ANALYTICAL REPORT

Job Number: 160-18553-1

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
9/8/2016 5:44 PM

Jessica H DeHerrera, Project Manager I
4955 Yarrow Street, Arvada, CO, 80002
(303)736-0165
jessica.deherrera@testamericainc.com
09/08/2016

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.

Table of Contents

Table of Contents

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: 160-18553-1

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. This is above the recommended temperature of 6.0°C or below. Thermal preservation is not required for the requested analyses; therefore, the laboratory will proceeded with the requested analyses and corrective action was deemed unnecessary. The client was notified on 8/9/16.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)
Samples SU01-EXB-022-SS-P-00 (160-18553-1), SU01-EXB-023-SS-P-00 (160-18553-2), SU01-EXB-024-SS-P-00 (160-18553-3), SU01-EXB-025-SS-P-00 (160-18553-4), SU01-EXB-026-SS-P-00 (160-18553-5), SU01-EXB-027-SS-P-00 (160-18553-6), SU01-EXB-028-SS-P-00 (160-18553-7), SU01-EXB-029-SS-P-00 (160-18553-8), SU01-EXB-030-SS-P-00 (160-18553-9), SU01-EXB-031-SS-P-00 (160-18553-10), SU01-EXB-032-SS-P-00 (160-18553-11), SU01-EXB-033-SS-P-00 (160-18553-12), SU01-EXB-034-SS-P-00 (160-18553-13), SU01-EXB-034-SS-DUP-00 (160-18553-14), SU01-EXB-035-SS-P-00 (160-18553-15), SU01-EXB-036-SS-P-00 (160-18553-16), SU01-EXB-037-SS-P-00 (160-18553-17), SU01-EXB-038-SS-P-00 (160-18553-18), SU01-EXB-039-SS-P-00 (160-18553-19) and SU01-EXB-039-SS-DUP-00 (160-18553-20) 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 analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM
Samples SU01-EXB-022-SS-P-00 (160-18553-1), SU01-EXB-023-SS-P-00 (160-18553-2), SU01-EXB-024-SS-P-00 (160-18553-3), SU01-EXB-025-SS-P-00 (160-18553-4), SU01-EXB-026-SS-P-00 (160-18553-5), SU01-EXB-027-SS-P-00 (160-18553-6), SU01-EXB-028-SS-P-00 (160-18553-7), SU01-EXB-029-SS-P-00 (160-18553-8), SU01-EXB-030-SS-P-00 (160-18553-9), SU01-EXB-031-SS-P-00 (160-18553-10), SU01-EXB-032-SS-P-00 (160-18553-11), SU01-EXB-033-SS-P-00 (160-18553-12), SU01-EXB-034-SS-P-00 (160-18553-13), SU01-EXB-034-SS-DUP-00 (160-18553-14), SU01-EXB-035-SS-P-00 (160-18553-15), SU01-EXB-036-SS-P-00 (160-18553-16), SU01-EXB-037-SS-P-00 (160-18553-17), SU01-EXB-038-SS-P-00 (160-18553-18), SU01-EXB-039-SS-P-00 (160-18553-19) and SU01-EXB-039-SS-DUP-00 (160-18553-20) 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 and 09/07/2016.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix:
SU01-EXB-022-SS-P-00 (160-18553-1), SU01-EXB-023-SS-P-00 (160-18553-2), SU01-EXB-024-SS-P-00 (160-18553-3), SU01-EXB-025-SS-P-00 (160-18553-4), SU01-EXB-026-SS-P-00 (160-18553-5), SU01-EXB-027-SS-P-00 (160-18553-6), SU01-EXB-028-SS-P-00 (160-18553-7), SU01-EXB-029-SS-P-00 (160-18553-8), SU01-EXB-030-SS-P-00 (160-18553-9), SU01-EXB-031-SS-P-00 (160-18553-10), SU01-EXB-032-SS-P-00 (160-18553-11), SU01-EXB-033-SS-P-00 (160-18553-12) and SU01-EXB-034-SS-P-00 (160-18553-13). The samples contained rocks.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix:
SU01-EXB-034-SS-DUP-00 (160-18553-14), SU01-EXB-035-SS-P-00 (160-18553-15), SU01-EXB-036-SS-P-00 (160-18553-16), SU01-EXB-037-SS-P-00 (160-18553-17), SU01-EXB-038-SS-P-00 (160-18553-18), SU01-EXB-039-SS-P-00 (160-18553-19), SU01-EXB-039-SS-DUP-00 (160-18553-20) and (160-18553-A-14-A DU). The samples contained rocks.

The following samples have an RER (replicate error ratio) result outside of the acceptance criteria of 1 (1.99) for Th-230:
SU01-EXB-022-SS-P-00 (160-18553-1), SU01-EXB-023-SS-P-00 (160-18553-2), SU01-EXB-024-SS-P-00 (160-18553-3), SU01-EXB-025-SS-P-00 (160-18553-4), SU01-EXB-026-SS-P-00 (160-18553-5), SU01-EXB-027-SS-P-00 (160-18553-6), SU01-EXB-028-SS-P-00 (160-18553-7), SU01-EXB-029-SS-P-00 (160-18553-8), SU01-EXB-030-SS-P-00 (160-18553-9),

SU01-EXB-031-SS-P-00 (160-18553-10), SU01-EXB-032-SS-P-00 (160-18553-11), SU01-EXB-033-SS-P-00 (160-18553-12), SU01-EXB-034-SS-P-00 (160-18553-13), (LCS 160-266485/2-A), (MB 160-266485/1-A), (160-18552-A-1-D) and (160-18552-A-1-E DU). Non-homogeneity of the sample matrix is suspected. The data have been qualified and reported.

The resolution (FWHM) for the Thorium-229 tracer peak for the following sample is greater than the 100 keV limit:.
SU01-EXB-033-SS-P-00 (160-18553-12). The resolution of the tracer peak in all other samples are within the 100 keV limit indicating an anomaly. 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: 160-18553-1

Client Sample ID: SU01-EXB-022-SS-P-00 — Lab Sample ID: 160-18553-1

No Detections.

Client Sample ID: SU01-EXB-023-SS-P-00 — Lab Sample ID: 160-18553-2

No Detections.

Client Sample ID: SU01-EXB-024-SS-P-00 — Lab Sample ID: 160-18553-3

No Detections.

Client Sample ID: SU01-EXB-025-SS-P-00 — Lab Sample ID: 160-18553-4

No Detections.

Client Sample ID: SU01-EXB-026-SS-P-00 — Lab Sample ID: 160-18553-5

No Detections.

Client Sample ID: SU01-EXB-027-SS-P-00 — Lab Sample ID: 160-18553-6

No Detections.

Client Sample ID: SU01-EXB-028-SS-P-00 — Lab Sample ID: 160-18553-7

No Detections.

Client Sample ID: SU01-EXB-029-SS-P-00 — Lab Sample ID: 160-18553-8

No Detections.

Client Sample ID: SU01-EXB-030-SS-P-00 — Lab Sample ID: 160-18553-9

No Detections.

Client Sample ID: SU01-EXB-031-SS-P-00 — Lab Sample ID: 160-18553-10

No Detections.

Client Sample ID: SU01-EXB-032-SS-P-00 — Lab Sample ID: 160-18553-11

No Detections.

Client Sample ID: SU01-EXB-033-SS-P-00 — Lab Sample ID: 160-18553-12

No Detections.

Client Sample ID: SU01-EXB-034-SS-P-00 — Lab Sample ID: 160-18553-13

No Detections.

Client Sample ID: SU01-EXB-034-SS-DUP-00 — Lab Sample ID: 160-18553-14

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: 160-18553-1

Client Sample ID: SU01-EXB-035-SS-P-00 — Lab Sample ID: 160-18553-15

No Detections.

Client Sample ID: SU01-EXB-036-SS-P-00 — Lab Sample ID: 160-18553-16

No Detections.

Client Sample ID: SU01-EXB-037-SS-P-00 — Lab Sample ID: 160-18553-17

No Detections.

Client Sample ID: SU01-EXB-038-SS-P-00 — Lab Sample ID: 160-18553-18

No Detections.

Client Sample ID: SU01-EXB-039-SS-P-00 — Lab Sample ID: 160-18553-19

No Detections.

Client Sample ID: SU01-EXB-039-SS-DUP-00 — Lab Sample ID: 160-18553-20

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SU01-EXB-022-SS-P-00 — Lab Sample ID: 160-18553-1

Date Collected: 08/08/16 10:37 — **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	0.979		0.235	0.256	0.500	0.193	pCi/g	08/11/16 15:30	09/01/16 14:33	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	0.807		0.146	0.161	0.100	0.0364	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.42		0.193	0.227	0.100	0.0197	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*65.6*		*30 - 110*	*08/25/16 09:34*	*08/31/16 19:41*	*1*

Client Sample ID: SU01-EXB-023-SS-P-00 — Lab Sample ID: 160-18553-2

Date Collected: 08/08/16 10:21 — **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		0.212	0.250	0.500	0.137	pCi/g	08/11/16 15:30	09/01/16 14:35	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	1.47		0.184	0.221	0.100	0.0419	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.39		0.177	0.212	0.100	0.0312	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.4*		*30 - 110*	*08/25/16 09:34*	*08/31/16 19:41*	*1*

Client Sample ID: SU01-EXB-024-SS-P-00 — Lab Sample ID: 160-18553-3

Date Collected: 08/08/16 10:26 — **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	1.15		0.177	0.213	0.500	0.148	pCi/g	08/11/16 15:30	09/01/16 14:42	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	1.35		0.169	0.203	0.100	0.0344	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.58		0.181	0.225	0.100	0.0287	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-024-SS-P-00 — Lab Sample ID: 160-18553-3

Date Collected: 08/08/16 10:26 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	89.5		30 - 110	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-025-SS-P-00 — Lab Sample ID: 160-18553-4

Date Collected: 08/08/16 10:31 — **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		0.187	0.218	0.500	0.127	pCi/g	08/11/16 15:30	09/01/16 14:40	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	0.915		0.159	0.176	0.100	0.0449	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.41		0.196	0.229	0.100	0.0375	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	68.9		30 - 110	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-026-SS-P-00 — Lab Sample ID: 160-18553-5

Date Collected: 08/08/16 10:12 — **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	1.23		0.208	0.244	0.500	0.152	pCi/g	08/11/16 15:30	09/01/16 15:06	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	5.35		0.341	0.564	0.100	0.0587	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	2.84		0.247	0.344	0.100	0.0297	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.4		30 - 110	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-027-SS-P-00 — Lab Sample ID: 160-18553-6

Date Collected: 08/08/16 10:17 — **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	1.50		0.302	0.340	0.500	0.224	pCi/g	08/11/16 15:30	09/01/16 15:08	1

Client Sample ID: SU01-EXB-027-SS-P-00 — Lab Sample ID: 160-18553-6

Date Collected: 08/08/16 10:17 — **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	2.08		0.208	0.272	0.100	0.0306	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	2.12		0.209	0.274	0.100	0.0155	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.0*		*30 - 110*	*08/25/16 09:34*	*08/31/16 19:41*	*1*

Client Sample ID: SU01-EXB-028-SS-P-00 — Lab Sample ID: 160-18553-7

Date Collected: 08/08/16 10:02 — **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	0.883		0.211	0.230	0.500	0.185	pCi/g	08/11/16 15:30	09/01/16 15:10	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	0.862		0.140	0.158	0.100	0.0703	pCi/g	08/25/16 09:34	09/07/16 14:28	1
Thorium-232	1.38		0.173	0.208	0.100	0.0565	pCi/g	08/25/16 09:34	09/07/16 14:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.9*		*30 - 110*	*08/25/16 09:34*	*09/07/16 14:28*	*1*

Client Sample ID: SU01-EXB-029-SS-P-00 — Lab Sample ID: 160-18553-8

Date Collected: 08/08/16 10:07 — **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		0.212	0.239	0.500	0.168	pCi/g	08/11/16 15:30	09/01/16 15:15	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	1.17		0.153	0.182	0.100	0.0328	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.71		0.184	0.234	0.100	0.0326	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.5*		*30 - 110*	*08/25/16 09:34*	*08/31/16 19:41*	*1*

Client Sample ID: SU01-EXB-030-SS-P-00 — Lab Sample ID: 160-18553-9

Date Collected: 08/08/16 09:57 — **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	1.22		0.273	0.301	0.500	0.238	pCi/g	08/11/16 15:30	09/01/16 15:14	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	1.33		0.169	0.203	0.100	0.0297	pCi/g	08/25/16 09:34	09/07/16 14:28	1
Thorium-232	1.85		0.200	0.253	0.100	0.0431	pCi/g	08/25/16 09:34	09/07/16 14:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.5*		*30 - 110*	*08/25/16 09:34*	*09/07/16 14:28*	*1*

Client Sample ID: SU01-EXB-031-SS-P-00 — Lab Sample ID: 160-18553-10

Date Collected: 08/08/16 09:51 — **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		0.227	0.280	0.500	0.134	pCi/g	08/11/16 15:30	09/01/16 16:11	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	0.848		0.137	0.154	0.100	0.0490	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.30		0.168	0.201	0.100	0.0434	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.7*		*30 - 110*	*08/25/16 09:34*	*08/31/16 19:41*	*1*

Client Sample ID: SU01-EXB-032-SS-P-00 — Lab Sample ID: 160-18553-11

Date Collected: 08/08/16 09:47 — **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	2.16		0.341	0.408	0.500	0.236	pCi/g	08/11/16 15:30	09/01/16 16:09	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	1.28		0.170	0.201	0.100	0.0169	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.31		0.172	0.204	0.100	0.0368	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-032-SS-P-00 — Lab Sample ID: 160-18553-11

Date Collected: 08/08/16 09:47 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	83.2		30 - 110	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-033-SS-P-00 — Lab Sample ID: 160-18553-12

Date Collected: 08/08/16 09:17 — **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	1.18		0.255	0.283	0.500	0.208	pCi/g	08/11/16 15:30	09/01/16 16:08	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	2.91		0.245	0.346	0.100	0.0338	pCi/g	08/25/16 09:34	09/07/16 14:28	1
Thorium-232	1.93		0.199	0.256	0.100	0.0283	pCi/g	08/25/16 09:34	09/07/16 14:28	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.6		30 - 110	08/25/16 09:34	09/07/16 14:28	1

Client Sample ID: SU01-EXB-034-SS-P-00 — Lab Sample ID: 160-18553-13

Date Collected: 08/08/16 09:22 — **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	1.14		0.200	0.232	0.500	0.156	pCi/g	08/11/16 15:30	09/01/16 16:07	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	2.18		0.214	0.282	0.100	0.0292	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	1.46		0.175	0.214	0.100	0.0418	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.2		30 - 110	08/25/16 09:34	08/31/16 19:41	1

Client Sample ID: SU01-EXB-034-SS-DUP-00 — Lab Sample ID: 160-18553-14

Date Collected: 08/08/16 09:22 — **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	1.05		0.197	0.226	0.500	0.155	pCi/g	08/11/16 15:30	09/01/16 16:09	1

Client Sample ID: SU01-EXB-034-SS-DUP-00 — Lab Sample ID: 160-18553-14

Date Collected: 08/08/16 09:22 — **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	1.13		0.181	0.205	0.100	0.0219	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.78		0.228	0.273	0.100	0.0537	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*59.8*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU01-EXB-035-SS-P-00 — Lab Sample ID: 160-18553-15

Date Collected: 08/08/16 09:29 — **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		0.235	0.258	0.500	0.198	pCi/g	08/11/16 15:30	09/01/16 16:06	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	0.822		0.135	0.151	0.100	0.0304	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.80		0.199	0.250	0.100	0.0403	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.3*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU01-EXB-036-SS-P-00 — Lab Sample ID: 160-18553-16

Date Collected: 08/08/16 09:35 — **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	1.32		0.260	0.294	0.500	0.201	pCi/g	08/11/16 15:30	09/01/16 16:02	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	1.33		0.167	0.201	0.100	0.0373	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.20		0.158	0.187	0.100	0.0287	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.2*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU01-EXB-037-SS-P-00 — Lab Sample ID: 160-18553-17

Date Collected: 08/08/16 09:41 — **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	1.46		0.253	0.295	0.500	0.182	pCi/g	08/11/16 15:30	09/01/16 16:46	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	1.03		0.163	0.185	0.100	0.0469	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.67		0.206	0.249	0.100	0.0349	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*70.7*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU01-EXB-038-SS-P-00 — Lab Sample ID: 160-18553-18

Date Collected: 08/08/16 09:01 — **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	1.52		0.230	0.279	0.500	0.183	pCi/g	08/11/16 15:30	09/01/16 16:47	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	1.13		0.159	0.185	0.100	0.0307	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.89		0.204	0.259	0.100	0.0166	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.6*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU01-EXB-039-SS-P-00 — Lab Sample ID: 160-18553-19

Date Collected: 08/08/16 09:10 — **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		0.209	0.246	0.500	0.127	pCi/g	08/11/16 15:30	09/01/16 16:48	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	1.22		0.154	0.185	0.100	0.0147	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	1.60		0.177	0.222	0.100	0.0320	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Client Sample ID: SU01-EXB-039-SS-P-00 — Lab Sample ID: 160-18553-19

Date Collected: 08/08/16 09:10 — **Matrix: Solid**
Date Received: 08/09/16 09:20

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.1*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Client Sample ID: SU01-EXB-039-SS-DUP-00 — Lab Sample ID: 160-18553-20

Date Collected: 08/08/16 09:10 — **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	**1.03**		0.187	0.216	0.500	0.128	pCi/g	08/11/16 15:30	09/01/16 16:51	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	**0.812**		0.144	0.159	0.100	0.0349	pCi/g	08/25/16 15:51	08/31/16 19:45	1
Thorium-232	**1.52**		0.195	0.233	0.100	0.0347	pCi/g	08/25/16 15:51	08/31/16 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*70.5*		*30 - 110*	*08/25/16 15:51*	*08/31/16 19:45*	*1*

Tracer/Carrier Summary

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

TestAmerica Job ID: 160-18553-1

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)**						
160-18553-1	SU01-EXB-022-SS-P-00	65.6						
160-18553-2	SU01-EXB-023-SS-P-00	75.4						
160-18553-3	SU01-EXB-024-SS-P-00	89.5						
160-18553-4	SU01-EXB-025-SS-P-00	68.9						
160-18553-5	SU01-EXB-026-SS-P-00	85.4						
160-18553-6	SU01-EXB-027-SS-P-00	84.0						
160-18553-7	SU01-EXB-028-SS-P-00	77.9						
160-18553-8	SU01-EXB-029-SS-P-00	88.5						
160-18553-9	SU01-EXB-030-SS-P-00	87.5						
160-18553-10	SU01-EXB-031-SS-P-00	79.7						
160-18553-11	SU01-EXB-032-SS-P-00	83.2						
160-18553-12	SU01-EXB-033-SS-P-00	86.6						
160-18553-13	SU01-EXB-034-SS-P-00	82.2						
160-18553-14	SU01-EXB-034-SS-DUP-00	59.8						
160-18553-14 DU	SU01-EXB-034-SS-DUP-00	61.2						
160-18553-15	SU01-EXB-035-SS-P-00	84.3						
160-18553-16	SU01-EXB-036-SS-P-00	88.2						
160-18553-17	SU01-EXB-037-SS-P-00	70.7						
160-18553-18	SU01-EXB-038-SS-P-00	79.6						
160-18553-19	SU01-EXB-039-SS-P-00	90.1						
160-18553-20	SU01-EXB-039-SS-DUP-00	70.5						
LCS 160-266485/2-A	Lab Control Sample	89.1						
LCS 160-266564/2-A	Lab Control Sample	92.5						
MB 160-266485/1-A	Method Blank	89.8						
MB 160-266564/1-A	Method Blank	101						

Tracer/Carrier Legend

Th-229 = Thorium-229

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

Lab Sample ID: MB 160-264540/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267763 — **Prep Batch: 264540**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.04080	U	0.177	0.177	0.500	0.309	pCi/g	08/11/16 15:30	09/01/16 14:31	1

Lab Sample ID: LCS 160-264540/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267762 — **Prep Batch: 264540**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.1	96.99		10.2		1.17	pCi/g	100	87 - 116		
Cesium-137			29.5	29.23		3.12		0.235	pCi/g	99	87 - 120		
Cobalt-60			16.6	15.76		1.63		0.0818	pCi/g	95	87 - 115		

Lab Sample ID: 160-18553-1 DU — **Client Sample ID: SU01-EXB-022-SS-P-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267763 — **Prep Batch: 264540**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Radium-226	0.979			1.106		0.234	0.500	0.140	pCi/g			0.26	1

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

Lab Sample ID: MB 160-266485/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267479 — **Prep Batch: 266485**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.1036		0.0442	0.0450	0.100	0.0141	pCi/g	08/25/16 09:34	08/31/16 19:41	1
Thorium-232	0.008202	U	0.0176	0.0176	0.100	0.0346	pCi/g	08/25/16 09:34	08/31/16 19:41	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.8*		*30 - 110*	*08/25/16 09:34*	*08/31/16 19:41*	*1*

Lab Sample ID: LCS 160-266485/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267480 — **Prep Batch: 266485**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	27.65		2.56	0.100	0.0694	pCi/g	113	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*89.1*		*30 - 110*

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

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*

Lab Sample ID: 160-18553-14 DU — **Client Sample ID: SU01-EXB-034-SS-DUP-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 267507 — **Prep Batch: 266564**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Thorium-230	1.13			0.9890		0.187	0.100	0.0529	pCi/g			0.35	1
Thorium-232	1.78			1.635		0.254	0.100	0.0426	pCi/g			0.28	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*61.2*		*30 - 110*

Rad

Leach Batch: 264089

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18553-1	SU01-EXB-022-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-2	SU01-EXB-023-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-3	SU01-EXB-024-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-4	SU01-EXB-025-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-5	SU01-EXB-026-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-6	SU01-EXB-027-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-7	SU01-EXB-028-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-8	SU01-EXB-029-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-9	SU01-EXB-030-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-10	SU01-EXB-031-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-11	SU01-EXB-032-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-12	SU01-EXB-033-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-13	SU01-EXB-034-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-14	SU01-EXB-034-SS-DUP-00	Total/NA	Solid	Dry and Grind	
160-18553-15	SU01-EXB-035-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-16	SU01-EXB-036-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-17	SU01-EXB-037-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-18	SU01-EXB-038-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-19	SU01-EXB-039-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-20	SU01-EXB-039-SS-DUP-00	Total/NA	Solid	Dry and Grind	
160-18553-1 DU	SU01-EXB-022-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18553-14 DU	SU01-EXB-034-SS-DUP-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 264540

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18553-1	SU01-EXB-022-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-2	SU01-EXB-023-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-3	SU01-EXB-024-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-4	SU01-EXB-025-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-5	SU01-EXB-026-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-6	SU01-EXB-027-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-7	SU01-EXB-028-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-8	SU01-EXB-029-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-9	SU01-EXB-030-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-10	SU01-EXB-031-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-11	SU01-EXB-032-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-12	SU01-EXB-033-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-13	SU01-EXB-034-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-14	SU01-EXB-034-SS-DUP-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-15	SU01-EXB-035-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-16	SU01-EXB-036-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-17	SU01-EXB-037-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-18	SU01-EXB-038-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-19	SU01-EXB-039-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089
160-18553-20	SU01-EXB-039-SS-DUP-00	Total/NA	Solid	Fill_Geo-21	264089
MB 160-264540/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-264540/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-18553-1 DU	SU01-EXB-022-SS-P-00	Total/NA	Solid	Fill_Geo-21	264089

Rad (Continued)

Prep Batch: 266485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18553-1	SU01-EXB-022-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-2	SU01-EXB-023-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-3	SU01-EXB-024-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-4	SU01-EXB-025-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-5	SU01-EXB-026-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-6	SU01-EXB-027-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-7	SU01-EXB-028-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-8	SU01-EXB-029-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-9	SU01-EXB-030-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-10	SU01-EXB-031-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-11	SU01-EXB-032-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-12	SU01-EXB-033-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-13	SU01-EXB-034-SS-P-00	Total/NA	Solid	ExtChrom	264089
MB 160-266485/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-266485/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 266564

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18553-14	SU01-EXB-034-SS-DUP-00	Total/NA	Solid	ExtChrom	264089
160-18553-15	SU01-EXB-035-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-16	SU01-EXB-036-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-17	SU01-EXB-037-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-18	SU01-EXB-038-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-19	SU01-EXB-039-SS-P-00	Total/NA	Solid	ExtChrom	264089
160-18553-20	SU01-EXB-039-SS-DUP-00	Total/NA	Solid	ExtChrom	264089
MB 160-266564/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-266564/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-18553-14 DU	SU01-EXB-034-SS-DUP-00	Total/NA	Solid	ExtChrom	264089

Lab Chronicle

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

TestAmerica Job ID: 160-18553-1

Client Sample ID: SU01-EXB-022-SS-P-00 — Lab Sample ID: 160-18553-1

Date Collected: 08/08/16 10:37
Date Received: 08/09/16 09:20
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267761	09/01/16 14:33	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267490	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-023-SS-P-00 — Lab Sample ID: 160-18553-2

Date Collected: 08/08/16 10:21
Date Received: 08/09/16 09:20
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267760	09/01/16 14:35	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267491	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-024-SS-P-00 — Lab Sample ID: 160-18553-3

Date Collected: 08/08/16 10:26
Date Received: 08/09/16 09:20
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267758	09/01/16 14:42	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267492	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-025-SS-P-00 — Lab Sample ID: 160-18553-4

Date Collected: 08/08/16 10:31
Date Received: 08/09/16 09:20
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267757	09/01/16 14:40	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267493	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-026-SS-P-00 — Lab Sample ID: 160-18553-5

Date Collected: 08/08/16 10:12 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267762	09/01/16 15:06	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267495	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-027-SS-P-00 — Lab Sample ID: 160-18553-6

Date Collected: 08/08/16 10:17 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267761	09/01/16 15:08	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267496	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-028-SS-P-00 — Lab Sample ID: 160-18553-7

Date Collected: 08/08/16 10:02 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267760	09/01/16 15:10	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	268503	09/07/16 14:28	ALD	TAL SL

Client Sample ID: SU01-EXB-029-SS-P-00 — Lab Sample ID: 160-18553-8

Date Collected: 08/08/16 10:07 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267758	09/01/16 15:15	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267498	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-030-SS-P-00 — Lab Sample ID: 160-18553-9

Date Collected: 08/08/16 09:57 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267757	09/01/16 15:14	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	268502	09/07/16 14:28	ALD	TAL SL

Client Sample ID: SU01-EXB-031-SS-P-00 — Lab Sample ID: 160-18553-10

Date Collected: 08/08/16 09:51 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267763	09/01/16 16:11	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267500	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-032-SS-P-00 — Lab Sample ID: 160-18553-11

Date Collected: 08/08/16 09:47 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267762	09/01/16 16:09	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267501	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-033-SS-P-00 — Lab Sample ID: 160-18553-12

Date Collected: 08/08/16 09:17 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267761	09/01/16 16:08	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	268501	09/07/16 14:28	ALD	TAL SL

Client Sample ID: SU01-EXB-034-SS-P-00 — Lab Sample ID: 160-18553-13

Date Collected: 08/08/16 09:22 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267760	09/01/16 16:07	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266485	08/25/16 09:34	ATS	TAL SL
Total/NA	Analysis	A-01-R		1	267503	08/31/16 19:41	ALD	TAL SL

Client Sample ID: SU01-EXB-034-SS-DUP-00 — Lab Sample ID: 160-18553-14

Date Collected: 08/08/16 09:22 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267758	09/01/16 16:09	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267506	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU01-EXB-035-SS-P-00 — Lab Sample ID: 160-18553-15

Date Collected: 08/08/16 09:29 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267757	09/01/16 16:06	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267508	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU01-EXB-036-SS-P-00 — Lab Sample ID: 160-18553-16

Date Collected: 08/08/16 09:35 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267754	09/01/16 16:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267510	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU01-EXB-037-SS-P-00 — Lab Sample ID: 160-18553-17

Date Collected: 08/08/16 09:41 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267763	09/01/16 16:46	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267511	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU01-EXB-038-SS-P-00 — Lab Sample ID: 160-18553-18

Date Collected: 08/08/16 09:01 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267762	09/01/16 16:47	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267512	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU01-EXB-039-SS-P-00 — Lab Sample ID: 160-18553-19

Date Collected: 08/08/16 09:10 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267761	09/01/16 16:48	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267513	08/31/16 19:45	ALD	TAL SL

Client Sample ID: SU01-EXB-039-SS-DUP-00 — Lab Sample ID: 160-18553-20

Date Collected: 08/08/16 09:10 — **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			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			264540	08/11/16 15:30	R1S	TAL SL
Total/NA	Analysis	901.1		1	267760	09/01/16 16:51	RTM	TAL SL
Total/NA	Leach	Dry and Grind			264089	08/09/16 15:11	DRO	TAL SL
Total/NA	Prep	ExtChrom			266564	08/25/16 15:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	267514	08/31/16 19:45	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: 160-18553-1

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: 160-18553-1

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: 160-18553-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-18553-1	SU01-EXB-022-SS-P-00	Solid	08/08/16 10:37	08/09/16 09:20
160-18553-2	SU01-EXB-023-SS-P-00	Solid	08/08/16 10:21	08/09/16 09:20
160-18553-3	SU01-EXB-024-SS-P-00	Solid	08/08/16 10:26	08/09/16 09:20
160-18553-4	SU01-EXB-025-SS-P-00	Solid	08/08/16 10:31	08/09/16 09:20
160-18553-5	SU01-EXB-026-SS-P-00	Solid	08/08/16 10:12	08/09/16 09:20
160-18553-6	SU01-EXB-027-SS-P-00	Solid	08/08/16 10:17	08/09/16 09:20
160-18553-7	SU01-EXB-028-SS-P-00	Solid	08/08/16 10:02	08/09/16 09:20
160-18553-8	SU01-EXB-029-SS-P-00	Solid	08/08/16 10:07	08/09/16 09:20
160-18553-9	SU01-EXB-030-SS-P-00	Solid	08/08/16 09:57	08/09/16 09:20
160-18553-10	SU01-EXB-031-SS-P-00	Solid	08/08/16 09:51	08/09/16 09:20
160-18553-11	SU01-EXB-032-SS-P-00	Solid	08/08/16 09:47	08/09/16 09:20
160-18553-12	SU01-EXB-033-SS-P-00	Solid	08/08/16 09:17	08/09/16 09:20
160-18553-13	SU01-EXB-034-SS-P-00	Solid	08/08/16 09:22	08/09/16 09:20
160-18553-14	SU01-EXB-034-SS-DUP-00	Solid	08/08/16 09:22	08/09/16 09:20
160-18553-15	SU01-EXB-035-SS-P-00	Solid	08/08/16 09:29	08/09/16 09:20
160-18553-16	SU01-EXB-036-SS-P-00	Solid	08/08/16 09:35	08/09/16 09:20
160-18553-17	SU01-EXB-037-SS-P-00	Solid	08/08/16 09:41	08/09/16 09:20
160-18553-18	SU01-EXB-038-SS-P-00	Solid	08/08/16 09:01	08/09/16 09:20
160-18553-19	SU01-EXB-039-SS-P-00	Solid	08/08/16 09:10	08/09/16 09:20
160-18553-20	SU01-EXB-039-SS-DUP-00	Solid	08/08/16 09:10	08/09/16 09:20

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

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
							Pulser	
							Thorium-230	7.167 Bq
							U	
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
							Thorium-230	6.629 Bq
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
							Thorium-230	7.352 Bq
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
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Pulser	
							Thorium-230	6.251 Bq
							U	
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 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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

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 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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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
.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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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
							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

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

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

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

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

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

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

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

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	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

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

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

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1966

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

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

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)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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 E_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 F_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

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

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

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

Source H_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

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)

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
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)

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

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

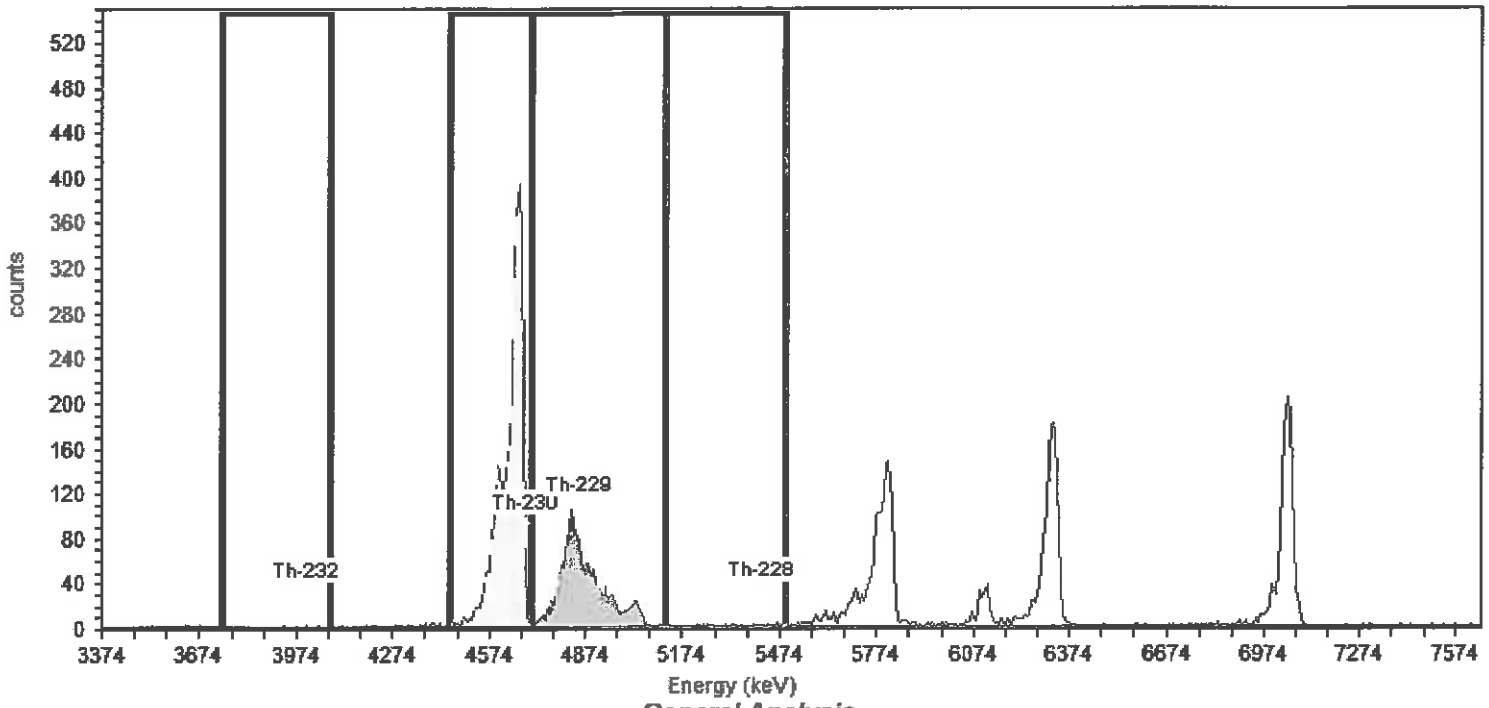
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

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

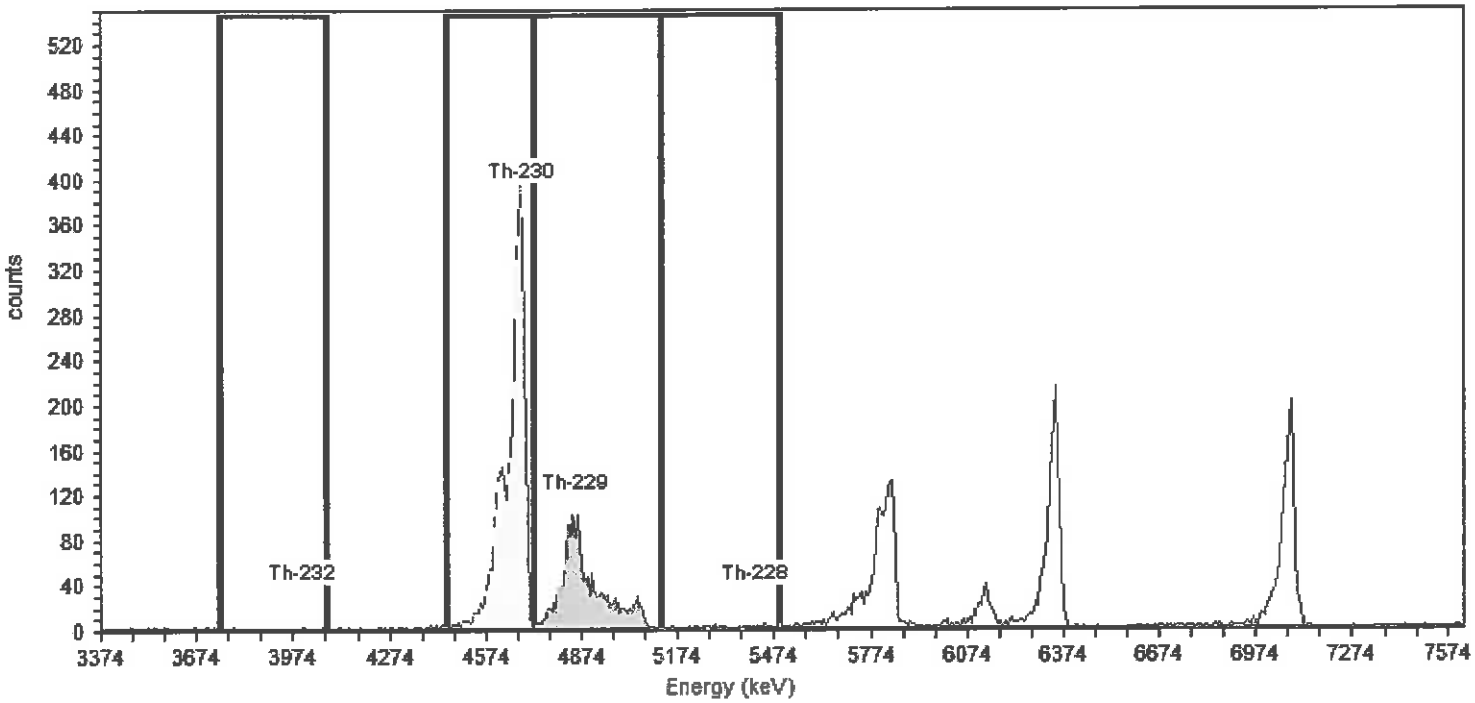
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

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

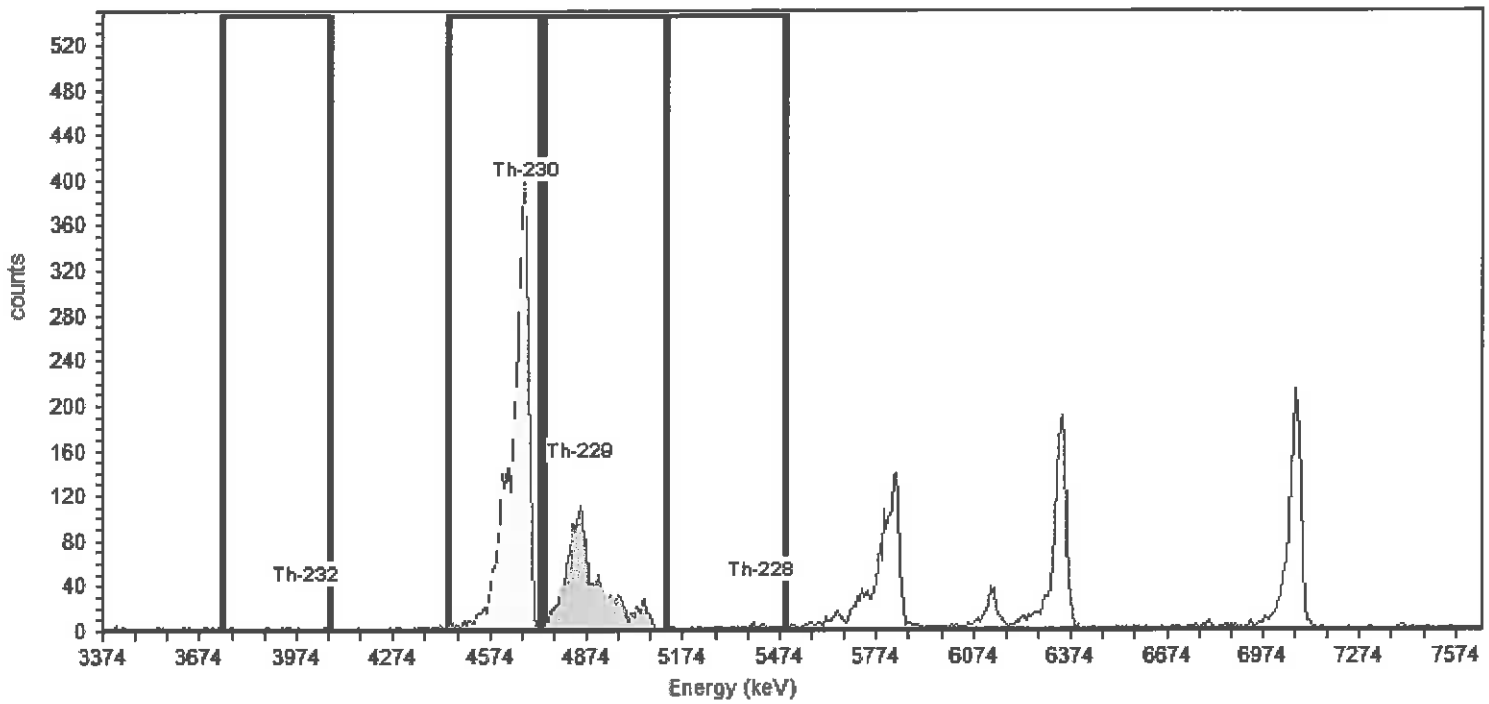
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

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

SamplD	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: for D. M. Montgomery, QA Manager 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

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

Tuna Can_00006

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)

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: 266485

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266485

Lab ID: MB 160-266485/1-A
Client ID:
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV148
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	0.1036	0.0442	0.0450		pCi/g	0.100	0.0141	267479
Thorium-232	0.008202	0.0176	0.0176	U	pCi/g	0.100	0.0346	267479

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.717	0.215	0.314		pCi/g	0.0389	3.03	89.8	30 - 110

Lab ID: LCS 160-266485/2-A
Client ID:
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV149
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	27.65	1.08	2.56		pCi/g	0.100	0.0694	267480

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.399	0.452	0.640		pCi/g	0.0694	6.06	89.1	30 - 110

Lab ID: 160-18553-1
Client ID: SU01-EXB-022-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV161
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	0.807	0.146	0.161		pCi/g	0.100	0.0364	267490
Thorium-232	1.42	0.193	0.227		pCi/g	0.100	0.0197	267490

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	1.99	0.186	0.250		pCi/g	0.0239	3.03	65.6	30 - 110

Lab ID: 160-18553-2
Client ID: SU01-EXB-023-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV162
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	1.47	0.184	0.221		pCi/g	0.100	0.0419	267491
Thorium-232	1.39	0.177	0.212		pCi/g	0.100	0.0312	267491

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.28	0.198	0.276		pCi/g	0.0371	3.03	75.4	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266485

Lab ID: 160-18553-3
Client ID: SU01-EXB-024-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV163
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	1.35	0.169	0.203		pCi/g	0.100	0.0344	267492
Thorium-232	1.58	0.181	0.225		pCi/g	0.100	0.0287	267492

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.71	0.226	0.321		pCi/g	0.0377	3.03	89.5	30 - 110

Lab ID: 160-18553-4
Client ID: SU01-EXB-025-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV164
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	0.915	0.159	0.176		pCi/g	0.100	0.0449	267493
Thorium-232	1.41	0.196	0.229		pCi/g	0.100	0.0375	267493

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.09	0.199	0.265		pCi/g	0.0478	3.03	68.9	30 - 110

Lab ID: 160-18553-5
Client ID: SU01-EXB-026-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV169
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	5.35	0.341	0.564		pCi/g	0.100	0.0587	267495
Thorium-232	2.84	0.247	0.344		pCi/g	0.100	0.0297	267495

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.59	0.220	0.309		pCi/g	0.0590	3.03	85.4	30 - 110

Lab ID: 160-18553-6
Client ID: SU01-EXB-027-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:41
Detector: AV170
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	2.08	0.208	0.272		pCi/g	0.100	0.0306	267496
Thorium-232	2.12	0.209	0.274		pCi/g	0.100	0.0155	267496

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.54	0.211	0.300		pCi/g	0.0321	3.03	84.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266485

Lab ID: 160-18553-7 | Analyzed: 09/07/16 14:28 | Decay Corrected: No
Client ID: SU01-EXB-028-SS-P-00 | Detector: AV212 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.862	0.140	0.158		pCi/g	0.100	0.0703	268503
Thorium-232	1.38	0.173	0.208		pCi/g	0.100	0.0565	268503

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.36	0.199	0.281		pCi/g	0.0384	3.03	77.9	30 - 110

Lab ID: 160-18553-8 | Analyzed: 08/31/16 19:41 | Decay Corrected: No
Client ID: SU01-EXB-029-SS-P-00 | Detector: AV173 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.17	0.153	0.182		pCi/g	0.100	0.0328	267498
Thorium-232	1.71	0.184	0.234		pCi/g	0.100	0.0326	267498

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.68	0.218	0.313		pCi/g	0.0324	3.03	88.5	30 - 110

Lab ID: 160-18553-9 | Analyzed: 09/07/16 14:28 | Decay Corrected: No
Client ID: SU01-EXB-030-SS-P-00 | Detector: AV211 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.33	0.169	0.203		pCi/g	0.100	0.0297	268502
Thorium-232	1.85	0.200	0.253		pCi/g	0.100	0.0431	268502

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.65	0.224	0.316		pCi/g	0.0348	3.03	87.5	30 - 110

Lab ID: 160-18553-10 | Analyzed: 08/31/16 19:41 | Decay Corrected: No
Client ID: SU01-EXB-031-SS-P-00 | Detector: AV176 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.848	0.137	0.154		pCi/g	0.100	0.0490	267500
Thorium-232	1.30	0.168	0.201		pCi/g	0.100	0.0434	267500

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.41	0.205	0.288		pCi/g	0.0374	3.03	79.7	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266485

Lab ID: 160-18553-11 | Analyzed: 08/31/16 19:41 | Decay Corrected: No
Client ID: SU01-EXB-032-SS-P-00 | Detector: AV177 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.28	0.170	0.201		pCi/g	0.100	0.0169	267501
Thorium-232	1.31	0.172	0.204		pCi/g	0.100	0.0368	267501

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.52	0.218	0.303		pCi/g	0.0377	3.03	83.2	30 - 110

Lab ID: 160-18553-12 | Analyzed: 09/07/16 14:28 | Decay Corrected: No
Client ID: SU01-EXB-033-SS-P-00 | Detector: AV210 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.91	0.245	0.346		pCi/g	0.100	0.0338	268501
Thorium-232	1.93	0.199	0.256		pCi/g	0.100	0.0283	268501

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.62	0.217	0.309		pCi/g	0.0329	3.03	86.6	30 - 110

Lab ID: 160-18553-13 | Analyzed: 08/31/16 19:41 | Decay Corrected: No
Client ID: SU01-EXB-034-SS-P-00 | Detector: AV189 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.18	0.214	0.282		pCi/g	0.100	0.0292	267503
Thorium-232	1.46	0.175	0.214		pCi/g	0.100	0.0418	267503

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.49	0.207	0.294		pCi/g	0.0240	3.03	82.2	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 160-266485/1-A	Thorium-230			0.1036		pCi/g							4.60196909
MB 160-266485/1-A	Thorium-232			0.008202	U	pCi/g							.93192806

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-266485/2-A	Thorium-230		24.5	27.65		pCi/g	113	81 - 118					1.8419972777

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266485

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

SDG No.:

Batch Number: 266485 Batch Start Date: 08/25/16 09:34 Batch Analyst: Sherman, Austin T

Batch Method: ExtChrom Batch End Date: 08/31/16 15:04

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00021	TRM-2 00001			
MB 160-266485/1		ExtChrom, A-01-R		1.0 g	0.1 mL				
LCS 160-266485/2		ExtChrom, A-01-R		0.4998 g	0.1 mL	0.4998 g			
160-18553-A-1-A	SU01-EXB-022-SS-P-00	ExtChrom, A-01-R	T	0.9999 g	0.1 mL				
160-18553-A-2-A	SU01-EXB-023-SS-P-00	ExtChrom, A-01-R	T	1.0004 g	0.1 mL				
160-18553-A-3-A	SU01-EXB-024-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18553-A-4-A	SU01-EXB-025-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18553-A-5-A	SU01-EXB-026-SS-P-00	ExtChrom, A-01-R	T	0.9998 g	0.1 mL				
160-18553-A-6-A	SU01-EXB-027-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18553-A-7-A	SU01-EXB-028-SS-P-00	ExtChrom, A-01-R	T	0.9999 g	0.1 mL				
160-18553-A-8-A	SU01-EXB-029-SS-P-00	ExtChrom, A-01-R	T	1.0001 g	0.1 mL				
160-18553-A-9-A	SU01-EXB-030-SS-P-00	ExtChrom, A-01-R	T	0.9995 g	0.1 mL				
160-18553-A-10-A	SU01-EXB-031-SS-P-00	ExtChrom, A-01-R	T	1.0002 g	0.1 mL				
160-18553-A-11-A	SU01-EXB-032-SS-P-00	ExtChrom, A-01-R	T	1.0006 g	0.1 mL				
160-18553-A-12-A	SU01-EXB-033-SS-P-00	ExtChrom, A-01-R	T	0.9995 g	0.1 mL				
160-18553-A-13-A	SU01-EXB-034-SS-P-00	ExtChrom, A-01-R	T	0.9997 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.: 160-18553-1

SDG No.:

Batch Number: 266485 Batch Start Date: 08/25/16 09:34 Batch Analyst: Sherman, Austin T

Batch Method: ExtChrom Batch End Date: 08/31/16 15:04

Batch Notes	
Balance ID	1123433897
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	jdl
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
2:24:15AM 9/1/2016

Sample

Sample Name: MB 160-266485/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-266485/1-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: 266485
AnalysisResultsID: 175965
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

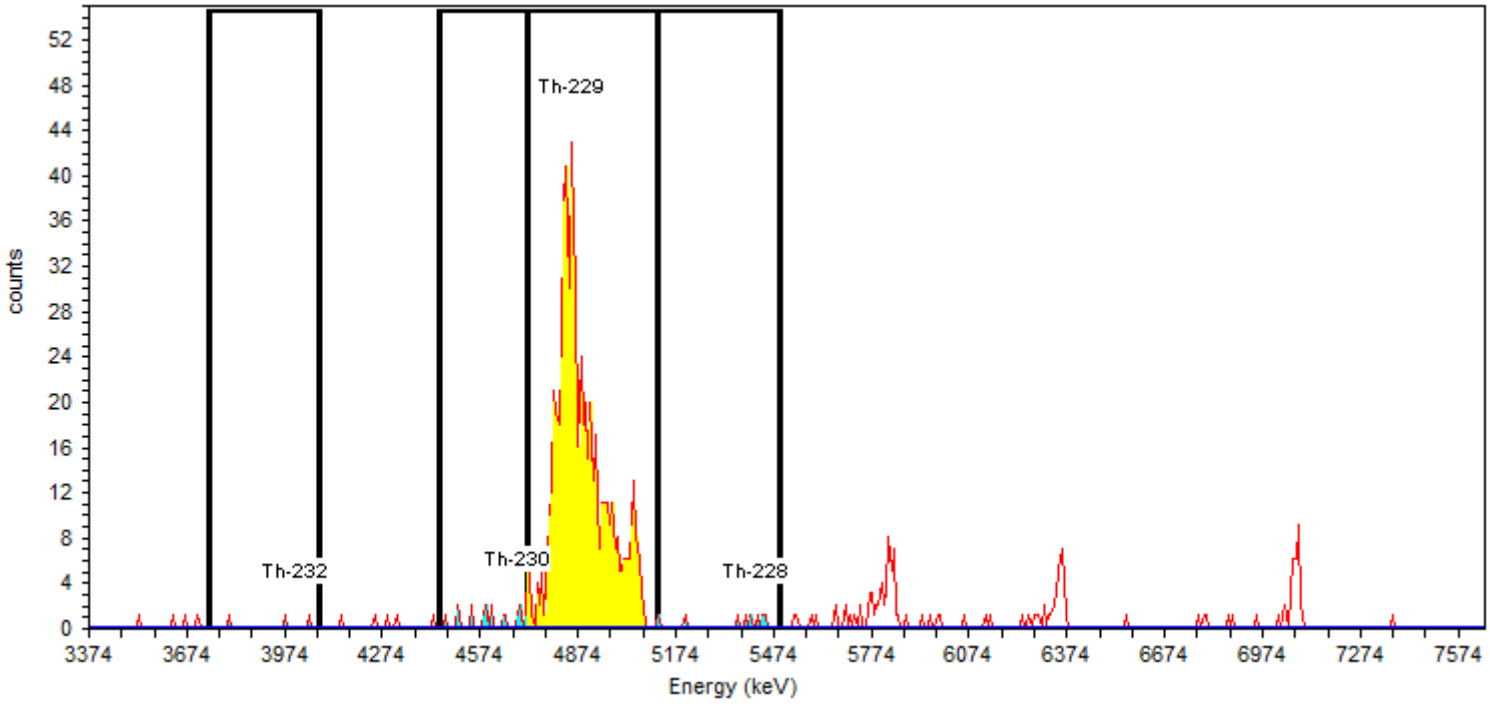
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.75%

Acquisition

Detector: AV148 SN: 50-05/R2
Acquisition Start Date: 8/31/2016 7:41:17PM
Live Time: 400.00 min.
Real Time: 400.21 min.
Background Date: 7/25/2016 1:14:03PM
Bkgd Info: Sample: ICB;AV148; Det: AV148; Spectrum #1; 7/25/2016 1:14:03 PM

Energy Calibration: IC-8874;AV148-20151016a
Efficiency Calibration:IC-8874;AV148-20151016a
Calibration Date: 10/16/2015 6:47:19PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.72% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:40PM
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	10.2	100.2	3	1.2500	1.75	8.202E-003	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	14.2	99.7	22	0.0000	22.00	1.036E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.6	99.6	645	2.5000	642.44	2.718E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	10.7	99.8	8	5.8333	2.10	9.899E-003	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:22:52AM 9/1/2016

Sample

Sample Name: LCS 160-266485/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-266485/2-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: 266485
AnalysisResultsID: 175955
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

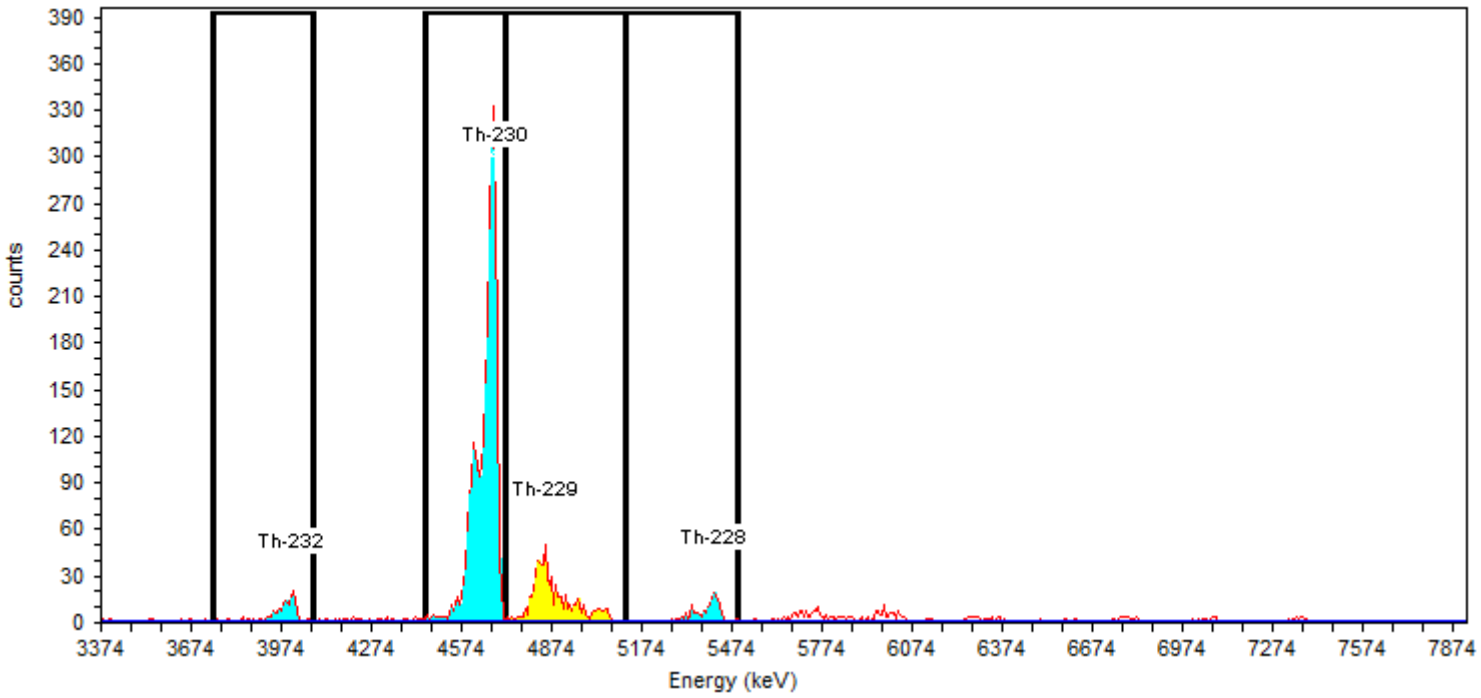
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.13%

Acquisition

Detector: AV149 SN: 50-05/R3
Acquisition Start Date: 8/31/2016 7:41:18PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:52PM
Bkgd Info: Sample: ICB;AV149; Det: AV149; Spectrum #1; 7/22/2016 3:43:52 PM

Energy Calibration: IC-8875;AV149-20151016
Efficiency Calibration:IC-8875;AV149-20151016
Calibration Date: 10/16/2015 6:46:43PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.03% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	64.3	100.2	139	0.0000	139.00	1.459E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.7	99.7	2621	0.8333	2620.23	2.765E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.1	99.6	575	1.2500	573.81	5.400E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.1	99.8	139	6.6667	132.25	1.395E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:22:00AM 9/1/2016

Sample

Sample Name: 160-18553-A-1-D Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-1-D
Sample Collection Date: 8/8/2016 10:37:00AM
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: 266485
AnalysisResultsID: 175948
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

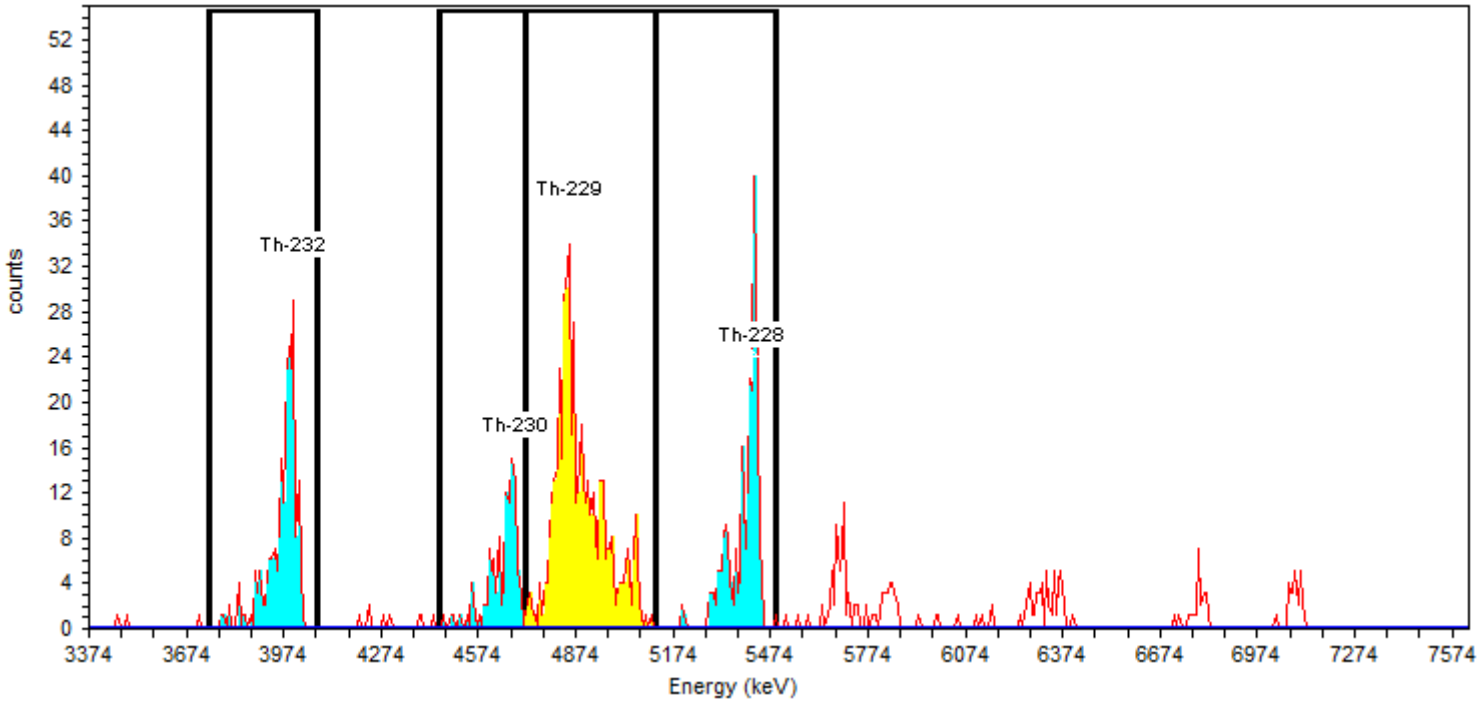
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 65.63%

Acquisition

Detector: AV161 SN: 50-05/II7
Acquisition Start Date: 8/31/2016 7:41:14PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:32PM
Bkgd Info: Sample: ICB;AV161; Det: AV161; Spectrum #1; 7/22/2016 3:43:32 PM

Energy Calibration: IC-7107;AV161-20151016
Efficiency Calibration:IC-7107;AV161-20151016
Calibration Date: 10/17/2015 2:36:23PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.14% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	53.5	100.2	217	0.0000	217.00	1.422E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.1	99.7	123	0.4167	122.61	8.074E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.9	99.6	460	0.4167	459.61	1.988E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.1	99.8	220	7.0833	212.83	1.401E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:22:30AM 9/1/2016

Sample

Sample Name: 160-18553-A-2-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-2-C
Sample Collection Date: 8/8/2016 10:21:00AM
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: 266485
AnalysisResultsID: 175952
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

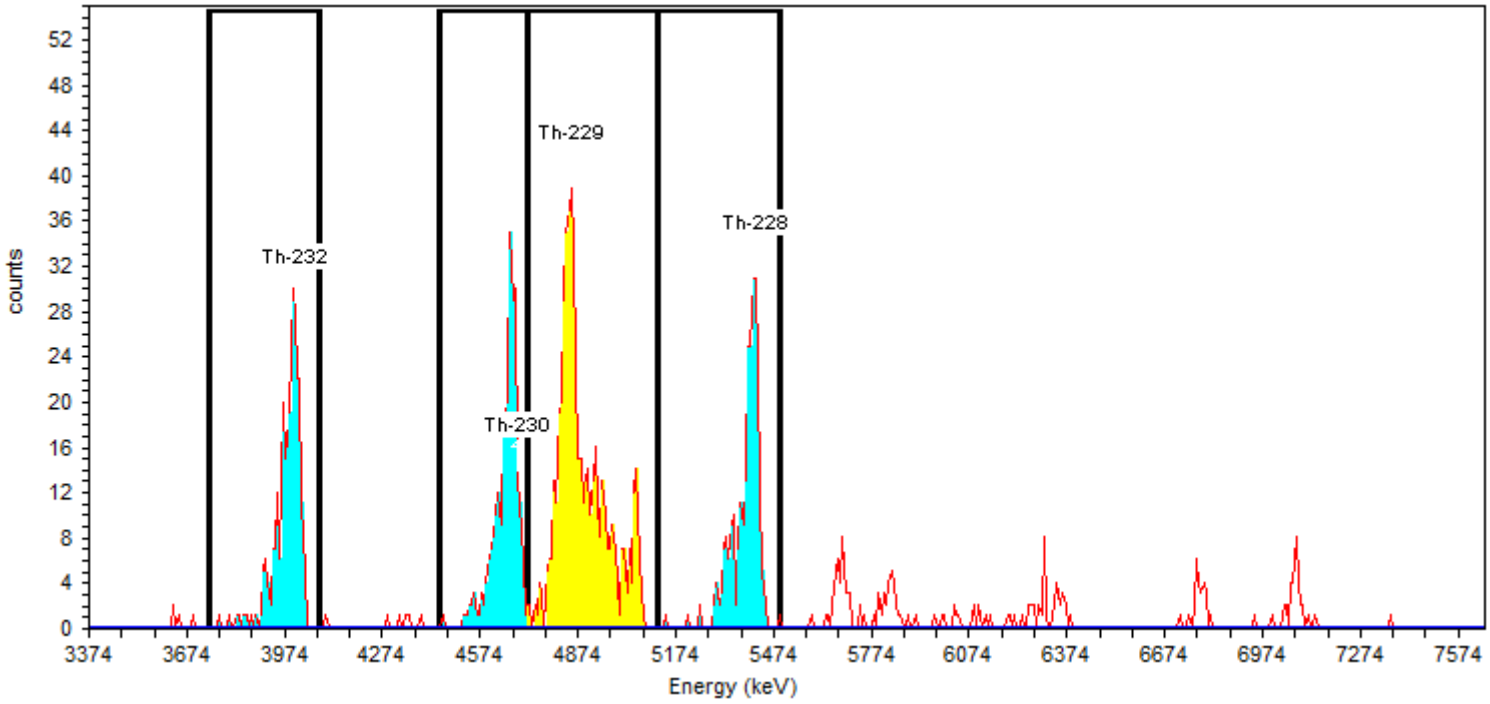
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 75.70%

Acquisition

Detector: AV162 SN: 50-05/JJ6
Acquisition Start Date: 8/31/2016 7:41:14PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:04PM
Bkgd Info: Sample: ICB;AV162; Det: AV162; Spectrum #1; 7/25/2016 1:14:04 PM

Energy Calibration: IC-8874;AV162-20151016
Efficiency Calibration:IC-8874;AV162-20151016
Calibration Date: 10/17/2015 2:36:27PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.38% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	68.9	100.2	246	0.4167	245.58	1.382E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.1	99.7	257	1.2500	255.75	1.446E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.0	99.6	537	2.0833	534.92	2.291E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	252	8.3333	243.58	1.377E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

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

Sample

Sample Name: 160-18553-A-2-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-2-C
Sample Collection Date: 8/8/2016 10:21:00AM
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: 266485
AnalysisResultsID: 175988
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

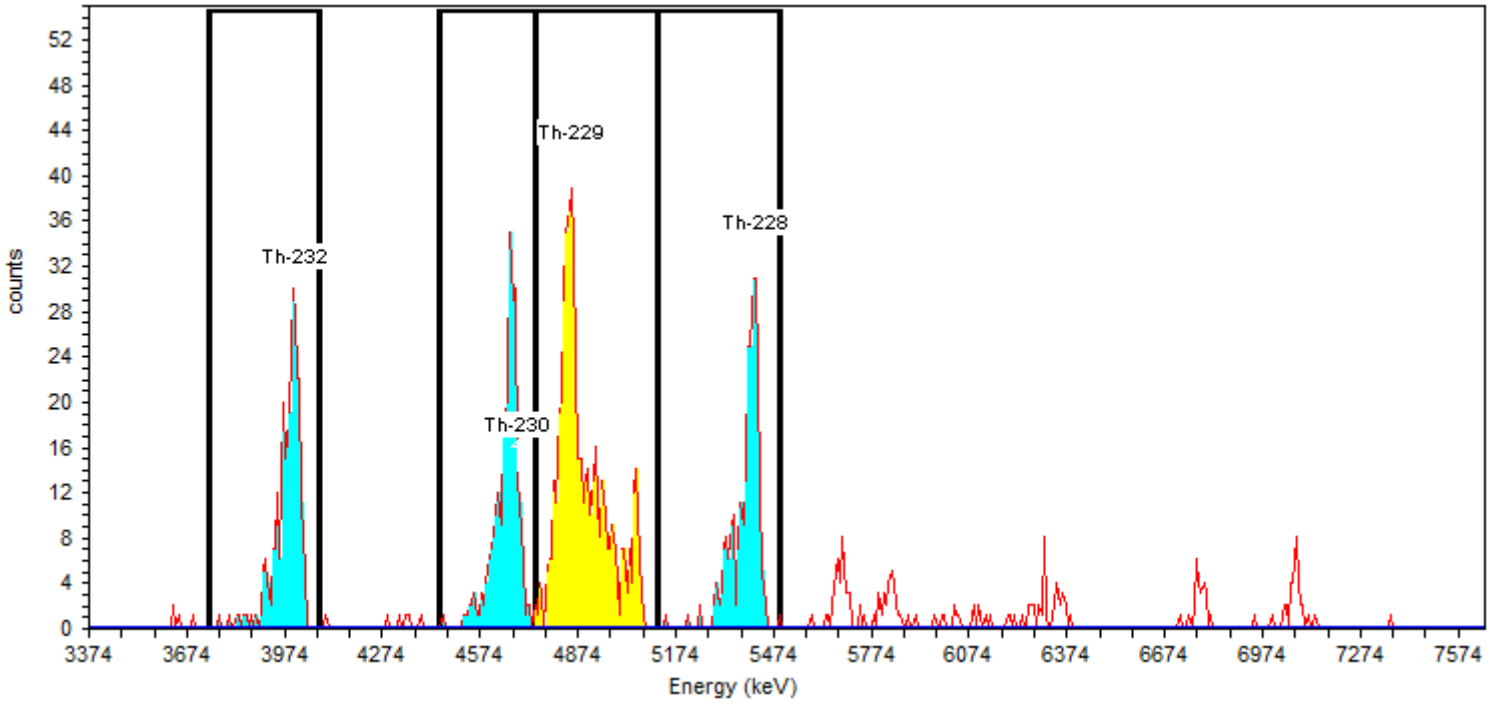
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 75.41%

Acquisition

Detector: AV162 SN: 50-05/JJ6
Acquisition Start Date: 8/31/2016 7:41:14PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:04PM
Bkgd Info: Sample: ICB;AV162; Det: AV162; Spectrum #1; 7/25/2016 1:14:04 PM

Energy Calibration: IC-8874;AV162-20151016
Efficiency Calibration:IC-8874;AV162-20151016
Calibration Date: 10/17/2015 2:36:27PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.38% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:36:39PM
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	68.9	100.2	246	0.4167	245.58	1.387E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	58.0	99.7	261	1.2500	259.75	1.474E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	65.0	99.6	535	2.0833	532.92	2.283E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	252	8.3333	243.58	1.382E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:22:22AM 9/1/2016

Sample

Sample Name: 160-18553-A-3-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-3-C
Sample Collection Date: 8/8/2016 10:26:00AM
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: 266485
AnalysisResultsID: 175951
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

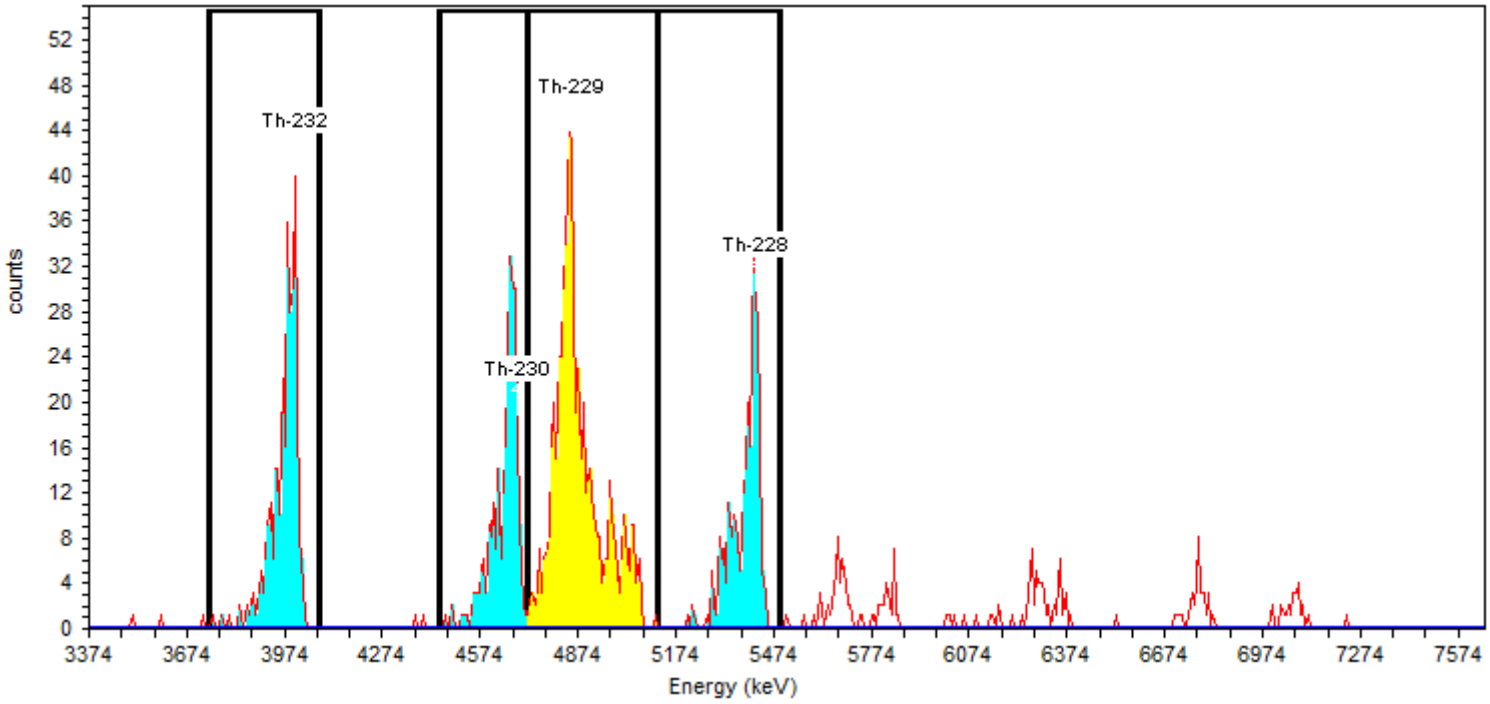
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.48%

Acquisition

Detector: AV163 SN: 50-110E7
Acquisition Start Date: 8/31/2016 7:41:14PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 7/22/2016 3:43:33PM
Bkgd Info: Sample: ICB;AV163; Det: AV163; Spectrum #1; 7/22/2016 3:43:33 PM

Energy Calibration: IC-8875;AV163-20151016
Efficiency Calibration:IC-8875;AV163-20151016
Calibration Date: 10/17/2015 2:36:32PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.17% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	58.6	100.2	304	0.4167	304.01	1.580E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	23.8	99.7	260	0.8333	259.20	1.354E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.3	99.6	581	1.6667	579.43	2.711E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.8	99.8	267	5.0000	262.06	1.368E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:22:15AM 9/1/2016

Sample

Sample Name: 160-18553-A-4-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-4-C
Sample Collection Date: 8/8/2016 10:31:00AM
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: 266485
AnalysisResultsID: 175950
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

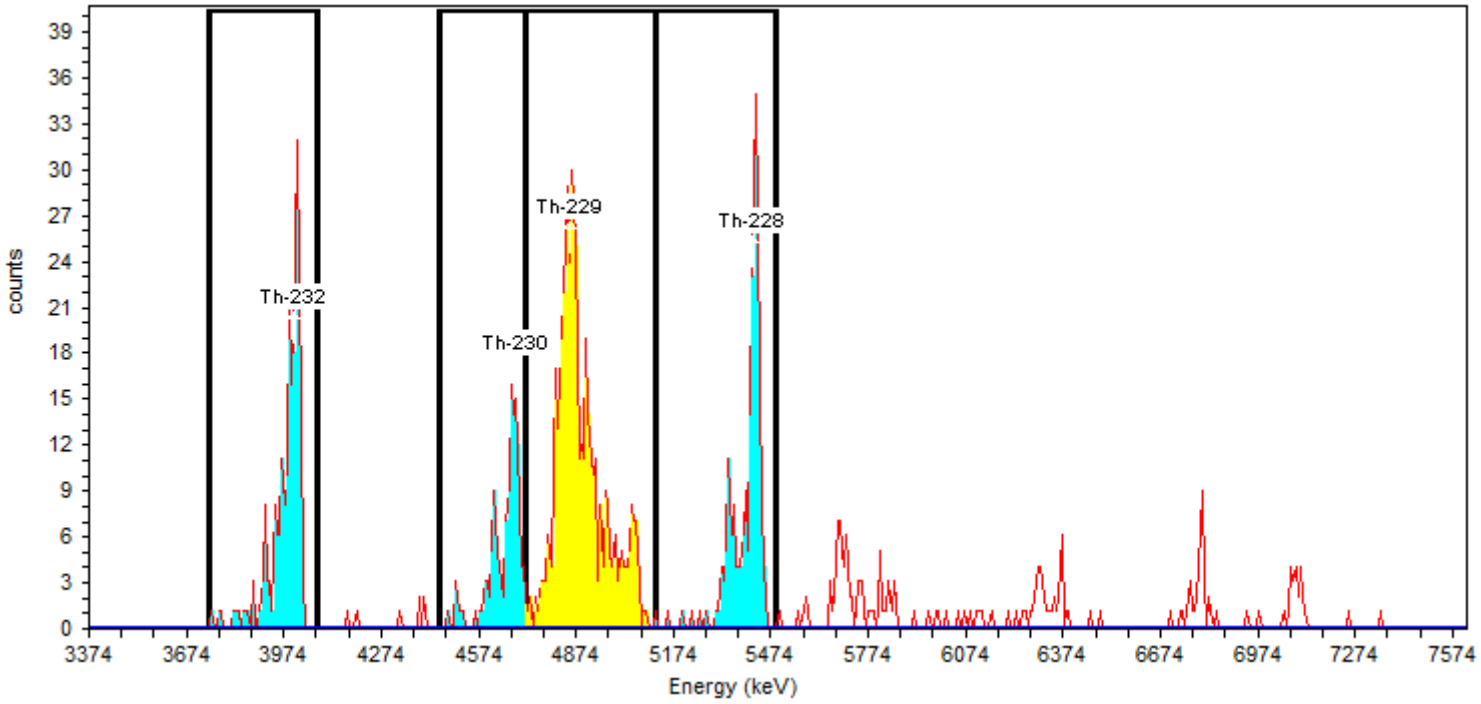
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 69.54%

Acquisition

Detector: AV164 SN: 50-112 A1
Acquisition Start Date: 8/31/2016 7:41:15PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:33PM
Bkgd Info: Sample: ICB;AV164; Det: AV164; Spectrum #1; 7/22/2016 3:43:33 PM

Energy Calibration: IC-8876;AV164-20151016
Efficiency Calibration:IC-8876;AV164-20151016
Calibration Date: 10/17/2015 2:36:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.03% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	58.1	100.2	207	0.4167	207.01	1.393E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.3	99.7	130	0.8333	129.14	8.734E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.8	99.6	451	3.3067	447.60	2.107E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.2	99.8	204	7.0567	196.97	1.331E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:59:19AM 9/1/2016

Sample

Sample Name: 160-18553-A-4-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-4-C
Sample Collection Date: 8/8/2016 10:31:00AM
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: 266485
AnalysisResultsID: 175987
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

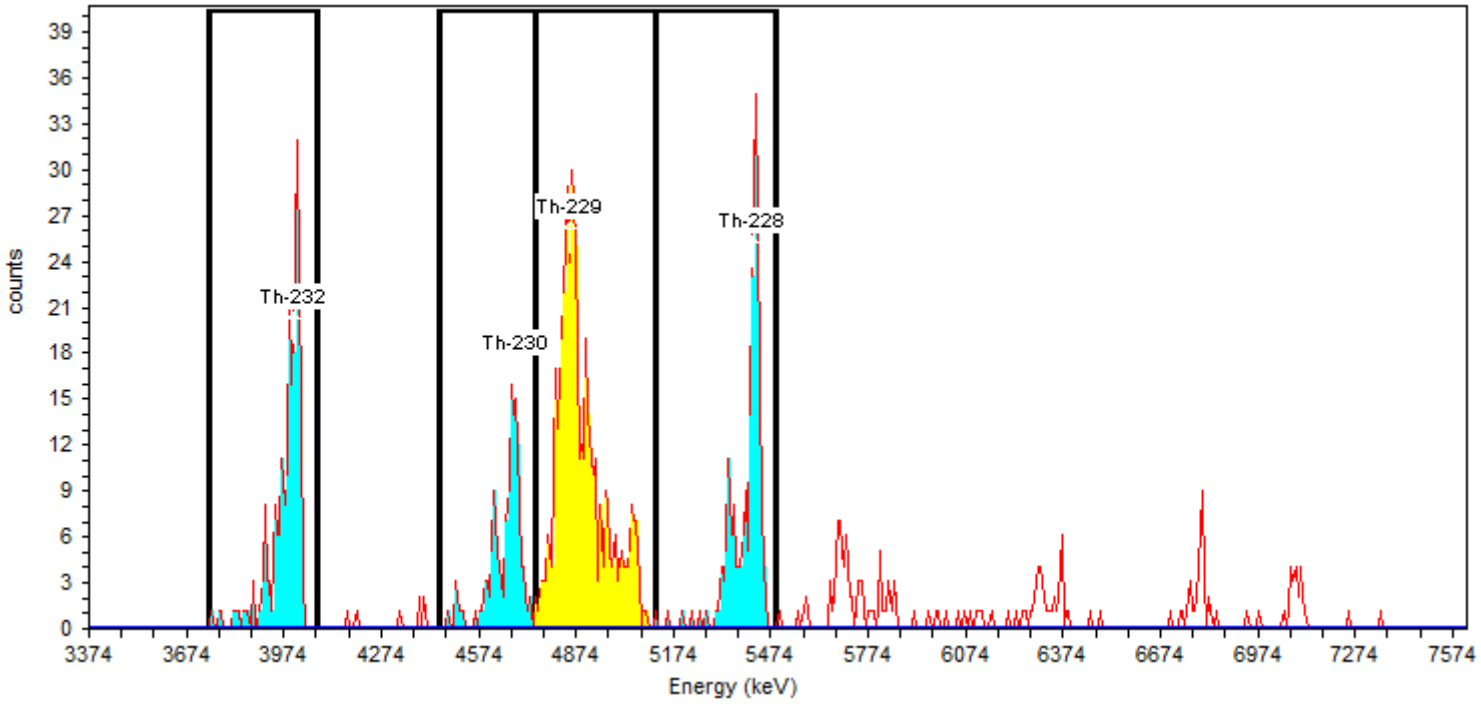
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 68.93%

Acquisition

Detector: AV164 SN: 50-112 A1
Acquisition Start Date: 8/31/2016 7:41:15PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:33PM
Bkgd Info: Sample: ICB;AV164; Det: AV164; Spectrum #1; 7/22/2016 3:43:33 PM

Energy Calibration: IC-8876;AV164-20151016
Efficiency Calibration:IC-8876;AV164-20151016
Calibration Date: 10/17/2015 2:36:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.03% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:36:39PM
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	58.1	100.2	207	0.4167	207.01	1.405E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	58.0	99.7	135	0.8333	134.17	9.155E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	80.8	99.6	447	3.3333	443.67	2.088E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.2	99.8	204	7.0567	196.97	1.343E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:08AM 9/1/2016

Sample

Sample Name: 160-18553-A-5-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-5-C
Sample Collection Date: 8/8/2016 10:12:00AM
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: 266485
AnalysisResultsID: 175957
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

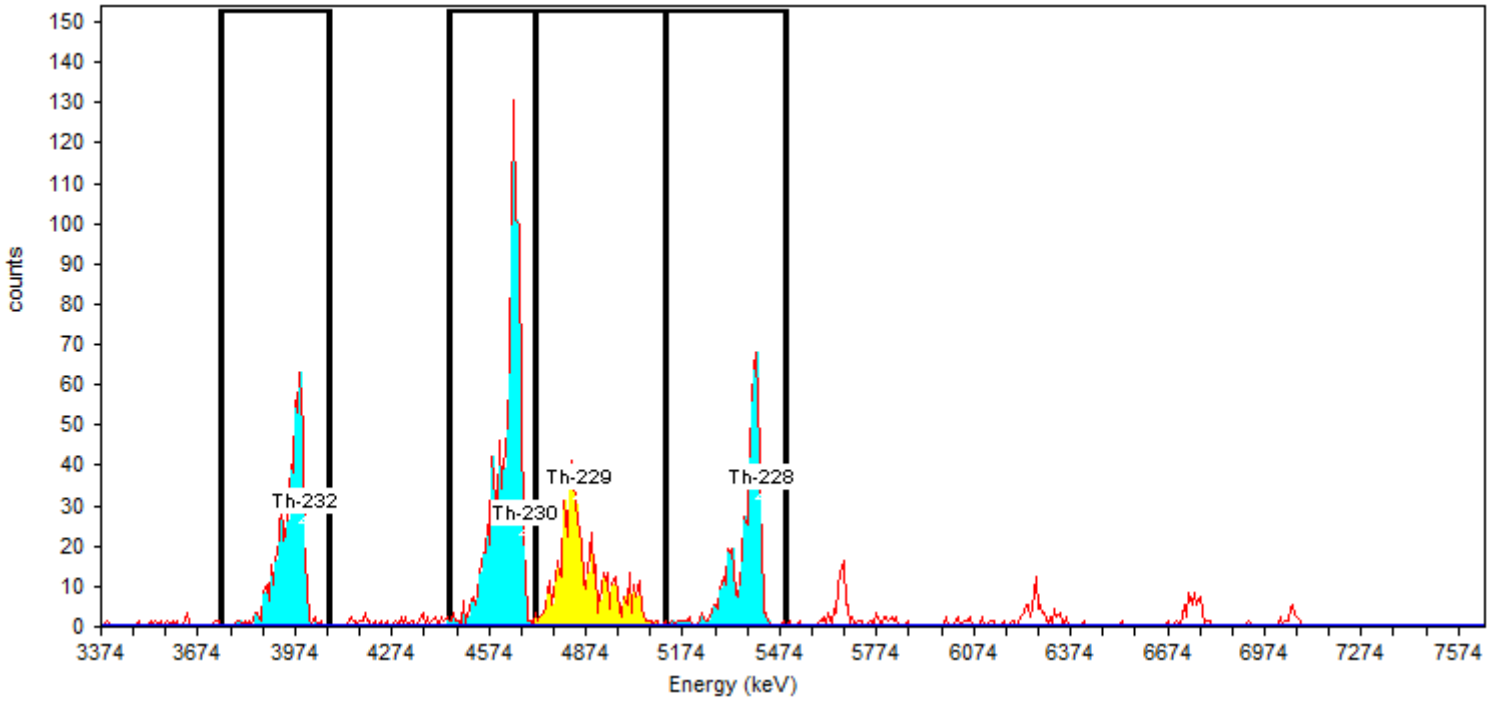
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 85.41%

Acquisition

Detector: AV169 SN: 50-112 G5
Acquisition Start Date: 8/31/2016 7:41:13PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:34PM
Bkgd Info: Sample: ICB;AV169; Det: AV169; Spectrum #1; 7/22/2016 3:43:34 PM

Energy Calibration: IC-9794;AV169-20151016
Efficiency Calibration:IC-9794;AV169-20151016
Calibration Date: 10/17/2015 2:36:47PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.50% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	62.7	100.2	530	0.4167	529.58	2.845E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	54.6	99.7	995	4.0383	991.21	5.351E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	64.5	99.6	567	6.2500	560.62	2.587E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.9	99.8	518	4.5833	513.35	2.770E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:17AM 9/1/2016

Sample

Sample Name: 160-18553-A-6-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-6-C
Sample Collection Date: 8/8/2016 10:17:00AM
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: 266485
AnalysisResultsID: 175958
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

