6138E+03	8.711E-01%	5.78E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.5 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 2000.5 keV) 3.9848164E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	==========	Knee	==========
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  2/28/2014 11:43:43 AM
TestAmerica                      Spectrum name: 7_TunaCan_20120388.An1

Sample description
     7_TunaCan_90099_030512


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
       Start time:                 3/5/2012 2:07:36 PM
       Live time:               3600
       Real time:               3721
       Dead time:                  3.25 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0324

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.63	53946.	0.53	0.87	2.487E-02	46.54	4.250	1.428E+04	Pb210
59.57	59050.	0.65	0.86	3.704E-02	59.54	35.700	1.242E+03	AM241
70.74	2770.	6.58	0.90	4.527E-02				
72.95	4536.	4.27	0.90	4.661E-02				
88.03	100494.	0.43	0.91	5.328E-02	88.03	3.610	1.598E+04	CD109
121.99	50865.	0.71	0.97	5.606E-02	122.06	85.600	3.468E+02	CO57
136.41	6524.	3.77	0.93	5.411E-02				
165.76	54838.	0.57	1.00	4.767E-02	165.85	79.900	5.395E+02	Ce139
255.13	1772.	7.37	1.21	3.404E-02				
279.24	42776.	0.59	1.13	3.153E-02	279.17	81.500	1.199E+03	Hg203
391.73	36096.	0.66	1.21	2.360E-02	391.69	64.000	9.768E+02	SN113
661.68	21323.	0.77	1.47	1.492E-02	661.66	85.210	4.677E+02	CS137
898.03	39603.	0.63	1.66	1.137E-02	898.02	93.700	1.567E+03	Y898
1173.21	22788.	0.85	1.92	8.929E-03	1173.24	99.900	7.262E+02	Co1173
1332.49	20124.	0.85	2.02	7.951E-03	1332.50	99.982	7.196E+02	Co1332
1836.00	22787.	0.70	2.43	5.919E-03	1836.01	99.200	1.636E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.41	70.73	15146.	2828.	6.248E+04	6.43	0.896	-	D
291.25	72.94	16305.	4682.	1.005E+05	4.12	0.899	-	D
545.11	136.41	12980.	6524.	1.206E+05	3.77	0.932	-	
1020.07	255.13	4580.	1772.	5.204E+04	7.37	1.209	-	

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.73	46.58	19825.	55636.	15.454	0.65	0.856
AM-241	237.72	59.57	21942.	59050.	16.403	0.65	0.857
CD-109	351.56	88.03	21396.	100494.	27.915	0.43	0.912
CO-57	487.42	121.99	16859.	50865.	14.129	0.71	0.971
Ce-139	662.55	165.76	9893.	54838.	15.233	0.57	1.005
Hg-203	1116.52	279.24	5111.	42776.	11.882	0.59	1.126
SN-113	1566.54	391.73	4106.	36096.	10.027	0.66	1.211
CS-137	2646.33	661.66	2922.	21323.	5.923	0.77	1.466D
Y-898	3591.84	898.03	3210.	39603.	11.001	0.63	1.659
Co-1173	4692.50	1173.21	1804.	22788.	6.330	0.85	1.924
Co-1332	5329.58	1332.49	1286.	20124.	5.590	0.85	2.020
Y-1836	7343.30	1836.00	283.	22787.	6.330	0.70	2.426

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4726E+04					8.15E+03
			46.54	1.473E+04	(	1.744E+02 6.52E-01 4.25E+00 G	
AM-241		1.2416E+03					1.58E+05
			59.54	1.242E+03	(	1.457E+01 6.49E-01 3.57E+01 G	
CD-109		1.5976E+04					4.63E+02
			88.03	1.598E+04	(	1.088E+02 4.29E-01 3.61E+00 G	
CO-57		3.4677E+02					2.72E+02
			122.06	3.468E+02	(	4.144E+00 7.08E-01 8.56E+01 G	

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3948E+02					1.38E+02	
		165.85	5.395E+02	(	4.586E+00	5.65E-01	7.99E+01 G
Hg-203	1.1992E+03					4.66E+01	
		279.17	1.199E+03	(	9.415E+00	5.92E-01	8.15E+01 G
SN-113	9.7676E+02					1.15E+02	
		391.69	9.768E+02	(	8.153E+00	6.55E-01	6.40E+01 G
CS-137	4.6766E+02					1.10E+04	
		661.66	4.677E+02	(	5.584E+00	7.73E-01	8.52E+01 G
Y-898	1.5673E+03					1.07E+02	
		898.02	1.567E+03	(	1.056E+01	6.29E-01	9.37E+01 G
Co-1173	7.2623E+02					1.93E+03	
		1173.24	7.262E+02	(	6.394E+00	8.53E-01	9.99E+01 G
Co-1332	7.1964E+02					1.93E+03	
		1332.50	7.196E+02	(	6.072E+00	8.54E-01	1.00E+02 G
Y-1836	1.6357E+03					1.07E+02	
		1836.01	1.636E+03	(	5.819E+00	7.02E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA
Pb-210	1.4646E+04	1.4726E+04	6.521E-01%	1.74E+02
AM-241	1.2413E+03	1.2416E+03	6.489E-01%	1.46E+01
CD-109	1.4512E+04	1.5976E+04	4.292E-01%	1.09E+02
CO-57	2.9445E+02	3.4677E+02	7.076E-01%	4.14E+00
Ce-139	3.9059E+02	5.3948E+02	5.652E-01%	4.59E+00
Hg-203	4.6224E+02	1.1992E+03	5.917E-01%	9.42E+00
SN-113	6.6381E+02	9.7676E+02	6.552E-01%	8.15E+00
CS-137	4.6577E+02	4.6766E+02	7.730E-01%	5.58E+00
Y-898	1.0329E+03	1.5673E+03	6.291E-01%	1.06E+01
Co-1173	7.0966E+02	7.2623E+02	8.534E-01%	6.39E+00
Co-1332	7.0321E+02	7.1964E+02	8.542E-01%	6.07E+00
Y-1836	1.0780E+03	1.6357E+03	7.017E-01%	5.82E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (701.8 to 2000.2 keV) 3.620E+04 Bq
Total Decayed Activity (701.8 to 2000.2 keV) 4.0121711E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:               3600
       Real time:               3655
       Dead time:                  1.49 %
       Detector ID:                   8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4960E+04					8.15E+03		
			46.54	1.496E+04	(	2.033E+02	7.55E-01	4.25E+00	G
AM-241		1.2405E+03					1.58E+05		
			59.54	1.240E+03	(	1.715E+01	7.72E-01	3.57E+01	G
CD-109		1.6066E+04					4.63E+02		
			88.03	1.607E+04	(	1.353E+02	5.26E-01	3.61E+00	G
CO-57		3.4512E+02					2.72E+02		
			122.06	3.451E+02	(	4.486E+00	7.68E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge12
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14446	96.8
Am-241	2037	418	0.3590	1163	1221.2	105.0
Cd-109	2881	591	0.0361	16363	16047	98.1
Co-57	1511	310	0.8560	362	351.89	97.2
Ce-139	2139	439	0.7990	549	541.18	98.6
Hg-203	4651	954	0.8146	1171	1185.4	101.3
Sn-113	3015	618	0.6400	966	985.86	102.1
Cs-137	1938	397	0.8510	467	464.95	99.6
Y-88	7264	1489	0.9370	1589	1567.8	98.6
Co-60	3580	734	0.9997	734	723.38	98.5
Co-60	3581	734	0.9999	734	722.83	98.4
Y-88	7690	1577	0.9920	1589	1631.1	102.6

Reviewed By: Jody Watson

Date: 10/4/2012

Calibration Data from file: 12_Soil_TunaCan.Clb
Energy Calibration Date: 10/4/2012 Time: 8:58:25 AM
Efficiency Calibration Date: 10/4/2012 Time: 9:05:44 AM

Calibration Description:
12_TunaCanCal_90099_100212

Energy Calibration Fit
Energy = 0.0090 +0.250225*Channel -3.66218e-008*Channel**2
FWHM (ch) = 3.4167 +0.000958*Channel -2.51787e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.06	46.54	46.56	-0.05%	0.90	0.90	0.39%
237.95	59.54	59.55	-0.01%	0.89	0.91	-2.27%
351.83	88.03	88.04	-0.01%	0.93	0.94	-1.36%
487.89	122.06	122.08	-0.02%	0.97	0.97	0.15%
663.08	165.85	165.91	-0.04%	1.00	1.01	-0.90%
1115.49	279.17	279.09	0.03%	1.15	1.11	3.32%
1565.26	391.69	391.59	0.03%	1.21	1.21	-0.06%
2645.31	661.66	661.67	-0.00%	1.46	1.44	1.36%
3590.75	898.02	898.03	-0.00%	1.65	1.63	0.91%
4692.00	1173.24	1173.26	-0.00%	1.80	1.84	-2.15%
5329.54	1332.50	1332.55	-0.00%	1.94	1.95	-0.63%
7345.18	1836.01	1835.98	0.00%	2.29	2.27	0.67%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.6978 %
Ln(Eff) = -0.7827 -0.300127*Ln(Eng) -0.0336956*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.9642 %
Ln(Eff) = -22.8841 +8.352717*Ln(Eng) -0.881237*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.1587E-002	2.2292E-002	-3.26%
59.54	3.2562E-002	3.1219E-002	4.12%
88.03	4.1933E-002	4.2777E-002	-2.01%
122.06	4.3987E-002	4.5264E-002	-2.90%
165.85	==========	Knee	==========
165.85	4.0281E-002	4.0886E-002	-1.50%
279.17	2.9349E-002	2.8963E-002	1.31%
391.69	2.3406E-002	2.2919E-002	2.08%
661.66	1.5679E-002	1.5712E-002	-0.21%
898.02	1.2338E-002	1.2502E-002	-1.33%
1173.24	1.0026E-002	1.0183E-002	-1.57%
1332.50	9.0782E-003	9.2201E-003	-1.56%
1836.01	7.3324E-003	7.1442E-003	2.57%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  10/4/2012 9:11:35 AM
TestAmerica, Inc                Spectrum name: 12_TunaCan_20122189.An1

Sample description
     12_TunaCan_90099


Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20122189.An1

Acquisition information
       Start time:                 10/2/2012 10:17:00 AM
       Live time:               7200
       Real time:               7302
       Dead time:                  1.40 %
       Detector ID:                   12

Detector system
     Ge12 S/N10034336


Calibration
       Filename:                   12_Soil_TunaCan.Clb
     12_TunaCanCal_90099_100212


       Energy Calibration
            Created:               10/4/2012 8:58:25 AM
            Zero offset:           0.009 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.662E-08 keV/channel^2

       Efficiency Calibration
            Created:               10/4/2012 9:05:44 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.70 %
            Log(Eff):             -7.827468E-01 + (-3.001271E-01*Log(E) ) +
                                   ( -3.369562E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.96 %
            Log(Eff):             -2.288409E+01 + ( 8.352717E+00*Log(E) ) +
                                   ( -8.812368E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.54keV )
       Stop channel:            8000 (  1999.46keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0301

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.56	96262.	0.47	0.90	2.231E-02	46.54	4.250	1.445E+04	Pb210
59.55	97880.	0.49	0.89	3.122E-02	59.54	35.700	1.221E+03	AM241
88.04	118171.	0.40	0.93	4.278E-02	88.03	3.610	1.605E+04	CD109
122.08	48689.	0.66	0.97	4.526E-02	122.06	85.600	3.519E+02	CO57
136.52	6070.	3.34	0.99	4.419E-02				
165.91	31873.	0.80	1.00	4.088E-02	165.85	79.900	5.412E+02	Ce139
279.09	3381.	4.68	1.15	2.897E-02	279.17	81.500	1.185E+03	Hg203
391.58	19876.	1.11	1.21	2.292E-02	391.69	64.000	9.859E+02	SN113
661.67	44047.	0.60	1.46	1.571E-02	661.66	85.210	4.649E+02	CS137
898.03	22124.	1.09	1.65	1.250E-02	898.02	93.700	1.568E+03	Y898
1173.25	47992.	0.54	1.80	1.018E-02	1173.24	99.900	7.234E+02	Co1173
1332.54	43454.	0.53	1.94	9.220E-03	1332.50	99.982	7.228E+02	Co1332
1835.96	13783.	0.98	2.29	7.144E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.60	136.52	8754.	6070.	1.374E+05	3.34	0.989	-

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.06	46.56	27968.	96262.	13.370	0.47	0.903
AM-241	237.95	59.55	29903.	97880.	13.594	0.49	0.891
CD-109	351.83	88.04	24170.	118171.	16.413	0.40	0.926
CO-57	487.89	122.08	12523.	48689.	6.762	0.66	0.972
Ce-139	663.08	165.91	7948.	31873.	4.427	0.80	1.002
Hg-203	1115.49	279.09	5203.	3381.	0.470	4.68	1.152
SN-113	1565.25	391.58	5206.	19876.	2.760	1.11	1.214
CS-137	2645.31	661.67	4245.	44047.	6.118	0.60	1.464
Y-898	3590.75	898.03	4771.	22124.	3.073	1.09	1.649
Co-1173	4691.96	1173.25	2353.	47992.	6.666	0.54	1.802
Co-1332	5329.49	1332.54	1369.	43454.	6.035	0.53	1.941
Y-1836	7345.05	1835.95	424.	13925.	1.934	0.97	2.293

s - Peak fails shape tests. ✓
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4446E+04				8.15E+03	
			46.54	1.445E+04	(	1.174E+02 4.69E-01 4.25E+00	G
AM-241		1.2212E+03				1.58E+05	
			59.54	1.221E+03	(	1.009E+01 4.87E-01 3.57E+01	G
CD-109		1.6047E+04				4.63E+02	
			88.03	1.605E+04	(	9.875E+01 4.00E-01 3.61E+00	G
CO-57		3.5189E+02				2.72E+02	
			122.06	3.519E+02	(	3.789E+00 6.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.4118E+02					1.38E+02	
		165.85	5.412E+02	(	7.100E+00	8.00E-01	7.99E+01 G
Hg-203	1.1854E+03					4.66E+01	
		279.17	1.185E+03	(	1.188E+02	4.68E+00	8.15E+01 G
SN-113	9.8586E+02					1.15E+02	
		391.69	9.859E+02	(	1.681E+01	1.11E+00	6.40E+01 G
CS-137	4.6495E+02					1.10E+04	
		661.66	4.649E+02	(	3.233E+00	5.99E-01	8.52E+01 G
Y-898	1.5678E+03					1.07E+02	
		898.02	1.568E+03	(	2.300E+01	1.09E+00	9.37E+01 G
Co-1173	7.2338E+02					1.93E+03	
		1173.24	7.234E+02	(	3.448E+00	5.35E-01	9.99E+01 G
Co-1332	7.2283E+02					1.93E+03	
		1332.50	7.228E+02	(	2.913E+00	5.31E-01	1.00E+02 G
Y-1836	1.6311E+03					1.07E+02	
		1836.01	1.631E+03	(	1.156E+01	9.66E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4112E+04	1.4446E+04	4.686E-01%	1.17E+02
AM-241	1.2198E+03	1.2212E+03	4.873E-01%	1.01E+01
CD-109	1.0628E+04	1.6047E+04	3.995E-01%	9.87E+01
CO-57	1.7453E+02	3.5189E+02	6.590E-01%	3.79E+00
Ce-139	1.3551E+02	5.4118E+02	7.998E-01%	7.10E+00
Hg-203	1.9895E+01	1.1854E+03	4.682E+00%	1.19E+02
SN-113	1.8819E+02	9.8586E+02	1.108E+00%	1.68E+01
CS-137	4.5695E+02	4.6495E+02	5.986E-01%	3.23E+00
Y-898	2.6230E+02	1.5678E+03	1.088E+00%	2.30E+01
Co-1173	6.5520E+02	7.2338E+02	5.354E-01%	3.45E+00
Co-1332	6.5470E+02	7.2283E+02	5.311E-01%	2.91E+00
Y-1836	2.7290E+02	1.6311E+03	9.660E-01%	1.16E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.5 keV) 2.878E+04 Bq
Total Decayed Activity (37.5 to 1999.5 keV) 3.9888684E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector:	Ge13
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14299	95.8
Am-241	2037	418	0.3590	1163	1236	106.2
Cd-109	2881	591	0.0361	16363	16083	98.3
Co-57	1511	310	0.8560	362	346.19	95.7
Ce-139	2139	439	0.7990	549	539.42	98.3
Hg-203	4651	954	0.8146	1171	1201.9	102.7
Sn-113	3015	618	0.6400	966	968.01	100.2
Cs-137	1938	397	0.8510	467	474.76	101.7
Y-88	7264	1489	0.9370	1589	1545.1	97.2
Co-60	3580	734	0.9997	734	719.78	98.0
Co-60	3581	734	0.9999	734	727.89	99.1
Y-88	7690	1577	0.9920	1589	1632.3	102.7

Reviewed By: Jody Watson

Date: 3/29/2012

Calibration Data from file: 13_Soil_TunaCan.Clb
Energy Calibration Date: 3/29/2012 Time: 7:50:00 AM
Efficiency Calibration Date: 3/29/2012 Time: 7:50:26 AM

Calibration Description:
13_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0722 +0.250086*Channel -2.12895e-008*Channel**2
FWHM (ch) = 3.9604 +0.000908*Channel -1.76283e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.95	46.54	46.58	-0.08%	1.03	1.03	-0.55%
237.92	59.54	59.57	-0.05%	1.03	1.04	-1.74%
351.94	88.03	88.09	-0.06%	1.05	1.07	-1.59%
488.07	122.06	122.13	-0.05%	1.10	1.10	0.25%
663.06	165.85	165.88	-0.02%	1.17	1.14	2.38%
1115.49	279.17	279.01	0.06%	1.24	1.24	0.44%
1565.36	391.69	391.49	0.05%	1.36	1.33	1.77%
2646.08	661.66	661.67	-0.00%	1.55	1.56	-0.89%
3591.99	898.02	898.10	-0.01%	1.75	1.75	-0.09%
4693.06	1173.24	1173.27	-0.00%	1.96	1.96	-0.07%
5330.52	1332.50	1332.56	-0.00%	2.06	2.07	-0.45%
7345.62	1836.01	1835.96	0.00%	2.42	2.42	0.26%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9134 %
Ln(Eff) = -0.5308 -0.305775*Ln(Eng) -0.0343757*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.5969 %
Ln(Eff) = -22.9222 +8.455931*Ln(Eng) -0.892406*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.5932E-002	2.7053E-002	-4.32%
59.54	4.0139E-002	3.8023E-002	5.27%
88.03	5.1336E-002	5.2255E-002	-1.79%
122.06	5.2852E-002	5.5285E-002	-4.60%
165.85	==========	Knee	==========
165.85	4.9293E-002	5.0203E-002	-1.85%
279.17	3.6281E-002	3.5323E-002	2.64%
391.69	2.7897E-002	2.7825E-002	0.26%
661.66	1.9294E-002	1.8934E-002	1.86%
898.02	1.4585E-002	1.4999E-002	-2.84%
1173.24	1.1920E-002	1.2168E-002	-2.08%
1332.50	1.0902E-002	1.0995E-002	-0.86%
1836.01	8.7053E-003	8.4769E-003	2.62%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/29/2012 12:11:47 PM   Page  1
TestAmerica, Inc                Spectrum name: 13_TunaCan_20120186.An1

Sample description
     13_TunaCan_90099_032712


Spectrum Filename: C:\User\Cal\Spectra\Det13\13_TunaCan_20120186.An1

Acquisition information
       Start time:                 3/27/2012 3:23:25 PM
       Live time:               3600
       Real time:               3670
       Dead time:                  1.92 %
       Detector ID:                   13

Detector system
     Ge13 SN/10064006


Calibration
       Filename:                   13_Soil_TunaCan.Clb
     13_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/29/2012 7:50:00 AM
            Zero offset:           0.072 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.129E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/29/2012 7:50:26 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.308398E-01 + (-3.057754E-01*Log(E) ) +
                                   ( -3.437570E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.60 %
            Log(Eff):             -2.292218E+01 + ( 8.455931E+00*Log(E) ) +
                                   ( -8.924057E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.58keV )
       Stop channel:            8000 (  1999.40keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/29/2012 12:11:47 PM   Page  2
TestAmerica, Inc                Spectrum name: 13_TunaCan_20120186.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0495
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.58	58754.	0.66	1.03	2.709E-02	46.54	4.250	1.430E+04	Pb210
59.57	60379.	0.66	1.03	3.805E-02	59.54	35.700	1.236E+03	AM241
70.81	1954.	9.69	1.05	4.529E-02				
72.99	3363.	5.52	1.06	4.644E-02				
88.09	95988.	0.44	1.05	5.227E-02	88.03	3.610	1.608E+04	CD109
122.13	47342.	0.70	1.10	5.528E-02	122.06	85.600	3.462E+02	CO57
136.50	6079.	3.90	1.17	5.395E-02				
165.88	50468.	0.66	1.17	5.020E-02	165.85	79.900	5.394E+02	Ce139
254.99	1887.	8.59	1.10	3.760E-02				
279.01	34595.	0.73	1.24	3.534E-02	279.17	81.500	1.202E+03	Hg203
391.49	36929.	0.70	1.36	2.783E-02	391.69	64.000	9.680E+02	SN113
661.67	27425.	0.90	1.55	1.893E-02	661.66	85.210	4.748E+02	CS137
898.10	44634.	0.61	1.75	1.500E-02	898.02	93.700	1.545E+03	Y898
1173.26	30535.	0.69	1.96	1.217E-02	1173.24	99.900	7.198E+02	Co1173
1332.55	27926.	0.70	2.06	1.099E-02	1332.50	99.982	7.279E+02	Co1332
1835.94	28215.	0.64	2.43	8.477E-03	1836.01	99.200	1.632E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.85	70.83	16957.	1954.	4.315E+04	9.69	1.054	-	D
291.58	73.01	15573.	3363.	7.242E+04	5.52	1.056	-	D
545.57	136.50	11563.	6079.	1.127E+05	3.90	1.173	-	
1019.41	254.99	5852.	1887.	5.018E+04	8.59	1.098	-	

s - Peak fails shape tests.

D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.95	46.58	20947.	58754.	16.321	0.66	1.027
AM-241	237.92	59.57	22064.	60379.	16.772	0.66	1.026
CD-109	351.94	88.09	20029.	95988.	26.663	0.44	1.053
CO-57	488.07	122.13	14046.	47342.	13.151	0.70	1.103
Ce-139	663.06	165.88	11600.	50468.	14.019	0.66	1.167
Hg-203	1115.49	279.01	5938.	34595.	9.610	0.73	1.243
SN-113	1565.36	391.49	4998.	36929.	10.258	0.70	1.359
CS-137	2646.08	661.67	4975.	27425.	7.618	0.90	1.546
Y-898	3591.97	898.10	3847.	44634.	12.398	0.61	1.747
Co-1173	4693.01	1173.26	1833.	30535.	8.482	0.69	1.958
Co-1332	5330.51	1332.55	1457.	27926.	7.757	0.70	2.064
Y-1836	7345.55	1835.94	482.	28215.	7.838	0.64	2.427

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4299E+04				8.15E+03	
			46.54	1.430E+04	(	1.648E+02 6.58E-01 4.25E+00	G
AM-241		1.2360E+03				1.58E+05	
			59.54	1.236E+03	(	1.423E+01 6.62E-01 3.57E+01	G
CD-109		1.6083E+04				4.63E+02	
			88.03	1.608E+04	(	1.110E+02 4.41E-01 3.61E+00	G
CO-57		3.4619E+02				2.72E+02	
			122.06	3.462E+02	(	4.058E+00 7.02E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/29/2012 12:11:47 PM Page 4
TestAmerica, Inc Spectrum name: 13_TunaCan_20120186.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3942E+02				1.38E+02	
		165.85	5.394E+02	(	5.393E+00 6.58E-01 7.99E+01	G
Hg-203	1.2019E+03				4.66E+01	
		279.17	1.202E+03	(	1.257E+01 7.27E-01 8.15E+01	G
SN-113	9.6801E+02				1.15E+02	
		391.69	9.680E+02	(	8.706E+00 6.96E-01 6.40E+01	G

```
CS-137       4.7476E+02                                      1.10E+04
                          661.66 4.748E+02  (  5.737E+00 8.98E-01 8.52E+01 G

Y-898        1.5451E+03                                      1.07E+02
                          898.02 1.545E+03  (  1.010E+01 6.13E-01 9.37E+01 G

Co-1173      7.1978E+02                                      1.93E+03
                         1173.24 7.198E+02  (  4.767E+00 6.89E-01 9.99E+01 G

Co-1332      7.2789E+02                                      1.93E+03
                         1332.50 7.279E+02  (  4.706E+00 7.04E-01 1.00E+02 G

Y-1836       1.6323E+03                                      1.07E+02
                         1836.01 1.632E+03  (  6.075E+00 6.40E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```

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      ORTEC g v - i (1087) Env32  G53W4.25  3/29/2012 12:11:47 PM   Page  5
 TestAmerica, Inc                Spectrum name: 13_TunaCan_20120186.An1

   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq             Bq
```

Pb-210	1.4195E+04	1.4299E+04	6.581E-01%	1.65E+02
AM-241	1.2356E+03	1.2360E+03	6.618E-01%	1.42E+01
CD-109	1.4134E+04	1.6083E+04	4.413E-01%	1.11E+02
CO-57	2.7789E+02	3.4619E+02	7.023E-01%	4.06E+00
Ce-139	3.4949E+02	5.3942E+02	6.584E-01%	5.39E+00
Hg-203	3.3381E+02	1.2019E+03	7.272E-01%	1.26E+01
SN-113	5.7605E+02	9.6801E+02	6.961E-01%	8.71E+00
CS-137	4.7218E+02	4.7476E+02	8.976E-01%	5.74E+00
Y-898	8.8221E+02	1.5451E+03	6.126E-01%	1.01E+01
Co-1173	6.9779E+02	7.1978E+02	6.892E-01%	4.77E+00
Co-1332	7.0565E+02	7.2789E+02	7.036E-01%	4.71E+00
Y-1836	9.3203E+02	1.6323E+03	6.402E-01%	6.07E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 1999.4 keV) 3.479E+04 Bq
Total Decayed Activity (82.3 to 1999.4 keV) 3.9773562E+04 Bq

Gamma Verification per Geometry

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
       Start time:                 4/23/2012 9:56:44 AM
       Live time:               3600
       Real time:               3665
       Dead time:                  1.77 %
       Detector ID:                   14

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       1/1/2012 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0575
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.67	47449.	0.64	0.73	2.181E-02	46.54	4.250	1.442E+04	Pb210
59.63	48139.	0.67	0.74	3.071E-02	59.54	35.700	1.223E+03	AM241
72.88	1815.	8.13	0.77	3.737E-02				
88.00	74331.	0.47	0.79	4.195E-02	88.03	3.610	1.614E+04	CD109
121.95	35331.	0.76	0.82	4.379E-02	122.06	85.600	3.493E+02	CO57
136.39	4314.	3.84	0.82	4.244E-02				
165.77	33960.	0.70	0.89	3.800E-02	165.85	79.900	5.385E+02	Ce139
279.15	17136.	1.05	1.00	2.596E-02	279.17	81.500	1.206E+03	Hg203
391.65	22586.	0.85	1.13	1.993E-02	391.69	64.000	9.714E+02	SN113
661.68	18625.	0.92	1.36	1.313E-02	661.66	85.210	4.657E+02	CS137
898.06	26064.	0.74	1.56	1.026E-02	898.02	93.700	1.570E+03	Y898
1173.24	20614.	0.80	1.76	8.244E-03	1173.24	99.900	7.242E+02	Co1173
1332.50	18485.	0.81	1.88	7.423E-03	1332.50	99.982	7.206E+02	Co1332
1835.98	15919.	0.83	2.23	5.686E-03	1836.01	99.200	1.634E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
290.81	72.88	9094.	1708.	4.569E+04	9.16	0.857	-
544.77	136.39	6618.	4314.	1.017E+05	3.84	0.819	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4422E+04					8.15E+03	
			46.54	1.442E+04	(	1.659E+02	6.42E-01 4.25E+00	G
AM-241		1.2225E+03					1.58E+05	
			59.54	1.223E+03	(	1.449E+01	6.65E-01 3.57E+01	G
CD-109		1.6145E+04					4.63E+02	
			88.03	1.614E+04	(	1.179E+02	4.73E-01 3.61E+00	G
CO-57		3.4928E+02					2.72E+02	
			122.06	3.493E+02	(	4.431E+00	7.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
Ce-139	5.3852E+02					1.38E+02	
		165.85	5.385E+02	(	5.643E+00	6.97E-01 7.99E+01	G
Hg-203	1.2059E+03					4.66E+01	
		279.17	1.206E+03	(	2.002E+01	1.05E+00 8.15E+01	G
SN-113	9.7136E+02					1.15E+02	
		391.69	9.714E+02	(	1.115E+01	8.54E-01 6.40E+01	G
CS-137	4.6565E+02					1.10E+04	
		661.66	4.657E+02	(	5.571E+00	9.21E-01 8.52E+01	G
Y-898	1.5700E+03					1.07E+02	

```
                          898.02 1.570E+03  (  1.261E+01 7.43E-01 9.37E+01 G

Co-1173      7.2416E+02                                        1.93E+03
                         1173.24 7.242E+02  (  5.275E+00 7.99E-01 9.99E+01 G

Co-1332      7.2060E+02                                        1.93E+03
                         1332.50 7.206E+02  (  4.737E+00 8.09E-01 1.00E+02 G

Y-1836       1.6340E+03                                        1.07E+02
                         1836.01 1.634E+03  (  6.084E+00 8.27E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



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   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4284E+04    1.4422E+04    6.417E-01%                1.66E+02
 AM-241       1.2219E+03    1.2225E+03    6.654E-01%                1.45E+01
 CD-109       1.3631E+04    1.6145E+04    4.729E-01%                1.18E+02
```

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Gamma Verification per Geometry

Detector:	Ge15
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

Calibration Data from file: 15_Soil_TunaCan.Clb
Energy Calibration Date: 3/22/2012 Time: 1:02:46 PM
Efficiency Calibration Date: 3/22/2012 Time: 1:03:01 PM

Calibration Description:
15_TunaCan_90099_032212

Energy Calibration Fit
Energy = 0.0042 +0.250192*Channel -3.10425e-008*Channel**2
FWHM (ch) = 3.5032 +0.001000*Channel -3.73783e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.91	46.54	46.52	0.05%	0.90	0.92	-2.54%
237.99	59.54	59.55	-0.01%	0.91	0.94	-2.43%
352.01	88.03	88.07	-0.05%	0.95	0.96	-1.92%
487.92	122.06	122.07	-0.01%	1.00	1.00	0.30%
663.08	165.85	165.89	-0.02%	1.05	1.04	1.34%
1115.99	279.17	279.18	-0.00%	1.18	1.14	3.23%
1565.41	391.69	391.58	0.03%	1.26	1.24	1.14%
2645.35	661.66	661.63	0.00%	1.50	1.47	2.11%
3590.98	898.02	898.04	-0.00%	1.67	1.65	0.79%
4692.06	1173.24	1173.24	-0.00%	1.80	1.84	-2.06%
5329.66	1332.50	1332.56	-0.00%	1.90	1.94	-2.28%
7344.95	1836.01	1835.98	0.00%	2.23	2.21	1.30%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9975 %
Ln(Eff) = -0.6895 -0.329061*Ln(Eng) -0.0387563*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1273 %
Ln(Eff) = -23.6268 +8.666669*Ln(Eng) -0.921464*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8904E-002	1.9569E-002	-3.52%
59.54	2.8630E-002	2.7372E-002	4.39%
88.03	3.6378E-002	3.7061E-002	-1.88%
122.06	3.7201E-002	3.8461E-002	-3.39%
165.85	========== Knee ==========		
165.85	3.3266E-002	3.3919E-002	-1.96%
279.17	2.3641E-002	2.3007E-002	2.68%
391.69	1.7841E-002	1.7674E-002	0.94%
661.66	1.1534E-002	1.1545E-002	-0.10%
898.02	8.8355E-003	8.9209E-003	-0.97%
1173.24	6.9001E-003	7.0763E-003	-2.55%
1332.50	6.2597E-003	6.3249E-003	-1.04%
1836.01	4.8716E-003	4.7412E-003	2.68%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1

Sample description
     15_TunaCan_90099_032212


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan_20120283.An1

Acquisition information
       Start time:                 3/22/2012 11:06:02 AM
       Live time:               3600
       Real time:               3653
       Dead time:                  1.44 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1
                                      Page 1
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       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0249
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	42849.	0.75	0.90	1.955E-02	46.54	4.250	1.441E+04	Pb210
59.55	42443.	0.72	0.91	2.738E-02	59.54	35.700	1.207E+03	AM241
72.95	2606.	6.34	0.95	3.318E-02				
88.07	68550.	0.54	0.95	3.707E-02	88.03	3.610	1.607E+04	CD109
122.10	33756.	0.64	1.00	3.846E-02	122.06	85.600	3.502E+02	CO57
136.52	4295.	2.96	1.01	3.724E-02				
165.89	34959.	0.78	1.05	3.391E-02	165.85	79.900	5.388E+02	Ce139
279.18	24347.	0.88	1.18	2.301E-02	279.17	81.500	1.202E+03	Hg203
391.58	24366.	0.82	1.26	1.768E-02	391.69	64.000	9.746E+02	SN113
661.63	16400.	1.16	1.50	1.155E-02	661.66	85.210	4.654E+02	CS137
898.03	27965.	0.74	1.67	8.921E-03	898.02	93.700	1.574E+03	Y898
1173.23	17709.	0.94	1.81	7.076E-03	1173.24	99.900	7.164E+02	Co1173
1332.55	16065.	0.98	1.90	6.325E-03	1332.50	99.982	7.266E+02	Co1332
1835.95	16330.	0.85	2.24	4.741E-03	1836.01	99.200	1.633E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.58	72.93	12341.	2606.	7.854E+04	6.34	0.949	- D
545.42	136.45	8010.	4524.	1.215E+05	4.23	1.054	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.91	46.52	15447.	42849.	11.903	0.75	0.900
AM-241	237.99	59.55	14029.	42443.	11.790	0.72	0.913
CD-109	352.01	88.07	16260.	68550.	19.042	0.54	0.945
CO-57	487.92	122.07	9130.	34324.	9.535	0.78	0.999
Ce-139	663.08	165.89	8215.	34959.	9.711	0.78	1.052
Hg-203	1115.99	279.18	4252.	24347.	6.763	0.88	1.182
SN-113	1565.41	391.58	3012.	24366.	6.768	0.82	1.259
CS-137	2645.35	661.63	3077.	16400.	4.555	1.16	1.503
Y-898	3590.94	898.03	2252.	27965.	7.768	0.74	1.667
Co-1173	4692.02	1173.23	1355.	17709.	4.919	0.94	1.807
Co-1332	5329.60	1332.55	1160.	16065.	4.463	0.98	1.900
Y-1836	7344.81	1835.95	345.	16330.	4.536	0.85	2.240

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4410E+04					8.15E+03	
			46.54	1.441E+04	(	1.957E+02	7.55E-01 4.25E+00	G
AM-241		1.2069E+03					1.58E+05	
			59.54	1.207E+03	(	1.577E+01	7.22E-01 3.57E+01	G
CD-109		1.6069E+04					4.63E+02	
			88.03	1.607E+04	(	1.399E+02	5.44E-01 3.61E+00	G
CO-57		3.5606E+02					2.72E+02	
			122.06	3.561E+02	(	4.647E+00	7.84E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
Ce-139	5.3881E+02					1.38E+02	
		165.85	5.388E+02	(	6.551E+00	7.82E-01 7.99E+01	G
Hg-203	1.2024E+03					4.66E+01	
		279.17	1.202E+03	(	1.514E+01	8.77E-01 8.15E+01	G
SN-113	9.7462E+02					1.15E+02	
		391.69	9.746E+02	(	1.034E+01	8.20E-01 6.40E+01	G
CS-137	4.6543E+02					1.10E+04	
		661.66	4.654E+02	(	7.413E+00	1.16E+00 8.52E+01	G
Y-898	1.5737E+03					1.07E+02	

```
                                898.02 1.574E+03  (  1.260E+01 7.45E-01 9.37E+01 G

Co-1173      7.1644E+02                                        1.93E+03
                               1173.24 7.164E+02  (  7.050E+00 9.39E-01 9.99E+01 G

Co-1332      7.2655E+02                                        1.93E+03
                               1332.50 7.266E+02  (  7.301E+00 9.83E-01 1.00E+02 G

Y-1836       1.6332E+03                                        1.07E+02
                               1836.01 1.633E+03  (  8.923E+00 8.49E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                        Peak Codes:
   T - Thermal Neutron Activation        G - Gamma Ray
   F - Fast Neutron Activation           X - X-Ray
   I - Fission Product                   P - Positron Decay
   N - Naturally Occurring Isotope       S - Single-Escape
```



```
   P - Photon Reaction                   D - Double-Escape
   C - Charged Particle Reaction         K - Key Line
   M - No MDA Calculation                A - Not in Average
   R - Coincidence Corrected             C - Coincidence Peak
   H - Halflife limit exceeded

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 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4311E+04    1.4410E+04    7.549E-01%                1.96E+02
 AM-241       1.2065E+03    1.2069E+03    7.219E-01%                1.58E+01
 CD-109       1.4233E+04    1.6069E+04    5.439E-01%                1.40E+02
```

CO-57	2.8961E+02	3.5606E+02	7.837E-01%	4.65E+00
Ce-139	3.5832E+02	5.3881E+02	7.816E-01%	6.55E+00
Hg-203	3.6068E+02	1.2024E+03	8.771E-01%	1.51E+01
SN-113	5.9836E+02	9.7462E+02	8.201E-01%	1.03E+01
CS-137	4.6306E+02	4.6543E+02	1.155E+00%	7.41E+00
Y-898	9.2933E+02	1.5737E+03	7.445E-01%	1.26E+01
Co-1173	6.9585E+02	7.1644E+02	9.390E-01%	7.05E+00
Co-1332	7.0567E+02	7.2655E+02	9.834E-01%	7.30E+00
Y-1836	9.6449E+02	1.6332E+03	8.486E-01%	8.92E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 1999.6 keV) 3.512E+04 Bq
Total Decayed Activity (82.3 to 1999.6 keV) 3.9873703E+04 Bq

Gamma Verification per Geometry

Detector:	Ge16
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14377	96.3
Am-241	2037	418	0.3590	1163	1228.5	105.6
Cd-109	2881	591	0.0361	16363	16032	98.0
Co-57	1511	310	0.8560	362	349.8	96.7
Ce-139	2139	439	0.7990	549	538.18	98.0
Sn-113	3015	618	0.6400	966	969.68	100.4
Cs-137	1938	397	0.8510	467	468.24	100.3
Y-88	7264	1489	0.9370	1589	1552.4	97.7
Co-60	3580	734	0.9997	734	725.6	98.8
Co-60	3581	734	0.9999	734	726.23	98.9
Y-88	7690	1577	0.9920	1589	1629.1	102.5

Reviewed By: Jody Watson

Date: 7/13/2012

Calibration Data from file: 16_Soil_TunaCan.Clb
Energy Calibration Date: 7/13/2012 Time: 9:47:11 AM
Efficiency Calibration Date: 7/13/2012 Time: 9:47:24 AM

Calibration Description:
16_TunaCan_90099_071012

Energy Calibration Fit
Energy = 0.1106 +0.250095*Channel -1.95476e-008*Channel**2
FWHM (ch) = 3.6339 +0.000937*Channel -2.1273e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.57	46.54	46.52	0.04%	0.97	0.95	1.52%
237.71	59.54	59.56	-0.03%	0.95	0.96	-1.11%
351.71	88.03	88.07	-0.05%	1.00	0.99	0.52%
487.80	122.06	122.10	-0.04%	1.03	1.02	1.07%
662.91	165.85	165.89	-0.03%	1.08	1.06	1.71%
1115.49	279.17	279.06	0.04%	1.13	1.16	-3.06%
1565.59	391.69	391.61	0.02%	1.25	1.26	-0.74%
2645.84	661.66	661.68	-0.00%	1.44	1.49	-3.61%
3591.32	898.02	898.03	-0.00%	1.74	1.68	3.44%
4692.55	1173.24	1173.26	-0.00%	1.94	1.89	2.70%
5329.87	1332.50	1332.53	-0.00%	1.95	2.01	-2.97%
7344.93	1836.01	1835.99	0.00%	2.34	2.34	0.11%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0068 %
Ln(Eff) = 0.0148 -0.551427*Ln(Eng) -0.0144348*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1708 %
Ln(Eff) = -24.0844 +8.948554*Ln(Eng) -0.95136*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.2670E-002	2.3523E-002	-3.76%
59.54	3.4907E-002	3.3268E-002	4.69%
88.03	4.4561E-002	4.5501E-002	-2.11%
122.06	4.5678E-002	4.7288E-002	-3.52%
165.85	========== Knee ==========		
165.85	4.0710E-002	4.1557E-002	-2.08%
279.17	2.9697E-002	2.8765E-002	3.14%
391.69	2.2647E-002	2.2549E-002	0.43%
661.66	1.5445E-002	1.5368E-002	0.50%
898.02	1.1965E-002	1.2246E-002	-2.35%
1173.24	9.8925E-003	1.0017E-002	-1.26%
1332.50	8.9987E-003	9.0965E-003	-1.09%
1836.01	7.2985E-003	7.1212E-003	2.43%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/13/2012 9:50:48 AM
TestAmerica, Inc.                Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Sample description
     16_Soil_TunaCan_90099_071012


Spectrum Filename: C:\User\SPC\Det16\16_Soil_TunaCan_90099_20120752.A

Acquisition information
       Start time:                 7/10/2012 10:35:34 AM
       Live time:               3600
       Real time:               3674
       Dead time:                  2.03 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Soil_TunaCan.Clb
     16_TunaCan_90099_071012


       Energy Calibration
            Created:               7/13/2012 9:47:11 AM
            Zero offset:           0.111 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.955E-08 keV/channel^2

       Efficiency Calibration
            Created:               7/13/2012 9:47:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.01 %
            Log(Eff):              1.477416E-02 + (-5.514266E-01*Log(E) ) +
                                   ( -1.443482E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.17 %
            Log(Eff):             -2.408438E+01 + ( 8.948554E+00*Log(E) ) +
                                   ( -9.513599E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.62keV )
       Stop channel:            8000 (  1999.62keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0309

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	50908.	0.67	0.97	2.351E-02	46.54	4.250	1.438E+04	Pb210
59.56	52484.	0.66	0.95	3.328E-02	59.54	35.700	1.229E+03	AM241
88.07	71211.	0.52	1.00	4.551E-02	88.03	3.610	1.603E+04	CD109
122.10	31320.	0.80	1.03	4.728E-02	122.06	85.600	3.498E+02	CO57
136.55	3896.	3.92	1.12	4.572E-02				
165.89	24588.	0.86	1.08	4.155E-02	165.85	79.900	5.382E+02	Ce139
279.05	6035.	2.82	1.13	2.877E-02	279.17	81.500	1.223E+03	Hg203
391.61	15948.	1.14	1.25	2.255E-02	391.69	64.000	9.697E+02	SN113
661.68	21809.	0.83	1.44	1.537E-02	661.66	85.210	4.682E+02	CS137
898.03	18524.	0.90	1.74	1.225E-02	898.02	93.700	1.552E+03	Y898
1173.26	24403.	0.75	1.94	1.002E-02	1173.24	99.900	7.256E+02	Co1173
1332.53	22198.	0.75	1.95	9.096E-03	1332.50	99.982	7.262E+02	Co1332
1835.98	11967.	0.97	2.34	7.121E-03	1836.01	99.200	1.629E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.57	136.55	5299.	3896.	8.521E+04	3.92	1.117	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.57	46.52	16008.	50908.	14.141	0.67	0.967
AM-241	237.71	59.56	16109.	52484.	14.579	0.66	0.954
CD-109	351.71	88.07	14747.	71211.	19.781	0.52	0.996
CO-57	487.80	122.10	7590.	31320.	8.700	0.80	1.033
Ce-139	662.91	165.89	4947.	24588.	6.830	0.86	1.080
Hg-203	1115.49	279.06	4192.	5963.	1.656	2.79	1.129
SN-113	1565.60	391.61	3105.	15948.	4.430	1.14	1.253
CS-137	2645.84	661.68	2129.	21809.	6.058	0.83	1.439
Y-898	3591.32	898.03	1720.	18524.	5.145	0.90	1.741
Co-1173	4692.53	1173.26	1220.	24403.	6.779	0.75	1.944
Co-1332	5329.86	1332.53	680.	22198.	6.166	0.75	1.948
Y-1836	7344.92	1835.98	144.	11967.	3.324	0.97	2.344

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4377E+04					8.15E+03		
			46.54	1.438E+04	(	1.673E+02	6.66E-01	4.25E+00	G
AM-241		1.2285E+03					1.58E+05		
			59.54	1.229E+03	(	1.391E+01	6.59E-01	3.57E+01	G
CD-109		1.6032E+04					4.63E+02		
			88.03	1.603E+04	(	1.280E+02	5.16E-01	3.61E+00	G
CO-57		3.4980E+02					2.72E+02		
			122.06	3.498E+02	(	4.565E+00	8.01E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3818E+02					1.38E+02	
		165.85	5.382E+02	(	7.233E+00	8.57E-01	7.99E+01 G
Hg-203	1.2081E+03					4.66E+01	
		279.17	1.208E+03	(	6.167E+01	2.79E+00	8.15E+01 G
SN-113	9.6968E+02					1.15E+02	
		391.69	9.697E+02	(	1.595E+01	1.14E+00	6.40E+01 G
CS-137	4.6824E+02					1.10E+04	
		661.66	4.682E+02	(	4.675E+00	8.31E-01	8.52E+01 G
Y-898	1.5524E+03					1.07E+02	
		898.02	1.552E+03	(	1.643E+01	8.98E-01	9.37E+01 G
Co-1173	7.2560E+02					1.93E+03	
		1173.24	7.256E+02	(	4.920E+00	7.53E-01	9.99E+01 G
Co-1332	7.2623E+02					1.93E+03	
		1332.50	7.262E+02	(	4.064E+00	7.46E-01	1.00E+02 G
Y-1836	1.6291E+03					1.07E+02	
		1836.01	1.629E+03	(	7.981E+00	9.68E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4145E+04	1.4377E+04	6.660E-01%	1.67E+02
AM-241	1.2275E+03	1.2285E+03	6.589E-01%	1.39E+01
CD-109	1.2043E+04	1.6032E+04	5.162E-01%	1.28E+02
CO-57	2.1493E+02	3.4980E+02	8.011E-01%	4.56E+00
Ce-139	2.0570E+02	5.3818E+02	8.567E-01%	7.23E+00
Hg-203	7.0659E+01	1.2081E+03	2.787E+00%	6.17E+01
SN-113	3.0697E+02	9.6968E+02	1.140E+00%	1.60E+01
CS-137	4.6263E+02	4.6824E+02	8.306E-01%	4.67E+00
Y-898	4.4842E+02	1.5524E+03	8.985E-01%	1.64E+01
Co-1173	6.7738E+02	7.2560E+02	7.529E-01%	4.92E+00
Co-1332	6.7797E+02	7.2623E+02	7.458E-01%	4.06E+00
Y-1836	4.7056E+02	1.6291E+03	9.676E-01%	7.98E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 3.095E+04 Bq
Total Decayed Activity (37.6 to 1999.6 keV) 3.9805016E+04 Bq

Analyzed by: _____
403135

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc.

Gamma Verification per Geometry

Detector:	Ge17
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14476	97.0
Am-241	2037	418	0.3590	1163	1217.3	104.6
Cd-109	2881	591	0.0361	16363	16121	98.5
Co-57	1511	310	0.8560	362	351.58	97.1
Ce-139	2139	439	0.7990	549	540.43	98.5
Hg-203	4651	954	0.8146	1171	1200.7	102.6
Sn-113	3015	618	0.6400	966	969.38	100.4
Cs-137	1938	397	0.8510	467	466.08	99.8
Y-88	7264	1489	0.9370	1589	1562.4	98.3
Co-60	3580	734	0.9997	734	724.88	98.7
Co-60	3581	734	0.9999	734	733.12	99.8
Y-88	7690	1577	0.9920	1589	1616.3	101.7

Reviewed By: Megan McAfee

Date: 4/13/2012

Calibration Data from file: 17_Soil_TunaCan.Clb
Energy Calibration Date: 4/12/2012 Time: 9:28:30 AM
Efficiency Calibration Date: 4/12/2012 Time: 9:28:42 AM

Calibration Description:
17_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1178 +0.250077*Channel -2.37566e-008*Channel**2
FWHM (ch) = 2.9772 +0.000994*Channel -3.22638e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.96	46.54	46.62	-0.17%	0.77	0.79	-3.16%
237.92	59.54	59.61	-0.12%	0.78	0.80	-3.33%
351.79	88.03	88.09	-0.07%	0.82	0.83	-1.16%
487.44	122.06	122.01	0.04%	0.89	0.86	3.09%
662.32	165.85	165.74	0.07%	0.93	0.91	2.22%
1115.65	279.17	279.09	0.03%	1.03	1.01	2.15%
1565.90	391.69	391.66	0.01%	1.10	1.11	-0.78%
2646.02	661.66	661.66	-0.00%	1.37	1.35	1.74%
3591.93	898.02	898.07	-0.01%	1.52	1.53	-0.67%
4693.19	1173.24	1173.25	-0.00%	1.72	1.73	-0.81%
5330.69	1332.50	1332.53	-0.00%	1.82	1.84	-0.74%
7346.32	1836.01	1835.98	0.00%	2.14	2.13	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9072 %
Ln(Eff) = -0.5264 -0.402416*Ln(Eng) -0.0260446*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.0020 %
Ln(Eff) = -23.4389 +8.582715*Ln(Eng) -0.907543*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0383E-002	2.1004E-002	-3.05%
59.54	3.0743E-002	2.9571E-002	3.81%
88.03	3.9976E-002	4.0594E-002	-1.55%
122.06	4.1510E-002	4.2756E-002	-3.00%
165.85	========== Knee ==========		
165.85	3.7629E-002	3.8252E-002	-1.65%
279.17	2.7514E-002	2.6814E-002	2.54%
391.69	2.1207E-002	2.1122E-002	0.40%
661.66	1.4433E-002	1.4427E-002	0.04%
898.02	1.1287E-002	1.1478E-002	-1.69%
1173.24	9.2333E-003	9.3589E-003	-1.36%
1332.50	8.4692E-003	8.4809E-003	-0.14%
1836.01	6.7041E-003	6.5931E-003	1.66%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  1
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det17\17_TunaCan_20120263.An1

Acquisition information
       Start time:                 3/26/2012 6:29:58 AM
       Live time:               3600
       Real time:               3672
       Dead time:                  1.95 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Soil_TunaCan.Clb
     17_TunaCan_90099_032612


       Energy Calibration
            Created:               4/12/2012 9:28:30 AM
            Zero offset:           0.118 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.376E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 9:28:42 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.264190E-01 + (-4.024164E-01*Log(E) ) +
                                   ( -2.604461E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -2.343889E+01 + ( 8.582715E+00*Log(E) ) +
                                   ( -9.075430E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.63keV )
       Stop channel:            8000 (  1999.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  2
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1
                                      Page 1
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       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0522
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.62	46187.	0.69	0.77	2.106E-02	46.54	4.250	1.448E+04	Pb210
59.61	46245.	0.74	0.78	2.961E-02	59.54	35.700	1.217E+03	AM241
72.97	2852.	5.64	0.82	3.610E-02				
88.09	74900.	0.46	0.82	4.061E-02	88.03	3.610	1.612E+04	CD109
122.01	37313.	0.73	0.89	4.276E-02	122.06	85.600	3.516E+02	CO57
136.40	4536.	4.09	0.81	4.164E-02				
165.74	38793.	0.66	0.93	3.765E-02	165.85	79.900	5.404E+02	Ce139
255.04	1259.	9.59	1.07	2.855E-02				
279.09	26776.	0.82	1.03	2.682E-02	279.17	81.500	1.201E+03	Hg203
391.66	28306.	0.76	1.11	2.112E-02	391.69	64.000	9.694E+02	SN113
661.66	20517.	0.91	1.37	1.443E-02	661.66	85.210	4.661E+02	CS137
898.07	34851.	0.63	1.52	1.148E-02	898.02	93.700	1.562E+03	Y898
1173.25	23664.	0.80	1.72	9.359E-03	1173.24	99.900	7.249E+02	Co1173
1332.52	21706.	0.78	1.83	8.481E-03	1332.50	99.982	7.331E+02	Co1332
1835.97	21924.	0.70	2.15	6.593E-03	1836.01	99.200	1.616E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.30	72.97	10374.	2884.	7.989E+04	5.33	0.816	-	D
544.98	136.40	8136.	4536.	1.089E+05	4.09	0.813	-	
1019.46	255.04	3805.	1259.	4.410E+04	9.59	1.072	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.