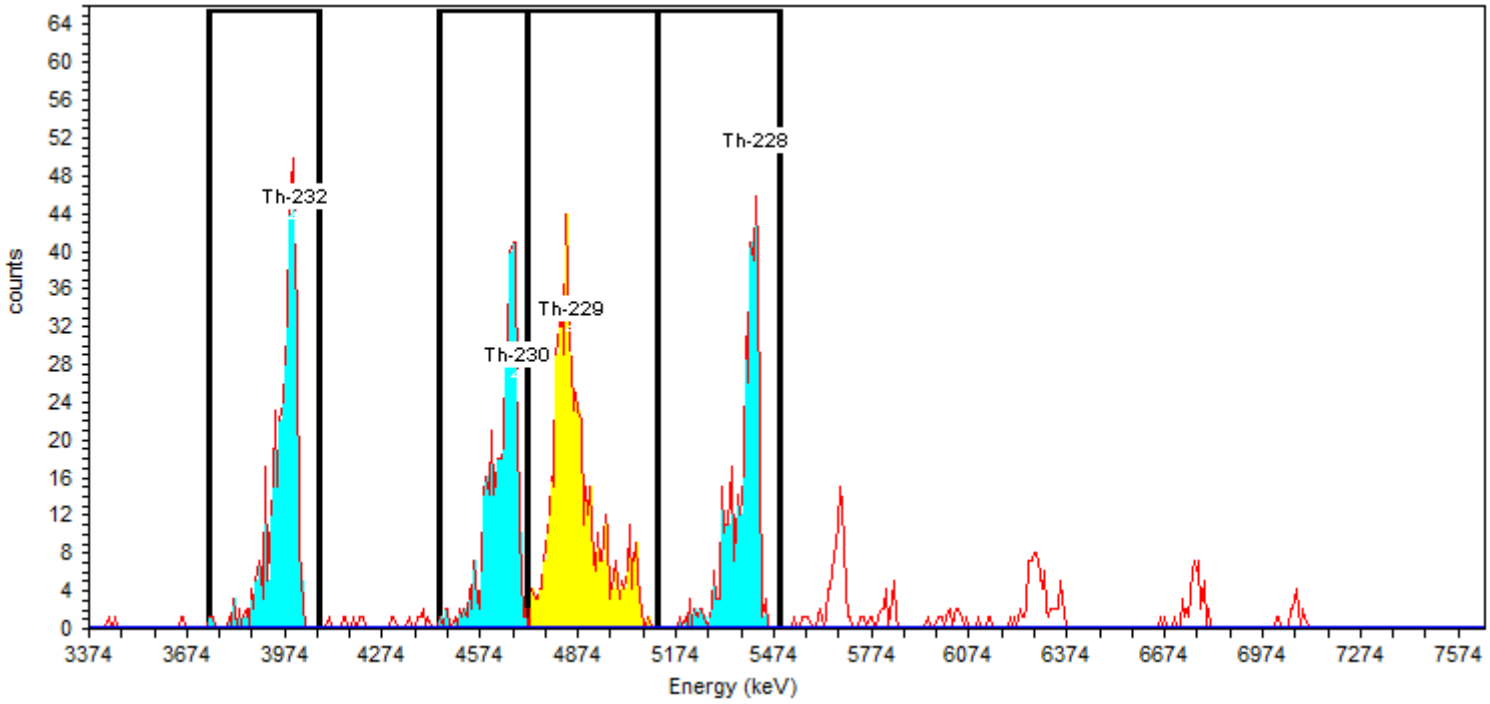
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.96%

Acquisition

Detector: AV170 SN: 50-112 G7
Acquisition Start Date: 8/31/2016 7:41:13PM
Live Time: 400.00 min.
Real Time: 400.00 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: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	60.6	100.2	410	0.0000	410.00	2.116E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	23.3	99.7	402	0.5450	401.15	2.080E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	94.4	99.6	585	1.2500	583.75	2.544E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.7	99.8	396	7.5000	388.50	2.014E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:08:58PM 9/7/2016

Sample

Sample Name: 160-18553-A-7-C Type: Sample
Spectrum #2 Analysis #1
: 160-18553-A-7-C
Sample Collection Date: 8/8/2016 10:02:00AM
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: 266485
AnalysisResultsID: 176240
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

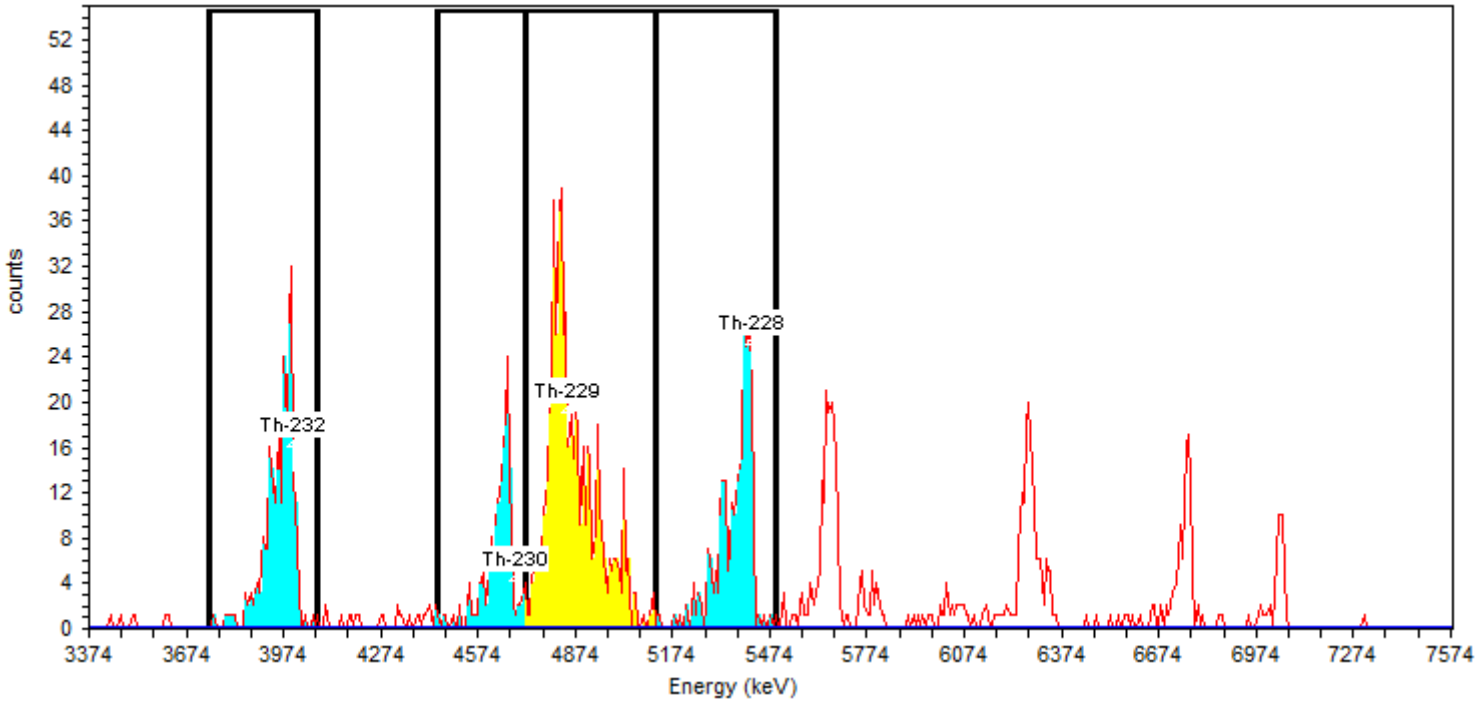
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 77.90%

Acquisition

Detector: AV212 SN: 49-155m5
Acquisition Start Date: 9/7/2016 2:28:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:17PM
Bkgd Info: Sample: ICB;AV212; Det: AV212; Spectrum #1; 9/1/2016 3:17:17 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 7:36:39PM
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	262	3.7500	257.79	1.377E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	41.2	99.7	167	6.6538	160.56	8.622E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.9	99.6	566	2.4871	563.61	2.359E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.2	99.8	266	2.8806	263.22	1.422E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:33AM 9/1/2016

Sample

Sample Name: 160-18553-A-8-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-8-C
Sample Collection Date: 8/8/2016 10:07:00AM
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: 266485
AnalysisResultsID: 175960
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

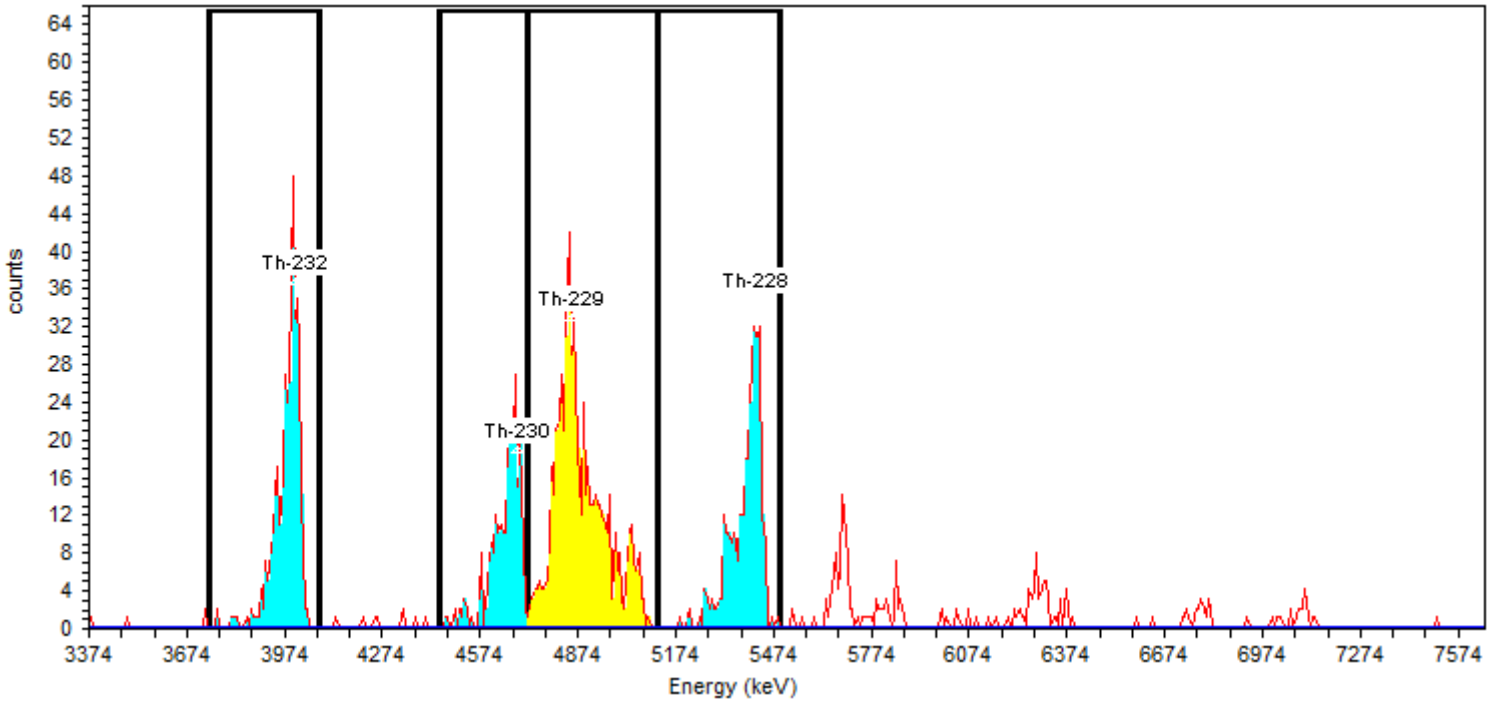
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.52%

Acquisition

Detector: AV173 SN: 50-112 Y4
Acquisition Start Date: 8/31/2016 7:41:14PM
Live Time: 400.00 min.
Real Time: 400.00 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: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	345	0.8333	344.17	1.708E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.9	99.7	235	0.8333	234.20	1.168E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	91.4	99.6	608	1.2234	606.81	2.681E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	65.6	99.8	327	5.3900	321.61	1.603E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:08:46PM 9/7/2016

Sample

Sample Name: 160-18553-A-9-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-9-C
Sample Collection Date: 8/8/2016 9:57:00AM
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: 266485
AnalysisResultsID: 176237
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

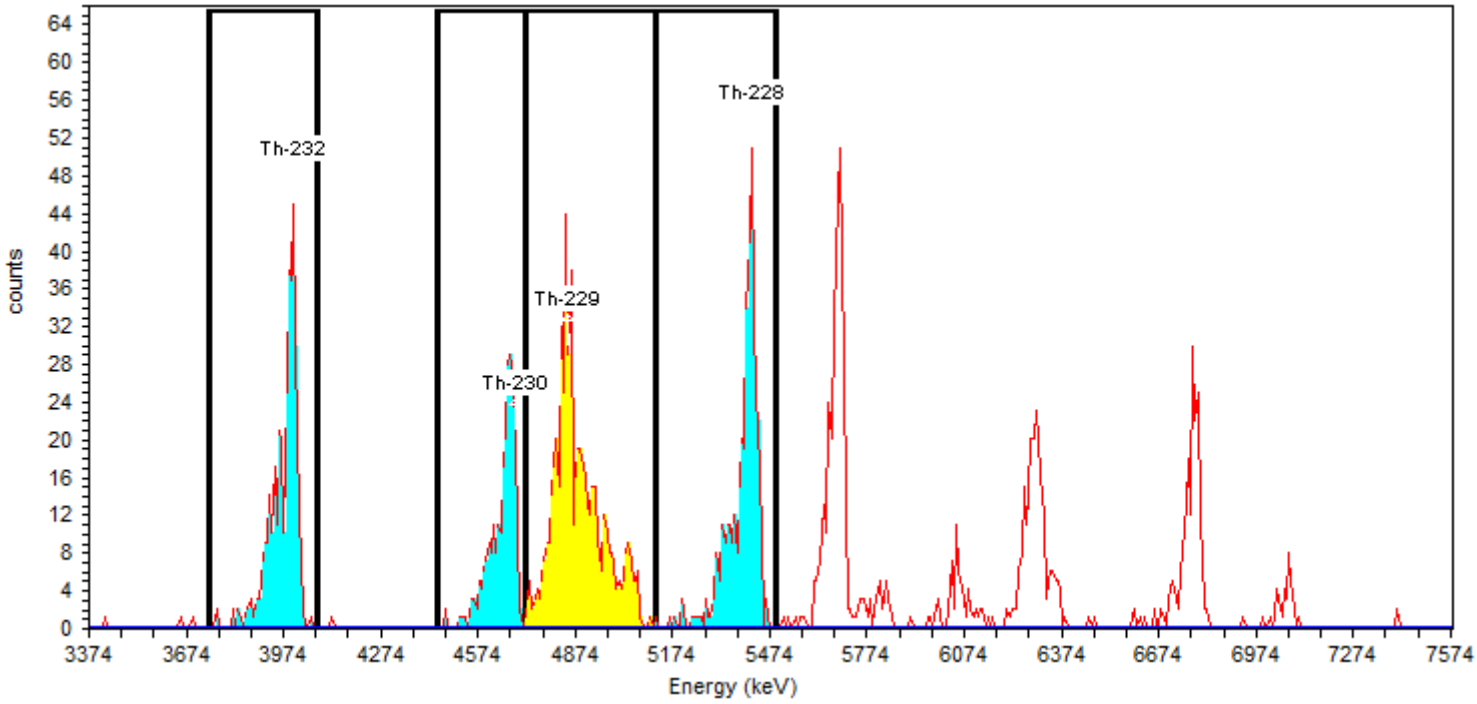
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.54%

Acquisition

Detector: AV211 SN: 50-117Z4
Acquisition Start Date: 9/7/2016 2:28:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:17PM
Bkgd Info: Sample: ICB;AV211; Det: AV211; Spectrum #1; 9/1/2016 3:17:17 PM

Energy Calibration: IC-9794;AV211-20151018a
Efficiency Calibration:IC-9794;AV211-20151018a
Calibration Date: 10/18/2015 6:42:45PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.00% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	56.3	100.2	347	1.6667	345.33	1.849E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.9	99.7	247	0.4167	246.65	1.327E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.2	99.6	564	1.2500	562.75	2.652E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	62.4	99.8	386	6.2500	379.69	2.055E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:58AM 9/1/2016

Sample

Sample Name: 160-18553-A-10-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-10-C
Sample Collection Date: 8/8/2016 9:51:00AM
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: 266485
AnalysisResultsID: 175963
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

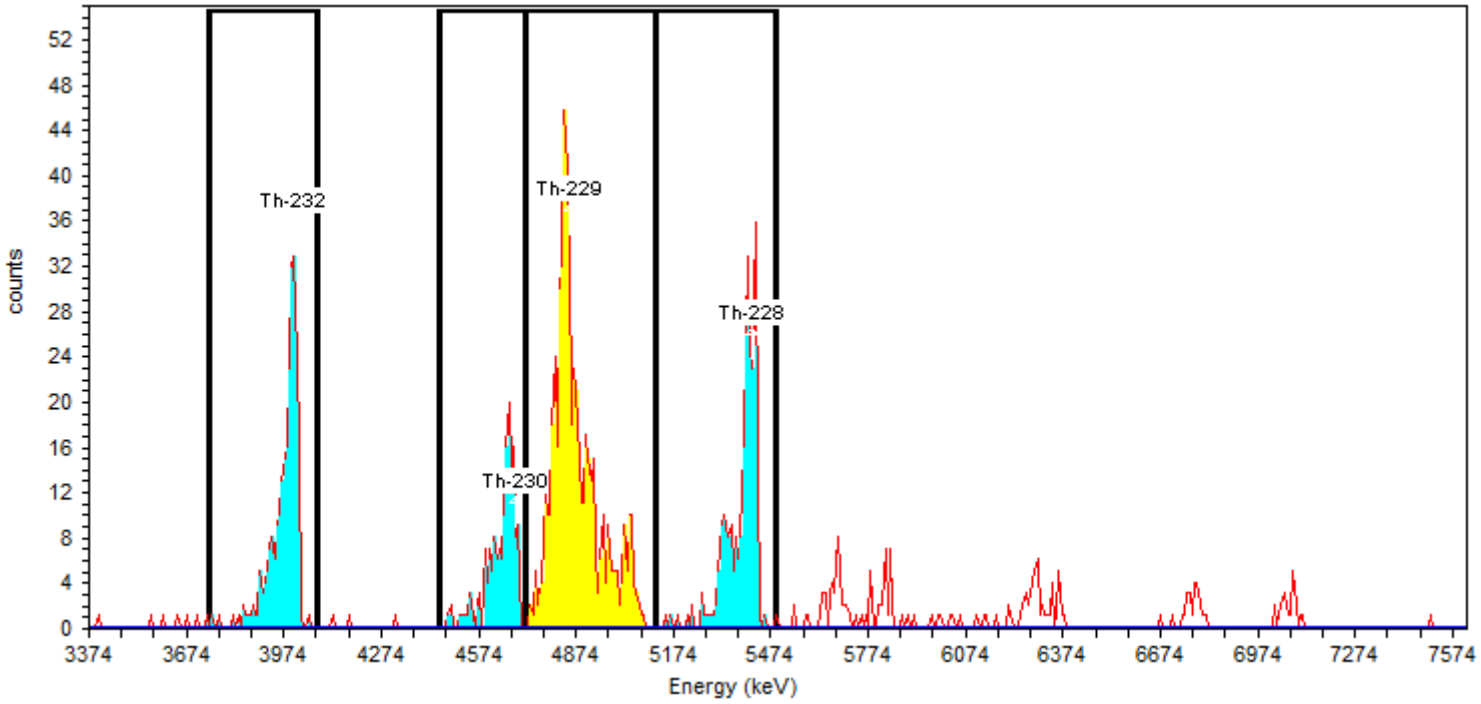
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 79.65%

Acquisition

Detector: AV176 SN: 50-117H2
Acquisition Start Date: 8/31/2016 7:41:15PM
Live Time: 400.00 min.
Real Time: 400.11 min.
Background Date: 7/22/2016 3:43:35PM
Bkgd Info: Sample: ICB;AV176; Det: AV176; Spectrum #1; 7/22/2016 3:43:35 PM

Energy Calibration: IC-8874;AV176-20151017
Efficiency Calibration:IC-8874;AV176-20151017
Calibration Date: 10/17/2015 6:01:52PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.19% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:38PM
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	52.8	100.2	243	1.6667	241.76	1.302E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.8	99.7	159	2.3845	156.62	8.478E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.7	99.6	561	2.0962	558.90	2.412E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.1	99.8	269	7.9167	261.00	1.412E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:50AM 9/1/2016

Sample

Sample Name: 160-18553-A-11-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-11-C
Sample Collection Date: 8/8/2016 9:47:00AM
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: 266485
AnalysisResultsID: 175962
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

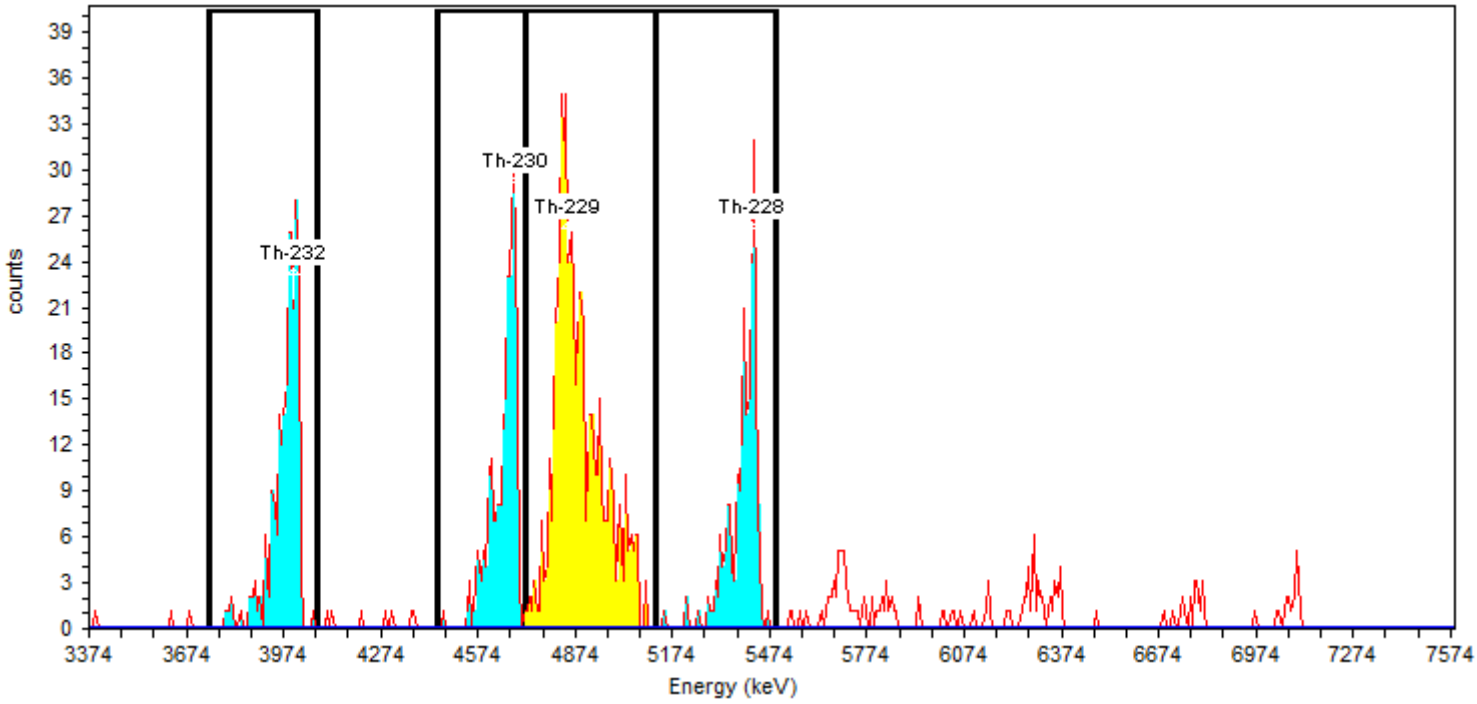
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.19%

Acquisition

Detector: AV177 SN: 50-117H3
Acquisition Start Date: 8/31/2016 7:41:15PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:36PM
Bkgd Info: Sample: ICB;AV177; Det: AV177; Spectrum #1; 7/22/2016 3:43:36 PM

Energy Calibration: IC-8875;AV177-20151017a
Efficiency Calibration:IC-8875;AV177-20151017a
Calibration Date: 10/17/2015 6:02:25PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.11% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	235	0.8333	234.17	1.311E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.0	99.7	228	0.0000	228.00	1.283E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.8	99.6	539	1.6667	537.33	2.518E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.9	99.8	216	6.2139	209.79	1.180E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:08:53PM 9/7/2016

Sample

Sample Name: 160-18553-A-12-C Type: Sample
Spectrum #2 Analysis #1
: 160-18553-A-12-C
Sample Collection Date: 8/8/2016 9:17:00AM
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: 266485
AnalysisResultsID: 176238
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

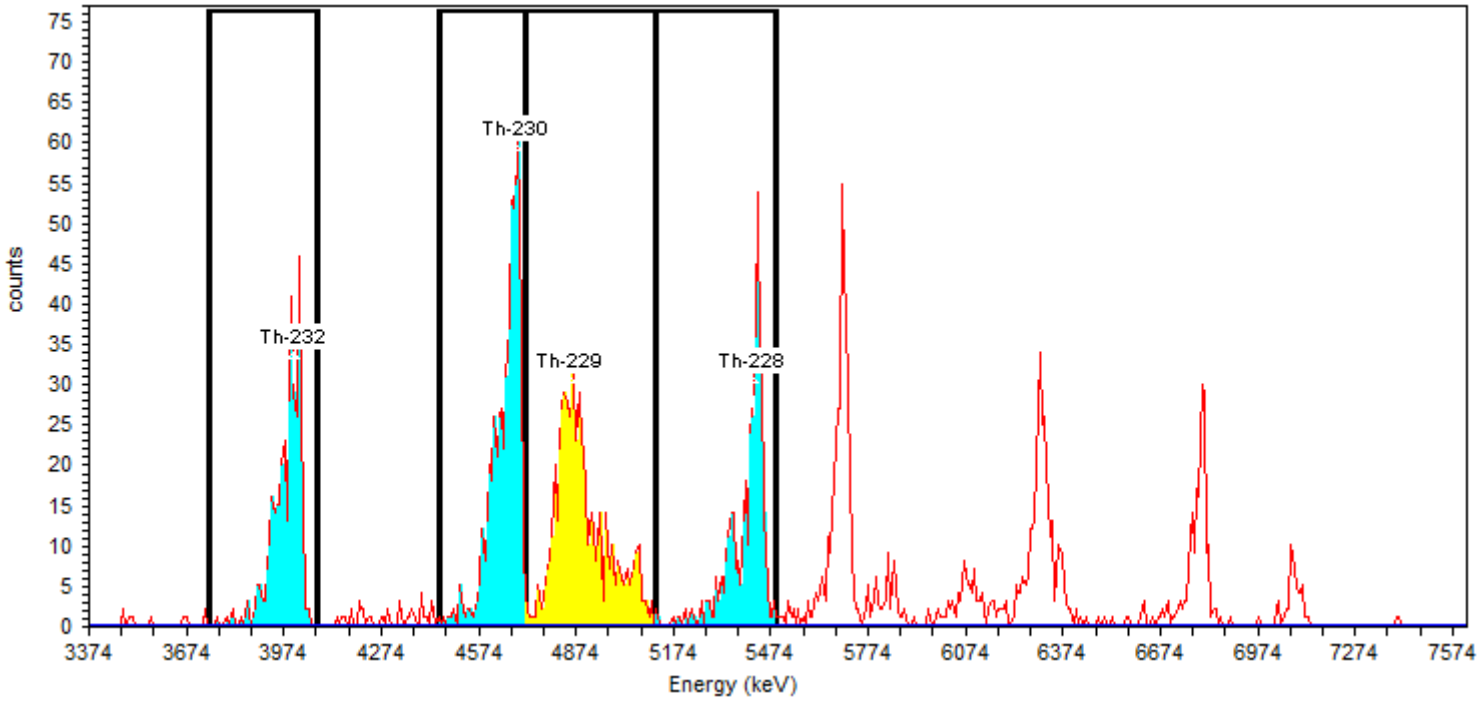
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.32%

Acquisition

Detector: AV210 SN: 50-119AA1
Acquisition Start Date: 9/7/2016 2:28:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:17PM
Bkgd Info: Sample: ICB;AV210; Det: AV210; Spectrum #1; 9/1/2016 3:17:17 PM

Energy Calibration: IC-9793;AV210-20151018a
Efficiency Calibration:IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.37% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:8/31/2016 7:36:39PM
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	75.8	100.2	377	0.4167	376.58	1.911E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.1	99.7	563	0.8333	561.80	2.866E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	102.5	99.6	595	1.2500	593.56	2.646E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	40.5	99.8	380	7.1194	372.75	1.913E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:11:38AM 9/8/2016

Sample

Sample Name: 160-18553-A-12-C Type: Sample
Spectrum #2 Analysis #1
: 160-18553-A-12-C
Sample Collection Date: 8/8/2016 9:17:00AM
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: 266485
AnalysisResultsID: 176279
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

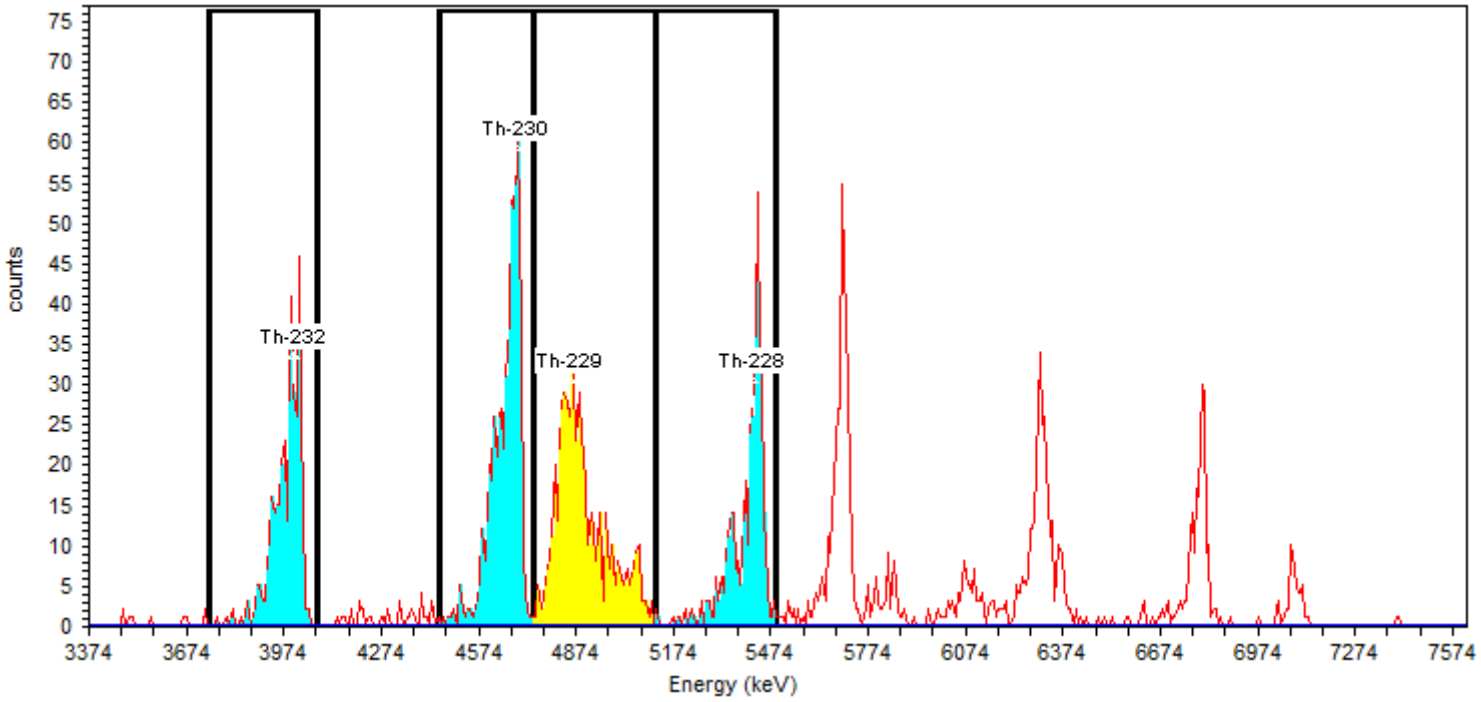
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.61%

Acquisition

Detector: AV210 SN: 50-119AA1
Acquisition Start Date: 9/7/2016 2:28:45PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:17PM
Bkgd Info: Sample: ICB;AV210; Det: AV210; Spectrum #1; 9/1/2016 3:17:17 PM

Energy Calibration: IC-9793;AV210-20151018a
Efficiency Calibration:IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.37% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:8/31/2016 7:36:39PM
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	75.8	100.2	377	0.4167	376.58	1.927E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	48.5	99.7	567	0.8333	566.17	2.912E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	102.5	99.6	590	1.2500	588.75	2.624E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	40.5	99.8	380	7.1194	372.75	1.929E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:24:07AM 9/1/2016

Sample

Sample Name: 160-18553-A-13-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-13-C
Sample Collection Date: 8/8/2016 9:22:00AM
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: 266485
AnalysisResultsID: 175964
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

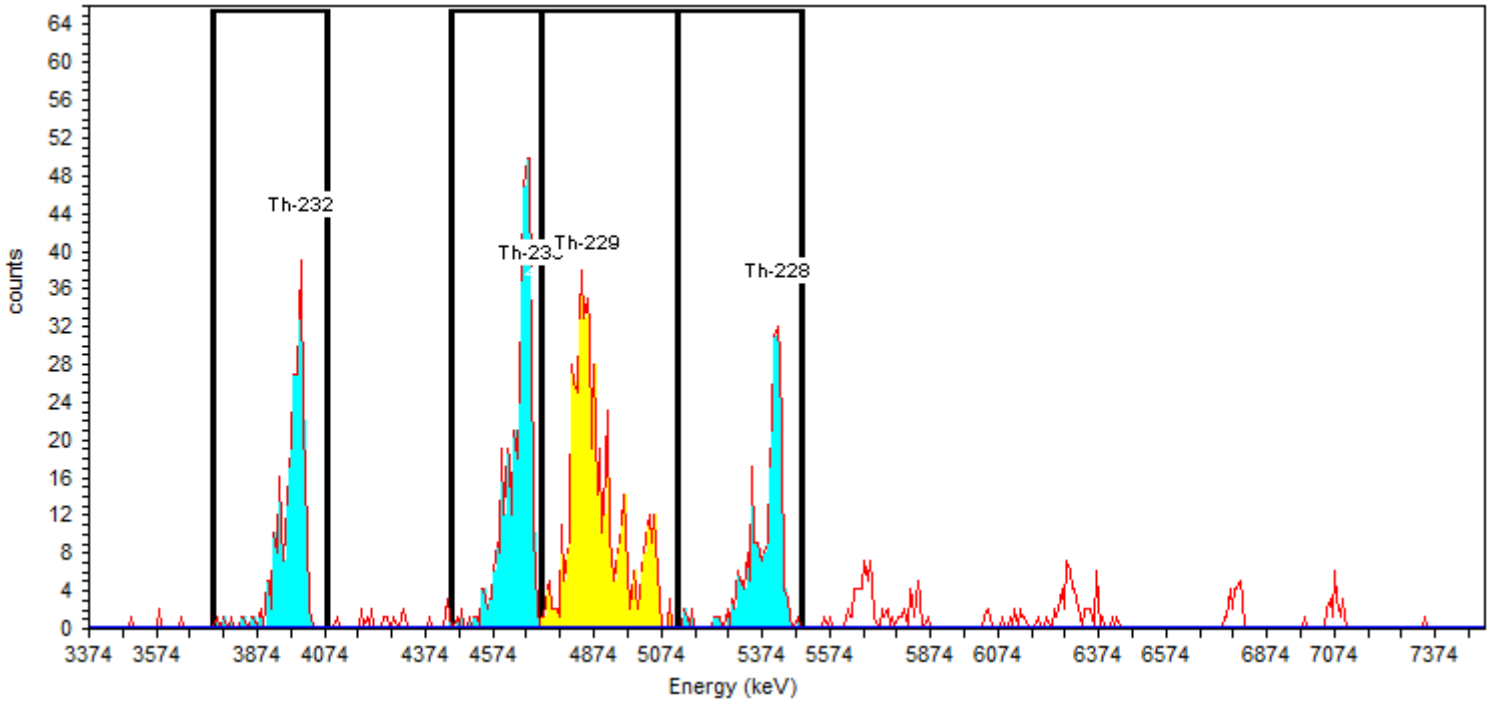
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.17%

Acquisition

Detector: AV189 SN: 50-112A3
Acquisition Start Date: 8/31/2016 7:41:17PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:38PM
Bkgd Info: Sample: ICB;AV189; Det: AV189; Spectrum #1; 7/22/2016 3:43:38 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:8/31/2016 7:36:39PM
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	53.9	100.2	283	1.6667	281.76	1.462E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.3	99.7	419	0.4425	418.87	2.184E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.5	99.6	581	0.4425	580.56	2.489E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.6	99.8	274	6.6667	267.33	1.393E+000	pCi/g

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: 160-18553-14
Client ID: SU01-EXB-034-SS-DUP-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV195
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	1.13	0.181	0.205		pCi/g	0.100	0.0219	267506
Thorium-232	1.78	0.228	0.273		pCi/g	0.100	0.0537	267506

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	1.81	0.179	0.235		pCi/g	0.0378	3.03	59.8	30 - 110

Lab ID: 160-18553-14 DU
Client ID: SU01-EXB-034-SS-DUP-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV196
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	0.9890	0.167	0.187		pCi/g	0.100	0.0529	267507
Thorium-232	1.635	0.214	0.254		pCi/g	0.100	0.0426	267507

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	1.853	0.179	0.237		pCi/g	0.0344	3.03	61.2	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Lab ID: 160-18553-15
Client ID: SU01-EXB-035-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV200
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	0.822	0.135	0.151		pCi/g	0.100	0.0304	267508
Thorium-232	1.80	0.199	0.250		pCi/g	0.100	0.0403	267508

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.56	0.218	0.306		pCi/g	0.0373	3.03	84.3	30 - 110

Lab ID: 160-18553-16
Client ID: SU01-EXB-036-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV206
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	1.33	0.167	0.201		pCi/g	0.100	0.0373	267510
Thorium-232	1.20	0.158	0.187		pCi/g	0.100	0.0287	267510

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.67	0.222	0.316		pCi/g	0.0399	3.03	88.2	30 - 110

Lab ID: 160-18553-17
Client ID: SU01-EXB-037-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV207
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	1.03	0.163	0.185		pCi/g	0.100	0.0469	267511
Thorium-232	1.67	0.206	0.249		pCi/g	0.100	0.0349	267511

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.14	0.196	0.266		pCi/g	0.0135	3.03	70.7	30 - 110

Lab ID: 160-18553-18
Client ID: SU01-EXB-038-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV208
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	1.13	0.159	0.185		pCi/g	0.100	0.0307	267512
Thorium-232	1.89	0.204	0.259		pCi/g	0.100	0.0166	267512

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.41	0.207	0.289		pCi/g	0.0291	3.03	79.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266564

Lab ID: 160-18553-19
Client ID: SU01-EXB-039-SS-P-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV209
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	1.22	0.154	0.185		pCi/g	0.100	0.0147	267513
Thorium-232	1.60	0.177	0.222		pCi/g	0.100	0.0320	267513

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.73	0.220	0.318		pCi/g	0.0244	3.03	90.1	30 - 110

Lab ID: 160-18553-20
Client ID: SU01-EXB-039-SS-DUP-00
Sigma: 2

Analyzed: 08/31/16 19:45
Detector: AV210
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	0.812	0.144	0.159		pCi/g	0.100	0.0349	267514
Thorium-232	1.52	0.195	0.233		pCi/g	0.100	0.0347	267514

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.13	0.195	0.265		pCi/g	0.0134	3.03	70.5	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

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-18553-14	Thorium-230	1.13		0.9890		pCi/g			13	0.35	0.99	1	
160-18553-14	Thorium-232	1.78		1.635		pCi/g			9	0.28	0.78	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

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		
160-18553-A-14-A	SU01-EXB-034-SS-DUP-00	ExtChrom, A-01-R	T	0.9999 g	0.1 mL				
160-18553-A-14-A DU	SU01-EXB-034-SS-DUP-00	ExtChrom, A-01-R	T	1.0001 g	0.1 mL				
160-18553-A-15-A	SU01-EXB-035-SS-P-00	ExtChrom, A-01-R	T	0.9992 g	0.1 mL				
160-18553-A-16-A	SU01-EXB-036-SS-P-00	ExtChrom, A-01-R	T	0.9996 g	0.1 mL				
160-18553-A-17-A	SU01-EXB-037-SS-P-00	ExtChrom, A-01-R	T	1.0007 g	0.1 mL				
160-18553-A-18-A	SU01-EXB-038-SS-P-00	ExtChrom, A-01-R	T	0.9999 g	0.1 mL				
160-18553-A-19-A	SU01-EXB-039-SS-P-00	ExtChrom, A-01-R	T	0.9983 g	0.1 mL				
160-18553-A-20-A	SU01-EXB-039-SS-DUP-00	ExtChrom, A-01-R	T	1.0007 g	0.1 mL				

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
THE LEADER IN ENVIRONMENTAL TESTING

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

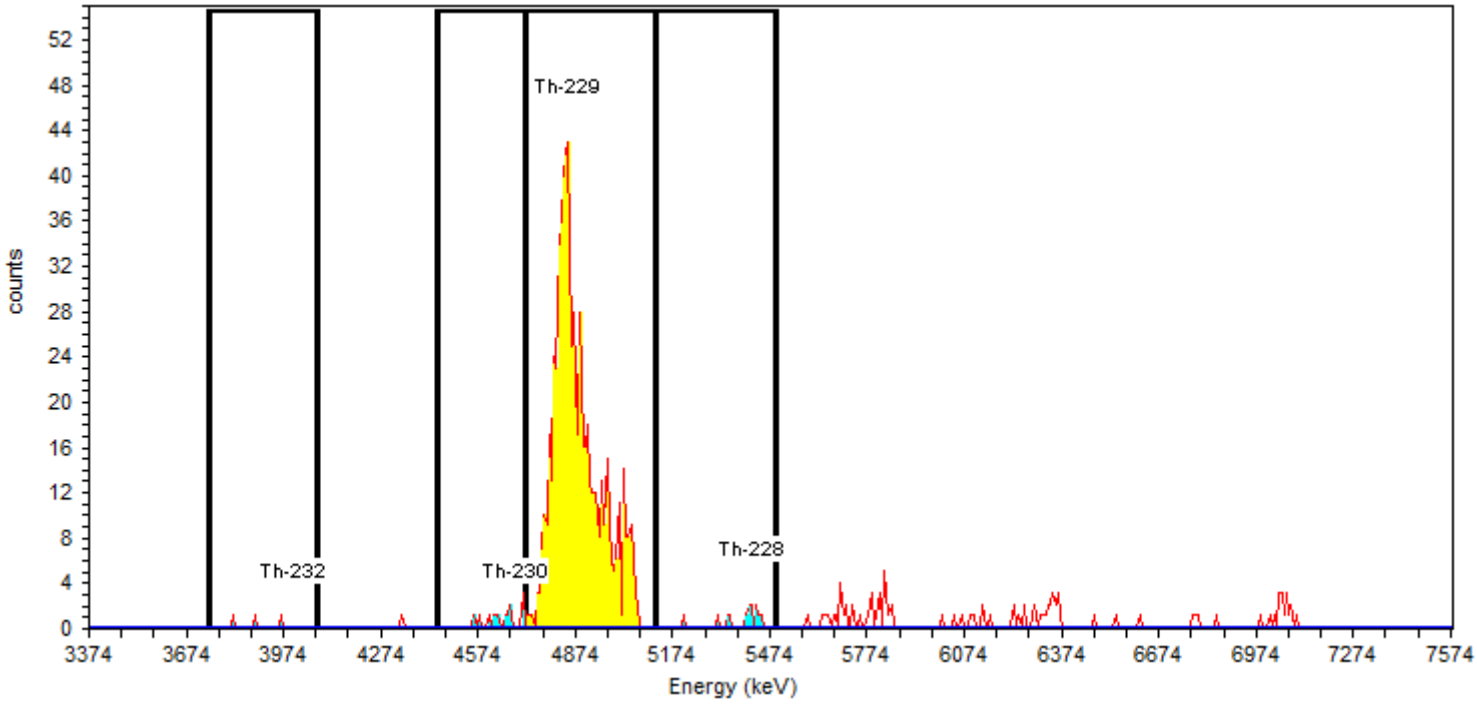
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

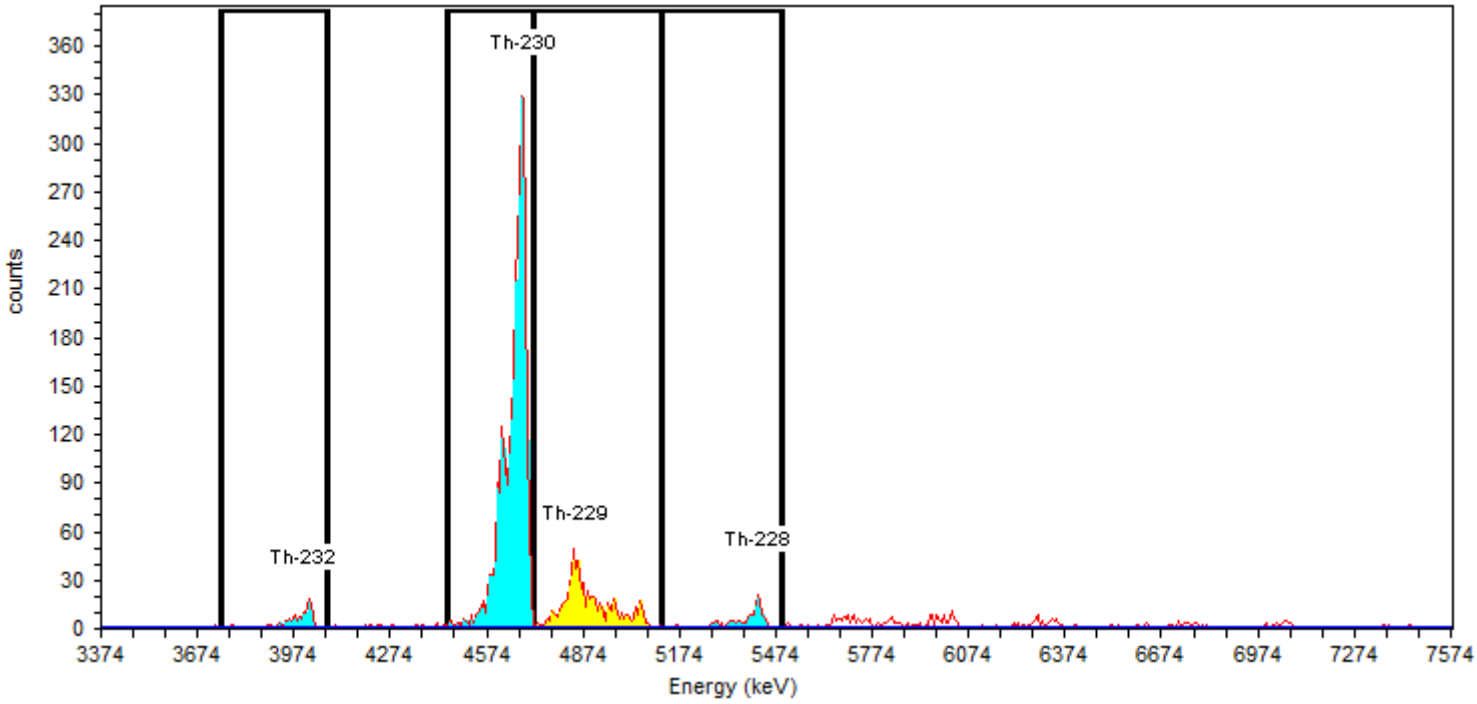
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:08AM 9/1/2016

Sample

Sample Name: 160-18553-A-14-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-14-C
Sample Collection Date: 8/8/2016 9:22:00AM
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: 175975
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

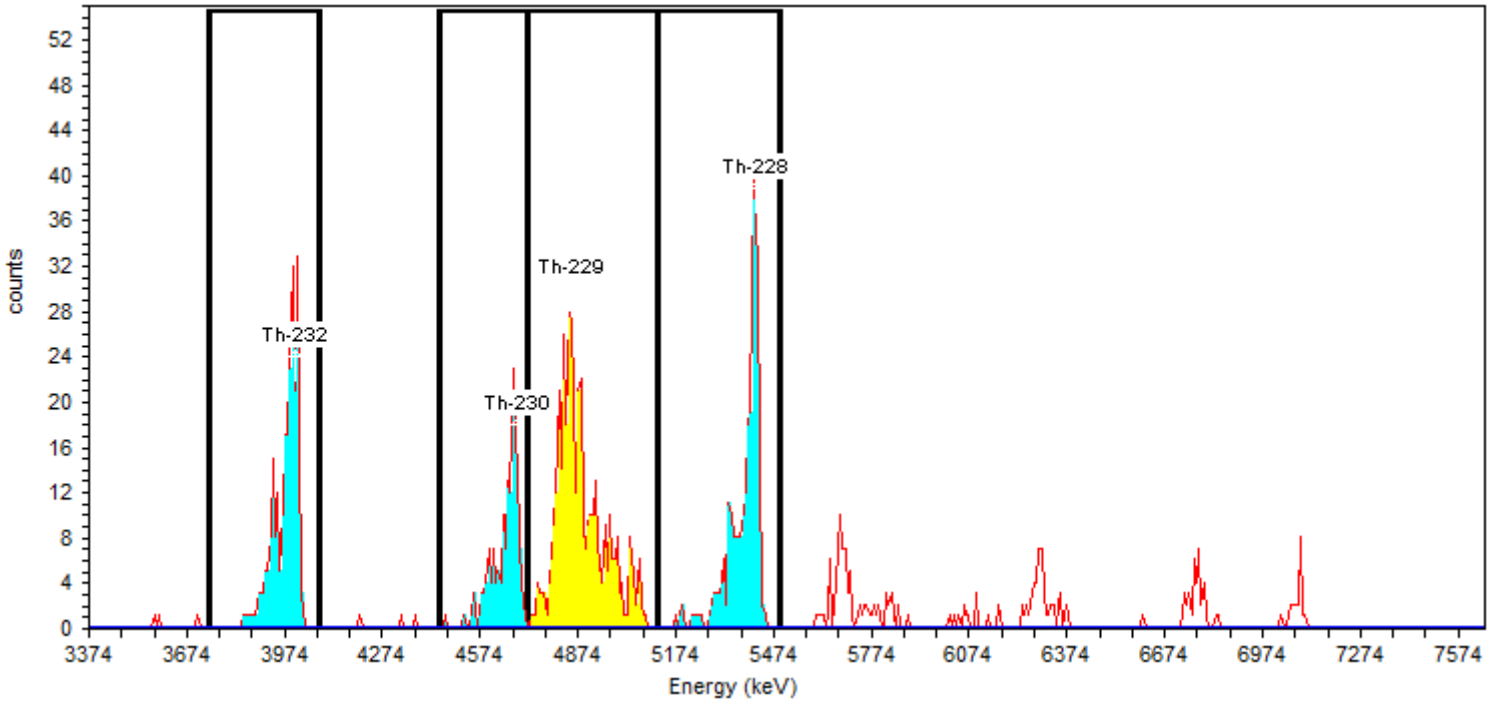
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 59.77%

Acquisition

Detector: AV195 SN: 50-117AA2
Acquisition Start Date: 8/31/2016 7:45:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:40PM
Bkgd Info: Sample: ICB;AV195; Det: AV195; Spectrum #1; 7/22/2016 3:43:40 PM

Energy Calibration: IC-9792;AV195-20151017a
Efficiency Calibration:IC-9792;AV195-20151017a
Calibration Date: 10/18/2015 3:55:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.85% +/- 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	52.9	100.2	246	1.2500	244.75	1.781E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.0	99.7	154	0.0000	154.00	1.126E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.9	99.6	416	2.0833	413.92	1.810E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.1	99.8	271	8.2972	262.70	1.920E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:28AM 9/1/2016

Sample

Sample Name: 160-18553-A-14-D DU Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-14-D DU
Sample Collection Date: 8/8/2016 9:22:00AM
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: 175979
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

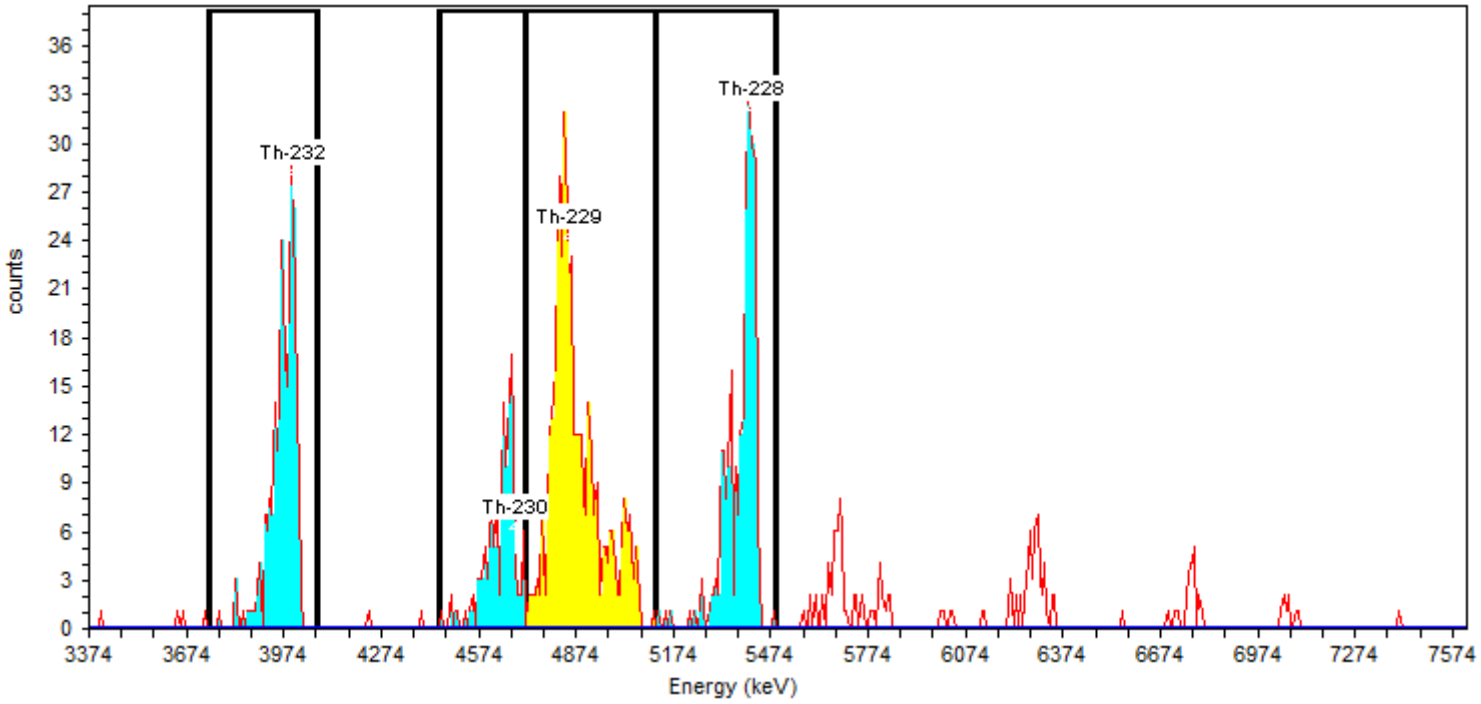
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 61.22%

Acquisition

Detector: AV196 SN: 50-117AA5
Acquisition Start Date: 8/31/2016 7:45:22PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:40PM
Bkgd Info: Sample: ICB;AV196; Det: AV196; Spectrum #1; 7/22/2016 3:43:40 PM

Energy Calibration: IC-9793;AV196-20151017
Efficiency Calibration:IC-9793;AV196-20151017
Calibration Date: 10/18/2015 3:55:18PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.43% +/- 0.32% 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	76.7	100.2	236	0.6423	235.36	1.635E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	17.9	99.7	143	1.3655	141.67	9.890E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.8	99.6	435	1.6538	433.44	1.854E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.8	99.8	281	5.0000	276.06	1.926E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:19AM 9/1/2016

Sample

Sample Name: 160-18553-A-15-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-15-C
Sample Collection Date: 8/8/2016 9:29:00AM
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: 175977
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

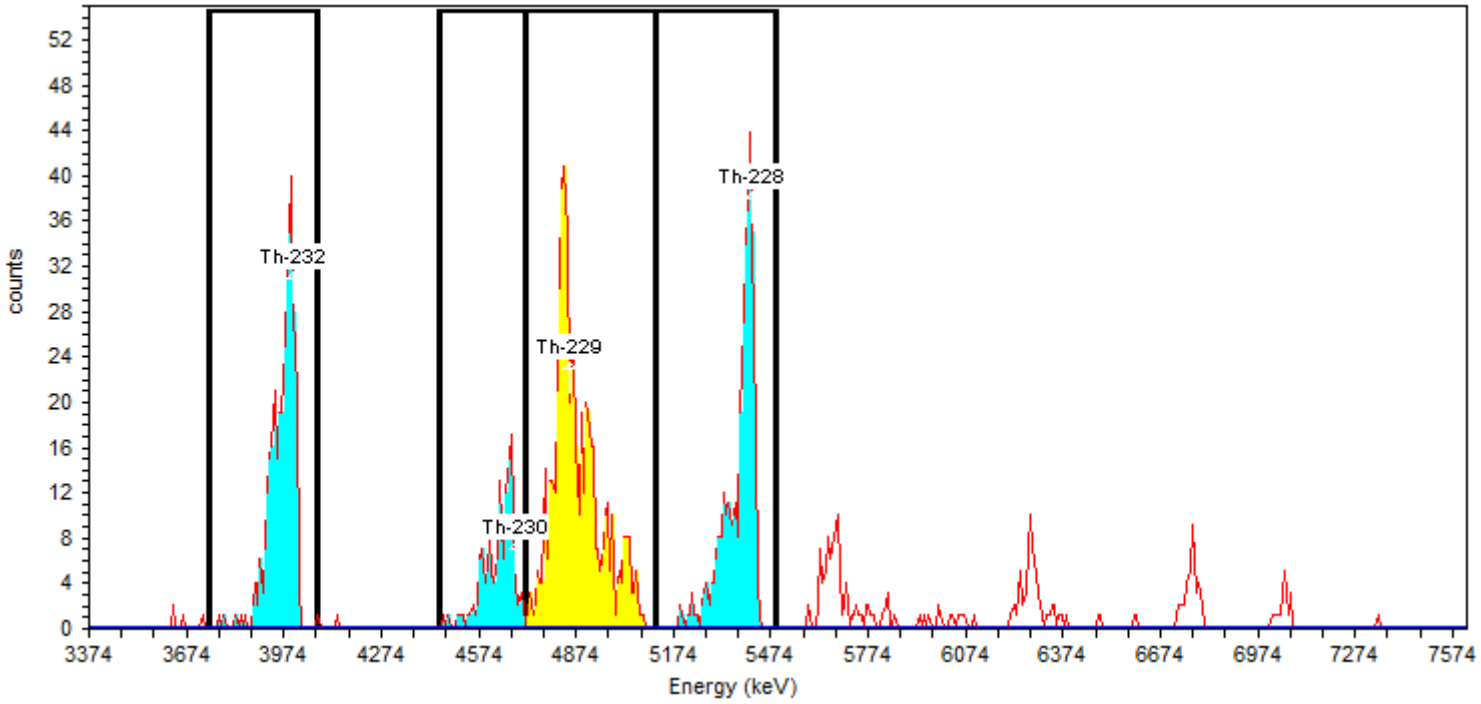
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.32%

Acquisition

Detector: AV200 SN: 50-117J6
Acquisition Start Date: 8/31/2016 7:45:23PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:13:59PM
Bkgd Info: Sample: ICB;AV200; Det: AV200; Spectrum #1; 7/25/2016 1:13:59 PM

Energy Calibration: IC-9884;AV200-20151017
Efficiency Calibration:IC-9884;AV200-20151017
Calibration Date: 10/18/2015 3:55:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.41% +/- 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	71.6	100.2	331	1.2500	329.29	1.800E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	17.9	99.7	150	0.4167	149.61	8.218E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.1	99.6	553	1.6667	551.36	2.556E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.6	99.8	340	6.6667	333.33	1.830E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:50AM 9/1/2016

Sample

Sample Name: 160-18553-A-16-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-16-C
Sample Collection Date: 8/8/2016 9:35:00AM
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: 175984
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

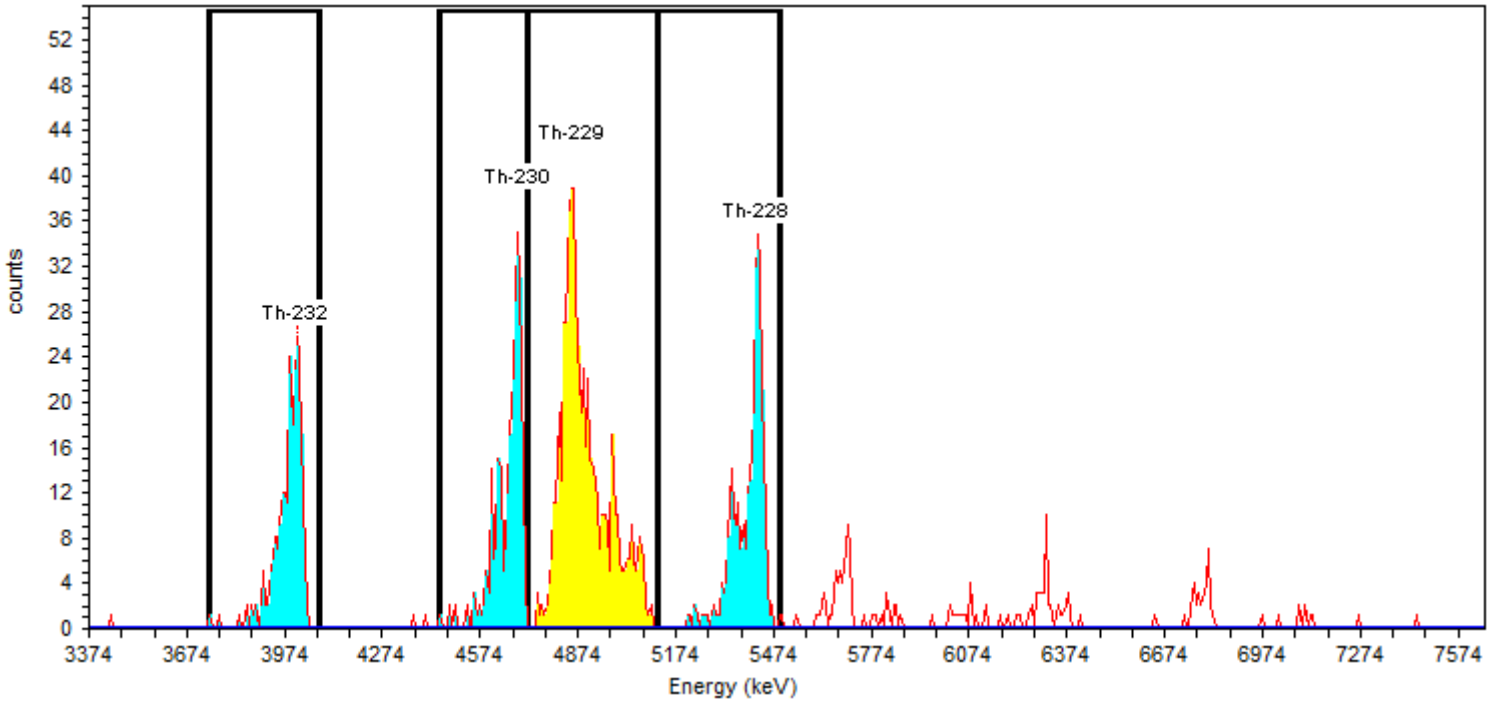
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.18%

Acquisition

Detector: AV206 SN: 50-119AA6
Acquisition Start Date: 8/31/2016 7:45:23PM
Live Time: 400.00 min.
Real Time: 400.07 min.
Background Date: 7/25/2016 1:14:01PM
Bkgd Info: Sample: ICB;AV206; Det: AV206; Spectrum #1; 7/25/2016 1:14:01 PM

Energy Calibration: IC-8876;AV206-20151018
Efficiency Calibration:IC-8876;AV206-20151018
Calibration Date: 10/18/2015 6:41:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.55% +/- 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	68.0	100.2	231	0.4167	230.16	1.196E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.0	99.7	256	1.1216	254.57	1.329E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.4	99.6	582	2.0833	579.92	2.672E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.6	99.8	281	5.0000	276.00	1.440E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:24AM 9/1/2016

Sample

Sample Name: 160-18553-A-17-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-17-C
Sample Collection Date: 8/8/2016 9:41:00AM
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: 175978
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

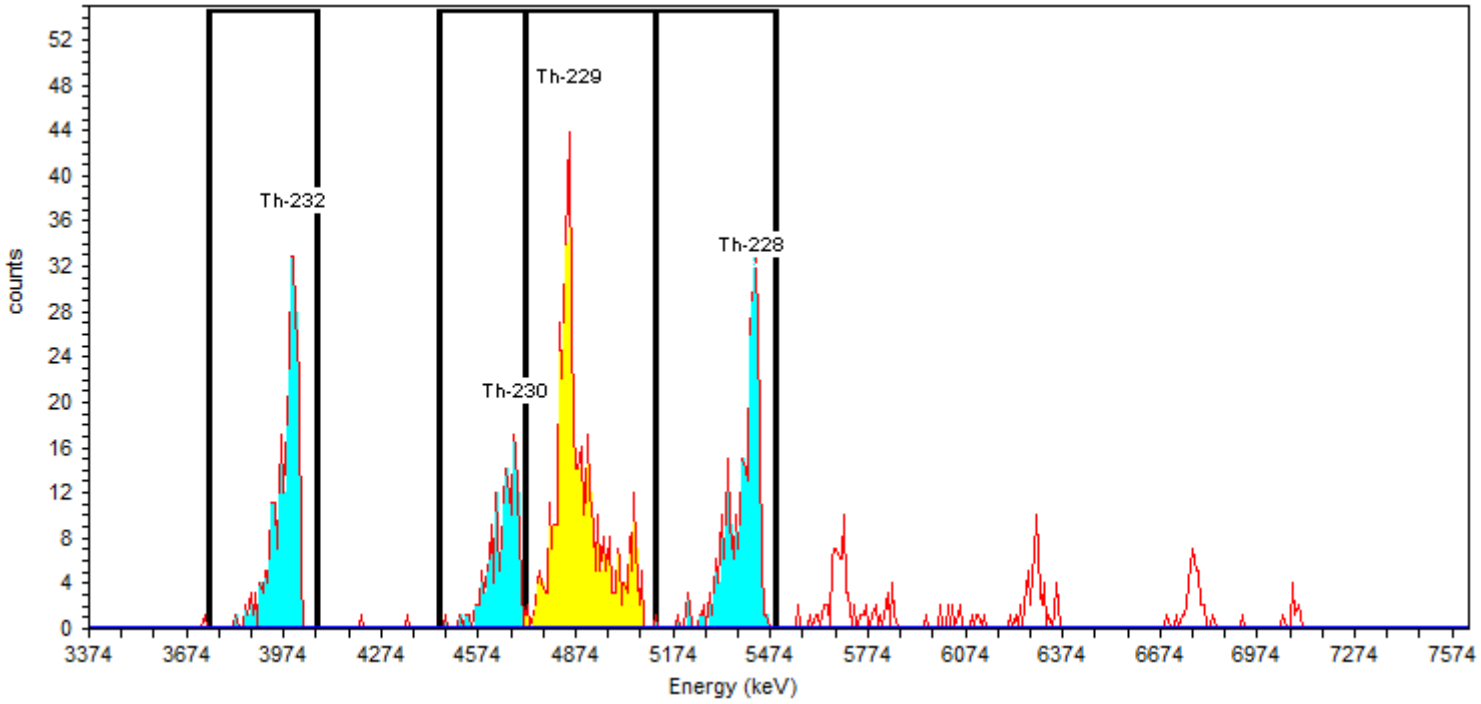
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 70.65%

Acquisition

Detector: AV207 SN: 50-117H6
Acquisition Start Date: 8/31/2016 7:45:24PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/22/2016 3:43:42PM
Bkgd Info: Sample: ICB;AV207; Det: AV207; Spectrum #1; 7/22/2016 3:43:42 PM

Energy Calibration: IC-8877;AV207-20151018
Efficiency Calibration:IC-8877;AV207-20151018
Calibration Date: 10/18/2015 6:41:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.15% +/- 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	55.6	100.2	265	0.4167	264.58	1.673E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.1	99.7	164	1.2500	162.78	1.034E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	62.1	99.6	476	0.0000	475.97	2.138E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.4	99.8	293	7.5000	285.44	1.812E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:32AM 9/1/2016

Sample

Sample Name: 160-18553-A-18-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-18-C
Sample Collection Date: 8/8/2016 9:01:00AM
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: 175980
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

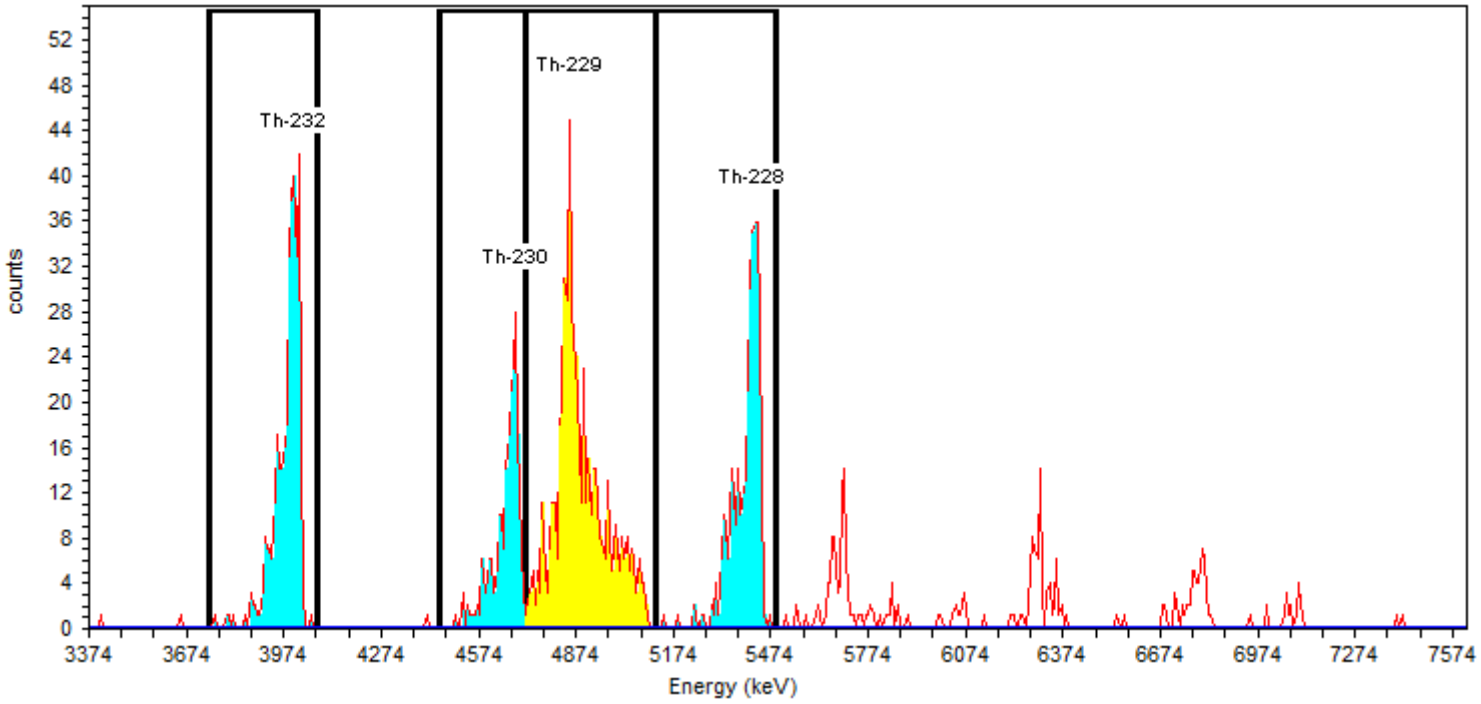
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 79.59%

Acquisition

Detector: AV208 SN: 50-112Z6
Acquisition Start Date: 8/31/2016 7:45:24PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:01PM
Bkgd Info: Sample: ICB;AV208; Det: AV208; Spectrum #1; 7/25/2016 1:14:01 PM

Energy Calibration: IC-9520;AV208-20151018a
Efficiency Calibration:IC-9520;AV208-20151018a
Calibration Date: 10/18/2015 6:42:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.52% +/- 0.36% 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	57.2	100.2	341	0.0000	341.00	1.887E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.4	99.7	203	0.4167	202.61	1.127E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.2	99.6	545	0.8333	544.20	2.411E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.1	99.8	330	5.8333	324.17	1.802E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:46AM 9/1/2016

Sample

Sample Name: 160-18553-A-19-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-19-C
Sample Collection Date: 8/8/2016 9:10:00AM
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: 175983
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

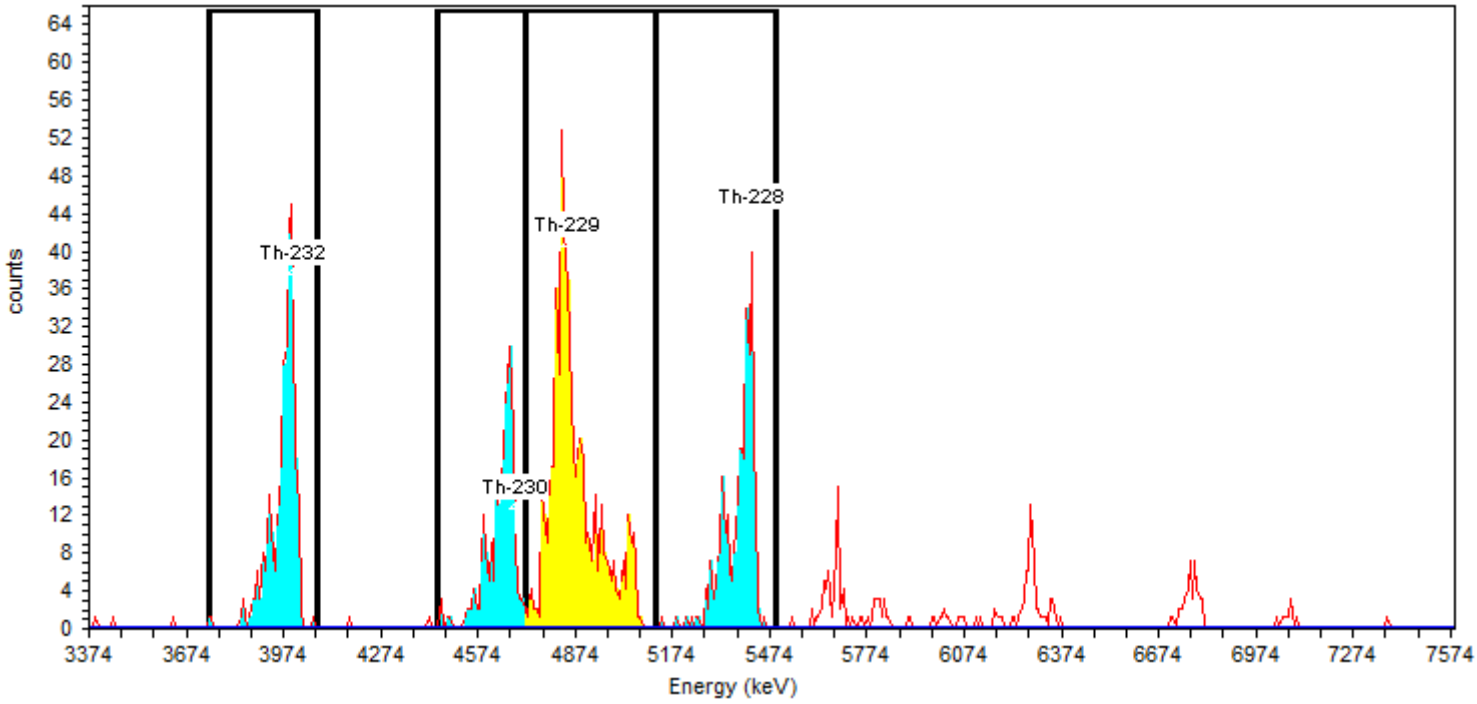
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.08%

Acquisition

Detector: AV209 SN: 50-117H7
Acquisition Start Date: 8/31/2016 7:45:24PM
Live Time: 400.00 min.
Real Time: 400.03 min.
Background Date: 7/25/2016 1:14:01PM
Bkgd Info: Sample: ICB;AV209; Det: AV209; Spectrum #1; 7/25/2016 1:14:01 PM

Energy Calibration: IC-9792;AV209-20151018
Efficiency Calibration:IC-9792;AV209-20151018
Calibration Date: 10/18/2015 6:42:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.67% +/- 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	51.4	100.2	329	0.8333	328.17	1.598E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	19.0	99.7	249	0.0000	248.97	1.218E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.6	99.6	620	0.4167	619.55	2.733E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.9	99.8	306	6.6667	299.33	1.464E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:41AM 9/1/2016

Sample

Sample Name: 160-18553-A-20-C Type: Sample
Spectrum #1 Analysis #1
: 160-18553-A-20-C
Sample Collection Date: 8/8/2016 9:10:00AM
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: 175982
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

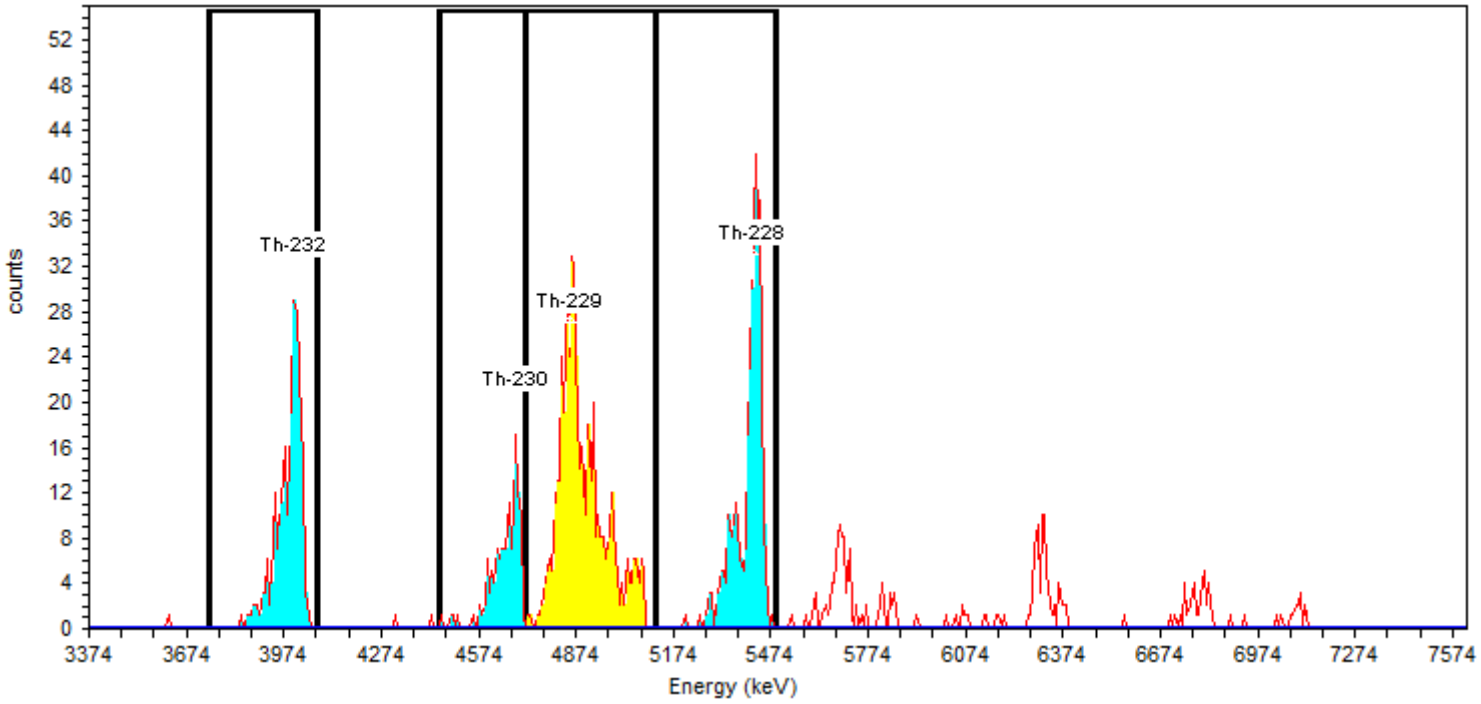
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 70.47%

Acquisition

Detector: AV210 SN: 50-119AA1
Acquisition Start Date: 8/31/2016 7:45:24PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 7/25/2016 1:14:01PM
Bkgd Info: Sample: ICB;AV210; Det: AV210; Spectrum #1; 7/25/2016 1:14:01 PM

Energy Calibration: IC-9793;AV210-20151018a
Efficiency Calibration:IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.37% +/- 0.32% 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	58.7	100.2	242	0.4167	241.58	1.517E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.0	99.7	129	0.4167	128.61	8.119E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.4	99.6	479	0.0000	479.03	2.133E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	45.7	99.8	313	5.8333	307.17	1.938E+000	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
AV148	08/31/16 09:06	6015	5686.2-6284.7	Pass	14.8	10-20	Pass	222.0	218.0-228.0	Pass	5022	4990.0-5070.0	Pass
AV149	08/31/16 09:06	5874	5704.3-6304.8	Pass	12.2	10-20	Pass	222.9	217.9-227.9	Pass	5030	4989.4-5069.4	Pass
AV161	08/31/16 09:06	6026	5716.9-6318.7	Pass	13.8	10-20	Pass	229.9	224.9-234.9	Pass	5082	5041.6-5121.6	Pass
AV162	08/31/16 09:06	6015	5631.4-6224.2	Pass	13.5	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.0-5070.0	Pass
AV163	08/31/16 09:06	6010	5620.8-6212.5	Pass	14.6	10-20	Pass	224.1	218.8-228.8	Pass	5038	4995.9-5075.9	Pass
AV164	08/31/16 09:06	5898	5609.5-6199.9	Pass	12.6	10-20	Pass	222.0	217.0-227.0	Pass	5023	4982.7-5062.7	Pass
AV169	08/31/16 09:06	5968	5719.2-6321.2	Pass	16.5	10-20	Pass	221.9	217.5-227.5	Pass	5022	4986.3-5066.3	Pass
AV170	08/31/16 09:06	6025	5708.9-6309.8	Pass	14.7	10-20	Pass	224.1	218.2-228.2	Pass	5038	4991.8-5071.8	Pass
AV173	08/31/16 09:06	6035	5721.2-6323.5	Pass	13.8	10-20	Pass	221.0	216.0-226.0	Pass	5015	4975.4-5055.4	Pass
AV176	08/31/16 09:06	5953	5679.9-6277.8	Pass	17.7	10-20	Pass	221.9	217.0-227.0	Pass	5022	4982.4-5062.4	Pass
AV177	08/31/16 09:06	5871	5589.1-6177.5	Pass	12.3	10-20	Pass	224.0	219.0-229.0	Pass	5038	4997.6-5077.6	Pass
AV189	08/31/16 09:07	6030	5679.0-6276.8	Pass	13.7	10-20	Pass	224.0	219.0-229.0	Pass	5037	4997.2-5077.2	Pass
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
AV195	08/31/16 09:07	6018	5665.0-6261.3	Pass	14.7	10-20	Pass	224.0	219.1-229.1	Pass	5038	4998.0-5078.0	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
AV200	08/31/16 09:07	5990	5688.6-6287.4	Pass	15.5	10-20	Pass	222.1	216.9-226.9	Pass	5023	4981.7-5061.7	Pass
AV206	08/31/16 09:07	5992	5675.7-6273.2	Pass	15.2	10-20	Pass	220.9	216.1-226.1	Pass	5014	4975.8-5055.8	Pass
AV207	08/31/16 09:07	5856	5708.0-6308.9	Pass	12.4	10-20	Pass	222.9	218.0-228.0	Pass	5029	4989.9-5069.9	Pass
AV208	08/31/16 09:07	5890	5698.3-6298.1	Pass	12.4	10-20	Pass	224.0	219.0-229.0	Pass	5037	4997.1-5077.1	Pass
AV209	08/31/16 09:07	6026	5544.5-6128.1	Pass	13.9	10-20	Pass	221.0	216.5-226.5	Pass	5015	4979.1-5059.1	Pass
AV210	08/31/16 09:07	6020	5674.3-6271.6	Pass	14.2	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.1-5070.1	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
AV210	09/07/16 12:23	6009	5674.3-6271.6	Pass	14.4	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.1-5070.1	Pass
AV211	09/07/16 12:29	6023	5682.8-6281.0	Pass	15.3	10-20	Pass	220.9	217.1-227.1	Pass	5015	4983.4-5063.4	Pass
AV212	09/07/16 12:29	6021	5725.1-6327.8	Pass	14.3	10-20	Pass	219.0	214.1-224.1	Pass	5000	4961.1-5041.1	Pass
AV216	09/07/16 12:28	6011	5666.3-6262.8	Pass	14.6	10-20	Pass	224.0	219.1-229.1	Pass	5037	4997.8-5077.8	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:22AM 8/31/2016

Sample

Sample Name: Pulser;AV148
Comment:

Spectrum #28 Analysis #1

Batch

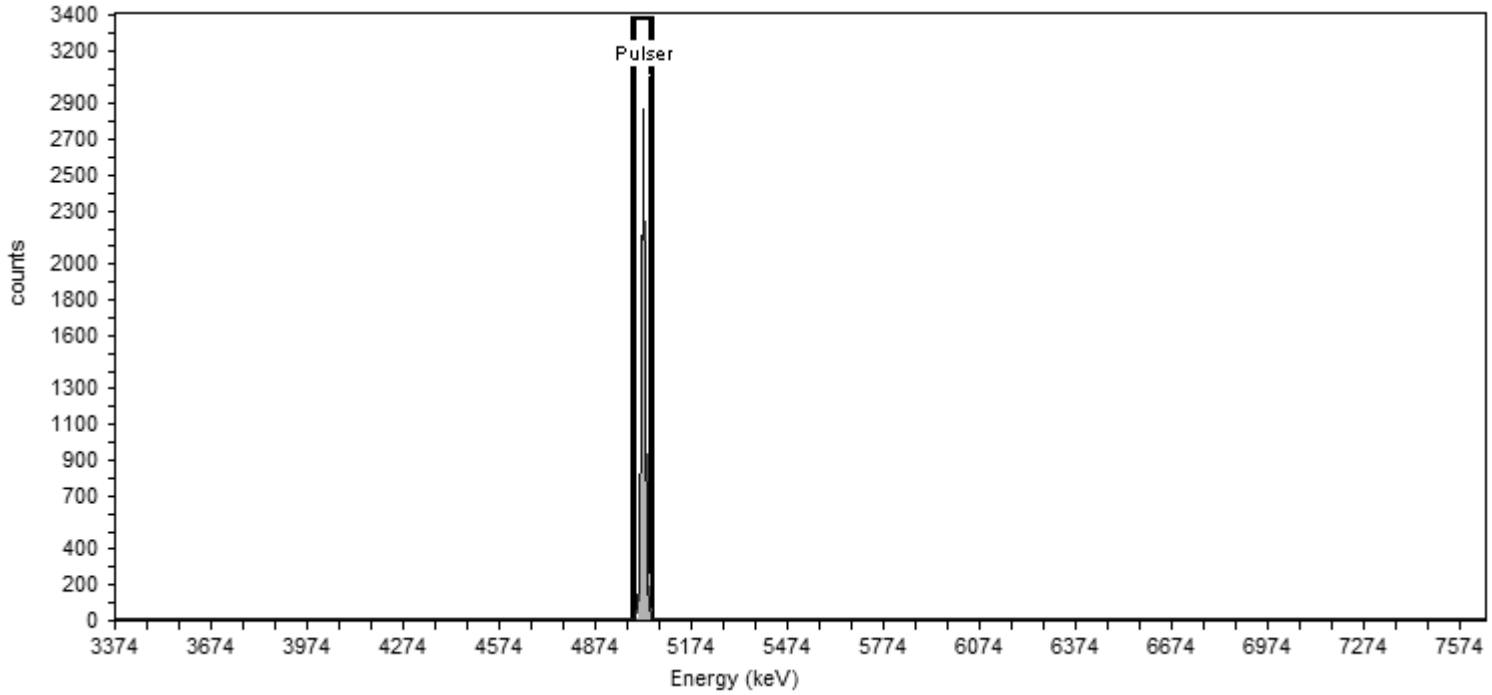
Batch Name: July2016a
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 8/31/2016 9:06:51AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV148-20151016a
Calibration Date: 10/16/2015 6:47:19PM

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	5022.425	4997.258	5047.593	14.79	6,085.49	6,014.78

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:20AM 8/31/2016

Sample

Sample Name: Pulser;AV149
Comment:

Spectrum #28 Analysis #1

Batch

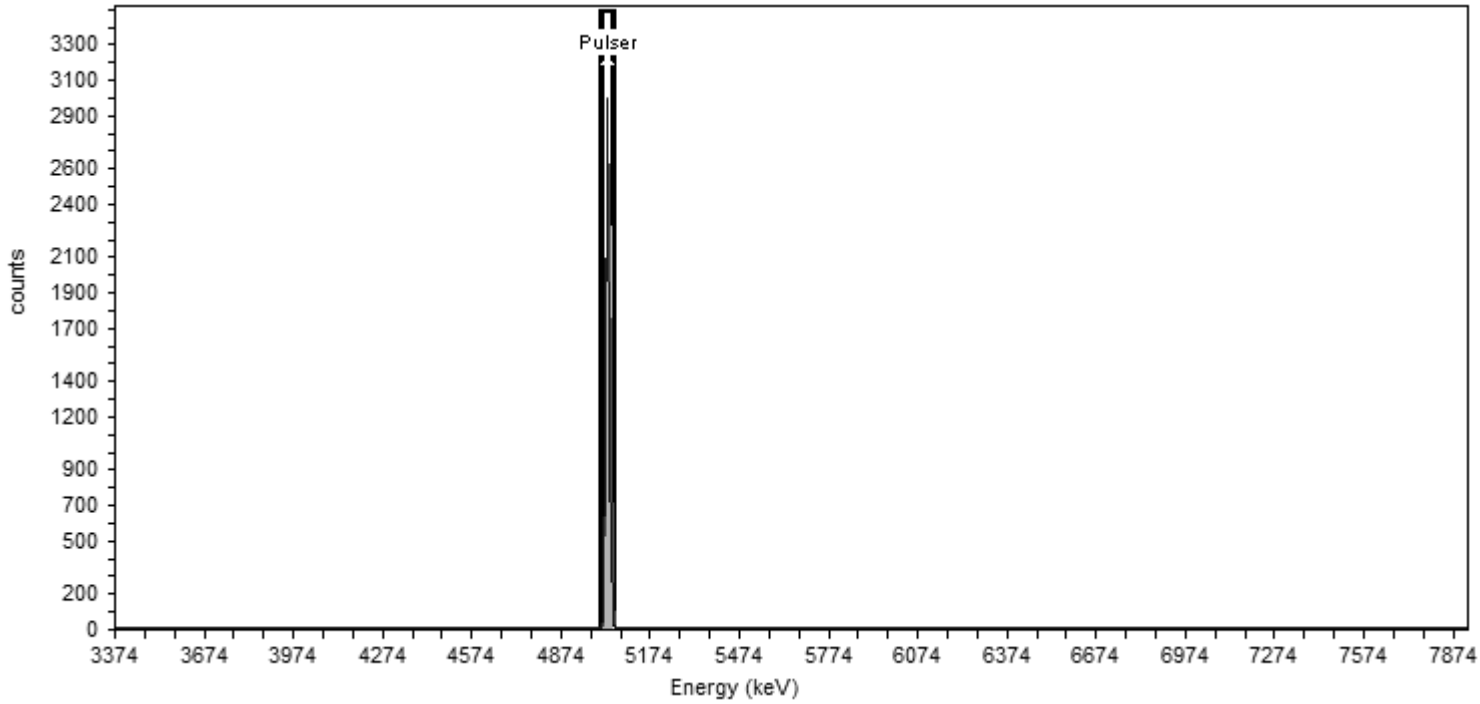
Batch Name: July2016a
Description:

Acquisition

Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 8/31/2016 9:06:45AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV149-20151016
Calibration Date: 10/16/2015 6:46:43PM

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	5008.750	5050.323	12.21	5,253.19	5,873.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:33AM 8/31/2016

Sample

Sample Name: Pulser;AV161
Comment:

Spectrum #29 Analysis #1

Batch

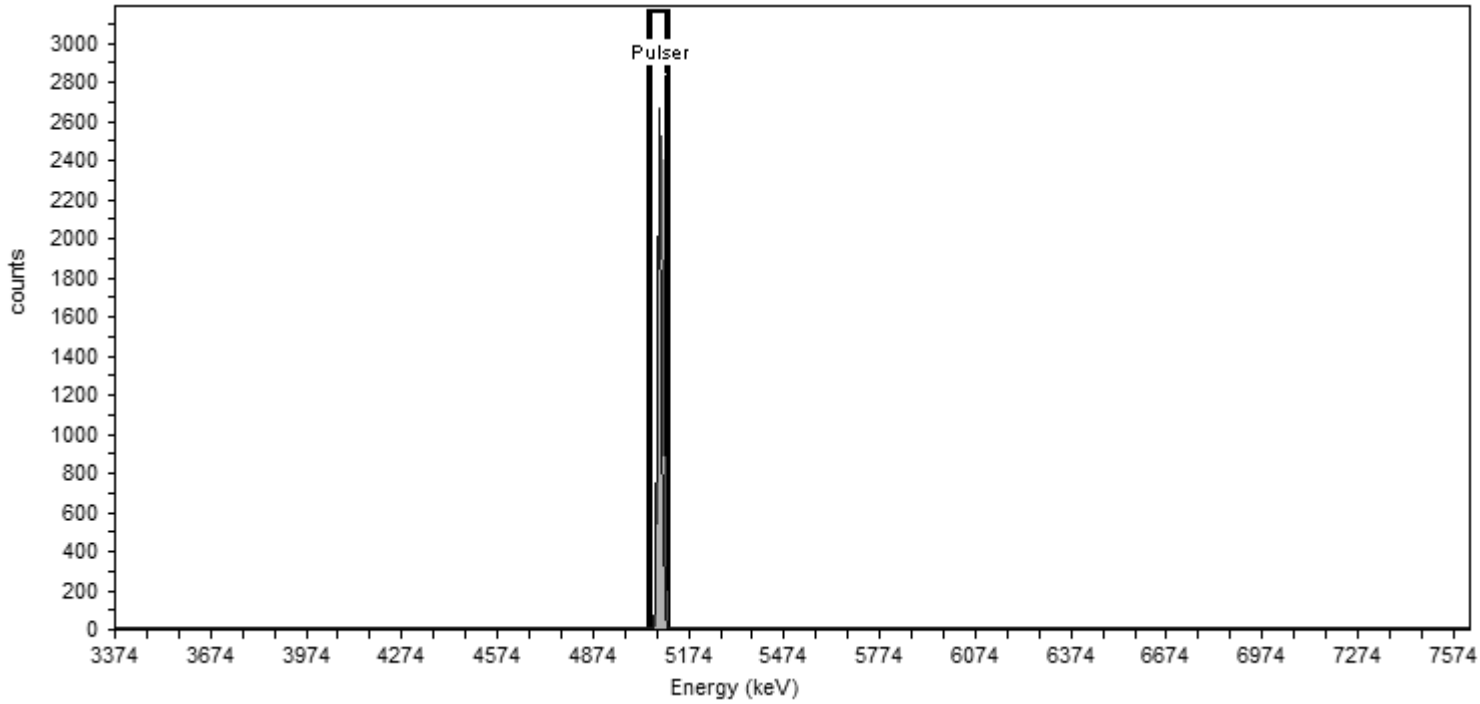
Batch Name: July2016a
Description:

Acquisition

Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 8/31/2016 9:06:49AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV161-20151016
Calibration Date: 10/17/2015 2:36:23PM

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	5081.524	5058.105	5104.944	13.76	5,269.31	6,026.44

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:27AM 8/31/2016

Sample

Sample Name: Pulser;AV162
Comment:

Spectrum #28 Analysis #1

Batch

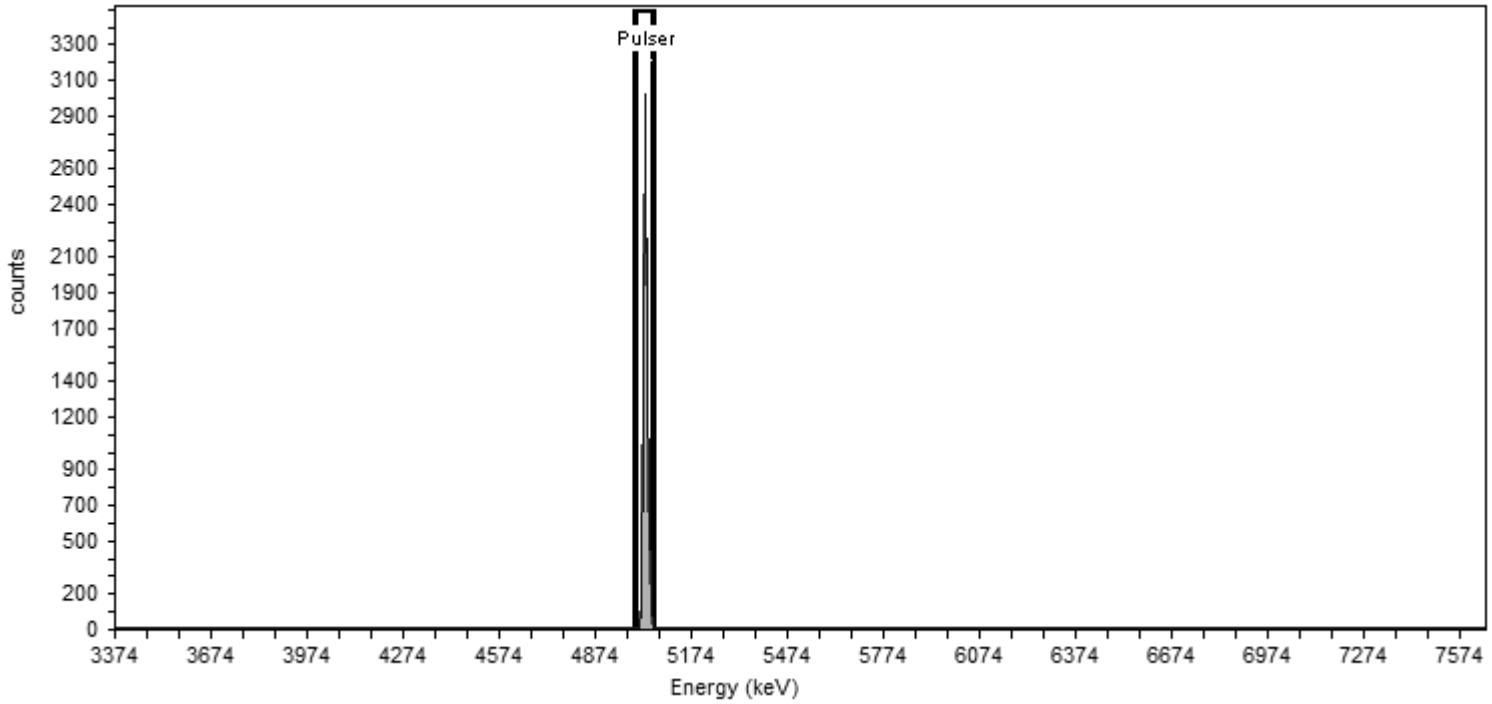
Batch Name: July2016a
Description:

Acquisition

Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 8/31/2016 9:06:48AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV162-20151016
Calibration Date: 10/17/2015 2:36:27PM

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	5030.310	5007.335	5053.285	13.50	5,850.65	6,014.89

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:29AM 8/31/2016

Sample

Sample Name: Pulser;AV163
Comment:

Spectrum #28 Analysis #1

Batch

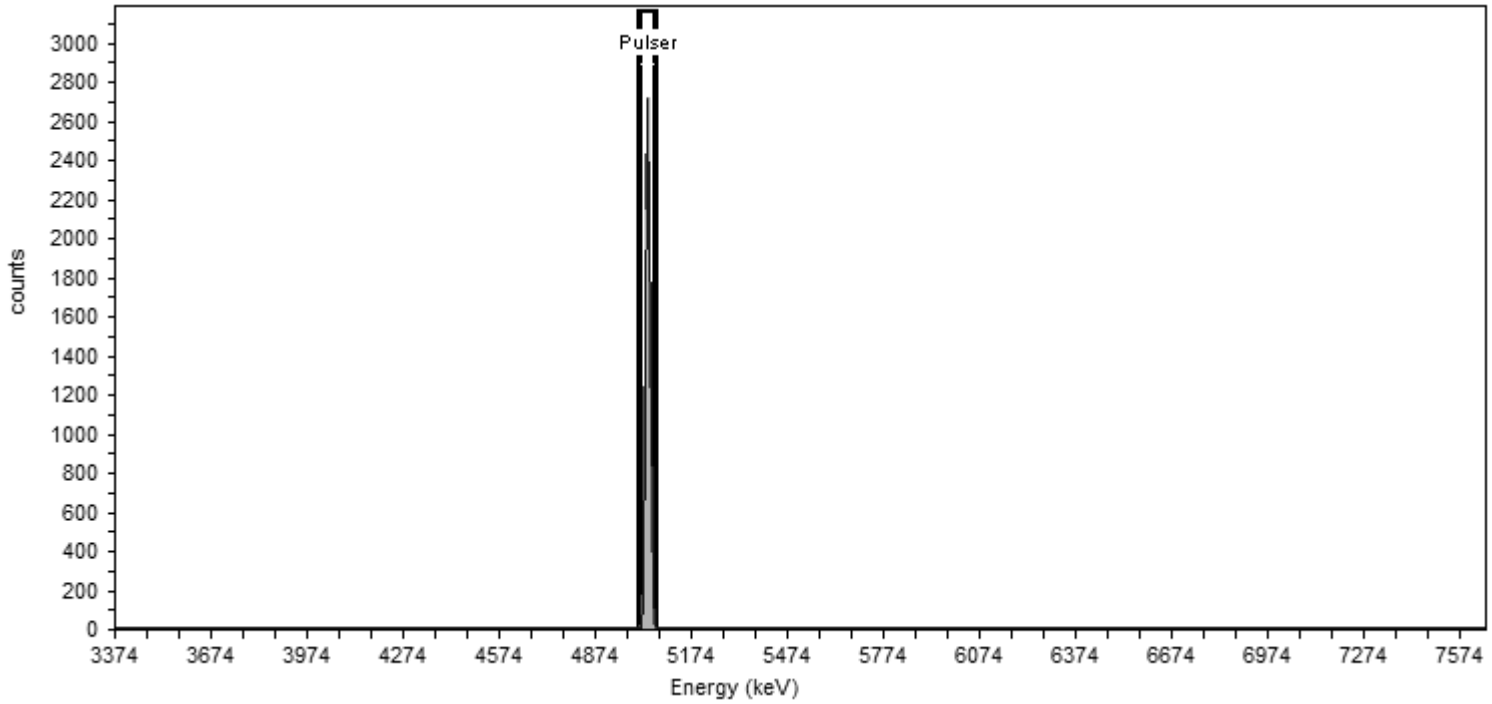
Batch Name: July2016a
Description:

Acquisition

Detector: AV163 , SN: 50-110E7
Acquisition Start Date: 8/31/2016 9:06:49AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV163-20151016
Calibration Date: 10/17/2015 2:36:32PM

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	5038.025	5013.225	5062.826	14.57	5,677.98	6,009.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:35AM 8/31/2016

Sample

Sample Name: Pulser;AV164
Comment:

Spectrum #28 Analysis #1

Batch

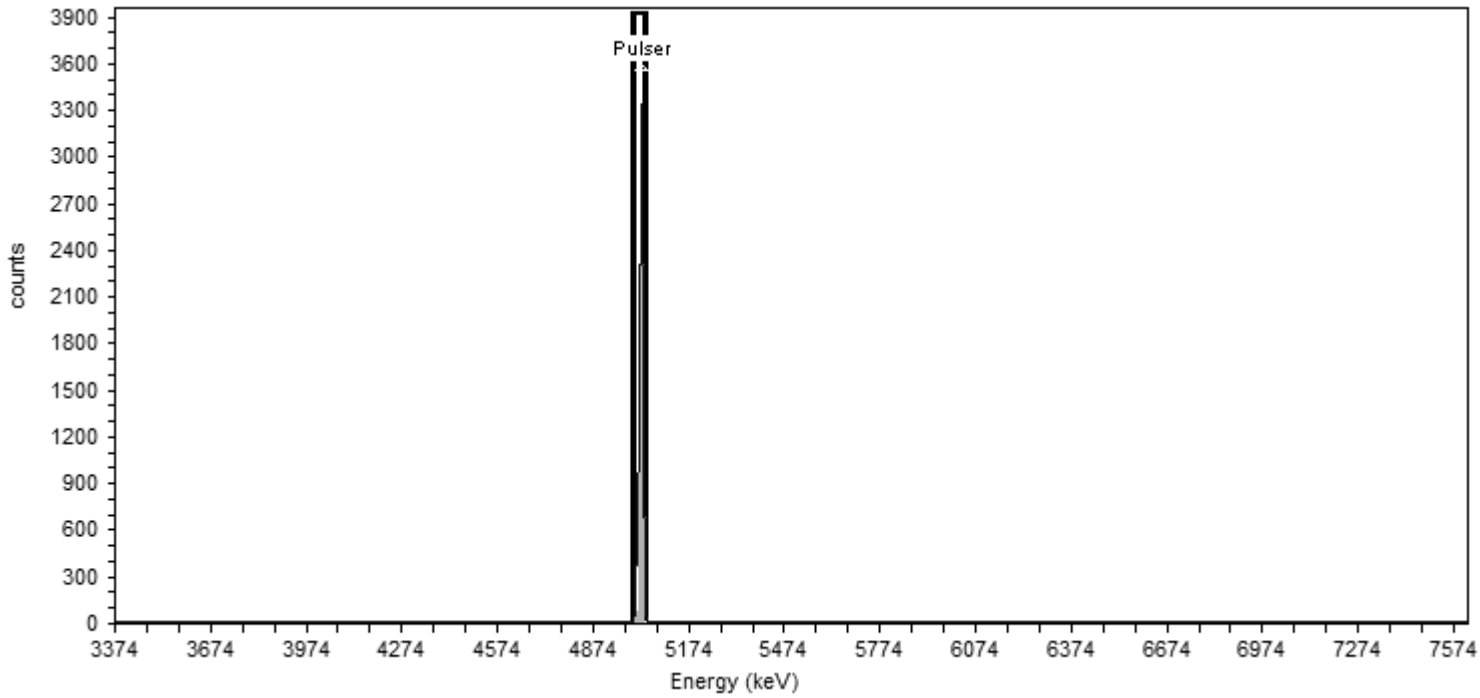
Batch Name: July2016a
Description:

Acquisition

Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 8/31/2016 9:06:49AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV164-20151016
Calibration Date: 10/17/2015 2:36:37PM

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	5022.528	5001.055	5044.002	12.62	6,036.67	5,897.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:07:50AM 8/31/2016

Sample

Sample Name: Pulser;AV169
Comment:

Spectrum #30 Analysis #1

Batch

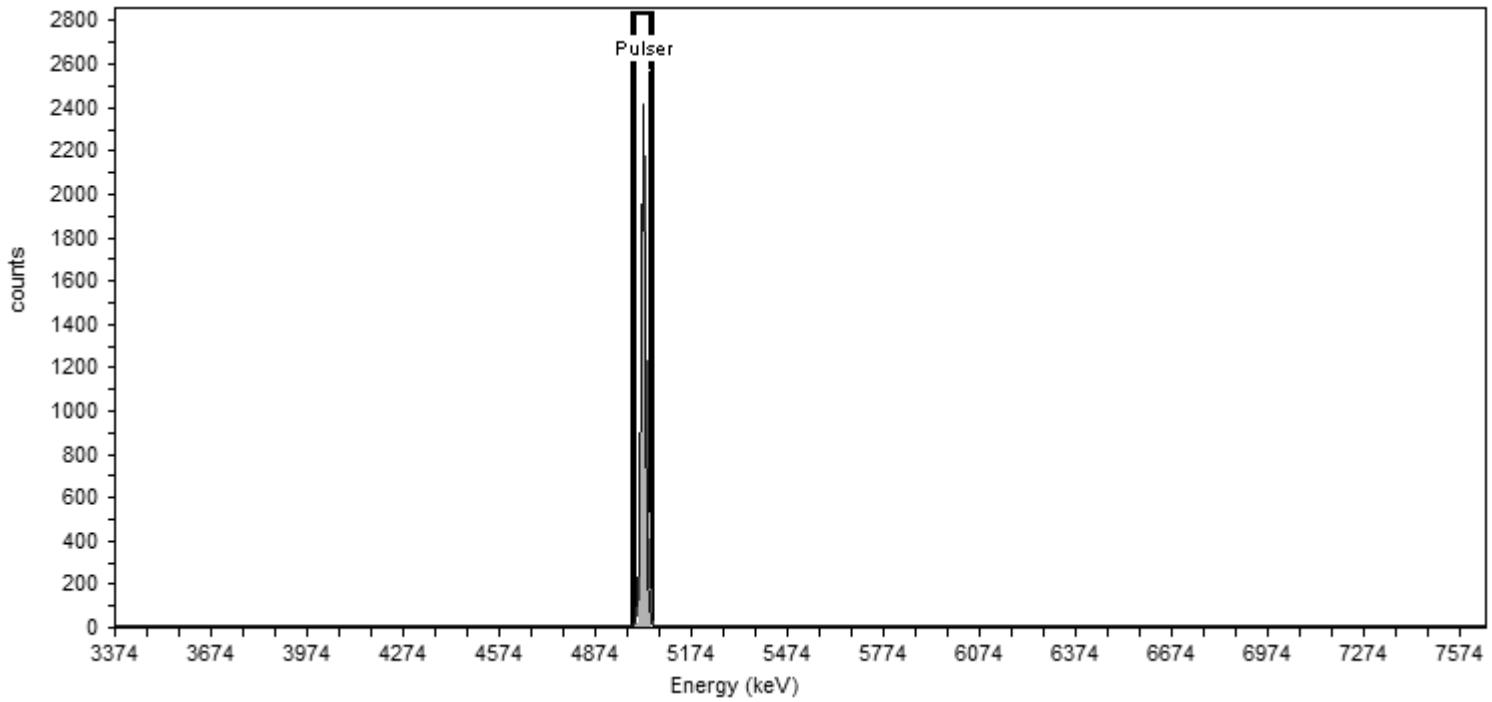
Batch Name: July2016a
Description:

Acquisition

Detector: AV169 , SN: 50-112 G5
Acquisition Start Date: 8/31/2016 9:06:50AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9794;AV169-20151016
Calibration Date: 10/17/2015 2:36:47PM

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	5021.932	4993.860	5050.004	16.49	5,705.27	5,968.04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:12AM 8/31/2016

Sample

Sample Name: Pulser;AV170
Comment:

Spectrum #30 Analysis #1

Batch

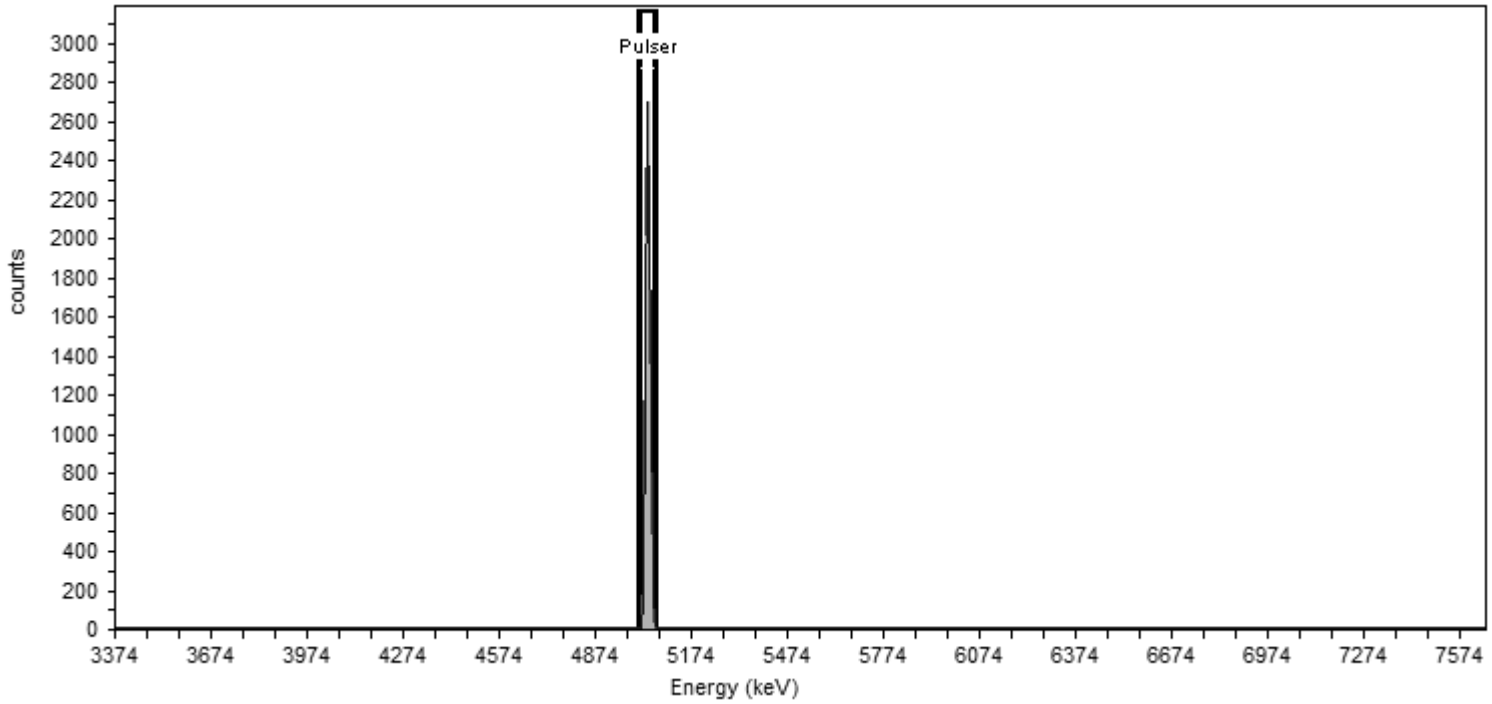
Batch Name: July2016a
Description:

Acquisition

Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 8/31/2016 9:06:50AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9795;AV170-20151016
Calibration Date: 10/17/2015 2:36:50PM

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	5037.824	5012.782	5062.866	14.71	5,697.50	6,025.21

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:17AM 8/31/2016

Sample

Sample Name: Pulser;AV173
Comment:

Spectrum #28 Analysis #1

Batch

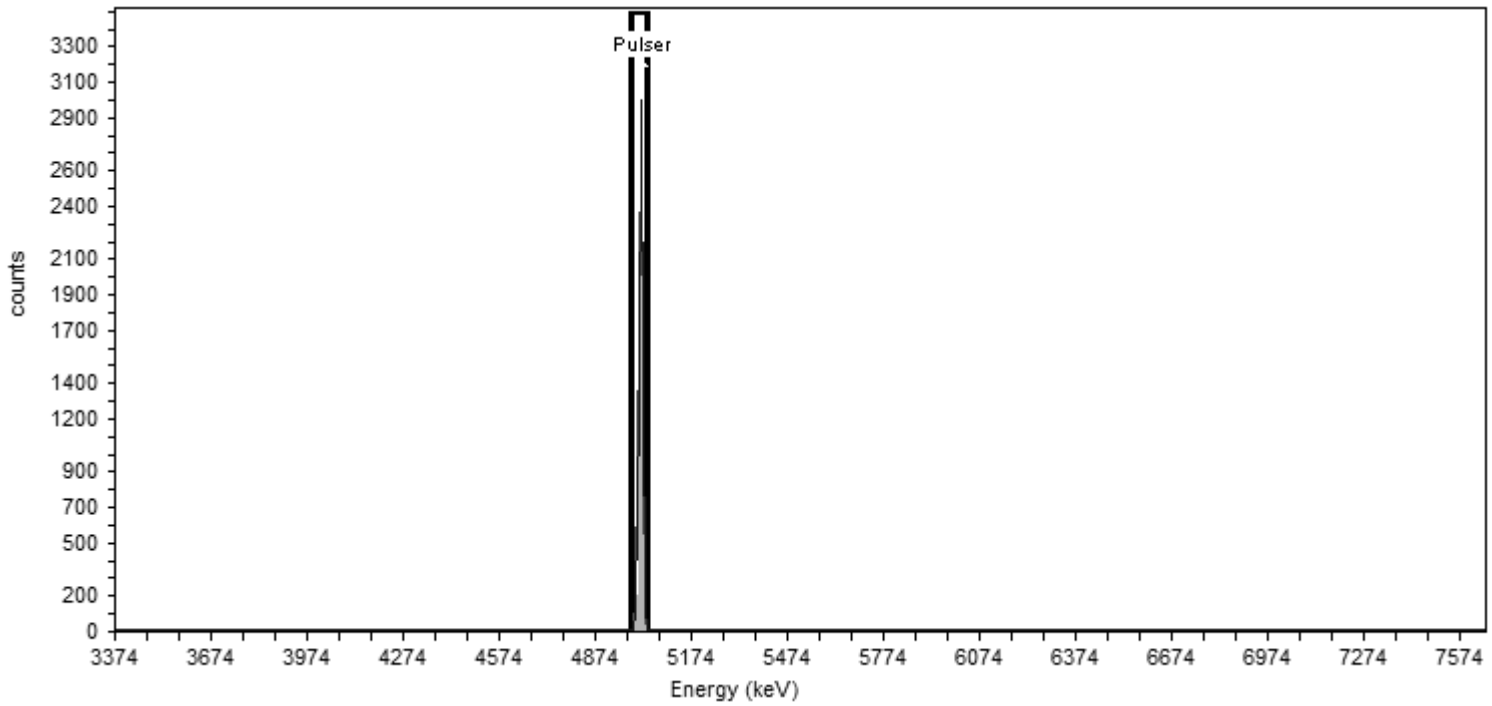
Batch Name: July2016a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 8/31/2016 9:06:50AM
Live Time: 1.00 min.
Real Time: 1.01 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	5015.283	4991.821	5038.745	13.78	5,937.30	6,034.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:15AM 8/31/2016

Sample

Sample Name: Pulser;AV176
Comment:

Spectrum #28 Analysis #1

Batch

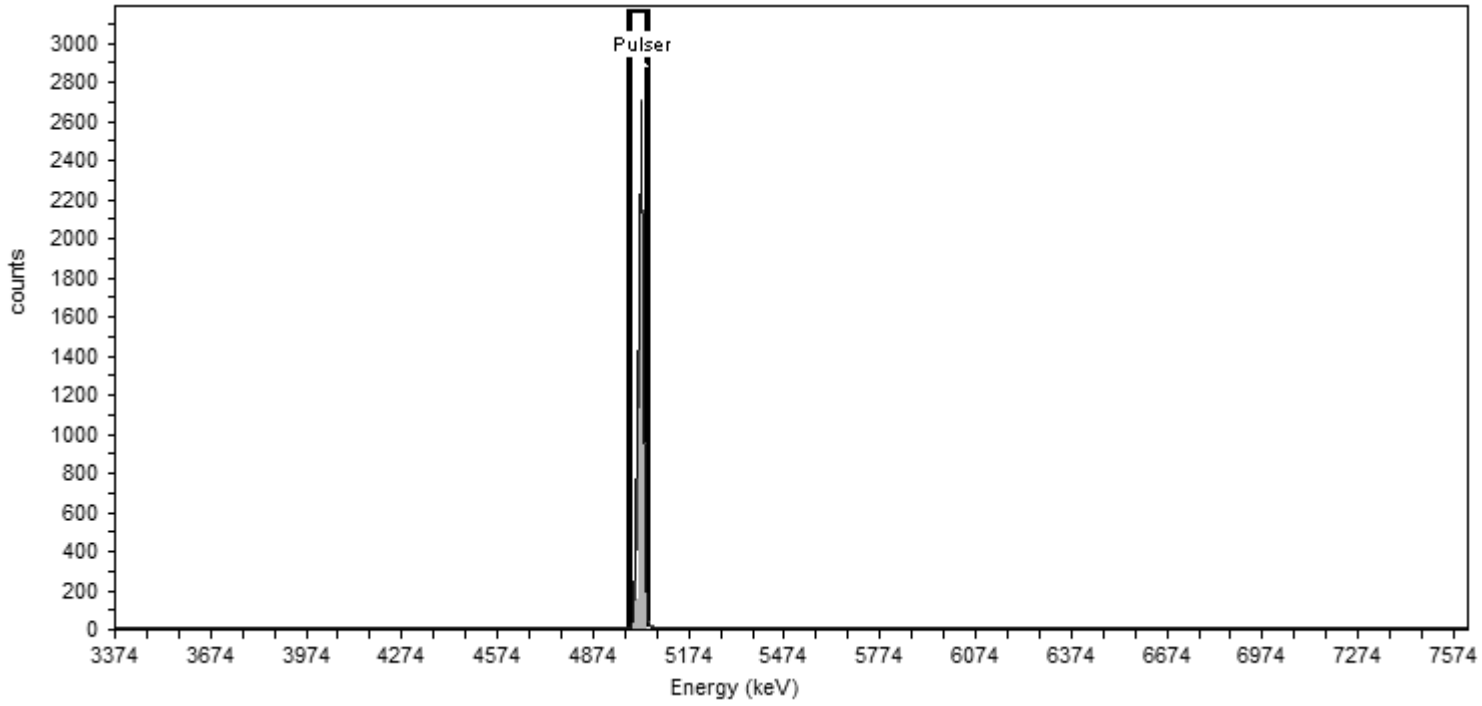
Batch Name: July2016a
Description:

Acquisition

Detector: AV176 , SN: 50-117H2
Acquisition Start Date: 8/31/2016 9:06:51AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV176-20151017
Calibration Date: 10/17/2015 6:01:52PM

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	5022.042	4991.885	5052.199	17.72	6,868.81	5,952.51

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:18AM 8/31/2016

Sample

Sample Name: Pulser;AV177
Comment:

Spectrum #28 Analysis #1

Batch

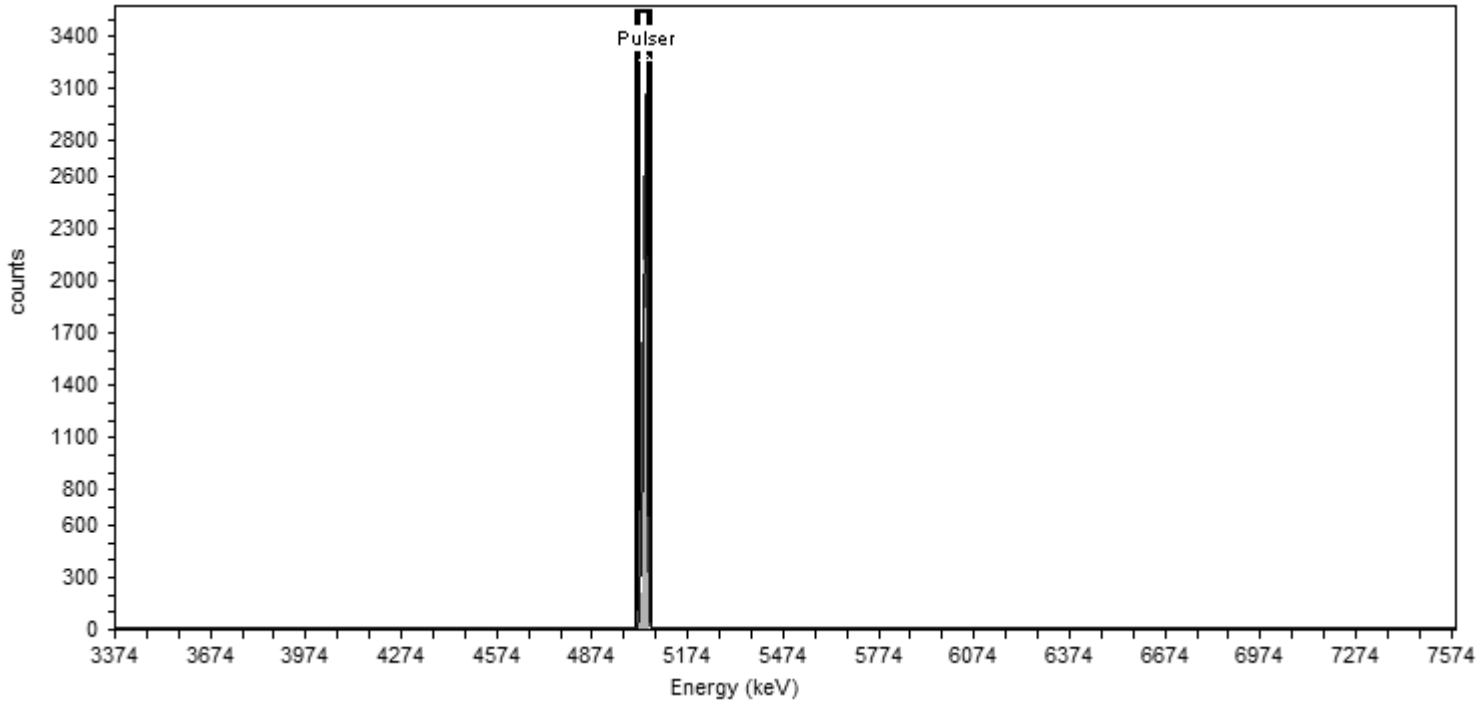
Batch Name: July2016a
Description:

Acquisition

Detector: AV177 , SN: 50-117H3
Acquisition Start Date: 8/31/2016 9:06:51AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV177-20151017a
Calibration Date: 10/17/2015 6:02:25PM

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	5037.782	5016.761	5058.803	12.35	5,425.52	5,871.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:40AM 8/31/2016

Sample

Sample Name: Pulser;AV189
Comment:

Spectrum #28 Analysis #1

Batch

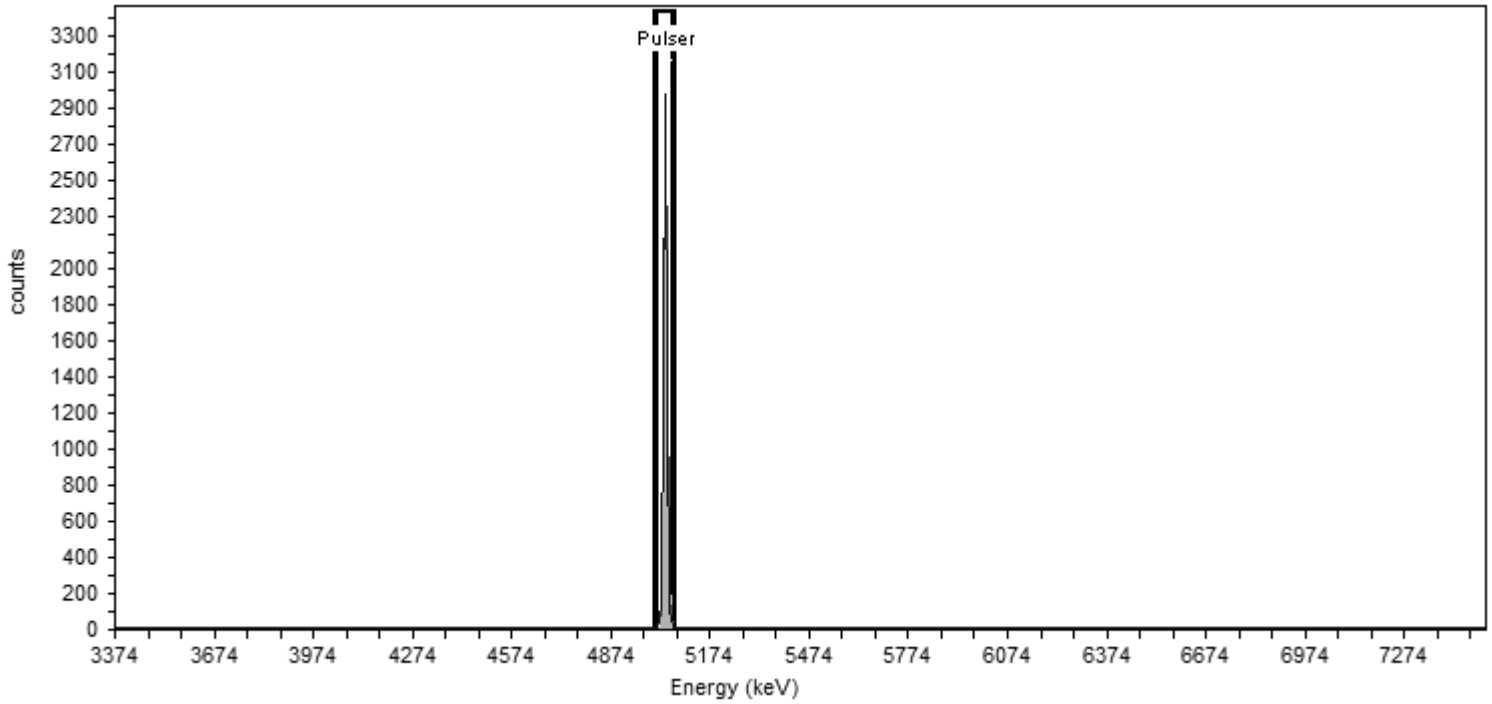
Batch Name: July2016b
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 8/31/2016 9:07:08AM
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	5037.232	5013.875	5060.590	13.72	5,850.04	6,029.74

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

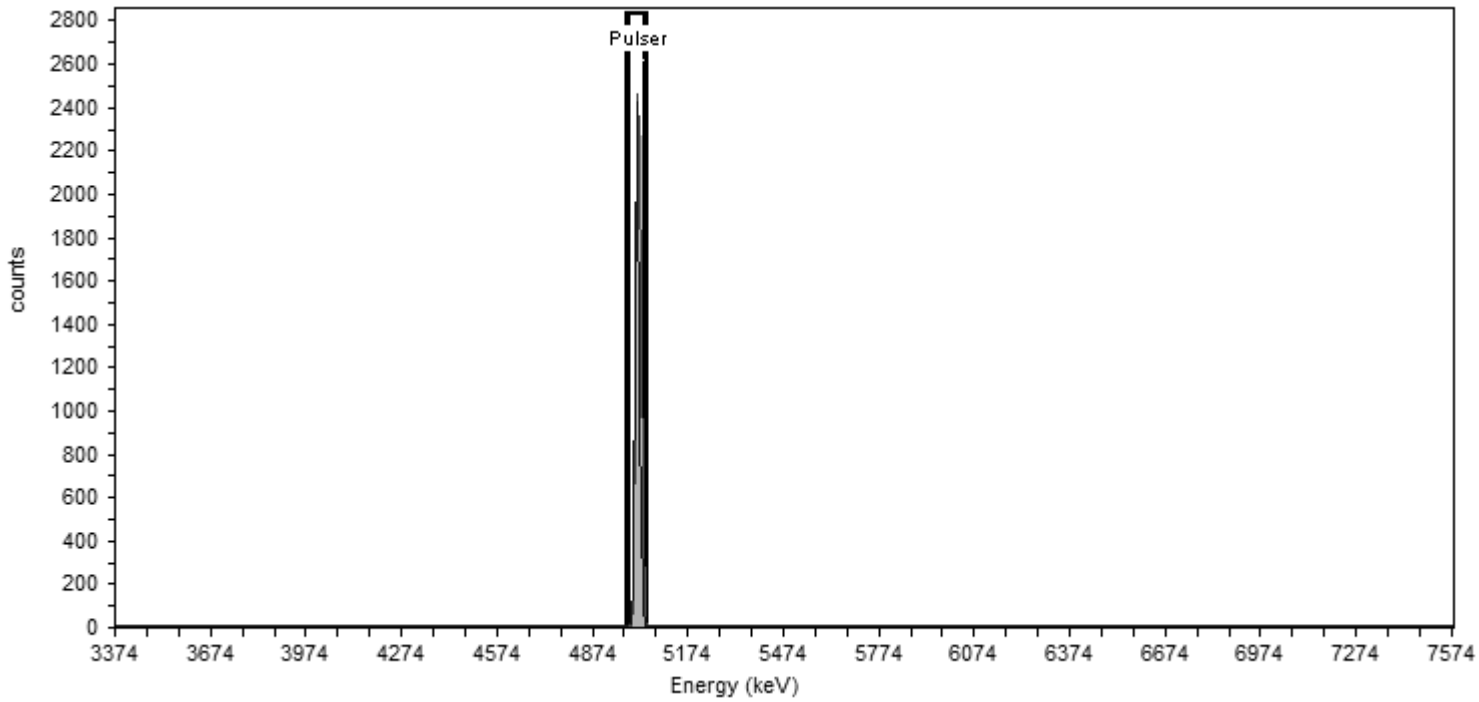
Batch Name: July2016b
Description:

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
THE LEADER IN ENVIRONMENTAL TESTING

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

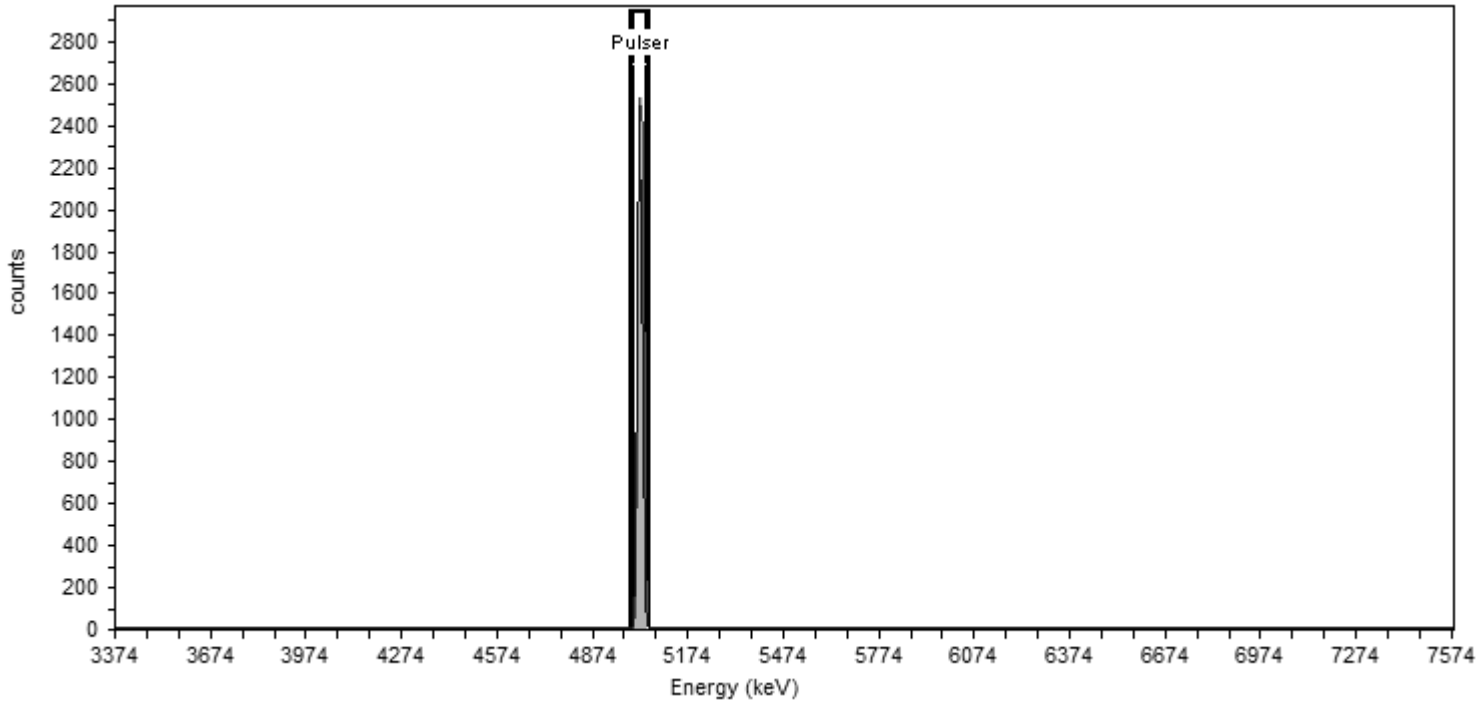
Batch Name: July2016b
Description:

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:49AM 8/31/2016

Sample

Sample Name: Pulser;AV195
Comment:

Spectrum #28 Analysis #1

Batch

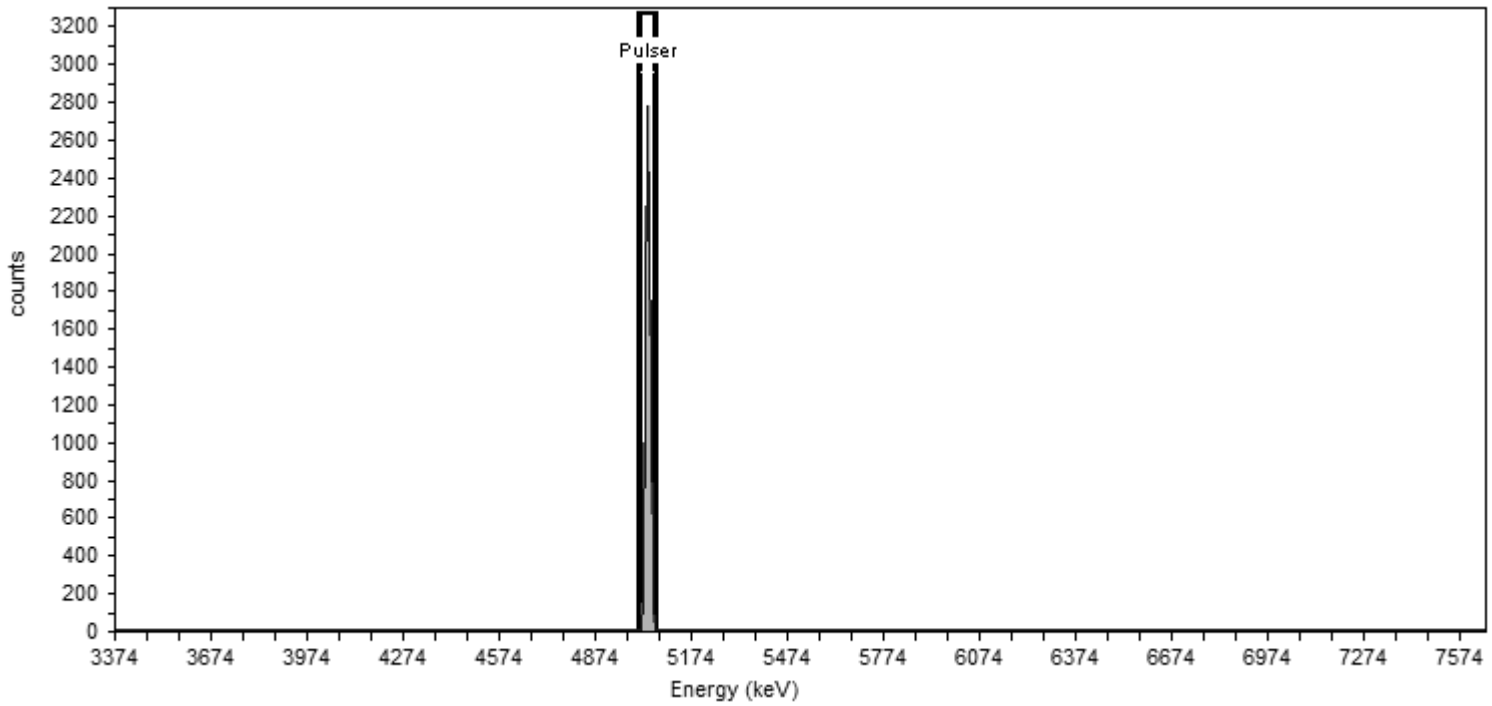
Batch Name: July2016b
Description:

Acquisition

Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 8/31/2016 9:07:09AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV195-20151017a
Calibration Date: 10/18/2015 3:55:41PM

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	5037.561	5012.467	5062.655	14.74	5,873.75	6,017.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

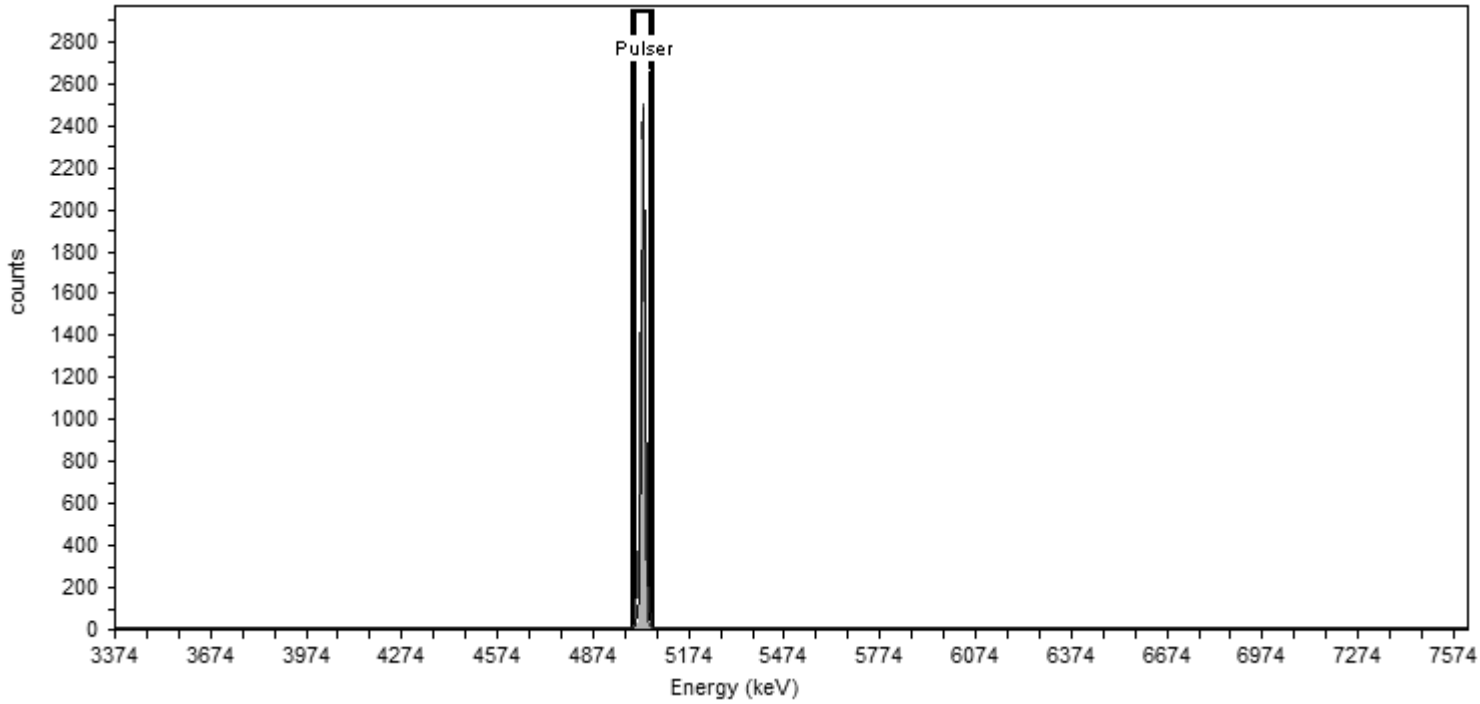
Batch Name: July2016b
Description:

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:37AM 8/31/2016

Sample

Sample Name: Pulser;AV200
Comment:

Spectrum #28 Analysis #1

Batch

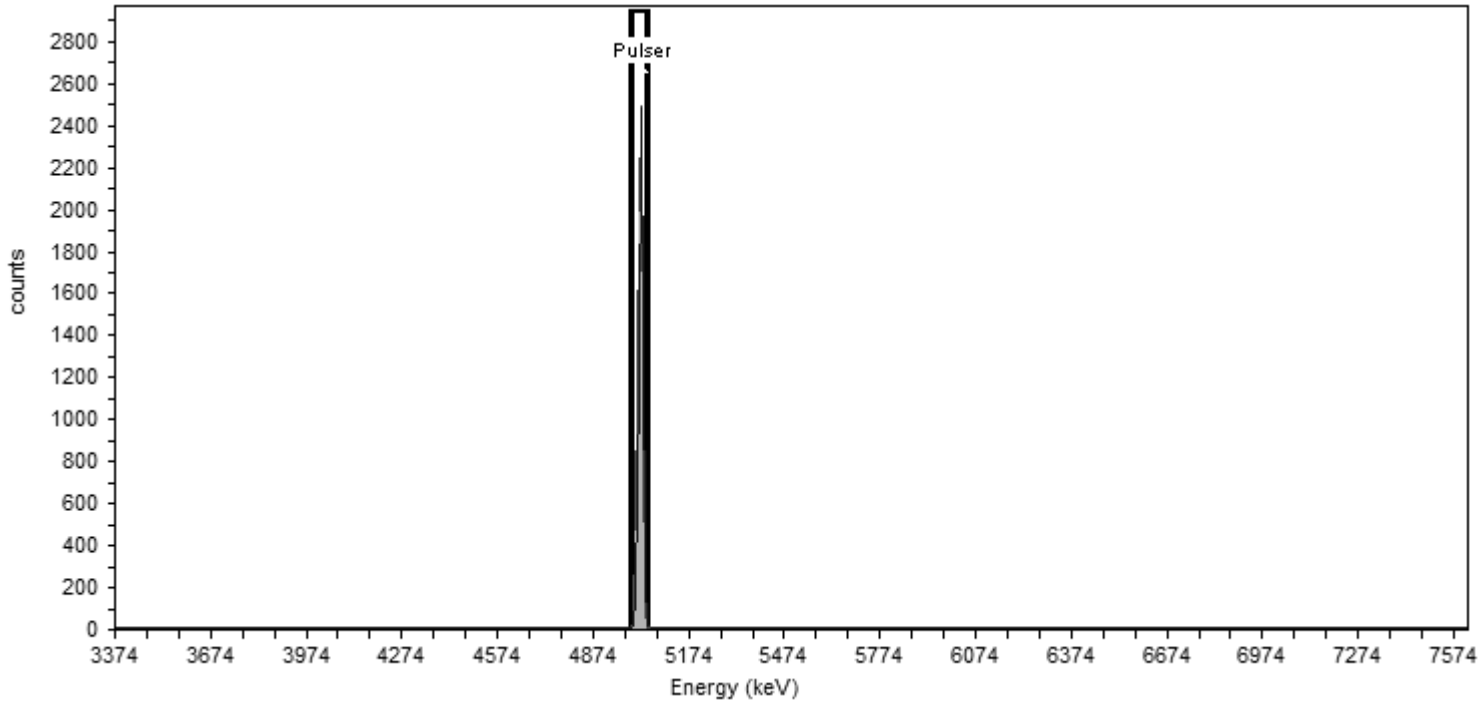
Batch Name: July2016b
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 8/31/2016 9:07:09AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV200-20151017
Calibration Date: 10/18/2015 3:55:33PM

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	5023.150	4996.698	5049.602	15.54	5,551.61	5,990.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:39AM 8/31/2016

Sample

Sample Name: Pulser;AV206
Comment:

Spectrum #32 Analysis #1

Batch

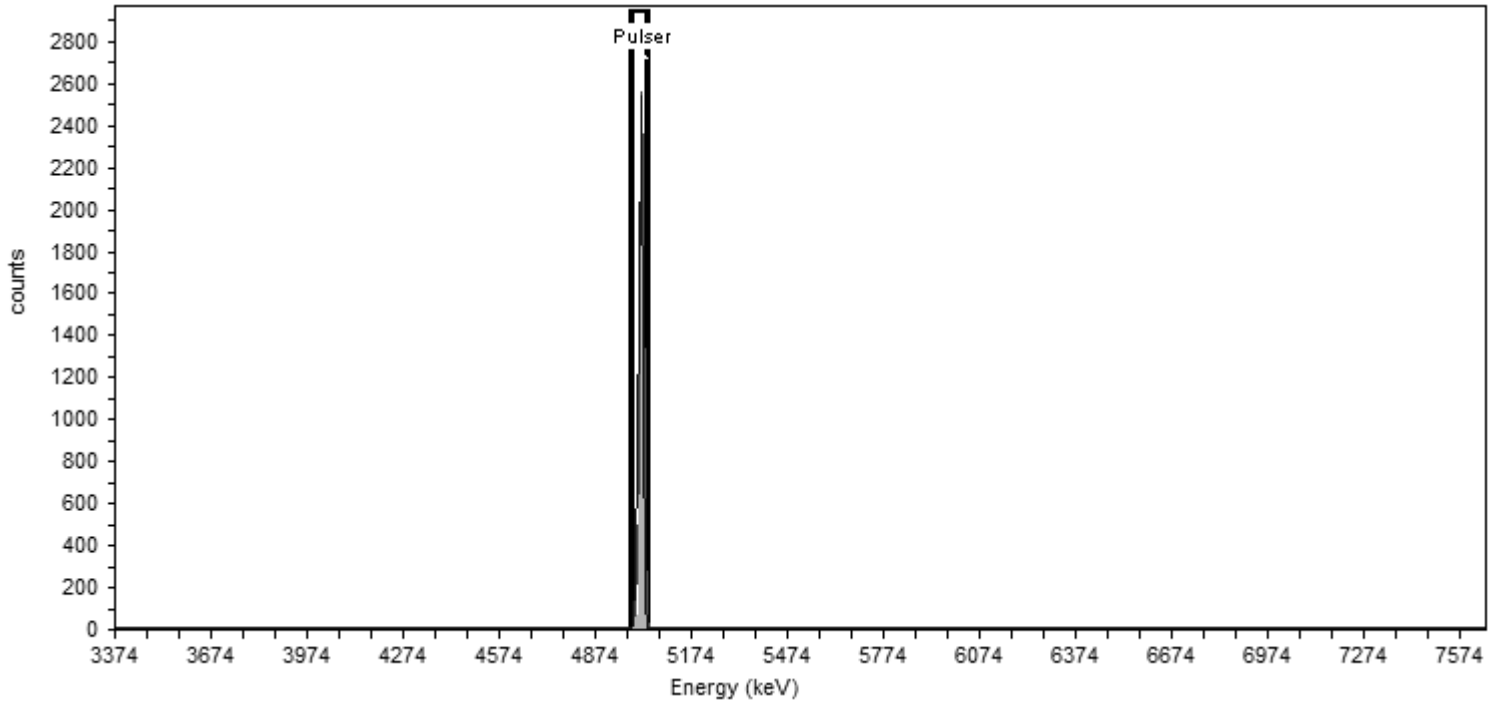
Batch Name: July2016b
Description:

Acquisition

Detector: AV206 , SN: 50-119AA6
Acquisition Start Date: 8/31/2016 9:07:10AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV206-20151018
Calibration Date: 10/18/2015 6:41:49PM

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	5014.183	4988.282	5040.084	15.22	5,592.67	5,992.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:41AM 8/31/2016

Sample

Sample Name: Pulser;AV207
Comment:

Spectrum #30 Analysis #1

Batch

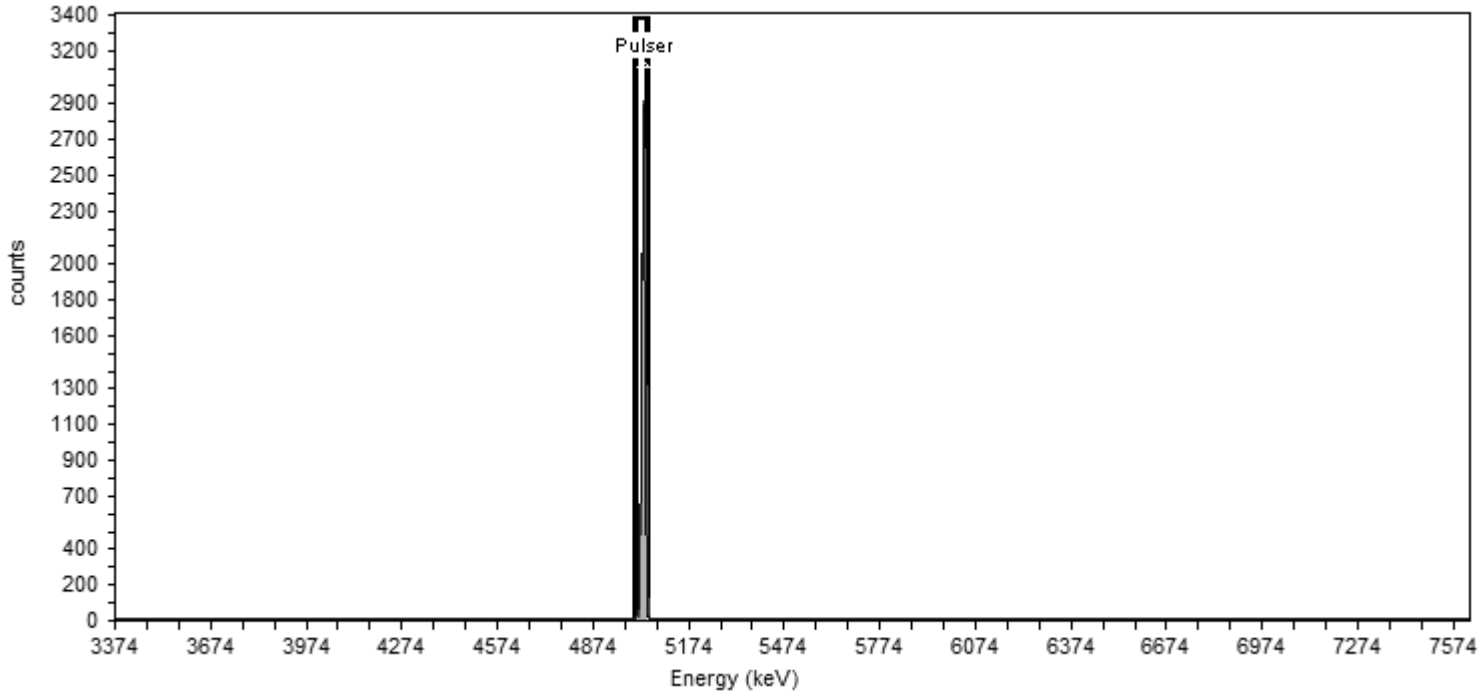
Batch Name: July2016b
Description:

Acquisition

Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 8/31/2016 9:07:10AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV207-20151018
Calibration Date: 10/18/2015 6:41:56PM

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	5029.433	5008.337	5050.529	12.39	5,171.88	5,855.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:44AM 8/31/2016

Sample

Sample Name: Pulser;AV208
Comment:

Spectrum #28 Analysis #1

Batch

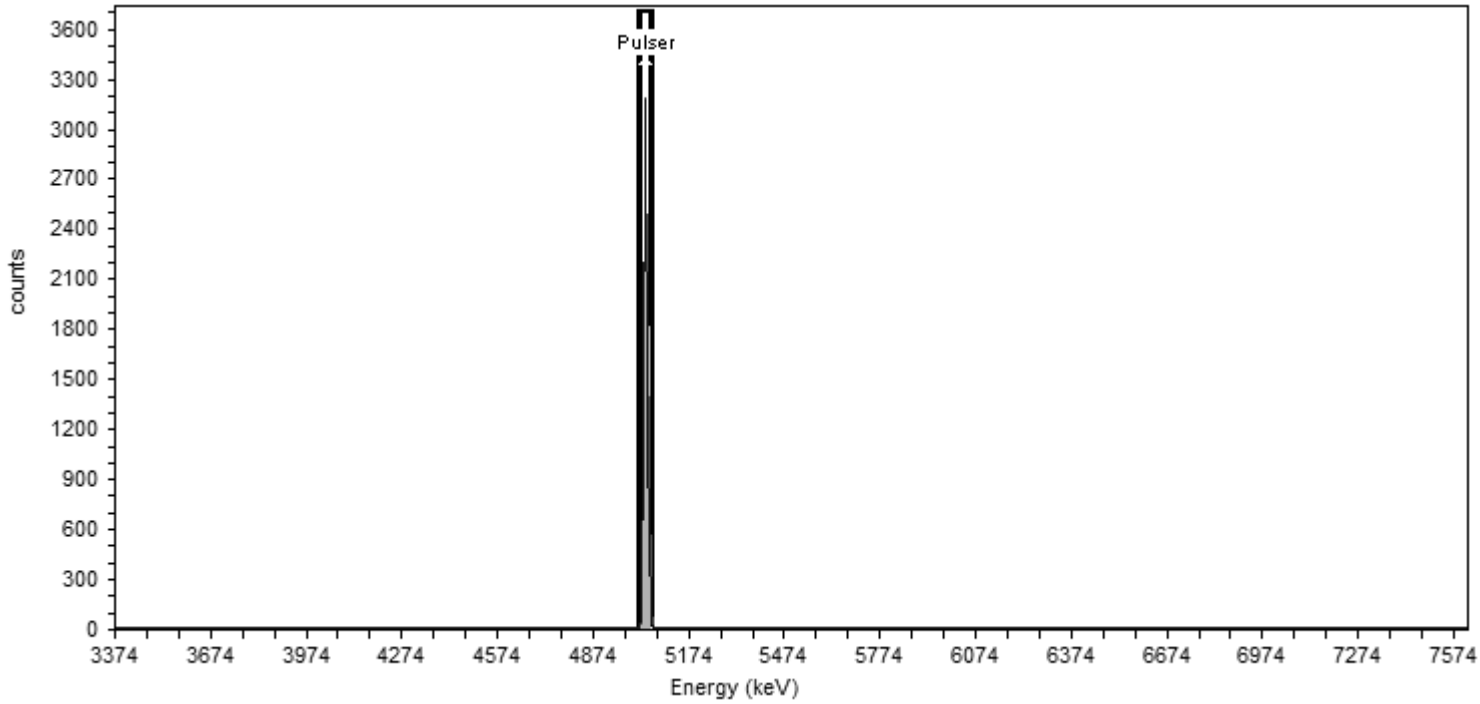
Batch Name: July2016b
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 8/31/2016 9:07:10AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV208-20151018a
Calibration Date: 10/18/2015 6:42:37PM

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	5037.255	5016.146	5058.365	12.40	5,657.59	5,889.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:43AM 8/31/2016

Sample

Sample Name: Pulser;AV209
Comment:

Spectrum #28 Analysis #1

Batch

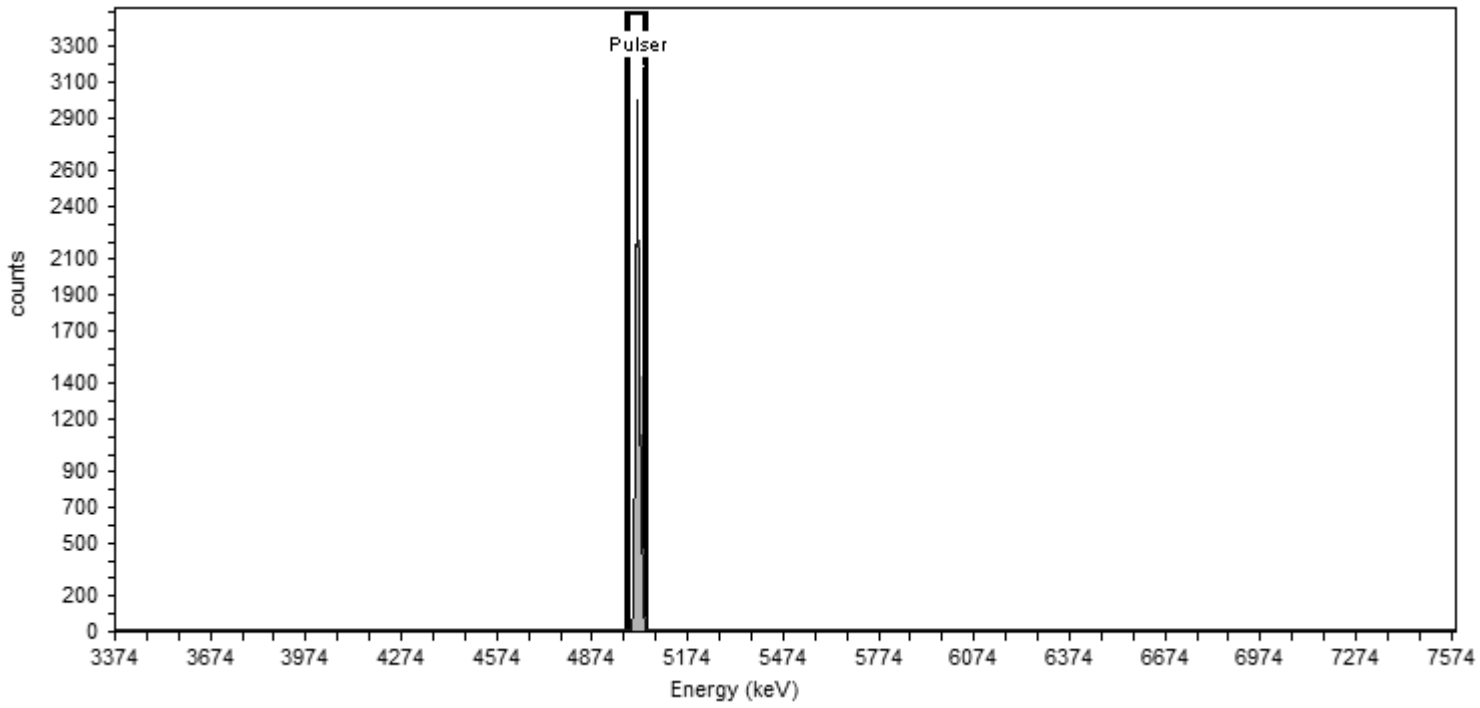
Batch Name: July2016b
Description:

Acquisition

Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 8/31/2016 9:07:10AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV209-20151018
Calibration Date: 10/18/2015 6:42:01PM

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	5015.031	4991.393	5038.669	13.89	5,973.93	6,026.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:45AM 8/31/2016

Sample

Sample Name: Pulser;AV210
Comment:

Spectrum #28 Analysis #1

Batch

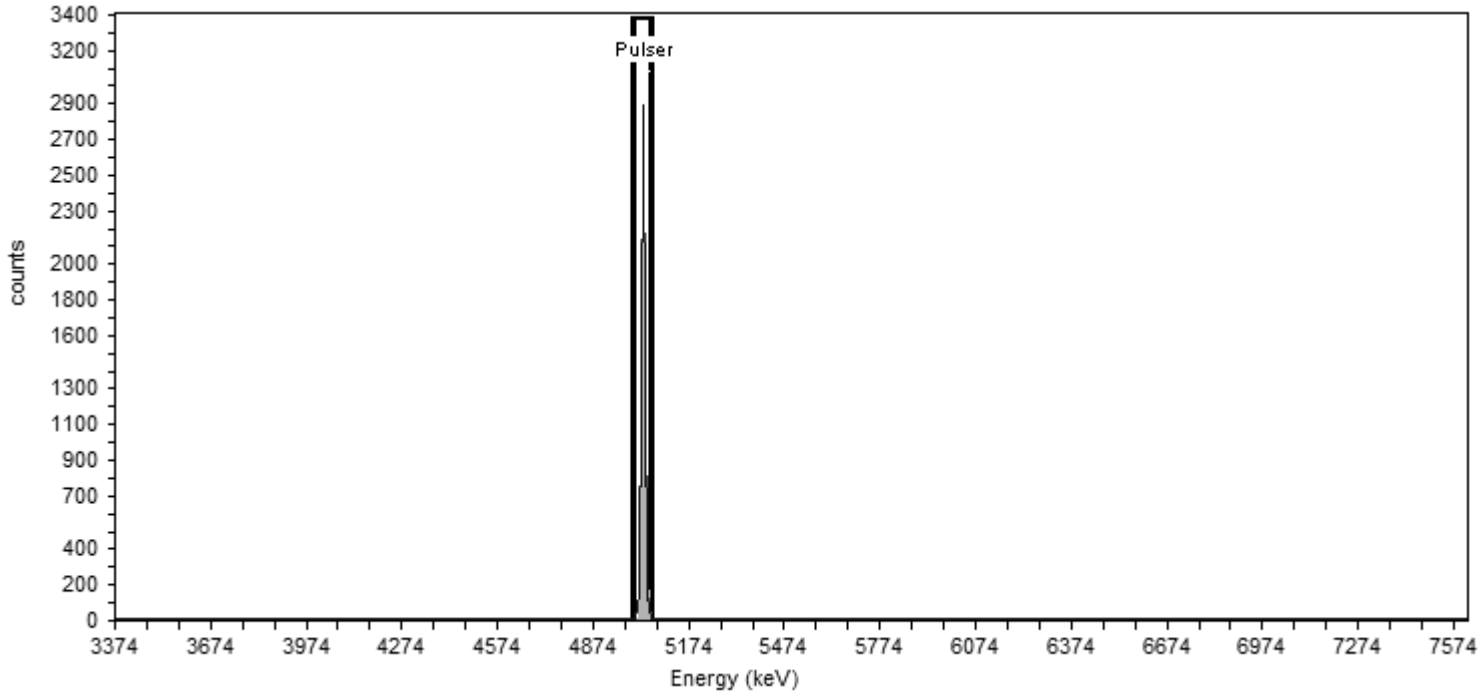
Batch Name: July2016b
Description:

Acquisition

Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 8/31/2016 9:07:10AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM

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	5029.994	5005.850	5054.138	14.18	5,884.75	6,019.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:56PM 9/7/2016

Sample

Sample Name: Pulser;AV210
Comment:

Spectrum #1 Analysis #1

Batch

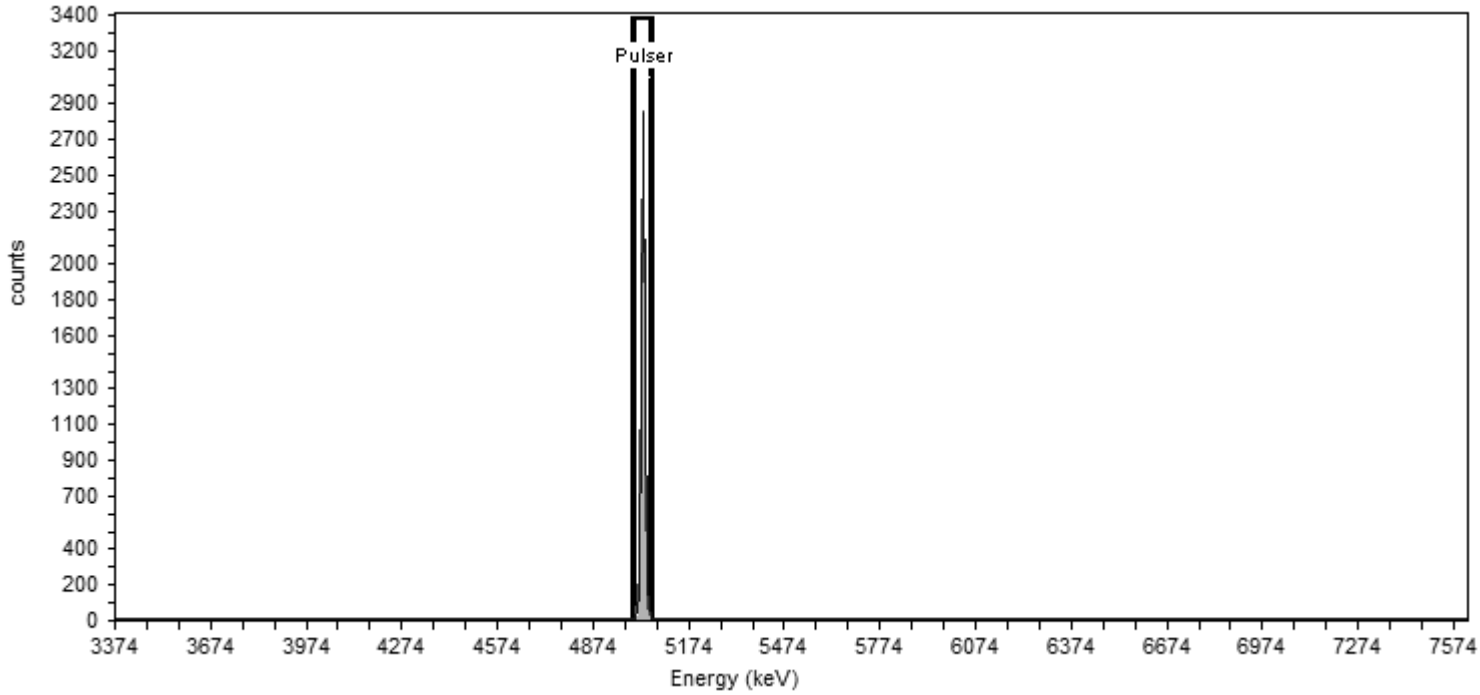
Batch Name: August2016b
Description:

Acquisition

Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 9/7/2016 12:23:21PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM

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	5030.309	5005.798	5054.819	14.40	5,891.67	6,008.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:00PM 9/7/2016

Sample

Sample Name: Pulser;AV211
Comment:

Spectrum #1 Analysis #1

Batch

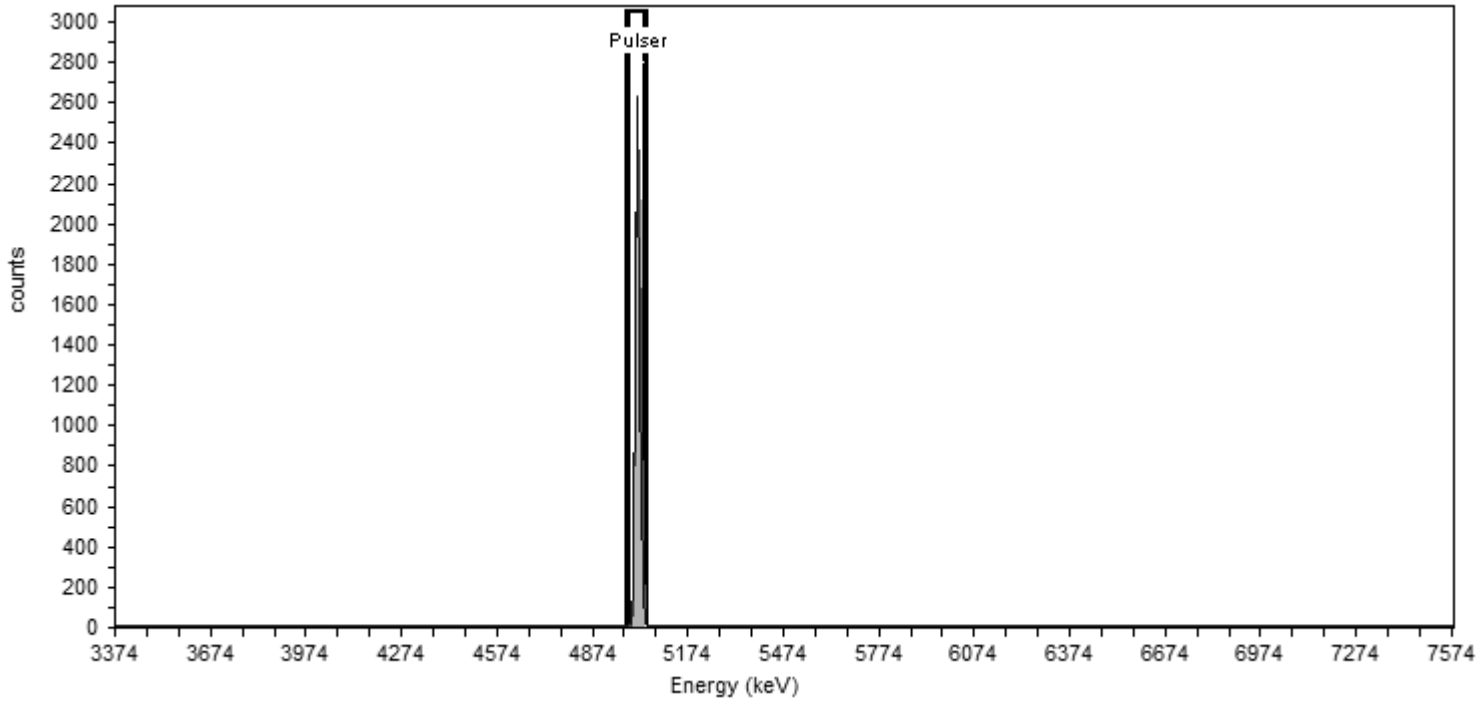
Batch Name: August2016c
Description:

Acquisition

Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 9/7/2016 12:29:01PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9794;AV211-20151018a
Calibration Date: 10/18/2015 6:42:45PM

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	5014.530	4988.500	5040.561	15.29	5,782.42	6,022.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:01PM 9/7/2016

Sample

Sample Name: Pulser;AV212
Comment:

Spectrum #1 Analysis #1

Batch

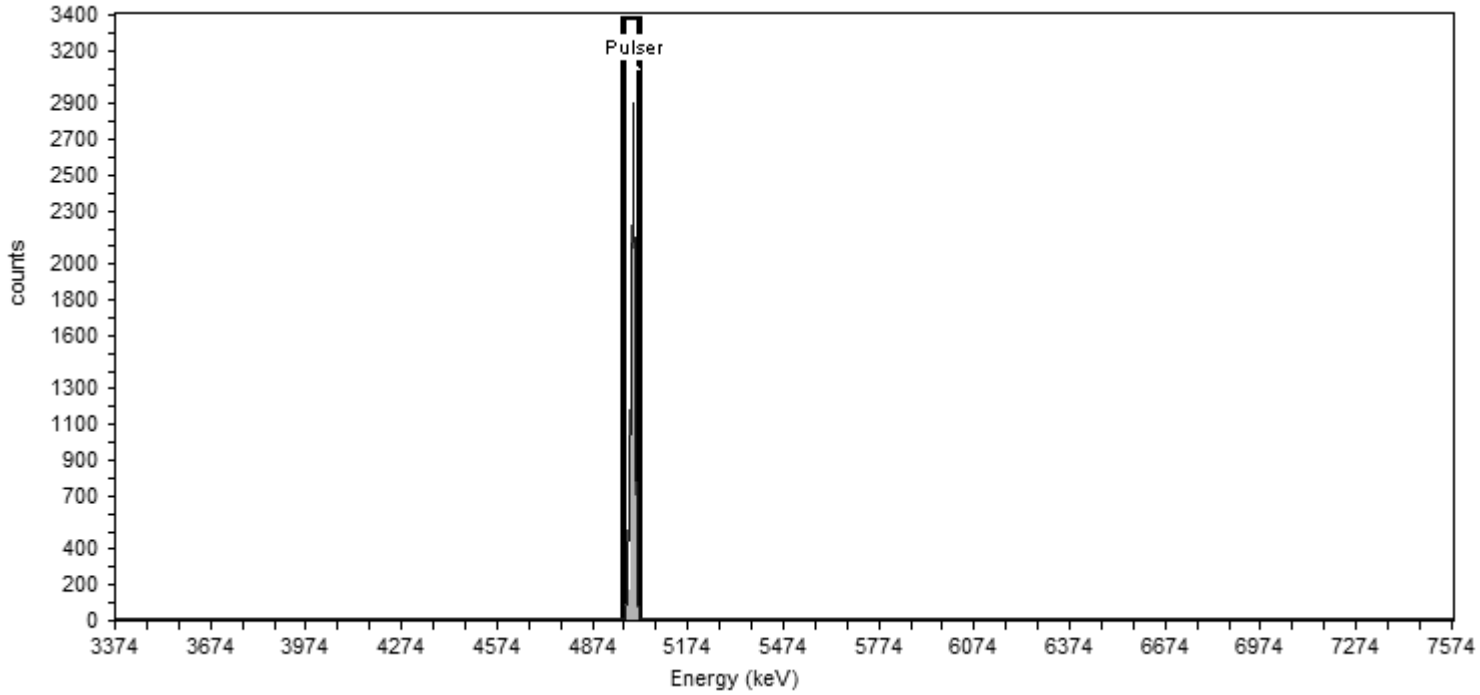
Batch Name: August2016c
Description:

Acquisition

Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 9/7/2016 12:29:01PM
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	5000.287	4975.937	5024.636	14.31	5,967.53	6,020.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:03PM 9/7/2016

Sample

Sample Name: Pulser;AV216
Comment:

Spectrum #1 Analysis #1

Batch

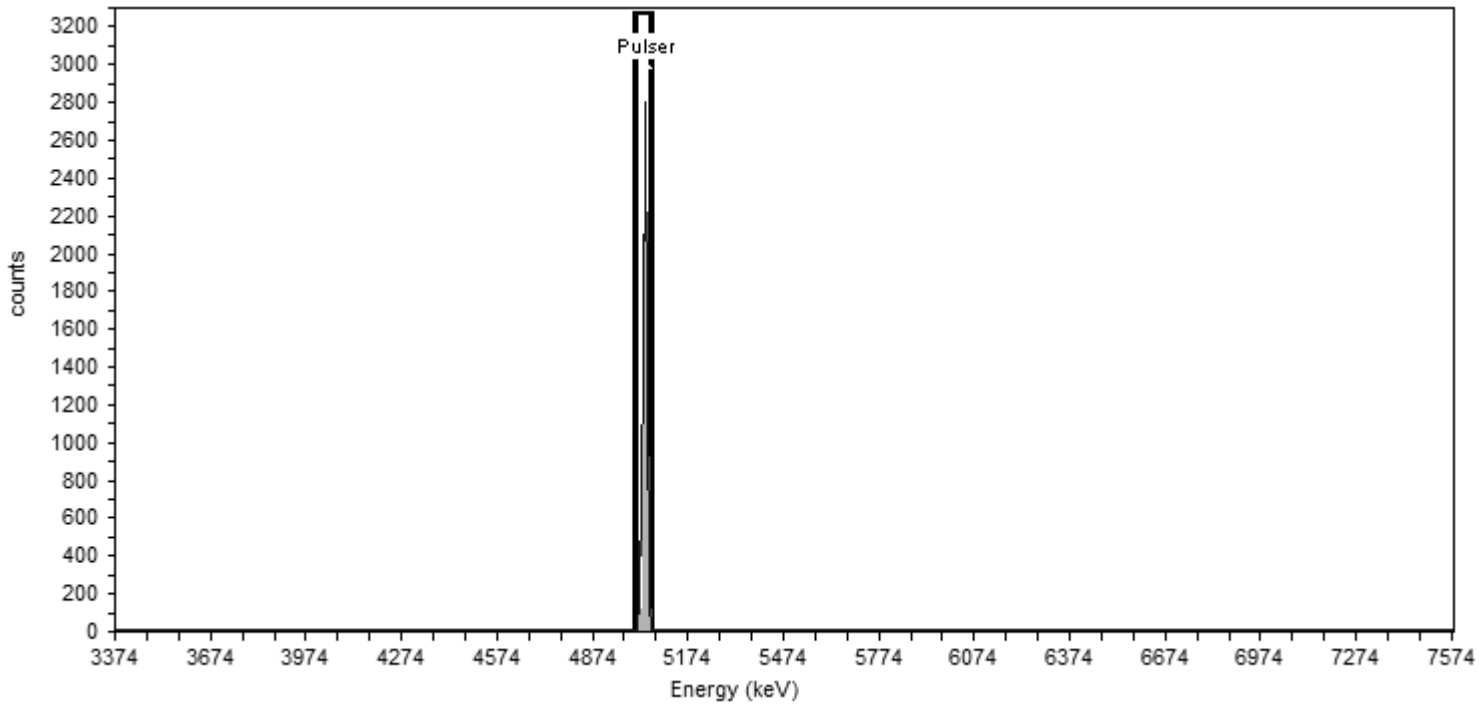
Batch Name: August2016c
Description:

Acquisition

Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 9/7/2016 12:28:59PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV216-20151018
Calibration Date: 10/18/2015 6:42:28PM

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	5037.318	5012.501	5062.135	14.58	5,861.00	6,010.89

Initial Calibrations

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:26:49PM 11/23/2015

Calibration

Sample Name: IC-8874;AV148-20151016a
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 10/16/2015 6:47:19PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

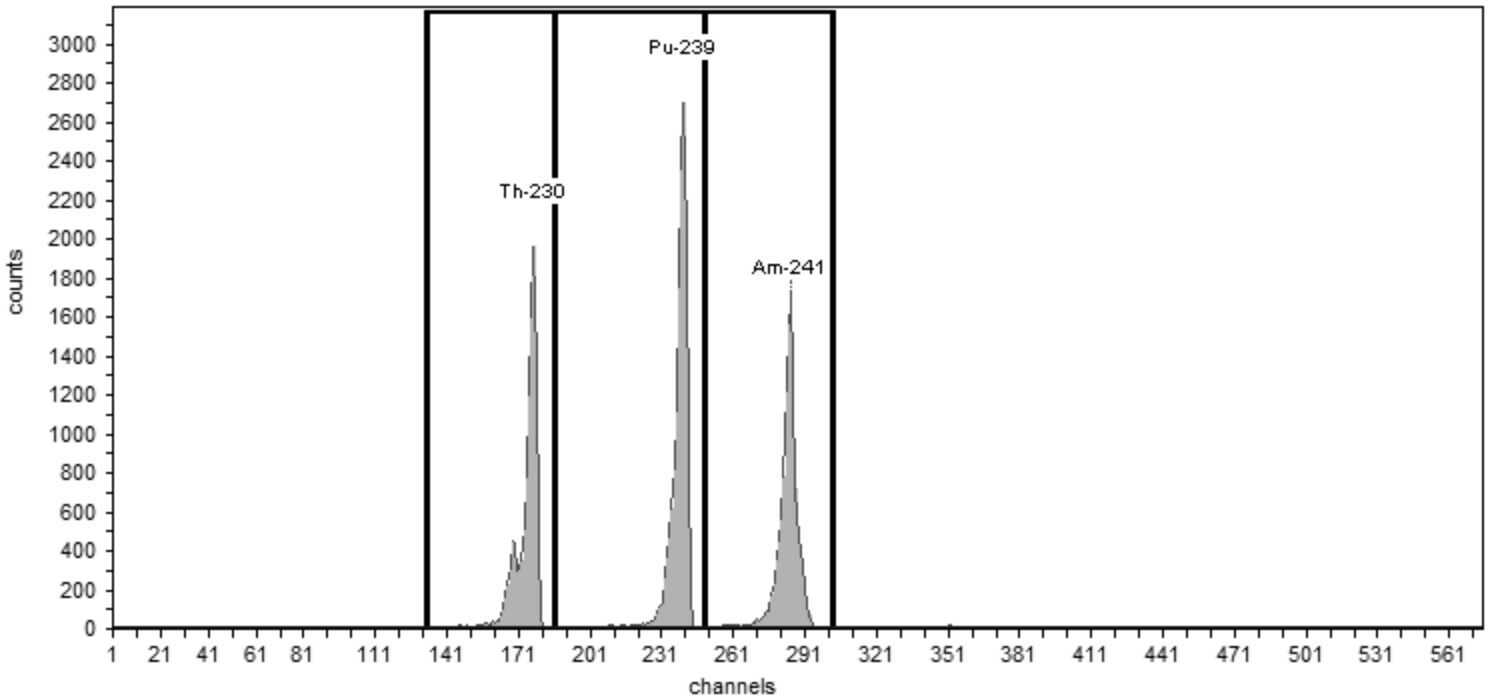
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 10/16/2015 4:27:06PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV148-20151016a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.72% +/- 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	29.28	10,746.00	76.76
Pu-239	240	5,155.40	186	249	31.36	14,143.00	101.02
Am-241	284	5,485.70	249	303	32.16	11,206.00	80.04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:26:56PM 11/23/2015

Calibration

Sample Name: IC-8875;AV149-20151016
Description:
Detector: AV149

Analyst: 60040
Analysis Date: 10/16/2015 6:46:43PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

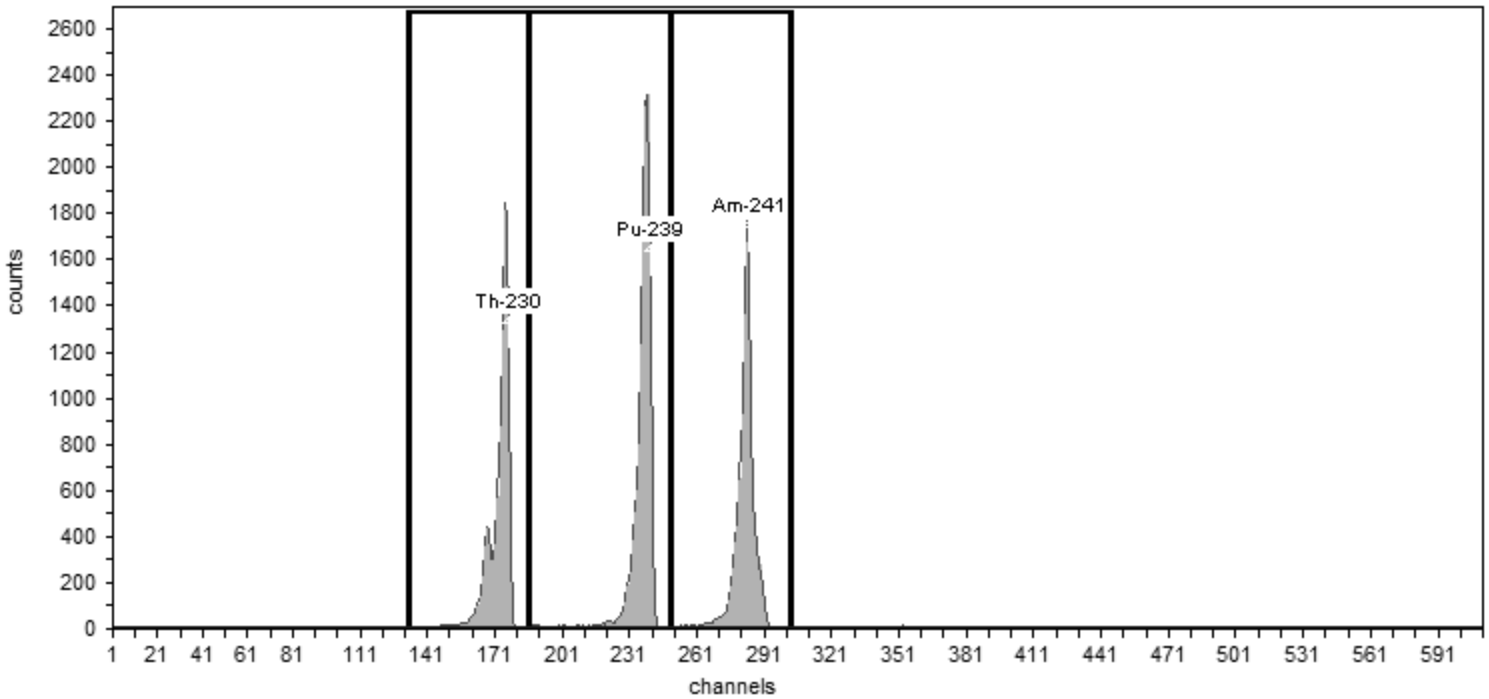
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 10/16/2015 3:51:18PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV149-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.03% +/- 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	31.48	10,971.00	78.36
Pu-239	240	5,155.40	186	249	33.62	12,896.00	92.11
Am-241	284	5,485.70	249	303	31.58	11,033.00	78.81

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:24PM 10/17/2015

Calibration

Sample Name: IC-7107;AV161-20151016
Description:
Detector: AV161

Analyst: 60040
Analysis Date: 10/17/2015 2:36:23PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

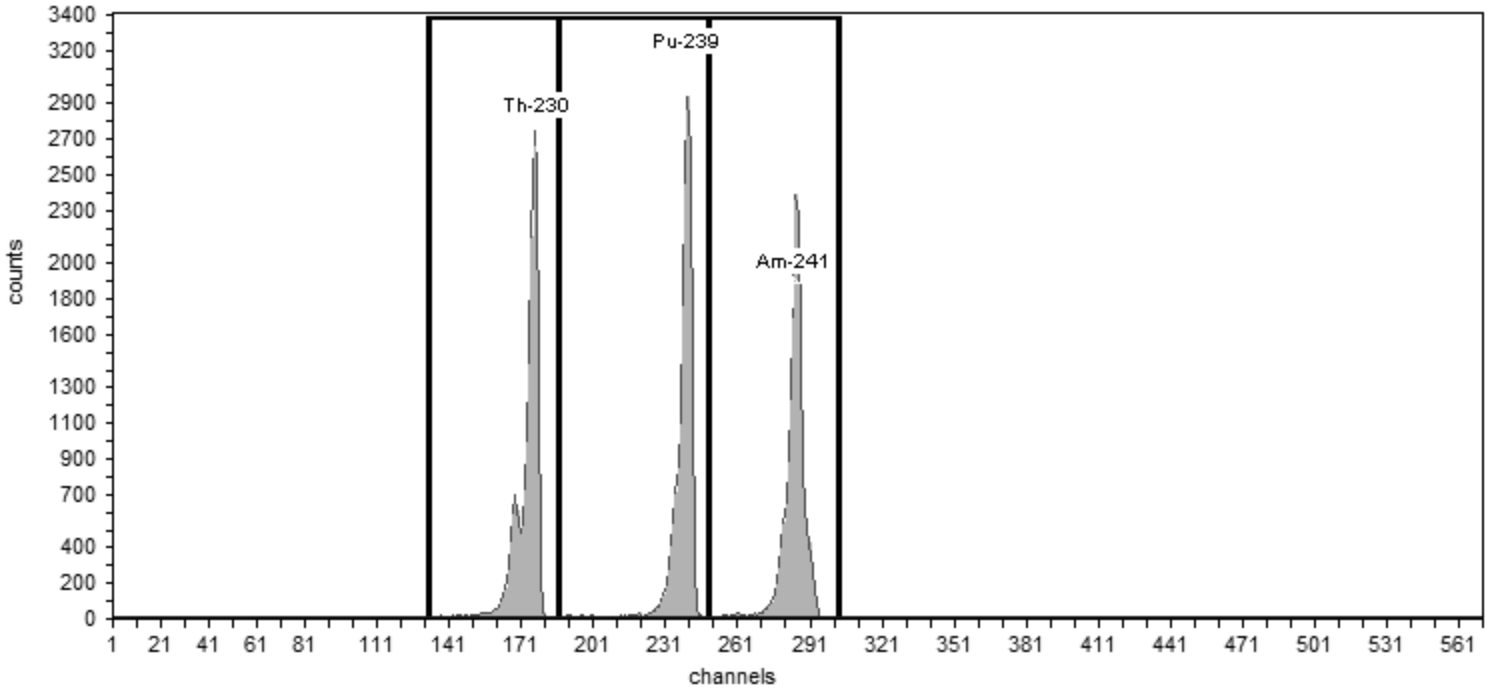
Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 10/16/2015 6:57:20PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV161-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.14% +/- 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	30.68	16,596.00	118.54
Pu-239	240	5,155.40	186	249	32.25	16,176.00	115.54
Am-241	284	5,485.70	249	303	34.34	15,558.00	111.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:23PM 11/23/2015

Calibration

Sample Name: IC-8874;AV162-20151016
Description:
Detector: AV162

Analyst: 60040
Analysis Date: 10/17/2015 2:36:27PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

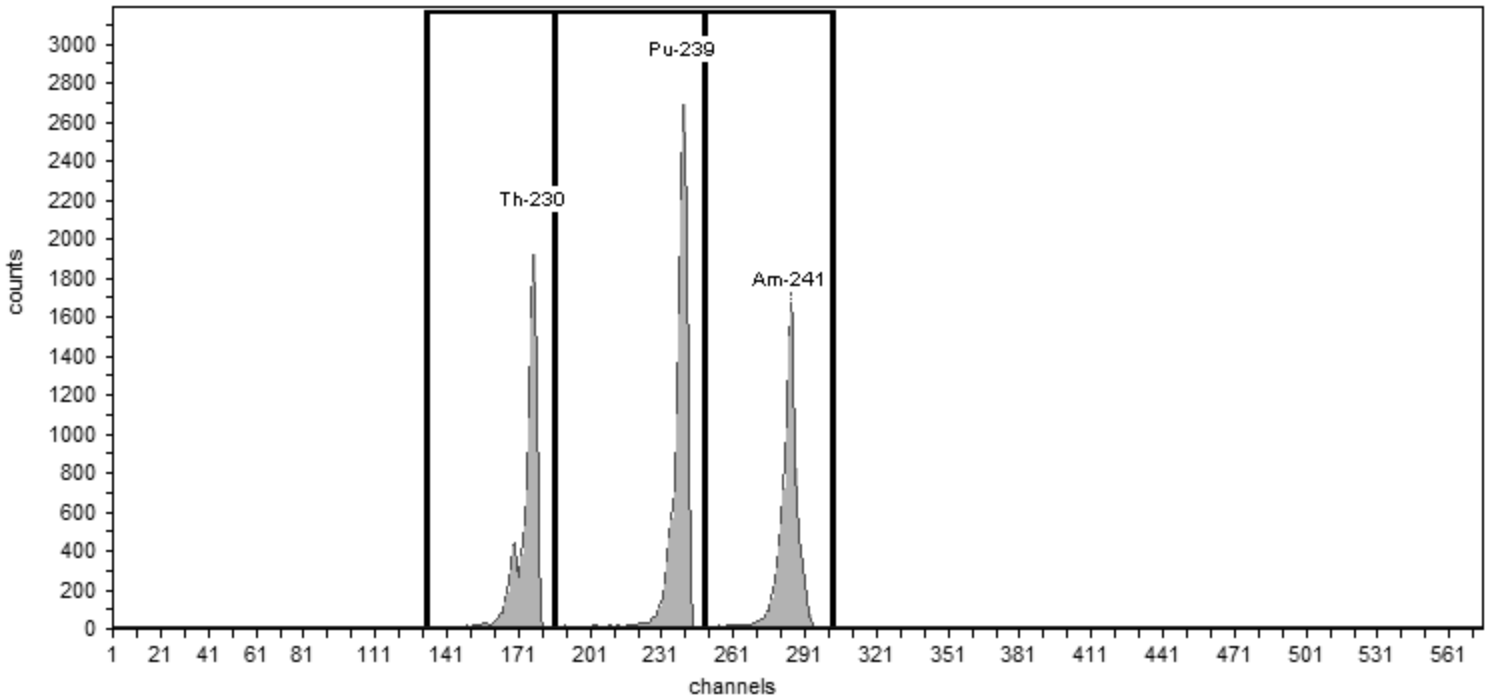
Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 10/16/2015 6:57:31PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV162-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.38% +/- 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	28.12	10,534.00	75.24
Pu-239	240	5,155.40	186	249	31.43	13,977.00	99.84
Am-241	284	5,485.70	249	303	31.73	11,128.00	79.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:33PM 10/17/2015

Calibration

Sample Name: IC-8875;AV163-20151016
Description:
Detector: AV163

Analyst: 60040
Analysis Date: 10/17/2015 2:36:32PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

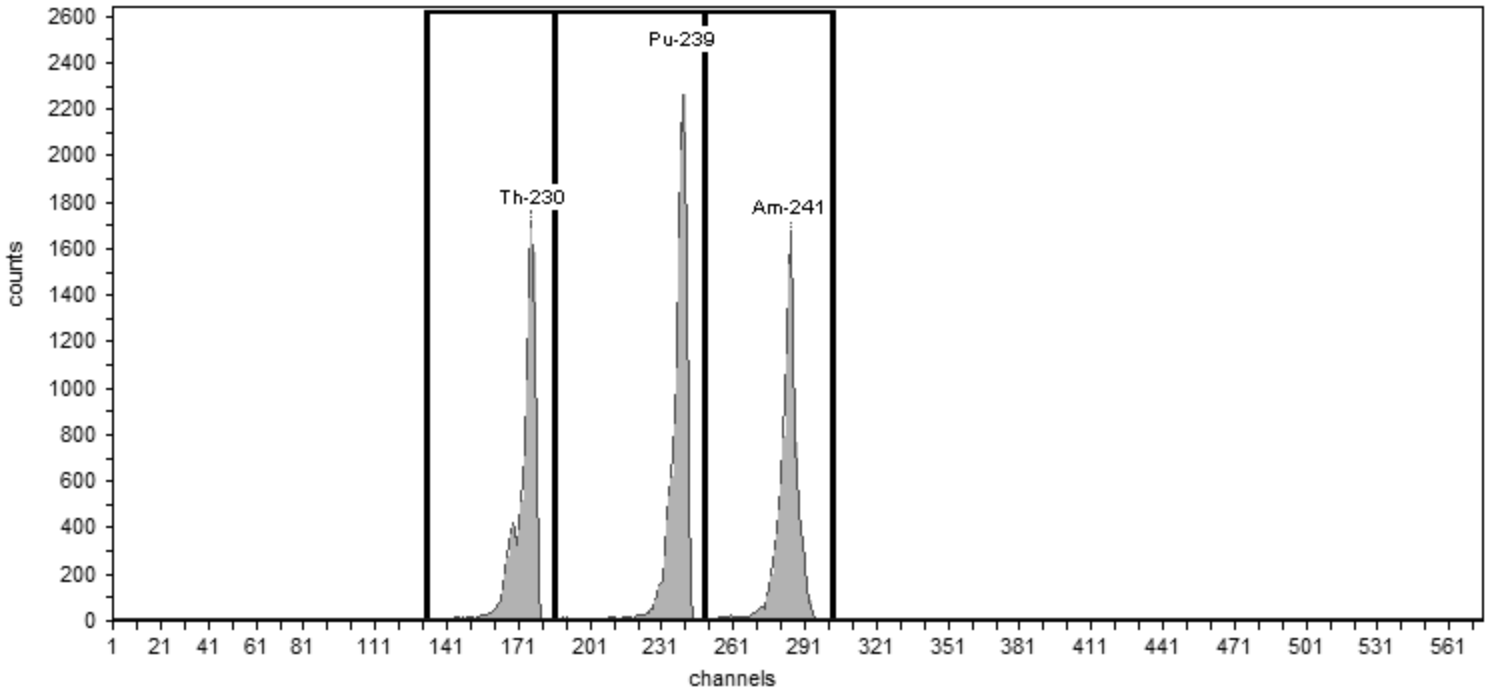
Detector: AV163 , SN: 50-110E7
Acquisition Start Date: 10/16/2015 6:57:43PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV163-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.17% +/- 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	31.49	10,815.00	77.25
Pu-239	240	5,155.40	186	249	32.82	12,895.00	92.11
Am-241	284	5,485.70	249	303	34.55	11,410.00	81.50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:37PM 10/17/2015

Calibration

Sample Name: IC-8876;AV164-20151016
Description:
Detector: AV164

Analyst: 60040
Analysis Date: 10/17/2015 2:36:37PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

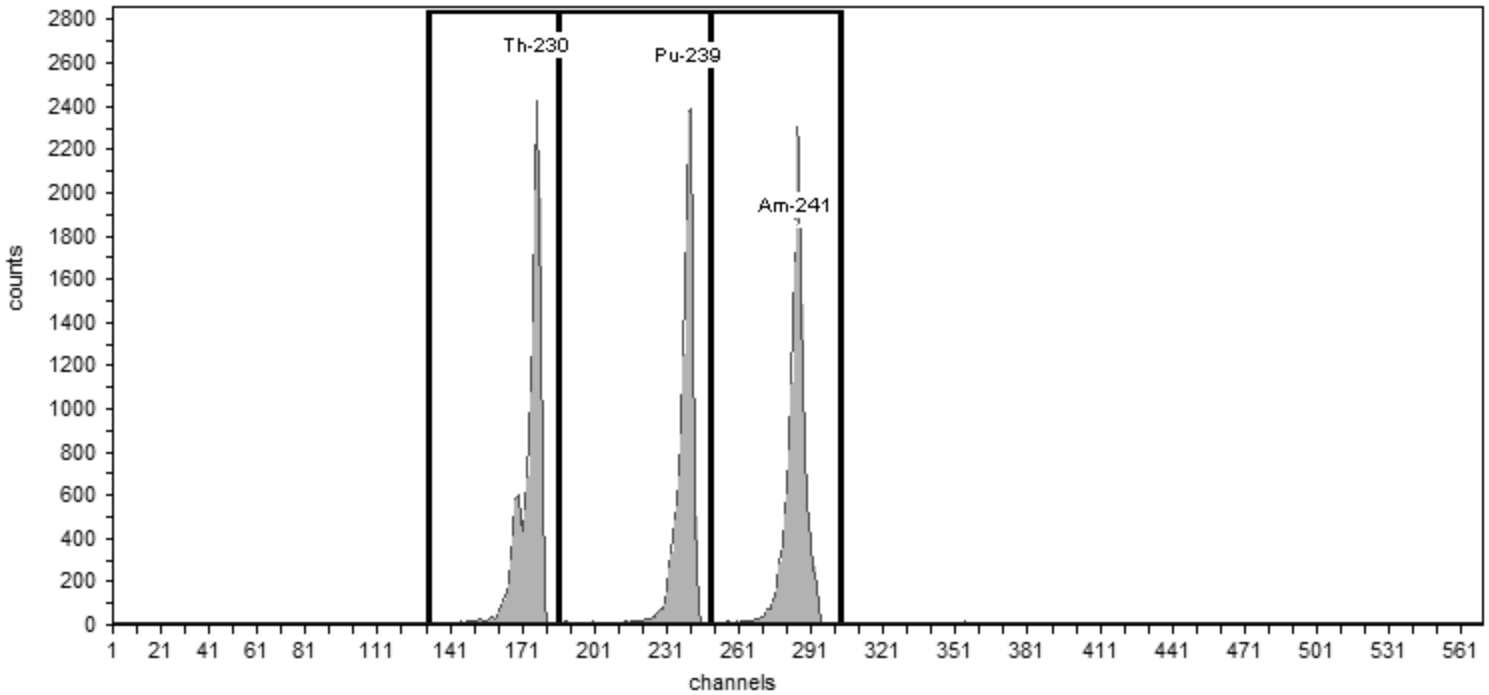
Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 10/16/2015 6:57:55PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8876;AV164-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.03% +/- 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	31.26	14,538.00	103.84
Pu-239	240	5,155.40	186	249	33.64	13,897.00	99.26
Am-241	284	5,485.70	249	303	33.02	14,901.00	106.44

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:32PM 11/23/2015

Calibration

Sample Name: IC-9794;AV169-20151016
Description:
Detector: AV169

Analyst: 60040
Analysis Date: 10/17/2015 2:36:47PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

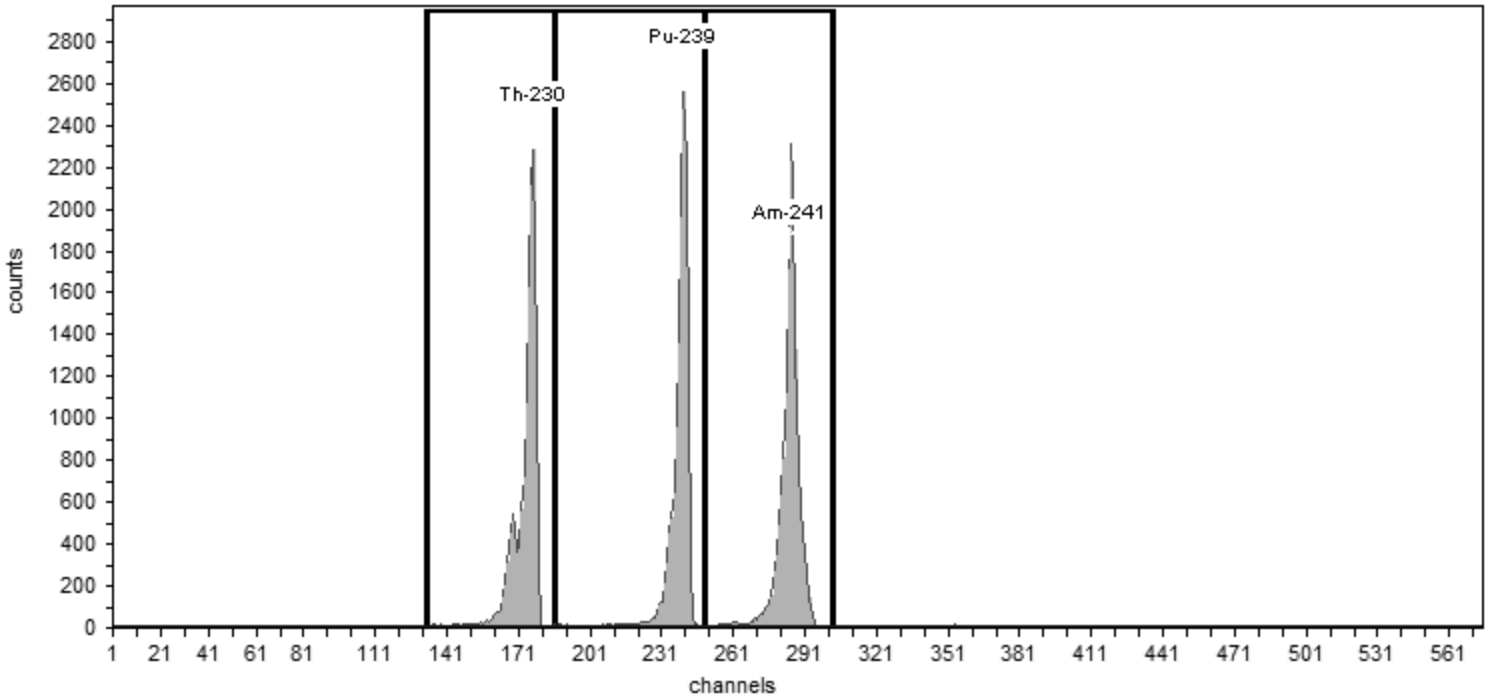
Detector: AV169 , SN: 50-112 G5
Acquisition Start Date: 10/16/2015 6:59:16PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9794;AV169-20151016

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.50% +/- 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	30.08	13,354.00	95.39
Pu-239	240	5,155.40	186	249	30.67	13,390.00	95.64
Am-241	284	5,485.70	249	303	31.74	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
2:36:51PM 10/17/2015

Calibration

Sample Name: IC-9795;AV170-20151016
Description:
Detector: AV170

Analyst: 60040
Analysis Date: 10/17/2015 2:36:50PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

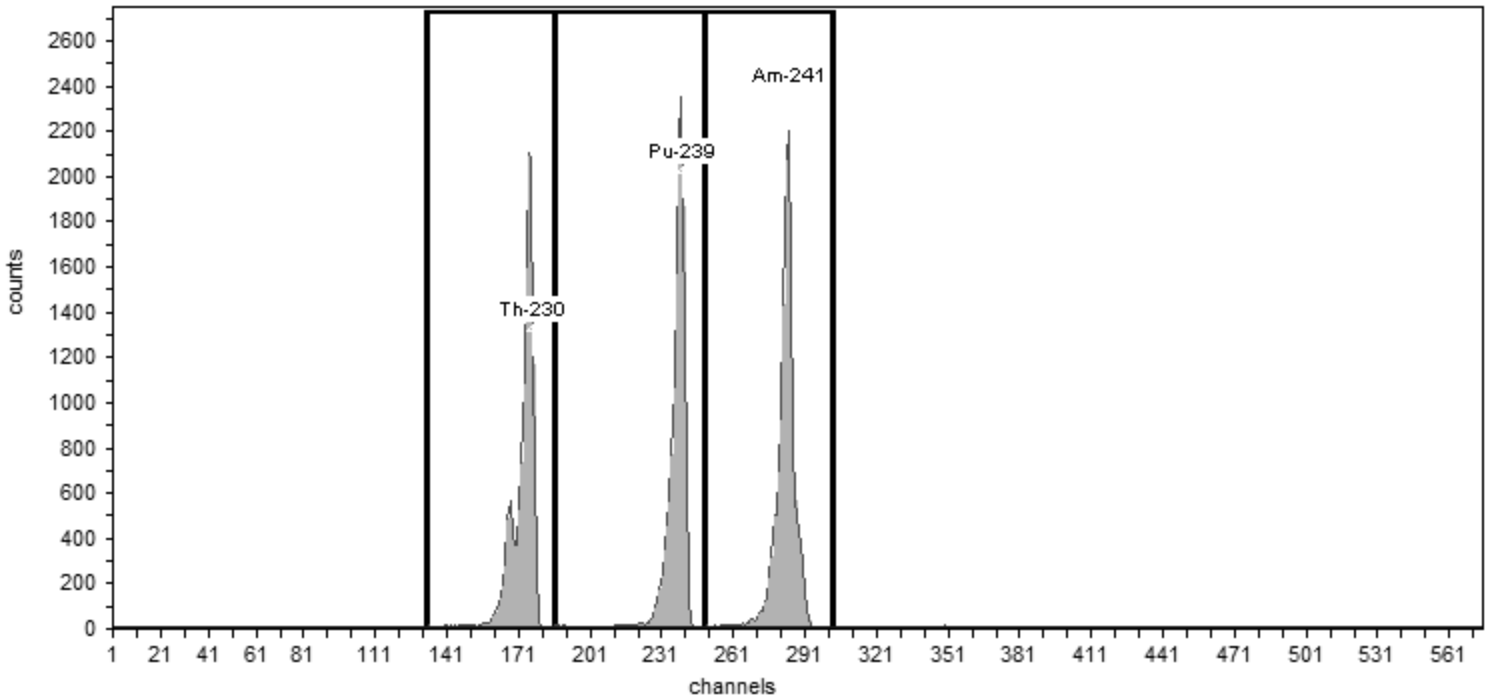
Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 10/16/2015 6:59:28PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9795;AV170-20151016

Energy Calibration Equation:
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

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	31.33	12,817.00	91.55
Pu-239	240	5,155.40	186	249	32.62	12,941.00	92.44
Am-241	284	5,485.70	249	303	31.87	13,865.00	99.04

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

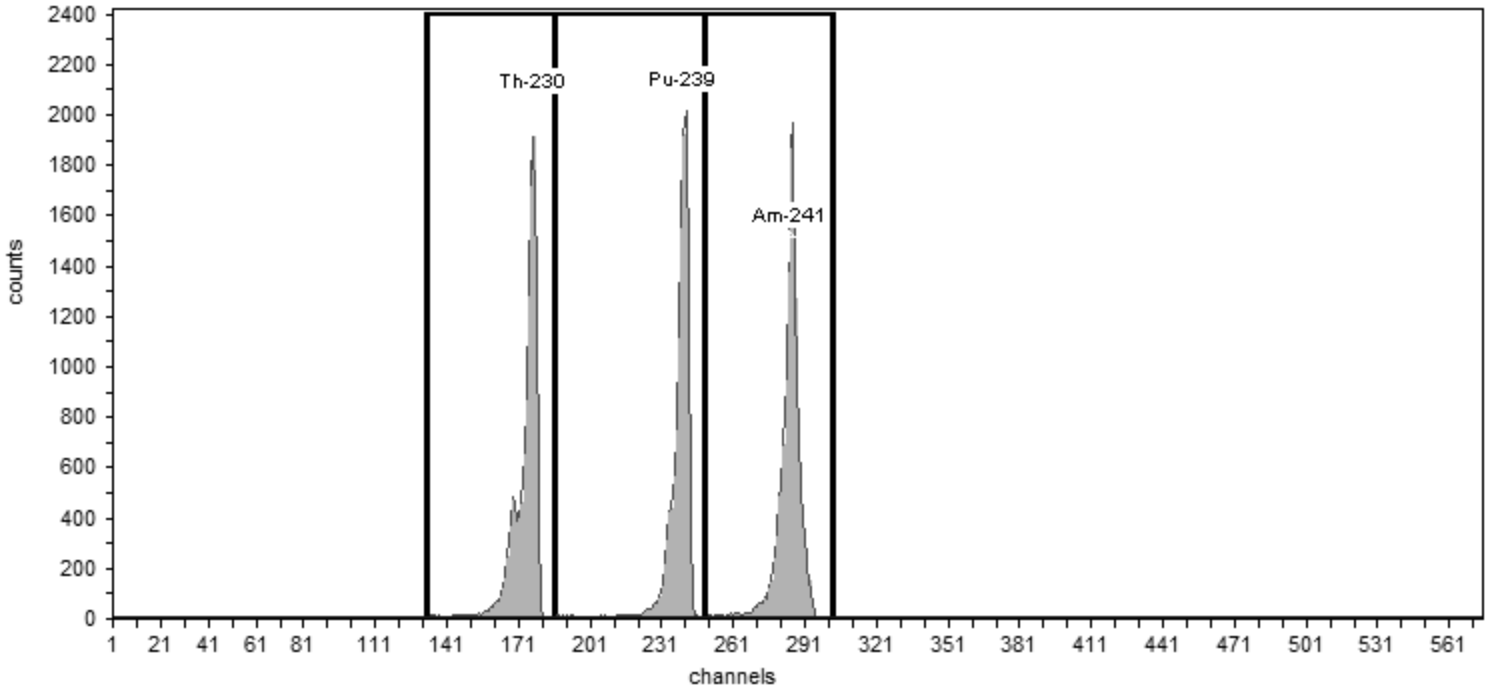
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 10/16/2015 7:04:44PM

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
6:01:53PM 10/17/2015

Calibration

Sample Name: IC-8874;AV176-20151017
Description:
Detector: AV176

Analyst: 60040
Analysis Date: 10/17/2015 6:01:52PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

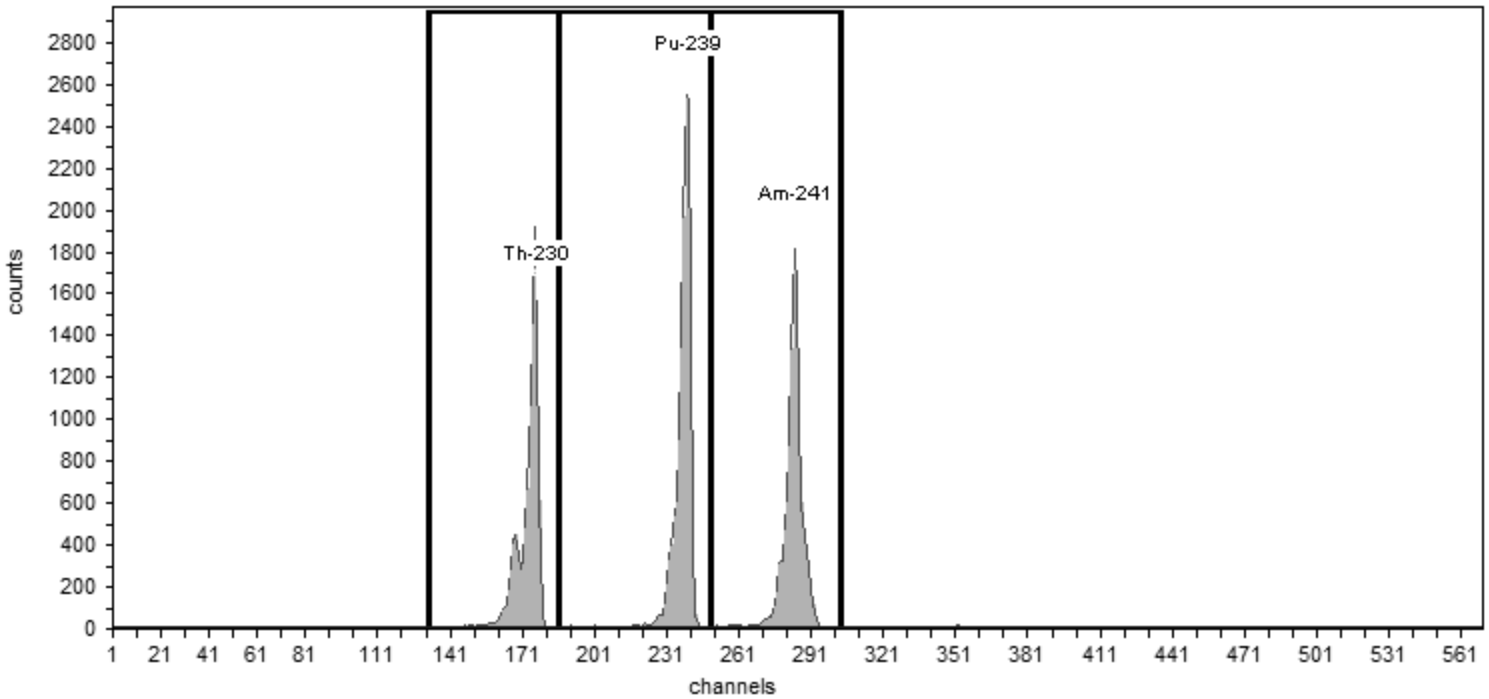
Detector: AV176 , SN: 50-117H2
Acquisition Start Date: 10/17/2015 2:48:41PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV176-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.19% +/- 0.37% 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	28.94	10,499.00	74.99
Pu-239	240	5,155.40	186	249	32.38	13,813.00	98.66
Am-241	284	5,485.70	249	303	31.56	11,072.00	79.09

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:26PM 10/17/2015

Calibration

Sample Name: IC-8875;AV177-20151017a
Description:
Detector: AV177

Analyst: 60040
Analysis Date: 10/17/2015 6:02:25PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

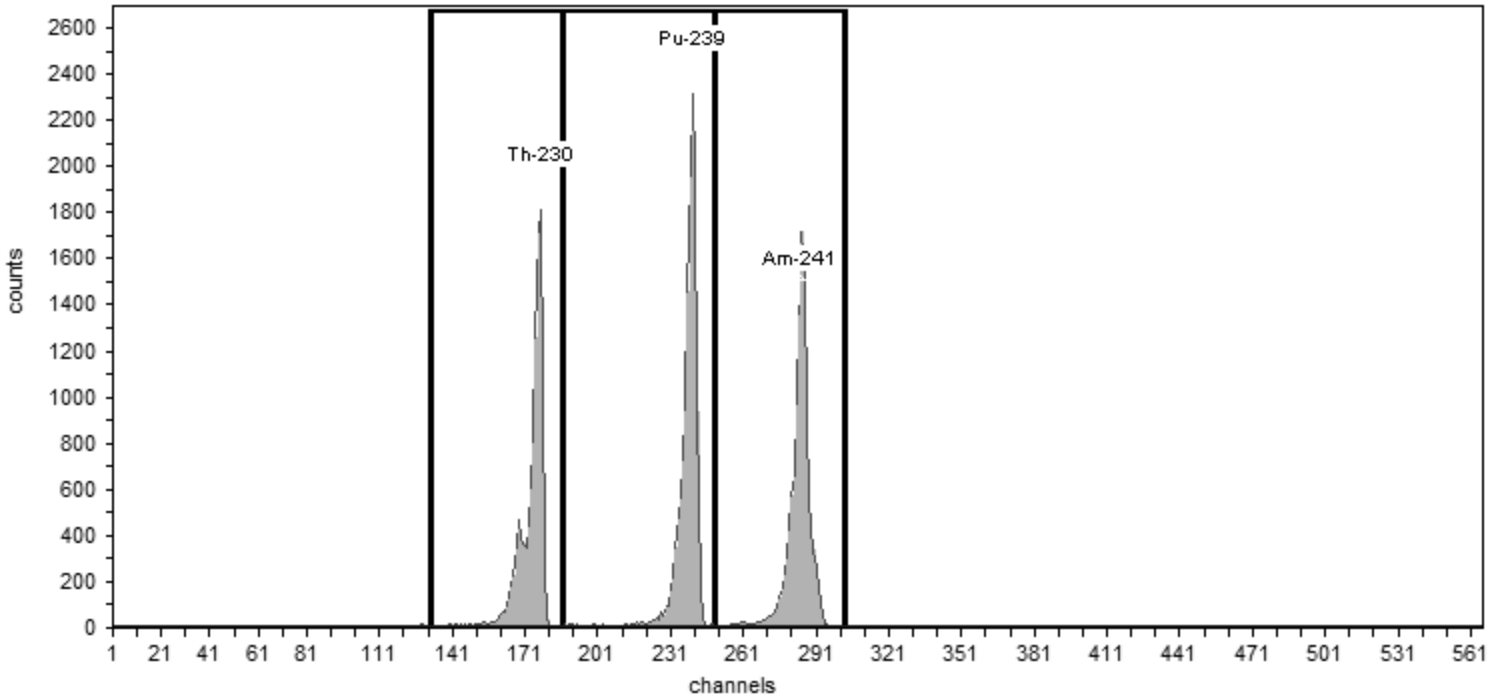
Detector: AV177 , SN: 50-117H3
Acquisition Start Date: 10/17/2015 2:55:31PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV177-20151017a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.11% +/- 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	29.65	10,840.00	77.43
Pu-239	240	5,155.40	186	249	32.55	12,880.00	92.00
Am-241	284	5,485.70	249	303	33.11	11,302.00	80.73

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

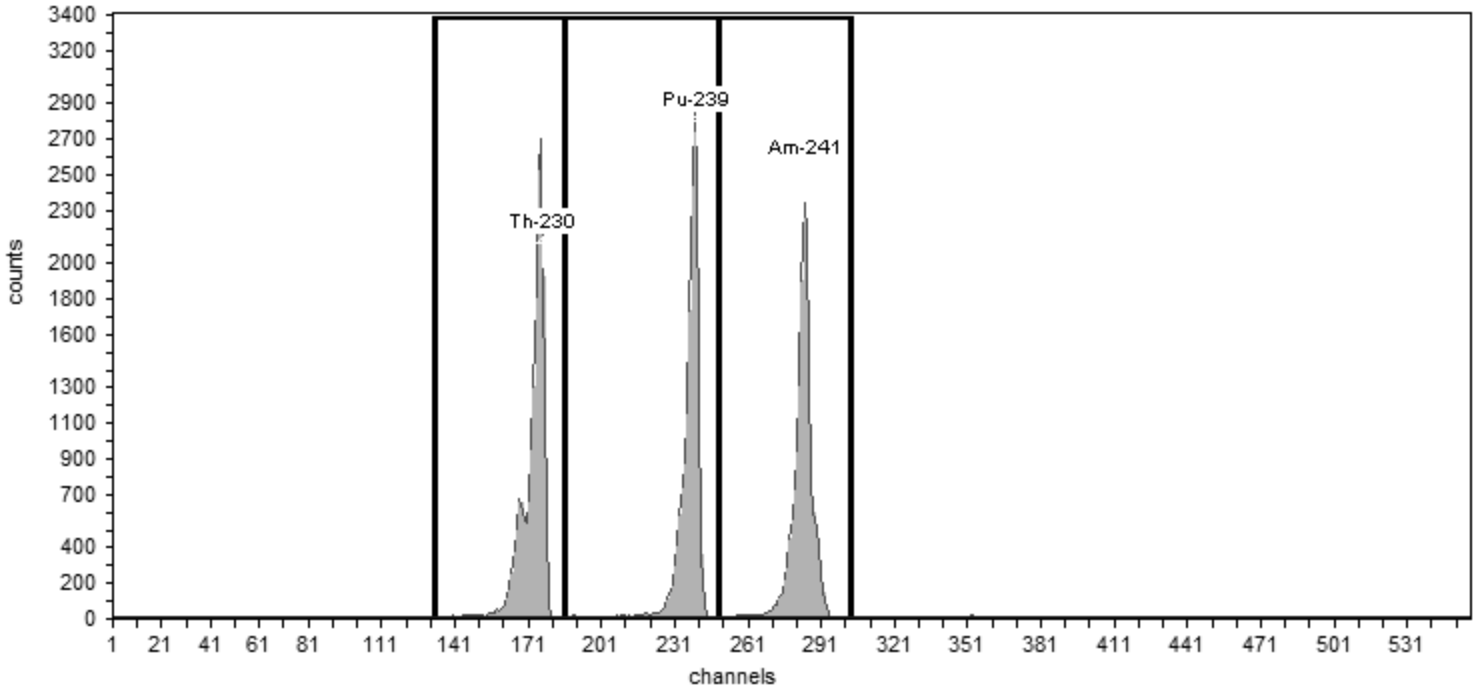
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 10/17/2015 6:19:19PM

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 / Ch^2

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
3:55:05PM 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

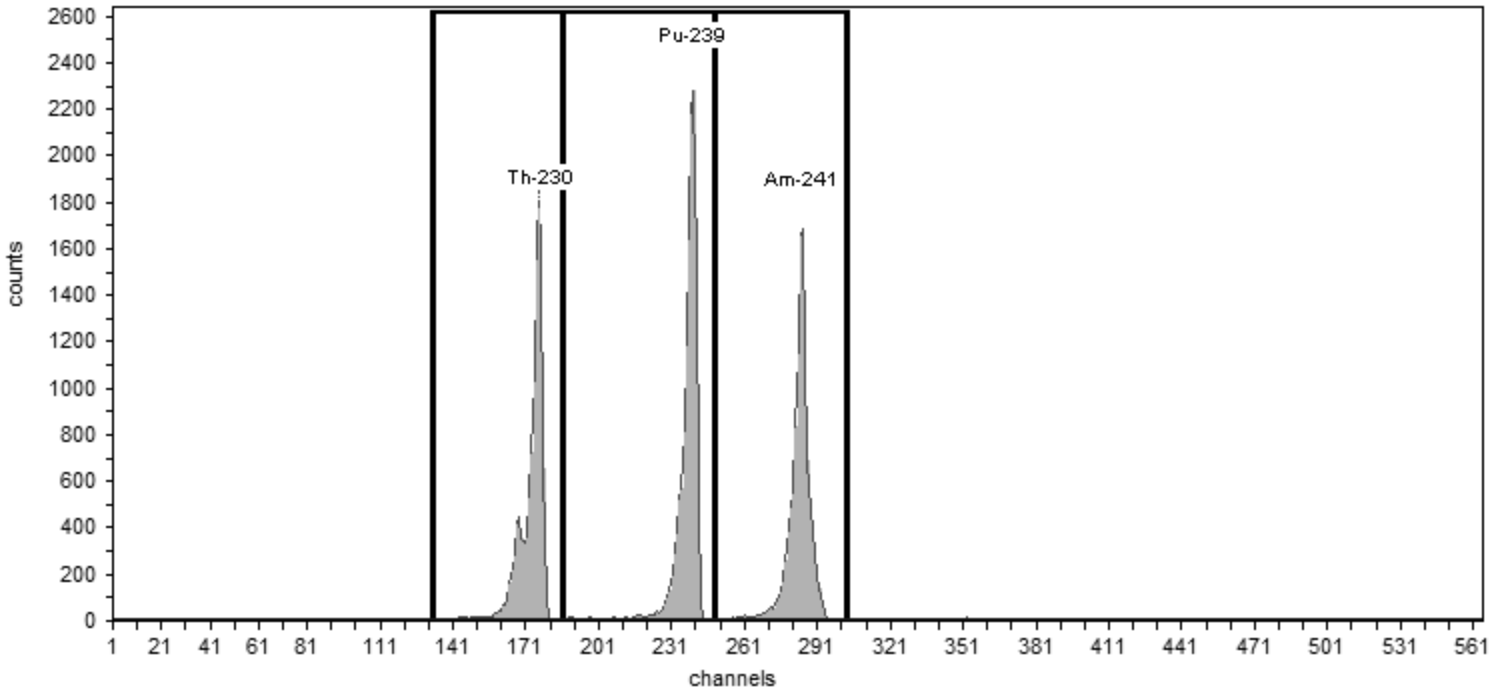
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 10/17/2015 6:13:26PM

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
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

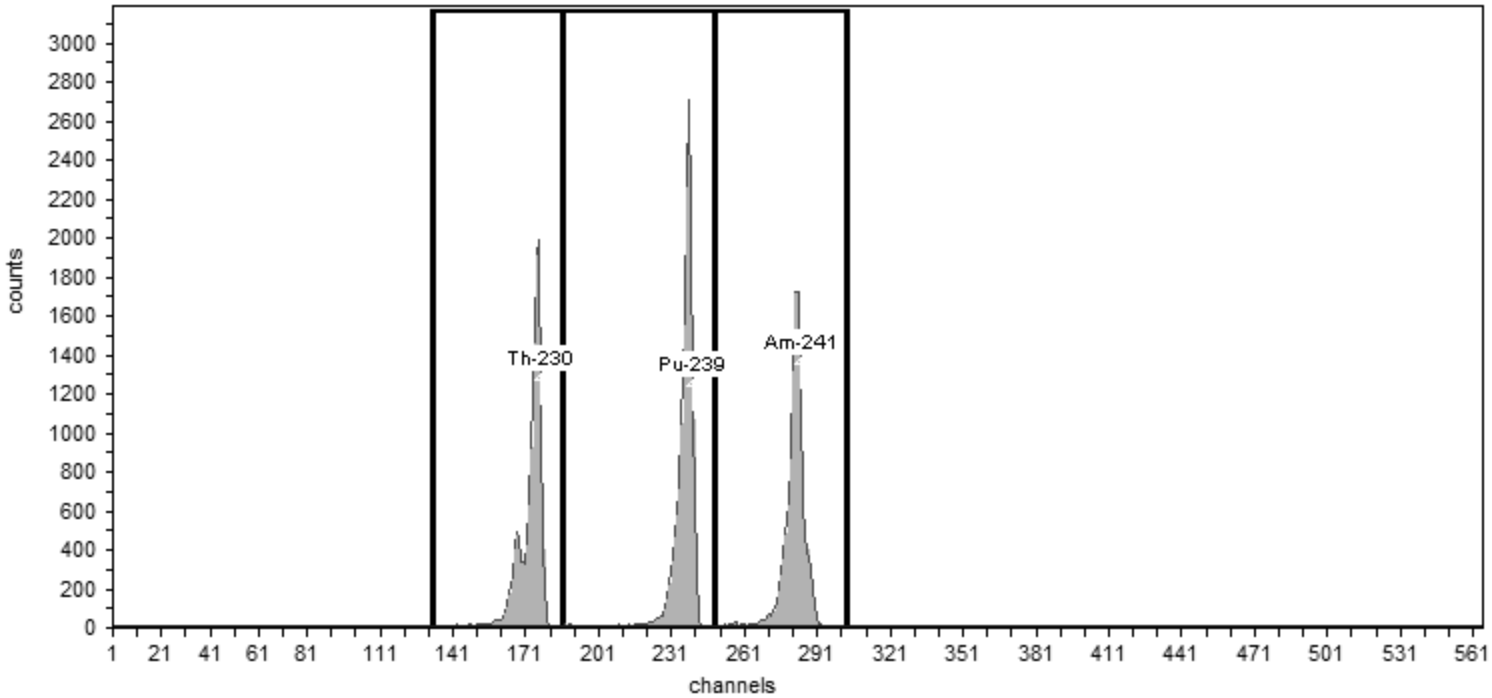
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 10/17/2015 6:13:59PM

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
3:55:42PM 10/18/2015

Calibration

Sample Name: IC-9792;AV195-20151017a
Description:
Detector: AV195

Analyst: 60040
Analysis Date: 10/18/2015 3:55:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

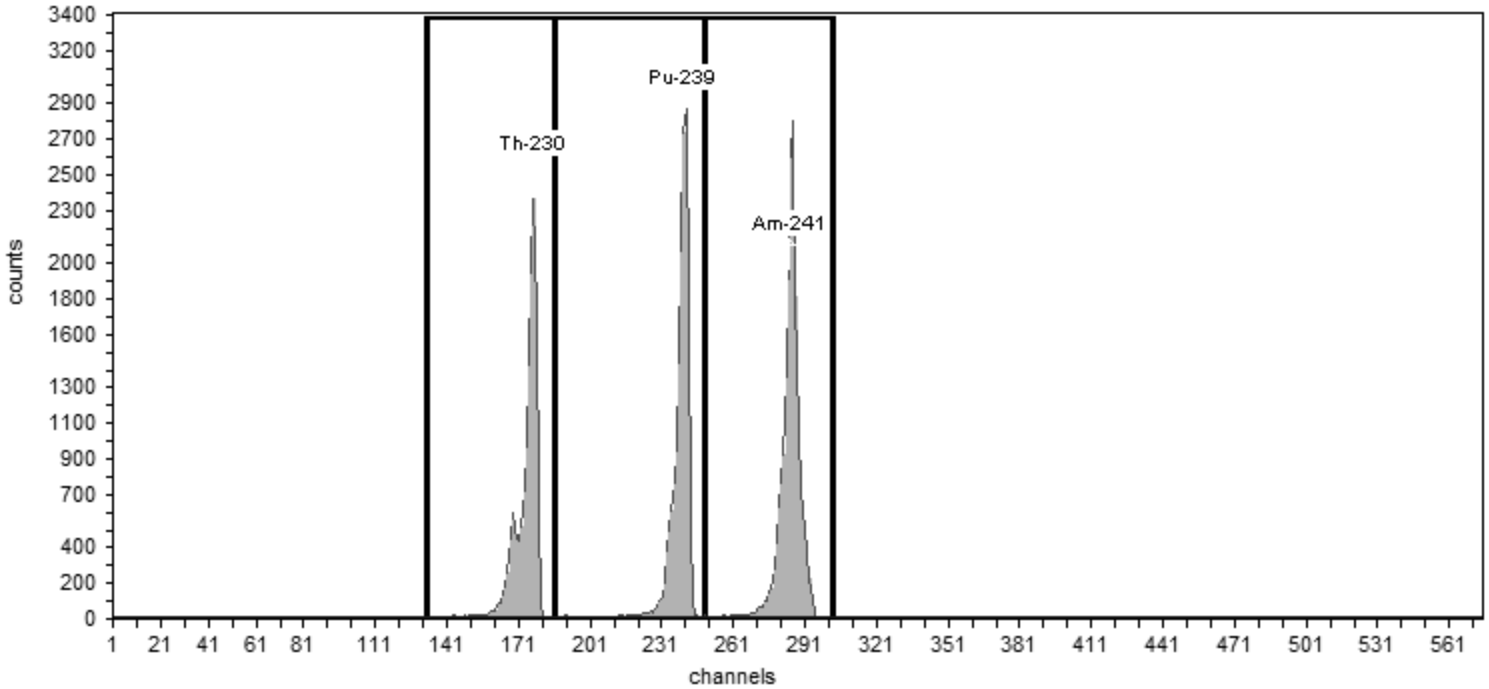
Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 10/17/2015 6:19:39PM

Live Time: 140.00 min.
Real Time: 140.03 min.

Efficiency Calibration Name: IC-9792;AV195-20151017a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.85% +/- 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	29.97	13,714.00	97.96
Pu-239	240	5,155.40	186	249	31.72	15,476.00	110.54
Am-241	284	5,485.70	249	303	33.21	17,919.00	127.99

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:19PM 10/18/2015

Calibration

Sample Name: IC-9793;AV196-20151017
Description:
Detector: AV196

Analyst: 60040
Analysis Date: 10/18/2015 3:55:18PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

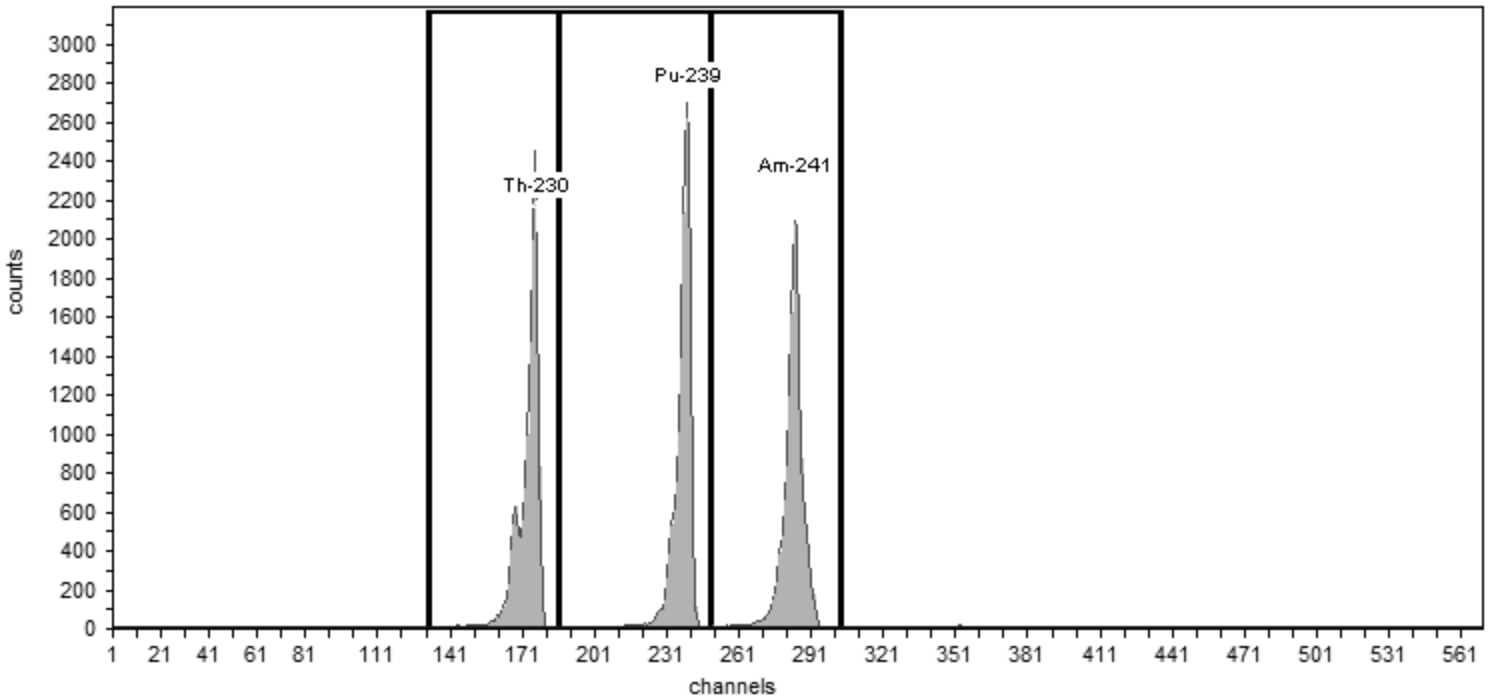
Detector: AV196 , SN: 50-117AA5
Acquisition Start Date: 10/17/2015 6:14:24PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9793;AV196-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.43% +/- 0.32% 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	31.10	14,580.00	104.14
Pu-239	240	5,155.40	186	249	32.20	15,318.00	109.41
Am-241	284	5,485.70	249	303	37.68	14,537.00	103.84

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:34PM 10/18/2015

Calibration

Sample Name: IC-9884;AV200-20151017
Description:
Detector: AV200

Analyst: 60040
Analysis Date: 10/18/2015 3:55:33PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

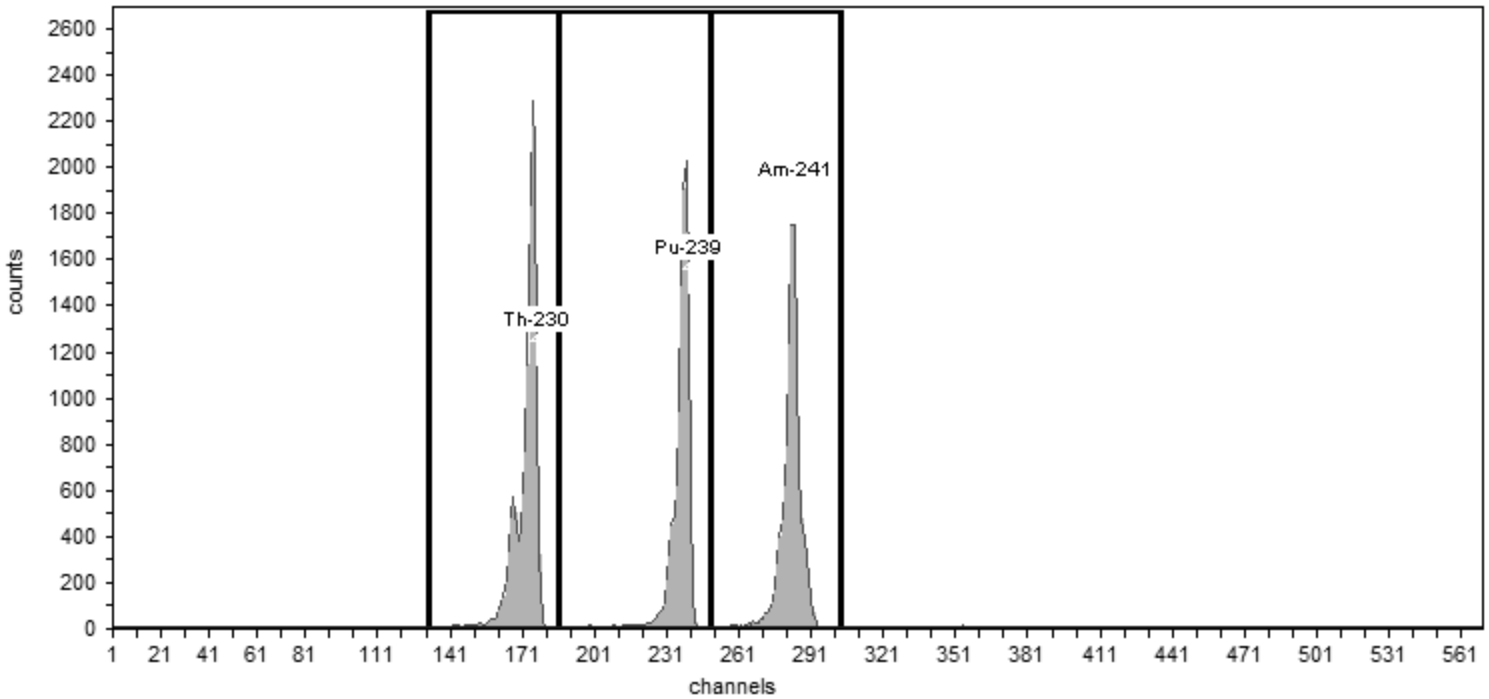
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 10/17/2015 6:15:29PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9884;AV200-20151017

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.41% +/- 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	29.48	13,618.00	97.27
Pu-239	240	5,155.40	186	249	32.34	11,160.00	79.71
Am-241	284	5,485.70	249	303	33.15	11,444.00	81.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:41:51PM 10/18/2015

Calibration

Sample Name: IC-8876;AV206-20151018
Description:
Detector: AV206

Analyst: 60040
Analysis Date: 10/18/2015 6:41:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

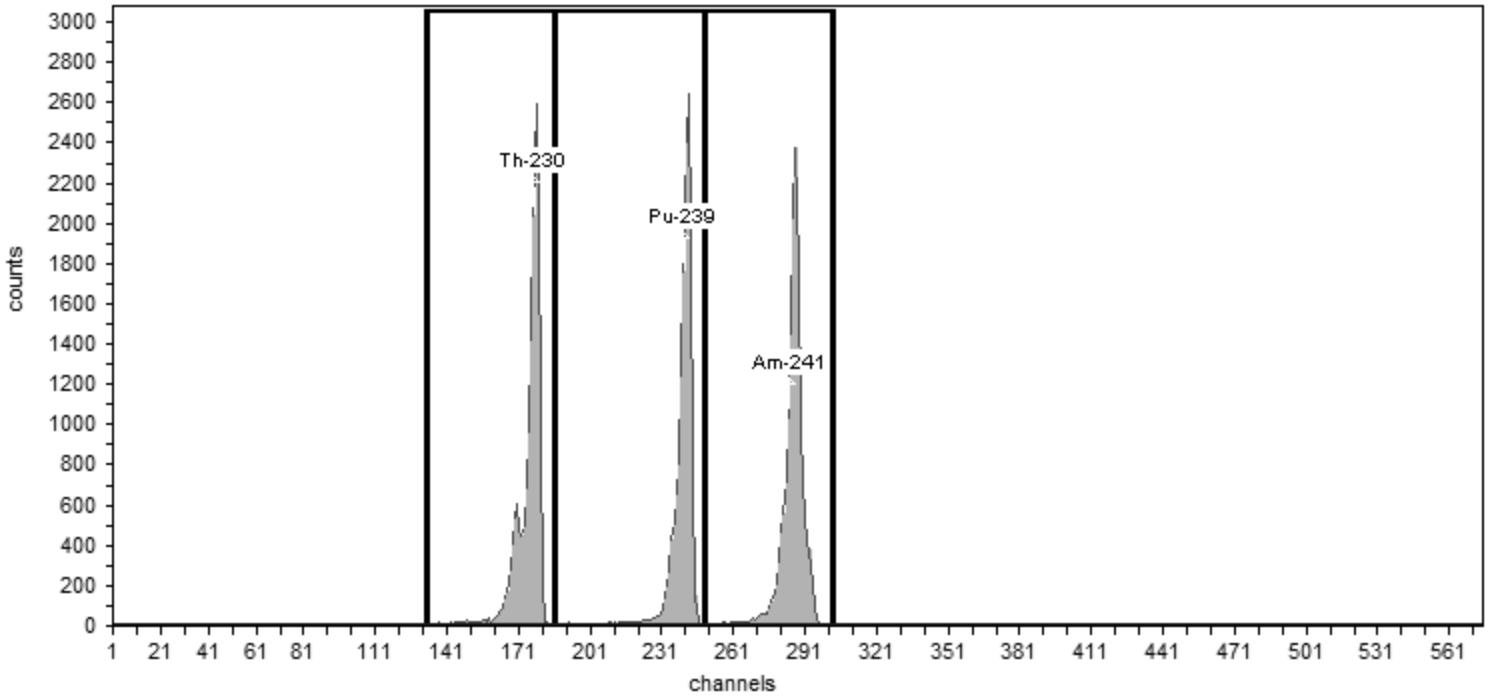
Detector: AV206 , SN: 50-119AA6
Acquisition Start Date: 10/18/2015 4:10:49PM

Live Time: 140.00 min.
Real Time: 140.02 min.

Efficiency Calibration Name: IC-8876;AV206-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.55% +/- 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	29.56	14,971.00	106.94
Pu-239	240	5,155.40	186	249	32.27	14,290.00	102.07
Am-241	284	5,485.70	249	303	32.56	15,026.00	107.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:41:58PM 10/18/2015

Calibration

Sample Name: IC-8877;AV207-20151018
Description:
Detector: AV207

Analyst: 60040
Analysis Date: 10/18/2015 6:41:56PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

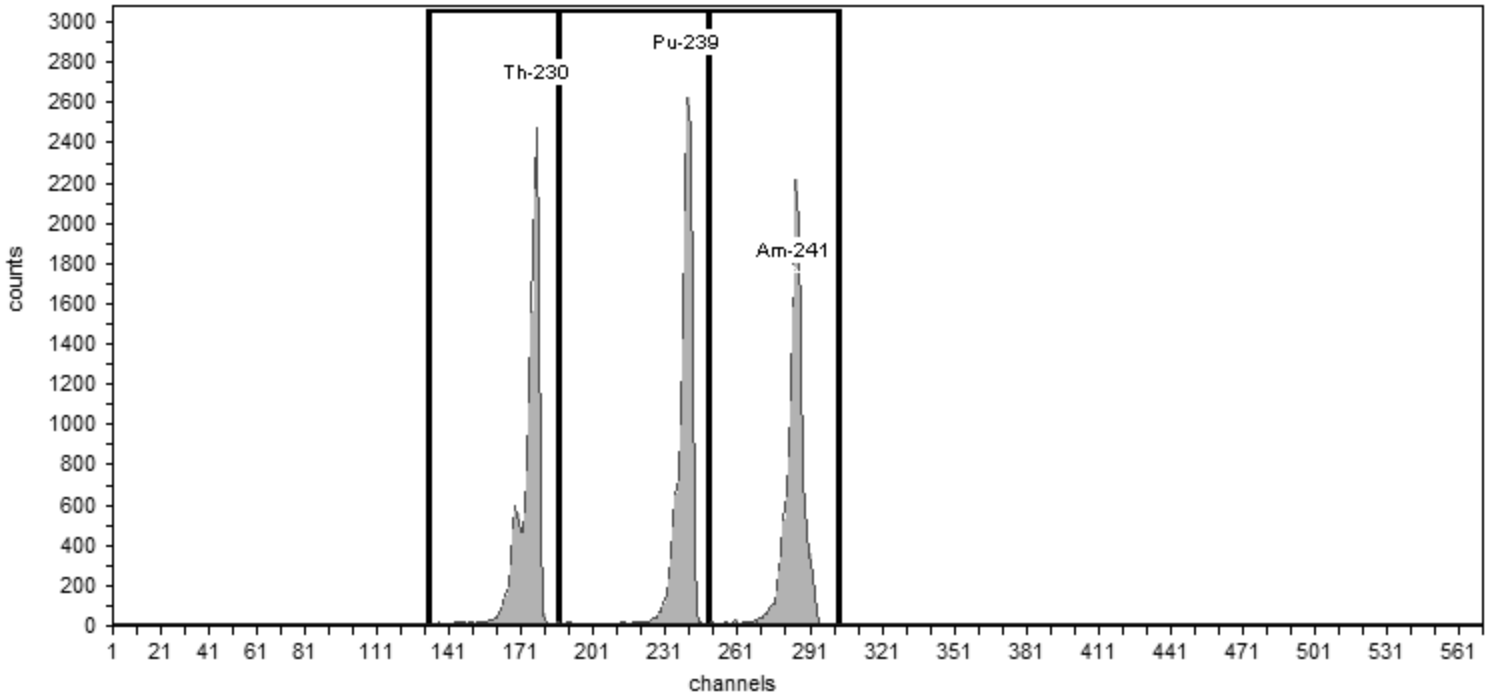
Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 10/18/2015 4:11:01PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV207-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.15% +/- 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	30.89	14,676.00	104.83
Pu-239	240	5,155.40	186	249	32.69	14,608.00	104.34
Am-241	284	5,485.70	249	303	33.13	14,312.00	102.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:38PM 10/18/2015

Calibration

Sample Name: IC-9520;AV208-20151018a
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 10/18/2015 6:42:37PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

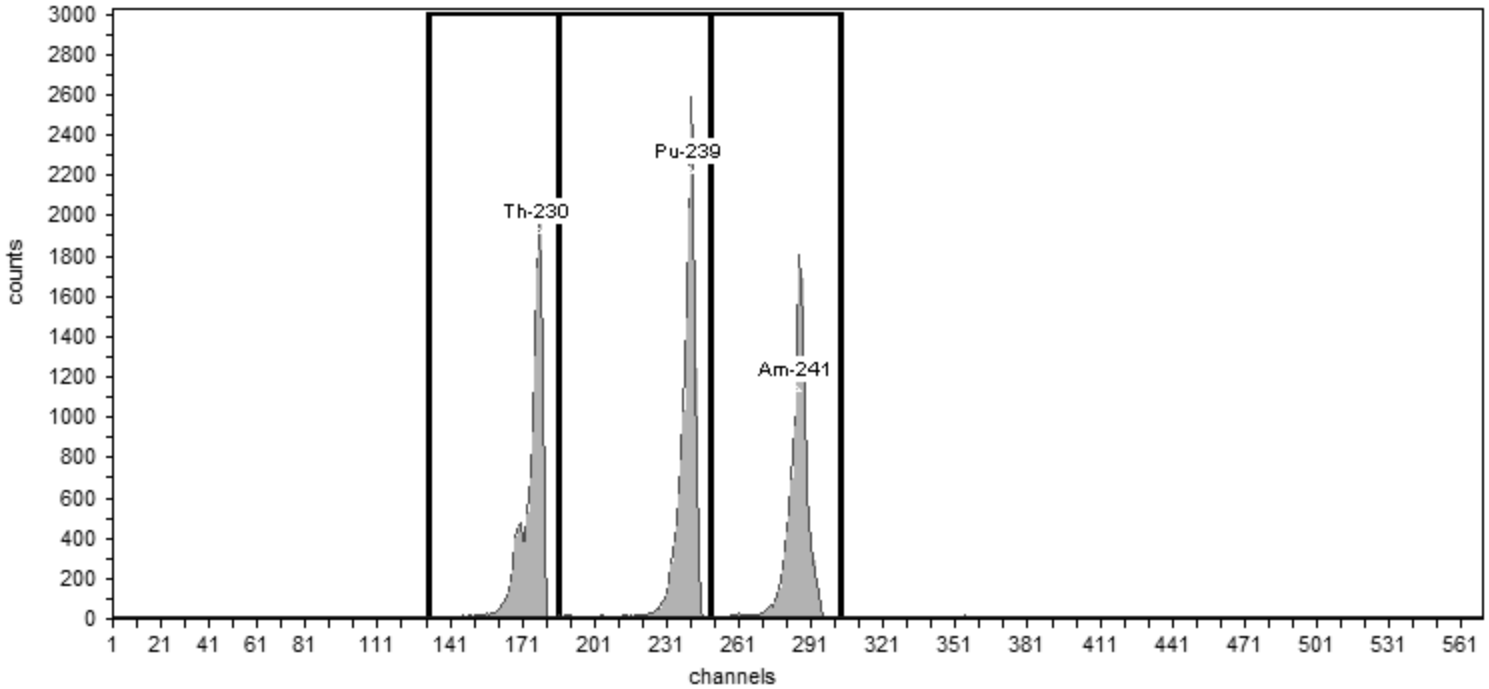
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 10/18/2015 4:19:21PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV208-20151018a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.52% +/- 0.36% 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	30.93	12,005.00	85.75
Pu-239	240	5,155.40	186	249	32.55	14,370.00	102.64
Am-241	284	5,485.70	249	303	34.84	11,892.00	84.94

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:29:01PM 11/23/2015

Calibration

Sample Name: IC-9792;AV209-20151018
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 10/18/2015 6:42:01PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

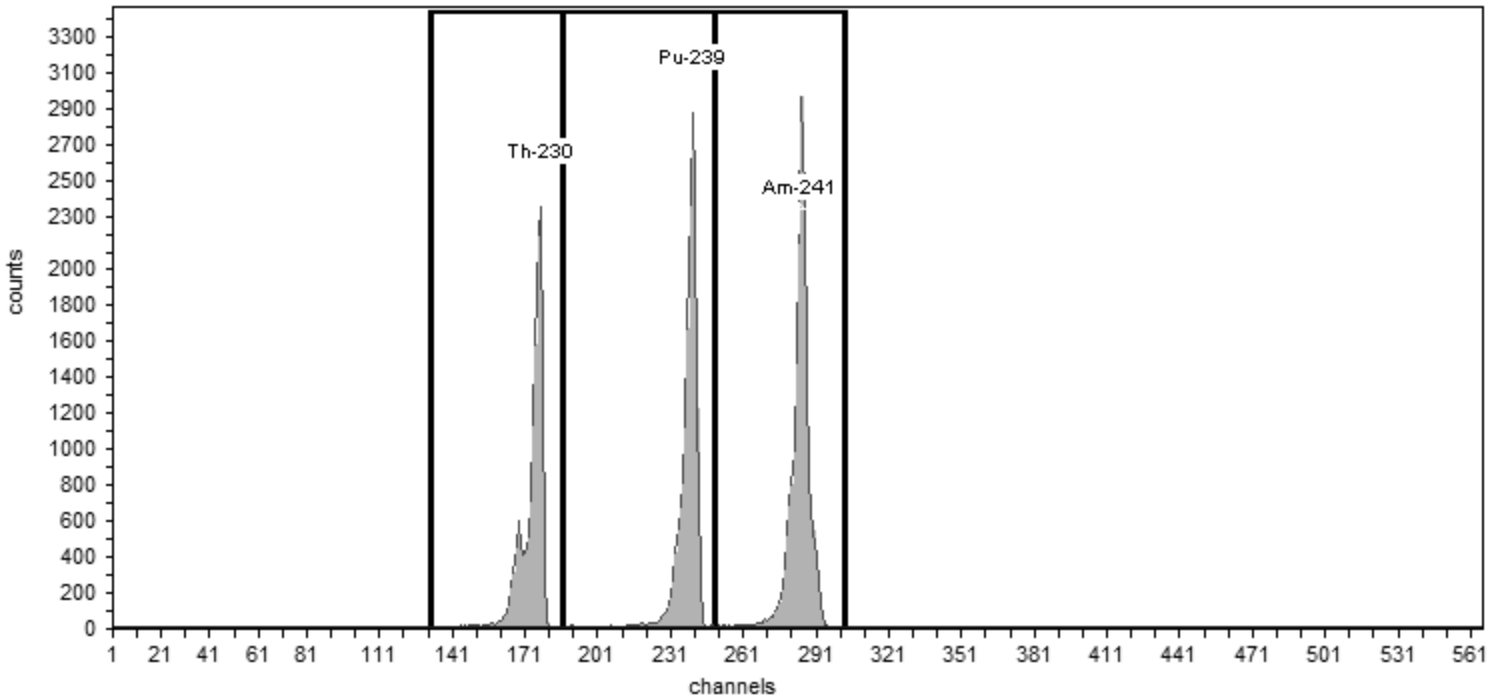
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 10/18/2015 4:11:29PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9792;AV209-20151018

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.67% +/- 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	30.70	13,691.00	97.79
Pu-239	240	5,155.40	186	249	31.61	15,526.00	110.90
Am-241	284	5,485.70	249	303	29.28	17,594.00	125.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:42PM 10/18/2015

Calibration

Sample Name: IC-9793;AV210-20151018a
Description:
Detector: AV210

Analyst: 60040
Analysis Date: 10/18/2015 6:42:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

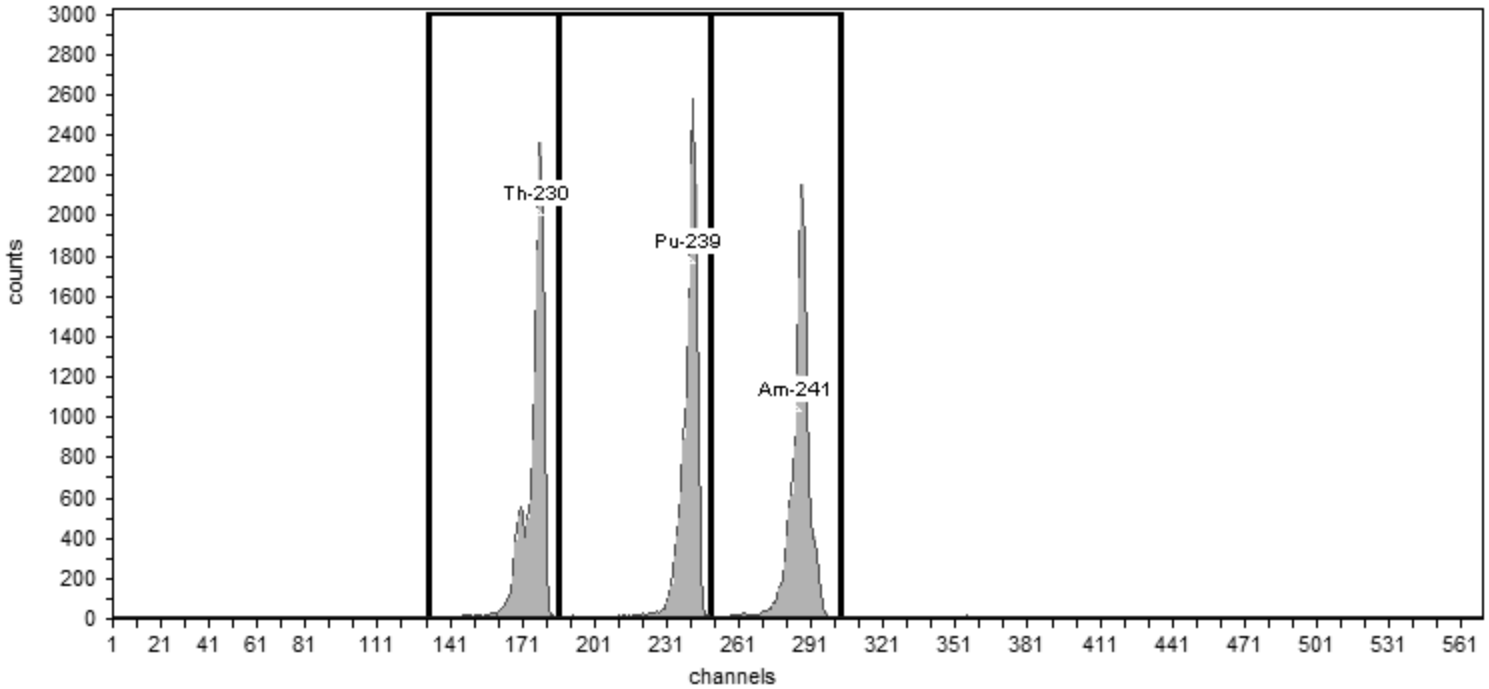
Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 10/18/2015 4:19:38PM

Live Time: 140.00 min.
Real Time: 140.05 min.