C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.96	46.62	15035.	46187.	12.830	0.69	0.766
AM-241	237.92	59.61	17361.	46245.	12.846	0.74	0.777
CD-109	351.79	88.09	12661.	74900.	20.806	0.46	0.821
CO-57	487.44	122.01	9755.	37313.	10.365	0.73	0.891
Ce-139	662.32	165.74	6828.	38793.	10.776	0.66	0.926
Hg-203	1115.65	279.09	4528.	26776.	7.438	0.82	1.034
SN-113	1565.90	391.66	3496.	28306.	7.863	0.76	1.105
CS-137	2646.02	661.66	2816.	20517.	5.699	0.91	1.369
Y-898	3591.91	898.07	2257.	34851.	9.681	0.63	1.523
Co-1173	4693.17	1173.25	1531.	23664.	6.573	0.80	1.720
Co-1332	5330.69	1332.52	1002.	21706.	6.029	0.78	1.825
Y-1836	7346.26	1835.97	205.	21924.	6.090	0.70	2.146

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4476E+04				8.15E+03	
			46.54	1.448E+04	(	1.799E+02 6.89E-01 4.25E+00	G
AM-241		1.2173E+03				1.58E+05	
			59.54	1.217E+03	(	1.623E+01 7.35E-01 3.57E+01	G
CD-109		1.6121E+04				4.63E+02	
			88.03	1.612E+04	(	1.134E+02 4.57E-01 3.61E+00	G
CO-57		3.5158E+02				2.72E+02	
			122.06	3.516E+02	(	4.362E+00 7.33E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 10:31:21 AM Page 4
TestAmerica, Inc. Spectrum name: 17_TunaCan_20120263.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.4043E+02				1.38E+02	
		165.85	5.404E+02	(	5.402E+00 6.57E-01 7.99E+01	G
Hg-203	1.2007E+03				4.66E+01	
		279.17	1.201E+03	(	1.418E+01 8.17E-01 8.15E+01	G
SN-113	9.6938E+02				1.15E+02	
		391.69	9.694E+02	(	9.529E+00 7.56E-01 6.40E+01	G
CS-137	4.6608E+02				1.10E+04	
		661.66	4.661E+02	(	5.679E+00 9.07E-01 8.52E+01	G

```
Y-898        1.5624E+03                                        1.07E+02
                          898.02 1.562E+03  (  1.005E+01 6.29E-01 9.37E+01 G

Co-1173      7.2488E+02                                        1.93E+03
                         1173.24 7.249E+02  (  5.668E+00 7.98E-01 9.99E+01 G

Co-1332      7.3312E+02                                        1.93E+03
                         1332.50 7.331E+02  (  5.074E+00 7.81E-01 1.00E+02 G

Y-1836       1.6163E+03                                        1.07E+02
                         1836.01 1.616E+03  (  5.123E+00 7.01E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



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   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4372E+04    1.4476E+04    6.891E-01%                1.80E+02
```

AM-241	1.2168E+03	1.2173E+03	7.355E-01%	1.62E+01
CD-109	1.4197E+04	1.6121E+04	4.569E-01%	1.13E+02
CO-57	2.8320E+02	3.5158E+02	7.325E-01%	4.36E+00
Ce-139	3.5257E+02	5.4043E+02	6.571E-01%	5.40E+00
Hg-203	3.4034E+02	1.2007E+03	8.175E-01%	1.42E+01
SN-113	5.8164E+02	9.6938E+02	7.559E-01%	9.53E+00
CS-137	4.6359E+02	4.6608E+02	9.066E-01%	5.68E+00
Y-898	9.0011E+02	1.5624E+03	6.288E-01%	1.00E+01
Co-1173	7.0308E+02	7.2488E+02	7.979E-01%	5.67E+00
Co-1332	7.1107E+02	7.3312E+02	7.808E-01%	5.07E+00
Y-1836	9.3113E+02	1.6163E+03	7.012E-01%	5.12E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (77.1 to 1999.2 keV) 3.505E+04 Bq
Total Decayed Activity (77.1 to 1999.2 keV) 3.9979633E+04 Bq

Initial Calibration Verifications

2nd Source Verification

Detector:	Ge5
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1160.9	99.7
Cs-137	1926	396	0.851	465	442.36	95.1
Co-60	3611	742	0.99974	742	700.21	94.3
Co-60	3612	742	0.999856	742	701.86	94.6

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  1
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1

Sample description
     5_TunaCan2nd_Rad10_032712


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan2nd_20120813.An1

Acquisition information
       Start time:                 3/27/2012 10:12:05 AM
       Live time:               7200
       Real time:               7250
       Dead time:                  0.69 %
       Detector ID:                    5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  2
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	- s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	- sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	- s

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 3
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 4
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4212E+04				8.15E+03	
			46.54	1.421E+04	(P	1.177E+02 4.91E-01 4.25E+00	G
AM-241		1.1609E+03				1.58E+05	
			59.54	1.161E+03	(	8.959E+00 4.87E-01 3.57E+01	G
CD-109		1.5419E+04				4.63E+02	
			88.03	1.542E+04	(	1.658E+02 6.81E-01 3.61E+00	G
CO-57		3.3478E+02				2.72E+02	
			122.06	3.348E+02	(	1.063E+01 1.66E+00 8.56E+01	G
Ce-139		5.3191E+02				1.38E+02	
			165.85	5.319E+02	(	7.689E+01 6.14E+00 7.99E+01	G
Hg-203		-6.5193E-03				4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00 8.22E+03 8.15E+01	G
SN-113		9.5011E+02				1.15E+02	
			391.69	9.501E+02	(	3.682E+02 1.63E+01 6.40E+01	G
CS-137		4.4236E+02				1.10E+04	
			661.66	4.424E+02	(P	3.020E+00 7.12E-01 8.52E+01	G
Y-898		1.6655E+03				1.07E+02	
			898.02	1.665E+03	(	6.908E+02 1.92E+01 9.37E+01	G
Co-1173		7.0021E+02				1.93E+03	
			1173.24	7.002E+02	(	4.056E+00 7.32E-01 9.99E+01	G
Co-1332		7.0186E+02				1.93E+03	
			1332.50	7.019E+02	(	1.651E+00 7.07E-01 1.00E+02	G
Y-1836		1.6424E+03				1.07E+02	
			1836.01	1.642E+03	(	1.392E+02 7.47E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%		1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%		8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%		1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%		1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%		7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00	
SN-113	6.9747E+00	9.5011E+02	1.633E+01%		3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%		3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%		6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%		4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%		1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%		1.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 8:52:25 AM
TestAmerica                      Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
     7_TunaCan2ndSource_81427-334_032712


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information
       Start time:                 3/27/2012 3:25:25 PM
       Live time:               3600
       Real time:               3684
       Dead time:                  2.28 %
       Detector ID:                   7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	8[illegible]	3.730E+04	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

Pb-210   N   1.3857E+04                                        8.15E+03
                            46.54 1.386E+04  (P 1.480E+02 6.34E-01 4.25E+00 G

AM-241       1.1504E+03                                        1.58E+05
                            59.54 1.150E+03  (  1.036E+01 5.81E-01 3.57E+01 G

CD-109       1.5217E+04                                        4.63E+02
                            88.03 1.522E+04  (  1.799E+02 7.73E-01 3.61E+00 G

CO-57        3.1712E+02                                        2.72E+02
                           122.06 3.171E+02  (  1.205E+01 2.04E+00 8.56E+01 G

Ce-139       5.1801E+02                                        1.38E+02
                           165.85 5.180E+02  (  7.941E+01 6.45E+00 7.99E+01 G

Hg-203      -4.5441E-01                                        4.66E+01
                           279.17-4.544E-01 ?(  2.347E+00 1.56E+02 8.15E+01 G

SN-113       9.3315E+02                                        1.15E+02
                           391.69 9.332E+02  (  4.178E+02 1.96E+01 6.40E+01 G

CS-137       4.4047E+02                                        1.10E+04
                           661.66 4.405E+02  (  3.706E+00 8.56E-01 8.52E+01 G

Y-898        1.6944E+03                                        1.07E+02
                           898.02 1.694E+03  (  8.216E+02 2.35E+01 9.37E+01 G

Co-1173      6.8172E+02                                        1.93E+03
                          1173.24 6.817E+02  (  4.436E+00 8.58E-01 9.99E+01 G

Co-1332      6.9210E+02                                        1.93E+03
                          1332.50 6.921E+02  (  2.586E+00 8.49E-01 1.00E+02 G

Y-1836       1.7801E+03                                        1.07E+02
                          1836.01 1.780E+03  (  2.065E+02 9.19E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

2nd Source Verification

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  1
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
     8_TunaCan_81427-334_2ndsource_032912


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
       Start time:                 3/29/2012 1:58:04 AM
       Live time:               3600
       Real time:               3622
       Dead time:                  0.61 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  2
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 3
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 4
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 3

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.4221E+04                                     8.15E+03
                            46.54 1.422E+04  (  1.806E+02 7.43E-01 4.25E+00 G

AM-241       1.1754E+03                                     1.58E+05
                            59.54 1.175E+03  (  1.311E+01 7.10E-01 3.57E+01 G

CD-109       1.5223E+04                                     4.63E+02
                            88.03 1.522E+04  (  2.071E+02 8.83E-01 3.61E+00 G

CO-57        3.3494E+02                                     2.72E+02
                           122.06 3.349E+02  (  1.600E+01 2.55E+00 8.56E+01 G

Ce-139       6.0766E+02                                     1.38E+02
                           165.85 6.077E+02 *(  1.153E+02 8.62E+00 7.99E+01 G

Hg-203       6.1671E-01                                     4.66E+01
                           279.17 6.167E-01  (  2.689E+00 1.31E+02 8.15E+01 G

SN-113       1.0157E+03                                     1.15E+02
                           391.69 1.016E+03  (  4.390E+02 1.79E+01 6.40E+01 G

CS-137       4.4661E+02                                     1.10E+04
                           661.66 4.466E+02  (P 3.489E+00 8.85E-01 8.52E+01 G

Y-898        2.5543E+03                                     1.07E+02
                           898.02 2.554E+03  (  9.046E+02 1.79E+01 9.37E+01 G

Co-1173      6.9722E+02                                     1.93E+03
                          1173.24 6.972E+02  (  4.649E+00 9.19E-01 9.99E+01 G

Co-1332      6.9192E+02                                     1.93E+03
                          1332.50 6.919E+02  (  2.515E+00 9.18E-01 1.00E+02 G

Y-1836       1.7236E+03                                     1.07E+02
                          1836.01 1.724E+03  (  1.542E+02 9.00E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
```

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 6
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector:	Ge12
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1143.6	98.2
Cs-137	1926	396	0.851	465	442.3	95.1
Co-60	3611	742	0.99974	742	688.36	92.7
Co-60	3612	742	0.999856	742	696.49	93.8

Reviewed By: Jody Watson

Date: 10/4/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  10/4/2012 1:47:48 PM
TestAmerica, Inc                Spectrum name: 12_TunaCan2nd_20122201.An1

Sample description
     12_TunaCan2nd_81427_104012


Spectrum Filename: C:\User\SPC\Det12\12_TunaCan2nd_20122201.An1

Acquisition information
       Start time:                 10/4/2012 9:10:35 AM
       Live time:               7200
       Real time:               7274
       Dead time:                  1.02 %
       Detector ID:                   12

Detector system
     Ge12 S/N10034336


Calibration
       Filename:                   12_Soil_TunaCan.Clb
     12_TunaCanCal_90099_100212


       Energy Calibration
            Created:               10/4/2012 8:58:25 AM
            Zero offset:           0.009 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.662E-08 keV/channel^2

       Efficiency Calibration
            Created:               10/4/2012 9:05:44 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.70 %
            Log(Eff):             -7.827468E-01 + (-3.001271E-01*Log(E) ) +
                                   ( -3.369562E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.96 %
            Log(Eff):             -2.288409E+01 + ( 8.352717E+00*Log(E) ) +
                                   ( -8.812368E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.54keV )
       Stop channel:            8000 (  1999.46keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2012-09-01_2017.PBC 9/1/2012 8:17:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0602

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.51	1416.	10.10	0.96	1.441E-02				
46.55	84361.	0.42	0.90	2.227E-02	46.54	4.250	1.345E+04	Pb210
49.64	1661.	13.12	1.17	2.460E-02				
59.51	91361.	0.43	0.89	3.120E-02	59.54	35.700	1.144E+03	AM241
74.70	192.	60.04	0.37	3.873E-02				
87.98	38152.	0.76	0.95	4.277E-02	88.03	3.610	1.551E+04	CD109
122.02	7369.	2.14	0.99	4.527E-02	122.06	85.600	3.444E+02	CO57
136.48	773.	12.58	1.02	4.420E-02				
165.75	856.	13.18	0.97	4.024E-02	165.85	79.900	5.800E+02	Ce139
238.46	426.	21.37	0.80	3.221E-02				
270.42	104.	53.05	0.50	2.960E-02				
277.12	37.	187.22	1.11	2.896E-02	279.17	81.500	HL>Cutoff	Hg203
294.88	216.	34.45	0.89	2.790E-02				
351.76	281.	28.30	0.91	2.471E-02				
385.62	79.	49.11	0.42	2.317E-02				
391.36	361.	28.92	0.71	2.293E-02	391.69	64.000	1.472E+03	SN113
469.80	98.	76.63	0.28	2.015E-02				
506.86	66.	63.64	1.31	1.908E-02				
510.13	151.	39.24	1.32	1.899E-02				
517.01	68.	58.29	0.42	1.881E-02				
661.58	40010.	0.58	1.44	1.571E-02	661.66	85.210	4.423E+02	CS137
897.91	201.	34.47	0.69	1.250E-02	898.02	93.700	1.665E+03	Y898
1072.91	53.	57.37	0.45	1.091E-02				
1090.45	58.	68.49	0.42	1.078E-02				
1173.14	35088.	0.63	1.82	1.018E-02	1173.24	99.900	6.884E+02	Co1173
1332.41	32170.	0.59	1.94	9.221E-03	1332.50	99.982	6.965E+02	Co1332
1835.69	150.	11.35	3.27	7.144E-03	1836.01	99.200	2.050E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.90	36.51	6010.	1416.	9.823E+04	10.10	0.958	-	s
198.34	49.64	14478.	1661.	6.754E+04	13.12	1.174	-	sM

298.51	74.70	5238.	192.	4.958E+03	60.04	0.372	-	s

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.45	136.48	2894.	773.	1.749E+04	12.58	1.017	-	
953.09	238.46	2483.	426.	1.323E+04	21.37	0.799	-	s
1080.86	270.42	1260.	104.	3.514E+03	53.05	0.496	-	s
1178.62	294.88	1774.	216.	7.741E+03	34.45	0.889	-	s
1406.03	351.76	1808.	281.	1.136E+04	28.30	0.914	-	s
1541.40	385.62	713.	79.	3.409E+03	49.11	0.419	-	s
1877.98	469.80	1744.	98.	4.856E+03	76.63	0.281	-	s
2026.19	506.79	849.	66.	3.459E+03	63.64	1.314	-	sc
2039.28	510.06	1671.	151.	7.930E+03	39.24	1.317	-	D
2066.76	517.01	651.	68.	3.633E+03	58.29	0.422	-	s
4290.46	1072.91	405.	53.	4.872E+03	57.37	0.452	-	s
4360.63	1090.45	570.	58.	5.382E+03	68.49	0.425	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.51	23444.	86492.	12.013	0.48	0.868
AM-241	237.80	59.51	16320.	91361.	12.689	0.43	0.894
CD-109	351.60	87.98	9992.	38152.	5.299	0.76	0.948
CO-57	487.64	122.02	4562.	7369.	1.024	2.14	0.992
Ce-139	662.45	165.75	3243.	856.	0.119	13.18	0.970
Hg-203	1107.62	277.12	2320.	37.	0.005	187.22	1.114s
SN-113	1565.46	391.64	1973.	296.	0.041	29.35	0.690s
CS-137	2644.92	661.58	2210.	40010.	5.557	0.58	1.443
Y-898	3590.25	897.91	1259.	201.	0.028	34.47	0.688s
Co-1173	4691.52	1173.14	1694.	35088.	4.873	0.63	1.818
Co-1332	5328.99	1332.41	521.	32170.	4.468	0.59	1.937
Y-1836	7344.02	1835.69	28.	150.	0.021	11.35	3.274s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
Pb-210	N	1.3814E+04						8.15E+03	
			46.54	1.381E+04	(P	1.144E+02	4.84E-01	4.25E+00	G
AM-241		1.1436E+03						1.58E+05	
			59.54	1.144E+03	(	7.486E+00	4.26E-01	3.57E+01	G
CD-109		1.5513E+04						4.63E+02	
			88.03	1.551E+04	(	1.905E+02	7.56E-01	3.61E+00	G
CO-57		3.4441E+02						2.72E+02	
			122.06	3.444E+02	(	1.484E+01	2.14E+00	8.56E+01	G
Ce-139		5.7998E+02						1.38E+02	
			165.85	5.800E+02	(	1.816E+02	1.32E+01	7.99E+01	G
Hg-203		2.1493E-01						4.66E+01	
			279.17	2.149E-01	?(	1.337E+00	1.87E+02	8.15E+01	G
SN-113		1.2045E+03						1.15E+02	
			391.69	1.204E+03	(	8.544E+02	2.94E+01	6.40E+01	G
CS-137		4.4230E+02						1.10E+04	
			661.66	4.423E+02	(	2.452E+00	5.77E-01	8.52E+01	G
Y-898		1.6647E+03						1.07E+02	
			898.02	1.665E+03	(	1.389E+03	3.45E+01	9.37E+01	G
Co-1173		6.8836E+02						1.93E+03	
			1173.24	6.884E+02	(	3.816E+00	6.32E-01	9.99E+01	G
Co-1332		6.9649E+02						1.93E+03	
			1332.50	6.965E+02	(	2.361E+00	5.94E-01	1.00E+02	G
Y-1836		2.0501E+03						1.07E+02	
			1836.01	2.050E+03	(	3.740E+02	1.14E+01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	277.12	2320.	37.	0.005	187.22	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2680E+04	1.3814E+04	4.851E-01%		1.14E+02
AM-241	1.1385E+03	1.1436E+03	4.256E-01%		7.49E+00
CD-109	3.4313E+03	1.5513E+04	7.557E-01%		1.91E+02
CO-57	2.6416E+01	3.4441E+02	2.139E+00%		1.48E+01
Ce-139	3.6407E+00	5.7998E+02	1.318E+01%		1.82E+02
Hg-203 #A	2.1493E-01	>12 Halflives	1.8722E+02%	1.3367E+00	
SN-113	2.7995E+00	1.2045E+03	2.935E+01%		8.54E+02
CS-137	4.1507E+02	4.4230E+02	5.769E-01%		2.45E+00
Y-898	2.3870E+00	1.6647E+03	3.447E+01%		1.39E+03
Co-1173	4.7903E+02	6.8836E+02	6.322E-01%		3.82E+00
Co-1332	4.8469E+02	6.9649E+02	5.939E-01%		2.36E+00
Y-1836	2.9396E+00	2.0501E+03	1.135E+01%		3.74E+02

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TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (516.8 to 1999.5 keV) 1.867E+04 Bq/Sample
Total Decayed Activity (516.8 to 1999.5 keV) 3.8141477E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector:	Ge13
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1139.6	97.9
Cs-137	1926	396	0.851	465	445.47	95.8
Co-60	3611	742	0.99974	742	679.75	91.6
Co-60	3612	742	0.999856	742	691.64	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:52:27 AM
TestAmerica, Inc                Spectrum name: 13_TunaCan2nd_20120188.An1

Sample description
     13_TunaCan2nd_Rad10_32712


Spectrum Filename: C:\User\SPC\Det13\13_TunaCan2nd_20120188.An1

Acquisition information
       Start time:                 3/27/2012 6:51:58 PM
       Live time:               3600
       Real time:               3628
       Dead time:                  0.78 %
       Detector ID:                   13

Detector system
     Ge13 SN/10064006


Calibration
       Filename:                   13_Soil_TunaCan.Clb
     13_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/29/2012 7:50:00 AM
            Zero offset:           0.072 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.129E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/29/2012 7:50:26 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.308398E-01 + (-3.057754E-01*Log(E) ) +
                                   ( -3.437570E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.60 %
            Log(Eff):             -2.292218E+01 + ( 8.455931E+00*Log(E) ) +
                                   ( -8.924057E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.58keV )
       Stop channel:            8000 (  1999.40keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:52:27 AM
TestAmerica, Inc Spectrum name: 13_TunaCan2nd_20120188.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 12:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	13_2012-02-26_0417.PBC 2/26/2012 4:17:38 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 28.2216

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.63	804.	13.85	1.08	1.752E-02				
40.21	60.	185.44	0.67	2.100E-02				
46.59	52644.	0.64	1.03	2.710E-02	46.54	4.250	1.363E+04	Pb210
59.58	55490.	0.64	1.04	3.805E-02	59.54	35.700	1.140E+03	AM241
88.11	30251.	0.82	1.05	5.228E-02	88.03	3.610	1.515E+04	CD109
122.15	7057.	2.19	1.12	5.528E-02	122.06	85.600	3.326E+02	CO57
136.58	848.	11.42	1.04	5.394E-02				
165.89	1296.	7.65	1.22	5.020E-02	165.85	79.900	5.488E+02	Ce139
172.07	64.	73.90	0.46	4.900E-02				
256.08	52.	107.49	0.43	3.749E-02				
391.55	506.	16.69	1.67	2.782E-02	391.69	64.000	1.081E+03	SN113
505.51	54.	53.76	0.71	2.313E-02				
606.29	68.	54.54	1.51	2.022E-02				
609.47	156.	25.34	1.52	2.014E-02				
661.70	24573.	0.73	1.57	1.893E-02	661.66	85.210	4.455E+02	CS137
712.45	48.	87.48	0.52	1.791E-02				
788.55	57.	45.24	0.72	1.658E-02				
865.90	201.	31.02	0.76	1.543E-02				
875.22	53.	53.16	0.57	1.530E-02				
892.03	70.	57.17	0.30	1.508E-02				
898.14	349.	18.02	1.75	1.500E-02	898.02	93.700	1.399E+03	Y898
936.66	183.	26.42	0.66	1.452E-02				
1000.19	143.	40.81	0.58	1.379E-02				
1173.33	22167.	0.77	1.99	1.217E-02	1173.24	99.900	6.798E+02	Co1173
1332.59	20398.	0.72	2.09	1.099E-02	1332.50	99.982	6.916E+02	Co1332
1836.09	255.	7.25	1.84	8.477E-03	1836.01	99.200	1.707E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.20	36.63	3474.	804.	4.587E+04	13.85	1.080	-	
160.50	40.21	4620.	60.	2.857E+03	185.44	0.671	-	c
545.87	136.58	2328.	848.	1.572E+04	11.42	1.036	-	s

687.79	172.07	921.	64.	1.299E+03	73.90	0.462	-	sc

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:52:27 AM
TestAmerica, Inc Spectrum name: 13_TunaCan2nd_20120188.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1023.76	256.08	1106.	52.	1.400E+03	107.49	0.433 -	sc
2021.40	505.51	369.	54.	2.349E+03	53.76	0.707 -	s
2424.54	605.96	659.	68.	3.375E+03	54.54	1.514 -	D
2437.27	609.15	707.	156.	7.762E+03	25.34	1.517 -	D
2849.24	712.45	490.	48.	2.681E+03	87.48	0.517 -	c
3153.66	788.55	257.	57.	3.419E+03	45.24	0.717 -	s
3463.13	865.90	819.	201.	1.303E+04	31.02	0.758 -	s
3500.42	875.22	313.	53.	3.442E+03	53.16	0.568 -	s
3567.71	892.03	535.	70.	4.621E+03	57.17	0.300 -	sM
3746.27	936.66	649.	183.	1.263E+04	26.42	0.655 -	s
4000.44	1000.19	757.	143.	1.039E+04	40.81	0.580 -	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.59	14100.	52644.	14.623	0.64	1.035
AM-241	237.95	59.58	13492.	55490.	15.414	0.64	1.040
CD-109	352.05	88.11	6670.	30251.	8.403	0.82	1.051
CO-57	488.16	122.15	3586.	7057.	1.960	2.19	1.121
Ce-139	663.07	165.89	2133.	1296.	0.360	7.65	1.221
SN-113	1565.60	391.55	1530.	506.	0.141	16.69	1.674s
CS-137	2646.19	661.70	1216.	24573.	6.826	0.73	1.574
Y-898	3592.12	898.14	1808.	349.	0.097	18.02	1.748
Co-1173	4693.29	1173.33	884.	22167.	6.157	0.77	1.991
Co-1332	5330.68	1332.59	172.	20398.	5.666	0.72	2.087
Y-1836	7346.16	1836.09	9.	255.	0.071	7.25	1.837s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:52:27 AM
TestAmerica, Inc Spectrum name: 13_TunaCan2nd_20120188.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
Pb-210	N	1.3634E+04						8.15E+03	
			46.54	1.363E+04	(	1.440E+02	6.41E-01	4.25E+00	G
AM-241		1.1396E+03						1.58E+05	
			59.54	1.140E+03	(	1.117E+01	6.38E-01	3.57E+01	G
CD-109		1.5147E+04						4.63E+02	
			88.03	1.515E+04	(	1.919E+02	8.19E-01	3.61E+00	G
CO-57		3.3255E+02						2.72E+02	
			122.06	3.326E+02	(	1.328E+01	2.19E+00	8.56E+01	G
Ce-139		5.4879E+02						1.38E+02	
			165.85	5.488E+02	(	9.228E+01	7.65E+00	7.99E+01	G
Hg-203		-4.5053E-03						4.66E+01	
			279.17	-4.505E-03	%(	2.170E+00	1.44E+04	8.15E+01	G
SN-113		1.0805E+03						1.15E+02	
			391.69	1.081E+03	(	3.950E+02	1.67E+01	6.40E+01	G
CS-137		4.4547E+02						1.10E+04	
			661.66	4.455E+02	(	2.995E+00	7.31E-01	8.52E+01	G
Y-898		1.3989E+03						1.07E+02	
			898.02	1.399E+03	?(	8.041E+02	1.80E+01	9.37E+01	G
Co-1173		6.7975E+02						1.93E+03	
			1173.24	6.798E+02	(	4.332E+00	7.66E-01	9.99E+01	G
Co-1332		6.9164E+02						1.93E+03	
			1332.50	6.916E+02	(	2.164E+00	7.24E-01	1.00E+02	G
Y-1836		1.7073E+03						1.07E+02	
			1836.01	1.707E+03	(	1.108E+02	7.25E+00	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:52:27 AM
TestAmerica, Inc Spectrum name: 13_TunaCan2nd_20120188.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2719E+04	1.3634E+04	6.406E-01%		1.44E+02
AM-241	1.1355E+03	1.1396E+03	6.376E-01%		1.12E+01
CD-109	4.4546E+03	1.5147E+04	8.189E-01%		1.92E+02
CO-57	4.1423E+01	3.3255E+02	2.186E+00%		1.33E+01
Ce-139	8.9749E+00	5.4879E+02	7.649E+00%		9.23E+01
Hg-203 #A	-4.5053E-03	>12 Halflives	1.4441E+04%	2.1699E+00	
SN-113 #	7.8929E+00	1.0805E+03	1.669E+01%		3.95E+02
CS-137	4.2308E+02	4.4547E+02	7.311E-01%		2.99E+00
Y-898 #	6.9065E+00	1.3989E+03	1.802E+01%		8.04E+02
Co-1173	5.0656E+02	6.7975E+02	7.655E-01%		4.33E+00
Co-1332	5.1542E+02	6.9164E+02	7.239E-01%		2.16E+00
Y-1836	8.4289E+00	1.7073E+03	7.248E+00%		1.11E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:52:27 AM
TestAmerica, Inc Spectrum name: 13_TunaCan2nd_20120188.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (661.7 to 1999.4 keV) 1.983E+04 Bq/Sample
Total Decayed Activity (661.7 to 1999.4 keV) 3.6805410E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
     14_TunaCan2nd_rad10_042412


Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
       Start time:                 4/24/2012 8:12:45 AM
       Live time:               3600
       Real time:               3635
       Dead time:                  0.95 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-04-01_0328.PBC 4/1/2012 3:28:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0804

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 3
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	-	s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	-	s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-	
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	-	s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	-	s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	-	s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	-	sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	-	s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	-	s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210   N   1.3845E+04                                        8.15E+03
                            46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241       1.1408E+03                                        1.58E+05
                            59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109       1.5678E+04                                        4.63E+02
                            88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57        3.2838E+02                                        2.72E+02
                           122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139       5.8018E+02                                        1.38E+02
                           165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203      -5.1862E-01                                        4.66E+01
                           279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113       1.0438E+03                                        1.15E+02
                           391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137       4.4755E+02                                        1.10E+04
                           661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898        2.2899E+03                                        1.07E+02
                           898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173      6.9001E+02                                        1.93E+03
                          1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332      6.9961E+02                                        1.93E+03
                          1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836       1.8162E+03                                        1.07E+02
                          1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%	1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%	1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%	2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%	1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%	1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00
SN-113	6.4765E+00	1.0438E+03	1.791E+01%	4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%	3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%	9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%	4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%	2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%	1.60E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 6
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

2nd Source Verification

Detector:	Ge 15
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1

Sample description
     15_TunaCan2nd_rad10_032312


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan2nd_20120288.An1

Acquisition information
       Start time:                 3/23/2012 6:10:28 AM
       Live time:               7200
       Real time:               7248
       Dead time:                  0.66 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_Soil_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       1/1/2010 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   YES       15_2012-02-26_0425.PBC
                                                 2/26/2012 4:25:10 AM

       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:      26.5953
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.48	1231.	11.17	1.20	1.258E-02				
46.44	76440.	0.51	0.91	1.950E-02	46.54	4.250	1.366E+04	Pb210
49.65	1514.	14.37	1.25	2.160E-02				
59.44	80694.	0.48	0.94	2.732E-02	59.54	35.700	1.151E+03	AM241
87.99	43578.	0.68	0.97	3.705E-02	88.03	3.610	1.527E+04	CD109
92.63	219.	44.56	0.42	3.776E-02				
122.00	10133.	1.58	1.01	3.846E-02	122.06	85.600	3.389E+02	CO57
136.33	1390.	8.77	1.13	3.725E-02				
165.85	1699.	7.29	1.05	3.392E-02	165.85	79.900	5.192E+02	Ce139
238.39	480.	20.10	1.42	2.594E-02				
260.67	81.	57.86	0.33	2.424E-02				
279.32	56.	141.32	1.14	2.301E-02	279.17	81.500	HL>Cutoff	Hg203
352.13	110.	54.66	0.68	1.922E-02				
368.26	125.	49.84	0.46	1.856E-02				
391.56	581.	13.59	1.28	1.768E-02	391.69	64.000	9.477E+02	SN113
400.57	73.	61.58	0.54	1.736E-02				
661.57	29285.	0.71	1.46	1.155E-02	661.66	85.210	4.352E+02	CS137
754.74	100.	52.53	0.39	1.034E-02				
898.10	516.	14.74	1.96	8.921E-03	898.02	93.700	1.681E+03	Y898
904.89	86.	54.53	0.36	8.863E-03				
1000.75	82.	43.22	0.58	8.127E-03				
1096.51	181.	26.16	0.80	7.507E-03				
1173.15	26111.	0.71	1.80	7.077E-03	1173.24	99.900	6.872E+02	Co1173
1226.66	98.	36.87	0.74	6.805E-03				
1332.45	23674.	0.68	1.95	6.325E-03	1332.50	99.982	6.965E+02	Co1332
1835.96	284.	9.76	1.20	4.741E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.78	36.48	5577.	1231.	9.786E+04	11.17	1.202	-	s
198.43	49.65	13746.	1514.	7.010E+04	14.37	1.248	-	sM
370.24	92.63	3274.	219.	5.791E+03	44.56	0.421	-	s

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 3
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
544.93	136.33	3516.	1390.	3.731E+04	8.77	1.130	-	s
952.92	238.39	2518.	480.	1.849E+04	20.10	1.422	-	sM
1042.01	260.67	968.	81.	3.328E+03	57.86	0.332	-	sM
1407.66	352.13	1248.	110.	5.749E+03	54.66	0.679	-	s
1472.16	368.26	1252.	125.	6.736E+03	49.84	0.459	-	s
1601.36	400.57	843.	73.	4.224E+03	61.58	0.543	-	s
3017.75	754.74	768.	100.	9.719E+03	52.53	0.393	-	s
3618.39	904.89	752.	86.	9.741E+03	54.53	0.363	-	s
4001.87	1000.75	476.	82.	1.015E+04	43.22	0.582	-	s
4385.05	1096.51	621.	181.	2.415E+04	26.16	0.796	-	s
4905.82	1226.66	215.	98.	1.445E+04	36.87	0.740	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.62	46.44	19930.	76355.	10.605	0.51	0.907
AM-241	237.58	59.44	16824.	80694.	11.208	0.48	0.935
CD-109	351.67	87.99	9695.	43578.	6.052	0.68	0.972
CO-57	487.63	122.00	4069.	10133.	1.407	1.58	1.014
Ce-139	662.95	165.85	3411.	1699.	0.236	7.29	1.054
Hg-203	1116.56	279.32	3139.	56.	0.008	141.32	1.144
SN-113	1565.32	391.56	1615.	581.	0.081	13.59	1.282
CS-137	2645.11	661.57	2071.	29285.	4.067	0.71	1.459
Y-898	3591.24	898.10	1317.	516.	0.072	14.74	1.959
Co-1173	4691.69	1173.15	1159.	26111.	3.627	0.71	1.803
Co-1332	5329.20	1332.45	323.	23674.	3.288	0.68	1.945
Y-1836	7345.58	1836.14	48.	260.	0.036	8.96	1.181s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210    N   1.3663E+04                                        8.15E+03
                              46.54 1.366E+04  (P 1.182E+02 5.11E-01 4.25E+00 G

AM-241        1.1510E+03                                        1.58E+05
                              59.54 1.151E+03  (  8.660E+00 4.81E-01 3.57E+01 G

CD-109        1.5268E+04                                        4.63E+02
                              88.03 1.527E+04  (  1.617E+02 6.78E-01 3.61E+00 G

CO-57         3.3887E+02                                        2.72E+02
                             122.06 3.389E+02  (  1.003E+01 1.58E+00 8.56E+01 G

Ce-139        5.1921E+02                                        1.38E+02
                             165.85 5.192E+02  (  8.400E+01 7.29E+00 7.99E+01 G

Hg-203        4.1717E-01                                        4.66E+01
                             279.17 4.172E-01  (  1.954E+00 1.41E+02 8.15E+01 G

SN-113        9.4771E+02                                        1.15E+02
                             391.69 9.477E+02  (  3.099E+02 1.36E+01 6.40E+01 G

CS-137        4.3518E+02                                        1.10E+04
                             661.66 4.352E+02  (  3.191E+00 7.12E-01 8.52E+01 G

Y-898         1.6812E+03                                        1.07E+02
                             898.02 1.681E+03  (  5.598E+02 1.47E+01 9.37E+01 G

Co-1173       6.8716E+02                                        1.93E+03
                            1173.24 6.872E+02  (  4.246E+00 7.12E-01 9.99E+01 G

Co-1332       6.9646E+02                                        1.93E+03
                            1332.50 6.965E+02  (  2.544E+00 6.82E-01 1.00E+02 G

Y-1836        1.5036E+03                                        1.07E+02
                            1836.01 1.504E+03  (  2.033E+02 8.96E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
                                       Page 4
```