Efficiency Calibration Name: IC-9793;AV210-20151018a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.37% +/- 0.32% 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	30.49	14,132.00	100.94
Pu-239	240	5,155.40	186	249	32.86	14,534.00	103.81
Am-241	284	5,485.70	249	303	34.07	13,987.00	99.91

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:29:07PM 11/23/2015

Calibration

Sample Name: IC-9794;AV211-20151018a
Description:
Detector: AV211

Analyst: 60040
Analysis Date: 10/18/2015 6:42:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

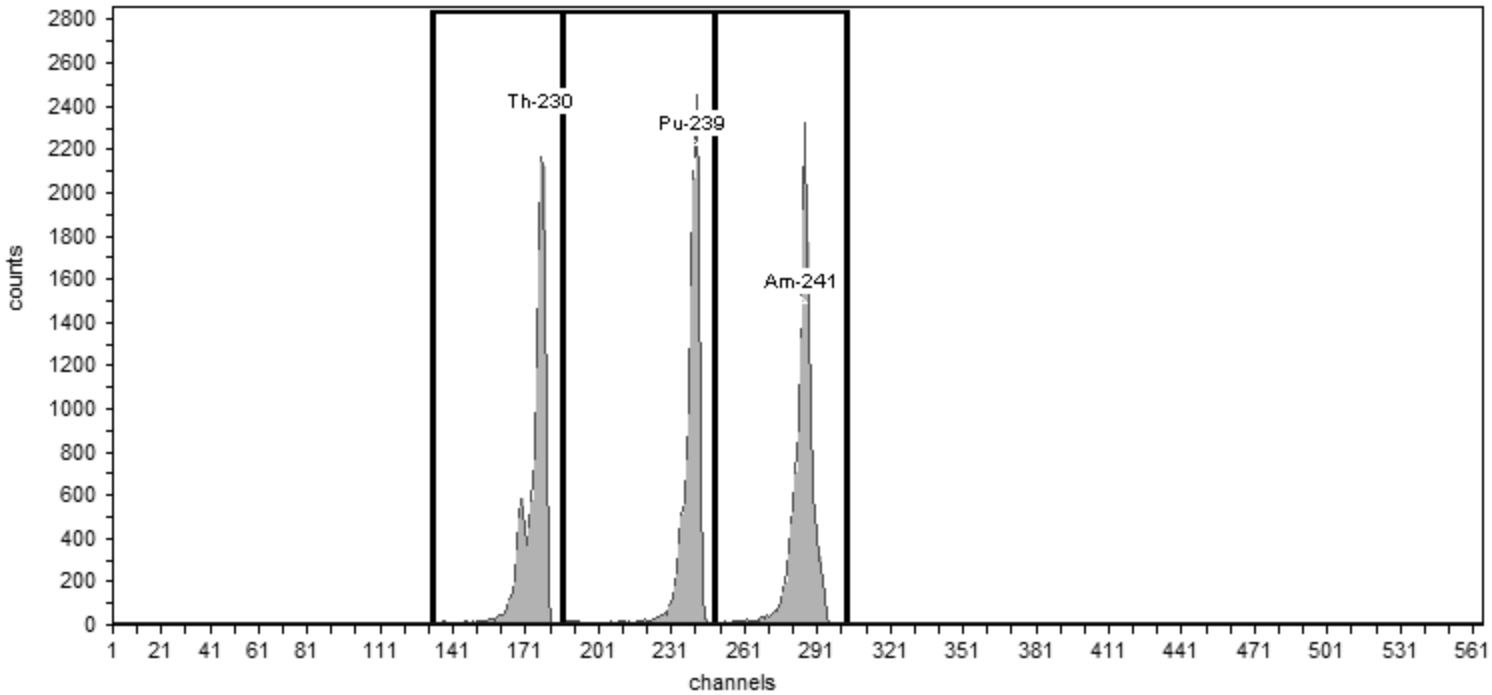
Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 10/18/2015 4:19:52PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9794;AV211-20151018a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.00% +/- 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	30.78	13,122.00	93.73
Pu-239	240	5,155.40	186	249	30.90	13,025.00	93.04
Am-241	284	5,485.70	249	303	31.20	14,343.00	102.45

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

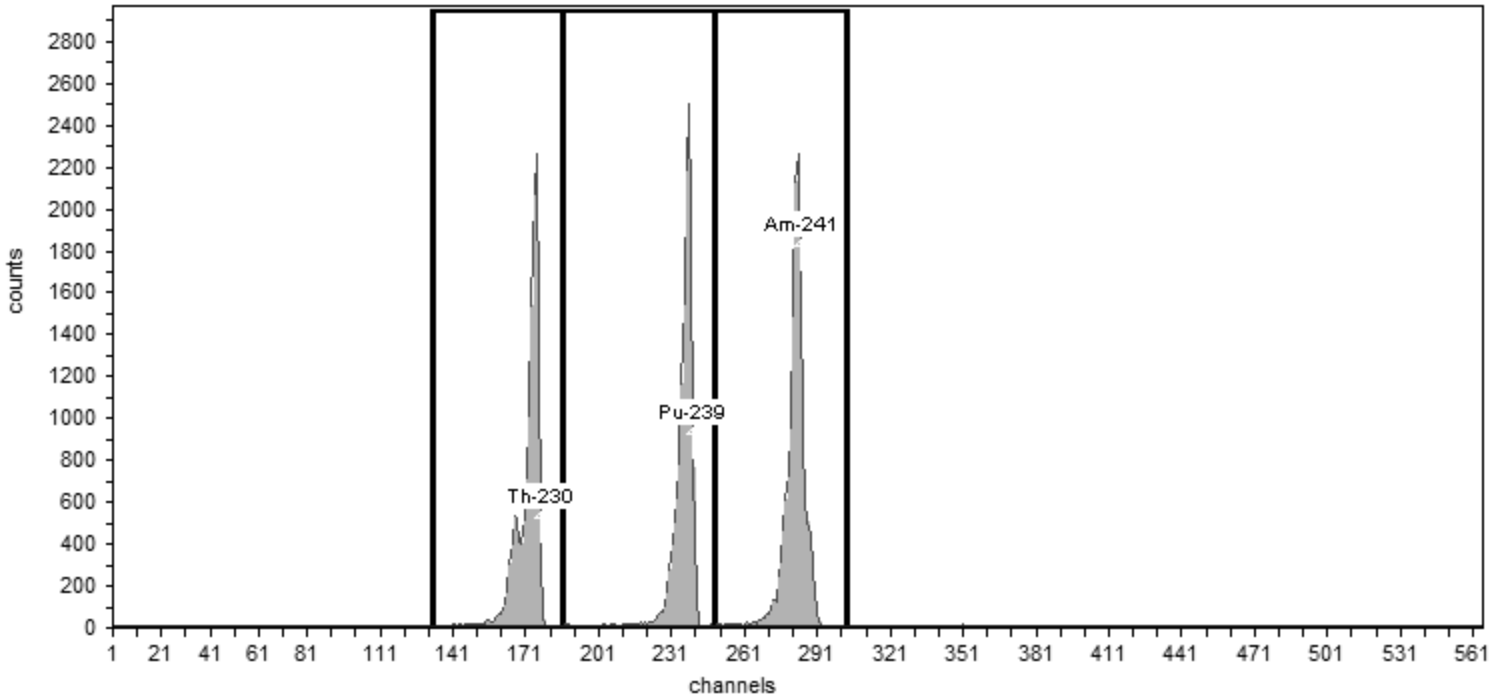
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 10/18/2015 4:12:14PM

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

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV148

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223445/1	10/16/15 16:27	82233-334_00001	0.2672	0.20-0.32		
ICV 160-223563/1	10/26/15 19:10	82232-334_00001	0.2586	0.20-0.32	96.8	95-105
CCV 160-262320/1	07/26/16 09:12	82233-334_00001	0.2643	0.20-0.32	98.9	95-105

Detector: AV149

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223446/1	10/16/15 15:51	82234-334_00001	0.2403	0.20-0.32		
ICV 160-223564/1	10/26/15 19:10	82245-334_00001	0.2396	0.20-0.32	99.7	95-105
CCV 160-262220/1	07/27/16 07:26	82234-334_00001	0.2292	0.20-0.32	95.4	95-105

Detector: AV161

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223458/1	10/16/15 18:57	82232-334_00001	0.2614	0.20-0.32		
ICV 160-223576/1	10/26/15 20:26	82233-334_00001	0.2638	0.20-0.32	100.9	95-105
CCV 160-262331/1	07/26/16 09:12	82232-334_00001	0.2560	0.20-0.32	97.9	95-105

Detector: AV162

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223459/1	10/16/15 18:57	82233-334_00001	0.2638	0.20-0.32		
ICV 160-223577/1	10/26/15 20:26	82232-334_00001	0.2572	0.20-0.32	97.5	95-105
CCV 160-262158/1	07/26/16 10:50	82233-334_00001	0.2581	0.20-0.32	97.8	95-105

Detector: AV163

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223460/1	10/16/15 18:57	82234-334_00001	0.2417	0.20-0.32		
ICV 160-223578/1	10/26/15 20:26	82245-334_00001	0.2423	0.20-0.32	100.2	95-105
CCV 160-262221/1	07/27/16 08:33	82234-334_00001	0.2312	0.20-0.32	95.6	95-105

Detector: AV164

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223461/1	10/16/15 18:57	82235-334_00001	0.2403	0.20-0.32		
ICV 160-223579/1	10/26/15 20:32	82247-334_00001	0.2364	0.20-0.32	98.4	95-105
CCV 160-262160/1	07/26/16 10:49	82235-334_00001	0.2296	0.20-0.32	95.6	95-105

Detector: AV169

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223466/1	10/16/15 18:59	82242-334_00001	0.2450	0.20-0.32		
ICV 160-223584/1	10/26/15 20:28	82237-334_00003	0.2461	0.20-0.32	100.4	95-105
CCV 160-262332/1	07/26/16 09:35	82242-334_00001	0.2337	0.20-0.32	95.4	95-105

Detector: AV170

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223467/1	10/16/15 18:59	82243-334_00001	0.2595	0.20-0.32		
ICV 160-223585/1	10/26/15 20:28	82240-334_00001	0.2539	0.20-0.32	97.8	95-105
CCV 160-262162/1	07/26/16 10:48	82243-334_00001	0.2603	0.20-0.32	100.3	95-105

Alpha Spectroscopy Calibration Summary

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 160-262165/1	07/26/16 10:47	82246-334_00001	0.2509	0.20-0.32	98.1	95-105

Detector: AV176

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223473/1	10/17/15 14:48	82233-334_00001	0.2619	0.20-0.32		
ICV 160-223591/1	10/31/15 14:14	82232-334_00001	0.2594	0.20-0.32	99.0	95-105
CCV 160-262168/1	07/26/16 12:11	82233-334_00001	0.2630	0.20-0.32	100.4	95-105

Detector: AV177

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223474/1	10/17/15 14:55	82234-334_00001	0.2411	0.20-0.32		
ICV 160-223592/1	10/31/15 14:14	82245-334_00001	0.2462	0.20-0.32	102.1	95-105
CCV 160-262169/1	07/26/16 12:11	82234-334_00001	0.2294	0.20-0.32	95.1	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 160-262172/1	07/26/16 12:12	82232-334_00001	0.2625	0.20-0.32	99.5	95-105

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

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: AV195

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223492/1	10/17/15 18:19	82240-334_00001	0.2585	0.20-0.32		
ICV 160-223610/1	11/01/15 14:28	82243-334_00001	0.2594	0.20-0.32	100.4	95-105
CCV 160-262176/1	07/26/16 12:23	82240-334_00001	0.2505	0.20-0.32	96.9	95-105

Detector: AV196

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223493/1	10/17/15 18:14	82241-334_00001	0.2643	0.20-0.32		
ICV 160-223611/1	11/01/15 14:25	82244-334_00001	0.2581	0.20-0.32	97.6	95-105
CCV 160-262333/1	07/26/16 09:35	82241-334_00001	0.2590	0.20-0.32	98.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV200

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223497/1	10/17/15 18:15	82245-334_00001	0.2441	0.20-0.32		
ICV 160-223615/1	11/01/15 14:26	82234-334_00001	0.2409	0.20-0.32	98.7	95-105
CCV 160-262177/1	07/26/16 12:13	82245-334_00001	0.2323	0.20-0.32	95.2	95-105

Detector: AV206

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223503/1	10/18/15 16:10	82235-334_00001	0.2455	0.20-0.32		
ICV 160-223621/1	11/01/15 16:02	82247-334_00001	0.2375	0.20-0.32	96.7	95-105
CCV 160-262180/1	07/26/16 19:07	82235-334_00001	0.2335	0.20-0.32	95.1	95-105

Detector: AV207

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223504/1	10/18/15 16:11	82236-334_00001	0.2515	0.20-0.32		
ICV 160-223622/1	11/01/15 16:10	82246-334_00001	0.2519	0.20-0.32	100.2	95-105
CCV 160-262181/1	07/26/16 12:13	82236-334_00001	0.2499	0.20-0.32	99.4	95-105

Detector: AV208

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223505/1	10/18/15 16:19	82237-334_00003	0.2552	0.20-0.32		
ICV 160-223623/1	11/01/15 16:11	82242-334_00001	0.2536	0.20-0.32	99.4	95-105
CCV 160-262182/1	07/26/16 12:14	82237-334_00003	0.2538	0.20-0.32	99.4	95-105

Detector: AV209

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223506/1	10/18/15 16:11	82240-334_00001	0.2567	0.20-0.32		
ICV 160-223624/1	11/01/15 16:11	82243-334_00001	0.2597	0.20-0.32	101.2	95-105
CCV 160-262183/1	07/26/16 13:39	82240-334_00001	0.2552	0.20-0.32	99.4	95-105

Detector: AV210

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223507/1	10/18/15 16:19	82241-334_00001	0.2537	0.20-0.32		
ICV 160-223625/1	11/01/15 16:03	82244-334_00001	0.2488	0.20-0.32	98.0	95-105
CCV 160-262184/1	07/26/16 10:46	82241-334_00001	0.2473	0.20-0.32	97.5	95-105
CCV 160-268352/1	09/06/16 11:23	82241-334_00001	0.2497	0.20-0.32	98.4	95-105

Detector: AV211

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223508/1	10/18/15 16:19	82242-334_00001	0.2400	0.20-0.32		
ICV 160-223626/1	11/01/15 16:11	82237-334_00003	0.2406	0.20-0.32	100.3	95-105
CCV 160-268353/1	09/06/16 11:23	82242-334_00001	0.2298	0.20-0.32	95.8	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 160-268354/1	09/06/16 11:24	82243-334_00001	0.2694	0.20-0.32	99.8	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:20:51PM 10/26/2015

Calibration

Sample Name: ICV-7107;AV148-20151026
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 10/26/2015 8:20:51PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

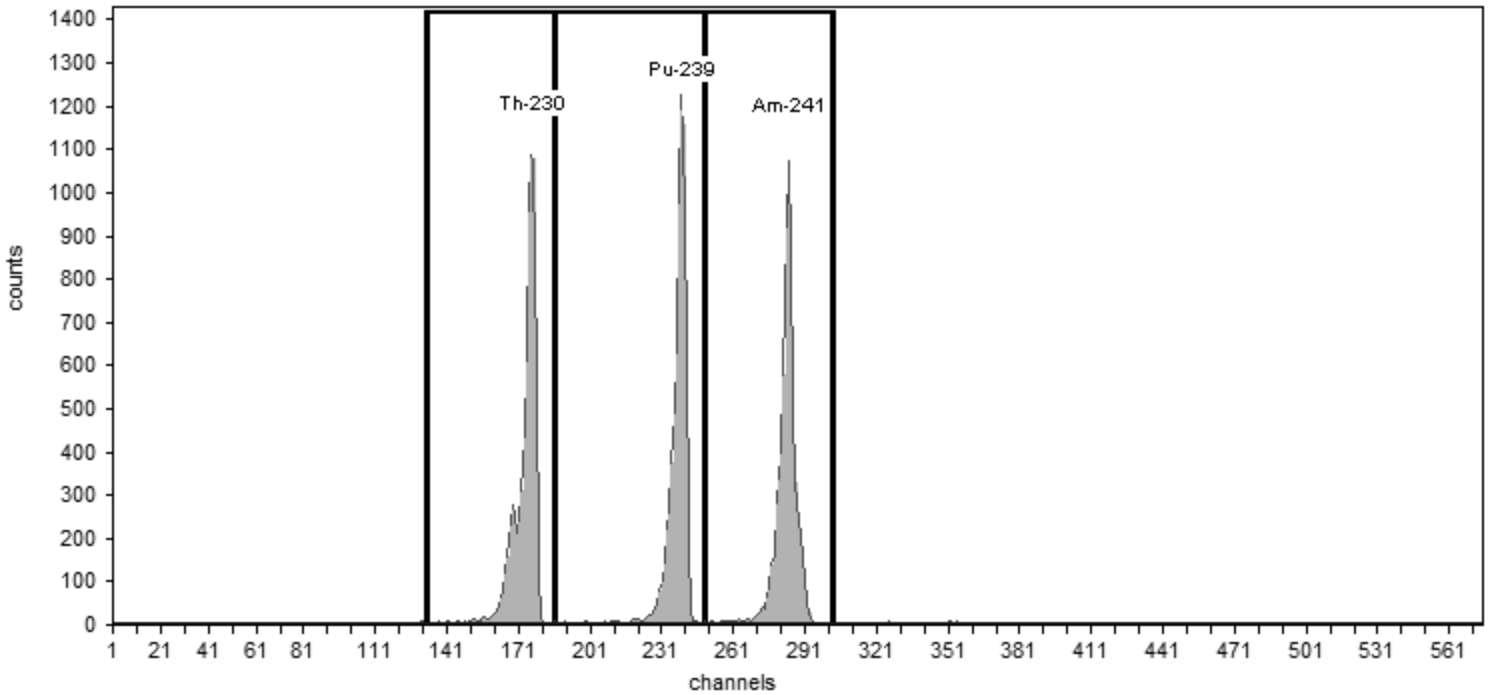
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 10/26/2015 7:10:27PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-7107;AV148-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.86% +/- 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	33.29	7,000.00	116.67
Pu-239	240	5,155.40	186	249	31.50	6,783.00	113.05
Am-241	284	5,485.70	249	303	30.75	6,700.00	111.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:20:54PM 10/26/2015

Calibration

Sample Name: ICV-9884;AV149-20151026
Description:
Detector: AV149

Analyst: 60040
Analysis Date: 10/26/2015 8:20:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

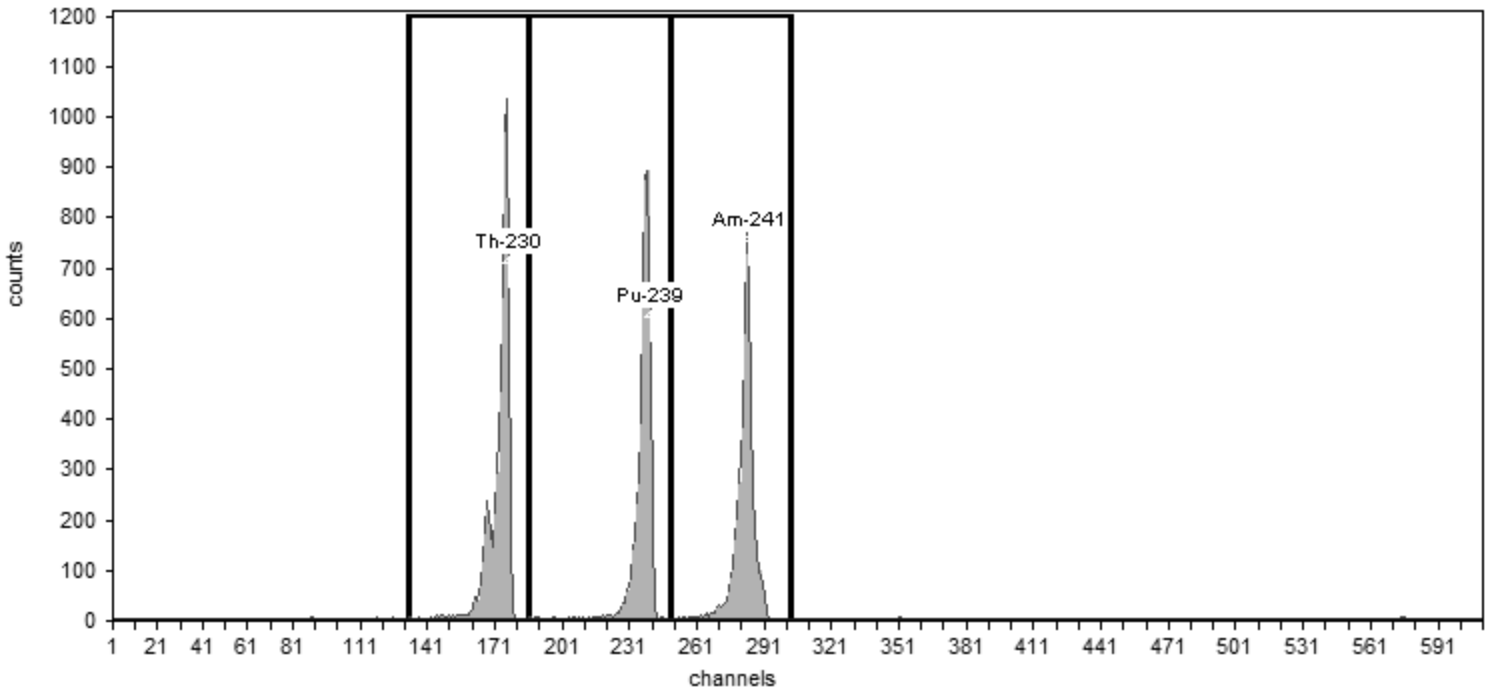
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 10/26/2015 7:10:42PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9884;AV149-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.96% +/- 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	29.24	5,784.00	96.40
Pu-239	240	5,155.40	186	249	30.13	4,711.00	78.52
Am-241	284	5,485.70	249	303	31.22	4,732.00	78.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:13:56PM 10/27/2015

Calibration

Sample Name: ICV-8874;AV161-20151026
Description:
Detector: AV161

Analyst: 60040
Analysis Date: 10/27/2015 2:13:54PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

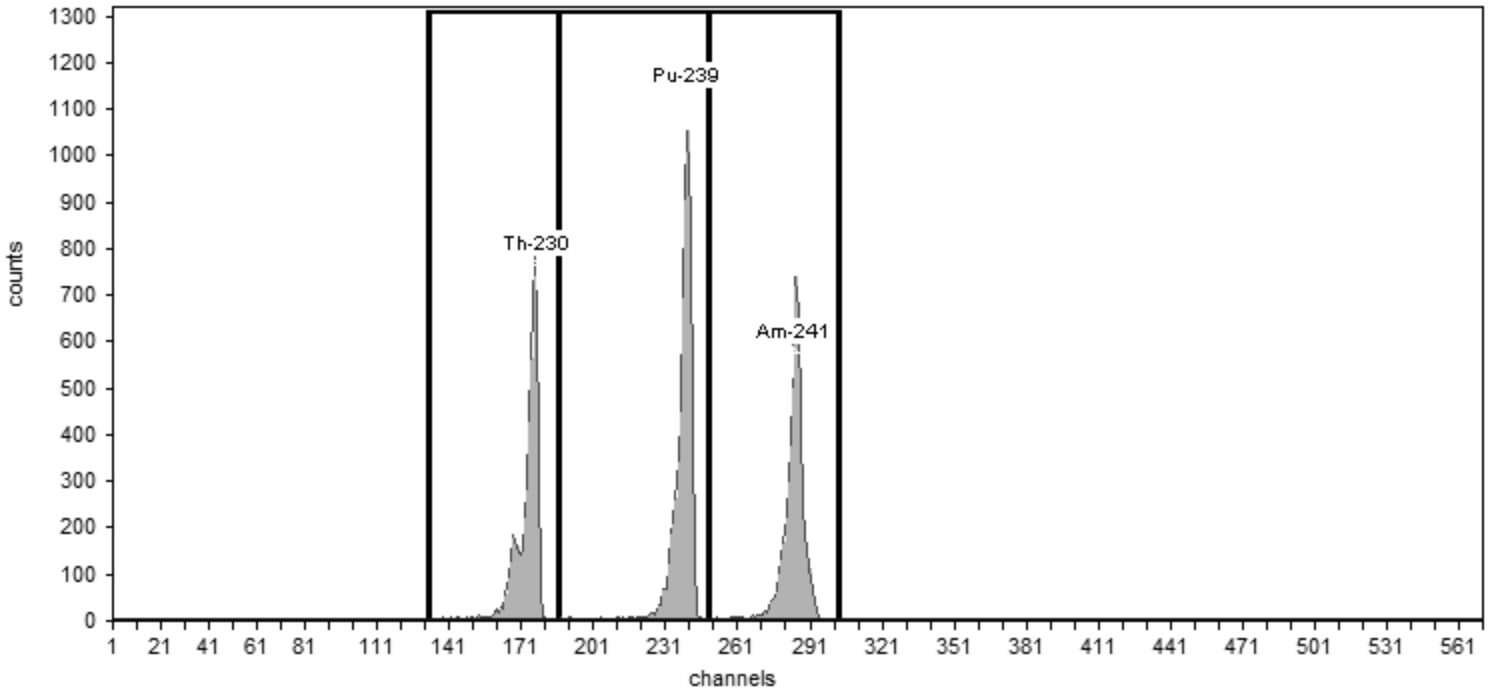
Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 10/26/2015 8:26:29PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8874;AV161-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.38% +/- 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	30.07	4,593.00	76.55
Pu-239	240	5,155.40	186	249	33.01	5,962.00	99.37
Am-241	284	5,485.70	249	303	32.82	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
2:13:59PM 10/27/2015

Calibration

Sample Name: ICV-7107;AV162-20151026
Description:
Detector: AV162

Analyst: 60040
Analysis Date: 10/27/2015 2:13:58PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

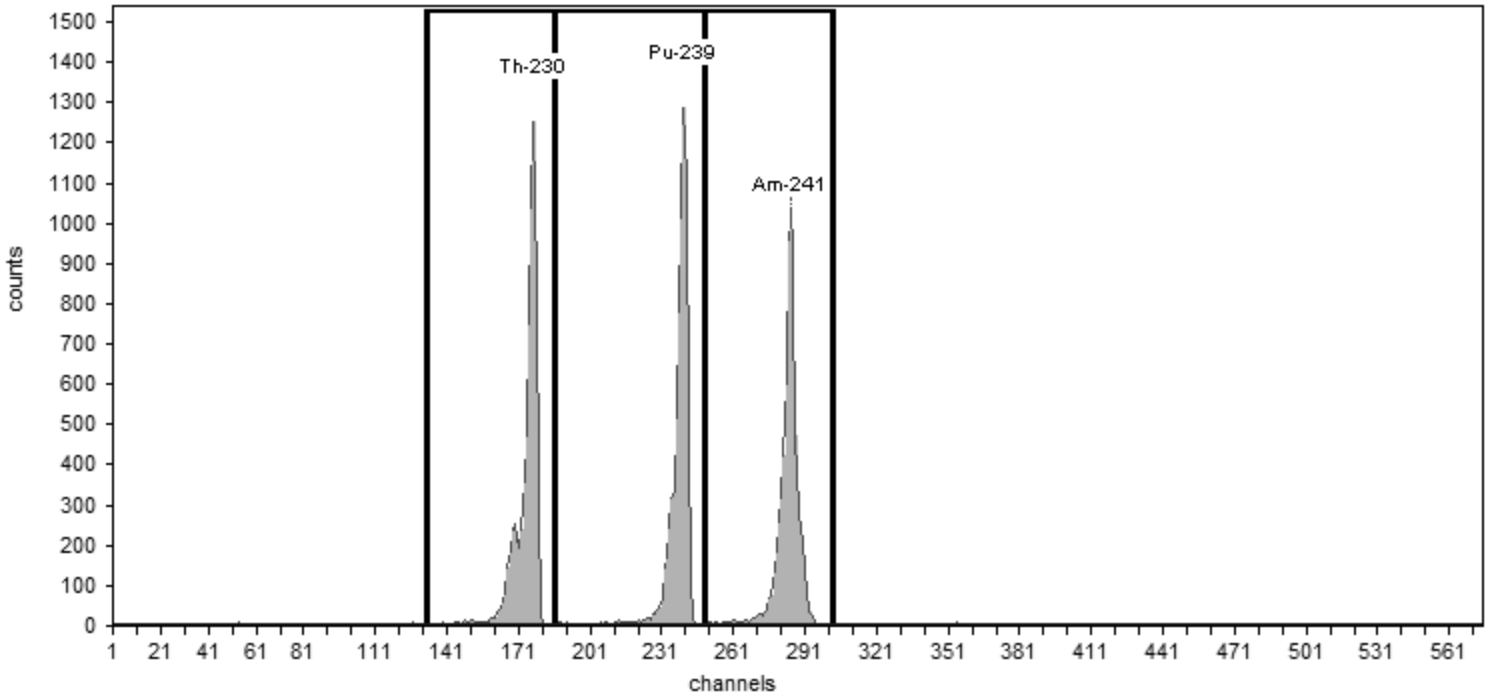
Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 10/26/2015 8:26:40PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV162-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.72% +/- 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	28.67	6,855.00	114.25
Pu-239	240	5,155.40	186	249	31.64	6,850.00	114.17
Am-241	284	5,485.70	249	303	29.54	6,681.00	111.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:03PM 10/27/2015

Calibration

Sample Name: ICV-9884;AV163-20151026
Description:
Detector: AV163

Analyst: 60040
Analysis Date: 10/27/2015 2:14:02PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

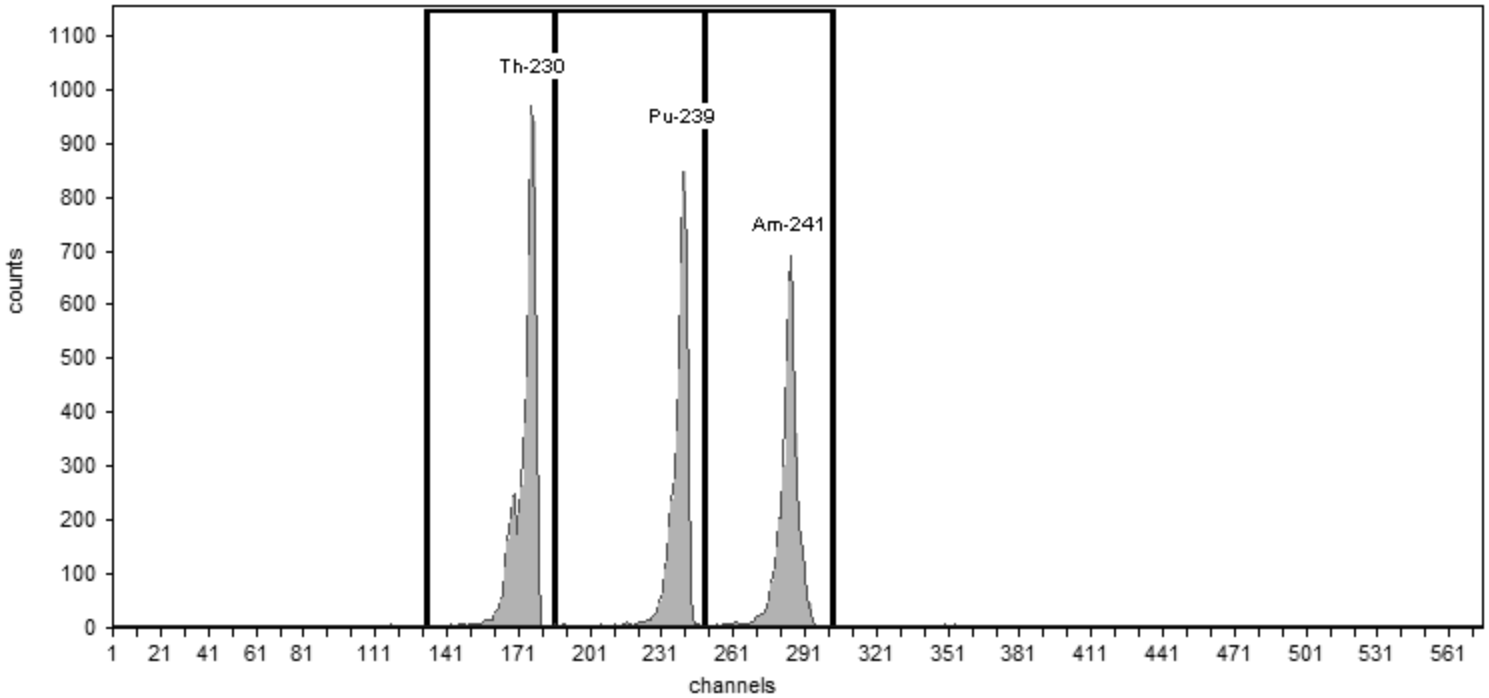
Detector: AV163 , SN: 50-110E7
Acquisition Start Date: 10/26/2015 8:26:57PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-9884;AV163-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.23% +/- 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	28.79	5,904.00	98.40
Pu-239	240	5,155.40	186	249	31.73	4,710.00	78.50
Am-241	284	5,485.70	249	303	36.21	4,779.00	79.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:44PM 10/27/2015

Calibration

Sample Name: ICV-9886;AV164-20151026a
Description:
Detector: AV164

Analyst: 60040
Analysis Date: 10/27/2015 2:14:43PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

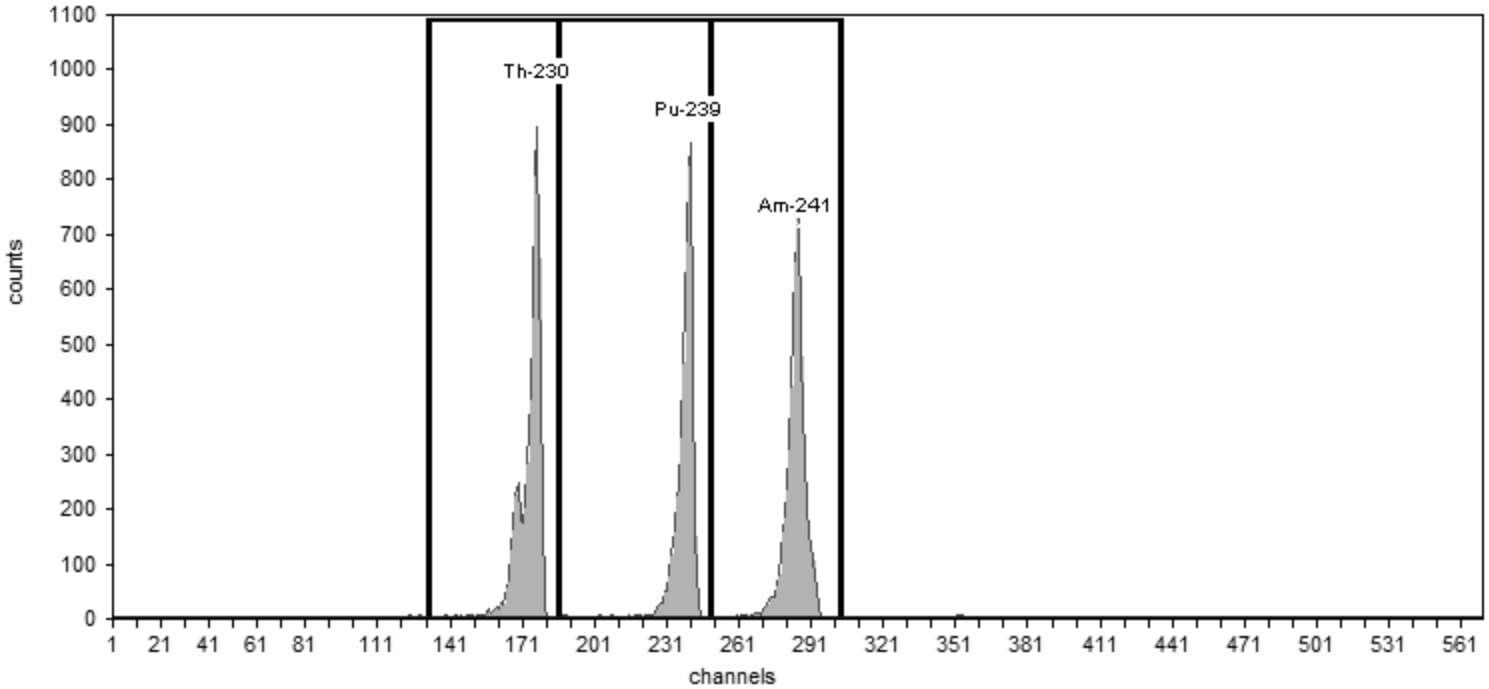
Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 10/26/2015 8:32:20PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9886;AV164-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.64% +/- 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	30.73	5,399.00	89.98
Pu-239	240	5,155.40	186	249	32.87	4,876.00	81.27
Am-241	284	5,485.70	249	303	35.38	5,252.00	87.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:19PM 10/27/2015

Calibration

Sample Name: ICV-9520;AV169-20151026
Description:
Detector: AV169

Analyst: 60040
Analysis Date: 10/27/2015 2:14:18PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

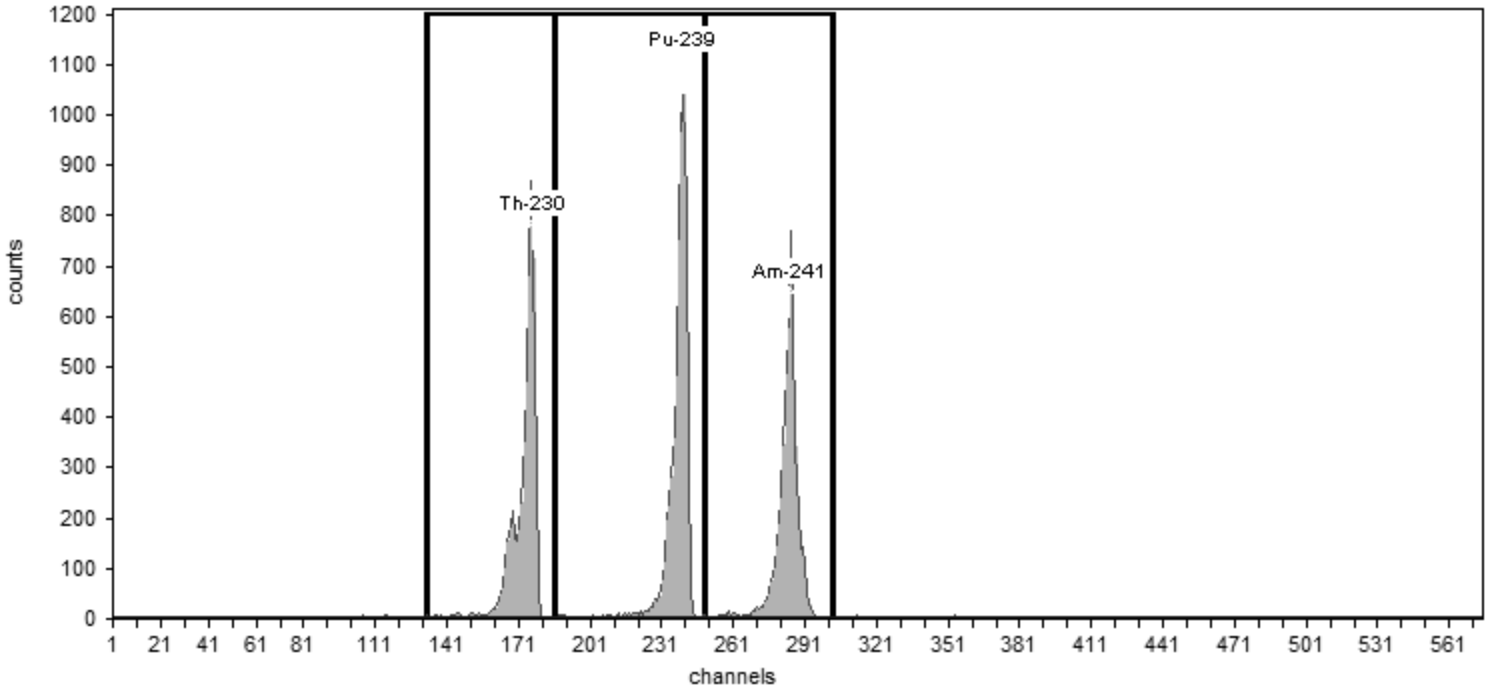
Detector: AV169 , SN: 50-112 G5
Acquisition Start Date: 10/26/2015 8:28:24PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9520;AV169-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.61% +/- 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	29.53	5,052.00	84.20
Pu-239	240	5,155.40	186	249	33.21	5,973.00	99.55
Am-241	284	5,485.70	249	303	33.98	4,794.00	79.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:23PM 10/27/2015

Calibration

Sample Name: ICV-9792;AV170-20151026
Description:
Detector: AV170

Analyst: 60040
Analysis Date: 10/27/2015 2:14:22PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

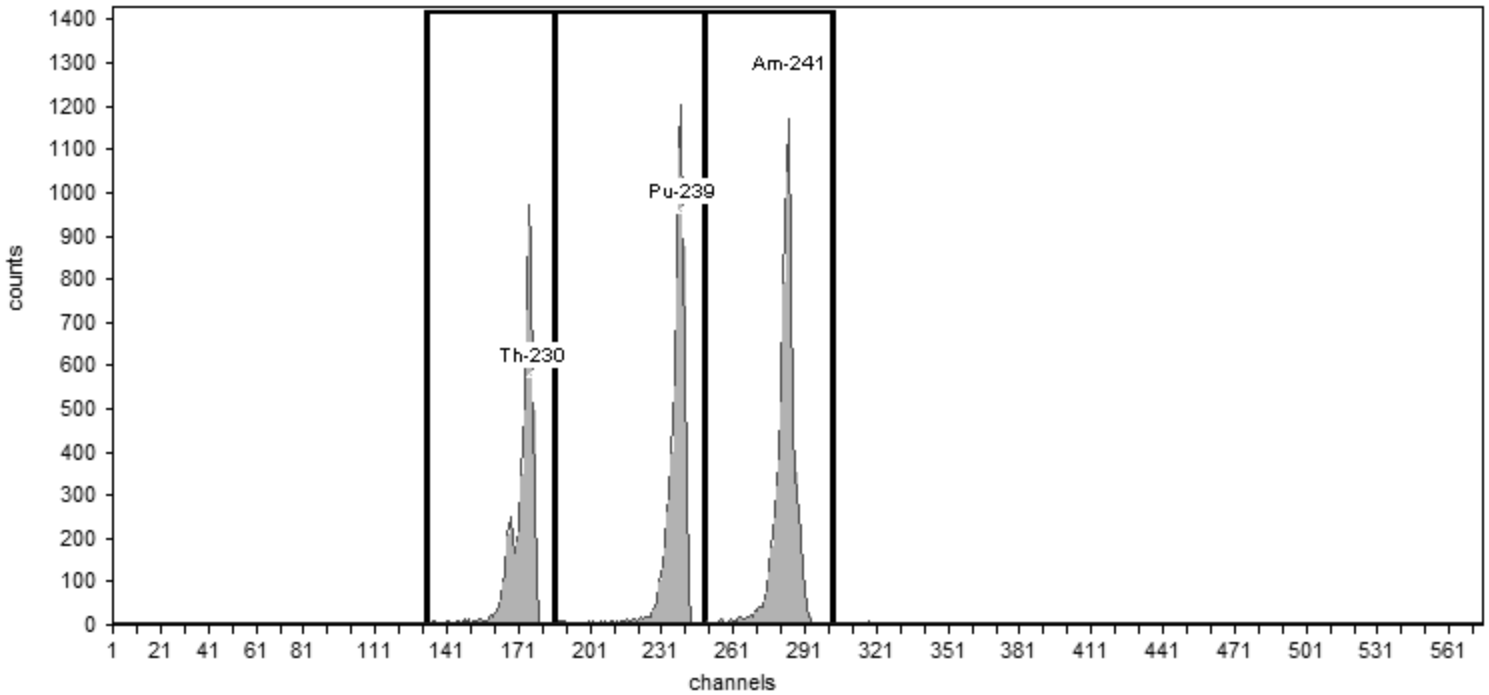
Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 10/26/2015 8:28:34PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9792;AV170-2015102

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.39% +/- 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	30.57	5,684.00	94.73
Pu-239	240	5,155.40	186	249	32.08	6,617.00	110.28
Am-241	284	5,485.70	249	303	32.83	7,530.00	125.50

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

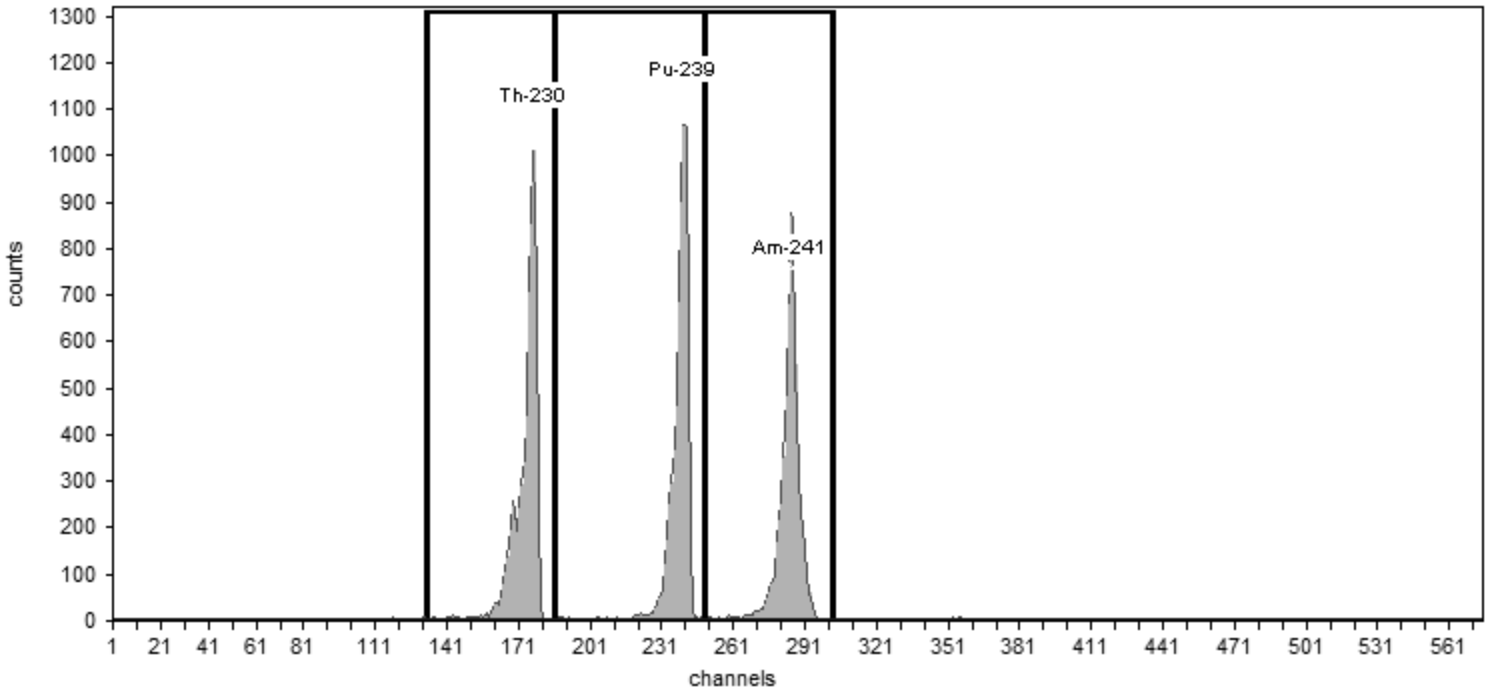
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 10/26/2015 8:29:21PM

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
3:50:46PM 10/31/2015

Calibration

Sample Name: ICV-7107;AV176-20151031
Description:
Detector: AV176

Analyst: 60040
Analysis Date: 10/31/2015 3:50:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

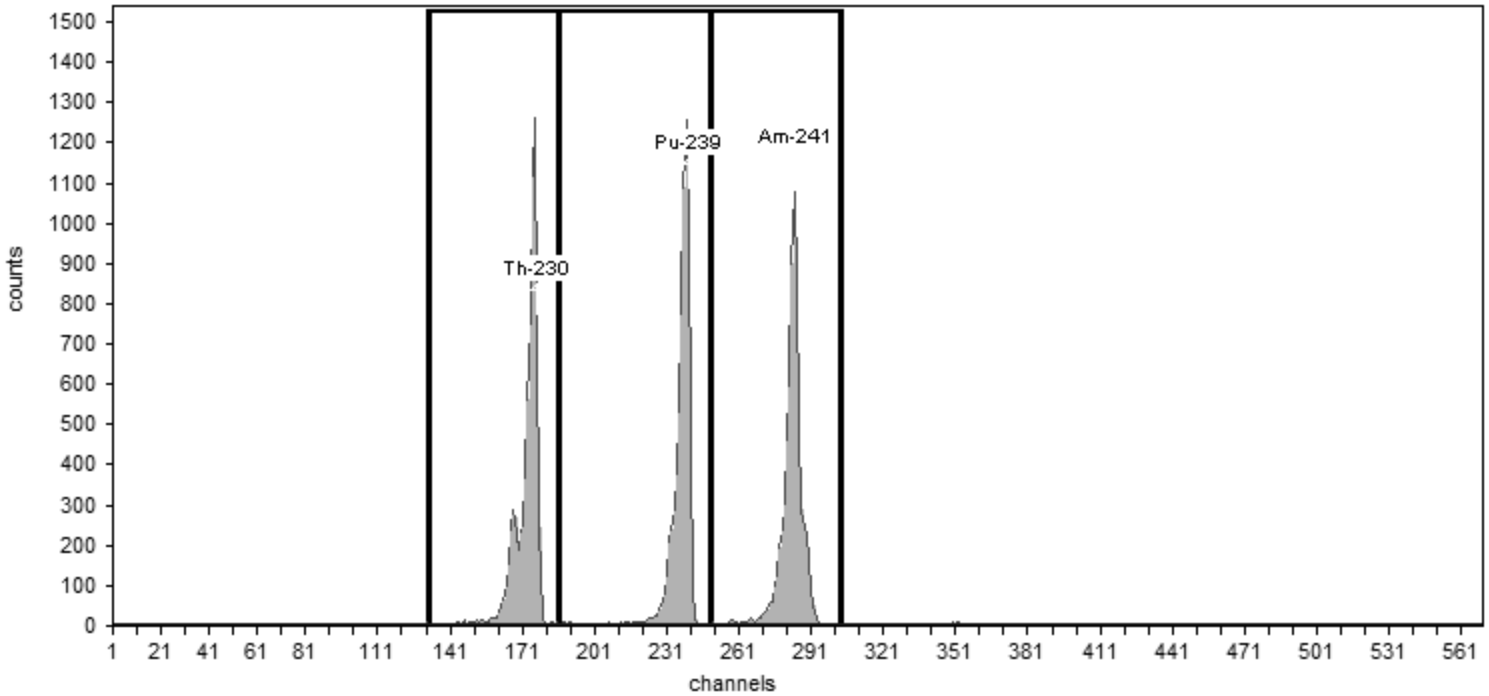
Detector: AV176 , SN: 50-117H2
Acquisition Start Date: 10/31/2015 2:14:13PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-7107;AV176-2015103

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.94% +/- 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	28.70	7,016.00	116.93
Pu-239	240	5,155.40	186	249	31.89	6,822.00	113.70
Am-241	284	5,485.70	249	303	32.07	6,708.00	111.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:50:49PM 10/31/2015

Calibration

Sample Name: ICV-9884;AV177-20151031
Description:
Detector: AV177

Analyst: 60040
Analysis Date: 10/31/2015 3:50:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

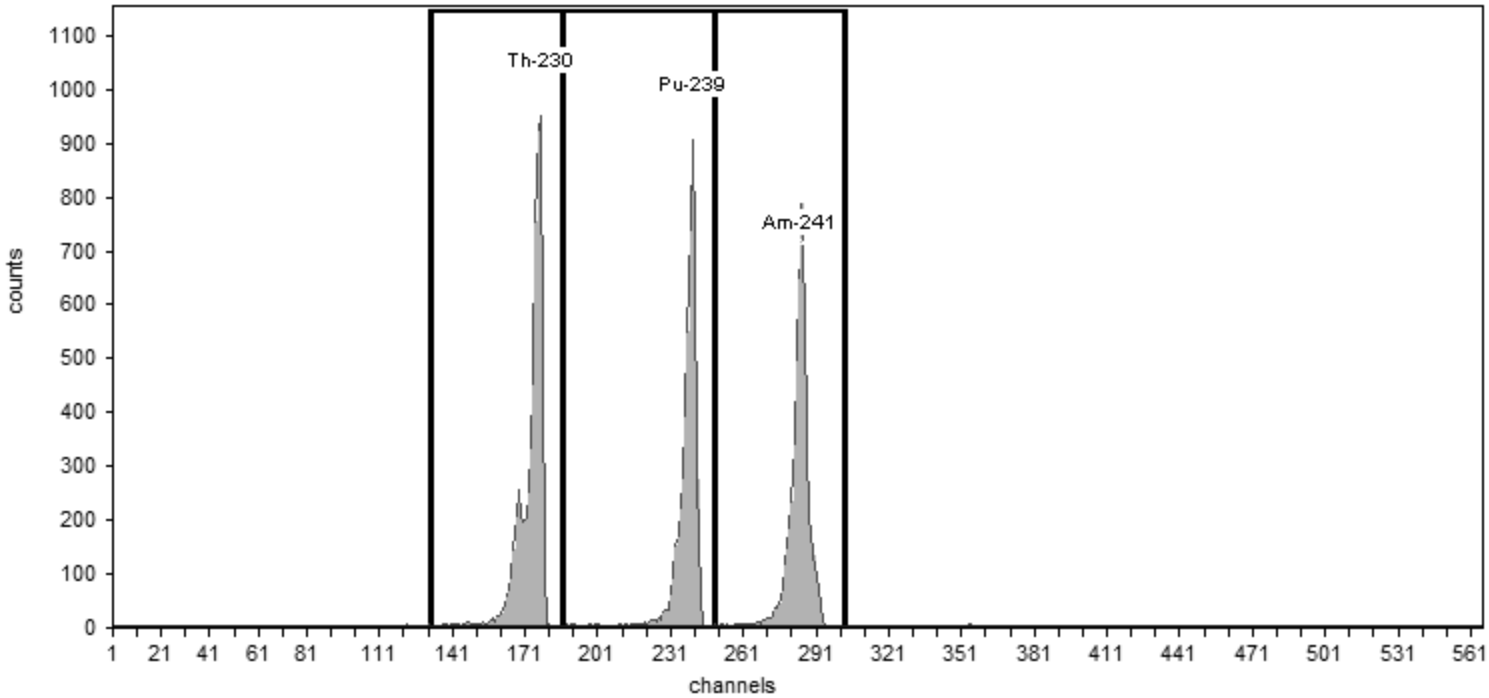
Detector: AV177 , SN: 50-117H3
Acquisition Start Date: 10/31/2015 2:14:31PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-9884;AV177-2015103

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.62% +/- 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	29.79	5,904.00	98.40
Pu-239	240	5,155.40	186	249	31.36	4,822.00	80.37
Am-241	284	5,485.70	249	303	33.32	4,925.00	82.08

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

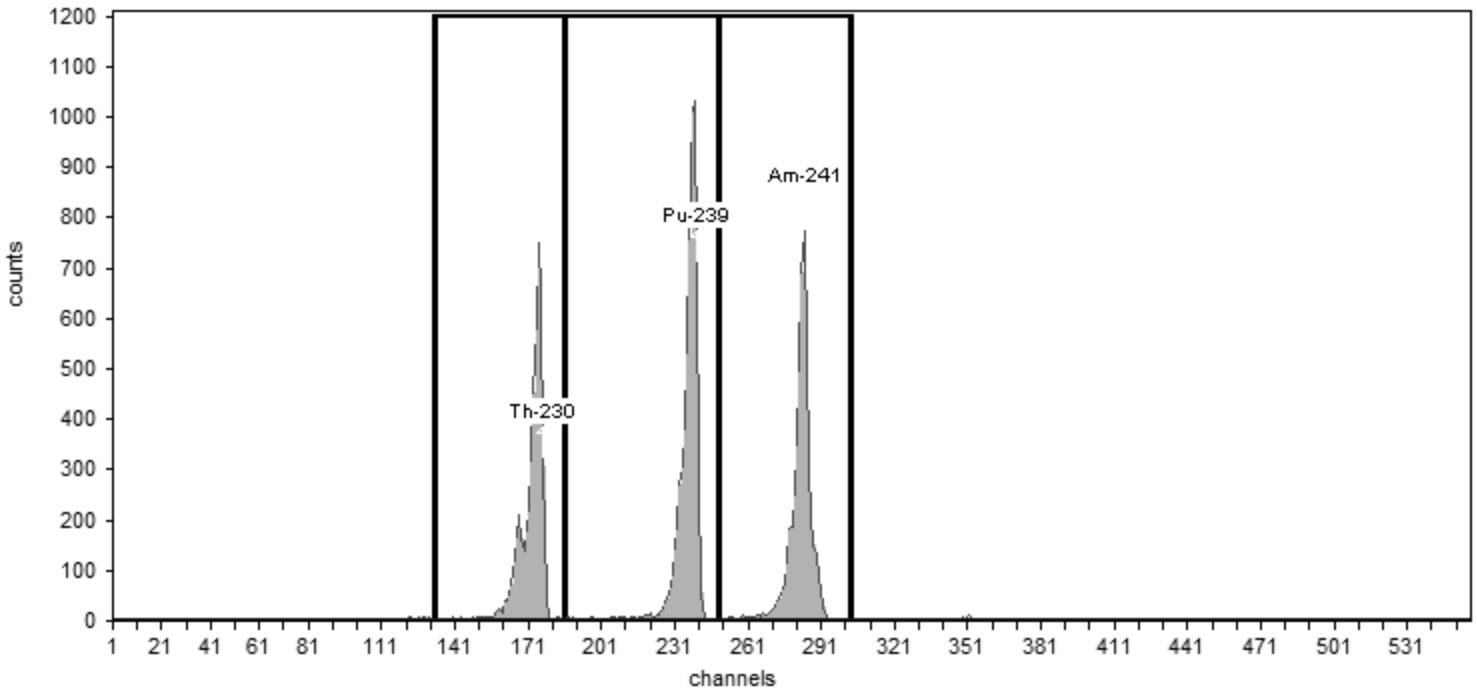
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 11/1/2015 2:23:08PM

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
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

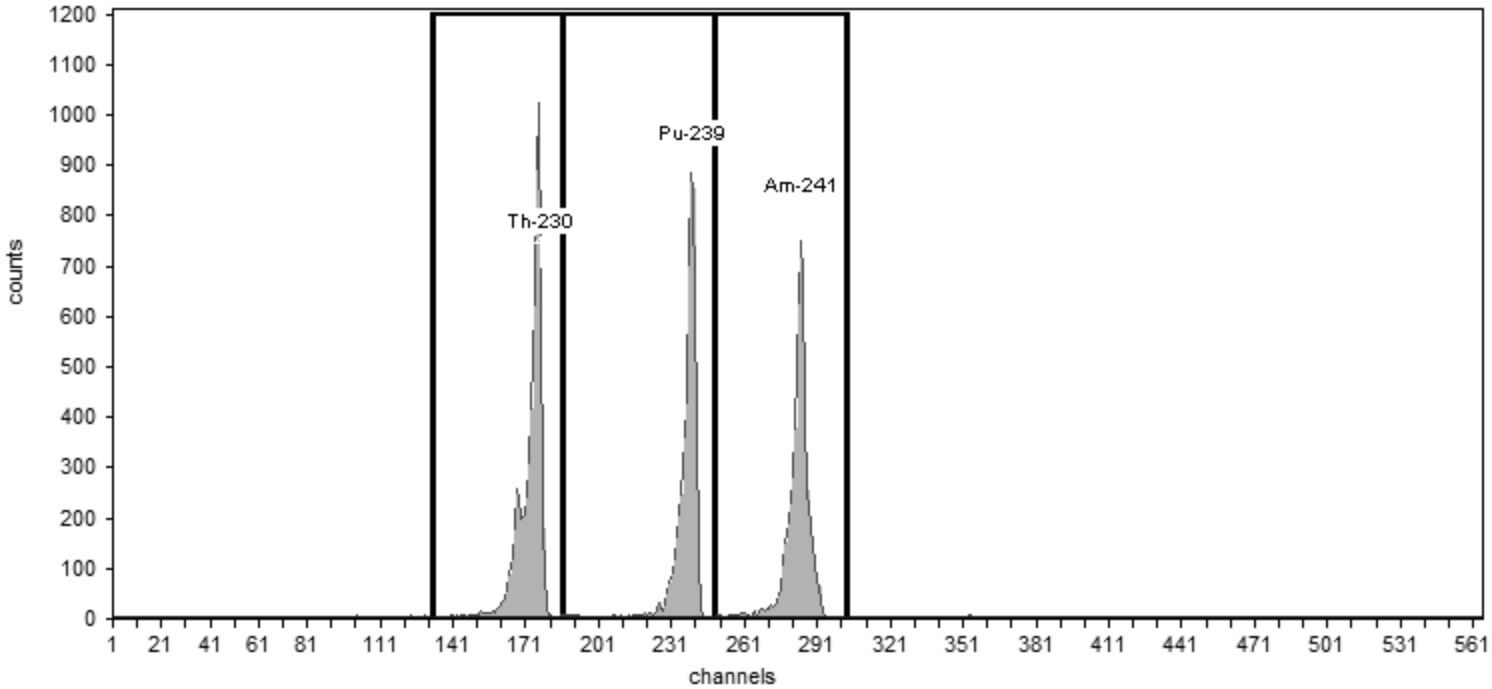
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 11/1/2015 6:11:24PM

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
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

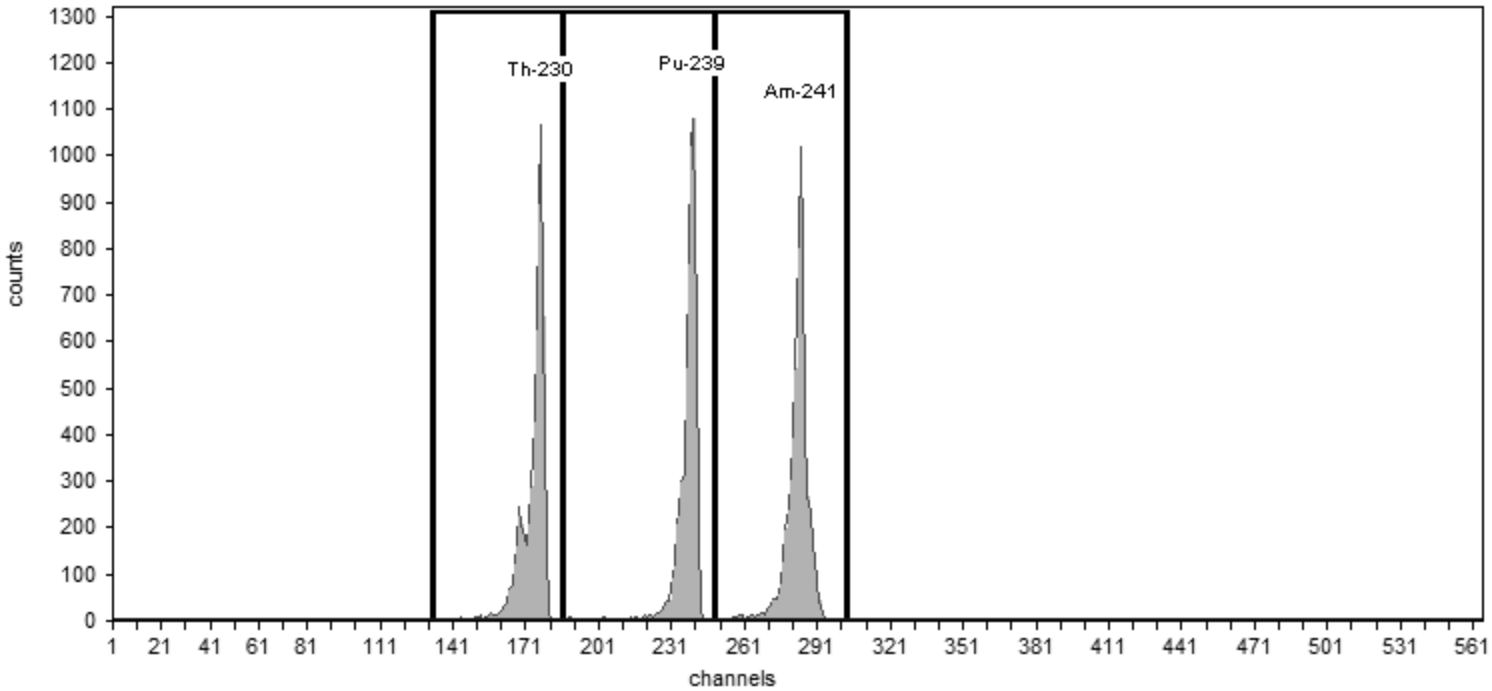
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 11/1/2015 2:24:38PM

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
3:56:20PM 11/1/2015

Calibration

Sample Name: ICV-9795;AV195-20151101a
Description:
Detector: AV195

Analyst: 60040
Analysis Date: 11/1/2015 3:56:19PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

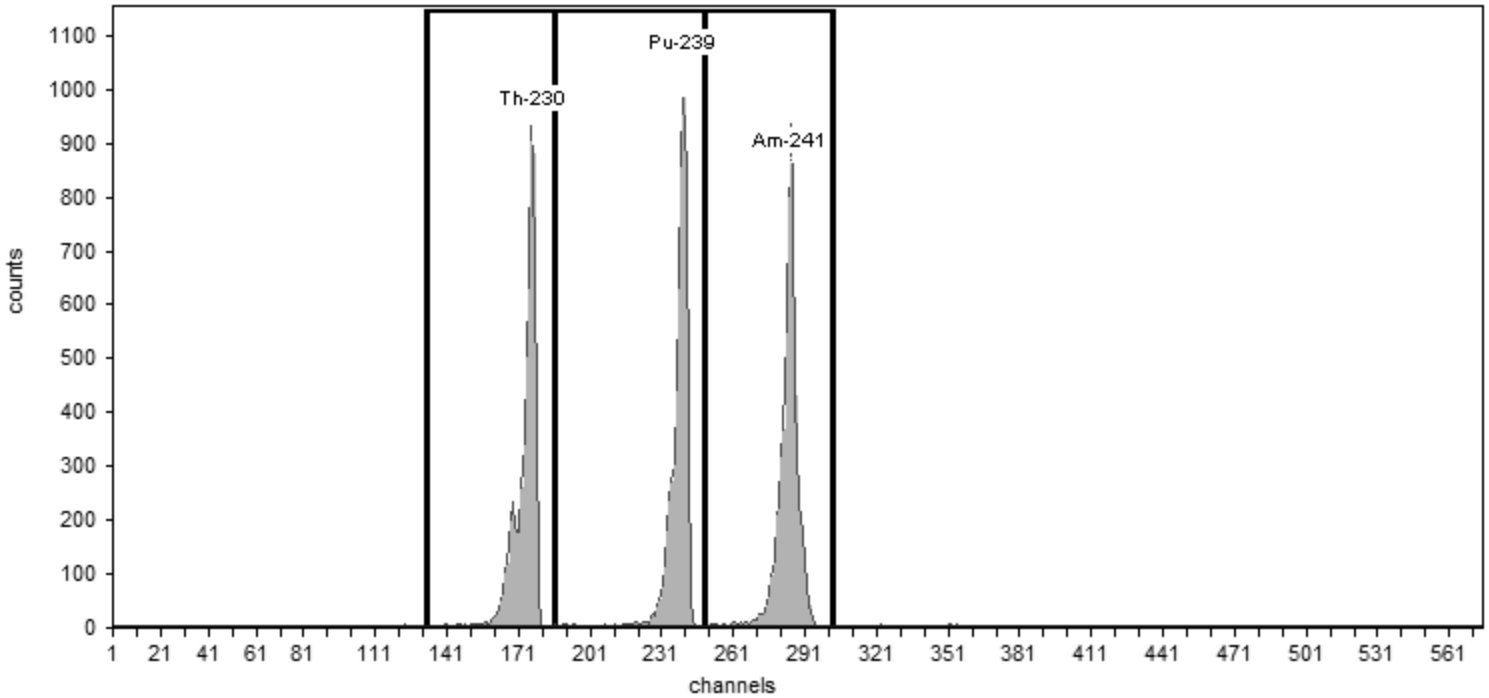
Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 11/1/2015 2:28:52PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9795;AV195-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.94% +/- 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	30.62	5,443.00	90.72
Pu-239	240	5,155.40	186	249	32.96	5,557.00	92.62
Am-241	284	5,485.70	249	303	32.40	5,972.00	99.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:00PM 11/23/2015

Calibration

Sample Name: ICV-9817;AV196-20151101
Description:
Detector: AV196

Analyst: 60040
Analysis Date: 11/1/2015 3:55:59PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

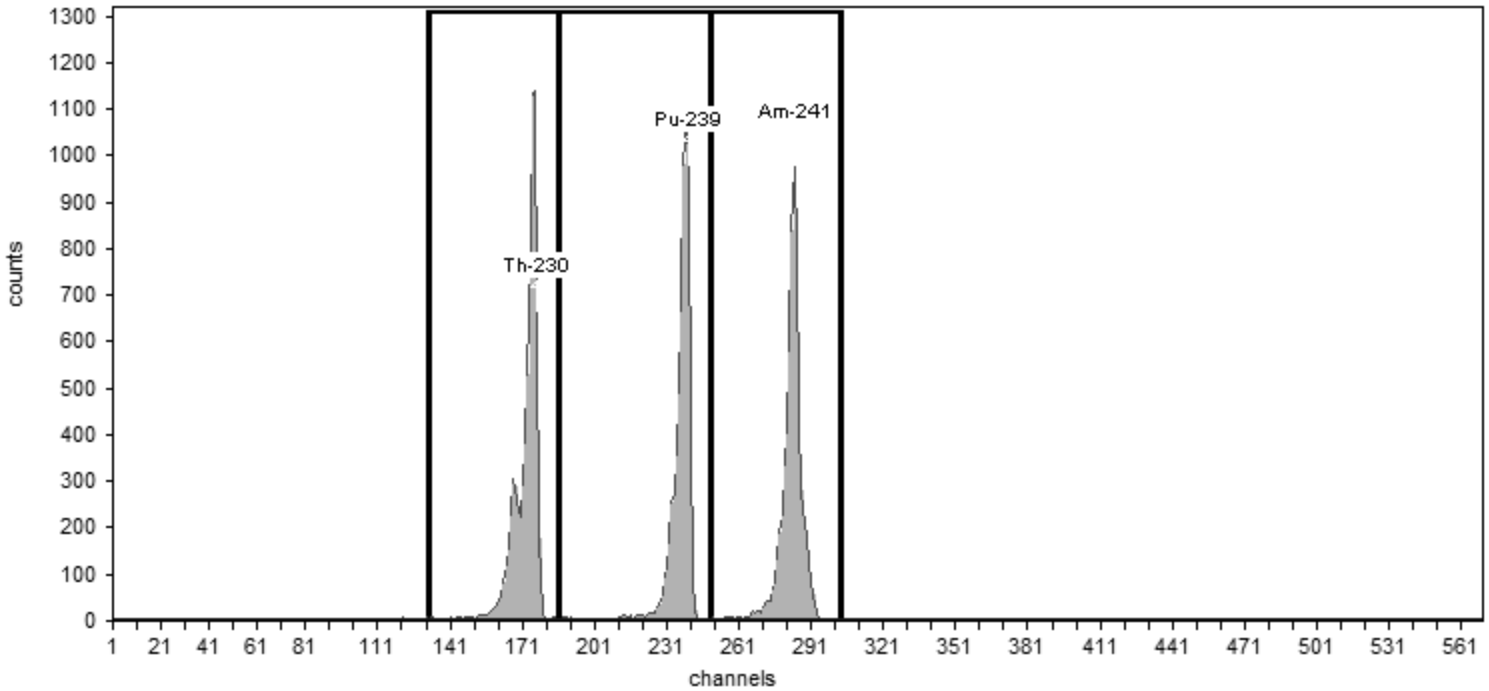
Detector: AV196 , SN: 50-117AA5
Acquisition Start Date: 11/1/2015 2:25:12PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9817;AV196-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.81% +/- 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	29.77	6,971.00	116.18
Pu-239	240	5,155.40	186	249	32.78	6,201.00	103.35
Am-241	284	5,485.70	249	303	32.67	6,258.00	104.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:56:11PM 11/1/2015

Calibration

Sample Name: ICV-8875;AV200-20151101
Description:
Detector: AV200

Analyst: 60040
Analysis Date: 11/1/2015 3:56:11PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

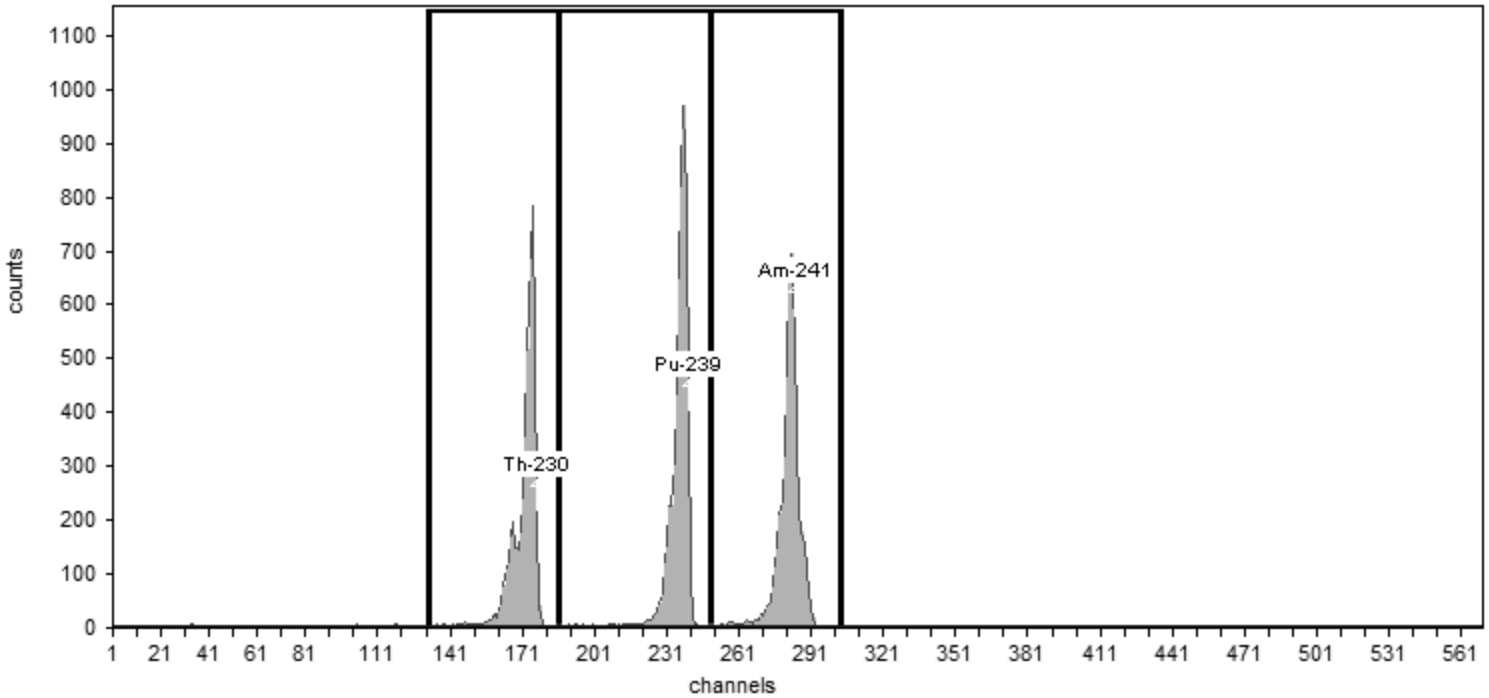
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 11/1/2015 2:26:11PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8875;AV200-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.09% +/- 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	31.02	4,670.00	77.83
Pu-239	240	5,155.40	186	249	33.77	5,472.00	91.20
Am-241	284	5,485.70	249	303	35.49	4,837.00	80.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:31PM 11/23/2015

Calibration

Sample Name: ICV-9886;AV206-20151101
Description:
Detector: AV206

Analyst: 60040
Analysis Date: 11/1/2015 6:06:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

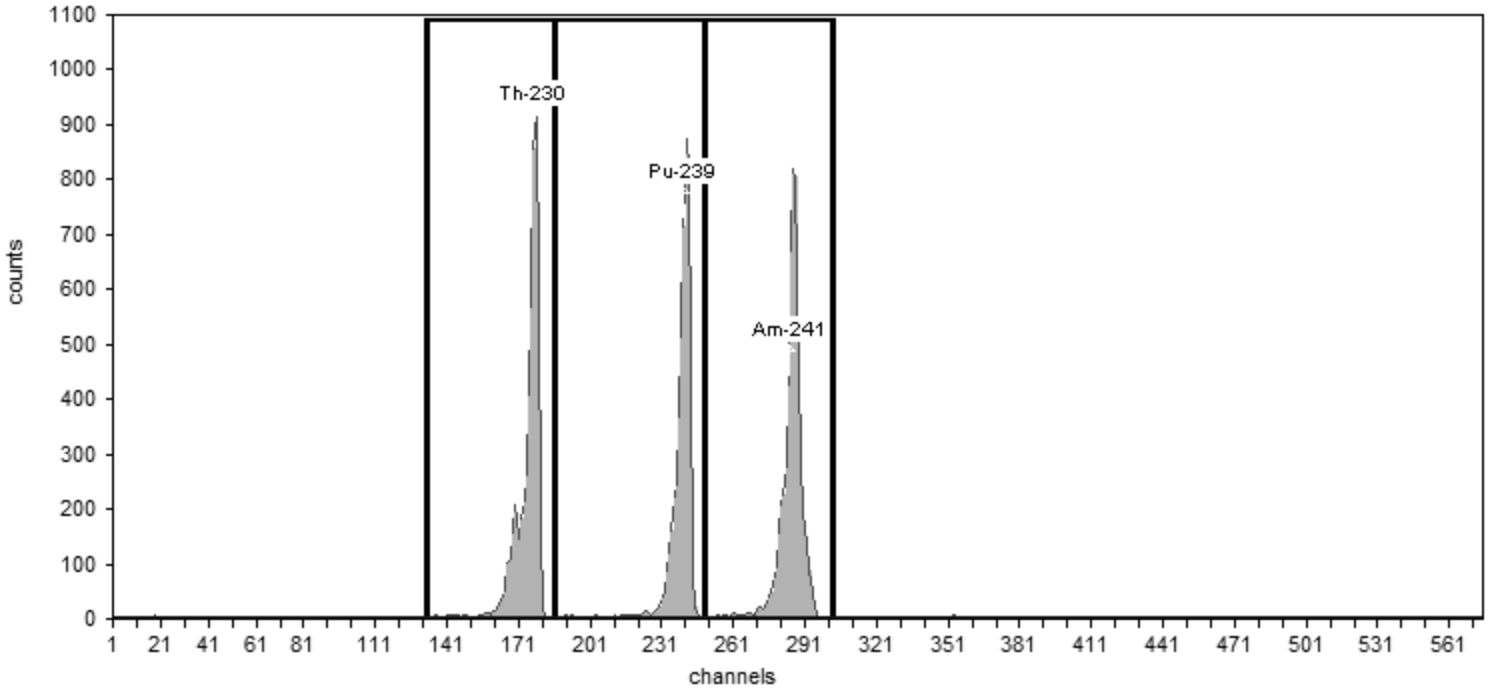
Detector: AV206 , SN: 50-119AA6
Acquisition Start Date: 11/1/2015 4:02:23PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-9886;AV206-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.75% +/- 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	29.65	5,304.00	88.40
Pu-239	240	5,155.40	186	249	34.18	4,902.00	81.70
Am-241	284	5,485.70	249	303	32.70	5,387.00	89.78

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:02PM 11/1/2015

Calibration

Sample Name: ICV-9885;AV207-20151101a
Description:
Detector: AV207

Analyst: 60040
Analysis Date: 11/1/2015 6:07:01PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

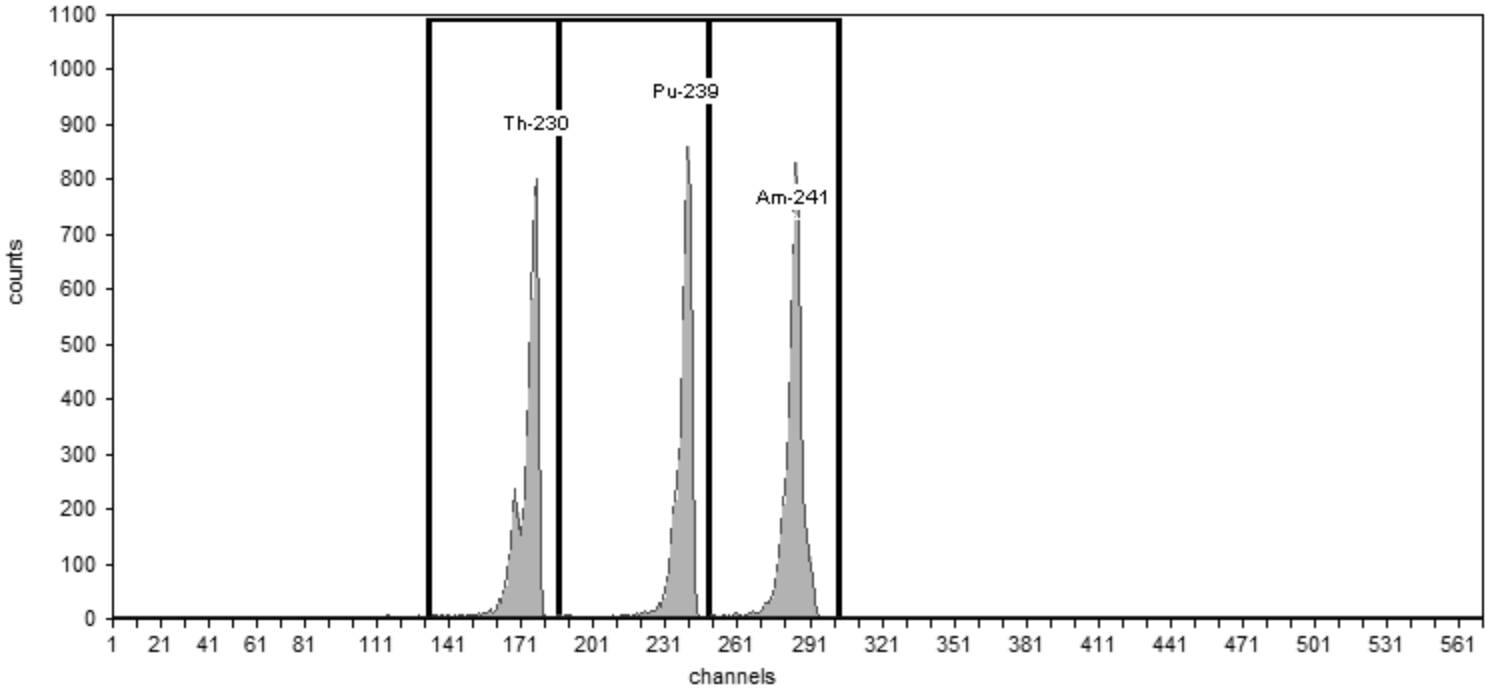
Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 11/1/2015 4:10:52PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV207-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.19% +/- 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	32.38	5,121.00	85.35
Pu-239	240	5,155.40	186	249	32.47	4,800.00	80.00
Am-241	284	5,485.70	249	303	34.15	5,384.00	89.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:13PM 11/1/2015

Calibration

Sample Name: ICV-9794;AV208-20151101a
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 11/1/2015 6:07:12PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

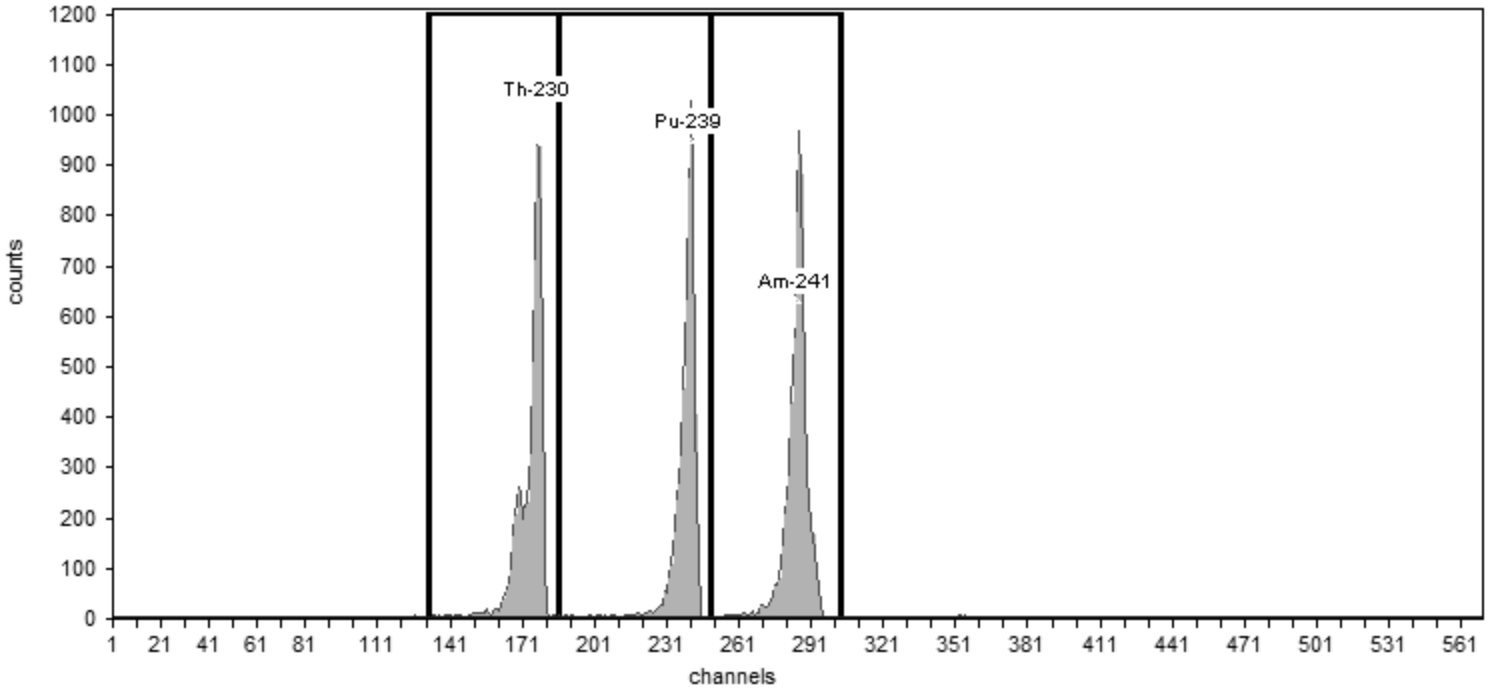
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 11/1/2015 4:11:10PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9794;AV208-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.36% +/- 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	32.70	6,034.00	100.57
Pu-239	240	5,155.40	186	249	33.04	5,859.00	97.65
Am-241	284	5,485.70	249	303	33.63	6,444.00	107.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:40PM 11/23/2015

Calibration

Sample Name: ICV-9795;AV209-20151101a
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 11/1/2015 6:07:16PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

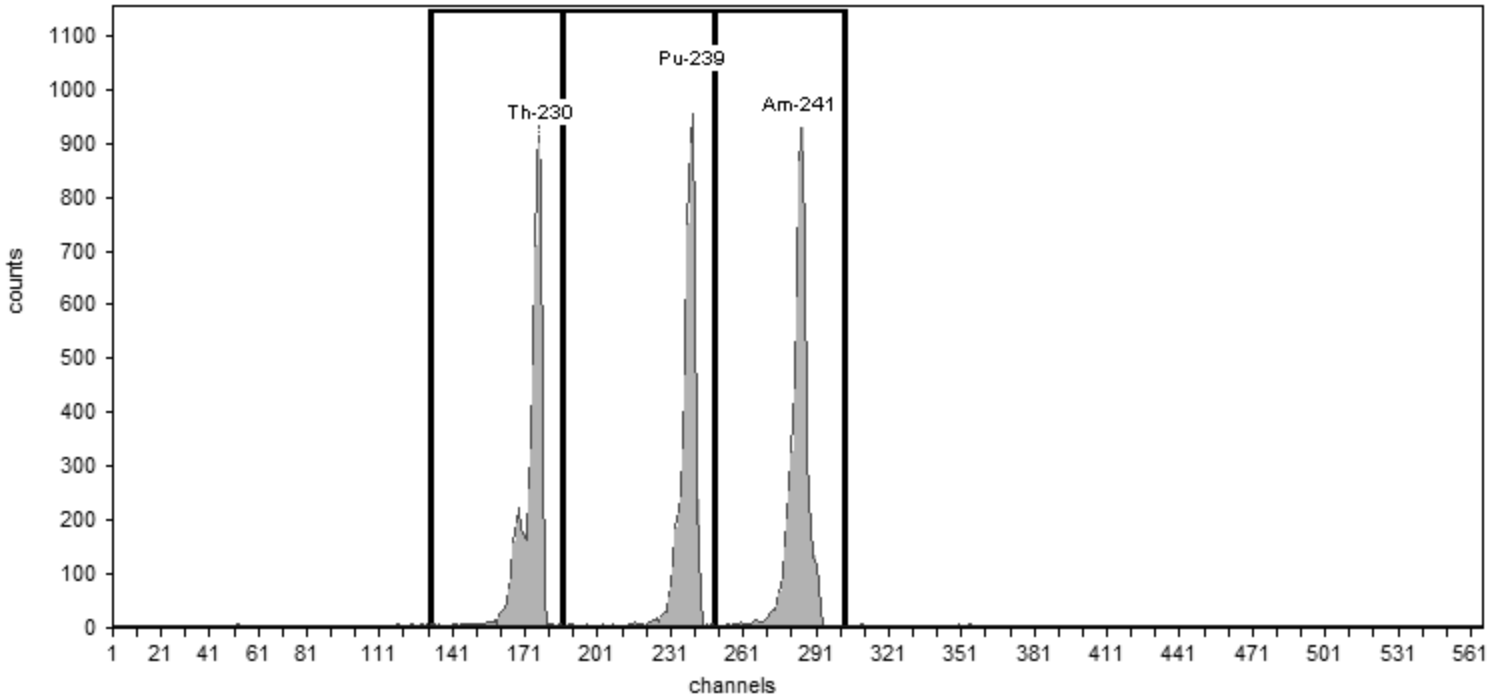
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 11/1/2015 4:11:24PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: ICV-9795;AV209-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.97% +/- 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	28.41	5,476.00	91.27
Pu-239	240	5,155.40	186	249	33.26	5,485.00	91.42
Am-241	284	5,485.70	249	303	33.82	6,037.00	100.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:06:49PM 11/1/2015

Calibration

Sample Name: ICV-9817;AV210-20151101
Description:
Detector: AV210

Analyst: 60040
Analysis Date: 11/1/2015 6:06:48PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