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210		1.2751E+04	1.3663E+04	5.115E-01%	1.18E+02
AM-241		1.1469E+03	1.1510E+03	4.812E-01%	8.66E+00
CD-109		4.5239E+03	1.5268E+04	6.776E-01%	1.62E+02
CO-57		4.2749E+01	3.3887E+02	1.583E+00%	1.00E+01
Ce-139		8.7071E+00	5.1921E+02	7.291E+00%	8.40E+01
Hg-203	A	4.1717E-01	>12 Halflives	1.4132E+02%	1.9540E+00
SN-113		7.1340E+00	9.4771E+02	1.359E+01%	3.10E+02
CS-137		4.1344E+02	4.3518E+02	7.117E-01%	3.19E+00
Y-898		8.5738E+00	1.6812E+03	1.474E+01%	5.60E+02
Co-1173		5.1301E+02	6.8716E+02	7.125E-01%	4.25E+00
Co-1332		5.1995E+02	6.9646E+02	6.817E-01%	2.54E+00
Y-1836		7.6681E+00	1.5036E+03	8.962E+00%	2.03E+02

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TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.6 keV) 1.994E+04 Bq/Sample
Total Decayed Activity (37.5 to 1999.6 keV) 3.6891324E+04 Bq/Sample

2nd Source Verification

Detector:	Ge16
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.5	101.0
Cs-137	1926	396	0.851	465	456.26	98.1
Co-60	3611	742	0.99974	742	696.55	93.8
Co-60	3612	742	0.999856	742	694.91	93.6

Reviewed By: Jody Watson

Date: 7/17/2012

16_TunaCan2nd_81427_071712

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/17/2012 12:43:11 PM   Page  1
TestAmerica, Inc.               Spectrum name: 16_TunaCan2nd_81427_071712.An1

Sample description
     16_Soil_TunaCan2nd_81427


Spectrum Filename: C:\User\SPC\Det16\16_TunaCan2nd_81427_071712.An1

Acquisition information
       Start time:                 7/17/2012 11:27:38 AM
       Live time:               3600
       Real time:               3637
       Dead time:                  1.01 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Soil_TunaCan.Clb
     16_TunaCan_90099_071012


       Energy Calibration
            Created:               7/13/2012 9:47:11 AM
            Zero offset:           0.111 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.955E-08 keV/channel^2

       Efficiency Calibration
            Created:               7/13/2012 9:47:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.01 %
            Log(Eff):              1.477416E-02 + (-5.514266E-01*Log(E) ) +
                                   ( -1.443482E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.17 %
            Log(Eff):             -2.408438E+01 + ( 8.948554E+00*Log(E) ) +
                                   ( -9.513599E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.62keV )
       Stop channel:            8000 (  1999.62keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method


     ORTEC g v - i (3263) Env32  G53W4.25  7/17/2012 12:43:11 PM   Page  2
TestAmerica, Inc.               Spectrum name: 16_TunaCan2nd_81427_071712.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2012-07-01_0410.PBC 7/1/2012 4:10:46 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0735

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	662.	16.00	0.95	1.502E-02				
46.61	44788.	0.57	0.95	2.354E-02	46.54	4.250	1.344E+04	Pb210
49.73	846.	14.98	0.96	2.615E-02				
51.93	67.	175.93	0.96	2.781E-02				
59.60	50058.	0.62	0.95	3.331E-02	59.54	35.700	1.176E+03	AM241
67.02	327.	40.04	0.43	3.772E-02				
77.05	248.	35.16	0.66	4.226E-02				
88.11	23229.	0.97	1.00	4.552E-02	88.03	3.610	1.578E+04	CD109
92.72	154.	41.19	0.62	4.641E-02				
102.49	234.	36.86	0.72	4.751E-02				
122.18	4603.	2.65	1.08	4.728E-02	122.06	85.600	3.368E+02	CO57
136.63	690.	11.63	1.03	4.571E-02				
165.89	573.	14.69	0.88	4.155E-02	165.85	79.900	5.132E+02	Ce139
279.05	48.	131.87	1.16	2.876E-02	279.17	81.500	HL>Cutoff	Hg203
383.49	28.	109.64	0.60	2.290E-02				
391.47	391.	21.81	0.93	2.256E-02	391.69	64.000	2.012E+03	SN113
416.76	115.	47.52	0.73	2.156E-02				
454.44	148.	42.64	0.71	2.024E-02				
470.03	138.	36.11	1.33	1.974E-02				
471.50	87.	46.19	1.33	1.970E-02				
609.23	184.	25.35	0.44	1.633E-02				
661.72	20285.	0.80	1.52	1.537E-02	661.66	85.210	4.563E+02	CS137
688.53	70.	44.77	0.67	1.492E-02				
756.44	34.	63.94	0.34	1.392E-02				
891.54	148.	42.73	0.38	1.231E-02				
898.03	342.	24.68	0.43	1.225E-02	898.02	93.700	3.456E+03	Y898
1092.88	180.	35.97	0.46	1.057E-02				
1173.34	17966.	0.81	1.90	1.002E-02	1173.24	99.900	6.965E+02	Co1173
1332.62	16290.	0.80	2.05	9.096E-03	1332.50	99.982	6.949E+02	Co1332
1836.30	109.	12.59	1.70	7.121E-03	1836.01	99.200	1.789E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.94	36.61	3330.	662.	4.407E+04	16.00	0.954	-
198.40	49.77	7608.	846.	3.236E+04	14.98	0.955	- D
206.87	51.89	6455.	301.	1.081E+04	38.23	0.957	- D

ORTEC g v - i (3263) Env32 G53W4.25 7/17/2012 12:43:11 PM Page 3
TestAmerica, Inc. Spectrum name: 16_TunaCan2nd_81427_071712.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
267.54	67.02	4805.	327.	8.670E+03	40.04	0.431	- s
307.65	77.05	2954.	248.	5.881E+03	35.16	0.659	- s
370.31	92.72	1548.	154.	3.319E+03	41.19	0.623	- s
409.40	102.49	2168.	234.	4.932E+03	36.86	0.719	- s
545.90	136.63	1724.	690.	1.509E+04	11.63	1.033	-
1533.12	383.49	438.	28.	1.245E+03	109.64	0.596	- c
1666.20	416.76	856.	115.	5.319E+03	47.52	0.732	- s
1816.90	454.44	1051.	148.	7.328E+03	42.64	0.711	- s
1879.23	470.27	1171.	138.	6.985E+03	36.11	1.330	- D
1885.13	471.75	760.	87.	4.406E+03	46.19	1.331	- D
2436.00	609.23	541.	184.	1.125E+04	25.35	0.437	- s
2753.21	688.53	304.	70.	4.691E+03	44.77	0.673	- s
3024.88	756.44	198.	34.	2.419E+03	63.94	0.336	- s
3565.37	891.54	821.	148.	1.199E+04	42.73	0.382	- sM
4370.93	1092.88	734.	180.	1.708E+04	35.97	0.458	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.56	12987.	46638.	12.955	0.67	0.934
AM-241	237.89	59.60	10773.	50058.	13.905	0.62	0.952
CD-109	351.86	88.11	5903.	23229.	6.452	0.97	0.996
CO-57	488.11	122.18	2577.	4603.	1.279	2.65	1.080
Ce-139	662.88	165.89	1776.	573.	0.159	14.69	0.876
Hg-203	1115.44	279.05	1953.	48.	0.013	131.87	1.164s
SN-113	1566.59	391.86	1251.	282.	0.078	26.27	0.890s
CS-137	2645.99	661.72	1025.	20285.	5.635	0.80	1.515
Y-898	3591.33	898.03	1130.	342.	0.095	24.68	0.434s
Co-1173	4692.85	1173.34	496.	17966.	4.991	0.81	1.896
Co-1332	5330.25	1332.62	94.	16290.	4.525	0.80	2.052
Y-1836	7346.21	1836.30	14.	109.	0.030	12.59	1.698s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4024E+04				8.15E+03	
			46.54	1.402E+04	(P	1.605E+02 6.71E-01 4.25E+00	G
AM-241		1.1755E+03				1.58E+05	
			59.54	1.176E+03	(	1.142E+01 6.21E-01 3.57E+01	G
CD-109		1.5779E+04				4.63E+02	
			88.03	1.578E+04	(	2.451E+02 9.70E-01 3.61E+00	G
CO-57		3.3677E+02				2.72E+02	
			122.06	3.368E+02	(	1.751E+01 2.65E+00 8.56E+01	G
Ce-139		5.1324E+02				1.38E+02	
			165.85	5.132E+02	(	1.783E+02 1.47E+01 7.99E+01	G
Hg-203		5.6505E-01				4.66E+01	
			279.17	5.651E-01	*(	2.473E+00 1.32E+02 8.15E+01	G
SN-113		1.4529E+03				1.15E+02	
			391.69	1.453E+03	(	8.626E+02 2.63E+01 6.40E+01	G
CS-137		4.5626E+02				1.10E+04	
			661.66	4.563E+02	(	3.417E+00 8.02E-01 8.52E+01	G
Y-898		3.4565E+03				1.07E+02	
			898.02	3.456E+03	*(	1.611E+03 2.47E+01 9.37E+01	G
Co-1173		6.9655E+02				1.93E+03	
			1173.24	6.965E+02	(	4.129E+00 8.09E-01 9.99E+01	G
Co-1332		6.9491E+02				1.93E+03	
			1332.50	6.949E+02	(	2.043E+00 8.03E-01 1.00E+02	G
Y-1836		1.7894E+03				1.07E+02	
			1836.01	1.789E+03	(	3.307E+02 1.26E+01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	279.05	1953.	48.	0.013	131.87	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2959E+04	1.4024E+04	6.724E-01%		1.60E+02
AM-241	1.1708E+03	1.1755E+03	6.214E-01%		1.14E+01
CD-109	3.9282E+03	1.5779E+04	9.701E-01%		2.45E+02
CO-57	3.1587E+01	3.3677E+02	2.653E+00%		1.75E+01
Ce-139	4.7936E+00	5.1324E+02	1.469E+01%		1.78E+02
Hg-203 #A	5.6505E-01	>12 Halflives	1.3187E+02%	2.4725E+00	
SN-113	5.4311E+00	1.4529E+03	2.627E+01%		8.63E+02
CS-137	4.3030E+02	4.5626E+02	8.015E-01%		3.42E+00
Y-898 #	8.2791E+00	3.4565E+03	2.468E+01%		1.61E+03
Co-1173	4.9870E+02	6.9655E+02	8.087E-01%		4.13E+00
Co-1332	4.9753E+02	6.9491E+02	8.032E-01%		2.04E+00
Y-1836	4.2861E+00	1.7894E+03	1.259E+01%		3.31E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/17/2012 12:43:11 PM Page 6
TestAmerica, Inc. Spectrum name: 16_TunaCan2nd_81427_071712.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (609.2 to 1999.6 keV) 1.954E+04 Bq/Sample
Total Decayed Activity (609.2 to 1999.6 keV) 4.0374930E+04 Bq/Sample

2nd Source Verification

Detector:	Ge17
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.2	97.9
Cs-137	1926	396	0.851	465	440.98	94.8
Co-60	3611	742	0.99974	742	682.05	91.9
Co-60	3612	742	0.999856	742	689.63	92.9

Reviewed By: Megan McAfee

Date: 4/13/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:25:36 AM     Page  1
TestAmerica, Inc.               Spectrum name: 17_Tuna2nd_20120265.An1

Sample description
     17_Tuna2nd_81427_032612


Spectrum Filename: C:\User\SPC\Det17\17_Tuna2nd_20120265.An1

Acquisition information
       Start time:                 3/26/2012 9:29:21 AM
       Live time:               3600
       Real time:               3637
       Dead time:                  1.02 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Soil_TunaCan.Clb
     17_TunaCan_90099_032612


       Energy Calibration
            Created:               4/12/2012 9:28:30 AM
            Zero offset:           0.118 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.376E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 9:28:42 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.264190E-01 + (-4.024164E-01*Log(E) ) +
                                   ( -2.604461E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -2.343889E+01 + ( 8.582715E+00*Log(E) ) +
                                   ( -9.075430E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.63keV )
       Stop channel:            8000 (  1999.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method


     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:25:36 AM     Page  2
TestAmerica, Inc.               Spectrum name: 17_Tuna2nd_20120265.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2012-02-26_0520.PBC 2/26/2012 5:20:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0590

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.64	681.	13.12	0.69	1.356E-02				
40.87	116.	86.09	0.16	1.677E-02				
46.62	41004.	0.69	0.76	2.106E-02	46.54	4.250	1.365E+04	Pb210
49.59	775.	17.97	0.63	2.318E-02				
59.61	43179.	0.65	0.77	2.961E-02	59.54	35.700	1.140E+03	AM241
77.20	214.	40.60	1.02	3.765E-02				
88.08	23344.	0.86	0.81	4.060E-02	88.03	3.610	1.500E+04	CD109
121.99	5536.	2.31	0.89	4.276E-02	122.06	85.600	3.357E+02	CO57
136.39	771.	11.84	0.71	4.164E-02				
162.22	87.	50.79	0.72	3.820E-02				
165.73	964.	7.35	1.09	3.765E-02	165.85	79.900	5.310E+02	Ce139
216.43	116.	39.82	0.95	3.196E-02				
217.94	83.	57.15	0.95	3.181E-02				
238.21	247.	27.84	0.94	2.992E-02				
265.99	94.	61.67	0.61	2.773E-02				
301.12	44.	67.34	0.41	2.544E-02				
340.53	91.	61.26	0.55	2.333E-02				
351.73	148.	32.96	0.62	2.280E-02				
391.54	336.	18.56	0.91	2.113E-02	391.69	64.000	9.356E+02	SN113
464.58	72.	65.99	1.18	1.868E-02				
466.04	44.	93.25	1.18	1.864E-02				
582.96	167.	29.62	0.45	1.584E-02				
661.66	18538.	0.82	1.37	1.443E-02	661.66	85.210	4.410E+02	CS137
738.88	57.	57.41	0.44	1.329E-02				
833.91	110.	41.26	0.51	1.214E-02				
856.69	111.	46.51	0.75	1.189E-02				
898.10	352.	17.10	1.23	1.148E-02	898.02	93.700	1.818E+03	Y898
1026.09	89.	47.19	0.52	1.037E-02				
1173.27	17119.	0.83	1.74	9.359E-03	1173.24	99.900	6.820E+02	Co1173
1332.53	15698.	0.82	1.79	8.481E-03	1332.50	99.982	6.896E+02	Co1332
1835.81	220.	7.55	1.96	6.593E-03	1836.01	99.200	1.873E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.04	36.64	2578.	681.	5.025E+04	13.12	0.695	-
162.95	40.87	4224.	116.	6.916E+03	86.09	0.161	- c
197.82	49.59	6204.	775.	3.343E+04	17.97	0.635	- sM
308.25	77.20	2934.	214.	5.685E+03	40.60	1.020	- s

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:25:36 AM Page 3
TestAmerica, Inc. Spectrum name: 17_Tuna2nd_20120265.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
544.96	136.39	1975.	771.	1.852E+04	11.84	0.713	-
648.26	162.22	793.	87.	2.269E+03	50.79	0.719	- s
865.04	216.40	1003.	116.	3.620E+03	39.82	0.953	- D
871.09	217.91	1078.	83.	2.603E+03	57.15	0.955	- D
952.16	238.21	1349.	247.	8.265E+03	27.84	0.937	- s
1063.26	265.99	1020.	94.	3.372E+03	61.67	0.615	- s
1203.77	301.12	417.	44.	1.730E+03	67.34	0.412	- sc
1361.41	340.53	898.	91.	3.887E+03	61.26	0.553	- s
1406.20	351.73	744.	148.	6.491E+03	32.96	0.618	- s
1857.60	464.69	1086.	72.	3.842E+03	65.99	1.178	- sc
1863.46	466.15	839.	44.	2.387E+03	93.25	1.179	- sc
2331.15	582.96	570.	167.	1.054E+04	29.62	0.448	- s
2954.96	738.88	338.	57.	4.289E+03	57.41	0.442	- s
3335.20	833.91	507.	110.	9.049E+03	41.26	0.506	- s
3426.35	856.69	611.	111.	9.318E+03	46.51	0.755	- s
4104.24	1026.09	453.	89.	8.549E+03	47.19	0.517	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.95	46.62	10512.	40927.	11.369	0.69	0.761
AM-241	237.89	59.61	9192.	43179.	11.994	0.65	0.771
CD-109	351.75	88.08	4394.	23344.	6.484	0.86	0.812
CO-57	487.38	121.99	2606.	5536.	1.538	2.31	0.891
Ce-139	662.30	165.73	1283.	964.	0.268	7.35	1.085
Hg-203	1119.82	280.13	1632.	-52.	-0.015	109.81	1.012s
SN-113	1565.42	391.54	971.	336.	0.093	18.56	0.910s
CS-137	2646.04	661.66	840.	18538.	5.149	0.82	1.373
Y-898	3592.05	898.10	753.	352.	0.098	17.10	1.228
Co-1173	4693.24	1173.27	496.	17119.	4.755	0.83	1.743
Co-1332	5330.69	1332.53	136.	15698.	4.361	0.82	1.789
Y-1836	7345.64	1835.81	10.	220.	0.061	7.55	1.956s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.3650E+04				8.15E+03	
			46.54	1.365E+04	(P	1.603E+02 6.87E-01 4.25E+00	G
AM-241		1.1402E+03				1.58E+05	
			59.54	1.140E+03	(	1.187E+01 6.55E-01 3.57E+01	G
CD-109		1.5004E+04				4.63E+02	
			88.03	1.500E+04	(	2.003E+02 8.59E-01 3.61E+00	G
CO-57		3.3573E+02				2.72E+02	
			122.06	3.357E+02	(	1.459E+01 2.31E+00 8.56E+01	G
Ce-139		5.3096E+02				1.38E+02	
			165.85	5.310E+02	(	9.338E+01 7.35E+00 7.99E+01	G
Hg-203		-6.6653E-01				4.66E+01	
			279.17	-6.665E-01	?(	2.427E+00 1.10E+02 8.15E+01	G
SN-113		9.3563E+02				1.15E+02	
			391.69	9.356E+02	@(	4.114E+02 1.86E+01 6.40E+01	G
CS-137		4.4098E+02				1.10E+04	
			661.66	4.410E+02	(	3.277E+00 8.23E-01 8.52E+01	G
Y-898		1.8177E+03				1.07E+02	
			898.02	1.818E+03	(	6.751E+02 1.71E+01 9.37E+01	G
Co-1173		6.8205E+02				1.93E+03	
			1173.24	6.820E+02	(	4.243E+00 8.31E-01 9.99E+01	G
Co-1332		6.8963E+02				1.93E+03	
			1332.50	6.896E+02	(	2.503E+00 8.22E-01 1.00E+02	G
Y-1836		1.8728E+03				1.07E+02	
			1836.01	1.873E+03	(	1.462E+02 7.55E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.13	1632.	-52.	-0.015	109.81	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma		MDA Bq/Sample
Pb-210	1.2735E+04	1.3650E+04	6.879E-01%		1.60E+02
AM-241	1.1361E+03	1.1402E+03	6.548E-01%		1.19E+01
CD-109	4.4248E+03	1.5004E+04	8.588E-01%		2.00E+02
CO-57	4.2016E+01	3.3573E+02	2.313E+00%		1.46E+01
Ce-139	8.7645E+00	5.3096E+02	7.352E+00%		9.34E+01
Hg-203 #A	-6.6653E-01	>12 Halflives	1.0981E+02%	2.4271E+00	
SN-113 #	6.9111E+00	9.3563E+02	1.856E+01%		4.11E+02
CS-137	4.1887E+02	4.4098E+02	8.234E-01%		3.28E+00
Y-898	9.0827E+00	1.8177E+03	1.710E+01%		6.75E+02
Co-1173	5.0861E+02	6.8205E+02	8.315E-01%		4.24E+00
Co-1332	5.1427E+02	6.8963E+02	8.225E-01%		2.50E+00
Y-1836 #	9.3579E+00	1.8728E+03	7.550E+00%		1.46E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

17_Tuna2nd_20120265

---------- S U M M A R Y ----------

Total Activity (582.9 to 1999.2 keV) 1.981E+04 Bq/Sample

Total Decayed Activity (582.9 to 1999.2 keV) 3.7099195E+04 Bq/Sample

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 5**
SpectrumID: 5_20160128006_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 5_Soil_TunaCan_90099_032612
Detector: Ge 5 SN/157

Verification Date: 2016-01-28 10:21
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.57E+02	-1.7%
Cs-137	661.66	400	3.97E+02	0.7%
Co-1332	1332.5	777	7.71E+02	0.8%

Comments:

Perform ___Jody Watson 1/28/16_____ Reviev _____Rachel Mueller 1/28/16_____

C:\User\CRpt\5_20160128006_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 5 SN/157
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 10:21:33
Analyzed: 2/4/2016 10:52

Analyst: Jody Watson

Efficiency: 5_Soil_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.566E+02	0.45
CS-137	3.974E+02	0.71
Co-1332	7.707E+02	1.09
Total	1.625E+03	

TestAmerica Spectrum name: 5_20160128006_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det5\5_20160128006_EffVerif.An1

Acquisition information

Start time:	1/28/2016 10:21:33 AM
Live time:	7200
Real time:	7242
Dead time:	0.59 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_Soil_TunaCan.Clb

5_Soil_TunaCan_90099_032612

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	3/27/2012 5:20:37 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.43 %
Log(Eff):	-2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files

Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0281

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.59    62614.   0.54   0.73  1.791E-02
   59.55    82059.   0.45   0.73  2.534E-02    59.54 100.000  4.566E+02 AM241
   87.79     1068.   8.88   0.81  3.458E-02
  661.63    22901.   0.71   1.29  9.925E-03   661.66 100.000  3.973E+02 CS137
 1173.12     9966.   1.10   1.75  6.139E-03
 1332.41     8977.   1.09   1.90  5.515E-03  1332.50 100.000  7.707E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.88    46.59     15162.     62614. 3.496E+06    0.54   0.733  -
  350.82    87.79      2502.      1068. 3.087E+04    8.88   0.809  -      s
 4692.76  1173.12       266.      9966. 1.624E+06    1.10   1.754  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.79	59.55	13086.	82059.	11.397	0.45	0.731
CS-137	2647.26	661.63	612.	22901.	3.181	0.71	1.293
Co-1332	5329.50	1332.41	77.	8977.	1.247	1.09	1.898

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5663E+02				1.58E+05	
			59.54	4.566E+02	(	2.981E+00 4.47E-01 1.00E+02 G	
CS-137		3.9735E+02				1.10E+04	
			661.66	3.973E+02	(	2.047E+00 7.08E-01 1.00E+02 G	
Co-1332		7.7068E+02				1.93E+03	
			1332.50	7.707E+02	(	3.743E+00 1.09E+00 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.4986E+02	4.5663E+02	4.468E-01%	2.98E+00
CS-137	3.2049E+02	3.9735E+02	7.077E-01%	2.05E+00
Co-1332	2.2610E+02	7.7068E+02	1.091E+00%	3.74E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 9.965E+02 uCi/Source
Total Decayed Activity (37.6 to 2000.8 keV) 1.6246621E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20160123003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2016-01-23 19:25
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.38E+02	2.5%
Cs-137	661.66	400	3.86E+02	3.6%
Co-1332	1332.5	777	7.19E+02	7.5%

Comments:

Perform ____Kody Saulters 2/4/16_____ Reviev ___Jody Watson 2/4/16_____

C:\User\CRpt\7_20160123003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/23/2016 19:25:53
Analyzed: 2/4/2016 10:49

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.380E+02	0.38
CS-137	3.857E+02	0.59
Co-1332	7.189E+02	0.94
Total	1.543E+03	

TestAmerica Spectrum name: 7_20160123003_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20160123003_EffVerif.An1

Acquisition information

Start time:	1/23/2016 7:25:53 PM
Live time:	7200
Real time:	7361
Dead time:	2.18 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration

Filename:	7_Soil_TunaCan.Clb

7_TunaCan_90099_032712

Energy Calibration

Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration

Created:	3/16/2012 11:45:14 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.48 %
Log(Eff):	-2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files

Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0434

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   36.52     1402.   9.33   1.11  1.474E-02
   46.60    75982.   0.45   0.84  2.485E-02
   59.55   114994.   0.38   0.89  3.702E-02    59.54 100.000  4.380E+02 AM241
   87.94     1428.   8.44   0.97  5.326E-02
  661.74    33440.   0.59   1.49  1.492E-02   661.66 100.000  3.857E+02 CS137
 1173.38    13650.   0.99   1.95  8.928E-03
 1332.63    12093.   0.94   1.99  7.950E-03  1332.50 100.000  7.189E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  145.62    36.52      4964.      1402. 9.512E+04    9.33   1.111  -      s
  185.78    46.56     20640.     82430. 3.318E+06    0.48   0.912  -
  351.31    87.94      3932.      1428. 2.682E+04    8.44   0.972  -      s
 4693.26  1173.38       567.     13650. 1.529E+06    0.99   1.950  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.75	59.55	18759.	114994.	15.971	0.38	0.895
CS-137	2646.69	661.74	882.	33440.	4.644	0.59	1.494
Co-1332	5330.24	1332.63	117.	12093.	1.680	0.94	1.990

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.3796E+02				1.58E+05	
			59.54	4.380E+02	(	2.441E+00 3.82E-01 1.00E+02 G	
CS-137		3.8573E+02				1.10E+04	
			661.66	3.857E+02	(	1.628E+00 5.85E-01 1.00E+02 G	
Co-1332		7.1885E+02				1.93E+03	
			1332.50	7.189E+02	(	3.157E+00 9.42E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.3147E+02	4.3796E+02	3.822E-01%	2.44E+00
CS-137	3.1121E+02	3.8573E+02	5.852E-01%	1.63E+00
Co-1332	2.1125E+02	7.1885E+02	9.418E-01%	3.16E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 9.539E+02 uCi/Source
Total Decayed Activity (37.6 to 2000.1 keV) 1.5425436E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 8**

SpectrumID: 8_20160128004_EffVerif

Analysis Description: ACVTop-776670;TunaCan2006

Calibration: 8_Soil_TunaCan_90099_032712

Detector: Ge 8 SN/174

Verification Date: 2016-01-28 18:34

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.79E+02	-6.7%
Cs-137	661.66	400	3.90E+02	2.5%
Co-1332	1332.5	777	7.56E+02	2.7%

Comments:

Perform Aaron Schroder 1/28/16

Reviev __Jody Watson_____1/29/16_____

C:\User\CRpt\8_20160128004_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 8 SN/174
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 18:34:05
Analyzed: 2/4/2016 10:51

Analyst: Jody Watson

Efficiency: 8_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.789E+02	0.41
CS-137	3.899E+02	0.64
Co-1332	7.564E+02	0.99
Total	1.625E+03	

TestAmerica Spectrum name: 8_20160128004_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det8\8_20160128004_EffVerif.An1

Acquisition information
Start time: 1/28/2016 6:34:05 PM
Live time: 7200
Real time: 7434
Dead time: 3.15 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) +
(-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) +
(-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0632

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.57    74004.   0.44   1.01  2.005E-02
   59.58   102880.   0.35   1.02  2.881E-02    59.54 100.000  5.034E+02 AM241
   88.09     1218.   9.96   0.76  3.993E-02
  661.54    27378.   0.64   1.34  1.209E-02   661.66 100.000  3.899E+02 CS137
 1173.07    11810.   1.00   1.56  7.454E-03
 1332.31    10667.   0.99   1.75  6.678E-03  1332.50 100.000  7.564E+02 Co1332


************ U N I D E N T I F I E D    P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.94    46.53     19029.     71370. 3.560E+06    0.54   0.847  -
  352.16    88.09      3683.      1218. 3.051E+04    9.96   0.764  -      s
 4692.32  1173.07       306.     11810. 1.584E+06    1.00   1.561  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.97	59.54	15110.	97876.	13.594	0.41	0.867D
CS-137	2646.10	661.54	638.	27378.	3.802	0.64	1.335
Co-1332	5329.28	1332.31	68.	10667.	1.482	0.99	1.753

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.7889E+02				1.58E+05	
			59.54	4.789E+02	(	2.816E+00 4.13E-01 1.00E+02 G	
CS-137		3.8993E+02				1.10E+04	
			661.66	3.899E+02	(	1.714E+00 6.40E-01 1.00E+02 G	
Co-1332		7.5635E+02				1.93E+03	
			1332.50	7.564E+02	(	2.913E+00 9.90E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.7179E+02	4.7889E+02	4.129E-01%	2.82E+00
CS-137	3.1450E+02	3.8993E+02	6.397E-01%	1.71E+00
Co-1332	2.2187E+02	7.5635E+02	9.900E-01%	2.91E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.008E+03 uCi/Source
Total Decayed Activity (37.5 to 2000.0 keV) 1.6251797E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20160128006_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2016-01-28 13:28
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.53E+02	-0.9%
Cs-137	661.66	400	3.91E+02	2.2%
Co-1332	1332.5	777	7.46E+02	4.0%

Comments:

Perforn _____Jody Watson 1/29/16_____ Revie _____Aaron Schroder 1/29/2016_____

C:\User\CRpt\12_20160128006_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge12 S/N10034336
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 13:28:46
Analyzed: 1/29/2016 13:56

Analyst: Jody Watson

Efficiency: 12_TunaCanCal_90099_100212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.532E+02	0.41
CS-137	3.911E+02	0.59
Co-1332	7.456E+02	0.90
Total	1.590E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det12\12_20160128006_EffVerif.An1

Acquisition information
Start time: 1/28/2016 1:28:46 PM
Live time: 7200
Real time: 7326
Dead time: 1.72 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) +
(-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) +
(-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0294
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.56	1334.	9.60	1.00	1.444E-02				
46.60	72273.	0.45	0.89	2.231E-02				
59.55	100350.	0.41	0.89	3.122E-02	59.54	100.000	4.532E+02	AM241
87.89	1239.	8.96	1.09	4.274E-02				
238.48	1003.	9.18	1.15	3.221E-02				
661.61	35682.	0.59	1.40	1.571E-02	661.66	100.000	3.911E+02	CS137
1173.14	15564.	0.95	1.81	1.018E-02				
1332.40	14520.	0.90	1.94	9.221E-03	1332.50	100.000	7.456E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.90	36.56	4764.	1334.	9.239E+04	9.60	0.995	-	s
185.89	46.56	20938.	74360.	3.333E+06	0.53	0.874	-	
351.04	87.89	3330.	1239.	2.899E+04	8.96	1.086	-	s
953.01	238.48	2037.	1003.	3.113E+04	9.18	1.146	-	
4691.52	1173.14	752.	15564.	1.528E+06	0.95	1.813	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.79	59.55	16419.	100350.	13.938	0.41	0.888
CS-137	2644.93	661.61	1381.	35682.	4.956	0.59	1.395
Co-1332	5329.01	1332.40	280.	14520.	2.017	0.90	1.943

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5317E+02				1.58E+05	
			59.54	4.532E+02	(	2.709E+00 4.06E-01 1.00E+02 G	
CS-137		3.9106E+02				1.10E+04	
			661.66	3.911E+02	(	1.928E+00 5.91E-01 1.00E+02 G	
Co-1332		7.4558E+02				1.93E+03	
			1332.50	7.456E+02	(	4.143E+00 8.99E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4645E+02	4.5317E+02	4.060E-01%	2.71E+00
CS-137	3.1542E+02	3.9106E+02	5.907E-01%	1.93E+00
Co-1332	2.1873E+02	7.4558E+02	8.990E-01%	4.14E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 9.806E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.4 keV) 1.5898042E+03 uCi/Source

TestAmerica
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ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #13**
SpectrumID: 13_20160407003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 13_Soil_TunaCan_90099_032712
Detector: Ge13 SN/10064006

Verification Date: 2016-04-07 10:57
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.53E+02	-0.8%
Cs-137	661.66	400	3.79E+02	5.4%
Co-1332	1332.5	777	7.20E+02	7.4%

Comments:

Perform Jody Watson 4/7/16

Reviev _Amanda Dick 4/7/16_

C:\User\CRpt\13_20160407003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge13 SN/10064006
Source Date: 10/1/2006 11:00
Acquired: 4/7/2016 10:57:01
Analyzed: 4/7/2016 12:58

Analyst: Jody Watson

Efficiency: 13_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.528E+02	0.37
CS-137	3.786E+02	0.53
Co-1332	7.197E+02	0.82
Total	1.551E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det13\13_20160407003_EffVerif.An1

Acquisition information

Start time:	4/7/2016 10:57:01 AM
Live time:	7200
Real time:	7258
Dead time:	0.79 %
Detector ID:	13

Detector system
Ge13 SN/10064006

Calibration

Filename:	13_Soil_TunaCan.Clb

13_Soil_TunaCan_90099_032712

Energy Calibration

Created:	2/23/2012 9:31:24 AM
Zero offset:	0.036 keV
Gain:	0.250 keV/channel
Quadratic:	-2.347E-08 keV/channel^2

Efficiency Calibration

Created:	3/29/2012 7:50:26 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.91 %
Log(Eff):	-5.308398E-01 + (-3.057754E-01*Log(E)) + (-3.437570E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.60 %
Log(Eff):	-2.292218E+01 + (8.455931E+00*Log(E)) + (-8.924057E-01*Log(E)^2)

Library Files

Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Test America Spectrum name: 13_20160407003_EffVerif.An1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0332

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.54	1974.	5.38	1.01	1.732E-02				
46.54	94328.	0.38	1.02	2.701E-02				
49.59	2173.	8.10	1.02	2.984E-02				
59.47	122086.	0.37	0.84	3.797E-02	59.54	100.000	4.528E+02	AM241
87.82	1531.	6.14	1.06	5.220E-02				
238.45	1089.	9.60	0.99	3.937E-02				
661.68	41444.	0.53	1.46	1.893E-02	661.66	100.000	3.786E+02	CS137
1173.22	17974.	0.85	1.88	1.217E-02				
1332.46	16298.	0.82	2.02	1.100E-02	1332.50	100.000	7.197E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.50	36.43	5595.	1571.	9.070E+04	9.26	0.868	-	sD
185.75	46.50	22594.	89194.	3.302E+06	0.48	0.810	-	D
198.11	49.59	14395.	2173.	7.284E+04	8.10	1.021	-	D
350.96	87.85	3656.	1531.	2.932E+04	6.14	1.057	-	D
953.25	238.45	2564.	1089.	2.766E+04	9.60	0.992	-	
4692.44	1173.22	644.	17974.	1.477E+06	0.85	1.876	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.63	59.47	18260.	122086.	16.956	0.37	0.835
CS-137	2645.90	661.68	1130.	41444.	5.756	0.53	1.460
Co-1332	5329.66	1332.46	203.	16298.	2.264	0.82	2.017

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Peak Code	Peak MDA Value GPS/Source	COMMENTS
AM-241		4.5280E+02				1.58E+05	
			59.54	4.528E+02	(	2.346E+00 3.67E-01 1.00E+02	G
CS-137		3.7859E+02				1.10E+04	
			661.66	3.786E+02	(	1.456E+00 5.30E-01 1.00E+02	G
Co-1332		7.1967E+02				1.93E+03	
			1332.50	7.197E+02	(	3.049E+00 8.18E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

Test America Spectrum name: 13_20160407003_EffVerif.An1

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.4595E+02	4.5280E+02	3.674E-01%	2.35E+00
CS-137	3.0401E+02	3.7859E+02	5.299E-01%	1.46E+00
Co-1332	2.0588E+02	7.1967E+02	8.182E-01%	3.05E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (95.6 to 1999.5 keV) 9.558E+02 GPS/Source
Total Decayed Activity (95.6 to 1999.5 keV) 1.5510570E+03 GPS/Source

TestAmerica
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ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #14**
SpectrumID: 14_20160125003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 14_TunaCan_90099_042312
Detector: Ge14 SN/11080670

Verification Date: 2016-01-25 12:29
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.55E+02	-1.4%
Cs-137	661.66	400	3.95E+02	1.3%
Co-1332	1332.5	777	7.57E+02	2.6%

Comments:

Perforn ___Kody Saulters 2/4/16_____ Revie __Jody Watson 2/4/16_____

C:\User\CRpt\14_20160125003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge14 SN/11080670
Source Date: 10/1/2006 11:00
Acquired: 1/25/2016 12:29:45
Analyzed: 2/4/2016 09:35

Analyst: Jody Watson

Efficiency: 14_TunaCan_90099_042312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.553E+02	0.40
CS-137	3.948E+02	0.62
Co-1332	7.566E+02	0.94
Total	1.607E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det14\14_20160125003_EffVerif.An1

Acquisition information
Start time: 1/25/2016 12:29:45 PM
Live time: 7200
Real time: 7259
Dead time: 0.81 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1953

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
46.67	73404.	0.51	0.89	2.181E-02				
59.66	98988.	0.40	0.90	3.073E-02	59.54	100.000	4.553E+02	AM241
87.86	1381.	7.63	1.19	4.192E-02				
238.23	859.	9.01	1.08	2.935E-02				
661.34	30113.	0.62	1.47	1.314E-02	661.66	100.000	3.948E+02	CS137
1172.91	13023.	0.94	1.74	8.246E-03				
1332.21	11875.	0.94	1.86	7.424E-03	1332.50	100.000	7.566E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
186.09	46.67	18352.	73404.	3.366E+06	0.51	0.888	-	s
350.79	87.86	3068.	1381.	3.294E+04	7.63	1.186	-	s
952.14	238.23	1621.	859.	2.928E+04	9.01	1.079	-	
4691.29	1172.91	312.	13023.	1.579E+06	0.94	1.737	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.04	59.66	15017.	98988.	13.748	0.40	0.897s
CS-137	2644.50	661.34	859.	30113.	4.182	0.62	1.470
Co-1332	5328.79	1332.21	65.	11875.	1.649	0.94	1.861

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5525E+02				1.58E+05	
			59.54	4.553E+02	(	2.639E+00 4.00E-01 1.00E+02 G	
CS-137		3.9479E+02				1.10E+04	
			661.66	3.948E+02	(	1.826E+00 6.21E-01 1.00E+02 G	
Co-1332		7.5658E+02				1.93E+03	
			1332.50	7.566E+02	(	2.566E+00 9.36E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting	1 Sigma	MDA
AM-241 #	4.4851E+02	4.5525E+02	3.997E-01%		2.64E+00
CS-137	3.1849E+02	3.9479E+02	6.211E-01%		1.83E+00
Co-1332	2.2220E+02	7.5658E+02	9.363E-01%		2.57E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.892E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.6066273E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #15**
SpectrumID: 15_20160504003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 15_TunaCan_90099_032212
Detector: Ge15 SN/11012216

Verification Date: 2016-05-04 18:46
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.45E+02	0.8%
Cs-137	661.66	400	3.87E+02	3.4%
Co-1332	1332.5	777	7.47E+02	3.8%

Comments:

Perform ___Jody Watson 5/5/16_____ Reviev __Kody Saulters 5/5/16_____

C:\User\CRpt\15_20160504003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge15 SN/11012216
Source Date: 10/1/2006 11:00
Acquired: 5/4/2016 18:46:19
Analyzed: 5/5/2016 12:02

Analyst: Jody Watson

Efficiency: 15_TunaCan_90099_032212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.452E+02	0.48
CS-137	3.866E+02	0.67
Co-1332	7.472E+02	1.06
Total	1.579E+03	

Test America Spectrum name: 15_20160504003_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det15\15_20160504003_EffVerif.An1

Acquisition information
Start time: 5/4/2016 6:46:19 PM
Live time: 7200
Real time: 7231
Dead time: 0.42 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0611

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.58    64528.   0.47   0.95  1.956E-02
   59.53    86404.   0.48   0.90  2.737E-02    59.54 100.000  4.452E+02 AM241
  661.75    25760.   0.67   1.44  1.154E-02   661.66 100.000  3.866E+02 CS137
 1173.43    10608.   1.12   1.87  7.075E-03
 1332.71     9639.   1.06   1.94  6.324E-03  1332.50 100.000  7.472E+02 Co1332


************ U N I D E N T I F I E D     P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.80    46.53     18441.     65393. 3.343E+06    0.57   0.887  -
 4692.75  1173.43       481.     10608. 1.499E+06    1.12   1.872  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.76	59.53	17200.	86404.	12.001	0.48	0.904
CS-137	2645.68	661.75	708.	25760.	3.578	0.67	1.435
Co-1332	5330.21	1332.71	114.	9639.	1.339	1.06	1.942

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4521E+02				1.58E+05	
			59.54	4.452E+02	(	3.163E+00 4.77E-01 1.00E+02 G	
CS-137		3.8657E+02				1.10E+04	
			661.66	3.866E+02	(	1.901E+00 6.74E-01 1.00E+02 G	
Co-1332		7.4720E+02				1.93E+03	
			1332.50	7.472E+02	(	4.067E+00 1.06E+00 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