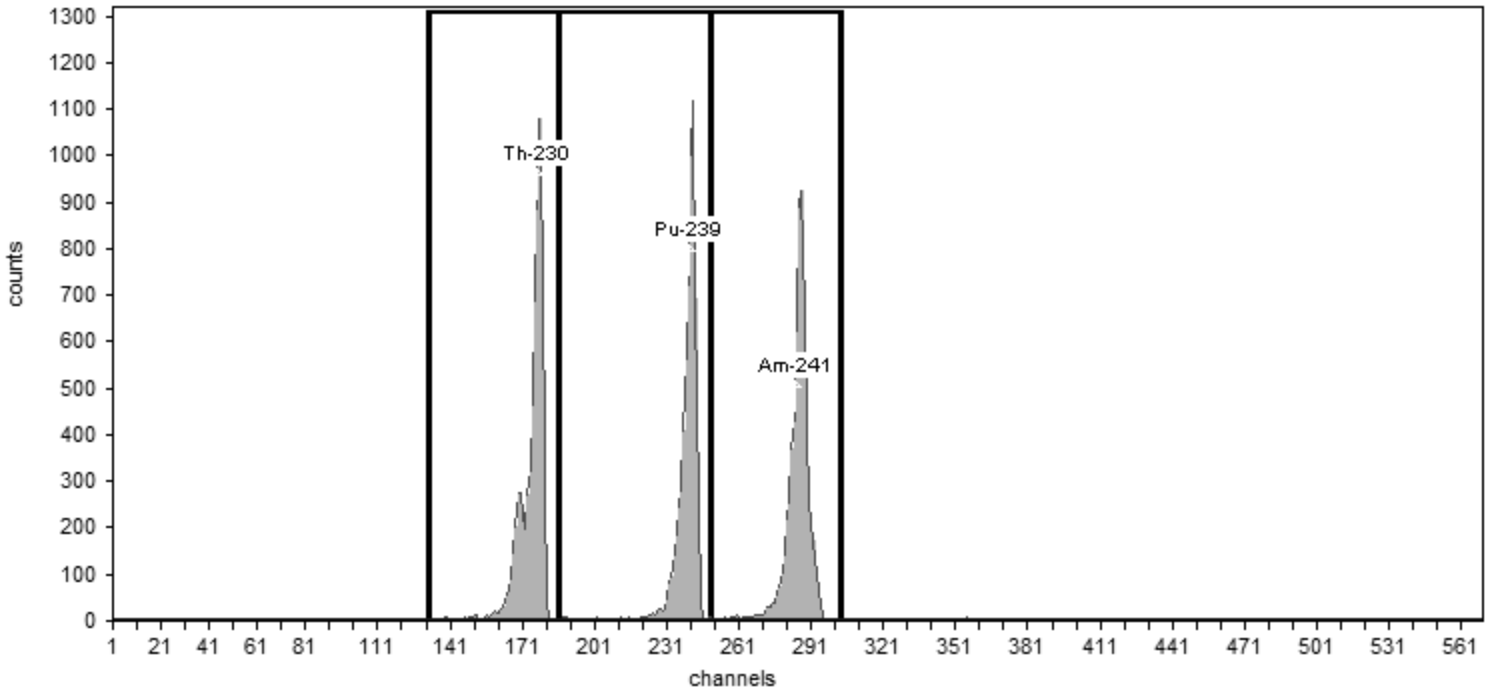
Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 11/1/2015 4:03:18PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9817;AV210-2015110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.88% +/- 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	30.92	6,513.00	108.55
Pu-239	240	5,155.40	186	249	32.12	6,022.00	100.37
Am-241	284	5,485.70	249	303	34.32	6,199.00	103.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:20PM 11/1/2015

Calibration

Sample Name: ICV-9520;AV211-20151101a
Description:
Detector: AV211

Analyst: 60040
Analysis Date: 11/1/2015 6:07:19PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

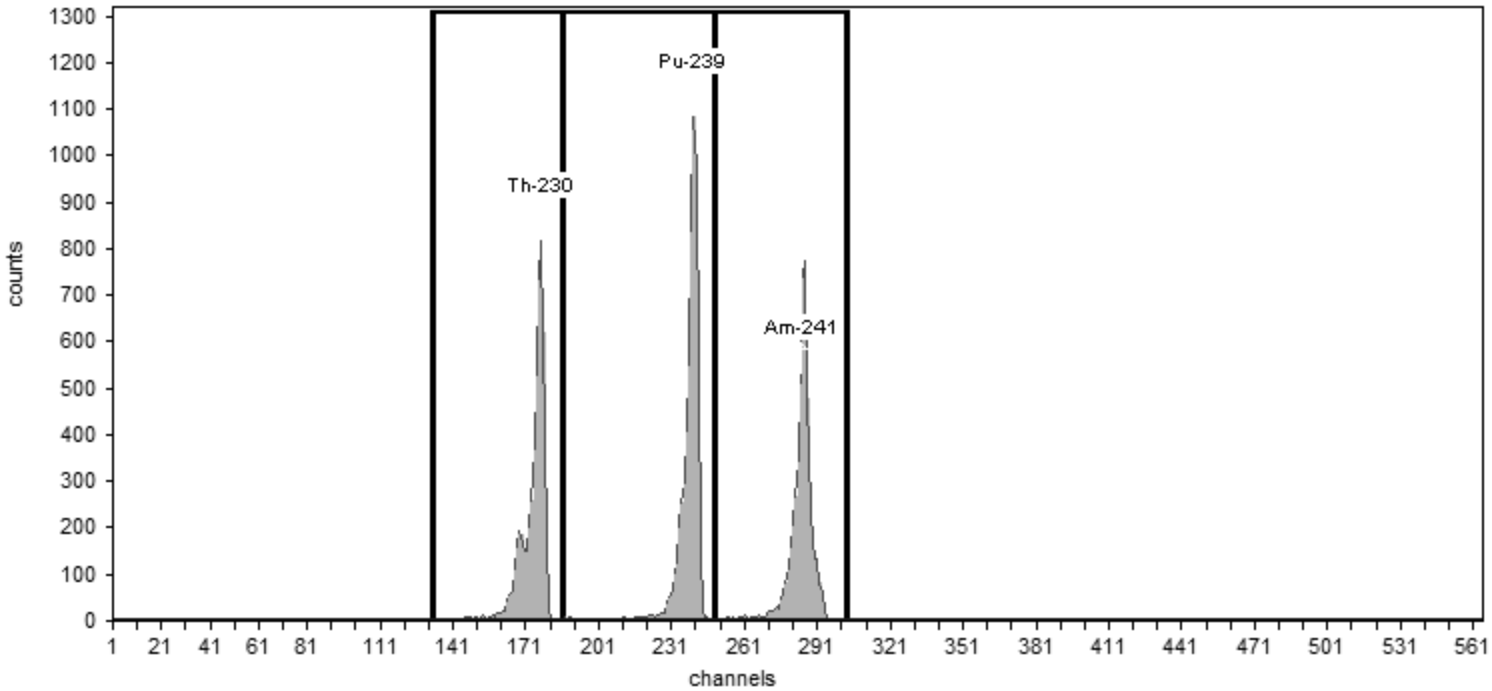
Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 11/1/2015 4:11:46PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9520;AV211-2015110´

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.06% +/- 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	31.42	4,918.00	81.97
Pu-239	240	5,155.40	186	249	29.92	5,801.00	96.68
Am-241	284	5,485.70	249	303	30.48	4,746.00	79.10

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

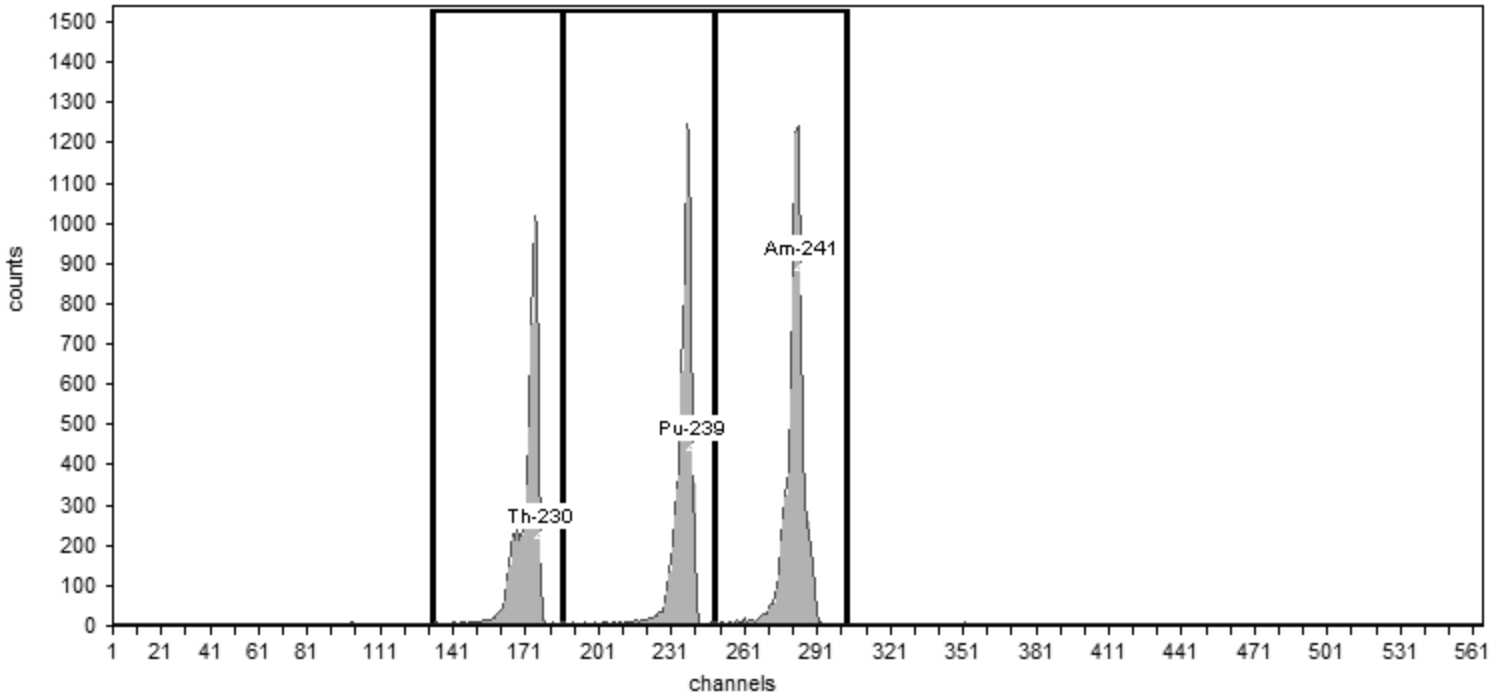
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 11/1/2015 6:11:55PM

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

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:00:44PM 7/27/2016

Calibration

Sample Name: CCV-8874;AV148-20160726
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 7/26/2016 10:30:18AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

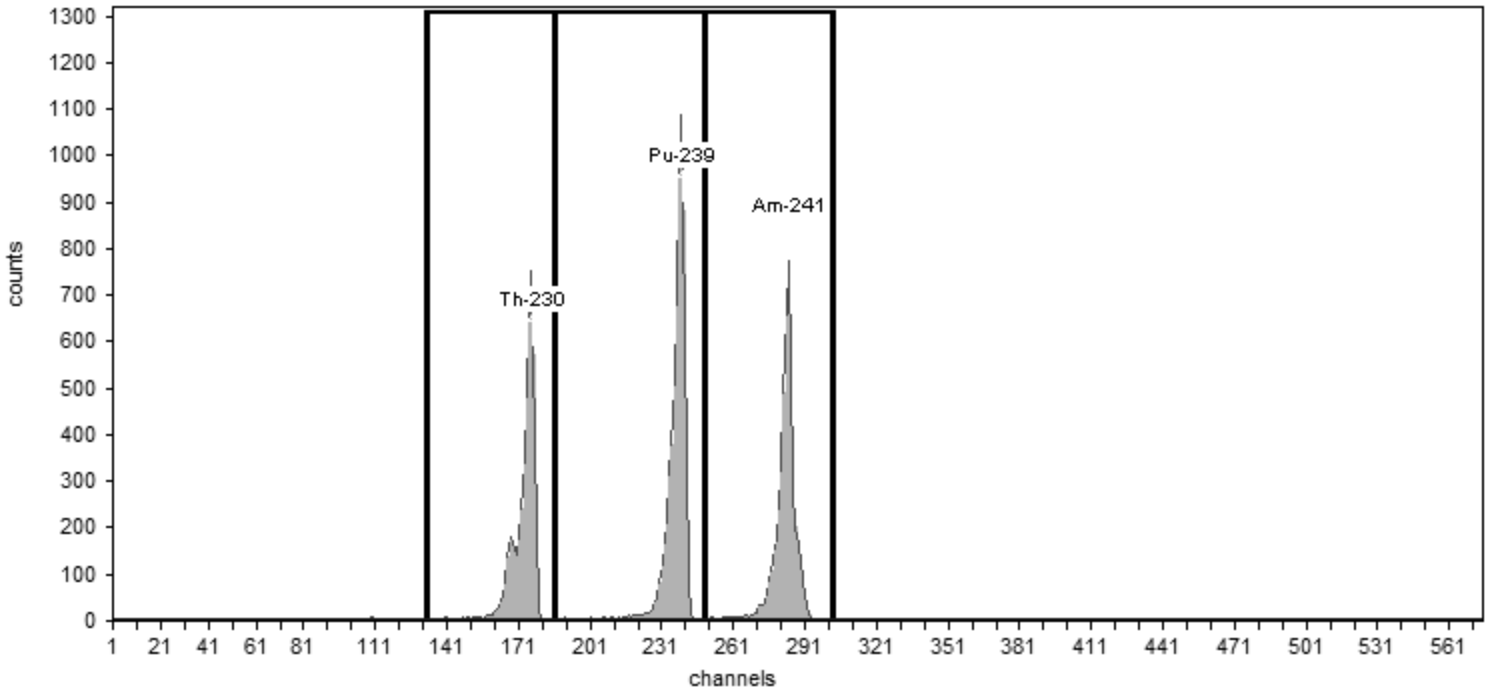
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 7/26/2016 9:12:53AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV148-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.43% +/- 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	31.70	4,498.00	74.97
Pu-239	240	5,155.40	186	249	32.83	6,081.00	101.35
Am-241	284	5,485.70	249	303	31.58	4,737.00	78.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:00AM 7/27/2016

Calibration

Sample Name: CCV-8875;AV149-20160727a
Description:
Detector: AV149

Analyst: 60040
Analysis Date: 7/27/2016 8:26:59AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

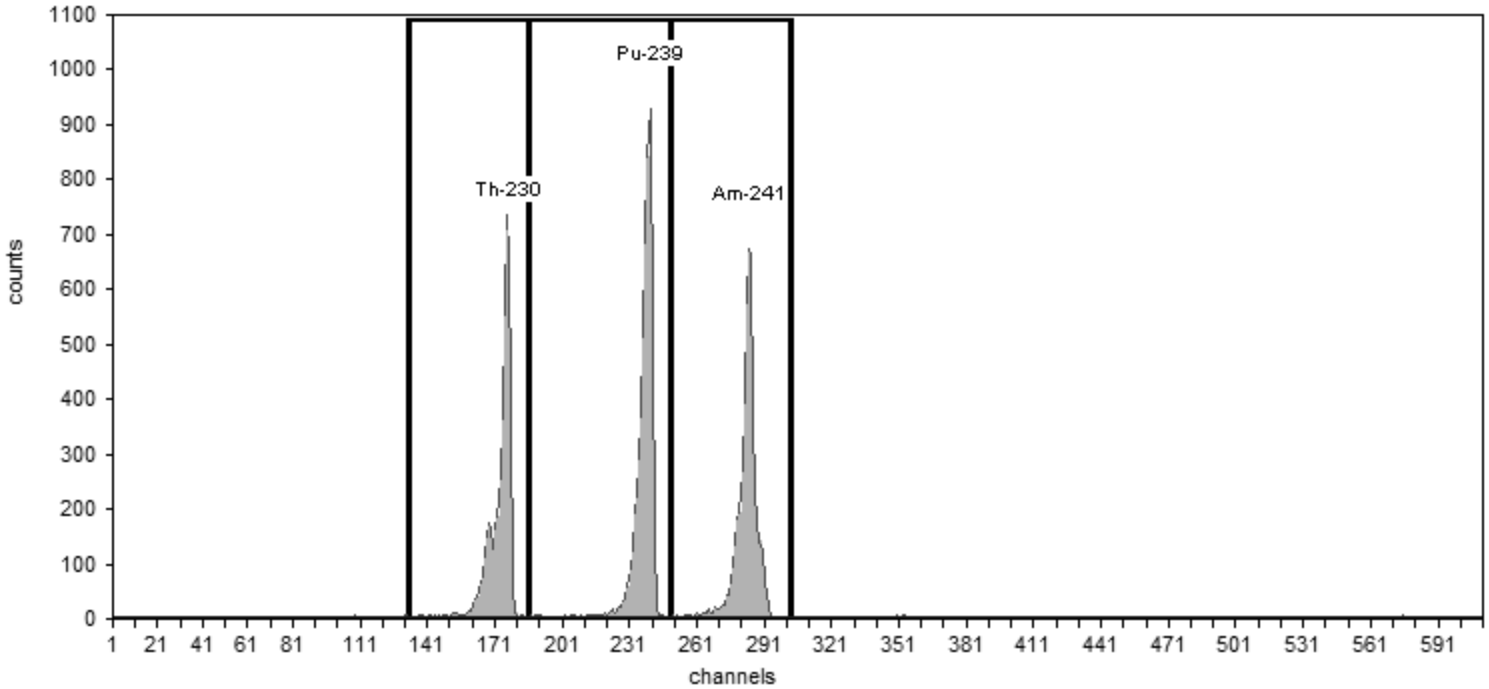
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 7/27/2016 7:26:53AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV149-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.92% +/- 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	29.75	4,412.00	73.53
Pu-239	240	5,155.40	186	249	33.33	5,193.00	86.55
Am-241	284	5,485.70	249	303	34.80	4,648.00	77.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:30:12AM 7/26/2016

Calibration

Sample Name: CCV-7107;AV161-20160726
Description:
Detector: AV161

Analyst: 60040
Analysis Date: 7/26/2016 10:30:10AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

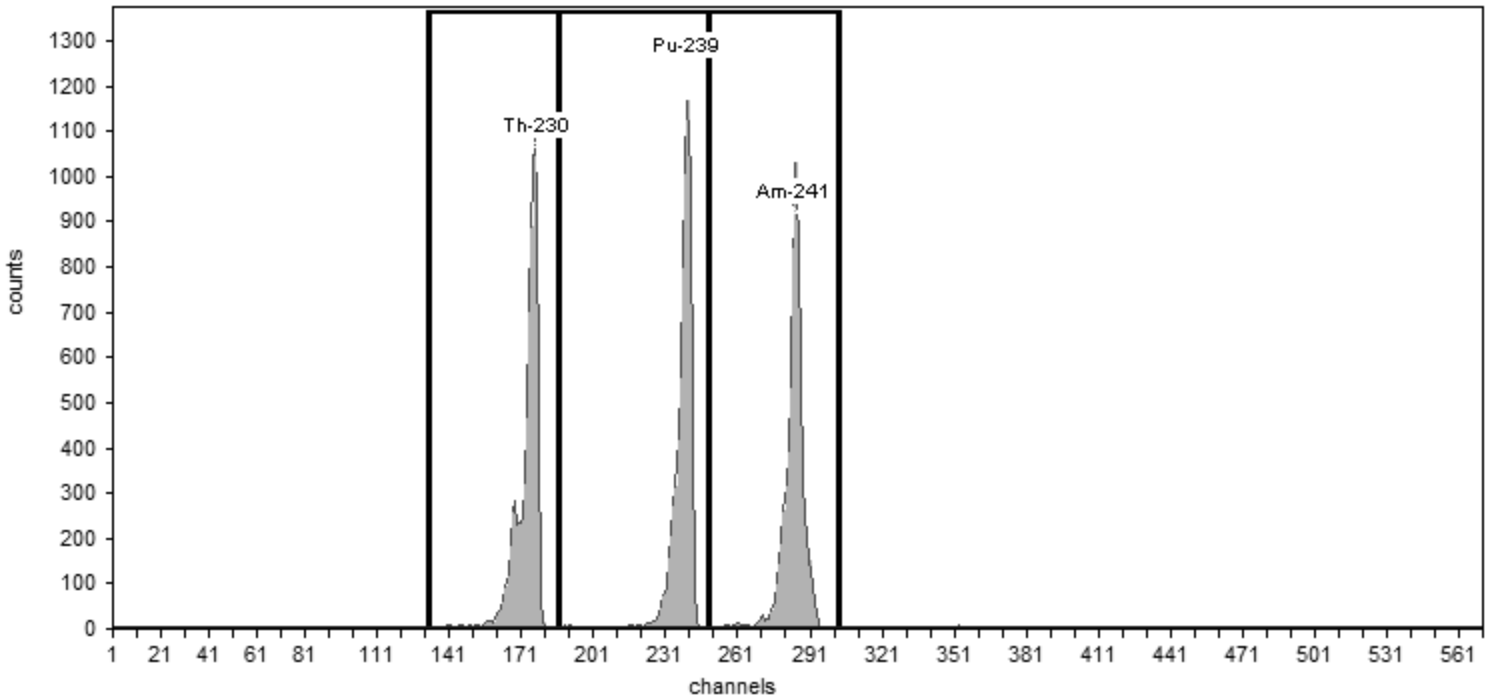
Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 7/26/2016 9:12:36AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV161-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.60% +/- 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	33.13	6,896.00	114.93
Pu-239	240	5,155.40	186	249	34.37	6,786.00	113.10
Am-241	284	5,485.70	249	303	32.27	6,595.00	109.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:54:44AM 7/26/2016

Calibration

Sample Name: CCV-8874;AV162-20160726
Description:
Detector: AV162

Analyst: 60040
Analysis Date: 7/26/2016 11:54:42AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

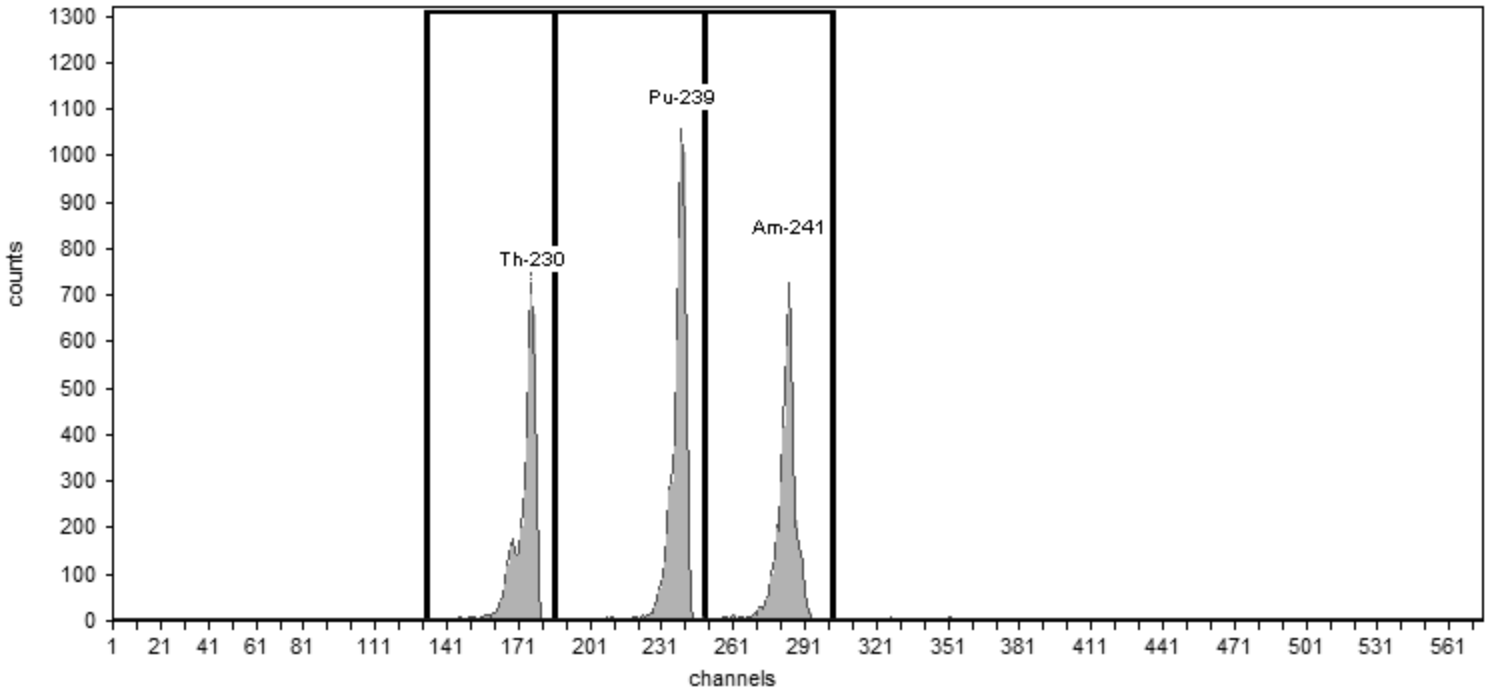
Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 7/26/2016 10:50:03AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV162-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.81% +/- 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	29.73	4,414.00	73.57
Pu-239	240	5,155.40	186	249	32.60	5,851.00	97.52
Am-241	284	5,485.70	249	303	34.68	4,681.00	78.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:33:26AM 7/27/2016

Calibration

Sample Name: CCV-8875;AV163-20160727
Description:
Detector: AV163

Analyst: 60040
Analysis Date: 7/27/2016 9:33:25AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

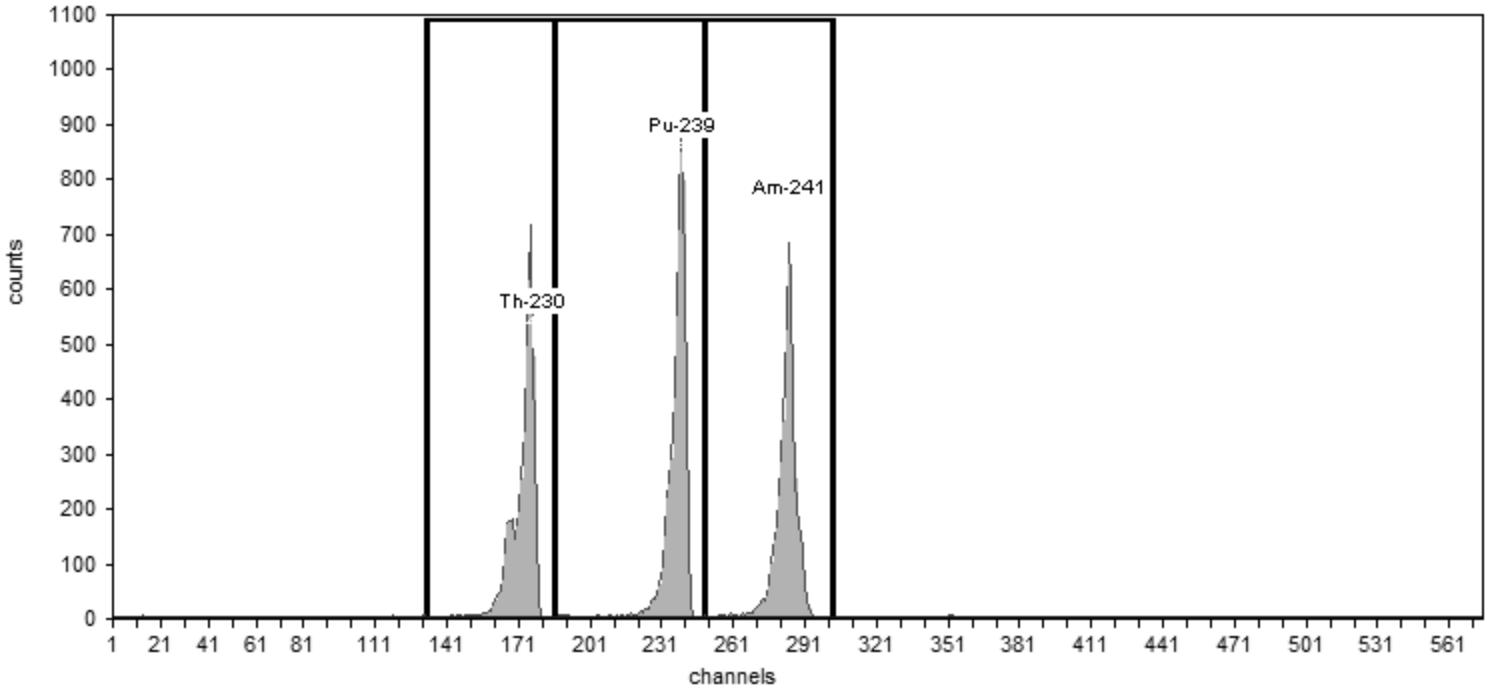
Detector: AV163 , SN: 50-110E7
Acquisition Start Date: 7/27/2016 8:33:11AM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-8875;AV163-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.12% +/- 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	31.86	4,551.00	75.85
Pu-239	240	5,155.40	186	249	33.79	5,224.00	87.07
Am-241	284	5,485.70	249	303	34.31	4,584.00	76.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:53:57AM 7/26/2016

Calibration

Sample Name: CCV-8876;AV164-20160726
Description:
Detector: AV164

Analyst: 60040
Analysis Date: 7/26/2016 11:53:55AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

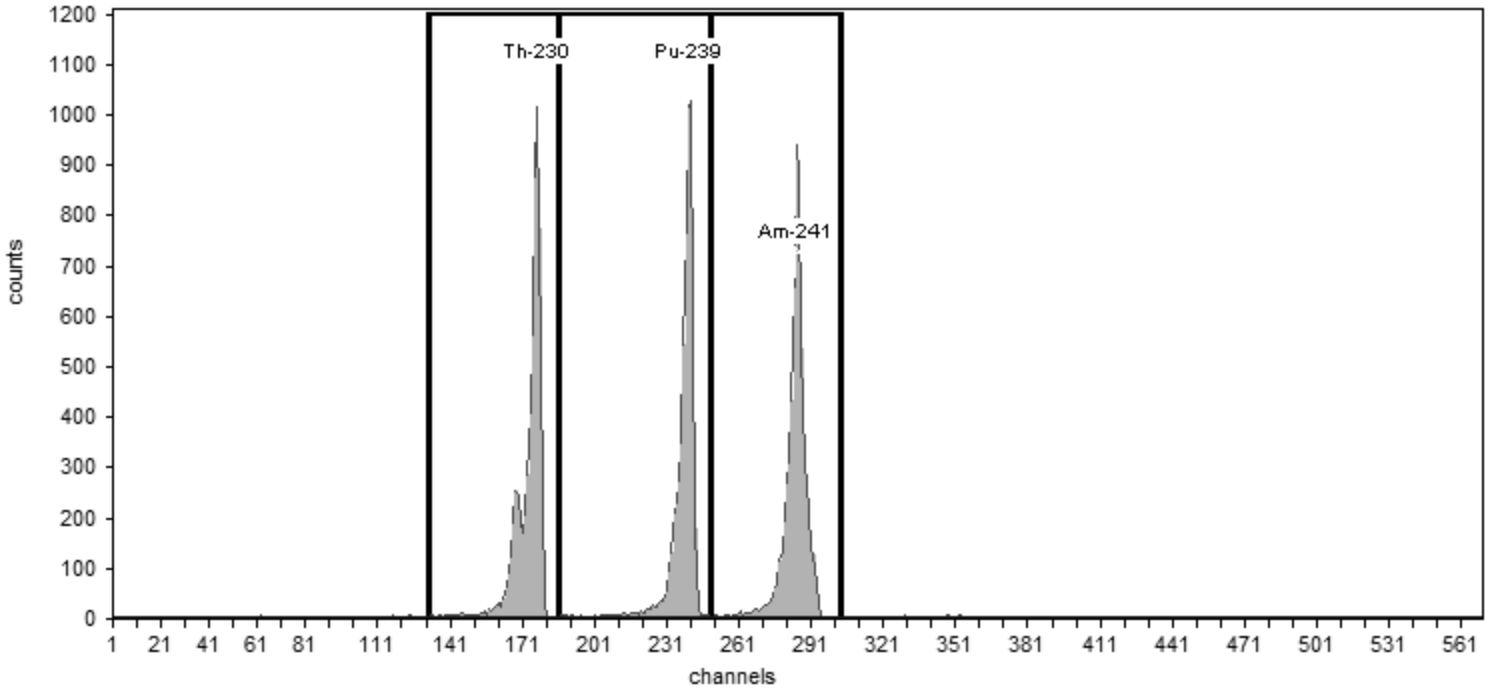
Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 7/26/2016 10:49:20AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8876;AV164-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.96% +/- 0.38% 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	28.58	5,945.00	99.08
Pu-239	240	5,155.40	186	249	32.55	5,810.00	96.83
Am-241	284	5,485.70	249	303	30.63	5,992.00	99.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:35:15AM 7/26/2016

Calibration

Sample Name: CCV-9794;AV169-20160726a
Description:
Detector: AV169

Analyst: 60040
Analysis Date: 7/26/2016 10:35:13AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

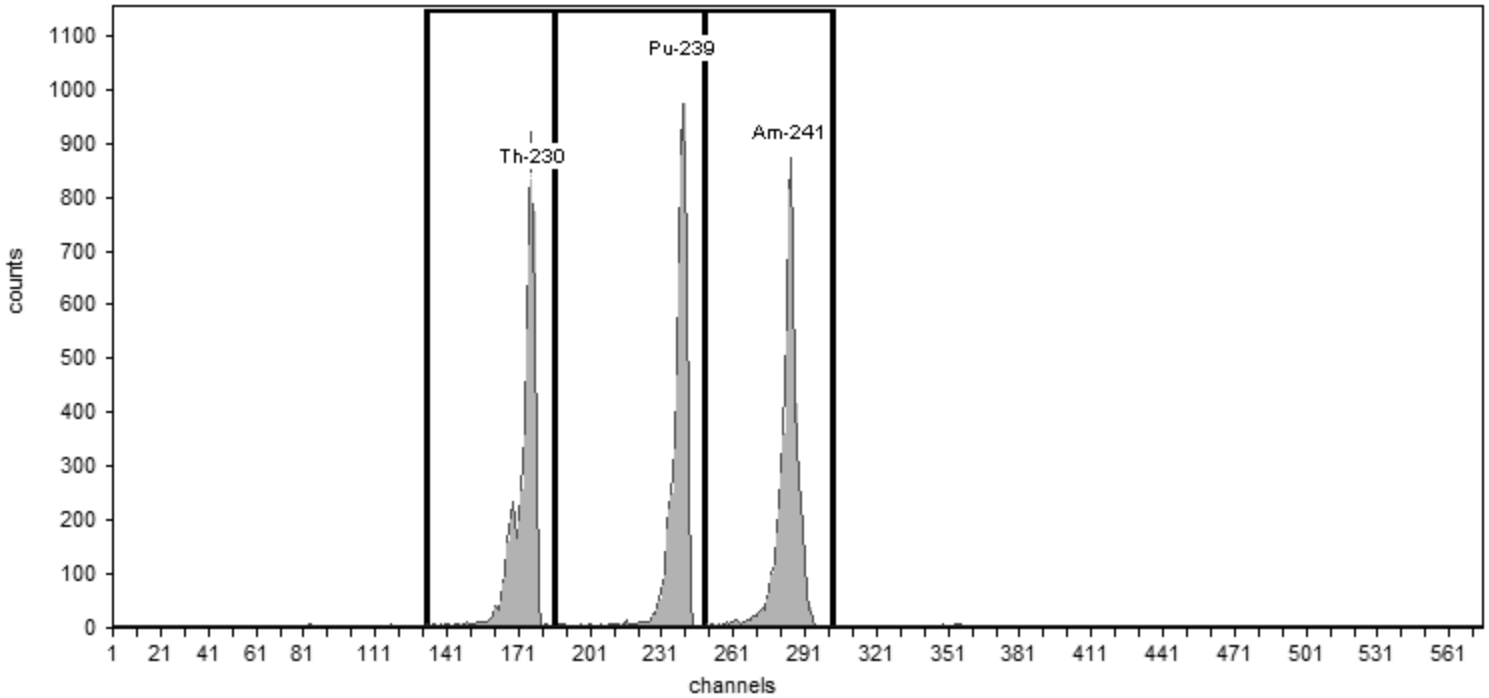
Detector: AV169 , SN: 50-112 G5
Acquisition Start Date: 7/26/2016 9:35:06AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9794;AV169-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.37% +/- 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	31.18	5,529.00	92.15
Pu-239	240	5,155.40	186	249	33.11	5,465.00	91.08
Am-241	284	5,485.70	249	303	33.62	5,901.00	98.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:53:12AM 7/26/2016

Calibration

Sample Name: CCV-9795;AV170-20160726
Description:
Detector: AV170

Analyst: 60040
Analysis Date: 7/26/2016 11:53:11AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

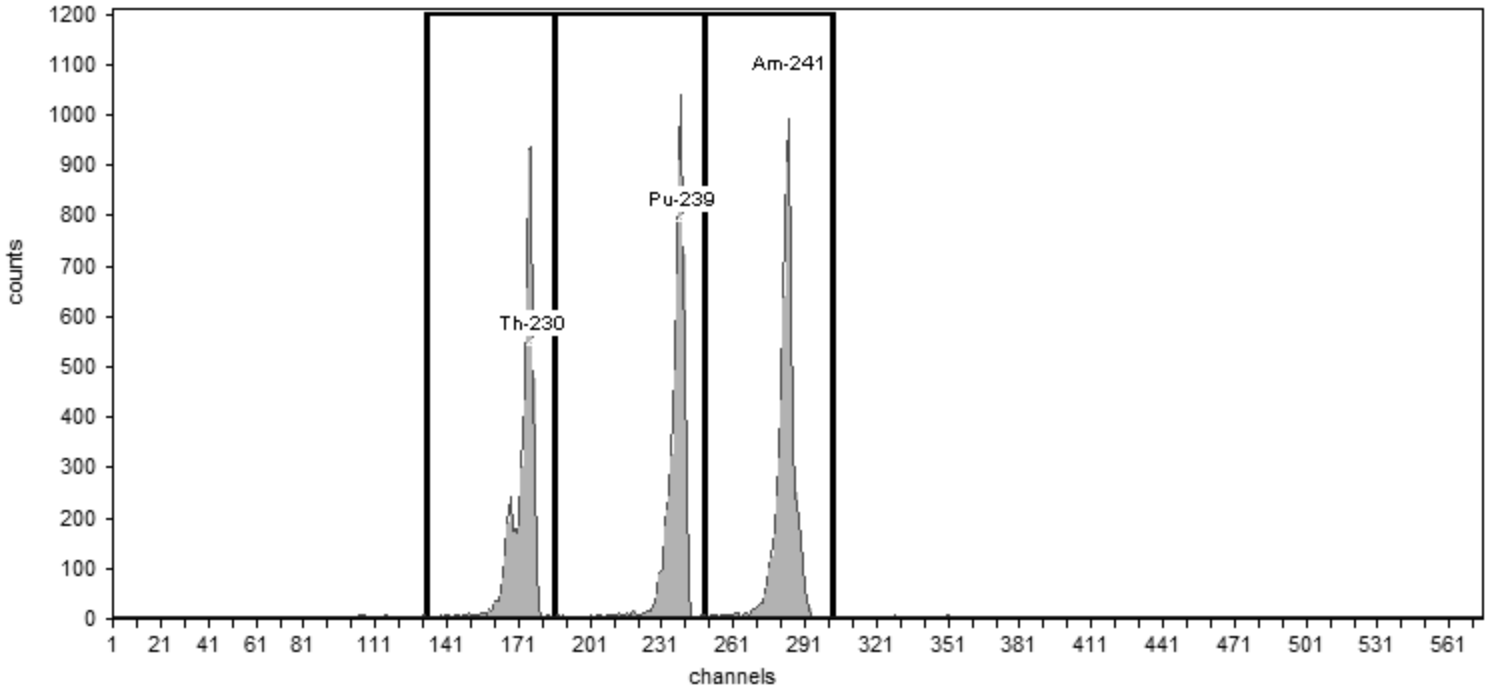
Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 7/26/2016 10:48:35AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9795;AV170-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.03% +/- 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	28.87	5,411.00	90.18
Pu-239	240	5,155.40	186	249	32.31	5,580.00	93.00
Am-241	284	5,485.70	249	303	31.50	6,032.00	100.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:52:12AM 7/26/2016

Calibration

Sample Name: CCV-9885;AV173-20160726
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 7/26/2016 11:52:11AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

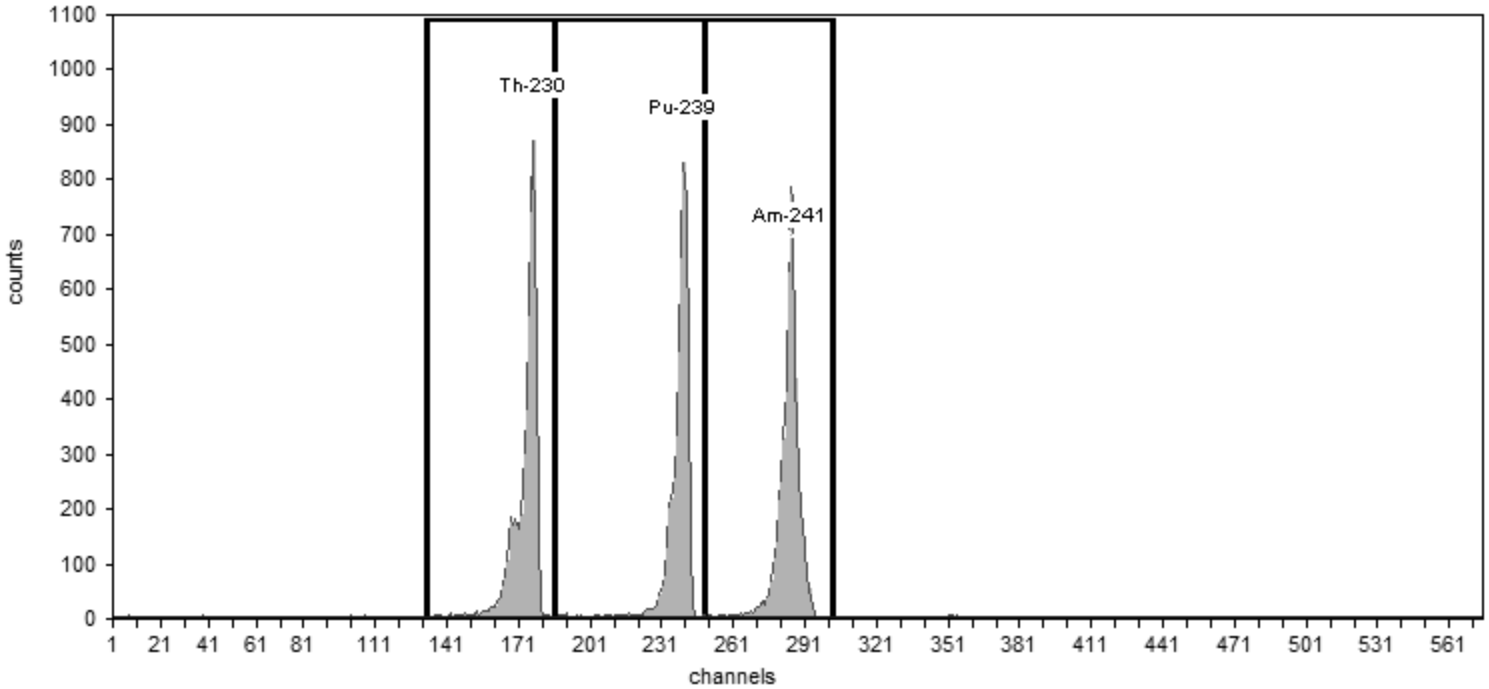
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 7/26/2016 10:47:38AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9885;AV173-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.09% +/- 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	29.02	5,063.00	84.38
Pu-239	240	5,155.40	186	249	33.82	4,853.00	80.88
Am-241	284	5,485.70	249	303	33.54	5,327.00	88.78

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:19:42PM 7/26/2016

Calibration

Sample Name: CCV-8874;AV176-20160726
Description:
Detector: AV176

Analyst: 60040
Analysis Date: 7/26/2016 1:19:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

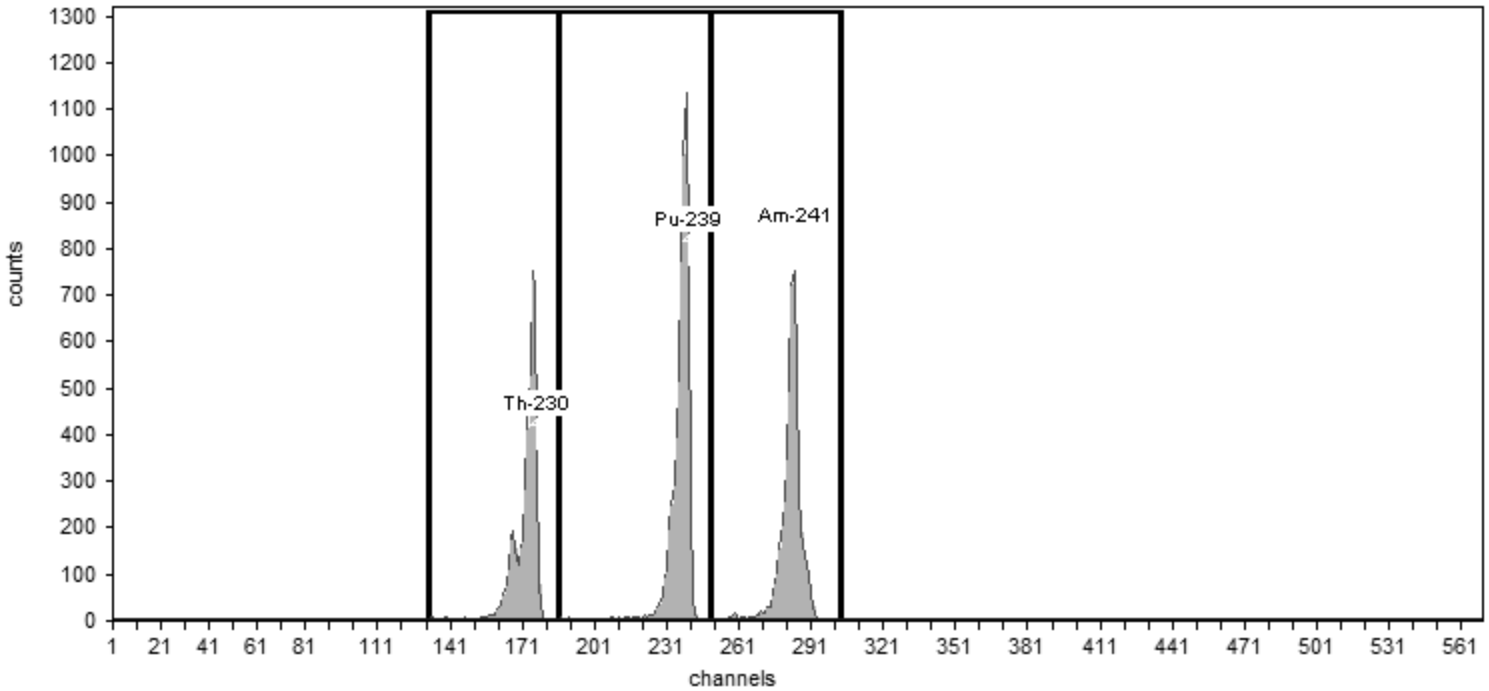
Detector: AV176 , SN: 50-117H2
Acquisition Start Date: 7/26/2016 12:11:00PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-8874;AV176-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 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	31.13	4,453.00	74.22
Pu-239	240	5,155.40	186	249	30.96	6,015.00	100.25
Am-241	284	5,485.70	249	303	33.04	4,773.00	79.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:19:48PM 7/26/2016

Calibration

Sample Name: CCV-8875;AV177-20160726
Description:
Detector: AV177

Analyst: 60040
Analysis Date: 7/26/2016 1:19:46PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

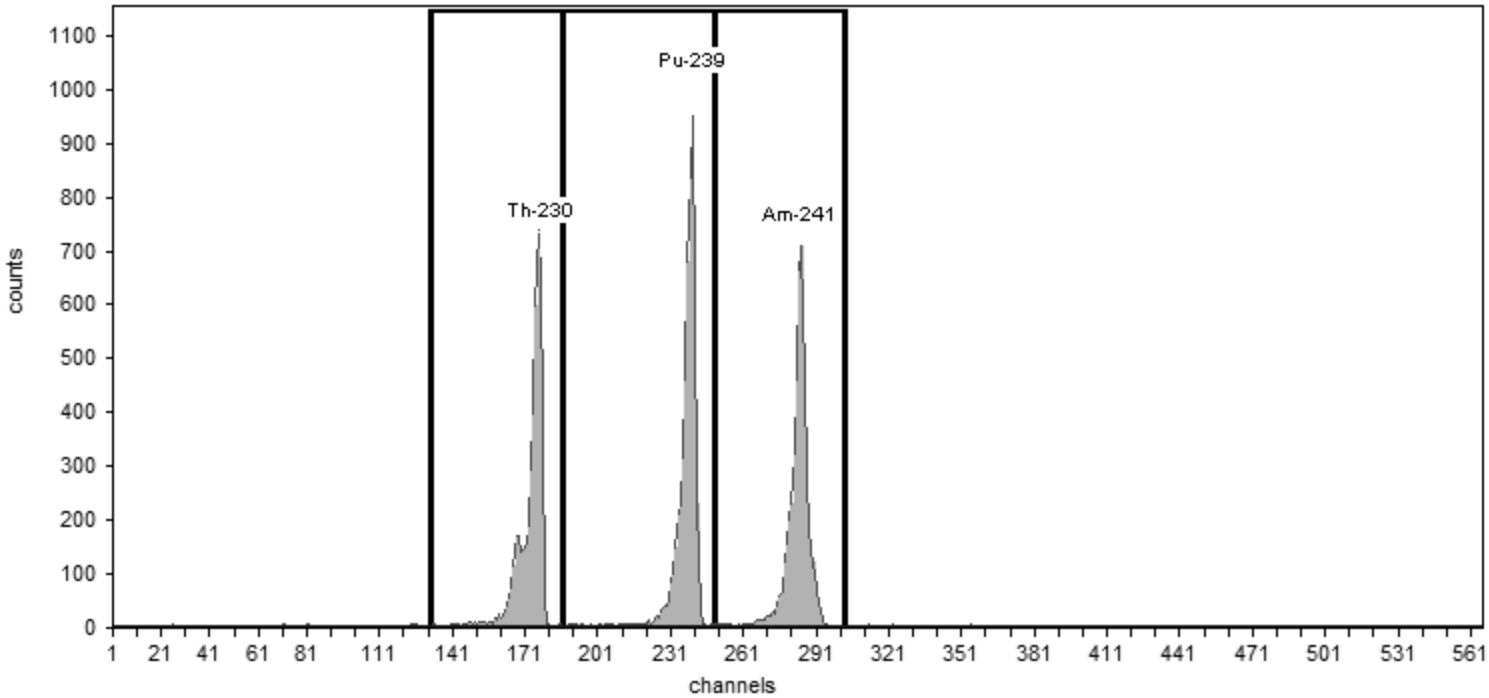
Detector: AV177 , SN: 50-117H3
Acquisition Start Date: 7/26/2016 12:11:15PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV177-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.94% +/- 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	31.52	4,528.00	75.47
Pu-239	240	5,155.40	186	249	31.96	5,178.00	86.30
Am-241	284	5,485.70	249	303	32.40	4,540.00	75.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:21:03PM 7/26/2016

Calibration

Sample Name: CCV-7107;AV189-20160726
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 7/26/2016 1:21:02PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

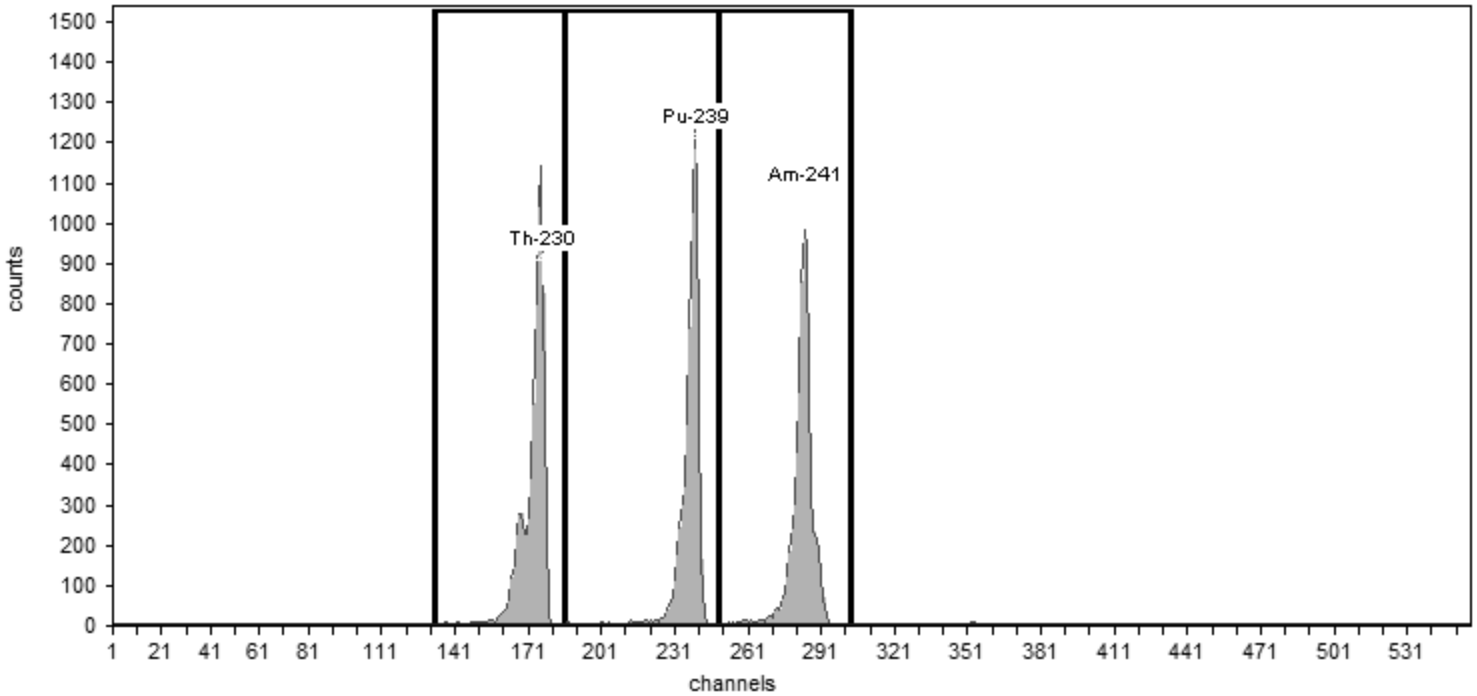
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 7/26/2016 12:12:44PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV189-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.25% +/- 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	32.45	7,045.00	117.42
Pu-239	240	5,155.40	186	249	33.21	6,916.00	115.27
Am-241	284	5,485.70	249	303	37.57	6,823.00	113.72

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

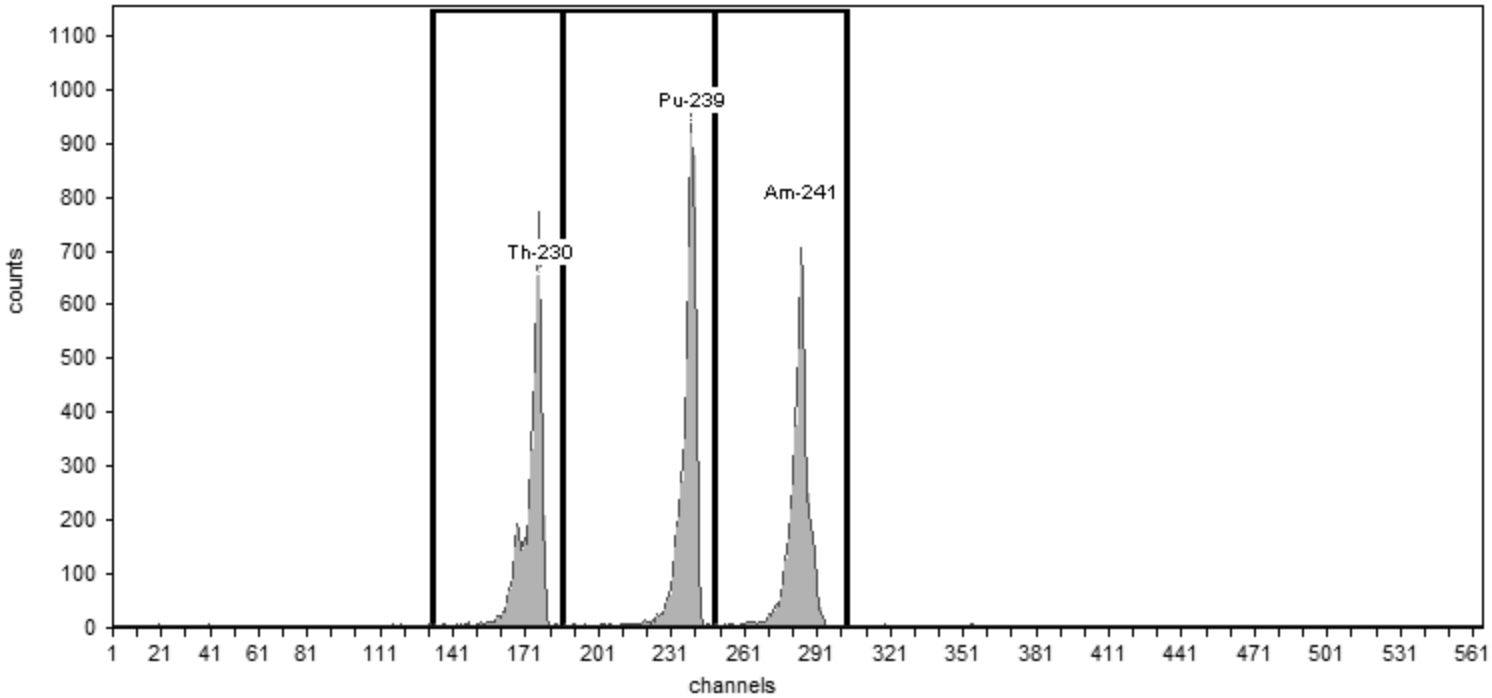
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 7/26/2016 5:46:47PM

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
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

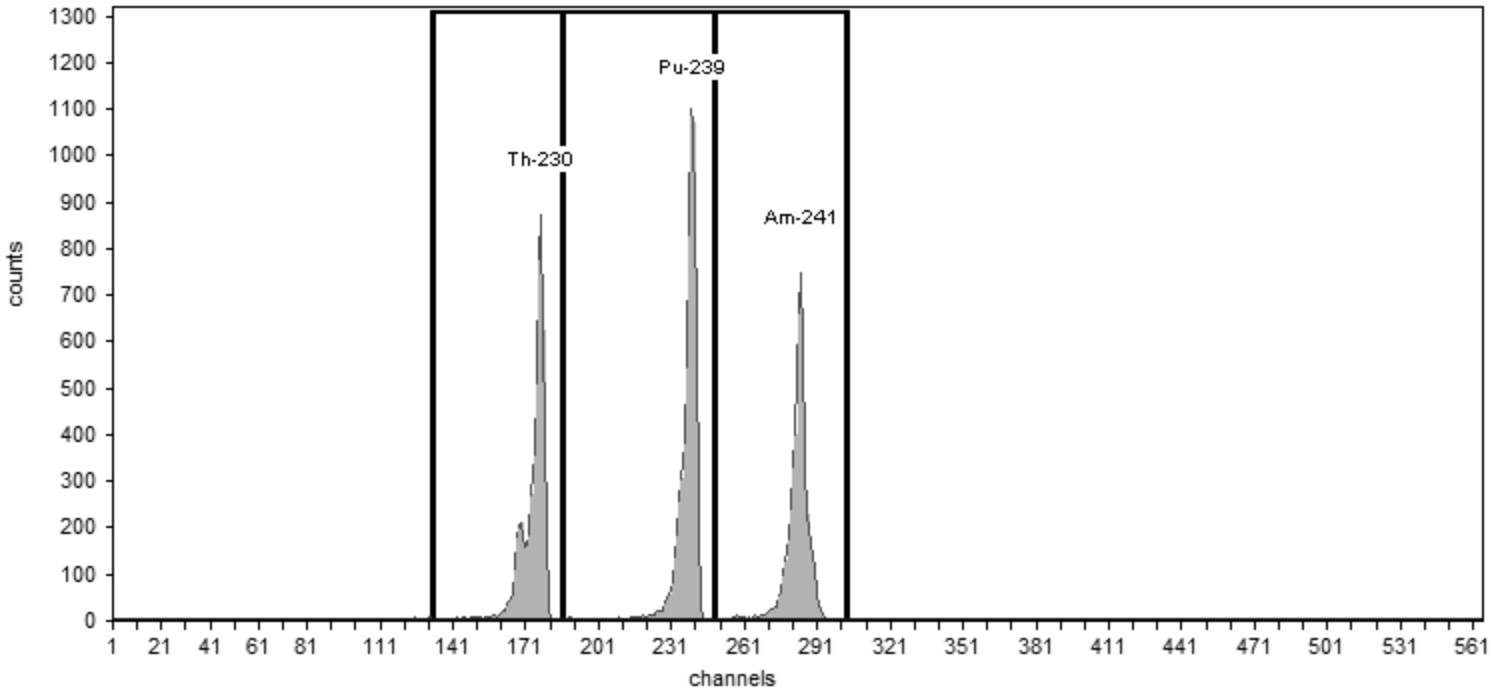
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 7/26/2016 11:01:13AM

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
1:23:32PM 7/26/2016

Calibration

Sample Name: CCV-9792;AV195-20160726a
Description:
Detector: AV195

Analyst: 60040
Analysis Date: 7/26/2016 1:23:31PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

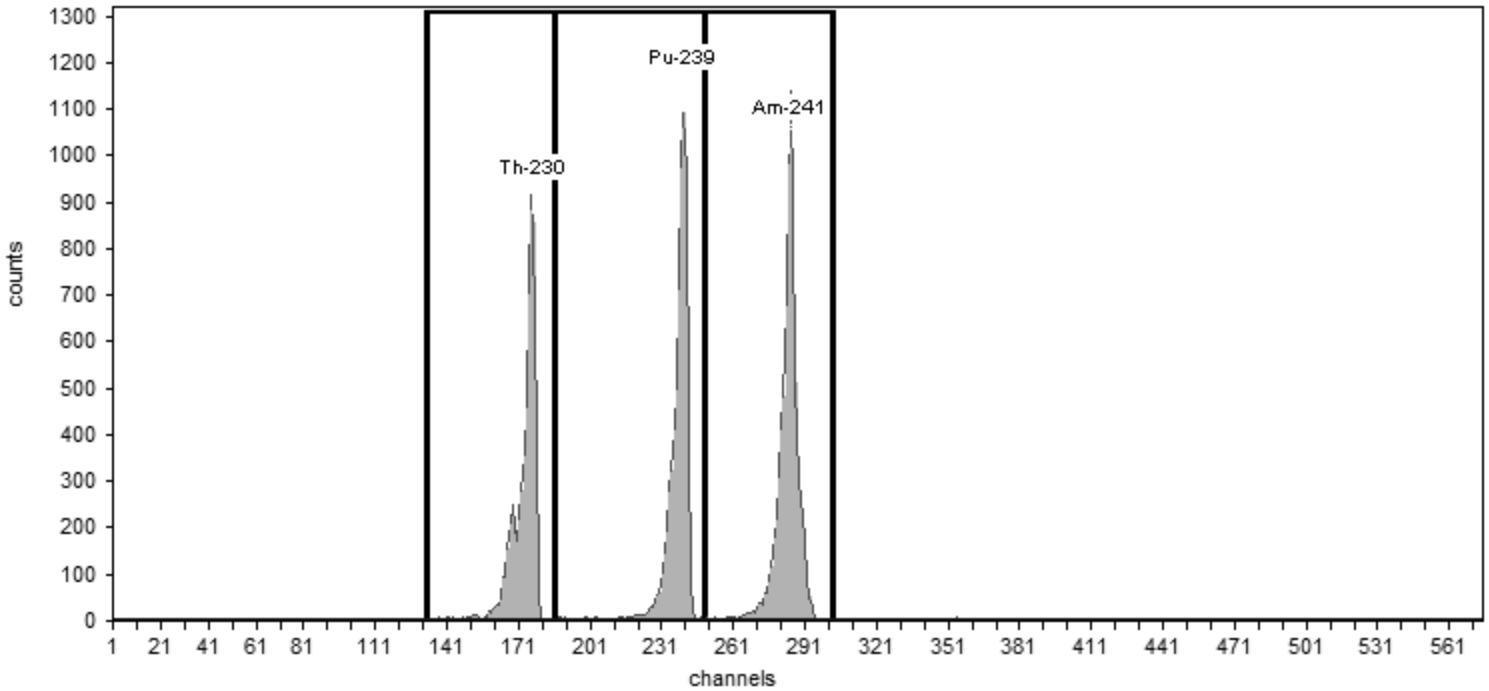
Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 7/26/2016 12:23:21PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9792;AV195-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.05% +/- 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	28.85	5,629.00	93.82
Pu-239	240	5,155.40	186	249	33.56	6,509.00	108.48
Am-241	284	5,485.70	249	303	32.69	7,418.00	123.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:35:31AM 7/26/2016

Calibration

Sample Name: CCV-9793;AV196-20160726a
Description:
Detector: AV196

Analyst: 60040
Analysis Date: 7/26/2016 10:35:30AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

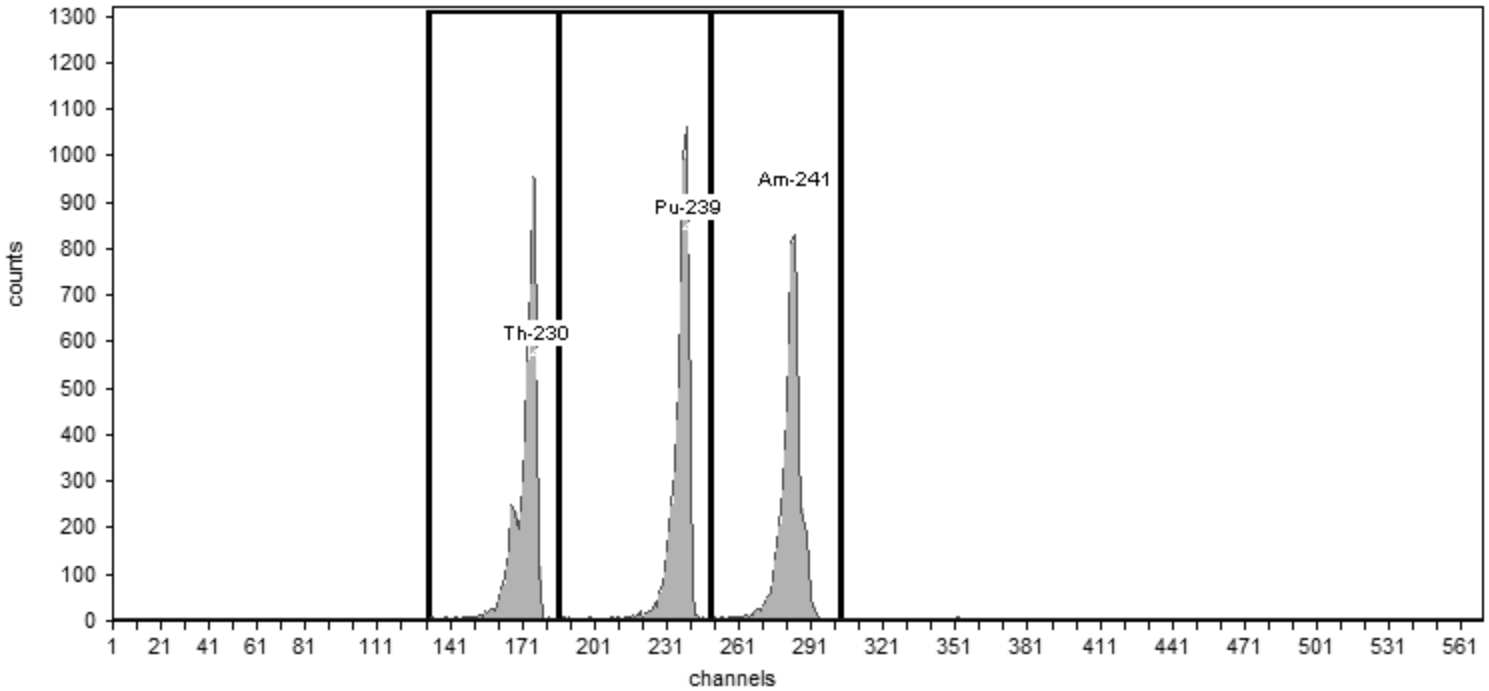
Detector: AV196 , SN: 50-117AA5
Acquisition Start Date: 7/26/2016 9:35:27AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9793;AV196-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.90% +/- 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	33.63	6,271.00	104.52
Pu-239	240	5,155.40	186	249	32.99	6,284.00	104.73
Am-241	284	5,485.70	249	303	39.61	6,098.00	101.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:21:44PM 7/26/2016

Calibration

Sample Name: CCV-9884;AV200-20160726
Description:
Detector: AV200

Analyst: 60040
Analysis Date: 7/26/2016 1:21:43PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

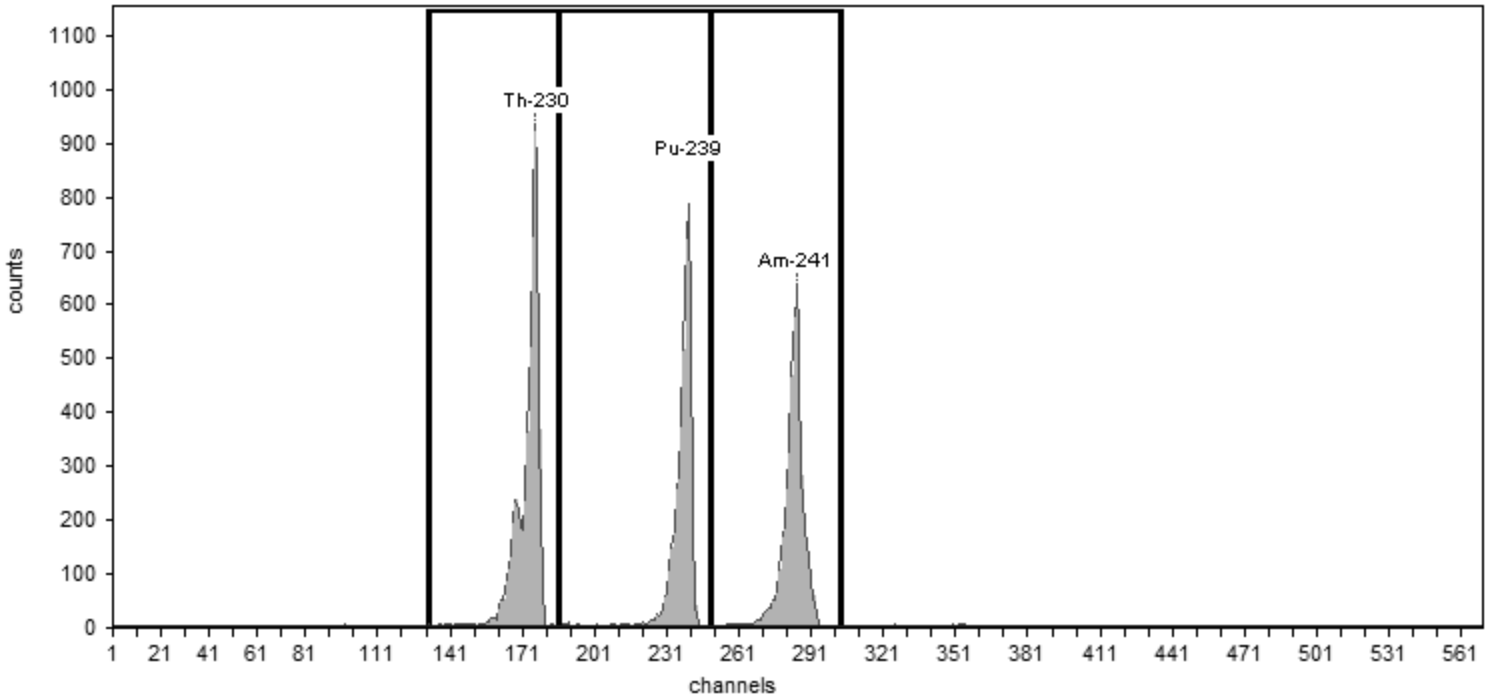
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 7/26/2016 12:13:27PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9884;AV200-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.23% +/- 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	29.82	5,734.00	95.57
Pu-239	240	5,155.40	186	249	32.46	4,488.00	74.80
Am-241	284	5,485.70	249	303	33.51	4,531.00	75.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:07:36AM 7/27/2016

Calibration

Sample Name: CCV-8876;AV206-20160726
Description:
Detector: AV206

Analyst: 60040
Analysis Date: 7/27/2016 6:07:35AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

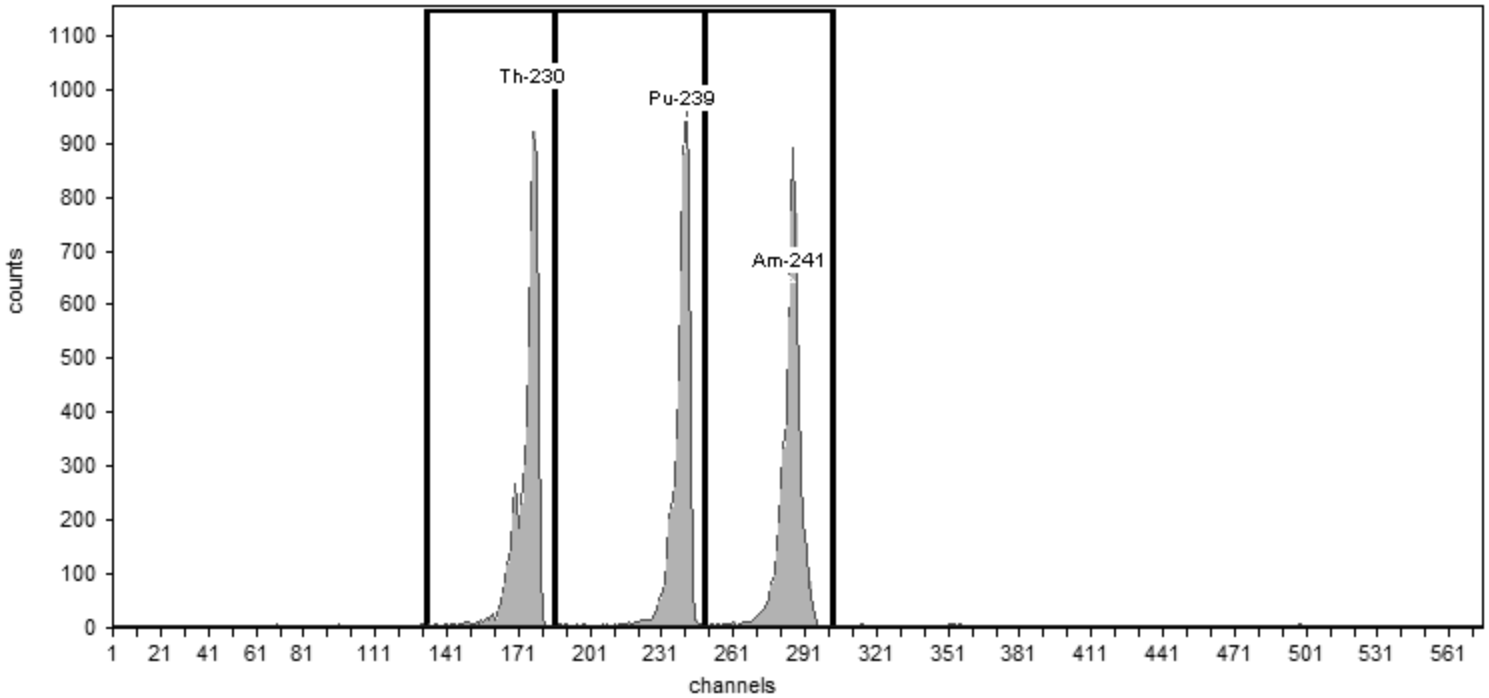
Detector: AV206 , SN: 50-119AA6
Acquisition Start Date: 7/26/2016 7:07:26PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-8876;AV206-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.35% +/- 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	32.55	6,077.00	101.28
Pu-239	240	5,155.40	186	249	34.60	5,809.00	96.82
Am-241	284	5,485.70	249	303	34.64	6,160.00	102.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:22:16PM 7/26/2016

Calibration

Sample Name: CCV-8877;AV207-20160726
Description:
Detector: AV207

Analyst: 60040
Analysis Date: 7/26/2016 1:22:15PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

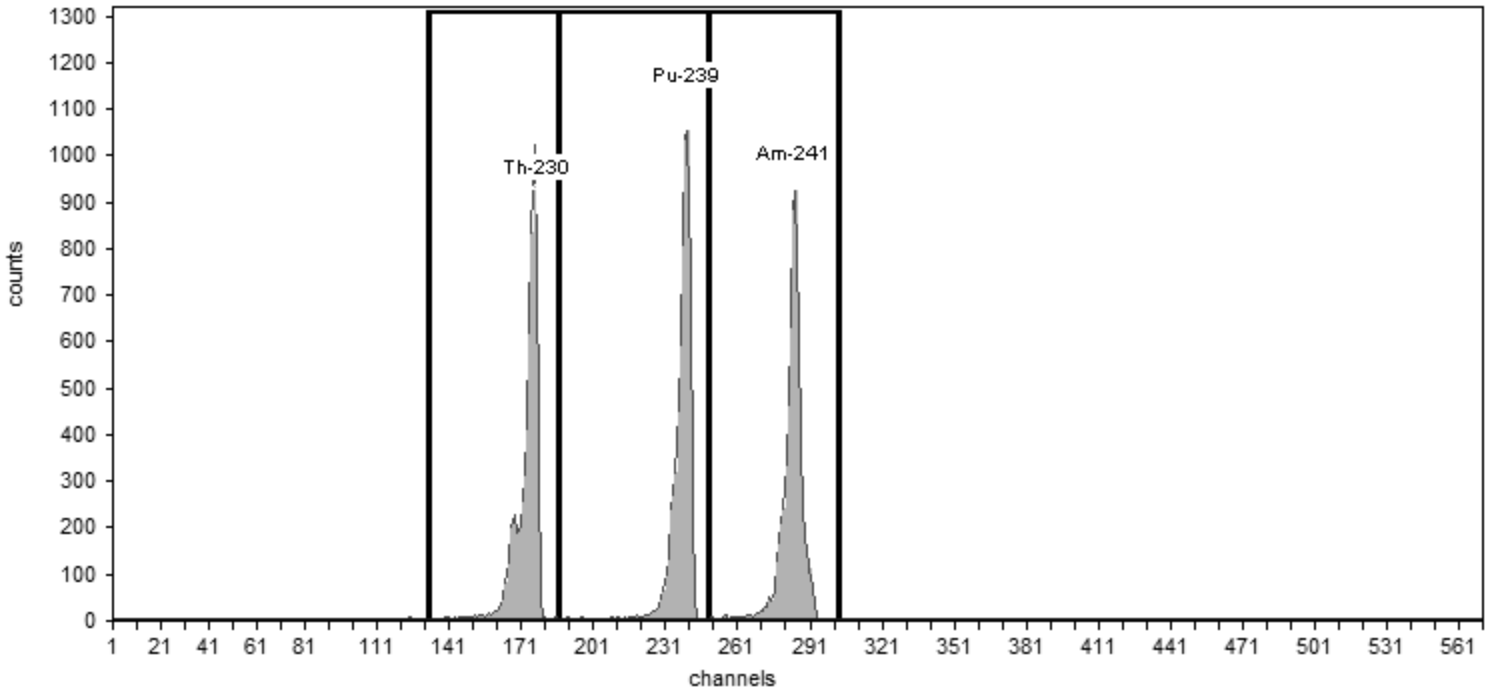
Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 7/26/2016 12:13:53PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV207-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.99% +/- 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	31.07	6,148.00	102.47
Pu-239	240	5,155.40	186	249	36.38	6,328.00	105.47
Am-241	284	5,485.70	249	303	34.54	6,103.00	101.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:22:38PM 7/26/2016

Calibration

Sample Name: CCV-9520;AV208-20160726
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 7/26/2016 1:22:37PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

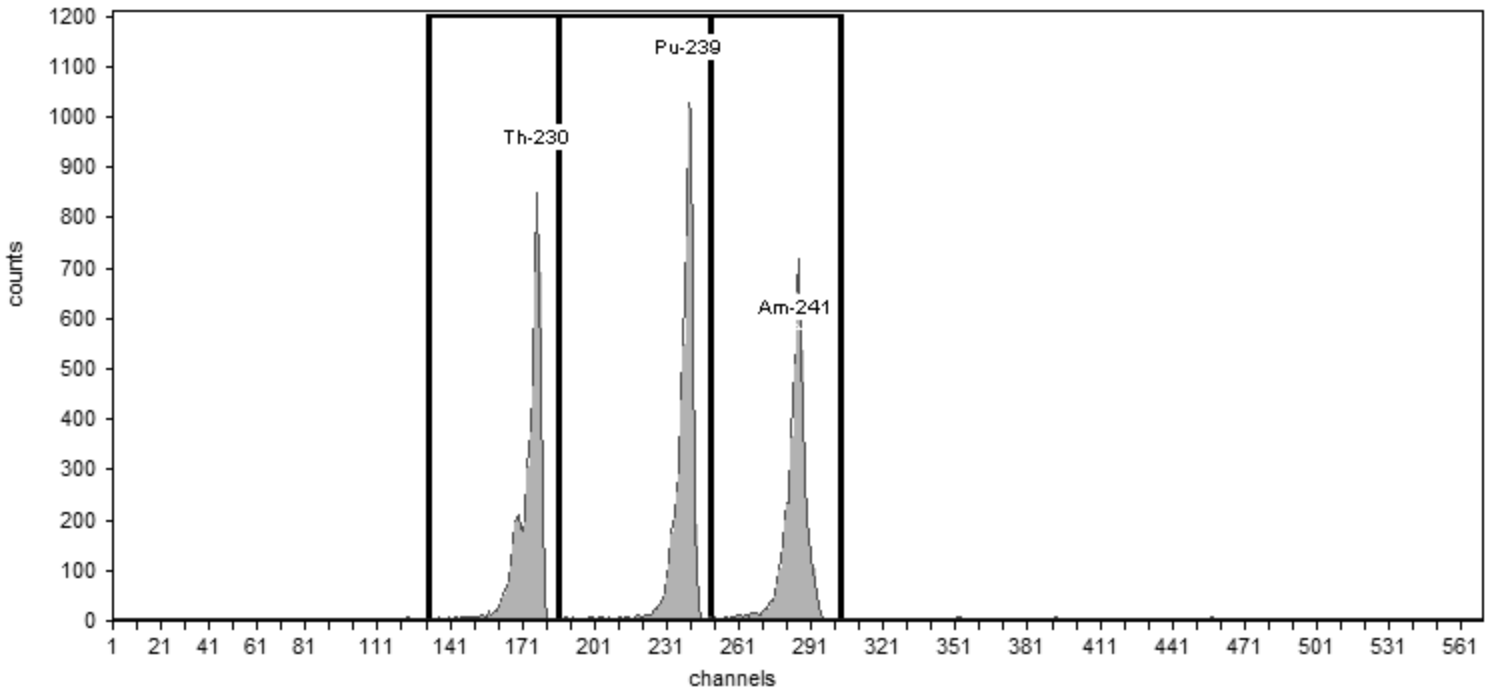
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 7/26/2016 12:14:17PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV208-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.38% +/- 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	30.13	5,259.00	87.65
Pu-239	240	5,155.40	186	249	34.16	6,039.00	100.65
Am-241	284	5,485.70	249	303	35.47	4,999.00	83.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:49:58PM 7/26/2016

Calibration

Sample Name: CCV-9792;AV209-20160726
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 7/26/2016 2:49:57PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

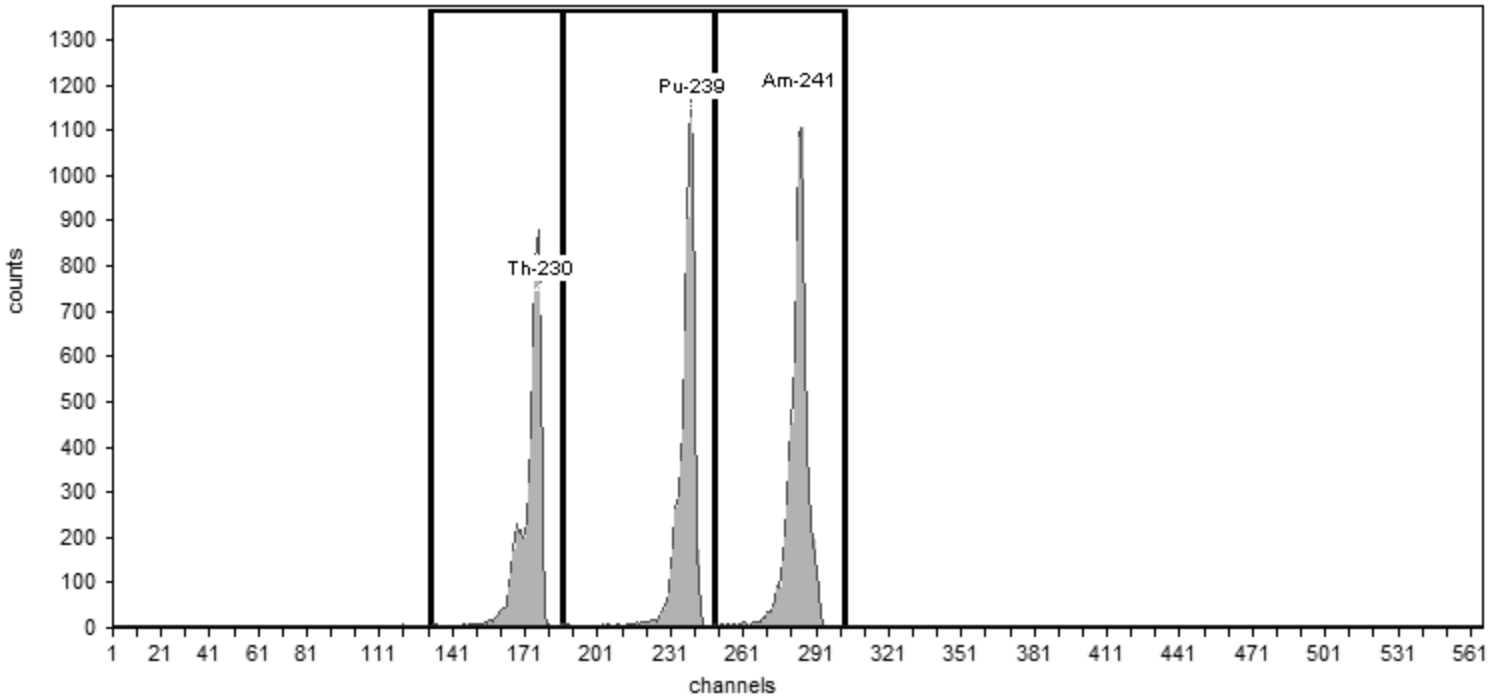
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 7/26/2016 1:39:54PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9792;AV209-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.52% +/- 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	32.80	5,705.00	95.08
Pu-239	240	5,155.40	186	249	31.98	6,667.00	111.12
Am-241	284	5,485.70	249	303	34.51	7,555.00	125.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:49:34AM 7/26/2016

Calibration

Sample Name: CCV-9793;AV210-20160726
Description:
Detector: AV210

Analyst: 60040
Analysis Date: 7/26/2016 11:49:32AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