Test America Spectrum name: 15_20160504003_EffVerif.An1

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting	1 Sigma	MDA
AM-241	4.3842E+02	4.4521E+02	4.765E-01%		3.16E+00
CS-137	3.0989E+02	3.8657E+02	6.738E-01%		1.90E+00
Co-1332	2.1166E+02	7.4720E+02	1.062E+00%		4.07E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.600E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5789875E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #16**
SpectrumID: 16_20160122005_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 16_TunaCan_90099_071012
Detector: Ge16 SN/11012217

Verification Date: 2016-01-22 10:56
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.42E+02	1.6%
Cs-137	661.66	400	3.99E+02	0.2%
Co-1332	1332.5	777	7.69E+02	1.0%

Comments:

Perforn Amanda Dick 01/22/2016

Revie' Jody Watson 01/22/2016

C:\User\CRpt\16_20160122005_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge16 SN/11012217
Source Date: 10/1/2006 11:00
Acquired: 1/22/2016 10:56:41
Analyzed: 2/3/2016 14:54

Analyst: Jody Watson

Efficiency: 16_TunaCan_90099_071012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.416E+02	0.43
CS-137	3.993E+02	0.57
Co-1332	7.690E+02	0.84
Total	1.610E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det16\16_20160122005_EffVerif.An1

Acquisition information
Start time: 1/22/2016 10:56:41 AM
Live time: 7200
Real time: 7636
Dead time: 5.70 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Soil_TunaCan.Clb
16_TunaCan_90099_071012

Energy Calibration
Created: 2/28/2012 9:35:31 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: -2.285E-08 keV/channel^2

Efficiency Calibration
Created: 7/13/2012 9:47:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 1.477416E-02 + (-5.514266E-01*Log(E)) +
(-1.443482E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.17 %
Log(Eff): -2.408438E+01 + (8.948554E+00*Log(E)) +
(-9.513599E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.63keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0291

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.50	1362.	9.86	0.91	1.492E-02				
46.55	73583.	0.45	0.96	2.349E-02				
59.54	104212.	0.43	0.98	3.327E-02	59.54	100.000	4.416E+02	AM241
238.61	855.	9.53	1.14	3.217E-02				
661.72	35644.	0.57	1.53	1.537E-02	661.66	100.000	3.992E+02	CS137
1173.34	16190.	0.90	1.97	1.002E-02				
1332.60	14808.	0.84	2.11	9.096E-03	1332.50	100.000	7.690E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.72	36.50	4998.	1362.	9.127E+04	9.86	0.911	-	s
185.73	46.51	21549.	77213.	3.286E+06	0.52	0.970	-	
953.82	238.61	1829.	855.	2.659E+04	9.53	1.137	-	
4692.71	1173.34	609.	16190.	1.616E+06	0.90	1.966	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.84	59.54	19873.	104212.	14.474	0.43	0.978
CS-137	2645.94	661.72	925.	35644.	4.951	0.57	1.529
Co-1332	5330.01	1332.60	89.	14808.	2.057	0.84	2.112

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4160E+02				1.58E+05	
			59.54	4.416E+02	(	2.795E+00 4.26E-01 1.00E+02 G	
CS-137		3.9925E+02				1.10E+04	
			661.66	3.992E+02	(	1.618E+00 5.70E-01 1.00E+02 G	
Co-1332		7.6901E+02				1.93E+03	
			1332.50	7.690E+02	(	2.422E+00 8.41E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3507E+02	4.4160E+02	4.259E-01%	2.80E+00
CS-137	3.2214E+02	3.9925E+02	5.705E-01%	1.62E+00
Co-1332	2.2610E+02	7.6901E+02	8.409E-01%	2.42E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 9.833E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.6 keV) 1.6098567E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #17**
SpectrumID: 17_20160127003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 17_TunaCan_90099_032612
Detector: Ge17 SN/11080671

Verification Date: 2016-01-27 15:26
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.51E+02	-0.5%
Cs-137	661.66	400	3.90E+02	2.6%
Co-1332	1332.5	777	7.57E+02	2.6%

Comments:

Perforn ____Jody Watson 1/28/16_____ Revie ____Rachel Mueller 1/28/16_____

C:\User\CRpt\17_20160127003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge17 SN/11080671
Source Date: 10/1/2006 11:00
Acquired: 1/27/2016 15:26:41
Analyzed: 2/4/2016 09:55

Analyst: Jody Watson

Efficiency: 17_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.514E+02	0.41
CS-137	3.896E+02	0.59
Co-1332	7.570E+02	0.90
Total	1.598E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det17\17_20160127003_EffVerif.An1

Acquisition information
Start time: 1/27/2016 3:26:41 PM
Live time: 7200
Real time: 7328
Dead time: 1.74 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) +
(-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) +
(-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0457
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.64	1282.	9.45	0.84	1.356E-02				
46.60	71264.	0.51	0.76	2.105E-02				
59.59	94693.	0.41	0.77	2.960E-02	59.54	100.000	4.514E+02	AM241
87.94	1141.	9.18	0.87	4.058E-02				
661.62	32640.	0.59	1.34	1.443E-02	661.66	100.000	3.896E+02	CS137
1173.18	14804.	0.88	1.69	9.359E-03				
1332.42	13566.	0.90	1.83	8.481E-03	1332.50	100.000	7.570E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.06	36.64	4466.	1282.	9.453E+04	9.45	0.838	-	s
185.88	46.60	17580.	71264.	3.386E+06	0.51	0.765	-	
351.17	87.94	3107.	1141.	2.812E+04	9.18	0.873	-	s
4692.02	1173.18	370.	14804.	1.582E+06	0.88	1.695	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.81	59.59	14991.	94693.	13.152	0.41	0.771
CS-137	2645.33	661.62	846.	32640.	4.533	0.59	1.344
Co-1332	5329.31	1332.42	142.	13566.	1.884	0.90	1.830

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5144E+02				1.58E+05	
			59.54	4.514E+02	(	2.733E+00 4.12E-01 1.00E+02 G	
CS-137		3.8955E+02				1.10E+04	
			661.66	3.896E+02	(	1.650E+00 5.89E-01 1.00E+02 G	
Co-1332		7.5703E+02				1.93E+03	
			1332.50	7.570E+02	(	3.256E+00 8.96E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4475E+02	4.5144E+02	4.119E-01%	2.73E+00
CS-137	3.1422E+02	3.8955E+02	5.894E-01%	1.65E+00
Co-1332	2.2216E+02	7.5703E+02	8.961E-01%	3.26E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.811E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5980165E+03 uCi/Source

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 5_20160730007_BGLong
Description: Background Long PBC Count
Acquired: 7/30/2016 5:50:09 PM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.43	1.55	1.60	PASS

Analyst: Mike Aldridge Reviewer: Rachel Mueller

(Page 1 of 1)

Test America
St. Louis
Background Check

Spectrum: 7_20160730008_BGLong
Description: Background Long PBC Count
Acquired: 7/30/2016 6:29:26 PM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Mike Aldridge Reviewer: Rachel Mueller

(Page 1 of 1)

Test America
St. Louis
Background Check

Spectrum: 8_20160807001_BGLong
Description: Background Long PBC Count
Acquired: 8/7/2016 10:06:19 PM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.58	1.68	1.74	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20160807001_BGLong.An1

Acquisition information

Start time:	8/7/2016 10:06:19 PM
Live time:	72000
Real time:	73864
Dead time:	2.52 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration

Filename:	8_QC.Clb

Ge8_QC

Energy Calibration

Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:07:20 AM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0882

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.59	443.	9.67	1.02	8.697E-02	59.54	35.900	1.971E-01	AM241
63.26	1018.	4.71	1.03	9.237E-02	63.29	3.810	4.015E+00	TH234
84.16	249.	20.41	0.81	1.232E-01				
92.66	2098.	3.77	1.06	1.295E-01	92.59	5.584	4.029E+00	TH234
					93.35	5.561	4.043E+00	AC228
98.58	180.	27.23	0.69	1.303E-01				
143.65	260.	19.95	0.89	1.248E-01	143.79	10.960	2.637E-01	U235
185.84	1118.	6.00	1.00	1.107E-01	185.72	54.000	2.596E-01	U235
					185.99	3.280	4.276E+00	Ra226
238.77	370.	14.28	1.05	9.635E-02	238.63	43.300	1.232E-01	PB212
582.93	136.	29.71	1.21	3.958E-02	583.02	84.500	5.627E-02	TL208
661.65	252.	13.69	1.06	3.334E-02	661.66	85.210	1.234E-01	CS137
1001.01	156.	19.09	1.20	2.158E-02	1001.00	0.837	1.201E+01	PA234M
1332.62	135.	19.92	0.43	1.637E-02	1332.50	99.980	1.145E-01	CO60
					1332.50	99.980	1.145E-01	CO60
1460.44	142.	16.98	2.24	1.543E-02	1460.83	10.670	1.201E+00	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
336.46	84.16	700.	249.	2.021E+03	20.41	0.813	-	s
394.13	98.58	635.	180.	1.382E+03	27.23	0.688	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.54	751.	444.	0.006	9.94	1.022D
TH-234	252.96	63.29	686.	1018.	0.014	4.80	1.025D
TH-234	370.45	92.66	994.	2098.	0.029	3.77	1.055
U-235	574.42	143.65	661.	260.	0.004	19.95	0.887s
U-235	742.71	185.72	780.	1090.	0.015	4.27	1.003D
PB-212	954.94	238.77	583.	370.	0.005	14.28	1.053
TL-208	2331.65	582.93	288.	136.	0.002	29.71	1.214
CS-137	2646.52	661.65	202.	252.	0.004	13.69	1.062s
PA-234M	4004.05	1001.01	119.	156.	0.002	19.09	1.196s
CO-60	5330.55	1332.62	84.	135.	0.002	19.92	0.434s
K-40	5841.82	1460.44	62.	142.	0.002	16.98	2.244

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.2010E+00					4.66E+11	
			1460.83	1.201E+00	(	3.316E-01	1.70E+01	1.07E+01 G
CO-60	F	1.1454E-01					1.93E+03	
			1332.50	1.145E-01	?(	3.854E-02	1.99E+01	1.00E+02 G
CS-137	I	1.2336E-01					1.10E+04	
			661.66	1.234E-01	(	3.368E-02	1.37E+01	8.52E+01 G
TL-208	N	5.6266E-02					6.98E+02	
			583.02	5.627E-02	(	3.394E-02	2.97E+01	8.45E+01 G
			277.28	0.000E+00	%	1.592E-01	9.63E+01	6.31E+00 G
			860.56	0.000E+00	%	1.660E-01	6.24E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.2324E-01					6.98E+02	
			238.63	1.232E-01	(	3.834E-02	1.43E+01	4.33E+01 G
			300.03	0.000E+00	%	3.039E-01	3.89E+01	3.28E+00 GA
TH-234	N	4.0234E+00					1.63E+12	
			63.29	4.015E+00	(	4.921E-01	4.80E+00	3.81E+00 G
			92.59	4.029E+00	(	2.874E-01	3.77E+00	5.58E+00 G
PA-234M	N	1.2010E+01					1.63E+12	
			1001.00	1.201E+01	?(	4.115E+00	1.91E+01	8.37E-01 G
			766.41	0.000E+00	%	6.184E+00	3.21E+01	2.94E-01 G
U-235	N	2.6374E-01					2.57E+11	
			185.72	2.530E-01	}	3.085E-02	4.27E+00	5.40E+01 GA
			143.79	2.637E-01	*(	1.245E-01	2.00E+01	1.10E+01 G
			205.33	0.000E+00	%	1.857E-01	3.16E+01	5.01E+00 G
			163.38	0.000E+00	%	1.792E-01	4.01E+01	5.08E+00 G
AM-241	T	1.9758E-01					1.58E+05	
			59.54	1.976E-01	(	5.807E-02	9.94E+00	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.1074E-01		
NA-22	<	3.2759E-02		
K-40		1.2010E+00	1.6983E+01%	3.316E-01
Sc-46	<	1.2420E-02		
CR-51	<	1.0349E-01		
MN-54	<	2.1811E-02		
FE-59	<	4.3605E-02		
Co-56	<	2.1139E-02		
CO-57	<	1.0718E-02		
CO-58	<	1.9336E-02		
CO-60	#	1.1454E-01	1.9918E+01%	3.854E-02
ZN-65	<	5.8930E-02		
NB-94	<	2.2388E-02		
ZR-95	<	3.7566E-02		
NB-95	<	3.0190E-02		
RU-103	<	1.7382E-02		
RH-106	<	1.1298E-01		
AG-108M	<	1.7064E-02		
AG-110M	<	3.6859E-02		
SN-113	<	2.2462E-02		
SB-124	<	1.5810E-02		
SB-125	<	5.0181E-02		
I-131	<	1.6793E-02		
BA-133	<	1.7715E-02		
CS-134	<	2.9686E-02		
CS-137		1.2336E-01	1.3691E+01%	3.368E-02
CE-139	<	1.1188E-02		
Ba-140	<	6.6143E-02		
La-140	<	3.0947E-02		
CE-141	<	1.3058E-02		
CE-144	<	8.7434E-02		
PM-144	<	2.3000E-02		
EU-152	<	6.2071E-02		
EU-154	<	2.7305E-01		
EU-155	<	3.8049E-02		

HF-181	<	2.6820E-02		
Ta-182	<	3.8846E-02		
Hg-203	<	1.6311E-02		
TL-208		5.6266E-02	2.9713E+01%	3.394E-02
pm-146	<	5.8568E-02		
y-88	<	3.0340E-02		
PB-210	<	3.8810E-01		
PB-212		1.2324E-01	1.4284E+01%	3.834E-02
PB-214	<	3.2306E-02		
BI-207	<	2.6400E-02		
BI-212	<	2.5440E-01		
BI-214	<	4.1397E-02		
BI-210M	<	1.8907E-02		
RA-224	<	3.8591E-01		
AC-228	<	1.0933E-01		
TH-227	<	1.1459E-01		
TH-229	<	2.1056E-01		
TH-234		4.0234E+00	3.0513E+00%	4.921E-01
PA-231	<	4.0252E-01		
PA-233	<	2.9282E-02		
PA-234	<	5.1695E-02		
PA-234M#		1.2010E+01	1.9092E+01%	4.115E+00
U-235		2.6374E-01	1.9954E+01%	1.245E-01
AM-241		1.9758E-01	9.9404E+00%	5.807E-02
Np-237	<	9.7820E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.811E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20160806005_BGLong
Description: Background Long PBC Count
Acquired: 8/6/2016 5:43:12 PM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.08	1.93	1.98	2.02	2.18	2.23	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20160806005_BGLong.An1

Acquisition information

Start time:	8/6/2016 5:43:12 PM
Live time:	72000
Real time:	72617
Dead time:	0.85 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_QC.Clb

12_QC-H_83725-334_060211

Energy Calibration

Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration

Created:	6/3/2011 6:41:14 AM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1080

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.59	1215.	6.91	1.07	6.304E-02	46.54	4.250	6.303E+00	PB210
63.34	800.	8.80	0.93	8.574E-02	63.29	3.810	3.406E+00	TH234
74.81	242.	18.20	0.92	1.013E-01				
77.34	264.	17.58	0.92	1.048E-01				
92.66	1220.	6.58	1.26	1.198E-01	92.59	5.584	2.532E+00	TH234
					93.35	5.561	2.541E+00	AC228
144.13	165.	25.60	1.71	1.176E-01	143.79	10.960	1.774E-01	U235
					145.44	48.200	4.051E-02	CE141
185.69	645.	10.91	1.01	1.068E-01	185.72	54.000	1.553E-01	U235
					185.99	3.280	2.559E+00	Ra226
198.65	204.	22.67	1.18	1.036E-01				
238.41	513.	11.47	1.01	9.399E-02	238.63	43.300	1.753E-01	PB212
242.00	158.	23.76	1.07	9.312E-02	242.00	7.430	3.168E-01	PB214
295.10	211.	19.02	1.09	8.027E-02	295.09	19.300	1.892E-01	PB214
351.82	356.	12.06	1.18	6.653E-02	351.93	37.600	1.977E-01	PB214
511.12	2258.	4.25	2.61	4.819E-02	511.86	20.000	3.258E+00	RH106
583.09	184.	25.01	1.31	4.296E-02	583.02	84.500	7.060E-02	TL208
609.21	382.	14.08	1.25	4.105E-02	609.31	46.090	2.808E-01	BI214
					610.30	5.750	2.255E+00	RU103
1000.83	123.	25.12	1.73	2.403E-02	1001.00	0.837	8.493E+00	PA234M
1120.03	164.	17.48	2.18	2.185E-02	1120.29	15.100	6.918E-01	BI214
					1120.55	99.987	1.045E-01	Sc46
					1121.30	34.900	2.996E-01	Ta182
1460.85	234.	13.91	1.89	1.768E-02	1460.83	10.670	1.727E+00	K40
1764.28	127.	15.34	0.74	1.522E-02	1764.49	15.400	7.546E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.78	74.84	848.	242.	2.388E+03	18.20	0.916	- sD
308.90	77.37	941.	264.	2.516E+03	17.58	0.919	- D
793.79	198.65	611.	204.	1.969E+03	22.67	1.180	- s
2043.08	511.12	818.	2258.	4.687E+04	4.25	2.609	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.98	46.59	1343.	1215.	0.017	6.91	1.067
TH-234	252.93	63.34	1188.	800.	0.011	8.80	0.929
TH-234	370.13	92.66	1254.	1220.	0.017	6.58	1.260s
U-235	575.84	144.13	570.	165.	0.002	25.60	1.708s
U-235	742.09	185.72	1032.	587.	0.008	7.95	1.009D
PB-212	953.60	238.63	621.	501.	0.007	8.33	1.071D
PB-214	967.05	242.00	624.	158.	0.002	23.76	1.075D
PB-214	1179.33	295.10	442.	211.	0.003	19.02	1.092
PB-214	1406.11	351.82	425.	356.	0.005	12.06	1.183
TL-208	2330.88	583.09	402.	184.	0.003	25.01	1.310
BI-214	2435.36	609.21	488.	382.	0.005	14.08	1.247
PA-234M	4001.98	1000.83	156.	123.	0.002	25.12	1.729
BI-214	4478.99	1120.03	117.	164.	0.002	17.48	2.178s
K-40	5843.24	1460.85	110.	234.	0.003	13.91	1.893s
BI-214	7058.30	1764.28	48.	127.	0.002	15.34	0.740s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS			COMMENTS
K-40	N	1.7269E+00					4.66E+11		
			1460.83	1.727E+00	(	3.807E-01	1.39E+01	1.07E+01	G
TL-208	N	7.0597E-02					6.98E+02		
			583.02	7.060E-02	(	3.681E-02	2.50E+01	8.45E+01	G
			277.28	0.000E+00	%	1.753E-01	4.46E+01	6.31E+00	G
			860.56	0.000E+00	%	1.915E-01	1.97E+02	1.24E+01	G
PB-210	N	6.3034E+00					8.14E+03		
			46.54	6.303E+00	(	9.004E-01	6.91E+00	4.25E+00	G
PB-212	N	1.7109E-01					6.98E+02		
			238.63	1.711E-01	(	4.059E-02	8.33E+00	4.33E+01	G
			300.03	0.000E+00	%	3.718E-01	1.33E+02	3.28E+00	GA
PB-214	N	1.9483E-01					5.84E+05		
			351.93	1.977E-01	(	5.486E-02	1.21E+01	3.76E+01	G
			295.09	1.892E-01	(	9.026E-02	1.90E+01	1.93E+01	G
			242.00	3.168E-01	+	2.391E-01	2.38E+01	7.43E+00	GA
BI-214	N	2.8084E-01					5.84E+05		
			609.31	2.808E-01	(	7.753E-02	1.41E+01	4.61E+01	G
			1120.29	6.918E-01	+	2.233E-01	1.75E+01	1.51E+01	G
			1764.49	7.546E-01	+	2.067E-01	1.53E+01	1.54E+01	G
TH-234	N	3.4059E+00					1.63E+12		
			63.29	3.406E+00	(	6.948E-01	8.80E+00	3.81E+00	G
			92.59	2.532E+00	-	3.482E-01	6.58E+00	5.58E+00	G
PA-234M	N	8.4934E+00					1.63E+12		
			1001.00	8.493E+00	?(	4.206E+00	2.51E+01	8.37E-01	G
			766.41	0.000E+00	%	7.040E+00	8.43E+01	2.94E-01	G
U-235	N	1.7744E-01					2.57E+11		
			185.72	1.415E-01	}	3.673E-02	7.95E+00	5.40E+01	GA
			143.79	1.774E-01	(	1.227E-01	2.56E+01	1.10E+01	G
			205.33	0.000E+00	%	2.106E-01	6.65E+01	5.01E+00	G
			163.38	0.000E+00	%	1.996E-01	8.18E+01	5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

```
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                    MDA
              DPS
_____________________________________________________________________________
BE-7    <    9.6366E-02
NA-22   <    2.3957E-02
K-40   #     1.7269E+00   1.3905E+01%               3.807E-01
Sc-46   <    3.0724E-02
CR-51   <    1.2470E-01
MN-54   <    2.2503E-02
FE-59   <    4.5326E-02
Co-56   <    2.4196E-02
CO-57   <    1.3697E-02
CO-58   <    3.6857E-02
CO-60   <    2.7075E-02
ZN-65   <    7.7609E-02
```

NB-94	<	2.1132E-02		
ZR-95	<	3.5675E-02		
NB-95	<	2.6452E-02		
RU-103	<	1.9981E-02		
RH-106	<	2.1103E-01		
AG-108M	<	1.6550E-02		
AG-110M	<	4.9616E-02		
SN-113	<	2.1882E-02		
SB-124	<	4.4076E-02		
SB-125	<	4.7560E-02		
I-131	<	1.5139E-02		
BA-133	<	2.1682E-02		
CS-134	<	3.0994E-02		
CS-137	<	3.3826E-02		
CE-139	<	1.4853E-02		
Ba-140	<	6.8576E-02		
La-140	<	2.5885E-02		
CE-141	<	1.4923E-02		
CE-144	<	6.5737E-02		
PM-144	<	2.2638E-02		
EU-152	<	3.5595E-02		
EU-154	<	1.7686E-01		
EU-155	<	4.6572E-02		
HF-181	<	2.8749E-02		
Ta-182	<	9.0455E-02		
Hg-203	<	1.4812E-02		
TL-208		7.0597E-02	2.5014E+01%	3.681E-02
pm-146	<	5.5252E-02		
y-88	<	2.8095E-02		
PB-210		6.3034E+00	6.9056E+00%	9.004E-01
PB-212	#	1.7109E-01	8.3347E+00%	4.059E-02
PB-214		1.9483E-01	1.1261E+01%	5.486E-02
BI-207	<	3.7834E-02		
BI-212	<	3.0458E-01		
BI-214		2.8084E-01	1.4082E+01%	7.753E-02
BI-210M	<	2.2966E-02		
RA-224	<	4.8310E-01		
AC-228	<	1.1655E-01		
TH-227	<	9.3285E-02		
TH-229	<	2.3434E-01		
TH-234		3.4059E+00	8.7950E+00%	6.948E-01
PA-231	<	5.3475E-01		
PA-233	<	3.4332E-02		
PA-234	<	7.8229E-02		
PA-234M	#	8.4934E+00	2.5124E+01%	4.206E+00
U-235		1.7744E-01	2.5598E+01%	1.227E-01
AM-241	<	7.4680E-02		
Np-237	<	1.2514E-01		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.4 keV)     2.082E+01  DPS
```

Test America
St. Louis
Background Check

Spectrum: 13_20160806006_BGLong
Description: Background Long PBC Count
Acquired: 8/6/2016 5:44:47 PM
Detector: Detector #13
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.71	1.77	1.90	2.04	2.10	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det13\13_20160806006_BGLong.An1

Acquisition information
Start time: 8/6/2016 5:44:47 PM
Live time: 43200
Real time: 43369
Dead time: 0.39 %
Detector ID: 13

Detector system
Ge13 SN/10064006

Calibration
Filename: 13_QC.Clb
13_QC-I_83725-334_060211

Energy Calibration
Created: 2/23/2012 9:31:24 AM
Zero offset: 0.036 keV
Gain: 0.250 keV/channel
Quadratic: -2.347E-08 keV/channel^2

Efficiency Calibration
Created: 6/5/2011 10:21:36 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1234

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
294.77	186.	23.51	2.48	1.133E-01	295.09	19.300	1.964E-01	PB214
352.04	136.	27.21	1.47	9.369E-02	351.93	37.600	8.958E-02	PB214
511.07	1421.	5.01	2.57	6.760E-02	511.86	20.000	2.437E+00	RH106
583.24	110.	21.98	1.34	6.013E-02	583.02	84.500	5.026E-02	TL208
609.08	155.	23.58	1.00	5.741E-02	609.31	46.090	1.356E-01	BI214
					610.30	5.750	1.089E+00	RU103
1460.53	113.	17.15	1.75	2.372E-02	1460.83	10.670	1.037E+00	K40
1763.86	68.	24.52	2.56	2.045E-02	1764.49	15.400	4.998E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2043.50	511.07	392.	1421.	2.103E+04	5.01	2.571	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-214	1178.45	294.77	382.	186.	0.004	23.51	2.481s
PB-214	1407.50	352.04	298.	136.	0.003	27.21	1.465
TL-208	2332.15	583.24	125.	110.	0.003	21.98	1.339s
BI-214	2435.51	609.08	253.	155.	0.004	23.58	0.998s
K-40	5842.25	1460.53	40.	113.	0.003	17.15	1.751
BI-214	7056.40	1763.86	30.	68.	0.002	24.52	2.562

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	1.0366E+00					4.66E+11	
			1460.83	1.037E+00	(	2.932E-01	1.71E+01	1.07E+01 G
TL-208	N	5.0263E-02					6.98E+02	
			583.02	5.026E-02	(	2.494E-02	2.20E+01	8.45E+01 G
			277.28	0.000E+00	&	1.704E-01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	%	1.528E-01	5.06E+01	1.24E+01 G
PB-214	N	1.2580E-01					5.84E+05	
			351.93	8.958E-02	(	5.461E-02	2.72E+01	3.76E+01 G
			295.09	1.964E-01	*(	9.921E-02	2.35E+01	1.93E+01 G
			242.00	0.000E+00	%	1.448E-01	9.43E+01	7.43E+00 GA
BI-214	N	1.3560E-01					5.84E+05	
			609.31	1.356E-01	(	6.722E-02	2.36E+01	4.61E+01 G
			1120.29	0.000E+00	%	1.637E-01	3.39E+01	1.51E+01 G
			1764.49	4.998E-01	+	2.075E-01	2.45E+01	1.54E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