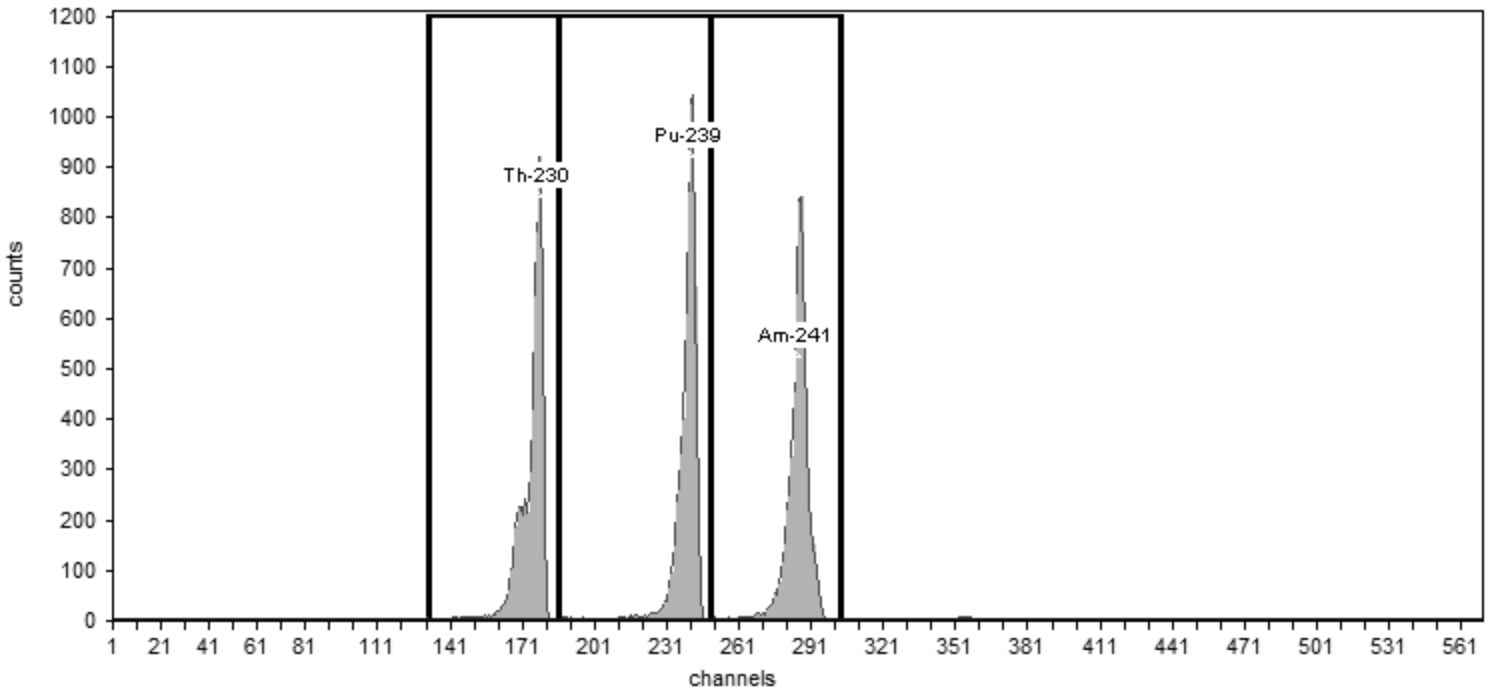
Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 7/26/2016 10:46:50AM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-9793;AV210-201607

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.73% +/- 0.42% 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	31.97	5,724.00	95.40
Pu-239	240	5,155.40	186	249	35.25	6,223.00	103.72
Am-241	284	5,485.70	249	303	37.03	5,877.00	97.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:29:54PM 9/6/2016

Calibration

Sample Name: CCV-9793;AV210-20160906
Description:
Detector: AV210

Analyst: 60040
Analysis Date: 9/6/2016 12:29:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

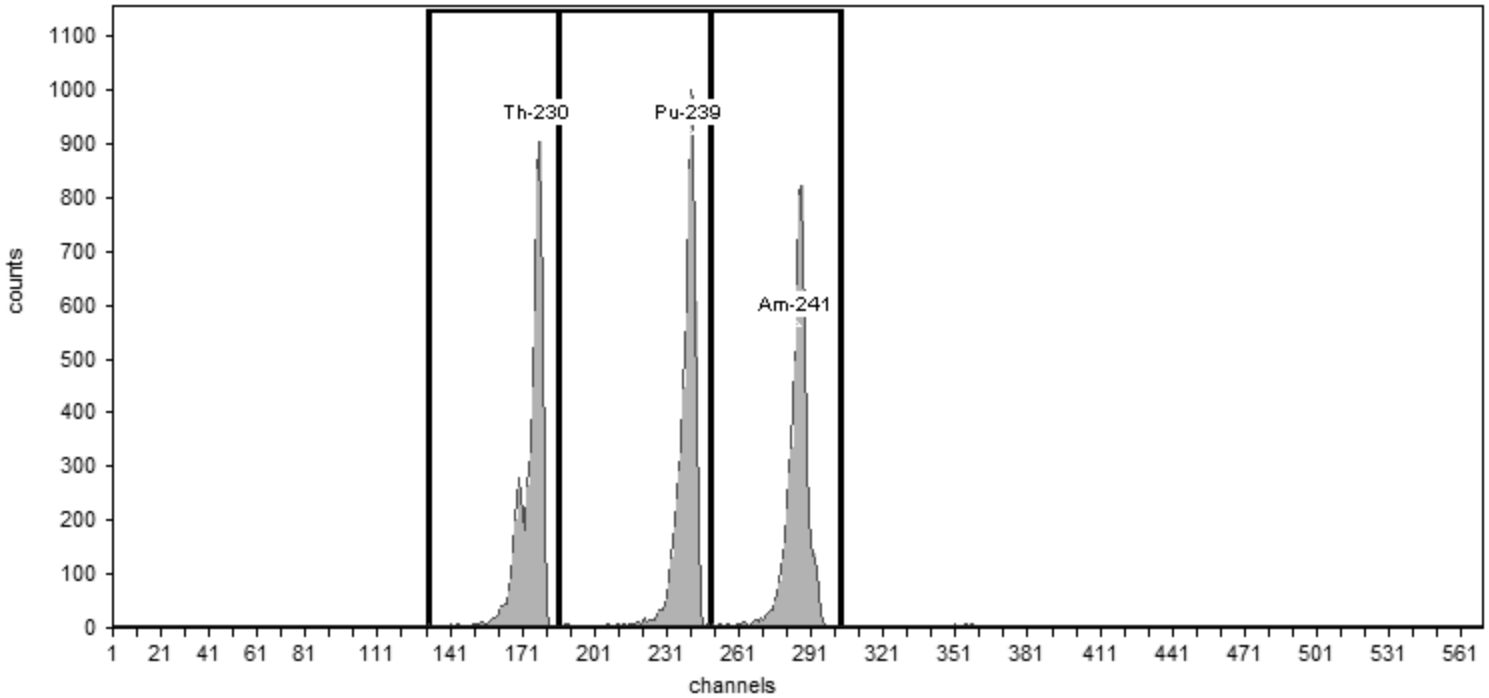
Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 9/6/2016 11:23:40AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9793;AV210-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.97% +/- 0.42% 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	32.61	5,886.00	98.10
Pu-239	240	5,155.40	186	249	36.30	6,251.00	104.18
Am-241	284	5,485.70	249	303	38.21	5,853.00	97.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:00PM 9/6/2016

Calibration

Sample Name: CCV-9794;AV211-20160906
Description:
Detector: AV211

Analyst: 60040
Analysis Date: 9/6/2016 12:29:59PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

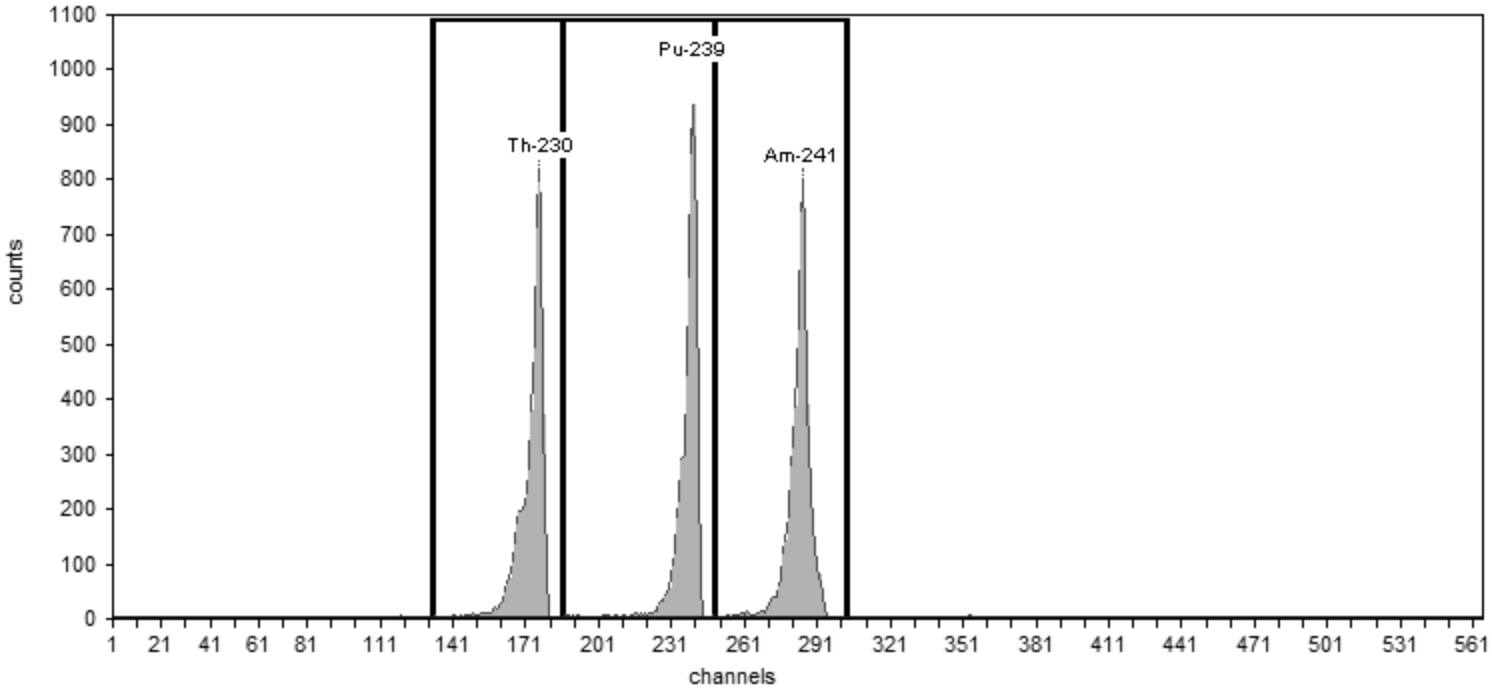
Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 9/6/2016 11:23:56AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9794;AV211-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.98% +/- 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	33.83	5,502.00	91.70
Pu-239	240	5,155.40	186	249	33.04	5,421.00	90.35
Am-241	284	5,485.70	249	303	34.67	5,697.00	94.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:07PM 9/6/2016

Calibration

Sample Name: CCV-9795;AV212-20160906
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 9/6/2016 12:30:06PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

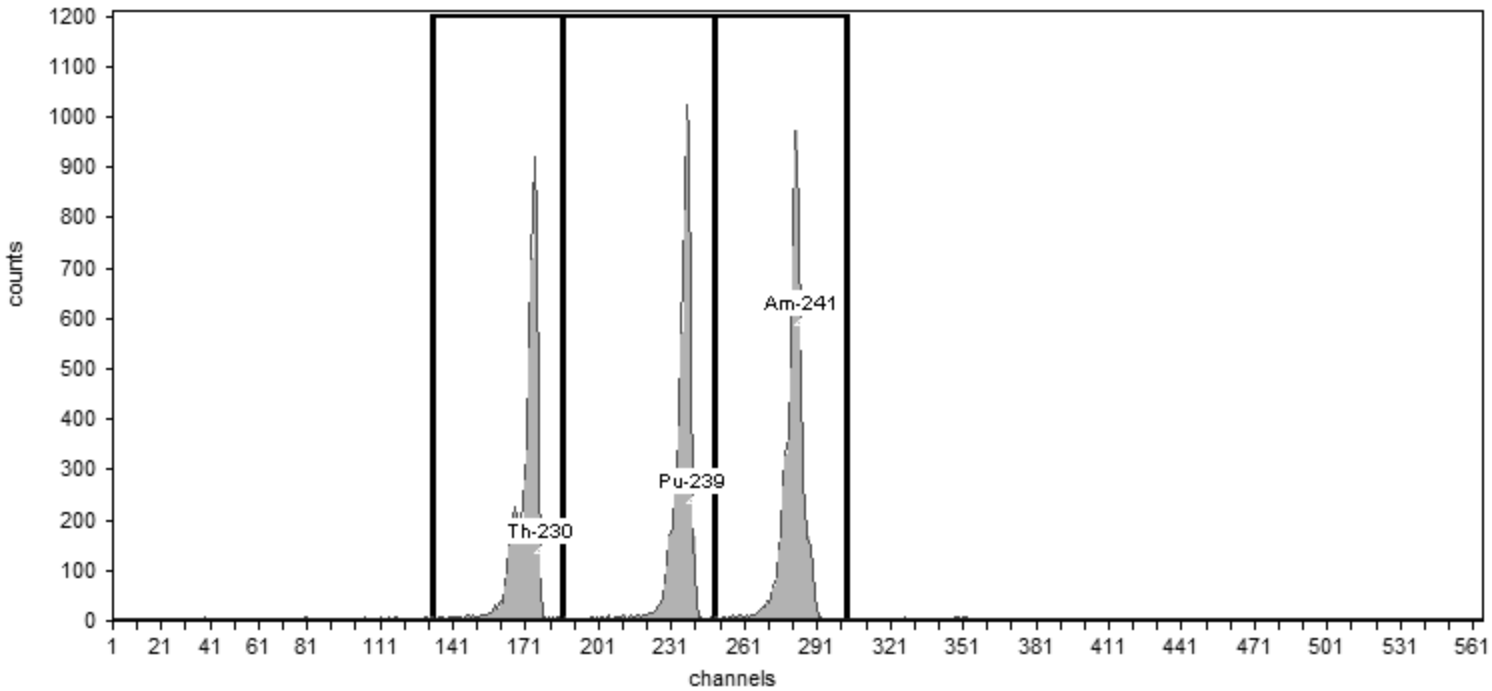
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 9/6/2016 11:24:11AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9795;AV212-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.94% +/- 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	31.02	5,561.00	92.68
Pu-239	240	5,155.40	186	249	33.35	5,855.00	97.58
Am-241	284	5,485.70	249	303	31.60	6,206.00	103.43

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:14:28AM 7/26/2016

Sample

Sample Name: ICB;AV148
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

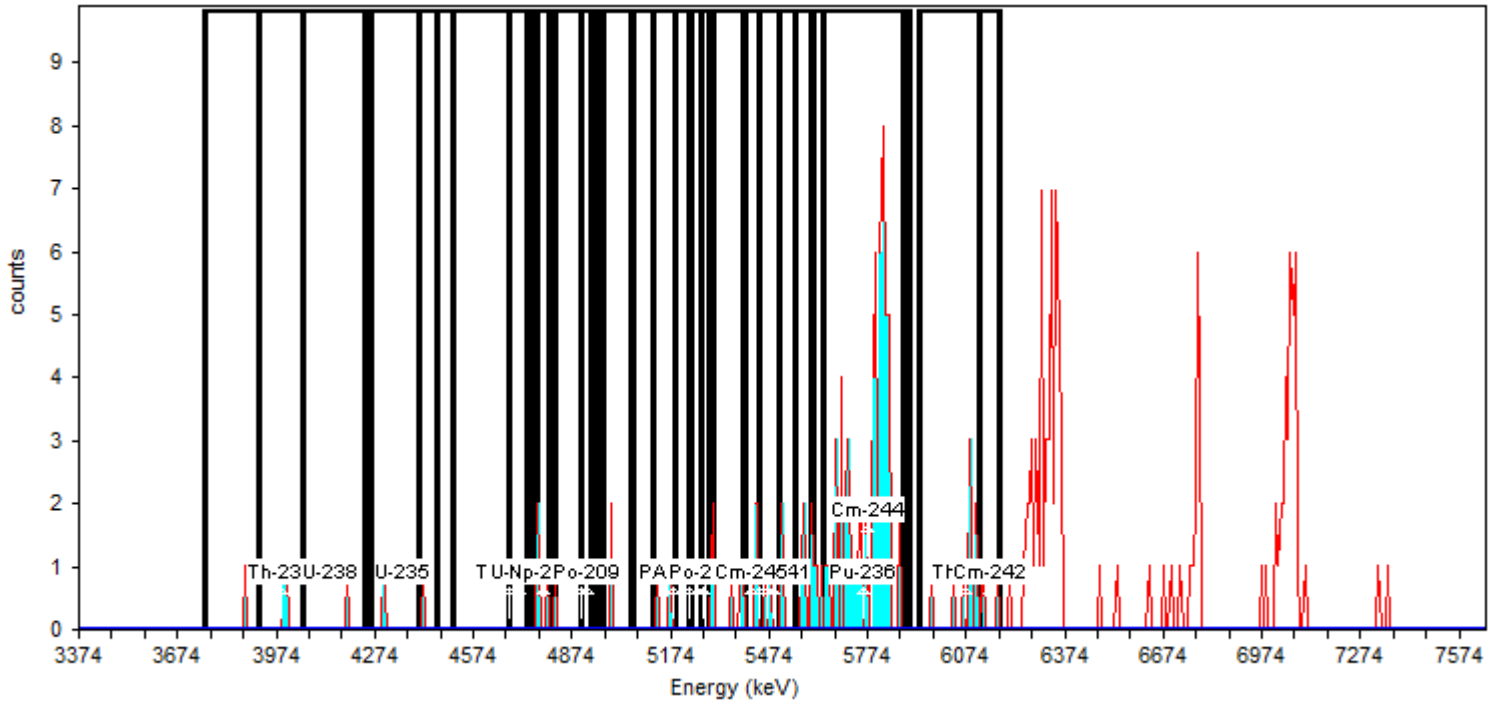
Batch Name: July2016a
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 7/25/2016 1:14:03PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8874;AV148-20151016a
Calibration Date: 10/16/2015 6:47:19PM

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: 223.00

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	3.00	3.125E-003	2.083E-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	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	4.00	4.167E-003	2.329E-003
Th-229	4,858.46	4,739.14	5,119.48	6.00	6.250E-003	2.756E-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	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	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	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-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	69.00	7.188E-002	8.715E-003
Cm-244	5,775.74	5,641.51	5,902.52	66.00	6.875E-002	8.526E-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	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
7:46:37AM 7/23/2016

Sample

Sample Name: ICB;AV149
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

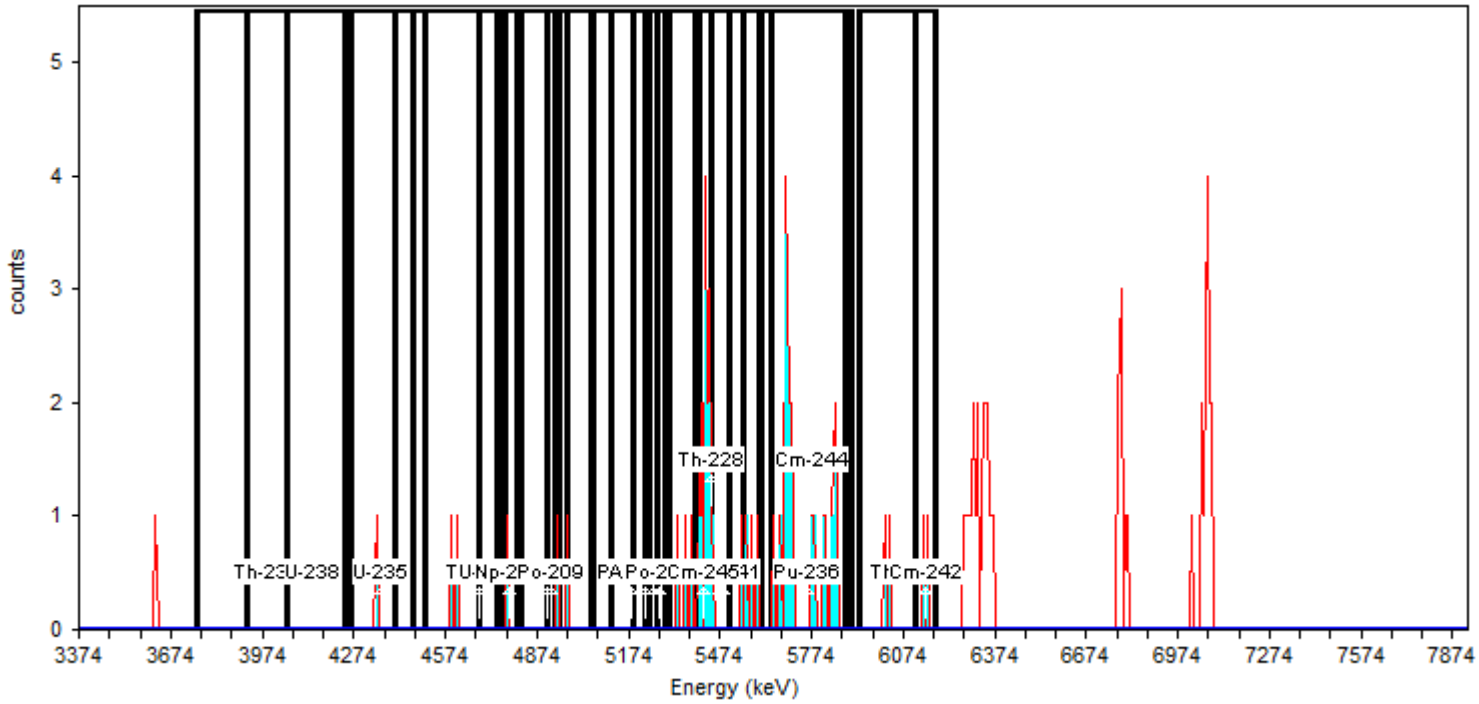
Batch Name: July2016
Description:

Acquisition

Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 7/22/2016 3:43:52PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV149-20151016
Calibration Date: 10/16/2015 6:46:43PM

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	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	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	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	0.00	0.000E+000	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	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	17.00	1.771E-002	4.419E-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	13.00	1.354E-002	3.898E-003
Pu-236	5,760.83	5,611.67	5,887.60	22.00	2.292E-002	4.996E-003
Cm-244	5,775.74	5,641.51	5,902.52	22.00	2.292E-002	4.996E-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	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
7:45:00AM 7/23/2016

Sample

Sample Name: ICB;AV161
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

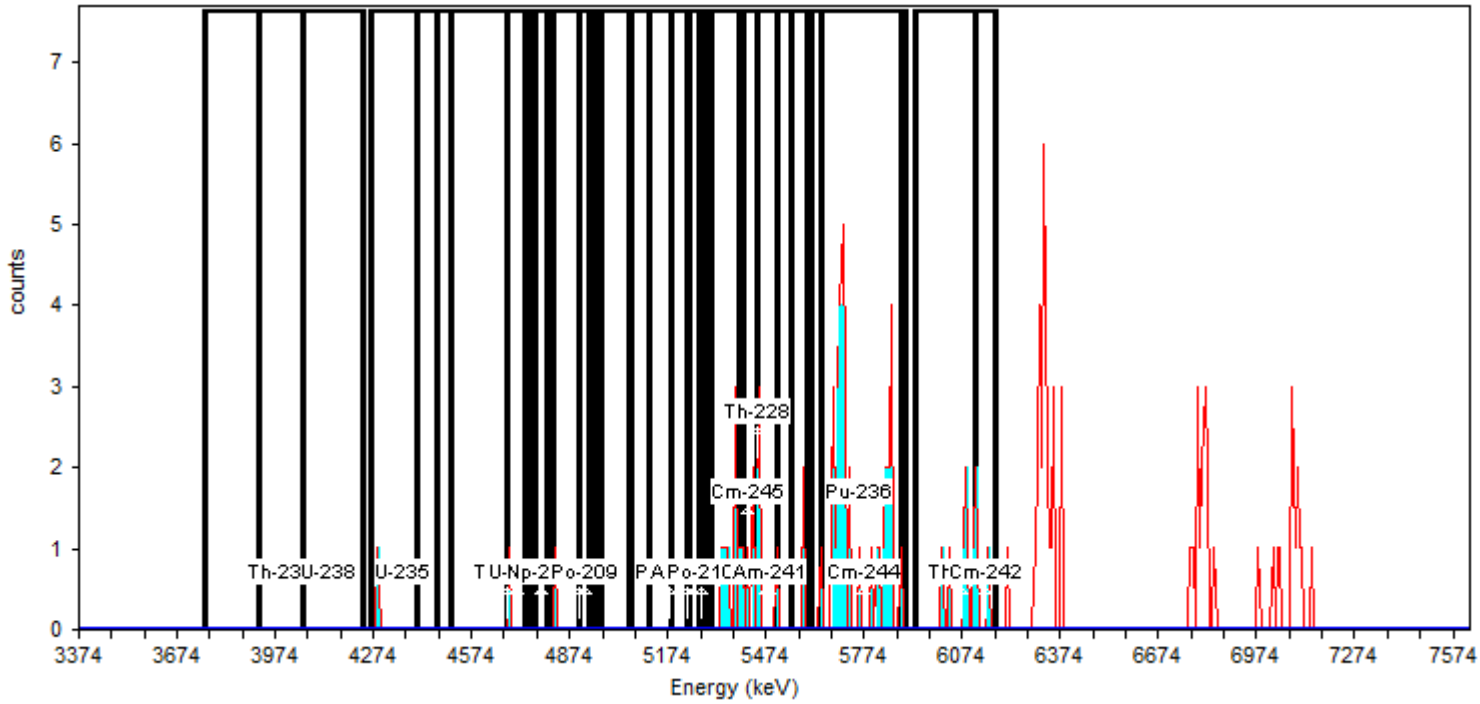
Batch Name: July2016
Description:

Acquisition

Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 7/22/2016 3:43:32PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-7107;AV161-20151016
Calibration Date: 10/17/2015 2:36:23PM

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: 121.00

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	2.00	2.083E-003	1.804E-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	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	0.00	0.000E+000	1.473E-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	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	18.00	1.875E-002	4.541E-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	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	36.00	3.750E-002	6.336E-003
Cm-244	5,775.74	5,641.51	5,902.52	36.00	3.750E-002	6.336E-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	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
5:14:57AM 7/26/2016

Sample

Sample Name: ICB;AV162
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

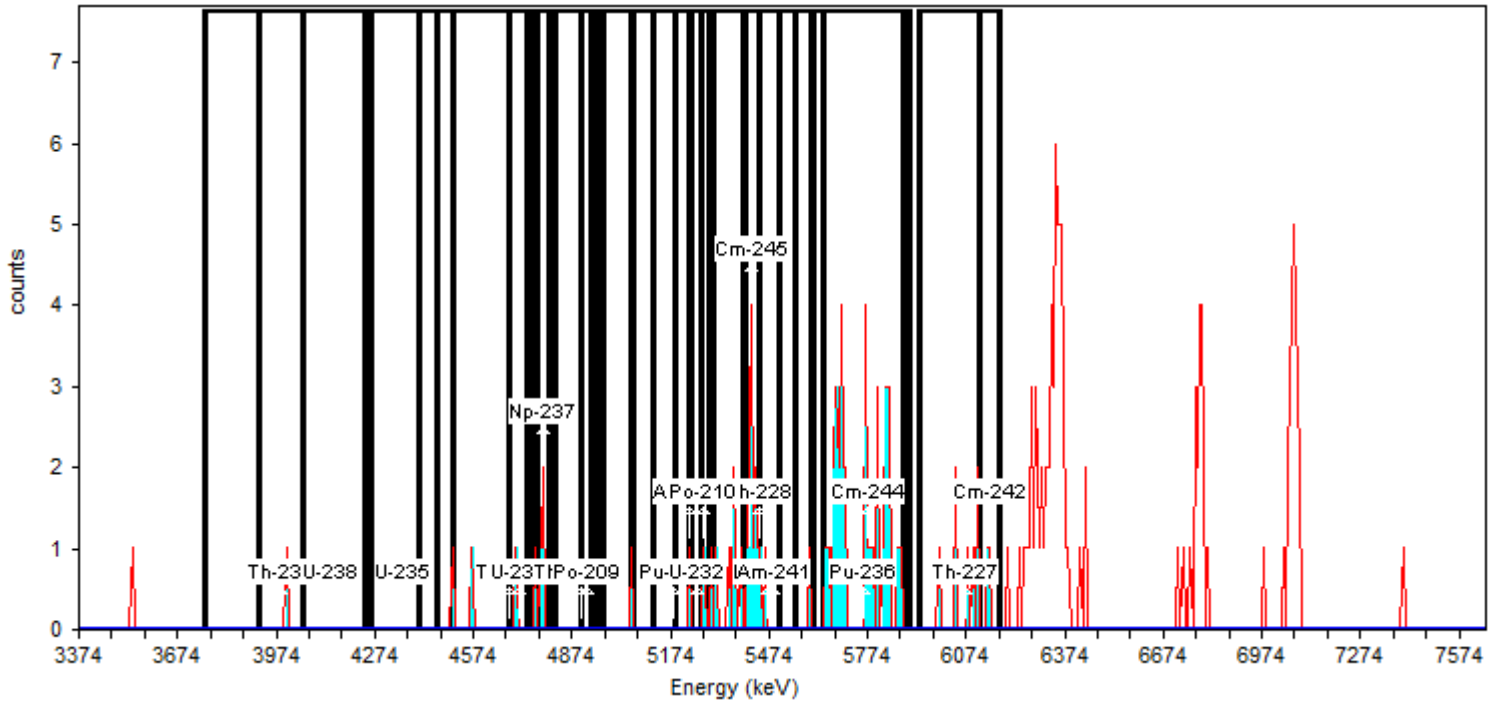
Batch Name: July2016a
Description:

Acquisition

Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 7/25/2016 1:14:04PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8874;AV162-20151016
Calibration Date: 10/17/2015 2:36:27PM

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: 170.00

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	7.00	7.292E-003	2.946E-003
Pu-242	4,903.21	4,679.48	4,947.95	5.00	5.208E-003	2.552E-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	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	20.00	2.083E-002	4.774E-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	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-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	40.00	4.167E-002	6.670E-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	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
7:44:52AM 7/23/2016

Sample

Sample Name: ICB;AV163
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

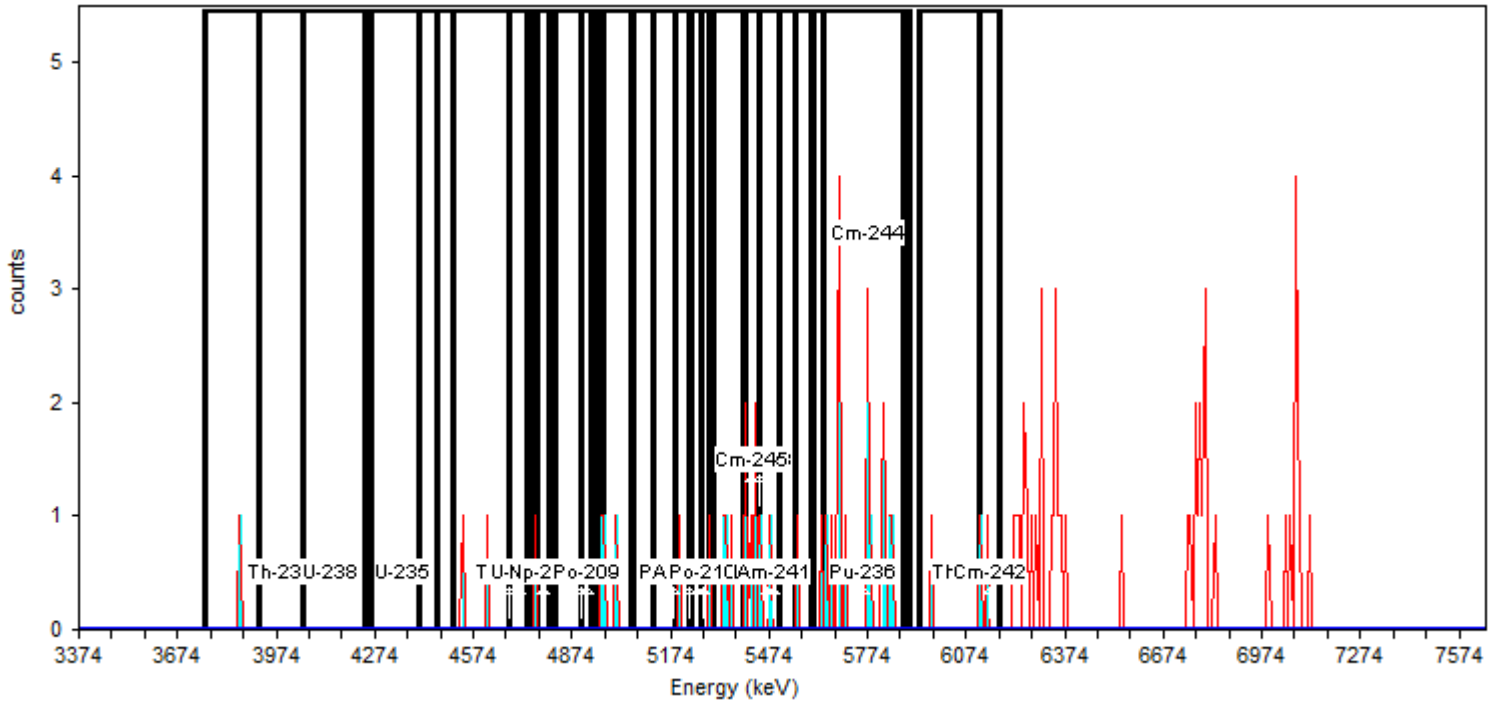
Batch Name: July2016
Description:

Acquisition

Detector: AV163 , SN: 50-110E7
Acquisition Start Date: 7/22/2016 3:43:33PM
Live Time: 960.00 min.
Real Time: 960.04 min.
Calibration Name: IC-8875;AV163-20151016
Calibration Date: 10/17/2015 2:36:32PM

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: 83.00

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	3.00	3.125E-003	2.083E-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	4.00	4.167E-003	2.329E-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	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	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	11.00	1.146E-002	3.608E-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	17.00	1.771E-002	4.419E-003
Cm-244	5,775.74	5,641.51	5,902.52	16.00	1.667E-002	4.295E-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	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
7:44:53AM 7/23/2016

Sample

Sample Name: ICB;AV164
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

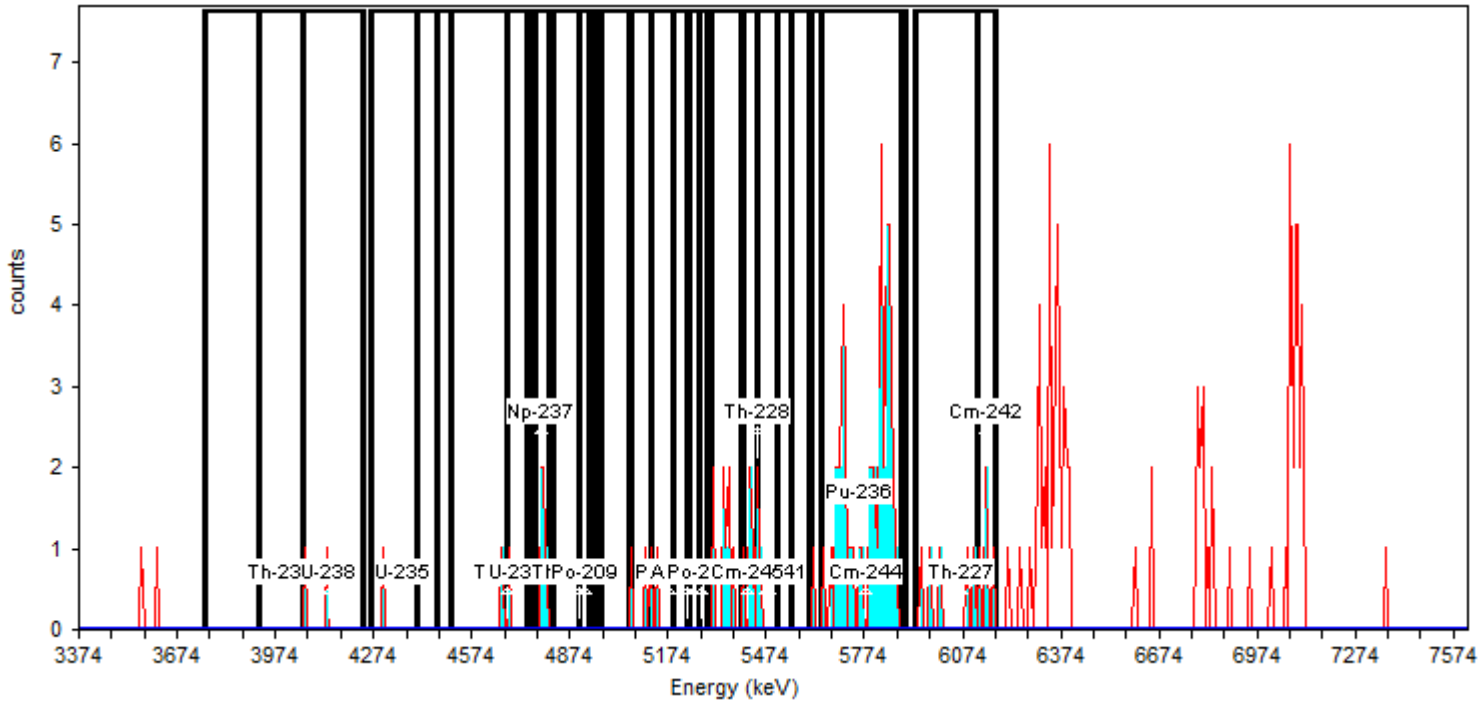
Batch Name: July2016
Description:

Acquisition

Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 7/22/2016 3:43:33PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8876;AV164-20151016
Calibration Date: 10/17/2015 2:36:37PM

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: 176.00

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	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	7.00	7.292E-003	2.946E-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	8.00	8.333E-003	3.125E-003
Np-237	4,783.89	4,768.97	4,806.26	5.00	5.208E-003	2.552E-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	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	13.00	1.354E-002	3.898E-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	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	15.00	1.563E-002	4.167E-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	54.00	5.625E-002	7.725E-003
Cm-244	5,775.74	5,641.51	5,902.52	53.00	5.521E-002	7.655E-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	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
8:43:05AM 7/23/2016

Sample

Sample Name: ICB;AV169
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

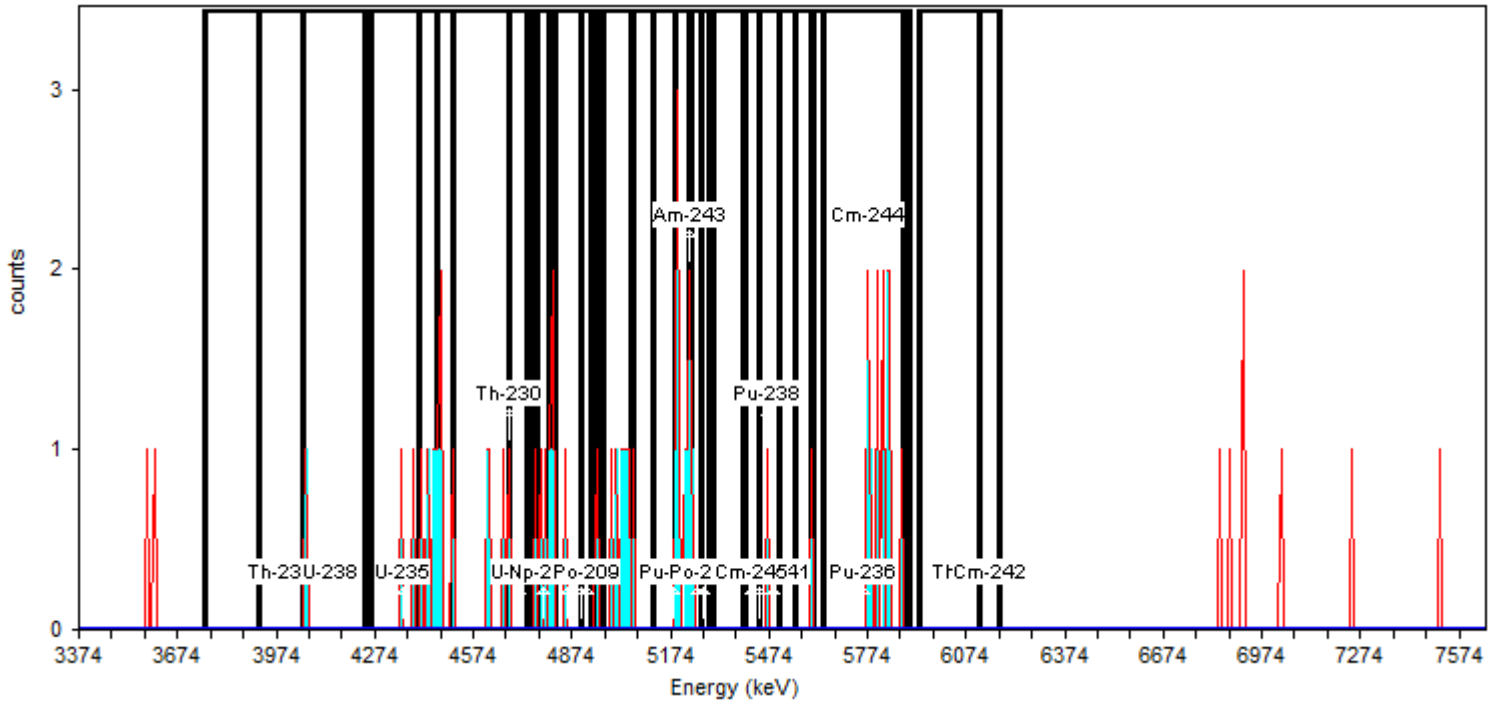
Batch Name: July2016
Description:

Acquisition

Detector: AV169 , SN: 50-112 G5
Acquisition Start Date: 7/22/2016 3:43:34PM
Live Time: 960.00 min.
Real Time: 1,019.60 min.
Calibration Name: IC-9794;AV169-20151016
Calibration Date: 10/17/2015 2:36:47PM

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: 64.00

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	7.00	7.292E-003	2.946E-003
Th-230	4,679.48	4,403.55	4,746.60	12.00	1.250E-002	3.756E-003
U-234	4,709.31	4,507.96	4,821.17	11.00	1.146E-002	3.608E-003
Pu-242	4,903.21	4,679.48	4,947.95	9.00	9.375E-003	3.294E-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	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	17.00	1.771E-002	4.419E-003
Am-243	5,231.34	5,052.36	5,305.92	11.00	1.146E-002	3.608E-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	11.00	1.146E-002	3.608E-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	1.00	1.042E-003	1.473E-003
Am-241	5,484.90	5,298.46	5,604.22	2.00	2.083E-003	1.804E-003
Cm-245	5,417.78	5,395.41	5,447.61	0.00	0.000E+000	1.473E-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	0.00	0.000E+000	1.473E-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
5:15:28AM 7/26/2016

Sample

Sample Name: ICB;AV170
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

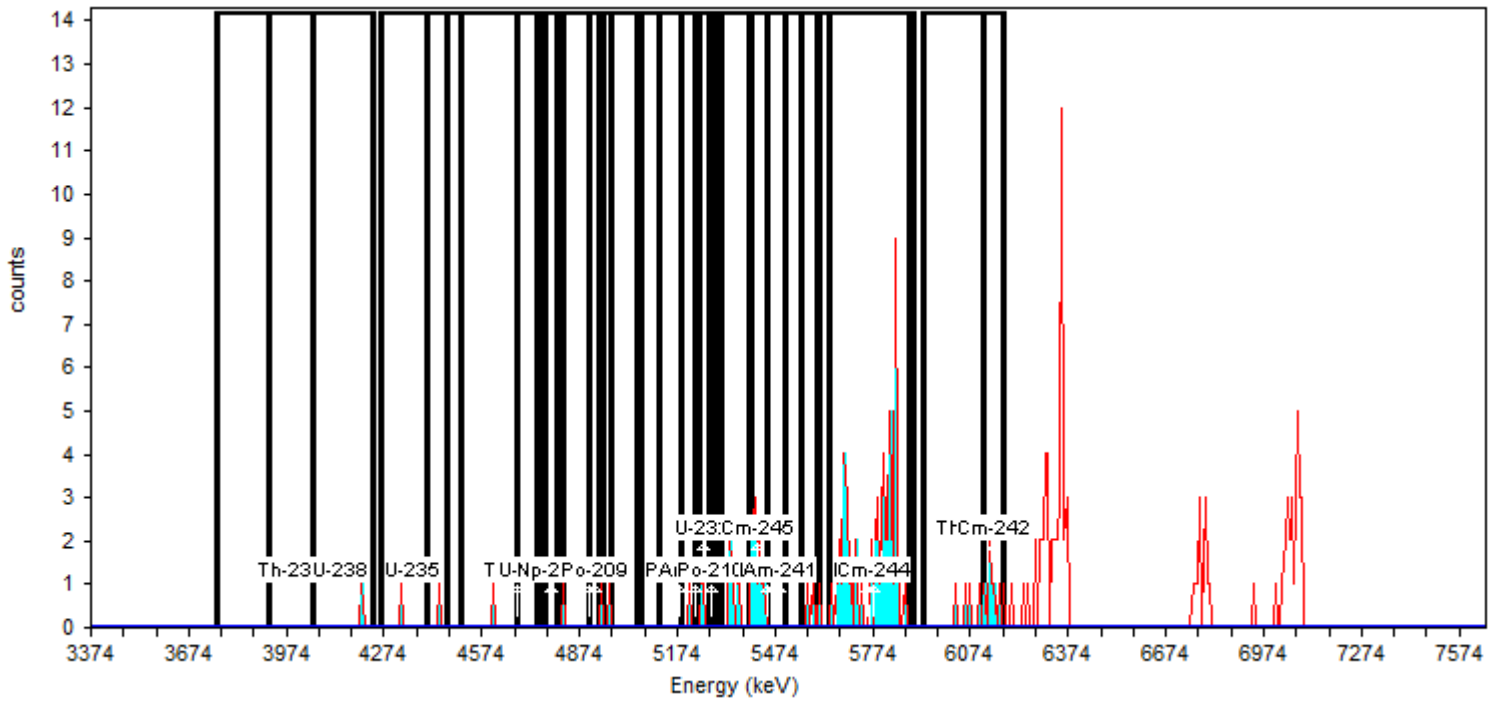
Batch Name: July2016a
Description:

Acquisition

Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 7/25/2016 1:14:05PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9795;AV170-20151016
Calibration Date: 10/17/2015 2:36:50PM

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: 170.00

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	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	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	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	10.00	1.042E-002	3.455E-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	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	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	53.00	5.521E-002	7.655E-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	11.00	1.146E-002	3.608E-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
5:15:24AM 7/26/2016

Sample

Sample Name: ICB;AV173
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

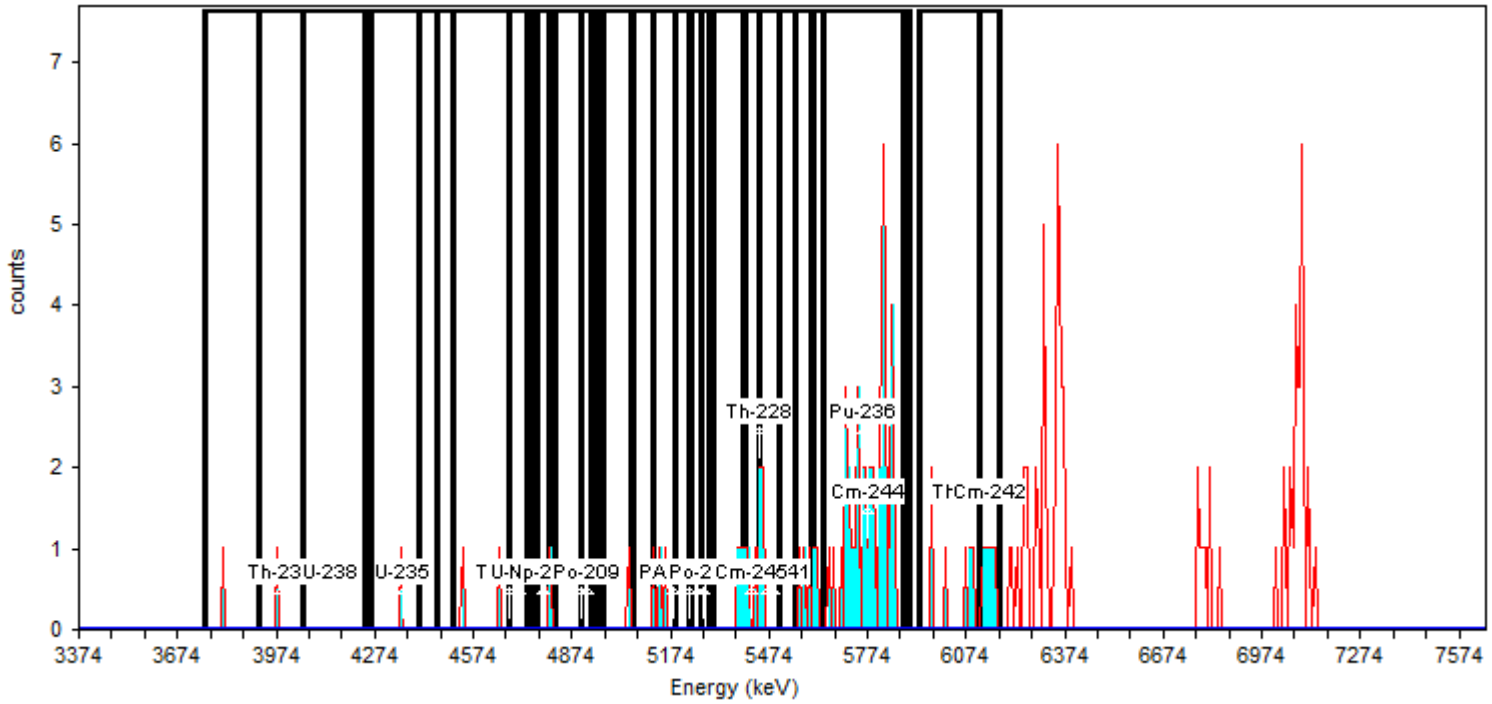
Batch Name: July2016a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 7/25/2016 1:14:05PM
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: 148.00

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	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	3.00	3.125E-003	2.083E-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	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	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	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	10.00	1.042E-002	3.455E-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	10.00	1.042E-002	3.455E-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	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	44.00	4.583E-002	6.988E-003
Cm-244	5,775.74	5,641.51	5,902.52	42.00	4.375E-002	6.831E-003
Th-227	6,074.04	5,932.35	6,178.45	12.00	1.250E-002	3.756E-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
7:46:44AM 7/23/2016

Sample

Sample Name: ICB;AV176
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

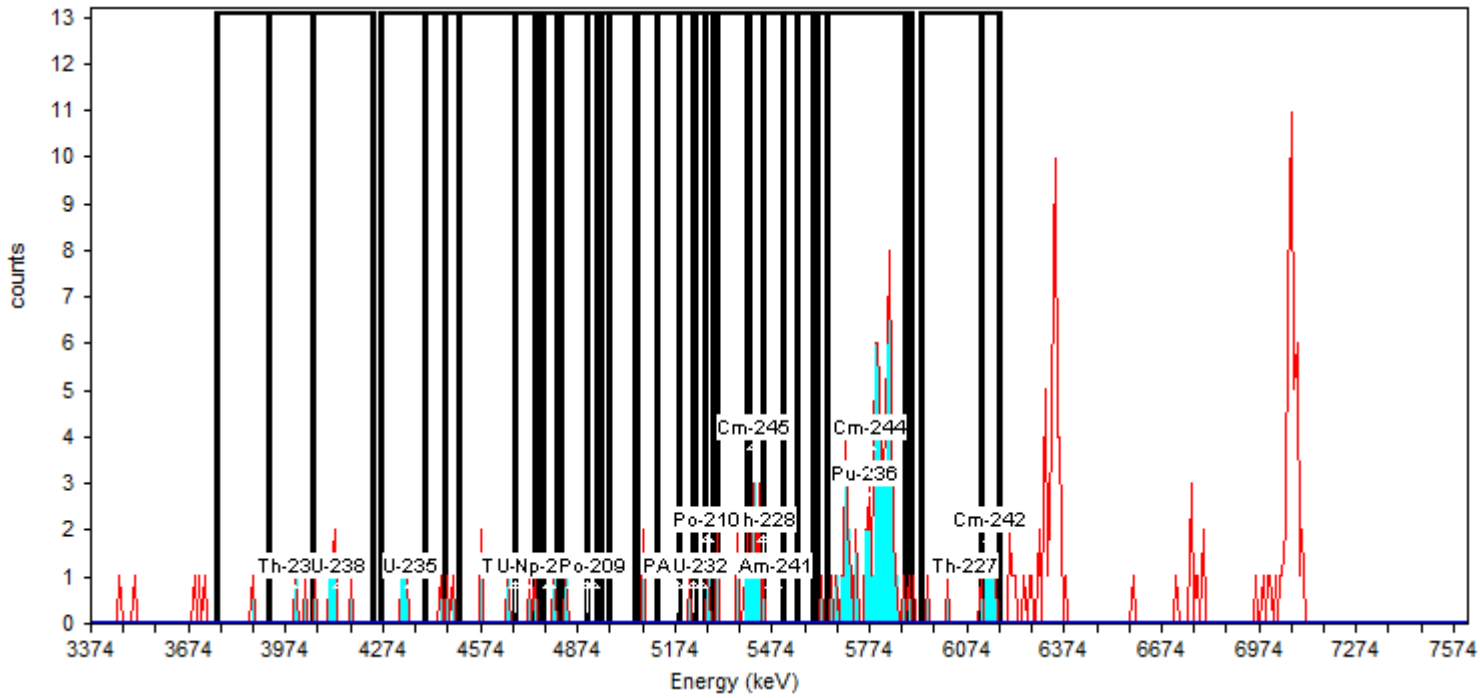
Batch Name: July2016
Description:

Acquisition

Detector: AV176 , SN: 50-117H2
Acquisition Start Date: 7/22/2016 3:43:35PM
Live Time: 960.00 min.
Real Time: 960.15 min.
Calibration Name: IC-8874;AV176-20151017
Calibration Date: 10/17/2015 6:01:52PM

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: 237.00

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	8.00	8.333E-003	3.125E-003
U-235	4,358.81	4,261.86	4,463.21	4.00	4.167E-003	2.329E-003
Th-230	4,679.48	4,403.55	4,746.60	8.00	8.333E-003	3.125E-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	4.00	4.167E-003	2.329E-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	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	12.00	1.250E-002	3.756E-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	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	12.00	1.250E-002	3.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	70.00	7.292E-002	8.777E-003
Cm-244	5,775.74	5,641.51	5,902.52	70.00	7.292E-002	8.777E-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
7:45:28AM 7/23/2016

Sample

Sample Name: ICB;AV177
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

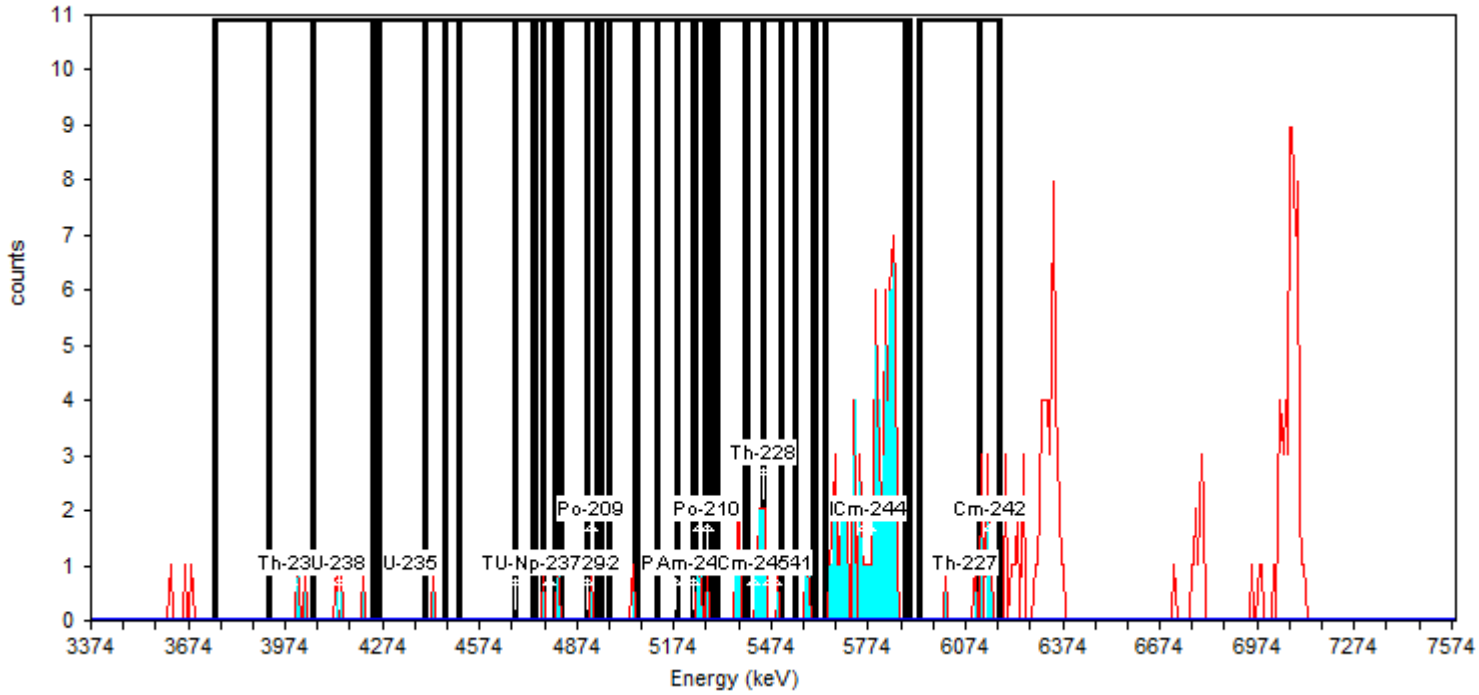
Batch Name: July2016
Description:

Acquisition

Detector: AV177 , SN: 50-117H3
Acquisition Start Date: 7/22/2016 3:43:36PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV177-20151017a
Calibration Date: 10/17/2015 6:02:25PM

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: 233.00

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	5.00	5.208E-003	2.552E-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	2.00	2.083E-003	1.804E-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	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	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	6.00	6.250E-003	2.756E-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	3.00	3.125E-003	2.083E-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	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	74.00	7.708E-002	9.021E-003
Cm-244	5,775.74	5,641.51	5,902.52	74.00	7.708E-002	9.021E-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	8.00	8.333E-003	3.125E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:45:38AM 7/23/2016

Sample

Sample Name: ICB;AV189
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

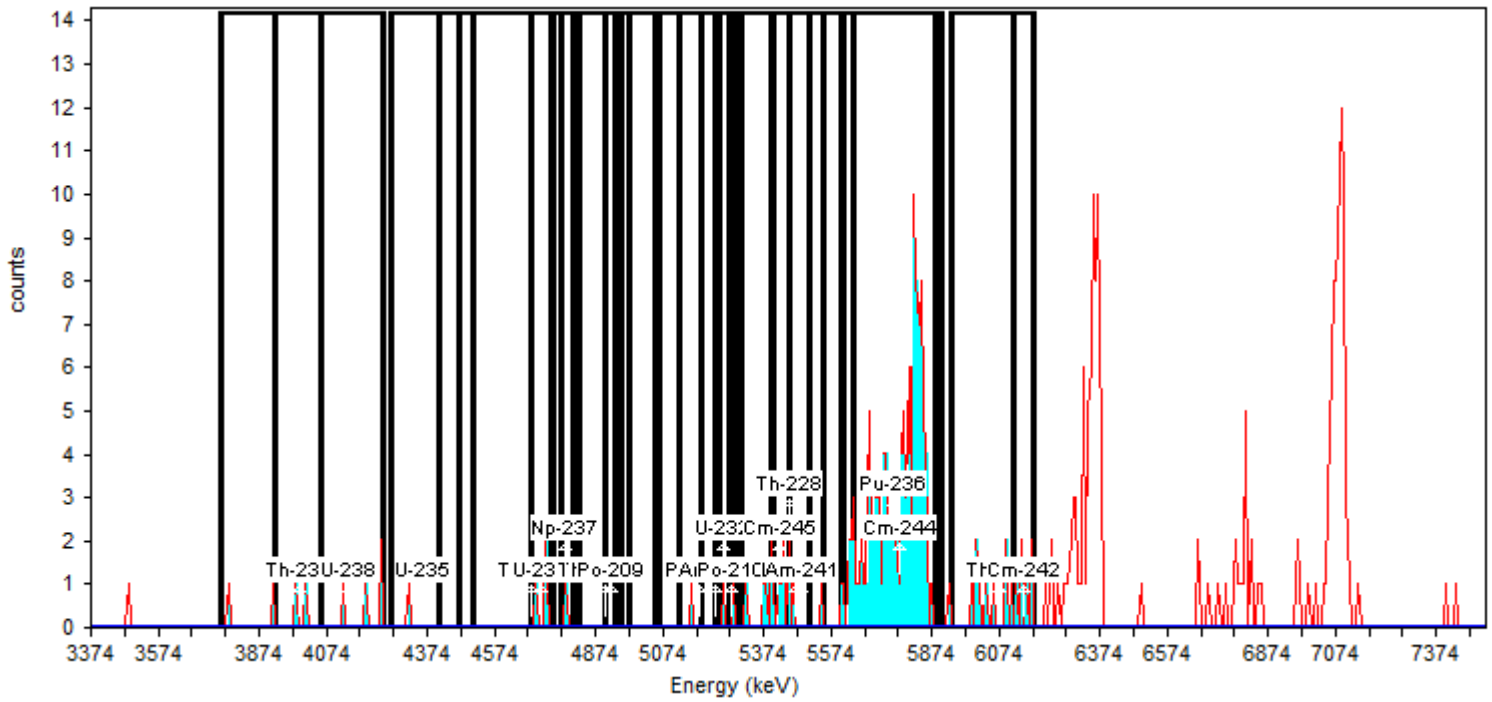
Batch Name: July2016
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 7/22/2016 3:43:38PM
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: 317.00

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	6.00	6.250E-003	2.756E-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	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	4.00	4.167E-003	2.329E-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	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	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	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	15.00	1.563E-002	4.167E-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	110.00	1.146E-001	1.097E-002
Cm-244	5,775.74	5,641.51	5,902.52	105.00	1.094E-001	1.072E-002
Th-227	6,074.04	5,932.35	6,178.45	15.00	1.563E-002	4.167E-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
7:45:49AM 7/23/2016

Sample

Sample Name: ICB;AV191
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

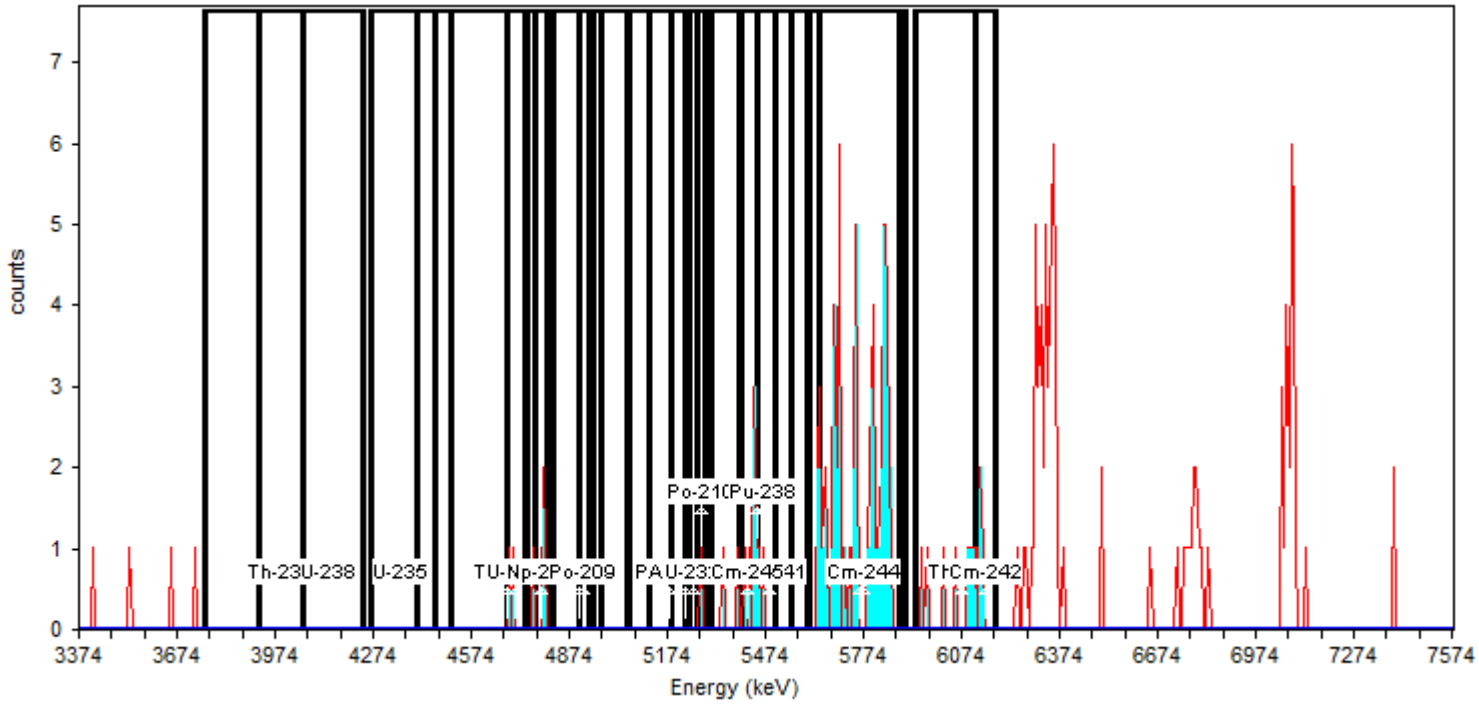
Batch Name: July2016
Description:

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
7:43:40AM 7/23/2016

Sample

Sample Name: ICB;AV194
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

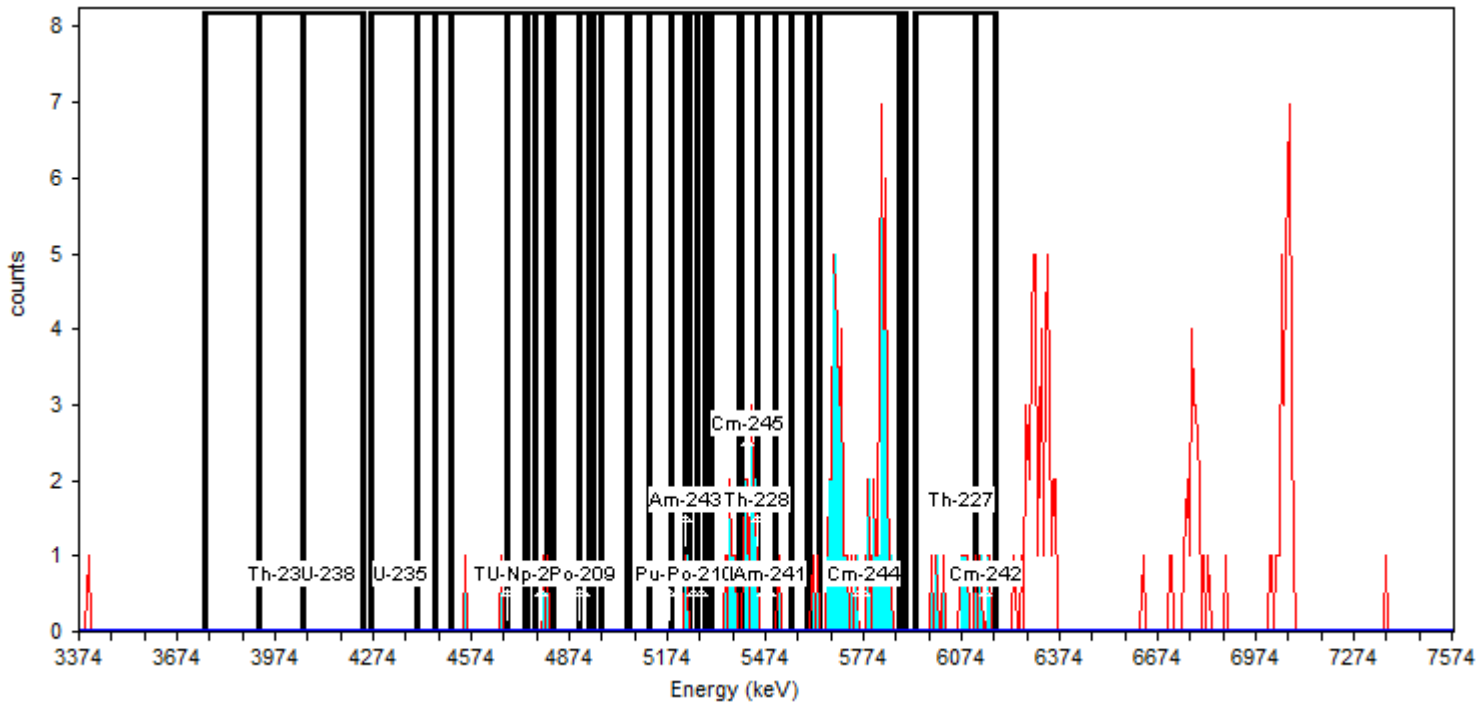
Batch Name: July2016
Description:

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
7:44:12AM 7/23/2016

Sample

Sample Name: ICB;AV195
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

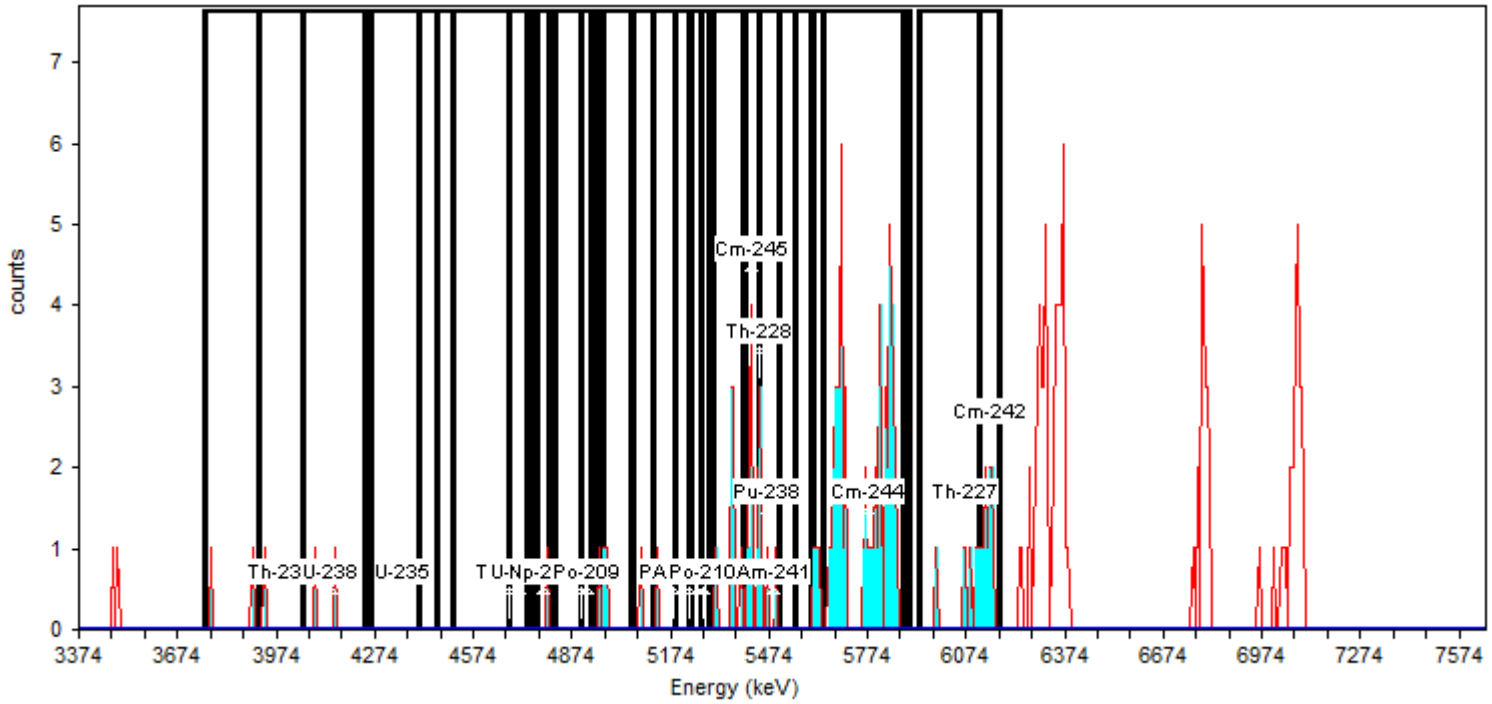
Batch Name: July2016
Description:

Acquisition

Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 7/22/2016 3:43:40PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV195-20151017a
Calibration Date: 10/18/2015 3:55:41PM

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: 185.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
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	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	10.00	1.042E-002	3.455E-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	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-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	53.00	5.521E-002	7.655E-003
Cm-244	5,775.74	5,641.51	5,902.52	50.00	5.208E-002	7.439E-003
Th-227	6,074.04	5,932.35	6,178.45	15.00	1.563E-002	4.167E-003
Cm-242	6,148.62	6,118.79	6,178.45	9.00	9.375E-003	3.294E-003
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	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
7:44:27AM 7/23/2016

Sample

Sample Name: ICB;AV196
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

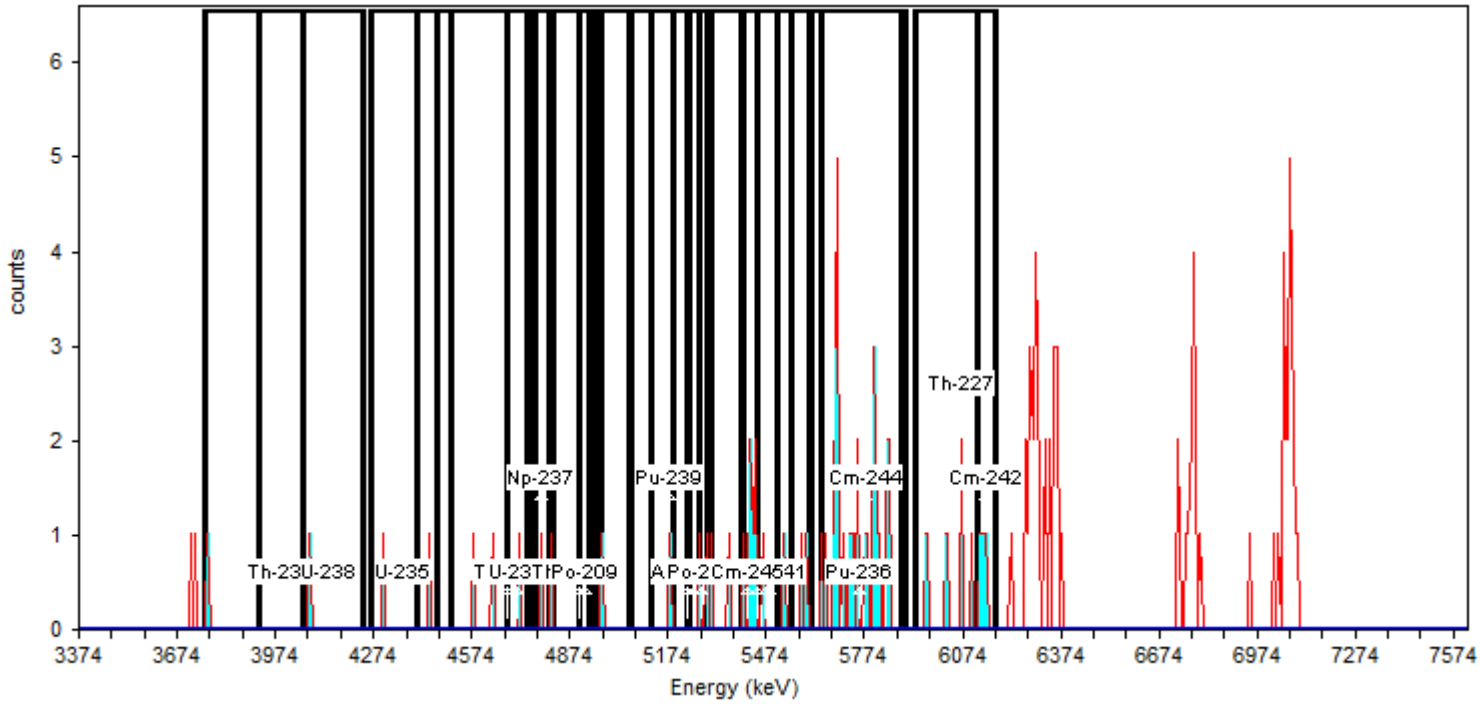
Batch Name: July2016
Description:

Acquisition

Detector: AV196 , SN: 50-117AA5
Acquisition Start Date: 7/22/2016 3:43:40PM
Live Time: 960.00 min.
Real Time: 960.00 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: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 126.00

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	2.00	2.083E-003	1.804E-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	5.00	5.208E-003	2.552E-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	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	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	12.00	1.250E-002	3.756E-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	6.00	6.250E-003	2.756E-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	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
5:16:08AM 7/26/2016

Sample

Sample Name: ICB;AV200
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

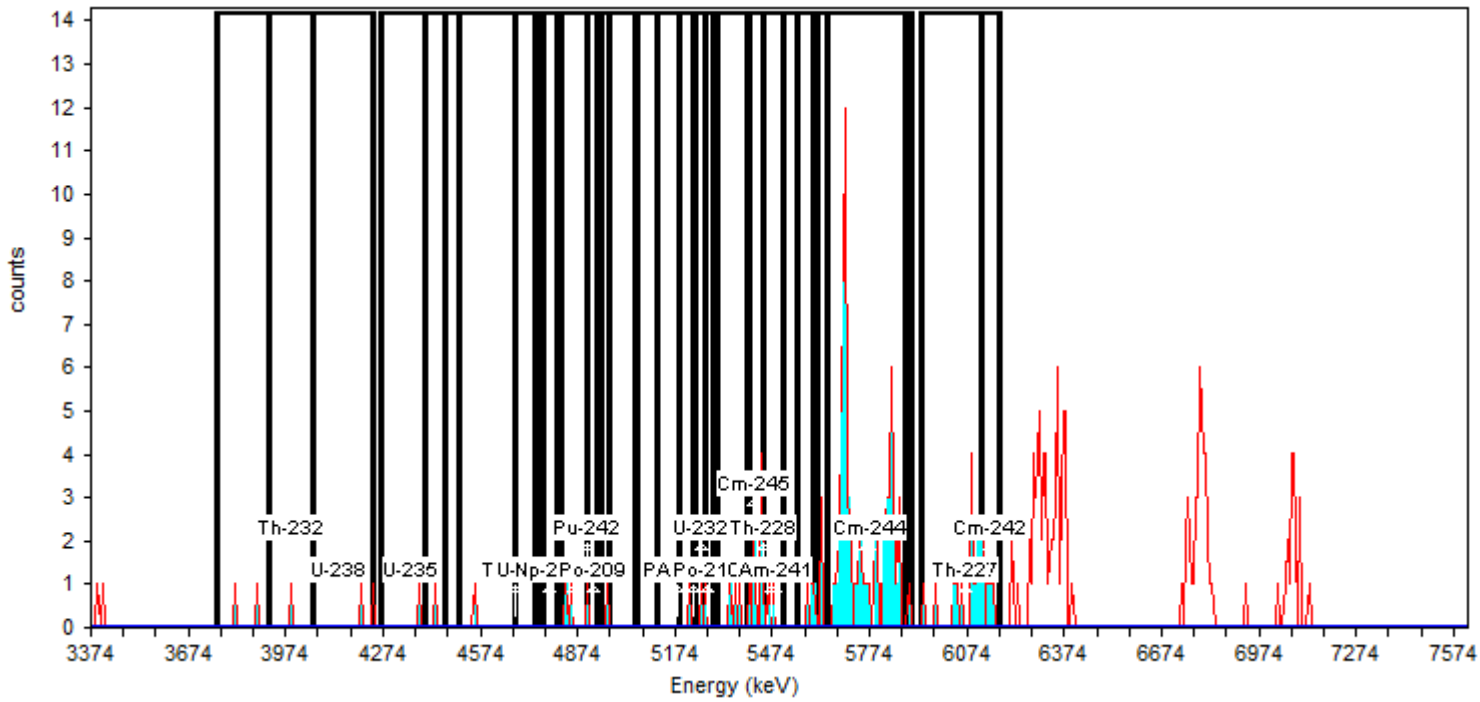
Batch Name: July2016a
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 7/25/2016 1:13:59PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9884;AV200-20151017
Calibration Date: 10/18/2015 3:55:33PM

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	3.00	3.125E-003	2.083E-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	2.00	2.083E-003	1.804E-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	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	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	3.00	3.125E-003	2.083E-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	16.00	1.667E-002	4.295E-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	14.00	1.458E-002	4.034E-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	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	70.00	7.292E-002	8.777E-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	20.00	2.083E-002	4.774E-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
5:16:51AM 7/26/2016

Sample

Sample Name: ICB;AV206
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

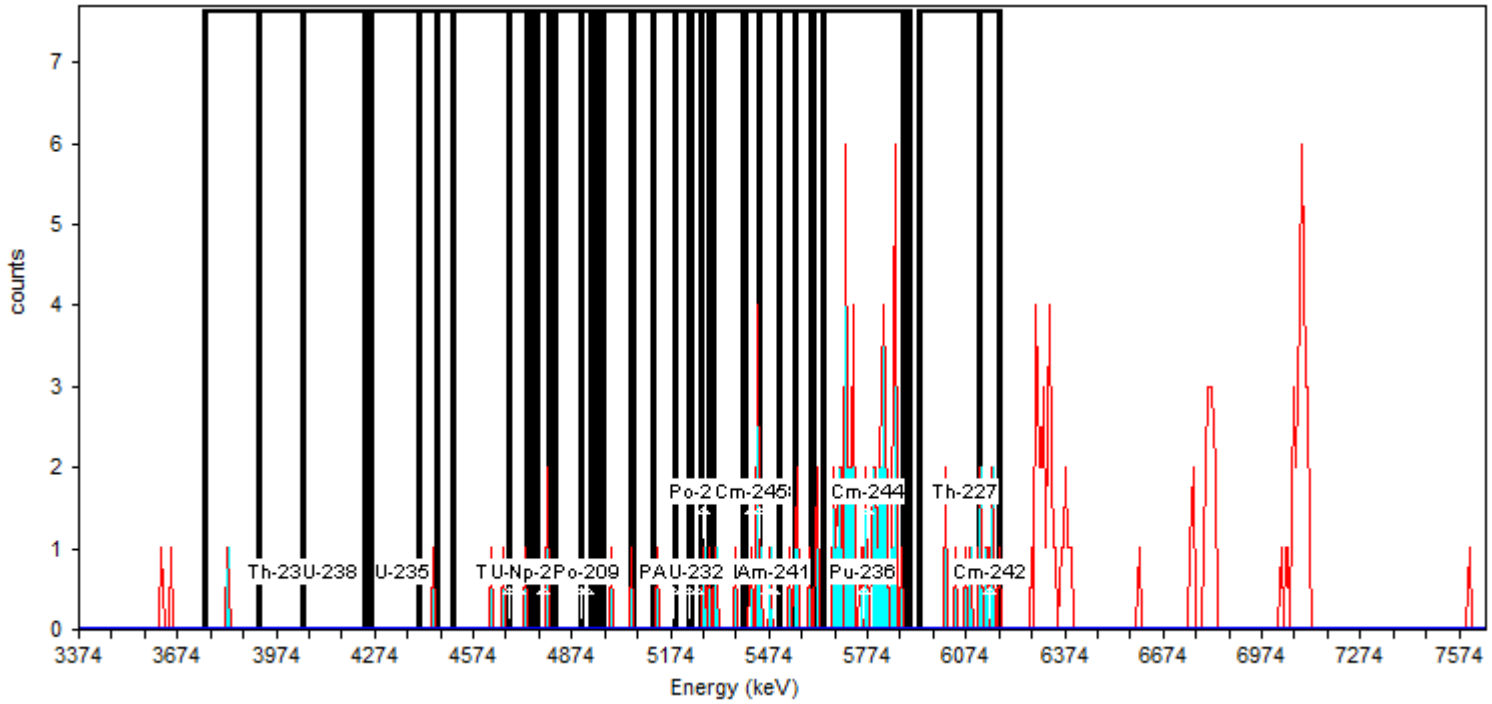
Batch Name: July2016a
Description:

Acquisition

Detector: AV206 , SN: 50-119AA6
Acquisition Start Date: 7/25/2016 1:14:01PM
Live Time: 960.00 min.
Real Time: 960.40 min.
Calibration Name: IC-8876;AV206-20151018
Calibration Date: 10/18/2015 6:41:49PM

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: 163.00

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	1.00	1.042E-003	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	5.00	5.208E-003	2.552E-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	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	4.00	4.167E-003	2.329E-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	11.00	1.146E-002	3.608E-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	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	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	50.00	5.208E-002	7.439E-003
Cm-244	5,775.74	5,641.51	5,902.52	48.00	5.000E-002	7.292E-003
Th-227	6,074.04	5,932.35	6,178.45	12.00	1.250E-002	3.756E-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
7:44:56AM 7/23/2016

Sample

Sample Name: ICB;AV207
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

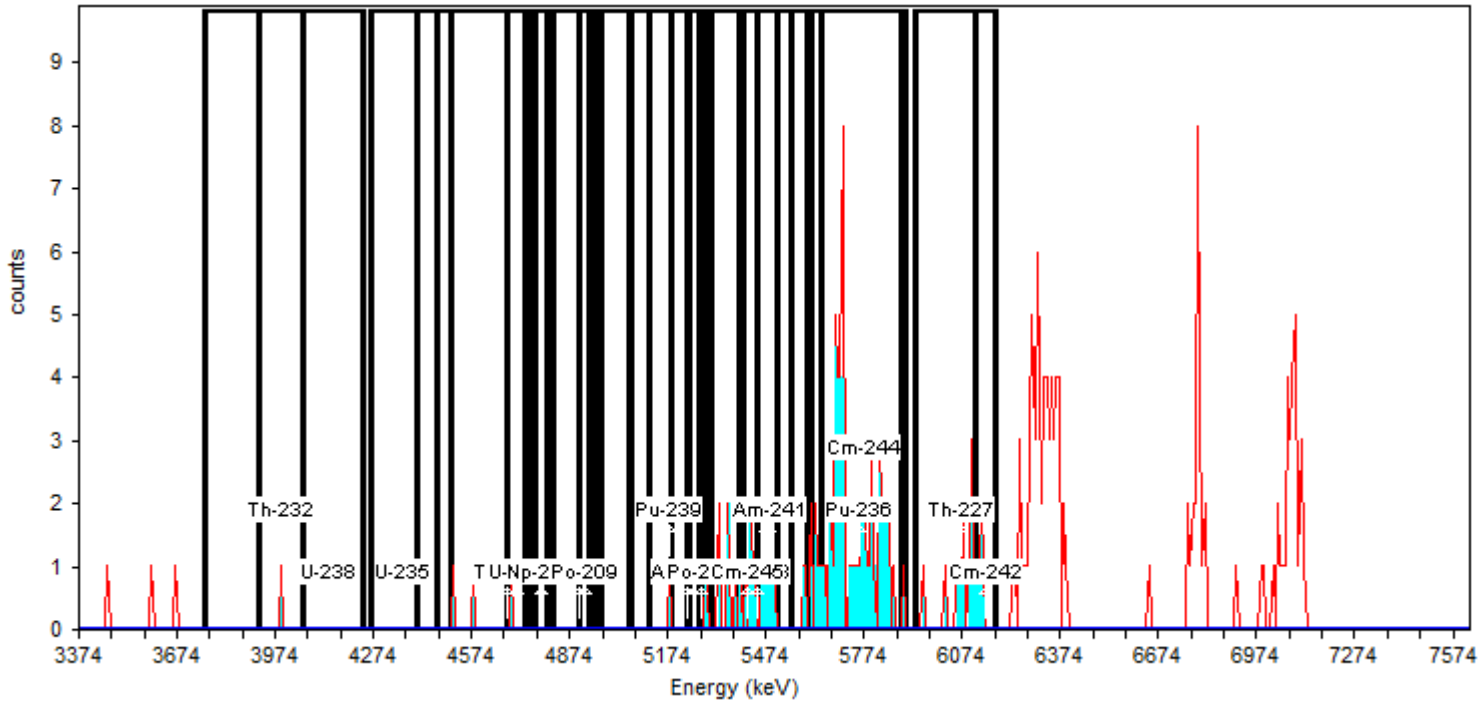
Batch Name: July2016
Description:

Acquisition

Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 7/22/2016 3:43:42PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV207-20151018
Calibration Date: 10/18/2015 6:41:56PM

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: 220.00

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	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	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	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	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	19.00	1.979E-002	4.658E-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	55.00	5.729E-002	7.795E-003
Th-227	6,074.04	5,932.35	6,178.45	17.00	1.771E-002	4.419E-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
5:16:45AM 7/26/2016