```
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                    MDA
               DPS
_____________________________________________________________________________
BE-7    <    1.7972E-01
NA-22   <    2.9908E-02
K-40         1.0366E+00   1.7150E+01%               2.932E-01
Sc-46   <    1.2505E-02
CR-51   <    1.2453E-01
MN-54   <    2.1979E-02
FE-59   <    4.2215E-02
Co-56   <    2.7365E-02
CO-57   <    8.0005E-03
CO-58   <    1.3466E-02
CO-60   <    2.6496E-02
ZN-65   <    6.3788E-02
NB-94   <    2.2818E-02
ZR-95   <    3.2742E-02
NB-95   <    3.0609E-02
RU-103  <    1.5734E-02
RH-106  <    1.6495E-01
AG-108M <    1.5768E-02
AG-110M <    1.5875E-02
```

SN-113	<	2.2821E-02		
SB-124	<	4.0013E-02		
SB-125	<	4.9544E-02		
I-131	<	1.6898E-02		
BA-133	<	2.3304E-02		
CS-134	<	2.0104E-02		
CS-137	<	2.1450E-02		
CE-139	<	1.7597E-02		
Ba-140	<	6.1472E-02		
La-140	<	2.7750E-02		
CE-141	<	1.8624E-02		
CE-144	<	9.5027E-02		
PM-144	<	2.2599E-02		
EU-152	<	4.9226E-02		
EU-154	<	2.1541E-01		
EU-155	<	4.5547E-02		
HF-181	<	2.6494E-02		
Ta-182	<	1.1121E-01		
Hg-203	<	1.3112E-02		
TL-208	#	5.0263E-02	2.1982E+01%	2.494E-02
pm-146	<	5.1685E-02		
y-88	<	2.7614E-02		
PB-210	<	5.2257E-01		
PB-212	<	2.5190E-02		
PB-214		1.2580E-01	1.7982E+01%	5.461E-02
BI-207	<	3.2014E-02		
BI-212	<	3.6108E-01		
BI-214		1.3560E-01	2.3579E+01%	6.722E-02
BI-210M	<	1.9143E-02		
RA-224	<	2.5978E-01		
AC-228	<	8.1664E-02		
TH-227	<	8.3922E-02		
TH-229	<	2.2294E-01		
TH-234	<	3.0947E-01		
PA-231	<	4.5692E-01		
PA-233	<	3.4335E-02		
PA-234	<	4.8431E-02		
PA-234M	<	2.6298E+00		
Ra-226	<	6.1917E-01		
U-235	<	8.5431E-02		
AM-241	<	3.2464E-02		
Np-237	<	1.0361E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     1.348E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 14_20160806006_BGLong
Description: Background Long PBC Count
Acquired: 8/6/2016 5:41:03 PM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.81	1.90	1.94	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20160806006_BGLong.An1

Acquisition information
Start time: 8/6/2016 5:41:03 PM
Live time: 43200
Real time: 43383
Dead time: 0.42 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	5/26/2005 8:30:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.3216

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.66	449.	9.37	0.94	6.139E-02	46.54	4.250	5.659E+00	PB210
63.27	381.	11.91	0.62	8.533E-02	63.29	3.810	2.713E+00	TH234
74.95	130.	29.56	0.94	1.022E-01				
92.63	589.	9.89	1.07	1.215E-01	92.59	5.584	2.010E+00	TH234
					93.35	5.561	7.782E+00	AC228
185.34	315.	14.49	1.05	1.073E-01	185.72	54.000	1.260E-01	U235
238.21	212.	14.53	1.08	9.400E-02	238.63	43.300	7.011E+00	PB212
351.56	161.	18.34	0.86	6.556E-02	351.93	37.600	1.518E-01	PB214
609.43	194.	16.70	1.52	3.708E-02	609.31	46.090	2.636E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
1460.71	119.	14.05	2.30	1.557E-02	1460.83	10.670	1.653E+00	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.17	74.95	505.	130.	1.272E+03	29.56	0.942	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.08	46.66	440.	449.	0.010	9.37	0.944s
TH-234	252.46	63.27	531.	381.	0.009	11.91	0.617s
TH-234	369.86	92.63	731.	589.	0.014	9.89	1.066s
U-235	740.62	185.34	505.	315.	0.007	14.49	1.048
PB-212	952.07	238.21	258.	212.	0.005	14.53	1.085
PB-214	1405.39	351.56	212.	161.	0.004	18.34	0.857
BI-214	2436.82	609.43	176.	194.	0.004	16.70	1.522s
K-40	5843.10	1460.71	23.	119.	0.003	14.05	2.297

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	1.6530E+00					4.66E+11	
			1460.83	1.653E+00	(	3.513E-01	1.41E+01	1.07E+01 G
PB-210	N	5.6588E+00					8.14E+03	
			46.54	5.659E+00	@(	1.266E+00	9.37E+00	4.25E+00 G
PB-212	N	7.0110E+00					6.98E+02	
			238.63	7.011E+00	(	2.573E+00	1.45E+01	4.33E+01 G
			300.03	0.000E+00	%	2.777E+01	1.00E+03	3.28E+00 GA
PB-214	N	1.5183E-01					5.84E+05	
			351.93	1.518E-01	(	6.673E-02	1.83E+01	3.76E+01 G
			295.09	0.000E+00	%	7.770E-02	3.60E+01	1.93E+01 G
			242.00	0.000E+00	&	2.539E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.6358E-01					5.84E+05	
			609.31	2.636E-01	*(	8.791E-02	1.67E+01	4.61E+01 G
			1120.29	0.000E+00	%	2.579E-01	5.68E+01	1.51E+01 G
			1764.49	0.000E+00	%	2.898E-01	1.00E+03	1.54E+01 G
TH-234	N	2.7128E+00					1.63E+12	
			63.29	2.713E+00	*(	7.834E-01	1.19E+01	3.81E+00 G
			92.59	2.010E+00	-	4.392E-01	9.89E+00	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235 N	1.2600E-01					2.57E+11	
		185.72	1.260E-01 $	4.297E-02	1.45E+01	5.40E+01	GA
		143.79	0.000E+00 %	1.272E-01	7.22E+01	1.10E+01	G
		205.33	0.000E+00 %	2.665E-01	2.07E+02	5.01E+00	G
		163.38	0.000E+00 %	2.557E-01	9.80E+01	5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Time Corrected Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7			>12 Halflives		
NA-22	<	3.9950E-02	7.8917E-01		
K-40		1.6530E+00	1.6530E+00	1.405E+01%	3.51E-01
Sc-46			>12 Halflives		
CR-51			>12 Halflives		
MN-54			>12 Halflives		
FE-59			>12 Halflives		
Co-56			>12 Halflives		
CO-57			>12 Halflives		
CO-58			>12 Halflives		
CO-60	<	3.1453E-02	1.3717E-01		
ZN-65			>12 Halflives		
NB-94	<	2.9107E-02	2.9118E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	2.3608E-01	4.6666E+02		
AG-108M	<	2.0086E-02	2.0462E-02		
AG-110M			>12 Halflives		
SN-113			>12 Halflives		
SB-124			>12 Halflives		
SB-125	<	6.1501E-02	1.0260E+00		
I-131			>12 Halflives		
BA-133	<	3.0623E-02	6.3959E-02		
CS-134	<	3.3339E-02	1.4312E+00		
CS-137	<	4.4722E-02	5.7930E-02		
CE-139			>12 Halflives		
Ba-140			>12 Halflives		
La-140			>12 Halflives		
CE-141			>12 Halflives		
CE-144			>12 Halflives		
PM-144	<	3.0136E-02	7.4331E+01		
EU-152	<	6.4822E-02	1.1502E-01		
EU-154	<	3.2360E-01	7.9862E-01		
EU-155	<	4.9908E-02	2.3871E-01		
HF-181			>12 Halflives		
Ta-182			>12 Halflives		
Hg-203			>12 Halflives		
TL-208	<	3.2269E-02	1.8787E+00		
pm-146	<	8.2671E-02	3.3650E-01		
y-88			>12 Halflives		
PB-210	#	3.9953E+00	5.6588E+00	9.367E+00%	1.27E+00
PB-212		1.2042E-01	7.0110E+00	1.453E+01%	2.57E+00

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PB-214		1.5109E-01	1.5183E-01	1.834E+01%	6.67E-02
BI-207	<	3.4569E-02	4.3994E-02		
BI-212	<	3.4555E-01	2.0118E+01		
BI-214	#	2.6230E-01	2.6358E-01	1.670E+01%	8.79E-02
BI-210M	<	2.6629E-02	2.6629E-02		
RA-224	<	5.7896E-01	3.3707E+01		
AC-228	<	1.2901E-01	4.9765E-01		
TH-227	<	1.5262E-01	2.1801E-01		
TH-229	<	2.9251E-01	2.9282E-01		
TH-234	#	2.7128E+00	2.7128E+00	1.191E+01%	7.83E-01
PA-231	<	5.3955E-01	5.3968E-01		
PA-233	<	4.2006E-02	4.2006E-02		
PA-234	<	9.9807E-02	9.9807E-02		
PA-234M	<	3.1784E+00	3.1784E+00		
Ra-226	<	7.6373E-01	7.6744E-01		
U-235		1.2600E-01	1.2600E-01	1.449E+01%	4.30E-02
AM-241	<	8.8619E-02	9.0224E-02		
Np-237	<	1.6311E-01	1.6333E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.021E+00 DPS
Total Decayed Activity (37.6 to 1999.5 keV) 1.7576994E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 15_20160806006_BGLong
Description: Background Long PBC Count
Acquired: 8/6/2016 5:39:09 PM
Detector: Detector #15
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.68	1.59	1.62	1.66	1.74	1.77	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det15\15_20160806006_BGLong.An1

Acquisition information
Start time: 8/6/2016 5:39:09 PM
Live time: 43200
Real time: 43222
Dead time: 0.05 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_QC.Clb
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 8/2/2011 8:55:45 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	5/26/2005 8:30:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 890.0583

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.60	408.	13.53	1.12	6.064E-02	46.54	4.250	5.198E+00	PB210
63.47	399.	14.14	1.70	8.224E-02	63.29	3.810	2.954E+00	TH234
92.72	552.	10.12	1.37	1.142E-01	92.59	5.584	2.006E+00	TH234
					93.35	5.561	7.766E+00	AC228
185.88	290.	18.18	1.83	9.774E-02	185.72	54.000	PBC<MDA	U235
					185.99	3.280	2.102E+00	Ra226
609.23	149.	22.27	2.37	3.220E-02	609.31	46.090	2.330E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
1460.92	86.	17.11	1.40	1.314E-02	1460.83	10.670	1.428E+00	K40
1764.82	66.	17.77	0.40	1.107E-02	1764.49	15.400	9.008E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
253.53	63.47	725.	399.	4.848E+03	14.14	1.701	- sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.10	46.60	660.	408.	0.009	13.53	1.116s
TH-234	370.42	92.72	672.	552.	0.013	10.12	1.366s
Ra-226	742.83	185.88	573.	290.	0.007	18.18	1.827s
BI-214	2435.62	609.23	183.	149.	0.003	22.27	2.366s
K-40	5843.38	1460.92	18.	86.	0.002	17.11	1.403s
BI-214	7060.07	1764.82	11.	66.	0.002	17.77	0.397s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.4283E+00					4.66E+11	
			1460.83	1.428E+00	?(	3.757E-01	1.71E+01	1.07E+01 G
Ta-182	F	1.5414E-44					1.14E+02	
			1121.30	0.000E+00	%	0.000E+00	1.00E+03	3.49E+01 G
			1221.41	0.000E+00	%	0.000E+00	5.06E+01	2.70E+01 G
			1189.05	0.000E+00	%	0.000E+00	1.00E+03	1.62E+01 G
PB-210	N	5.1980E+00					8.14E+03	
			46.54	5.198E+00	*(	1.560E+00	1.35E+01	4.25E+00 G
BI-214	N	2.3302E-01					5.84E+05	
			609.31	2.330E-01	*(	1.031E-01	2.23E+01	4.61E+01 G
			1120.29	0.000E+00	%	2.569E-01	1.18E+02	1.51E+01 G
			1764.49	9.008E-01	+	2.479E-01	1.78E+01	1.54E+01 G
Ra-226		2.1017E+00					5.84E+05	
			185.99	2.102E+00	(	8.292E-01	1.82E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-234	92.72	672.	552.	0.013	10.12	2.006E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Time Corrected Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7			>12 Halflives		
NA-22	<	5.2772E-02	1.0425E+00		
K-40	#	1.4283E+00	1.4283E+00	1.711E+01%	3.76E-01
Sc-46			>12 Halflives		
CR-51			>12 Halflives		
MN-54			>12 Halflives		
FE-59			>12 Halflives		
Co-56			>12 Halflives		
CO-57			>12 Halflives		
CO-58			>12 Halflives		
CO-60	<	4.5576E-02	1.9876E-01		
ZN-65			>12 Halflives		
NB-94	<	3.6732E-02	3.6746E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	2.8541E-01	5.6415E+02		

AG-108M	<	2.7334E-02	2.7846E-02		
AG-110M		>12 Halflives			
SN-113		>12 Halflives			
SB-124		>12 Halflives			
SB-125	<	7.4068E-02	1.2357E+00		
I-131		>12 Halflives			
BA-133	<	2.6374E-02	5.5085E-02		
CS-134	<	4.3712E-02	1.8765E+00		
CS-137	<	2.9831E-02	3.8641E-02		
CE-139		>12 Halflives			
Ba-140		>12 Halflives			
La-140		>12 Halflives			
CE-141		>12 Halflives			
CE-144		>12 Halflives			
PM-144	<	3.4645E-02	8.5454E+01		
EU-152	<	5.7735E-02	1.0244E-01		
EU-154	<	2.6990E-01	6.6608E-01		
EU-155	<	6.9986E-02	3.3474E-01		
HF-181		>12 Halflives			
Ta-182	C	1.5414E-44	>12 Halflives	0.000E+00%	0.00E+00
Hg-203		>12 Halflives			
TL-208	<	3.4517E-02	2.0096E+00		
pm-146	<	7.9341E-02	3.2295E-01		
y-88		>12 Halflives			
PB-210	#	3.6699E+00	5.1980E+00	1.353E+01%	1.56E+00
PB-212	<	3.8675E-02	2.2516E+00		
PB-214	<	5.5708E-02	5.5979E-02		
BI-207	<	4.8073E-02	6.1179E-02		
BI-212	<	4.1728E-01	2.4294E+01		
BI-214		2.3189E-01	2.3302E-01	2.227E+01%	1.03E-01
BI-210M	<	2.9784E-02	2.9784E-02		
RA-224	<	3.6296E-01	2.1131E+01		
AC-228	<	1.2371E-01	4.7723E-01		
TH-227	<	1.2455E-01	1.7791E-01		
TH-229	<	3.3476E-01	3.3512E-01		
TH-234	<	1.0822E+00	1.0822E+00		
PA-231	<	8.8132E-01	8.8153E-01		
PA-233	<	4.5043E-02	4.5043E-02		
PA-234	<	6.7139E-02	6.7139E-02		
PA-234M	<	5.3338E+00	5.3338E+00		
Ra-226	#	2.0915E+00	2.1017E+00	1.818E+01%	8.29E-01
U-235	<	1.2693E-01	1.2693E-01		
AM-241	<	7.0686E-02	7.1965E-02		
Np-237	<	1.8634E-01	1.8659E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.5 keV)     7.422E+00  DPS
Total Decayed Activity (   37.6 to  1999.5 keV) 8.9609756E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 16_20160806005_BGLong
Description: Background Long PBC Count
Acquired: 8/6/2016 5:37:18 PM
Detector: Detector #16
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.68	2.51	2.56	2.63	2.80	2.86	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det16\16_20160806005_BGLong.An1

Acquisition information

Start time:	8/6/2016 5:37:18 PM
Live time:	43200
Real time:	43514
Dead time:	0.72 %
Detector ID:	16

Detector system
Ge16 SN/11012217

Calibration

Filename:	16_QC.Clb

16_QC-G_081311

Energy Calibration

Created:	2/28/2012 9:35:31 AM
Zero offset:	0.050 keV
Gain:	0.250 keV/channel
Quadratic:	-2.285E-08 keV/channel^2

Efficiency Calibration

Created:	8/14/2011 1:15:14 PM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.64keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	5/26/2005 8:30:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1377

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.52	972.	5.40	1.01	7.070E-02	46.54	4.250	1.060E+01	PB210
59.64	255.	16.30	0.97	8.973E-02	59.54	35.900	1.873E-01	AM241
63.27	602.	7.67	0.97	9.499E-02	63.29	3.810	3.851E+00	TH234
74.84	330.	12.81	0.99	1.118E-01				
77.12	219.	19.80	0.99	1.151E-01				
84.48	284.	20.38	0.59	1.257E-01				
92.62	896.	8.70	1.00	1.312E-01	92.59	5.584	2.832E+00	TH234
					93.35	5.561	1.097E+01	AC228
185.66	500.	13.03	1.01	1.130E-01	185.72	54.000	1.895E-01	U235
					185.99	3.280	3.138E+00	Ra226
238.51	323.	14.79	1.15	9.905E-02	238.63	43.300	1.015E+01	PB212
352.11	258.	16.70	1.27	6.901E-02	351.93	37.600	2.310E-01	PB214
					351.93	37.600	2.310E-01	PB214
583.62	170.	23.16	1.73	4.377E-02	583.02	84.500	6.194E+00	TL208
609.56	220.	16.57	1.50	4.174E-02	609.31	46.090	2.660E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
728.17	88.	29.28	1.95	3.465E-02	727.17	7.550	4.558E+01	BI212
1001.53	95.	27.68	1.50	2.469E-02	1001.00	0.837	1.068E+01	PA234M
1120.12	76.	28.69	2.47	2.235E-02	1120.29	15.100	5.205E-01	BI214
					1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1461.37	248.	10.23	2.45	1.797E-02	1460.83	10.670	2.988E+00	K40
1765.11	73.	18.16	2.16	1.550E-02	1764.49	15.400	7.113E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.03	74.89	730.	330.	2.957E+03	12.81	0.986	- sD
308.14	77.17	828.	219.	1.900E+03	19.80	0.988	- sD
337.54	84.48	872.	284.	2.256E+03	20.38	0.593	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.52	563.	972.	0.022	5.40	1.011
AM-241	237.83	59.54	663.	253.	0.006	15.71	0.971D
TH-234	252.82	63.29	766.	602.	0.014	7.67	0.975D
TH-234	370.57	92.74	1210.	985.	0.023	8.01	1.030s
Ra-226	742.12	185.66	863.	500.	0.012	13.03	1.014s
PB-212	953.41	238.51	560.	323.	0.007	14.79	1.153
PB-214	1407.68	352.11	383.	258.	0.006	16.70	1.271
TL-208	2333.56	583.62	276.	170.	0.004	23.16	1.730s
BI-214	2437.30	609.56	266.	220.	0.005	16.57	1.500
BI-212	2911.74	728.17	130.	88.	0.002	29.28	1.955s
PA-234M	4005.29	1001.53	113.	95.	0.002	27.68	1.505
BI-214	4479.76	1120.12	88.	76.	0.002	28.69	2.471s
K-40	5845.32	1461.37	60.	248.	0.006	10.23	2.449
BI-214	7061.10	1765.11	22.	73.	0.002	18.16	2.157

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
K-40	N	2.9884E+00				4.66E+11	
			1460.83	2.988E+00	?(	4.704E-01 1.02E+01 1.07E+01	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	6.1940E+00					6.98E+02	
			583.02	6.194E+00	@(	2.919E+00	2.32E+01	8.45E+01 G
			277.28	0.000E+00	&	1.516E+01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	%	1.595E+01	4.08E+01	1.24E+01 G
PB-210	N	1.0599E+01					8.14E+03	
			46.54	1.060E+01	(	1.236E+00	5.40E+00	4.25E+00 G
PB-212	N	1.0153E+01					6.98E+02	
			238.63	1.015E+01	(	3.551E+00	1.48E+01	4.33E+01 G
			300.03	0.000E+00	%	2.951E+01	7.78E+02	3.28E+00 GA
PB-214	N	2.3096E-01					5.84E+05	
			351.93	2.310E-01	(	8.414E-02	1.67E+01	3.76E+01 G
BI-212	N	4.5584E+01					6.98E+02	
			727.17	4.558E+01	&(	2.871E+01	2.93E+01	7.55E+00 G
			785.42	0.000E+00	%	1.331E+02	1.02E+02	1.28E+00 GA
BI-214	N	2.6599E-01					5.84E+05	
			609.31	2.660E-01	?(	9.517E-02	1.66E+01	4.61E+01 G
			1120.29	5.205E-01	+	3.192E-01	2.87E+01	1.51E+01 G
			1764.49	7.113E-01	+	2.394E-01	1.82E+01	1.54E+01 G
TH-234	N	3.8501E+00					1.63E+12	
			63.29	3.850E+00	(	8.423E-01	7.67E+00	3.81E+00 G
			92.59	3.112E+00	-	5.207E-01	8.01E+00	5.58E+00 G
PA-234M	N	1.0679E+01					1.63E+12	
			1001.00	1.068E+01	(	5.844E+00	2.77E+01	8.37E-01 G
			766.41	0.000E+00	&	9.438E+00	1.18E+02	2.94E-01 G
Ra-226		3.1375E+00					5.84E+05	
			185.99	3.138E+00	@(	8.768E-01	1.30E+01	3.28E+00 G
AM-241	T	1.8542E-01					1.58E+05	
			59.54	1.854E-01	(	8.996E-02	1.57E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Time Corrected Activity DPS	Uncertainty Counting 1 Sigma	MDA
BE-7			>12 Halflives		
NA-22	<	3.0357E-02	5.9966E-01		
K-40	#	2.9884E+00	2.9884E+00	1.023E+01%	4.70E-01
Sc-46			>12 Halflives		
CR-51			>12 Halflives		
MN-54			>12 Halflives		
FE-59			>12 Halflives		
Co-56			>12 Halflives		
CO-57			>12 Halflives		
CO-58			>12 Halflives		
CO-60	<	3.3600E-02	1.4653E-01		
ZN-65			>12 Halflives		
NB-94	<	4.4994E-02	4.5011E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	3.0330E-01	5.9952E+02		
AG-108M	<	2.4546E-02	2.5006E-02		

AG-110M		>12 Halflives			
SN-113		>12 Halflives			
SB-124		>12 Halflives			
SB-125	<	7.8184E-02	1.3043E+00		
I-131		>12 Halflives			
BA-133	<	3.8631E-02	8.0685E-02		
CS-134	<	1.8334E-02	7.8703E-01		
CS-137	<	3.5977E-02	4.6601E-02		
CE-139		>12 Halflives			
Ba-140		>12 Halflives			
La-140		>12 Halflives			
CE-141		>12 Halflives			
CE-144		>12 Halflives			
PM-144	<	4.3929E-02	1.0835E+02		
EU-152	<	6.5184E-02	1.1566E-01		
EU-154	<	2.7755E-01	6.8497E-01		
EU-155	<	7.0831E-02	3.3878E-01		
HF-181		>12 Halflives			
Ta-182		>12 Halflives			
Hg-203		>12 Halflives			
TL-208	#	1.0639E-01	6.1940E+00	2.316E+01%	2.92E+00
pm-146	<	8.5016E-02	3.4605E-01		
y-88		>12 Halflives			
PB-210		7.4832E+00	1.0599E+01	5.402E+00%	1.24E+00
PB-212		1.7439E-01	1.0153E+01	1.479E+01%	3.55E+00
PB-214	#	2.2985E-01	2.3096E-01	1.670E+01%	8.41E-02
BI-207	<	4.6789E-02	5.9545E-02		
BI-212	#	7.8297E-01	4.5584E+01	2.928E+01%	2.87E+01
BI-214		2.6470E-01	2.6599E-01	1.657E+01%	9.52E-02
BI-210M	<	3.2298E-02	3.2298E-02		
RA-224	<	5.9769E-01	3.4797E+01		
AC-228	<	1.9620E-01	7.5685E-01		
TH-227	<	1.5253E-01	2.1788E-01		
TH-229	<	3.5694E-01	3.5732E-01		
TH-234		3.8501E+00	3.8501E+00	7.675E+00%	8.42E-01
PA-231	<	7.3042E-01	7.3059E-01		
PA-233	<	4.4685E-02	4.4685E-02		
PA-234	<	1.3657E-01	1.3657E-01		
PA-234M		1.0679E+01	1.0679E+01	2.768E+01%	5.84E+00
Ra-226	#	3.1224E+00	3.1375E+00	1.303E+01%	8.77E-01
U-235	<	1.3493E-01	1.3493E-01		
AM-241		1.8213E-01	1.8542E-01	1.571E+01%	9.00E-02
Np-237	<	1.7913E-01	1.7936E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.6 keV)     2.986E+01  DPS
Total Decayed Activity (   37.6 to  1999.6 keV) 9.3867340E+01  DPS
```

Test America
St. Louis
Background Check

Spectrum: 17_20160817003_BGLong
Description: Background Long PBC Count
Acquired: 8/17/2016 9:28:24 AM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.31	2.42	2.46	PASS

Analyst: Jody Watson Reviewer: Aaron Schroder

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20160817003_BGLong.An1

Acquisition information

Start time:	8/17/2016 9:28:24 AM
Live time:	72000
Real time:	73176
Dead time:	1.61 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration

Filename:	17_QC.Clb

17_QC_83725-334_SOURCE H_042211

Energy Calibration

Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration

Created:	5/1/2011 11:17:56 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	5/26/2005 8:30:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1232

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.54	1563.	4.61	0.84	5.941E-02	46.54	4.250	1.219E+01	PB210
63.33	1400.	5.68	0.83	8.041E-02	63.29	3.810	6.350E+00	TH234
74.98	354.	14.39	0.80	9.494E-02				
77.30	221.	21.16	0.80	9.785E-02				
84.51	476.	14.79	1.51	1.069E-01				
92.65	1733.	4.61	1.04	1.119E-01	92.59	5.584	3.853E+00	TH234
					93.35	5.561	1.497E+01	AC228
143.55	238.	24.19	0.84	1.094E-01	143.79	10.960	2.760E-01	U235
163.02	171.	29.41	0.92	1.039E-01	163.38	5.080	4.505E-01	U235
					162.66	6.220	HL>Cutoff	Ba140
185.61	961.	8.49	0.89	9.859E-02	185.72	54.000	2.508E-01	U235
					185.99	3.280	4.151E+00	Ra226
198.41	196.	28.57	1.20	9.568E-02				
238.49	425.	11.73	1.06	8.656E-02	238.63	43.300	9.269E+00	PB212
295.03	216.	21.60	1.21	7.372E-02	295.09	19.300	2.119E-01	PB214
352.09	273.	17.33	1.29	6.077E-02	351.93	37.600	1.667E-01	PB214
511.07	2535.	4.08	2.66	4.372E-02	511.86	20.000	8.127E+03	RH106
609.56	224.	21.12	1.30	3.708E-02	609.31	46.090	1.826E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
1001.26	127.	22.38	1.48	2.198E-02	1001.00	0.837	9.614E+00	PA234M
1120.04	118.	27.06	1.90	1.989E-02	1120.29	15.100	5.483E-01	BI214
					1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1460.76	321.	10.42	1.62	1.608E-02	1460.83	10.670	2.598E+00	K40
1764.03	103.	17.93	2.71	1.381E-02	1764.49	15.400	6.760E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.33	74.94	1122.	354.	3.732E+03	14.39	0.802	- D
308.60	77.26	987.	221.	2.262E+03	21.16	0.804	- D
337.44	84.51	1278.	476.	4.447E+03	14.79	1.508	- s
792.86	198.41	840.	196.	2.049E+03	28.57	1.200	- s
2043.15	511.07	830.	2535.	5.797E+04	4.08	2.659	- sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.64	46.54	1040.	1563.	0.022	4.61	0.837s
TH-234	252.74	63.33	1344.	1400.	0.019	5.68	0.832
TH-234	370.00	92.65	1398.	1733.	0.024	4.61	1.037s
U-235	573.48	143.55	973.	238.	0.003	24.19	0.836s
U-235	651.33	163.02	786.	171.	0.002	29.41	0.922s
U-235	742.10	185.72	1267.	878.	0.012	5.64	0.895D
PB-212	953.09	238.49	650.	425.	0.006	11.73	1.064
PB-214	1179.20	295.03	560.	216.	0.003	21.60	1.209s
PB-214	1407.36	352.09	536.	273.	0.004	17.33	1.292s
BI-214	2437.09	609.56	463.	224.	0.003	21.12	1.302
PA-234M	4004.09	1001.26	147.	127.	0.002	22.38	1.479s
BI-214	4479.36	1120.04	169.	118.	0.002	27.06	1.896
K-40	5842.96	1460.76	114.	321.	0.004	10.42	1.621
BI-214	7057.00	1764.03	42.	103.	0.001	17.93	2.710s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	2.5977E+00				4.66E+11	
			1460.83	2.598E+00	(	4.246E-01 1.04E+01 1.07E+01	G
PB-210	N	1.2189E+01				8.14E+03	
			46.54	1.219E+01	*(	1.193E+00 4.61E+00 4.25E+00	G
PB-212	N	9.2686E+00				6.98E+02	
			238.63	9.269E+00	(	2.650E+00 1.17E+01 4.33E+01	G
			300.03	0.000E+00	%	2.263E+01 3.62E+01 3.28E+00	GA
PB-214	N	1.8200E-01				5.84E+05	
			351.93	1.667E-01	(	6.752E-02 1.73E+01 3.76E+01	G
			295.09	2.119E-01	(	1.108E-01 2.16E+01 1.93E+01	G
			242.00	0.000E+00		2.537E-01 0.00E+00 7.43E+00	GA
BI-214	N	1.8256E-01				5.84E+05	
			609.31	1.826E-01	(	8.409E-02 2.11E+01 4.61E+01	G
			1120.29	5.483E-01	+	2.941E-01 2.71E+01 1.51E+01	G
			1764.49	6.760E-01	+	2.160E-01 1.79E+01 1.54E+01	G
TH-234	N	6.3505E+00				1.63E+12	
			63.29	6.350E+00	(	7.872E-01 5.68E+00 3.81E+00	G
			92.59	3.853E+00	-	3.933E-01 4.61E+00 5.58E+00	G
PA-234M	N	9.6140E+00				1.63E+12	
			1001.00	9.614E+00	*(	4.466E+00 2.24E+01 8.37E-01	G
			766.41	0.000E+00	%	7.714E+00 5.46E+01 2.94E-01	G
U-235	N	3.3130E-01				2.57E+11	
			185.72	2.292E-01	}	4.399E-02 5.64E+00 5.40E+01	GA
			143.79	2.760E-01	@(	1.716E-01 2.42E+01 1.10E+01	G
			205.33	0.000E+00	%	2.431E-01 3.50E+01 5.01E+00	G
			163.38	4.505E-01	@(	3.513E-01 2.94E+01 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.

$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Time Corrected Activity DPS	Uncertainty Counting 1 Sigma	MDA
BE-7			>12 Halflives		
NA-22	<	3.0626E-02	6.0970E-01		
K-40		2.5977E+00	2.5977E+00	1.042E+01%	4.25E-01
Sc-46			>12 Halflives		
CR-51			>12 Halflives		
MN-54			>12 Halflives		
FE-59			>12 Halflives		
Co-56			>12 Halflives		
CO-57			>12 Halflives		
CO-58			>12 Halflives		
CO-60	<	3.4093E-02	1.4925E-01		
ZN-65			>12 Halflives		
NB-94	<	2.5544E-02	2.5553E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	2.5765E-01	5.1946E+02		

AG-108M	<	1.7786E-02	1.8120E-02		
AG-110M		>12 Halflives			
SN-113		>12 Halflives			
SB-124		>12 Halflives			
SB-125	<	5.5950E-02	9.4029E-01		
I-131		>12 Halflives			
BA-133	<	1.9612E-02	4.1040E-02		
CS-134	<	4.0422E-02	1.7523E+00		
CS-137	<	4.5539E-02	5.9028E-02		
CE-139		>12 Halflives			
Ba-140		>12 Halflives			
La-140		>12 Halflives			
CE-141		>12 Halflives			
CE-144		>12 Halflives			
PM-144	<	2.6534E-02	6.6792E+01		
EU-152	<	3.9729E-02	7.0599E-02		
EU-154	<	2.7796E-01	6.8760E-01		
EU-155	<	4.5907E-02	2.2047E-01		
HF-181		>12 Halflives			
Ta-182		>12 Halflives			
Hg-203		>12 Halflives			
TL-208	<	2.5413E-02	1.4953E+00		
pm-146	<	6.6444E-02	2.7144E-01		
y-88		>12 Halflives			
PB-210	#	8.5983E+00	1.2189E+01	4.615E+00%	1.19E+00
PB-212		1.5752E-01	9.2686E+00	1.173E+01%	2.65E+00
PB-214		1.8112E-01	1.8200E-01	1.384E+01%	6.75E-02
BI-207	<	3.1580E-02	4.0215E-02		
BI-212	<	4.7013E-01	2.7662E+01		
BI-214		1.8168E-01	1.8256E-01	2.112E+01%	8.41E-02
BI-210M	<	2.4873E-02	2.4873E-02		
RA-224	<	2.4211E-01	1.4246E+01		
AC-228	<	1.3763E-01	5.3277E-01		
TH-227	<	1.5910E-01	2.2748E-01		
TH-229	<	2.7569E-01	2.7598E-01		
TH-234		6.3505E+00	6.3505E+00	5.682E+00%	7.87E-01
PA-231	<	6.2900E-01	6.2915E-01		
PA-233	<	3.8187E-02	3.8187E-02		
PA-234	<	8.6311E-02	8.6311E-02		
PA-234M	#	9.6140E+00	9.6140E+00	2.238E+01%	4.47E+00
U-235	#	3.3130E-01	3.3130E-01	1.904E+01%	1.72E-01
AM-241	<	6.9067E-02	7.0321E-02		
Np-237	<	7.6558E-02	7.6660E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.5 keV)     2.801E+01  DPS
Total Decayed Activity (   37.6 to  1999.5 keV) 4.0716099E+01  DPS
```

Run Logs

Gamma Spectroscopy Run Log

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
01/28/16 10:21		ACVTOP 160-236240/1		236240			PS
07/30/16 17:50		ICB 160-262848/1		262848			RTM
09/01/16 00:22		CCB 160-267754/1		267754			RTM
09/01/16 05:32		CCV 160-267754/2		267754			
09/01/16 05:54		CCV 160-267754/3		267754			RTM
09/01/16 08:44	30	ZZZZZ		267754			
09/01/16 09:19	30	ZZZZZ		267754			
09/01/16 09:58	30	ZZZZZ		267754			
09/01/16 10:49	30	ZZZZZ		267754			
09/01/16 11:51	30	160-18554-3	SU02-EXW-042-SS-P-00	267754	264535	901.1	RTM
09/01/16 12:42	30	160-18554-11	SU02-EXB-050-SS-P-00	267754	264535	901.1	RTM
09/01/16 13:24	30	160-18554-18	SU02-EXB-057-SS-P-00	267754	264535	901.1	RTM
09/01/16 14:36	30	ZZZZZ		267754			
09/01/16 15:16	30	ZZZZZ		267754			
09/01/16 16:02	30	ZZZZZ		267754			
09/01/16 17:10		ZZZZZ		267754			
09/01/16 17:57		ZZZZZ		267754			
09/01/16 19:52	60	ZZZZZ		267754			
09/01/16 21:11	60	ZZZZZ		267754			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
01/23/16 19:25		ACVTOP 160-236241/1		236241			PS
07/30/16 18:29		ICB 160-262849/1		262849			RTM
09/01/16 00:23		CCB 160-267755/1		267755			RTM
09/01/16 05:35		CCV 160-267755/2		267755			
09/01/16 05:58		CCV 160-267755/3		267755			RTM
09/01/16 08:44	30	ZZZZZ		267755			
09/01/16 09:20	30	ZZZZZ		267755			
09/01/16 09:59	30	ZZZZZ		267755			
09/01/16 10:47	30	ZZZZZ		267755			
09/01/16 11:52	30	160-18554-2	SU02-EXN-041-SS-P-00	267755	264535	901.1	RTM
09/01/16 12:39	30	160-18554-1 DU	SU02-EXW-040-SS-P-00 DU	267755	264535	901.1	RTM
09/01/16 13:25	30	160-18554-19	SU02-EXW-047-SS-DUP-P-00	267755	264535	901.1	RTM
09/01/16 14:36	30	ZZZZZ		267755			
09/01/16 15:13	30	ZZZZZ		267755			
09/01/16 16:04	30	ZZZZZ		267755			
09/01/16 19:52	60	ZZZZZ		267755			
09/01/16 21:12	120	ZZZZZ		267755			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
01/28/16 18:34		ACVTOP 160-236248/1		236248			PS

Gamma Spectroscopy Run Log

Detector: GV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/07/16 22:06		ICB 160-263973/1		263973			ALS
09/01/16 00:24		CCB 160-267756/1		267756			RTM
09/01/16 05:38		CCV 160-267756/2		267756			
09/01/16 06:01		CCV 160-267756/3		267756			RTM
09/01/16 08:46	30	ZZZZZ		267756			
09/01/16 09:21	30	ZZZZZ		267756			
09/01/16 10:00	30	ZZZZZ		267756			
09/01/16 10:46	30	ZZZZZ		267756			
09/01/16 11:54	30	160-18554-1	SU02-EXW-040-SS-P-00	267756	264535	901.1	RTM
09/01/16 12:44	30	160-18554-10	SU02-EXB-049-SS-P-00	267756	264535	901.1	RTM
09/01/16 13:26	30	160-18554-20	SU02-EXB-049-SS-DUP-I -00	267756	264535	901.1	RTM
09/01/16 14:38	30	ZZZZZ		267756			
09/01/16 15:12	30	ZZZZZ		267756			
09/01/16 16:05	30	ZZZZZ		267756			
09/01/16 17:11		ZZZZZ		267756			
09/01/16 17:56		ZZZZZ		267756			
09/01/16 19:54	60	ZZZZZ		267756			
09/01/16 21:14	30	ZZZZZ		267756			
09/01/16 21:54	30	ZZZZZ		267756			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/02/12 10:16		IC 160-13156/1		13156			JLW
10/04/12 09:10		ICV 160-13156/2		13156			JLW
01/28/16 13:28		ACVTOP 160-235885/1		235885			PS
08/06/16 17:43		ICB 160-263713/1		263713			ALS
09/01/16 00:25		CCV 160-267757/1		267757			
09/01/16 00:48		CCV 160-267757/2		267757			RTM
09/01/16 05:20		CCB 160-267757/3		267757			RTM
09/01/16 08:10	30	ZZZZZ		267757			
09/01/16 08:49	30	ZZZZZ		267757			
09/01/16 09:23	30	ZZZZZ		267757			
09/01/16 10:08	30	ZZZZZ		267757			
09/01/16 10:42	30	ZZZZZ		267757			
09/01/16 11:37	30	ZZZZZ		267757			
09/01/16 12:31	30	160-18554-4	SU02-EXB-043-SS-P-00	267757	264535	901.1	RTM
09/01/16 13:09	30	160-18554-12	SU02-EXW-051-SS-P-00	267757	264535	901.1	RTM
09/01/16 14:40	30	ZZZZZ		267757			
09/01/16 15:14	30	ZZZZZ		267757			
09/01/16 16:06	30	ZZZZZ		267757			
09/01/16 16:45		ZZZZZ		267757			
09/01/16 19:55	60	ZZZZZ		267757			
09/01/16 21:14	60	ZZZZZ		267757			

Detector: GV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:23		IC 160-12348/1		12348			JLW
03/27/12 18:51		ICV 160-12348/2		12348			JLW
04/07/16 10:57		ACVTOP 160-244901/1		244901			PS
08/06/16 17:44		ICB 160-263714/1		263714			ALS

Gamma Spectroscopy Run Log

Detector: GV13 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/16 00:27		CCV 160-267758/1		267758			
09/01/16 00:50		CCV 160-267758/2		267758			RTM
09/01/16 05:21		CCB 160-267758/3		267758			RTM
09/01/16 08:11	30	ZZZZZ		267758			
09/01/16 08:48	30	ZZZZZ		267758			
09/01/16 09:25	30	ZZZZZ		267758			
09/01/16 10:09	30	ZZZZZ		267758			
09/01/16 10:43	30	ZZZZZ		267758			
09/01/16 11:38	30	ZZZZZ		267758			
09/01/16 12:32	30	160-18554-5	SU02-EXN-044-SS-P-00	267758	264535	901.1	RTM
09/01/16 13:10	30	160-18554-13	SU02-EXB-052-SS-P-00	267758	264535	901.1	RTM
09/01/16 14:42	30	ZZZZZ		267758			
09/01/16 15:15	30	ZZZZZ		267758			
09/01/16 16:09	30	ZZZZZ		267758			
09/01/16 16:44	30	ZZZZZ		267758			
09/01/16 19:55	60	ZZZZZ		267758			
09/01/16 21:15	60	ZZZZZ		267758			
09/01/16 22:17	60	ZZZZZ		267758			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
01/25/16 12:29		ACVTOP 160-235877/1		235877			PS
08/06/16 17:41		ICB 160-263717/1		263717			ALS
09/01/16 00:23		CCB 160-267760/1		267760			RTM
09/01/16 05:23		CCV 160-267760/2		267760			
09/01/16 05:48		CCV 160-267760/3		267760			RTM
09/01/16 08:11	30	ZZZZZ		267760			
09/01/16 09:10	30	ZZZZZ		267760			
09/01/16 09:47	30	ZZZZZ		267760			
09/01/16 10:37	30	ZZZZZ		267760			
09/01/16 11:39	30	ZZZZZ		267760			
09/01/16 12:33	30	160-18554-6	SU02-EXB-045-SS-P-00	267760	264535	901.1	RTM
09/01/16 13:11	30	160-18554-14	SU02-EXB-053-SS-P-00	267760	264535	901.1	RTM
09/01/16 14:35	30	ZZZZZ		267760			
09/01/16 15:10	30	ZZZZZ		267760			
09/01/16 16:07	30	ZZZZZ		267760			
09/01/16 16:51	30	ZZZZZ		267760			
09/01/16 19:56	120	ZZZZZ		267760			
09/01/16 22:09	120	ZZZZZ		267760			

Detector: GV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/22/12 11:06		IC 160-12362/1		12362			JLW
03/23/12 06:10		ICV 160-12362/2		12362			JLW
05/04/16 18:46		ACVTOP 160-249629/1		249629			PS
08/06/16 17:39		ICB 160-263718/1		263718			ALS
09/01/16 00:24		CCB 160-267761/1		267761			RTM
09/01/16 05:23		CCV 160-267761/2		267761			
09/01/16 05:48		CCV 160-267761/3		267761			RTM

Gamma Spectroscopy Run Log

Detector: GV15 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/16 08:34	30	ZZZZZ		267761			
09/01/16 09:14	30	ZZZZZ		267761			
09/01/16 09:48	30	ZZZZZ		267761			
09/01/16 10:38	30	ZZZZZ		267761			
09/01/16 11:40	30	ZZZZZ		267761			
09/01/16 12:33	30	160-18554-7	SU02-EXW-046-SS-P-00	267761	264535	901.1	RTM
09/01/16 13:12	30	160-18554-15	SU02-EXB-054-SS-P-00	267761	264535	901.1	RTM
09/01/16 14:33	30	ZZZZZ		267761			
09/01/16 15:08	30	ZZZZZ		267761			
09/01/16 16:08	30	ZZZZZ		267761			
09/01/16 16:48	30	ZZZZZ		267761			
09/01/16 19:57	60	ZZZZZ		267761			
09/01/16 21:16	30	ZZZZZ		267761			

Detector: GV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/10/12 10:35		IC 160-12382/1		12382			JLW
07/17/12 11:27		ICV 160-12382/2		12382			JLW
01/22/16 10:56		ACVTOP 160-235879/1		235879			PS
08/06/16 17:37		ICB 160-263719/1		263719			ALS
09/01/16 00:26		CCB 160-267762/1		267762			RTM
09/01/16 05:24		CCV 160-267762/2		267762			
09/01/16 05:48		CCV 160-267762/3		267762			RTM
09/01/16 08:31	60	ZZZZZ		267762			
09/01/16 09:49	30	ZZZZZ		267762			
09/01/16 10:39	30	ZZZZZ		267762			
09/01/16 11:46	30	MB 160-264535/1-A		267762	264535	901.1	RTM
09/01/16 12:35	30	160-18554-8	SU02-EXW-047-SS-P-00	267762	264535	901.1	RTM
09/01/16 13:13	30	160-18554-16	SU02-EXS-055-SS-P-00	267762	264535	901.1	RTM
09/01/16 14:32	30	ZZZZZ		267762			
09/01/16 15:06	30	ZZZZZ		267762			
09/01/16 16:09	30	ZZZZZ		267762			
09/01/16 16:47	30	ZZZZZ		267762			
09/01/16 19:58	120	ZZZZZ		267762			

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 06:29		IC 160-12390/1		12390			JLW
03/26/12 09:29		ICV 160-12390/2		12390			JLW
01/27/16 15:26		ACVTOP 160-235874/1		235874			PS
08/17/16 09:28		ICB 160-265384/1		265384			ALS
09/01/16 00:28		CCB 160-267763/1		267763			RTM
09/01/16 05:33		CCV 160-267763/2		267763			
09/01/16 05:57		CCV 160-267763/3		267763			RTM
09/01/16 08:17	30	ZZZZZ		267763			
09/01/16 08:51	30	ZZZZZ		267763			
09/01/16 09:51	30	ZZZZZ		267763			
09/01/16 10:41	30	ZZZZZ		267763			
09/01/16 11:51	30	LCS 160-264535/2-A		267763	264535	901.1	RTM
09/01/16 12:36	30	160-18554-9	SU02-EXB-048-SS-P-00	267763	264535	901.1	RTM
09/01/16 13:14	30	160-18554-17	SU02-EXB-056-SS-P-00	267763	264535	901.1	RTM

Gamma Spectroscopy Run Log

Detector: GV17 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/16 14:31	30	ZZZZZ		267763			
09/01/16 15:05	30	ZZZZZ		267763			
09/01/16 16:11	30	ZZZZZ		267763			
09/01/16 16:46	30	ZZZZZ		267763			
09/01/16 19:59	120	ZZZZZ		267763			

Radiological
Pre-Preparation Data

Shipping and Receiving Documents

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax 314.298.8757

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Greg Bright	Site Contact: Bachir Badaoui	Date: 8/8/2016	COC No: 001
Cabrera Services, Inc	Tel/Fax: 508-315-6246	Lab Contact: Jessica DeHerrera	Carrier:	1 of 2 COCs
3355 Myrtle Ave, Suite 210	Analysis Turnaround Time			Sampler:
North Highlands, CA 95660	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(916) 334-3740 Phone	TAT if different from Below 20			Walk-in Client:
(916) 334-4867 FAX	☐ 2 weeks			Lab Sampling:
Project Name: WR 111 - Little Mountain Test Annex	☐ 1 week			
Site: Hill Air Force Base, Utah	☐ 2 days			Job / SDG No.:
PO #:11460	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Radium 226- by Gamma spec	Isotopic Thorium (Th-230, Th-232)	Sample Specific Notes:
SU02-EXW-040-SS-P-00	8/8/2016	1141		S	1			X	X	
SU02-EXN-041-SS-P-00	8/8/2016	1149		S	1			X	X	
SU02-EXW-042-SS-P-00	8/8/2016	1212		S	1			X	X	
SU02-EXB-043-SS-P-00	8/8/2016	1208		S	1			X	X	
SU02-EXN-044-SS-P-04	8/8/2016	1203		S	1			X	X	
SU02-EXB-045-SS-P-00	8/8/2016	1158		S	1			X	X	
SU02-EXW-046-SS-P-00	8/8/2016	1224		S	1			X	X	
SU02-EXW-047-SS-P-00	8/8/2016	1218		S	1			X	X	
SU02-EXB-048-SS-P-00	8/8/2016	1244		S	1			X	X	
SU02-EXB-049-SS-P-00	8/8/2016	1322		S	1			X	X	
SU02-EXB-050-SS-P-00	8/8/2016	1333		S	1			X	X	
SU02-EXW-051-SS-P-00	8/8/2016	1228		S	1			X	X	

160-18554 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☐Disposal by Lab ☐Archive for_____ Months

Special Instructions/QC Requirements & Comments: Gamma spec analysis for Ra-226 which includes 21 day ingrowth. Alpha Spec/ST-RD-0210 (Th-230 and Th-232). Gamma Spec/ST-RD-0102 for (Ra-226)

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Bachir Badaoui	Cabrera Services	8/8/2016 1530	B	TA	8/9/16 0920
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax 314.298.8757

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Greg Bright	Site Contact: Bachir Badaoui	Date: 7/29/2016	COC No: 001
Cabrera Services, Inc	Tel/Fax: 508-315-6246	Lab Contact: Jessica DeHerrera	Carrier:	2 of 2 COCs
3355 Myrtle Ave, Suite 210	Analysis Turnaround Time			Sampler:
North Highlands, CA 95660	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(916) 334-3740 Phone	TAT if different from Below 20			Walk-in Client:
(916) 334-4867 FAX	☐ 2 weeks			Lab Sampling:
Project Name: WR 111 - Little Mountain Test Annex	☐ 1 week			
Site: Hill Air Force Base, Utah	☐ 2 days			Job / SDG No.:
PO #:11460	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Radium 226- by Gamma spec	Isotopic Thorium (Th-230, Th-232)	Sample Specific Notes:
SU02-EXB-052-SS-P-00	8/8/2016	1240		S	1			X	X	
SU02-EXB-053-SS-P-00	8/8/2016	1328		S	1			X	X	
SU02-EXB-054-SS-P-00	8/8/2016	1325		S	1			X	X	
SU02-EXS-055-SS-P-00	8/8/2016	1233		S	1			X	X	
SU02-EXB-056-SS-P-00	8/8/2016	1320		S	1			X	X	
SU02-EXB-057-SS-P-00	8/8/2016	1315		S	1			X	X	
SU02-EXW-047-DUP-P-00	8/8/2016	1218		S	1			X	X	
SU02-EXB-049-SS-DUP-00	8/8/2016	1322		S	1			X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☐Disposal by Lab ☐Archive for_____ Months

Special Instructions/QC Requirements & Comments: Gamma spec analysis for Ra-226 which includes 21 day ingrowth. Alpha Spec/ST-RD-0210 (Th-230 and Th-232). Gamma Spec/ST-RD-0102 for (Ra-226)

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Bachir Badaoui	Cabrera Services	8/8/2016 1530	[illegible]	TA	8/9/16 0920
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: EA Engineering, Science, and Technology

Job Number: 160-18554-1

Login Number: 18554
List Number: 1
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	