Sample

Sample Name: ICB;AV208
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

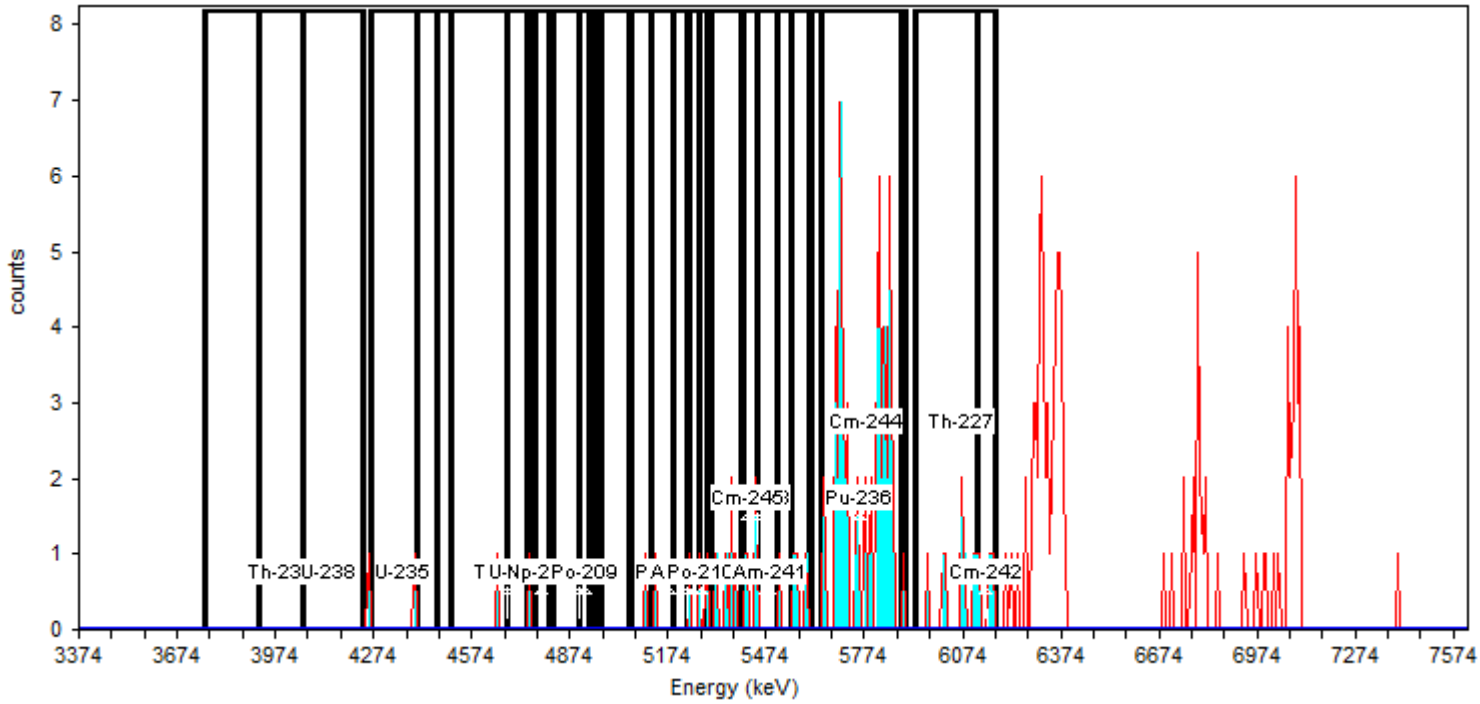
Batch Name: July2016a
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 7/25/2016 1:14:01PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9520;AV208-20151018a
Calibration Date: 10/18/2015 6:42:37PM

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: 196.00

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	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	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	10.00	1.042E-002	3.455E-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	3.00	3.125E-003	2.083E-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	5.00	5.208E-003	2.552E-003
Pu-236	5,760.83	5,611.67	5,887.60	62.00	6.458E-002	8.268E-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	12.00	1.250E-002	3.756E-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
5:14:03AM 7/26/2016

Sample

Sample Name: ICB;AV209
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

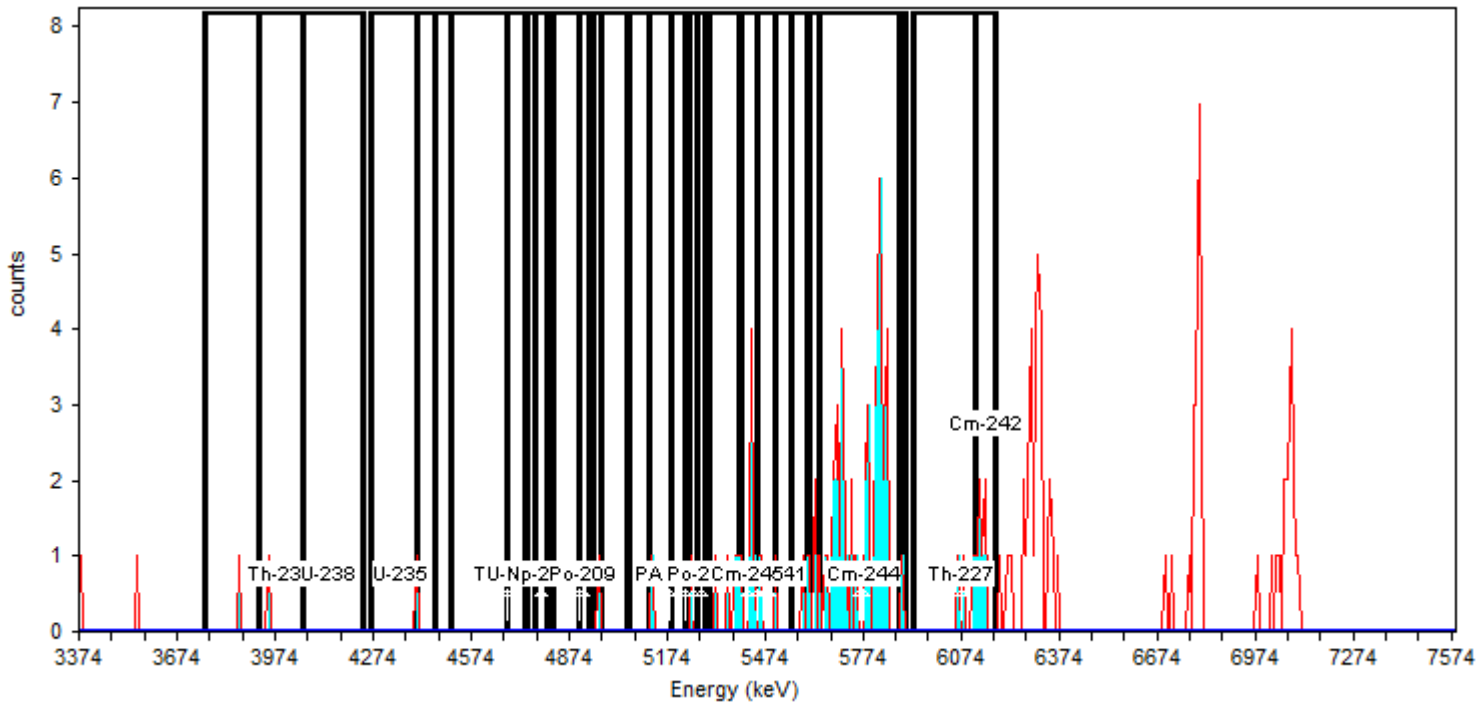
Batch Name: July2016a
Description:

Acquisition

Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 7/25/2016 1:14:01PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV209-20151018
Calibration Date: 10/18/2015 6:42:01PM

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: 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	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	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	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	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	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	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	1.00	1.042E-003	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	17.00	1.771E-002	4.419E-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	52.00	5.417E-002	7.583E-003
Cm-244	5,775.74	5,641.51	5,902.52	50.00	5.208E-002	7.439E-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	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
5:16:39AM 7/26/2016

Sample

Sample Name: ICB;AV210
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

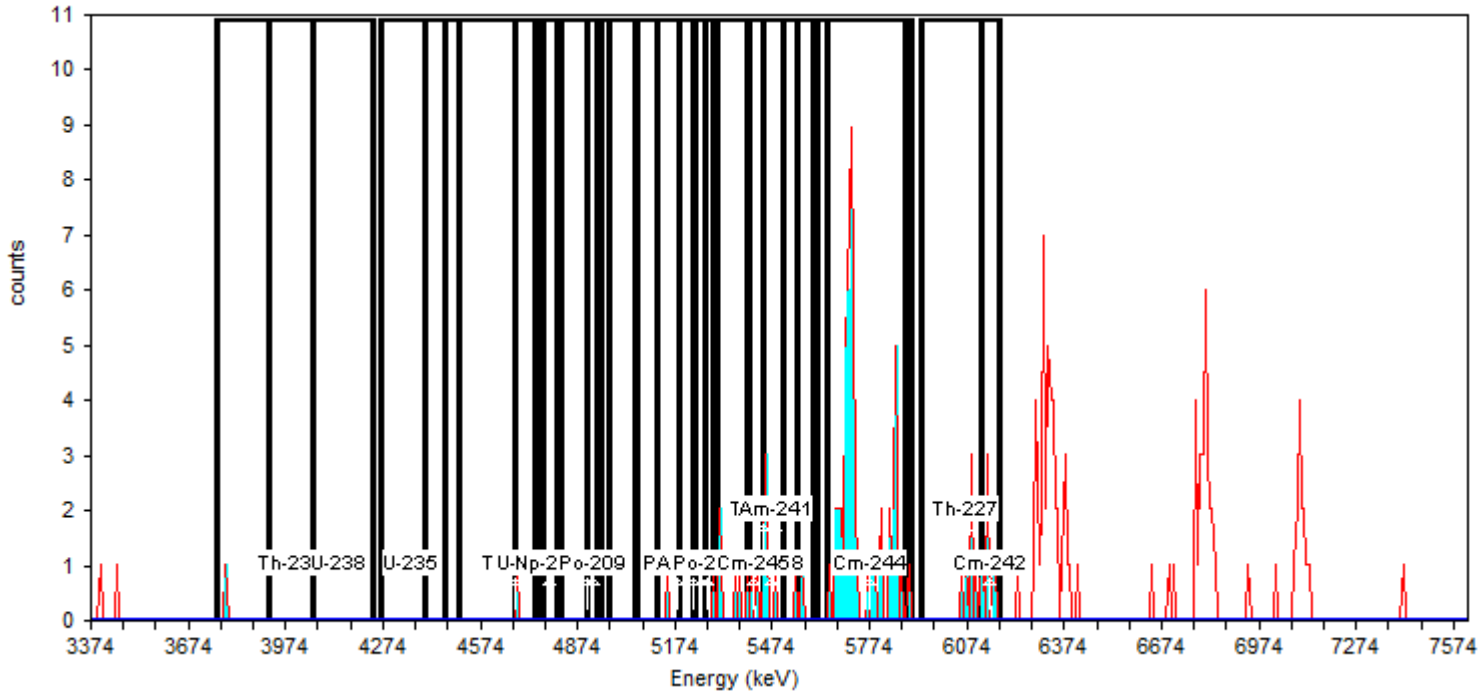
Batch Name: July2016a
Description:

Acquisition

Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 7/25/2016 1:14:01PM
Live Time: 960.00 min.
Real Time: 960.08 min.
Calibration Name: IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM

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	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	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	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	7.00	7.292E-003	2.946E-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	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	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	54.00	5.625E-002	7.725E-003
Cm-244	5,775.74	5,641.51	5,902.52	55.00	5.729E-002	7.795E-003
Th-227	6,074.04	5,932.35	6,178.45	13.00	1.354E-002	3.898E-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
7:19:47AM 9/2/2016

Sample

Sample Name: ICB;AV210
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

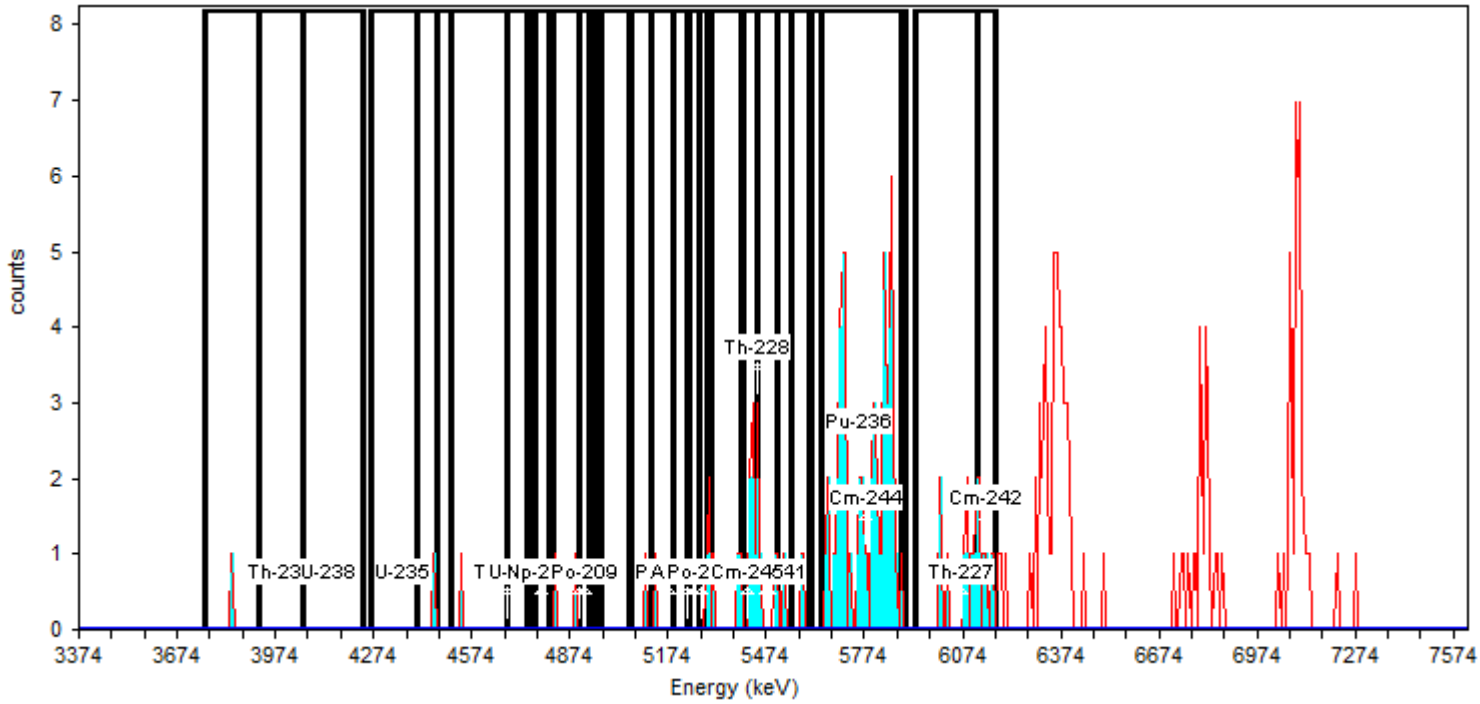
Batch Name: August2016
Description:

Acquisition

Detector: AV210 , SN: 50-119AA1
Acquisition Start Date: 9/1/2016 3:17:17PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9793;AV210-20151018a
Calibration Date: 10/18/2015 6:42:41PM

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: 211.00

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	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	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	2.00	2.083E-003	1.804E-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	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	19.00	1.979E-002	4.658E-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	61.00	6.354E-002	8.202E-003
Cm-244	5,775.74	5,641.51	5,902.52	61.00	6.354E-002	8.202E-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	8.00	8.333E-003	3.125E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:43AM 9/2/2016

Sample

Sample Name: ICB;AV211
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

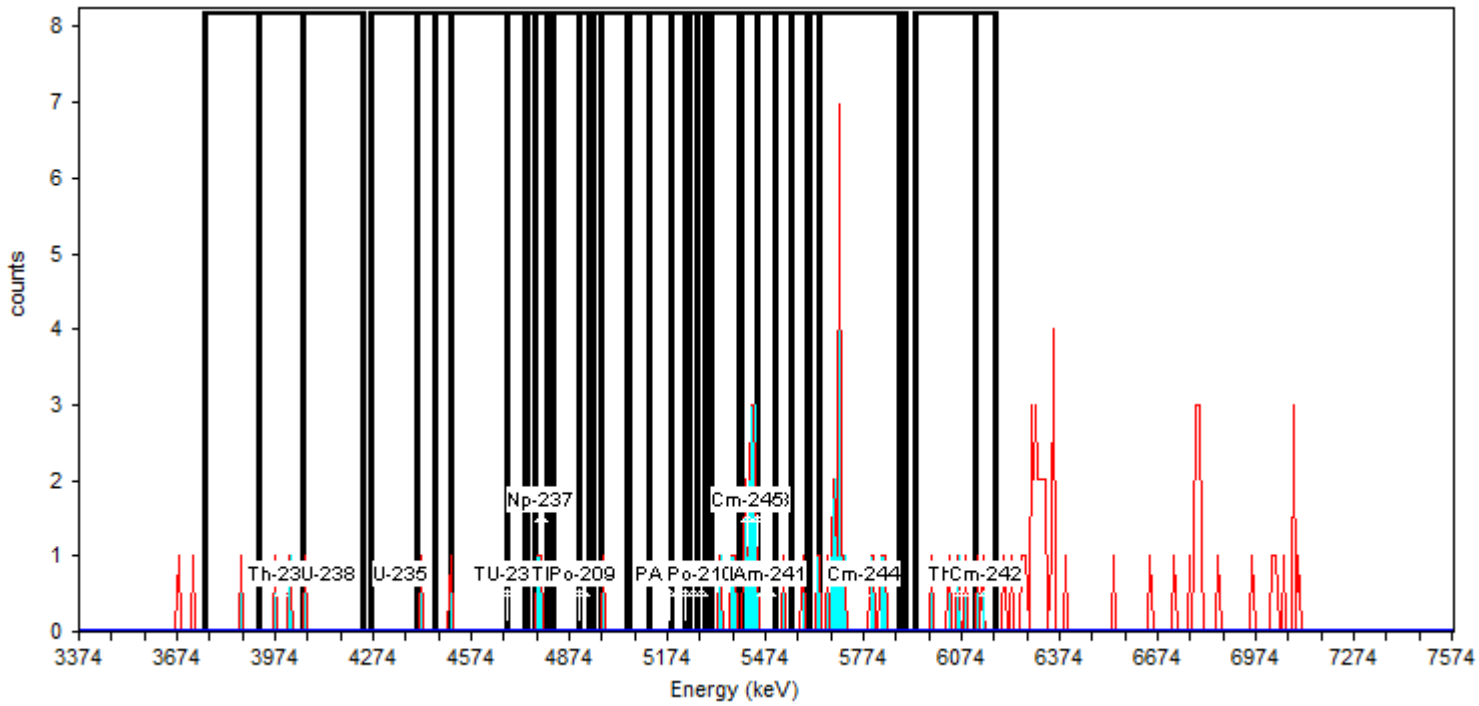
Batch Name: August2016
Description:

Acquisition

Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 9/1/2016 3:17:17PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV211-20151018a
Calibration Date: 10/18/2015 6:42:45PM

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: 104.00

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	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	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	3.00	3.125E-003	2.083E-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	0.00	0.000E+000	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	15.00	1.563E-002	4.167E-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	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	12.00	1.250E-002	3.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	21.00	2.188E-002	4.886E-003
Cm-244	5,775.74	5,641.51	5,902.52	20.00	2.083E-002	4.774E-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
7:22:15AM 9/2/2016

Sample

Sample Name: ICB;AV212
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

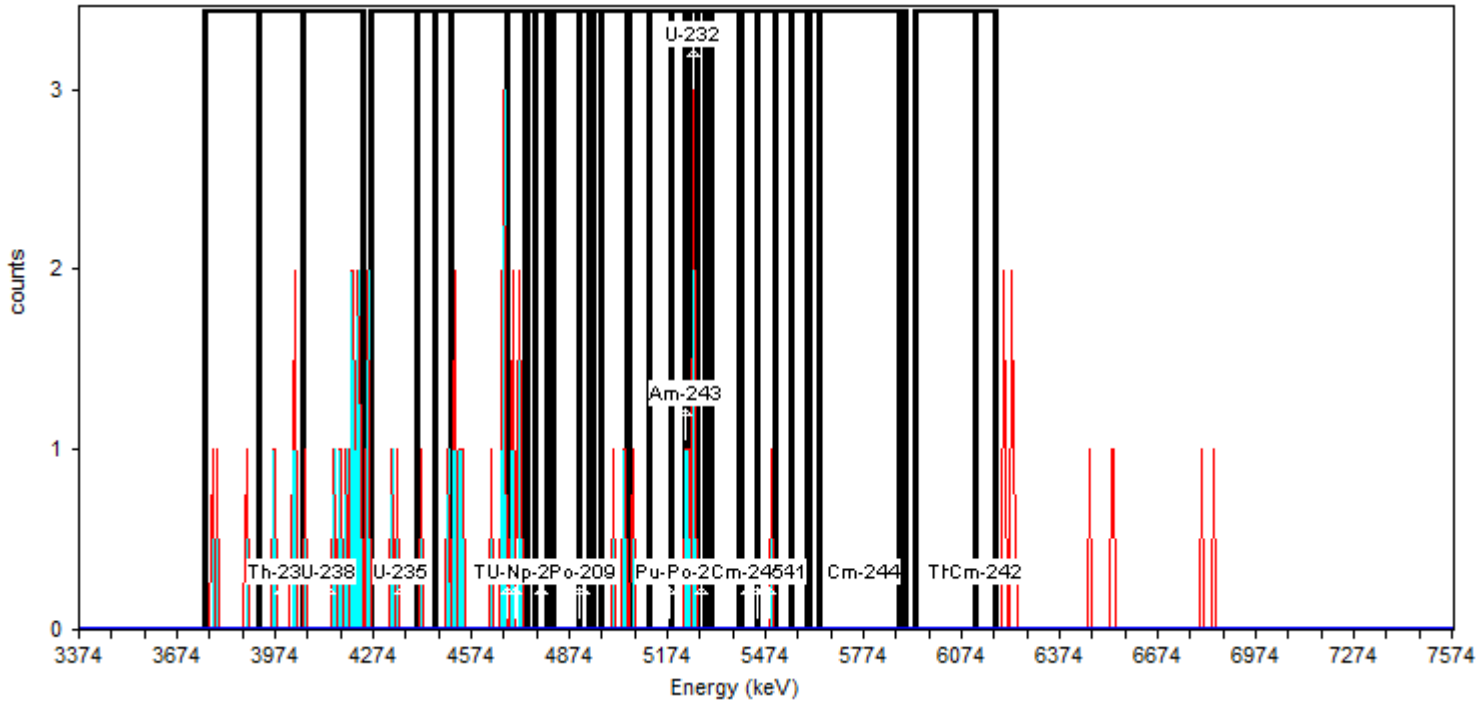
Batch Name: August2016
Description:

Acquisition

Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 9/1/2016 3:17:17PM
Live Time: 960.00 min.
Real Time: 965.14 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: 64.00

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	8.00	8.333E-003	3.125E-003
U-238	4,135.08	3,918.81	4,239.49	18.00	1.875E-002	4.541E-003
U-235	4,358.81	4,261.86	4,463.21	3.00	3.125E-003	2.083E-003
Th-230	4,679.48	4,403.55	4,746.60	18.00	1.875E-002	4.541E-003
U-234	4,709.31	4,507.96	4,821.17	16.00	1.667E-002	4.295E-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	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	6.00	6.250E-003	2.756E-003
Am-243	5,231.34	5,052.36	5,305.92	7.00	7.292E-003	2.946E-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	7.00	7.292E-003	2.946E-003
Po-210	5,276.09	5,231.34	5,291.00	6.00	6.250E-003	2.756E-003
Pu-238	5,469.98	5,268.63	5,552.01	1.00	1.042E-003	1.473E-003
Am-241	5,484.90	5,298.46	5,604.22	1.00	1.042E-003	1.473E-003
Cm-245	5,417.78	5,395.41	5,447.61	0.00	0.000E+000	1.473E-003
Pu-236	5,760.83	5,611.67	5,887.60	0.00	0.000E+000	1.473E-003
Cm-244	5,775.74	5,641.51	5,902.52	0.00	0.000E+000	1.473E-003
Th-227	6,074.04	5,932.35	6,178.45	0.00	0.000E+000	1.473E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV148

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 16:27	140	IC 160-223445/1		223445			PS
10/26/15 19:10	60	ICV 160-223563/1		223563			PS
07/25/16 13:14	960	ICB 160-261998/1		261998			PS
07/26/16 09:12	60	CCV 160-262320/1		262320			PS
08/31/16 09:06	1	PULSER 160-267479/1		267479			ALD
08/31/16 19:41	400	MB 160-266485/1-A		267479	266485	A-01-R	ALD

Detector: AV149

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:51	140	IC 160-223446/1		223446			PS
10/26/15 19:10	60	ICV 160-223564/1		223564			PS
07/22/16 15:43	960	ICB 160-261903/1		261903			PS
07/27/16 07:26	60	CCV 160-262220/1		262220			PS
08/31/16 09:06	1	PULSER 160-267480/1		267480			ALD
08/31/16 19:41	400	LCS 160-266485/2-A		267480	266485	A-01-R	ALD

Detector: AV161

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:57	140	IC 160-223458/1		223458			PS
10/26/15 20:26	60	ICV 160-223576/1		223576			PS
07/22/16 15:43	960	ICB 160-261915/1		261915			PS
07/26/16 09:12	60	CCV 160-262331/1		262331			PS
08/31/16 09:06	1	PULSER 160-267490/1		267490			ALD
08/31/16 14:07	180	ZZZZZ		267490			
08/31/16 19:41	400	160-18553-1	SU01-EXB-022-SS-P-00	267490	266485	A-01-R	ALD

Detector: AV162

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:57	140	IC 160-223459/1		223459			PS
10/26/15 20:26	60	ICV 160-223577/1		223577			PS
07/25/16 13:14	960	ICB 160-262003/1		262003			PS
07/26/16 10:50	60	CCV 160-262158/1		262158			PS
08/31/16 09:06	1	PULSER 160-267491/1		267491			ALD
08/31/16 14:07	180	ZZZZZ		267491			
08/31/16 19:41	400	160-18553-2	SU01-EXB-023-SS-P-00	267491	266485	A-01-R	ALD

Detector: AV163

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:57	140	IC 160-223460/1		223460			PS
10/26/15 20:26	60	ICV 160-223578/1		223578			PS
07/22/16 15:43	960	ICB 160-261917/1		261917			PS
07/27/16 08:33	60	CCV 160-262221/1		262221			PS
08/31/16 09:06	1	PULSER 160-267492/1		267492			ALD
08/31/16 14:07	180	ZZZZZ		267492			
08/31/16 19:41	400	160-18553-3	SU01-EXB-024-SS-P-00	267492	266485	A-01-R	ALD

Alpha Spectroscopy Run Log

Detector: AV164

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:57	140	IC 160-223461/1		223461			PS
10/26/15 20:32	60	ICV 160-223579/1		223579			PS
07/22/16 15:43	960	ICB 160-261918/1		261918			PS
07/26/16 10:49	60	CCV 160-262160/1		262160			PS
08/31/16 09:06	1	PULSER 160-267493/1		267493			ALD
08/31/16 14:07	180	ZZZZZ		267493			
08/31/16 19:41	400	160-18553-4	SU01-EXB-025-SS-P-00	267493	266485	A-01-R	ALD

Detector: AV169

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223466/1		223466			PS
10/26/15 20:28	60	ICV 160-223584/1		223584			PS
07/22/16 15:43	960	ICB 160-261923/1		261923			PS
07/26/16 09:35	60	CCV 160-262332/1		262332			PS
08/31/16 09:06	1	PULSER 160-267495/1		267495			ALD
08/31/16 14:07	180	ZZZZZ		267495			
08/31/16 19:41	400	160-18553-5	SU01-EXB-026-SS-P-00	267495	266485	A-01-R	ALD

Detector: AV170

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223467/1		223467			PS
10/26/15 20:28	60	ICV 160-223585/1		223585			PS
07/25/16 13:14	960	ICB 160-262008/1		262008			PS
07/26/16 10:48	60	CCV 160-262162/1		262162			PS
08/31/16 09:06	1	PULSER 160-267496/1		267496			ALD
08/31/16 14:07	180	ZZZZZ		267496			
08/31/16 19:41	400	160-18553-6	SU01-EXB-027-SS-P-00	267496	266485	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
07/25/16 13:14	960	ICB 160-262009/1		262009			PS
07/26/16 10:47	60	CCV 160-262165/1		262165			PS
08/31/16 09:06	1	PULSER 160-267498/1		267498			ALD
08/31/16 14:07	180	ZZZZZ		267498			
08/31/16 19:41	400	160-18553-8	SU01-EXB-029-SS-P-00	267498	266485	A-01-R	ALD

Detector: AV176

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 14:48	140	IC 160-223473/1		223473			PS
10/31/15 14:14	60	ICV 160-223591/1		223591			PS
07/22/16 15:43	960	ICB 160-261930/1		261930			PS
07/26/16 12:11	60	CCV 160-262168/1		262168			PS
08/31/16 09:06	1	PULSER 160-267500/1		267500			ALD
08/31/16 14:07	180	ZZZZZ		267500			
08/31/16 19:41	400	160-18553-10	SU01-EXB-031-SS-P-00	267500	266485	A-01-R	ALD

Alpha Spectroscopy Run Log

Detector: AV177

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 14:55	140	IC 160-223474/1		223474			PS
10/31/15 14:14	60	ICV 160-223592/1		223592			PS
07/22/16 15:43	960	ICB 160-261931/1		261931			PS
07/26/16 12:11	60	CCV 160-262169/1		262169			PS
08/31/16 09:06	1	PULSER 160-267501/1		267501			ALD
08/31/16 14:07	180	ZZZZZ		267501			
08/31/16 19:41	400	160-18553-11	SU01-EXB-032-SS-P-00	267501	266485	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
07/22/16 15:43	960	ICB 160-261935/1		261935			PS
07/26/16 12:12	60	CCV 160-262172/1		262172			PS
08/31/16 09:07	1	PULSER 160-267503/1		267503			ALD
08/31/16 14:07	180	ZZZZZ		267503			
08/31/16 19:41	400	160-18553-13	SU01-EXB-034-SS-P-00	267503	266485	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

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: AV195

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:19	140	IC 160-223492/1		223492			PS
11/01/15 14:28	60	ICV 160-223610/1		223610			PS
07/22/16 15:43	960	ICB 160-261941/1		261941			PS
07/26/16 12:23	60	CCV 160-262176/1		262176			PS
08/31/16 09:07	1	PULSER 160-267506/1		267506			ALD
08/31/16 14:15	180	ZZZZZ		267506			
08/31/16 19:45	400	160-18553-14	SU01-EXB-034-SS-DUP-(0	267506	266564	A-01-R	ALD

Alpha Spectroscopy Run Log

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	160-18553-14 DU	SU01-EXB-034-SS-DUP-0 DU	267507	266564	A-01-R	ALD

Detector: AV200

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:15	140	IC 160-223497/1		223497			PS
11/01/15 14:26	60	ICV 160-223615/1		223615			PS
07/25/16 13:13	960	ICB 160-262019/1		262019			PS
07/26/16 12:13	60	CCV 160-262177/1		262177			PS
08/31/16 09:07	1	PULSER 160-267508/1		267508			ALD
08/31/16 14:15	180	ZZZZZ		267508			
08/31/16 19:45	400	160-18553-15	SU01-EXB-035-SS-P-00	267508	266564	A-01-R	ALD

Detector: AV206

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:10	140	IC 160-223503/1		223503			PS
11/01/15 16:02	60	ICV 160-223621/1		223621			PS
07/25/16 13:14	960	ICB 160-262024/1		262024			PS
07/26/16 19:07	60	CCV 160-262180/1		262180			PS
08/31/16 09:07	1	PULSER 160-267510/1		267510			ALD
08/31/16 14:15	180	ZZZZZ		267510			
08/31/16 19:45	400	160-18553-16	SU01-EXB-036-SS-P-00	267510	266564	A-01-R	ALD

Detector: AV207

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:11	140	IC 160-223504/1		223504			PS
11/01/15 16:10	60	ICV 160-223622/1		223622			PS
07/22/16 15:43	960	ICB 160-261952/1		261952			PS
07/26/16 12:13	60	CCV 160-262181/1		262181			PS
08/31/16 09:07	1	PULSER 160-267511/1		267511			ALD
08/31/16 14:15	180	ZZZZZ		267511			
08/31/16 19:45	400	160-18553-17	SU01-EXB-037-SS-P-00	267511	266564	A-01-R	ALD

Detector: AV208

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:19	140	IC 160-223505/1		223505			PS
11/01/15 16:11	60	ICV 160-223623/1		223623			PS
07/25/16 13:14	960	ICB 160-262025/1		262025			PS
07/26/16 12:14	60	CCV 160-262182/1		262182			PS
08/31/16 09:07	1	PULSER 160-267512/1		267512			ALD
08/31/16 14:15	180	ZZZZZ		267512			
08/31/16 19:45	400	160-18553-18	SU01-EXB-038-SS-P-00	267512	266564	A-01-R	ALD

Alpha Spectroscopy Run Log

Detector: AV209

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:11	140	IC 160-223506/1		223506			PS
11/01/15 16:11	60	ICV 160-223624/1		223624			PS
07/25/16 13:14	960	ICB 160-262026/1		262026			PS
07/26/16 13:39	60	CCV 160-262183/1		262183			PS
08/31/16 09:07	1	PULSER 160-267513/1		267513			ALD
08/31/16 14:15	180	ZZZZZ		267513			
08/31/16 19:45	400	160-18553-19	SU01-EXB-039-SS-P-00	267513	266564	A-01-R	ALD

Detector: AV210

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:19	140	IC 160-223507/1		223507			PS
11/01/15 16:03	60	ICV 160-223625/1		223625			PS
07/25/16 13:14	960	ICB 160-262027/1		262027			PS
07/26/16 10:46	60	CCV 160-262184/1		262184			PS
08/31/16 09:07	1	PULSER 160-267514/1		267514			ALD
08/31/16 14:15	180	ZZZZZ		267514			
08/31/16 19:45	400	160-18553-20	SU01-EXB-039-SS-DUP-0	267514	266564	A-01-R	ALD
09/01/16 15:17	960	ICB 160-268073/1		268073			PS
09/06/16 11:23	60	CCV 160-268352/1		268352			PS
09/07/16 12:23	1	PULSER 160-268501/1		268501			ALD
09/07/16 14:28	400	160-18553-12	SU01-EXB-033-SS-P-00	268501	266485	A-01-R	ALD

Detector: AV211

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:19	140	IC 160-223508/1		223508			PS
11/01/15 16:11	60	ICV 160-223626/1		223626			PS
09/01/16 15:17	960	ICB 160-268074/1		268074			PS
09/06/16 11:23	60	CCV 160-268353/1		268353			PS
09/07/16 12:29	1	PULSER 160-268502/1		268502			ALD
09/07/16 14:28	400	160-18553-9	SU01-EXB-030-SS-P-00	268502	266485	A-01-R	ALD

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
09/01/16 15:17	960	ICB 160-268075/1		268075			PS
09/06/16 11:24	60	CCV 160-268354/1		268354			PS
09/07/16 12:29	1	PULSER 160-268503/1		268503			ALD
09/07/16 14:28	400	160-18553-7	SU01-EXB-028-SS-P-00	268503	266485	A-01-R	ALD

Detector: AV216

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:13	140	IC 160-223512/1		223512			PS
11/01/15 16:12	60	ICV 160-223631/1		223631			PS
09/01/16 15:17	960	ICB 160-268079/1		268079			PS
09/07/16 08:38	60	CCV 160-268387/1		268387			PS
09/07/16 12:28	1	PULSER 160-268505/1		268505			ALD

Alpha Spectroscopy Run Log

Detector: AV216 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/07/16 14:28	400	ZZZZZ		268505			

GAMMA SPECTROSCOPY

Method 901.1
Ra-226

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

Prep Batch: 264540

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264540

Lab ID: MB 160-264540/1-A Analyzed: 09/01/16 14:31 Ts: 30 Sigma: 2
Client ID: Detector: GV17 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	-0.04080	0.177	0.177	U	pCi/g	0.500	0.309	267763

Lab ID: LCS 160-264540/2-A Analyzed: 09/01/16 14:32 Ts: 30 Sigma: 2
Client ID: Detector: GV16 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Americium-241	96.99	1.58	10.2		pCi/g		1.17	267762
Cesium-137	29.23	0.673	3.12		pCi/g		0.235	267762
Cobalt-60	15.76	0.401	1.63		pCi/g		0.0818	267762

Lab ID: 160-18553-1 Analyzed: 09/01/16 14:33 Ts: 30 Sigma: 2
Client ID: SU01-EXB-022-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	0.979	0.235	0.256		pCi/g	0.500	0.193	267761

Lab ID: 160-18553-1 DU Analyzed: 09/01/16 15:05 Ts: 30 Sigma: 2
Client ID: SU01-EXB-022-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.106	0.204	0.234		pCi/g	0.500	0.140	267763

Lab ID: 160-18553-2 Analyzed: 09/01/16 14:35 Ts: 30 Sigma: 2
Client ID: SU01-EXB-023-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.28	0.212	0.250		pCi/g	0.500	0.137	267760

Lab ID: 160-18553-3 Analyzed: 09/01/16 14:42 Ts: 30 Sigma: 2
Client ID: SU01-EXB-024-SS-P-00 Detector: GV13 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.15	0.177	0.213		pCi/g	0.500	0.148	267758

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264540

Lab ID: 160-18553-4 Analyzed: 09/01/16 14:40 Ts: 30 Sigma: 2
Client ID: SU01-EXB-025-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.08	0.187	0.218		pCi/g	0.500	0.127	267757

Lab ID: 160-18553-5 Analyzed: 09/01/16 15:06 Ts: 30 Sigma: 2
Client ID: SU01-EXB-026-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.23	0.208	0.244		pCi/g	0.500	0.152	267762

Lab ID: 160-18553-6 Analyzed: 09/01/16 15:08 Ts: 30 Sigma: 2
Client ID: SU01-EXB-027-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.50	0.302	0.340		pCi/g	0.500	0.224	267761

Lab ID: 160-18553-7 Analyzed: 09/01/16 15:10 Ts: 30 Sigma: 2
Client ID: SU01-EXB-028-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	0.883	0.211	0.230		pCi/g	0.500	0.185	267760

Lab ID: 160-18553-8 Analyzed: 09/01/16 15:15 Ts: 30 Sigma: 2
Client ID: SU01-EXB-029-SS-P-00 Detector: GV13 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.07	0.212	0.239		pCi/g	0.500	0.168	267758

Lab ID: 160-18553-9 Analyzed: 09/01/16 15:14 Ts: 30 Sigma: 2
Client ID: SU01-EXB-030-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.22	0.273	0.301		pCi/g	0.500	0.238	267757

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264540

Lab ID: 160-18553-10 Analyzed: 09/01/16 16:11 Ts: 30 Sigma: 2
Client ID: SU01-EXB-031-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.57	0.227	0.280		pCi/g	0.500	0.134	267763

Lab ID: 160-18553-11 Analyzed: 09/01/16 16:09 Ts: 30 Sigma: 2
Client ID: SU01-EXB-032-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	2.16	0.341	0.408		pCi/g	0.500	0.236	267762

Lab ID: 160-18553-12 Analyzed: 09/01/16 16:08 Ts: 30 Sigma: 2
Client ID: SU01-EXB-033-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.18	0.255	0.283		pCi/g	0.500	0.208	267761

Lab ID: 160-18553-13 Analyzed: 09/01/16 16:07 Ts: 30 Sigma: 2
Client ID: SU01-EXB-034-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.14	0.200	0.232		pCi/g	0.500	0.156	267760

Lab ID: 160-18553-14 Analyzed: 09/01/16 16:09 Ts: 30 Sigma: 2
Client ID: SU01-EXB-034-SS-DUP-00 Detector: GV13 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.05	0.197	0.226		pCi/g	0.500	0.155	267758

Lab ID: 160-18553-15 Analyzed: 09/01/16 16:06 Ts: 30 Sigma: 2
Client ID: SU01-EXB-035-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.02	0.235	0.258		pCi/g	0.500	0.198	267757

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264540

Lab ID: 160-18553-16 Analyzed: 09/01/16 16:02 Ts: 30 Sigma: 2
Client ID: SU01-EXB-036-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.32	0.260	0.294		pCi/g	0.500	0.201	267754

Lab ID: 160-18553-17 Analyzed: 09/01/16 16:46 Ts: 30 Sigma: 2
Client ID: SU01-EXB-037-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.46	0.253	0.295		pCi/g	0.500	0.182	267763

Lab ID: 160-18553-18 Analyzed: 09/01/16 16:47 Ts: 30 Sigma: 2
Client ID: SU01-EXB-038-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.52	0.230	0.279		pCi/g	0.500	0.183	267762

Lab ID: 160-18553-19 Analyzed: 09/01/16 16:48 Ts: 30 Sigma: 2
Client ID: SU01-EXB-039-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.26	0.209	0.246		pCi/g	0.500	0.127	267761

Lab ID: 160-18553-20 Analyzed: 09/01/16 16:51 Ts: 30 Sigma: 2
Client ID: SU01-EXB-039-SS-DUP-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.03	0.187	0.216		pCi/g	0.500	0.128	267760

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 264540

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 160-264540/1-A	Radium-226			-0.04080	U	pCi/g							-.46210227

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-264540/2-A	Americium-241		97.1	96.99		pCi/g	100	87 - 116					-.013784392
LCS 160-264540/2-A	Cesium-137		29.5	29.23		pCi/g	99	87 - 120					-.1191953367
LCS 160-264540/2-A	Cobalt-60		16.6	15.76		pCi/g	95	87 - 115					-.7249588394

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-18553-1	Radium-226	0.979		1.106		pCi/g			12	0.26	0.73	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18553-1

SDG No.:

Batch Number: 264540 Batch Start Date: 08/11/16 15:30 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/11/16 17:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-264540/1		Fill_Geo-21, 901.1				291.18 g	8/11/2016	9/1/2016	Tuna Can
LCS 160-264540/2		Fill_Geo-21, 901.1				341.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-1-A	SU01-EXB-022-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	355.5 g	308.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-1-A DU	SU01-EXB-022-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	355.5 g	308.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-2-A	SU01-EXB-023-SS-P-00	Fill_Geo-21, 901.1	T	46.5 g	368.4 g	321.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-3-A	SU01-EXB-024-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	338.2 g	292.1 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-4-A	SU01-EXB-025-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	365.7 g	319.4 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-5-A	SU01-EXB-026-SS-P-00	Fill_Geo-21, 901.1	T	46.2 g	364.0 g	317.8 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-6-A	SU01-EXB-027-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	373.3 g	327 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-7-A	SU01-EXB-028-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	350.2 g	303.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-8-A	SU01-EXB-029-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	373.3 g	326.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-9-A	SU01-EXB-030-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	287.1 g	240.7 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-10-A	SU01-EXB-031-SS-P-00	Fill_Geo-21, 901.1	T	46.2 g	367.4 g	321.2 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-11-A	SU01-EXB-032-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	324.5 g	278.4 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-12-A	SU01-EXB-033-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	382.6 g	336.2 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-13-A	SU01-EXB-034-SS-P-00	Fill_Geo-21, 901.1	T	46.0 g	369.3 g	323.3 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-14-A	SU01-EXB-034-SS-DUP-00	Fill_Geo-21, 901.1	T	46.5 g	369.1 g	322.6 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-15-A	SU01-EXB-035-SS-P-00	Fill_Geo-21, 901.1	T	45.9 g	338.0 g	292.1 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-16-A	SU01-EXB-036-SS-P-00	Fill_Geo-21, 901.1	T	45.8 g	415.6 g	369.8 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-17-A	SU01-EXB-037-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	306.5 g	259.9 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-18-A	SU01-EXB-038-SS-P-00	Fill_Geo-21, 901.1	T	46.8 g	355.0 g	308.2 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.: 160-18553-1

SDG No.:

Batch Number: 264540 Batch Start Date: 08/11/16 15:30 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/11/16 17:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
160-18553-A-19-A	SU01-EXB-039-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	402.5 g	355.8 g	8/11/2016	9/1/2016	Tuna Can
160-18553-A-20-A	SU01-EXB-039-SS-DUP-00	Fill_Geo-21, 901.1	T	46.7 g	384.7 g	338 g	8/11/2016	9/1/2016	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
MB 160-264540/1		Fill_Geo-21, 901.1							
LCS 160-264540/2		Fill_Geo-21, 901.1		# g					
160-18553-A-1-A	SU01-EXB-022-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-1-A DU	SU01-EXB-022-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-2-A	SU01-EXB-023-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-3-A	SU01-EXB-024-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-4-A	SU01-EXB-025-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-5-A	SU01-EXB-026-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-6-A	SU01-EXB-027-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-7-A	SU01-EXB-028-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-8-A	SU01-EXB-029-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-9-A	SU01-EXB-030-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-10-A	SU01-EXB-031-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-11-A	SU01-EXB-032-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-12-A	SU01-EXB-033-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-13-A	SU01-EXB-034-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-14-A	SU01-EXB-034-SS-DUP-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.: 160-18553-1

SDG No.:

Batch Number: 264540 Batch Start Date: 08/11/16 15:30 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/11/16 17:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
160-18553-A-15-A	SU01-EXB-035-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-16-A	SU01-EXB-036-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-17-A	SU01-EXB-037-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-18-A	SU01-EXB-038-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-19-A	SU01-EXB-039-SS-P-00	Fill_Geo-21, 901.1	T						
160-18553-A-20-A	SU01-EXB-039-SS-DUP-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: 17_Gamma_20161132

Sample Description: 264540_Gamma_MB 160-264540~1-A
Detector: Detector #17
Batch ID: 264540
Work Order Number: Gamma
Lot Number: MB 160-264540~1-A

Decay to Time: 9/1/2016 14:31 Live Time: 1800 sec
Acquisition Time: 9/1/2016 14:31:47 Real Time: 1848 sec
Analysis Time: 9/1/2016 15:03 Dead Time: 2.57 %
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	0.000E+00	1.#INF	2.883E-01	2.883E-01	6.938E+00
NA-22	-4.221E-01	79.4	3.351E-01	3.357E-01	1.135E+00
K-40	-5.733E+00	81.6	4.678E+00	4.687E+00	1.316E+01
Sc-46	-1.602E-02	2504.0	4.011E-01	4.011E-01	1.449E+00
CR-51	-3.712E-01	768.0	2.851E+00	2.851E+00	7.932E+00
MN-54	-9.163E-02	403.1	3.694E-01	3.694E-01	9.230E-01
FE-59	8.291E-02	608.0	5.041E-01	5.041E-01	1.330E+00
Co-56	7.722E-02	396.5	3.062E-01	3.062E-01	7.851E-01
CO-57	1.411E-01	115.9	1.636E-01	1.638E-01	5.582E-01
CO-58	2.289E-01	95.9	2.196E-01	2.199E-01	7.635E-01
CO-60	-7.444E-01	85.3	6.353E-01	6.364E-01	1.399E+00
ZN-65	0.000E+00	1.#INF	1.596E-01	1.596E-01	2.102E+00
NB-94	-3.616E-01	138.4	5.005E-01	5.009E-01	1.006E+00
ZR-95	3.085E-01	162.1	5.000E-01	5.002E-01	1.307E+00
NB-95	5.947E-02	532.3	3.166E-01	3.166E-01	1.146E+00
RU-103	1.363E-01	111.3	1.517E-01	1.518E-01	4.145E-01
RH-106	-1.852E-01	2328.1	4.312E+00	4.312E+00	1.519E+01
AG-108M	-3.128E-02	628.5	1.966E-01	1.966E-01	5.682E-01
AG-110M	7.256E-02	129.6	9.401E-02	9.408E-02	1.976E+00
SN-113	-4.097E-01	107.1	4.388E-01	4.393E-01	1.544E+00
SB-124	1.434E-01	293.4	4.209E-01	4.209E-01	1.464E+00
SB-125	8.438E-01	72.3	6.101E-01	6.116E-01	1.101E+00
I-131	-1.441E-01	225.0	3.242E-01	3.243E-01	7.157E-01
Gd-153	-3.700E-03	105.4	3.899E-03	3.906E-03	1.982E+00
Ga-68	1.980E+00	501.7	9.931E+00	9.932E+00	2.599E+01
Tc-99m	3.895E-02	576.2	2.244E-01	2.244E-01	7.772E-01
BA-133	3.619E-01	113.1	4.094E-01	4.098E-01	9.924E-01
CS-134	0.000E+00	1.#INF	3.691E-02	3.691E-02	1.518E+00
CS-137	0.000E+00	1.#INF	6.391E-02	6.391E-02	4.972E-01
CE-139	1.254E-01	152.6	1.912E-01	1.916E-01	6.595E-01
Ba-140	1.584E-01	117.8	1.866E-01	1.868E-01	3.231E+00
La-140	6.224E-02	347.5	2.163E-01	2.163E-01	5.828E-01
CE-141	-3.076E-01	143.7	4.422E-01	4.425E-01	1.501E+00

CE-144	-8.763E-01	167.0	1.464E+00	1.464E+00	5.027E+00
PM-144	-3.637E-01	120.4	4.377E-01	4.381E-01	1.070E+00
EU-152	9.001E-01	80.6	7.258E-01	7.273E-01	2.320E+00
EU-154	4.233E-01	107.9	4.568E-01	4.573E-01	2.846E+00
EU-155	-3.162E-01	308.1	9.741E-01	9.743E-01	2.566E+00
HF-181	-1.867E-02	113.4	2.117E-02	2.119E-02	1.038E+00
Ta-182	2.120E-01	259.2	5.494E-01	5.495E-01	1.211E+00
Hg-203	1.102E-01	227.3	2.505E-01	2.506E-01	8.758E-01
TL-208	8.302E-02	397.9	3.304E-01	3.304E-01	8.863E-01
pm-146	4.874E-01	37.7	1.836E-01	1.853E-01	2.426E+00
y-88	5.166E-02	800.0	4.132E-01	4.133E-01	1.041E+00
Cd-113m	-2.545E+03	132.4	3.369E+03	3.373E+03	1.158E+04
Cd-109	0.000E+00	1.#INF	2.340E+00	2.340E+00	2.393E+01
Cf-251	1.188E-01	812.8	9.657E-01	9.657E-01	2.756E+00
Cf-249	1.805E-01	106.7	1.926E-01	1.928E-01	1.254E+00
Sn-126	1.697E+00	113.3	1.923E+00	1.925E+00	6.554E+00
PB-210	1.022E+01	80.9	8.270E+00	8.292E+00	2.444E+01
PB-212	-2.889E-02	1897.7	5.483E-01	5.483E-01	1.918E+00
PB-214	-7.018E-01	96.5	6.774E-01	6.784E-01	2.570E+00
BI-207	1.020E-01	189.2	1.930E-01	1.931E-01	8.340E-01
BI-212	1.824E-01	1688.2	3.079E+00	3.079E+00	1.157E+01
BI-214	-4.396E-01	216.3	9.510E-01	9.513E-01	3.334E+00
BI-210M	1.869E-01	224.7	4.201E-01	4.202E-01	1.463E+00
AC-228	8.483E-01	42.2	3.577E-01	3.603E-01	3.399E+00
TH-227	5.893E-01	509.9	3.005E+00	3.005E+00	9.038E+00
TH-229	5.219E+00	48.6	2.534E+00	2.569E+00	8.707E+00
TH-234	-1.174E+01	49.1	5.764E+00	5.797E+00	2.151E+01
PA-231	4.987E+00	126.3	6.297E+00	6.302E+00	3.004E+01
PA-233	6.407E-01	131.3	8.415E-01	8.422E-01	2.541E+00
PA-234	4.079E-01	179.1	7.308E-01	7.311E-01	3.230E+00
PA-234M	-3.379E-01	147.5	4.985E-01	4.988E-01	1.347E+02
U-235	-3.427E-01	275.4	9.440E-01	9.441E-01	6.436E+00
AM-241	-5.545E-01	110.9	6.150E-01	6.157E-01	1.778E+00
Np-237	4.389E-01	460.3	2.020E+00	2.021E+00	6.905E+00
Ir-192	-2.621E-01	103.4	2.710E-01	2.714E-01	9.210E-01
Cs-136	4.490E-02	179.7	8.068E-02	8.072E-02	9.766E-01
Np-239	2.477E-01	290.4	7.193E-01	7.194E-01	2.492E+00
Nd-147	-2.615E+00	97.5	2.550E+00	2.554E+00	6.436E+00
Total	3.320E+01				

Analyst: Mike Aldridge

Sample description
264540_Gamma_MB 160-264540~1-A

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161132.An1

Acquisition information
Start time: 9/1/2016 2:31:47 PM
Live time: 1800
Real time: 1848
Dead time: 2.57 %
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 2:31:00 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. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 1.0000

***** 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
46.52	16.	80.90	0.59	2.099E-02	46.54	4.250	PBC<MDA	PB210
50.14	2.	509.90	0.78	2.357E-02	50.14	8.000	PBC<MDA	TH227
63.29	-25.	49.09	0.79	3.164E-02	63.29	3.810	PBC<MDA	TH234
64.28	10.	113.29	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
86.49	4.	460.30	0.81	4.026E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.872E-01	EU155
92.64	5.	255.12	0.66	4.145E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.242E+00	AC228
103.20	8.	122.45	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
106.13	4.	290.38	0.83	4.282E-02	106.13	22.700	PBC<MDA	Np239
122.06	9.	115.90	0.85	4.276E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.411E-01	CO57
123.10	9.	107.91	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
131.29	7.	179.15	0.85	4.212E-02	131.29	18.000	PBC<MDA	PA234
136.30	3.	408.70	0.86	4.165E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.957E-01	CO57
140.51	2.	576.19	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	-6.	275.44	0.87	4.080E-02	143.79	10.960	PBC<MDA	U235
162.66	9.	117.75	0.88	3.813E-02	162.66	6.220	PBC<MDA	Ba140
165.85	7.	152.56	0.89	3.825E-02	165.85	79.900	PBC<MDA	CE139
176.60	1.	812.79	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251
193.51	7.	115.68	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	2.	701.81	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
210.85	16.	48.56	0.93	3.253E-02	210.85	2.990	PBC<MDA	TH229
227.00	7.	106.48	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
242.00	4.	361.43	0.96	2.960E-02	242.00	7.430	PBC<MDA	PB214
265.83	5.	224.74	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
279.20	4.	227.28	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
295.09	2.	506.03	1.01	2.580E-02	295.09	19.300	PBC<MDA	PB214
300.03	14.	68.01	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.	169.36	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.390E+00	PA231
					300.18	6.200	2.139E+00	PA233
300.18	6.	178.77	1.01	2.549E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.391E+00	PA231
					300.18	6.200	2.139E+00	PA233
302.65	6.	187.32	1.01	2.534E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	7.298E-01	BA133
302.85	6.	195.87	1.01	2.533E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	7.298E-01	BA133
304.85	2.	578.93	1.02	2.522E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	PBC<MDA	BI210M
312.01	6.	192.45	1.02	2.481E-02	312.01	36.000	PBC<MDA	PA233
328.76	2.	480.88	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	6.	106.73	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.32	13.	42.16	1.05	2.344E-02	338.32	12.010	PBC<MDA	AC228
340.57	4.	179.70	1.05	2.333E-02	340.57	46.900	PBC<MDA	Cs136
344.29	4.	197.34	1.05	2.315E-02	344.29	26.500	PBC<MDA	EU152
345.83	6.	156.48	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
356.00	6.	113.24	1.06	2.261E-02	356.00	62.050	PBC<MDA	BA133
427.88	4.	104.51	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
463.37	3.	127.03	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
468.06	4.	127.21	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
497.05	4.	111.29	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	51.	26.38	2.45	1.742E-02	511.86	20.000	8.133E+00	RH106
569.70	4.	189.16	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.472E+00	PA234
					569.70	97.740	1.235E-01	BI207
583.02	2.	397.91	1.26	1.584E-02	583.02	84.500	PBC<MDA	TL208
600.50	8.	141.39	1.28	1.550E-02	600.50	17.860	PBC<MDA	SB125
602.73	4.	293.44	1.28	1.546E-02	602.73	98.260	PBC<MDA	SB124
609.31	-6.	216.34	1.29	1.533E-02	609.31	46.090	PBC<MDA	BI214
657.76	3.	129.56	1.33	1.449E-02	657.76	94.640	PBC<MDA	AG110M
735.72	8.	37.66	1.40	1.333E-02	735.72	22.500	1.428E+00	pm146
756.73	4.	162.06	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
765.79	1.	532.32	1.42	1.294E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
766.41	4.	178.86	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	PBC<MDA	PA234M
810.78	5.	95.93	1.46	1.240E-02	810.78	99.460	PBC<MDA	CO58
815.77	2.	347.50	1.47	1.234E-02	815.77	23.280	PBC<MDA	La140
846.77	2.	396.48	1.49	1.200E-02	846.77	99.935	PBC<MDA	Co56
898.04	1.	800.00	1.53	1.148E-02	898.04	93.700	PBC<MDA	y88
911.07	1.	800.00	1.55	1.135E-02	911.07	29.000	PBC<MDA	AC228
946.02	1.	979.80	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	6.	80.63	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
996.33	3.	169.88	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-3.	234.66	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1063.66	1.	702.38	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	1.	501.66	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	1.	608.03	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1120.29	-3.	193.62	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	2.	259.19	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182

********** 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
369.92	92.64	28.	48.	1.170E+03	23.18	0.664	-

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	185.54	46.52	62.	16.	0.009	80.90	0.586s
TH-227	200.03	50.14	36.	2.	0.001	509.90	0.778s
AM-241	237.59	59.54	45.	-11.	-0.006	110.92	0.787s
TH-234	252.59	63.29	89.	-25.	-0.014	49.09	0.791s
Sn-126	256.56	64.28	54.	10.	0.005	113.29	0.792s
BA-133	323.36	80.99	60.	-13.	-0.007	99.25	0.807s
Np-237	345.35	86.49	182.	4.	0.002	460.30	0.813s
EU-155	345.56	86.54	186.	0.	0.000	1000.00	0.813s
Sn-126	347.15	86.94	186.	0.	0.000	1000.00	0.813s
Sn-126	349.67	87.57	186.	0.	0.000	1000.00	0.814s
Cd-109	351.55	88.04	186.	0.	0.000	1000.00	0.814s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	363.79	91.10	186.	0.	0.000	1000.00	0.817s
TH-234	369.74	92.59	284.	-58.	-0.032	27.57	0.818
AC-228	372.78	93.35	254.	-15.	-0.008	154.73	0.819s
Gd-153	389.37	97.50	83.	-8.	-0.004	171.56	0.823s
Np-239	397.37	99.50	87.	-5.	-0.003	286.43	0.825s
Gd-153	412.16	103.20	40.	8.	0.004	122.45	0.828s
Np-239	414.16	103.70	64.	-10.	-0.006	113.25	0.829s
EU-155	420.61	105.31	71.	-5.	-0.003	308.12	0.830s
Np-239	423.88	106.13	77.	4.	0.002	290.38	0.831s
EU-152	486.43	121.78	75.	-12.	-0.007	107.97	0.846s
CO-57	487.57	122.06	53.	9.	0.005	115.90	0.846s
EU-154	491.73	123.10	46.	9.	0.005	107.91	0.847s
PA-234	524.49	131.29	79.	7.	0.004	179.15	0.855s
HF-181	531.41	133.02	86.	0.	0.000	1000.00	0.856s
CE-144	533.46	133.54	71.	-7.	-0.004	167.01	0.857s
HF-181	544.50	136.30	82.	3.	0.002	408.70	0.859s
CO-57	545.20	136.47	85.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	102.	2.	0.001	576.19	0.863s
U-235	574.43	143.79	111.	-6.	-0.003	275.44	0.866s
CE-141	581.05	145.44	116.	-11.	-0.006	143.75	0.868s
Ba-140	649.90	162.66	48.	9.	0.005	117.75	0.884s
U-235	652.78	163.38	80.	-15.	-0.009	109.07	0.885s
CE-139	662.67	165.85	52.	7.	0.004	152.56	0.887s
Cf-251	705.64	176.60	37.	1.	0.001	812.79	0.897s
TH-229	773.25	193.51	20.	7.	0.004	115.68	0.913s
U-235	820.52	205.33	38.	2.	0.001	701.81	0.924s
TH-229	842.58	210.85	13.	16.	0.009	48.56	0.929s
Cf-251	907.16	227.00	13.	7.	0.004	106.48	0.944s
PB-214	967.13	242.00	80.	4.	0.002	361.43	0.958
TH-227	1024.08	256.24	34.	-10.	-0.005	133.73	0.971s
Cd-113m	1053.91	263.70	48.	-8.	-0.004	132.38	0.978s
BI-210M	1062.44	265.83	53.	5.	0.003	224.74	0.979s
TL-208	1108.23	277.28	39.	-7.	-0.004	192.25	0.990s
Hg-203	1115.89	279.20	46.	4.	0.002	227.28	0.992s
I-131	1136.28	284.30	22.	-1.	-0.001	883.18	0.996s
PB-214	1179.43	295.09	20.	2.	0.001	506.03	1.006
PB-212	1199.19	300.03	36.	14.	0.008	68.01	1.011s
PA-231	1199.35	300.07	50.	6.	0.003	169.36	1.011s
PA-233	1199.79	300.18	56.	6.	0.003	178.77	1.011s
PA-231	1209.66	302.65	62.	6.	0.003	187.32	1.013s
BA-133	1210.47	302.85	68.	6.	0.003	195.87	1.013s
Ba-140	1218.46	304.85	75.	2.	0.001	578.93	1.015s
Ir-192	1232.82	308.44	126.	-10.	-0.006	161.66	1.019s
PA-233	1247.10	312.01	67.	6.	0.003	192.45	1.022s
Ir-192	1265.01	316.49	49.	-10.	-0.006	103.41	1.026s
CR-51	1279.38	320.08	47.	-2.	-0.001	767.97	1.029s
La-140	1314.07	328.76	26.	2.	0.001	480.88	1.037s
Cf-249	1332.79	333.44	11.	6.	0.003	106.73	1.041s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1352.30	338.32	8.	13.	0.007	42.16	1.046s
Cs-136	1361.30	340.57	20.	4.	0.002	179.70	1.048s
EU-152	1376.16	344.29	24.	4.	0.002	197.34	1.051s
HF-181	1382.33	345.83	46.	6.	0.004	156.48	1.053s
PB-214	1406.74	351.93	63.	-11.	-0.006	96.53	1.058
BA-133	1423.00	356.00	23.	6.	0.004	113.24	1.062s
I-131	1456.93	364.48	20.	-5.	-0.003	224.98	1.070s
BA-133	1534.34	383.84	37.	-1.	-0.001	653.83	1.087
Cf-249	1550.77	387.95	39.	0.	0.000	1000.00	1.091s
SN-113	1565.73	391.69	56.	-10.	-0.006	107.10	1.094s
SB-125	1710.44	427.88	4.	4.	0.002	104.51	1.127s
AG-108M	1734.69	433.94	11.	-1.	-0.001	628.49	1.132s
pm-146	1814.44	453.88	20.	-8.	-0.004	115.02	1.150s
SB-125	1852.38	463.37	8.	3.	0.002	127.03	1.158s
Ir-192	1871.15	468.06	11.	4.	0.002	127.21	1.163s
BE-7	1909.29	477.59	21.	0.	0.000	1000.00	1.171s
HF-181	1926.89	482.00	28.	-7.	-0.004	113.39	1.175s
La-140	1946.98	487.02	24.	-10.	-0.006	101.00	1.180s
RU-103	1987.11	497.05	4.	4.	0.002	111.29	1.188s
RH-106	2046.35	511.86	20.	51.	0.028	26.38	2.452s
Nd-147	2122.88	531.00	24.	-10.	-0.006	97.51	1.219s
Ba-140	2147.92	537.26	21.	-4.	-0.002	127.74	1.224s
CS-134	2251.82	563.24	20.	-10.	-0.006	46.33	1.247s
CS-134	2276.15	569.32	16.	0.	0.000	1000.00	1.252s
PA-234	2276.75	569.47	21.	-3.	-0.002	235.44	1.253s
BI-207	2277.67	569.70	20.	4.	0.002	189.16	1.253s
TL-208	2330.95	583.02	16.	2.	0.001	397.91	1.264
SB-125	2400.86	600.50	56.	8.	0.004	141.39	1.280s
SB-124	2409.78	602.73	64.	4.	0.002	293.44	1.282s
CS-134	2417.70	604.71	68.	0.	0.000	1000.00	1.284s
BI-214	2436.10	609.31	73.	-6.	-0.003	216.34	1.287s
RU-103	2440.05	610.30	67.	0.	0.000	1000.00	1.288s
AG-108M	2455.98	614.28	67.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	67.	0.	0.000	1000.00	1.295s
I-131	2546.75	636.97	27.	-11.	-0.006	111.41	1.312s
AG-110M	2629.90	657.76	7.	3.	0.002	129.56	1.330s
CS-137	2645.49	661.66	3.	0.	0.000	1000.00	1.333s
PM-144	2785.03	696.54	26.	-9.	-0.005	120.36	1.363s
NB-94	2809.38	702.63	22.	-9.	-0.005	138.43	1.368s
SB-124	2890.01	722.79	14.	-1.	-0.001	538.52	1.386s
AG-108M	2890.61	722.94	15.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	15.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	15.	0.	0.000	1000.00	1.387s
pm-146	2941.74	735.72	0.	8.	0.004	37.66	1.397s
pm-146	2987.51	747.16	13.	-1.	-0.001	273.94	1.407s
ZR-95	3025.79	756.73	9.	4.	0.002	162.06	1.415s
AG-110M	3054.64	763.94	18.	-10.	-0.005	68.54	1.421s
NB-95	3062.03	765.79	26.	1.	0.001	532.32	1.423s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	3064.52	766.41	21.	4.	0.002	178.86	1.423s
EU-152	3114.56	778.92	9.	-2.	-0.001	368.78	1.434s
BI-212	3140.56	785.42	26.	-12.	-0.007	89.57	1.440s
CS-134	3182.35	795.87	9.	-1.	0.000	909.67	1.448s
CS-134	3206.69	801.95	13.	0.	0.000	1000.00	1.454s
CO-58	3241.99	810.78	9.	5.	0.003	95.93	1.461s
La-140	3261.97	815.77	14.	2.	0.001	347.50	1.465s
MN-54	3338.30	834.85	14.	-2.	-0.001	403.11	1.481s
Co-56	3385.99	846.77	9.	2.	0.001	396.48	1.491s
TL-208	3441.18	860.56	10.	-5.	-0.003	132.48	1.503s
EU-154	3491.85	873.23	0.	0.	0.000	1000.00	1.514s
PA-234	3521.06	880.53	21.	-7.	-0.004	93.48	1.520s
PA-234	3531.90	883.24	28.	-6.	-0.003	127.62	1.522s
AG-110M	3537.67	884.68	34.	0.	0.000	1000.00	1.523s
y-88	3591.11	898.04	14.	1.	0.001	800.00	1.534s
AC-228	3643.24	911.07	14.	1.	0.001	800.00	1.545s
AG-110M	3748.95	937.49	9.	-2.	-0.001	285.36	1.567s
PA-234	3783.07	946.02	9.	1.	0.000	979.80	1.574
EU-152	3855.45	964.11	7.	6.	0.003	80.63	1.589s
AC-228	3874.90	968.97	22.	-2.	-0.001	437.29	1.593s
EU-154	3984.36	996.33	10.	3.	0.002	169.88	1.616s
PA-234M	4003.04	1001.00	16.	-3.	-0.002	234.66	1.620s
Co-56	4150.45	1037.84	5.	-3.	-0.002	246.46	1.650s
Cs-136	4191.39	1048.07	12.	-3.	-0.002	158.75	1.658s
RH-106	4200.55	1050.36	17.	0.	0.000	1000.00	1.661s
BI-207	4253.77	1063.66	10.	1.	0.001	702.38	1.671s
Ga-68	4308.74	1077.40	5.	1.	0.001	501.66	1.683s
FE-59	4396.18	1099.25	5.	1.	0.000	608.03	1.700s
EU-152	4447.49	1112.07	11.	-1.	0.000	569.21	1.711s
ZN-65	4461.38	1115.55	12.	0.	0.000	1000.00	1.713s
BI-214	4480.35	1120.29	15.	-3.	-0.002	193.62	1.717s
Ta-182	4484.41	1121.30	1.	0.	0.000	1000.00	1.718s
CO-60	4692.24	1173.24	0.	0.	0.000	1000.00	1.760s
Ta-182	4755.52	1189.05	15.	-7.	-0.004	80.27	1.772s
Ta-182	4885.02	1221.41	6.	2.	0.001	259.19	1.798s
Co-56	4952.53	1238.28	1.	-1.	0.000	926.72	1.812s
NA-22	5097.60	1274.53	11.	-7.	-0.004	79.37	1.840s
EU-154	5097.66	1274.54	17.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	11.	-7.	-0.004	117.90	1.854s
CO-60	5329.61	1332.50	16.	-11.	-0.006	85.35	1.886s
EU-152	5631.79	1408.00	0.	0.	0.000	1000.00	1.944s
K-40	5843.25	1460.83	14.	-9.	-0.005	81.59	1.985s
SB-124	6764.55	1690.98	12.	-8.	-0.005	86.25	2.157s
BI-214	7058.84	1764.49	11.	-9.	-0.005	86.94	2.211s
Co-56	7086.31	1771.35	6.	0.	0.000	1000.00	2.216s
y-88	7345.39	1836.06	0.	0.	0.000	1000.00	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	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
NA-22	C	-4.2215E-01				9.50E+02	
			1274.53	-4.221E-01	?(	1.135E+00 7.94E+01 9.99E+01	G
K-40	N	-5.7326E+00				4.66E+11	
			1460.83	-5.733E+00	?(P	1.316E+01 8.16E+01 1.07E+01	G
Sc-46	F	-1.6017E-02				8.38E+01	
			889.28	-1.602E-02	%(	1.449E+00 2.50E+03 1.00E+02	G
			1120.55	-6.832E-09	%	1.067E+00 4.05E+09 1.00E+02	G
CR-51	F	-3.7118E-01				2.77E+01	
			320.08	-3.712E-01	?(P	7.932E+00 7.68E+02 9.94E+00	G
MN-54	C	-9.1635E-02				3.12E+02	
			834.85	-9.163E-02	?(	9.230E-01 4.03E+02 1.00E+02	G
FE-59	F	8.2912E-02				4.45E+01	
			1099.25	8.291E-02	?(P	1.330E+00 6.08E+02 5.65E+01	G
			1291.60	-9.867E-01	+	2.654E+00 1.18E+02 4.32E+01	G
Co-56	C	7.7217E-02				7.73E+01	
			846.77	7.722E-02	?(	7.851E-01 3.96E+02 9.99E+01	G
			1238.28	-5.744E-02	+ P	6.903E-01 9.27E+02 6.61E+01	G
			1037.84	-1.161E+00	+ P	5.035E+00 2.46E+02 1.41E+01	G
			1771.35	0.000E+00	-	7.556E+00 1.00E+03 1.55E+01	A
CO-57	C	1.4114E-01				2.72E+02	
			122.06	1.411E-01	?(	5.582E-01 1.16E+02 8.56E+01	G
			136.47	0.000E+00	&	5.707E+00 1.00E+03 1.07E+01	G
CO-58	C	2.2886E-01				7.09E+01	
			810.78	2.289E-01	?(	7.635E-01 9.59E+01 9.95E+01	G
CO-60	F	-7.4441E-01				1.93E+03	
			1332.50	-7.444E-01	?(	1.399E+00 8.53E+01 1.00E+02	G
			1173.24	0.000E+00	+	4.379E-01 1.00E+03 9.99E+01	G
NB-94	I	-3.6156E-01				7.41E+06	
			702.63	-3.616E-01	?(P	1.006E+00 1.38E+02 9.79E+01	G
			871.10	-1.578E-02	%	8.024E-01 1.31E+03 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	3.0850E-01					6.40E+01	
			756.73	3.085E-01	?(P	1.307E+00	1.62E+02	5.45E+01 G
			724.20	0.000E+00	-	1.936E+00	1.00E+03	4.42E+01 G
NB-95	I	5.9474E-02					6.40E+01	
			765.79	5.947E-02	?(	1.146E+00	5.32E+02	9.98E+01 G
RU-103	I	1.3629E-01					3.93E+01	
			497.05	1.363E-01	?(P	4.145E-01	1.11E+02	9.09E+01 G
			610.30	0.000E+00	&	2.577E+01	1.00E+03	5.75E+00 GA
RH-106	I	-1.8521E-01					3.74E+02	
			621.92	-1.852E-01	%(	1.519E+01	2.33E+03	9.93E+00 G
			1050.36	0.000E+00	+	7.597E+01	1.00E+03	1.56E+00 G
			511.86	8.133E+00	?	3.756E+00	2.64E+01	2.00E+01 GA
AG-108M	C	-3.1282E-02					1.53E+05	
			433.94	-3.128E-02	?(	5.682E-01	6.28E+02	9.05E+01 G
			722.94	0.000E+00	+	9.398E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	1.657E+00	1.00E+03	8.98E+01 G
AG-110M	F	7.2559E-02					2.50E+02	
			884.68	0.000E+00	?(	1.976E+00	1.00E+03	7.27E+01 G
			657.76	1.283E-01	?(	6.033E-01	1.30E+02	9.46E+01 G
			937.49	-3.396E-01	&	2.466E+00	2.85E+02	3.44E+01 G
			1384.30	-5.852E-02	% P	2.047E+00	2.72E+03	2.43E+01 G
			763.94	-1.901E+00	+	4.324E+00	6.85E+01	2.23E+01 G
SN-113	F	-4.0974E-01					1.15E+02	
			391.69	-4.097E-01	?(P	1.544E+00	1.07E+02	6.40E+01 G
SB-124	F	1.4342E-01					6.02E+01	
			602.73	1.434E-01	?(P	1.464E+00	2.93E+02	9.83E+01 G
			1690.98	-1.384E+00	+ P	3.156E+00	8.62E+01	4.78E+01 G
			722.79	-3.804E-01	+	7.663E+00	5.39E+02	1.08E+01 G
SB-125	I	8.4380E-01					1.01E+03	
			427.88	3.707E-01	?(	1.101E+00	1.05E+02	2.96E+01 G
			600.50	1.547E+00	?(	7.512E+00	1.41E+02	1.79E+01 G
			635.89	-1.653E-01	%	6.763E+00	1.09E+03	1.13E+01 G
			463.37	9.825E-01	&(P	4.479E+00	1.27E+02	1.05E+01 G
I-131	I	-1.4412E-01					8.02E+00	
			364.48	-1.441E-01	(P	7.157E-01	2.25E+02	8.17E+01 G
			284.30	-3.418E-01	&	8.396E+00	8.83E+02	6.14E+00 G
			636.97	-5.692E+00	& P	1.404E+01	1.11E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-3.7001E-03					2.42E+02	
			97.50	-3.370E-01	?(	1.982E+00	1.72E+02	3.00E+01 G
			103.20	4.550E-01	?(	1.916E+00	1.22E+02	2.18E+01 G
Ga-68	C	1.9797E+00					4.71E-02	
			1077.40	1.980E+00	?(	2.599E+01	5.02E+02	3.30E+00 G
Tc-99m	I	3.8948E-02					2.51E-01	
			140.51	3.895E-02	?(	7.772E-01	5.76E+02	8.93E+01 G
BA-133	F	3.6186E-01					3.85E+03	
			356.00	2.532E-01	?(	9.924E-01	1.13E+02	6.20E+01 G
			302.85	7.298E-01	&(	4.933E+00	1.96E+02	1.83E+01 G
			383.84	-3.867E-01	+	9.043E+00	6.54E+02	8.94E+00 GA
			80.99	-5.305E-01	& P	1.631E+00	9.93E+01	3.41E+01 GA
CE-139	F	1.2536E-01					1.38E+02	
			165.85	1.254E-01	@(	6.595E-01	1.53E+02	7.99E+01 G
Ba-140	I	1.5845E-01					1.28E+01	
			537.26	-4.848E-01	?(P	3.231E+00	1.28E+02	2.44E+01 G
			162.66	2.035E+00	(	8.197E+00	1.18E+02	6.22E+00 G
			304.85	1.094E+00	(P	2.210E+01	5.79E+02	4.29E+00 G
La-140	I	6.2238E-02					1.28E+01	
			1596.21	-3.299E-02	%(P	5.828E-01	1.72E+03	9.54E+01 G
			487.02	-6.761E-01	+	1.727E+00	1.01E+02	4.55E+01 G
			328.76	2.292E-01	&(P	3.029E+00	4.81E+02	2.03E+01 G
			815.77	3.069E-01	?(	3.945E+00	3.48E+02	2.33E+01 G
CE-141	I	-3.0765E-01					3.25E+01	
			145.44	-3.076E-01	?(	1.501E+00	1.44E+02	4.82E+01 G
CE-144	I	-8.7633E-01					2.85E+02	
			133.54	-8.763E-01	?(	5.027E+00	1.67E+02	1.11E+01 G
PM-144	C	-3.6367E-01					3.63E+02	
			696.54	-3.637E-01	?(	1.070E+00	1.20E+02	9.90E+01 G
			618.06	0.000E+00	+	1.509E+00	1.00E+03	9.91E+01 G
EU-152	F	9.0011E-01					4.94E+03	
			344.29	3.309E-01	?(	2.320E+00	1.97E+02	2.65E+01 G
			1112.07	-3.479E-01	+	7.535E+00	5.69E+02	1.36E+01 G
			121.78	-5.343E-01	+	1.953E+00	1.08E+02	2.86E+01 G
			778.92	-5.601E-01	+	5.521E+00	3.69E+02	1.29E+01 G
			964.11	1.933E+00	?(	5.311E+00	8.06E+01	1.46E+01 G
			244.69	1.247E-01	%	8.432E+00	1.89E+03	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	0.000E+00	-	2.399E+00	1.00E+03	2.10E+01 GA
EU-154	I	4.2333E-01					3.14E+03	
			873.23	0.000E+00	&(	2.846E+00	1.00E+03	1.23E+01 G
			123.10	2.969E-01	(	1.092E+00	1.08E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.976E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	4.224E+00	1.00E+03	2.02E+01 G
			1004.77	-9.756E-02	%	5.773E+00	1.56E+03	1.80E+01 G
			996.33	1.400E+00	?(	8.680E+00	1.70E+02	1.06E+01 G
EU-155	I	-3.1616E-01					1.81E+03	
			105.31	-3.162E-01	(P	2.566E+00	3.08E+02	2.12E+01 G
			86.54	0.000E+00	+	2.978E+00	1.00E+03	3.07E+01 G
HF-181	F	-1.8670E-02					4.24E+01	
			482.00	-2.655E-01	?(	1.038E+00	1.13E+02	8.05E+01 G
			133.02	0.000E+00	+	1.404E+00	1.00E+03	4.33E+01 G
			345.83	1.012E+00	(	5.481E+00	1.56E+02	1.51E+01 G
			136.30	7.221E-01	&(	1.025E+01	4.09E+02	5.85E+00 G
Ta-182	F	2.1198E-01					1.14E+02	
			1121.30	0.000E+00	?(	1.211E+00	1.00E+03	3.49E+01 G
			1221.41	4.860E-01	?(P	3.172E+00	2.59E+02	2.70E+01 G
			1189.05	-2.656E+00	+ P	7.724E+00	8.03E+01	1.62E+01 G
Hg-203	F	1.1022E-01					4.66E+01	
			279.20	1.102E-01	?(	8.758E-01	2.27E+02	8.15E+01 G
TL-208	N	8.3021E-02					6.98E+02	
			583.02	8.302E-02	?(	8.863E-01	3.98E+02	8.45E+01 G
			277.28	-2.187E+00	+ P	1.036E+01	1.92E+02	6.31E+00 G
			860.56	-1.982E+00	+ P	6.653E+00	1.32E+02	1.24E+01 G
pm-146	C	4.8741E-01					2.02E+03	
			747.16	-1.348E-01	?(P	2.426E+00	2.74E+02	3.40E+01 G
			735.72	1.428E+00	?(P	1.365E+00	3.77E+01	2.25E+01 G
			453.88	-3.598E-01	+	1.059E+00	1.15E+02	6.50E+01 G
y-88	F	5.1656E-02					1.07E+02	
			898.04	5.166E-02	&(	1.041E+00	8.00E+02	9.37E+01 G
			1836.06	0.000E+00	-	6.260E-01	1.00E+03	9.92E+01 G
Cd-113m		-2.5447E+03					5.33E+03	
			263.70	-2.545E+03	?(	1.158E+04	1.32E+02	6.00E-03 K
Cf-251	T	1.1881E-01					3.28E+05	
			176.60	1.188E-01	?(	2.756E+00	8.13E+02	1.70E+01 G
			227.00	1.870E+00	?	5.624E+00	1.06E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	1.8046E-01					1.28E+05	
			387.95	0.000E+00	?(	1.254E+00	1.00E+03	6.60E+01 G
			333.44	9.484E-01	&(	2.748E+00	1.07E+02	1.55E+01 G
Sn-126		1.6973E+00					3.65E+07	
			87.57	0.000E+00	-	2.424E+00	1.00E+03	3.75E+01 GA
			64.28	1.697E+00	?(	6.554E+00	1.13E+02	9.70E+00 G
			86.94	0.000E+00	-	1.009E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.0222E+01					8.14E+03	
			46.54	1.022E+01	*(P	2.444E+01	8.09E+01	4.25E+00 G
PB-212	N	-2.8893E-02					6.98E+02	
			238.63	-2.889E-02	%(P	1.918E+00	1.90E+03	4.33E+01 G
			300.03	9.093E+00	? P	2.047E+01	6.80E+01	3.28E+00 GA
PB-214	N	-7.0177E-01					5.84E+05	
			351.93	-7.018E-01	?(P	2.570E+00	9.65E+01	3.76E+01 G
			295.09	1.779E-01	+ P	2.632E+00	5.06E+02	1.93E+01 G
			242.00	8.962E-01		1.124E+01	3.61E+02	7.43E+00 GA
BI-207	C	1.0204E-01					1.18E+04	
			569.70	1.235E-01	?(	8.340E-01	1.89E+02	9.77E+01 G
			1063.66	7.390E-02	?(	1.289E+00	7.02E+02	7.45E+01 G
BI-212	N	1.8236E-01					6.98E+02	
			727.17	1.824E-01	%(	1.157E+01	1.69E+03	7.55E+00 G
			785.42	-4.191E+01	+	9.049E+01	8.96E+01	1.28E+00 GA
BI-214	N	-4.3958E-01					5.84E+05	
			609.31	-4.396E-01	?(P	3.334E+00	2.16E+02	4.61E+01 G
			1120.29	-1.119E+00	+ P	7.788E+00	1.94E+02	1.51E+01 G
			1764.49	-4.635E+00	+ P	9.534E+00	8.69E+01	1.54E+01 G
BI-210M	T	1.8691E-01					1.10E+09	
			265.83	1.869E-01	?(	1.463E+00	2.25E+02	5.00E+01 G
			304.90	-2.306E-03	% P	3.432E+00	4.22E+04	2.80E+01 G
AC-228	N	8.4834E-01					2.10E+03	
			911.07	1.687E-01	?(	3.399E+00	8.00E+02	2.90E+01 G
			968.97	-4.484E-01	+	7.145E+00	4.37E+02	1.75E+01 G
			338.32	2.489E+00	&(	3.109E+00	4.22E+01	1.20E+01 G
			93.35	-3.555E+00	+	1.852E+01	1.55E+02	5.56E+00 XA
TH-227	N	5.8935E-01					7.95E+03	
			50.14	5.893E-01	?(	9.038E+00	5.10E+02	8.00E+00 G
			256.24	-2.672E+00	+ P	8.287E+00	1.34E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	5.2187E+00					2.68E+06	
			193.51	2.684E+00	?(P	8.707E+00	1.16E+02	4.40E+00 G
			210.85	8.948E+00	?(	1.127E+01	4.86E+01	2.99E+00 G
TH-234	N	-1.1742E+01					1.63E+12	
			63.29	-1.174E+01	(P	2.151E+01	4.91E+01	3.81E+00 G
			92.59	-1.382E+01	+ P	1.949E+01	2.76E+01	5.58E+00 G
PA-231	N	4.9867E+00					1.20E+07	
			302.65	4.643E+00	?(	3.004E+01	1.87E+02	2.88E+00 G
			300.07	5.390E+00	?(	3.160E+01	1.69E+02	2.46E+00 G
PA-233	C	6.4072E-01					7.82E+08	
			312.01	3.826E-01	?(	2.541E+00	1.92E+02	3.60E+01 G
			300.18	2.139E+00	?(	1.323E+01	1.79E+02	6.20E+00 G
PA-234	N	4.0791E-01					1.63E+12	
			131.29	5.251E-01	?(	3.230E+00	1.79E+02	1.80E+01 G
			946.02	2.505E-01	?(	6.367E+00	9.80E+02	1.34E+01 G
			569.47	-1.191E+00	+	1.008E+01	2.35E+02	8.20E+00 G
			883.24	-3.084E+00	+	1.366E+01	1.28E+02	9.60E+00 G
			880.53	-5.940E+00	+	1.899E+01	9.35E+01	6.00E+00 GA
PA-234M	N	-3.3788E-01					1.63E+12	
			1001.00	-1.999E+01	&(P	1.347E+02	2.35E+02	8.37E-01 G
			766.41	5.561E+01	?(P	3.531E+02	1.79E+02	2.94E-01 G
U-235	N	-3.4272E-01					2.57E+11	
			143.79	-7.398E-01	?(P	6.436E+00	2.75E+02	1.10E+01 G
			205.33	5.260E-01	?(P	1.058E+01	7.02E+02	5.01E+00 G
			163.38	-4.418E+00	+ P	1.278E+01	1.09E+02	5.08E+00 G
AM-241	T	-5.5448E-01					1.58E+05	
			59.54	-5.545E-01	?(	1.778E+00	1.11E+02	3.59E+01 G
Np-237	F	4.3893E-01					2.14E+06	
			86.49	4.389E-01	?(	6.905E+00	4.60E+02	1.31E+01 G
Ir-192	F	-2.6206E-01					7.40E+01	
			316.49	-2.621E-01	?(	9.210E-01	1.03E+02	8.70E+01 G
			468.06	2.334E-01	+	1.057E+00	1.27E+02	5.18E+01 G
			308.44	-7.005E-01	+	3.849E+00	1.62E+02	3.18E+01 G
Cs-136	F	4.4898E-02					1.30E+01	
			818.50	-2.257E-02	%(	9.766E-01	1.16E+03	1.00E+02 G
			1048.07	-2.268E-01	+	1.298E+00	1.59E+02	8.00E+01 G
			340.57	1.887E-01	?(	1.208E+00	1.80E+02	4.69E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   2.4770E-01                                      2.36E+00
                          103.70-5.632E-01 +   2.168E+00 1.13E+02 2.40E+01 X
                          106.13 2.477E-01 &(  2.492E+00 2.90E+02 2.27E+01 G
                           99.50-4.083E-01 +   4.040E+00 2.86E+02 1.50E+01 X

Nd-147      -2.6148E+00                                     1.11E+01
                          531.00-2.615E+00 ?(  6.436E+00 9.75E+01 1.30E+01 G
                           91.10 0.000E+00 &   3.158E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

********** 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	36.	2.	0.001	509.90	5.893E-01	
AM-241	59.54	45.	-11.	-0.006	110.92	-5.545E-01	
TH-234	63.29	89.	-25.	-0.014	49.09	-1.174E+01	P
Sn-126	64.28	54.	10.	0.005	113.29	1.697E+00	
BA-133	80.99	60.	-13.	-0.007	99.25	-5.305E-01	P
Np-237	86.49	182.	4.	0.002	460.30	4.389E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	92.59	284.	-58.	-0.032	27.57	-1.382E+01	P
AC-228	93.35	254.	-15.	-0.008	154.73	-3.555E+00	
Gd-153	97.50	83.	-8.	-0.004	171.56	-3.370E-01	
Np-239	99.50	87.	-5.	-0.003	286.43	-4.083E-01	
Gd-153	103.20	40.	8.	0.004	122.45	4.550E-01	
Np-239	103.70	64.	-10.	-0.006	113.25	-5.632E-01	
EU-155	105.31	71.	-5.	-0.003	308.12	-3.162E-01	P
Np-239	106.13	77.	4.	0.002	290.38	2.477E-01	
EU-152	121.78	75.	-12.	-0.007	107.97	-5.343E-01	
CO-57	122.06	53.	9.	0.005	115.90	1.411E-01	
EU-154	123.10	46.	9.	0.005	107.91	2.969E-01	
PA-234	131.29	79.	7.	0.004	179.15	5.251E-01	
CE-144	133.54	71.	-7.	-0.004	167.01	-8.763E-01	
HF-181	136.30	82.	3.	0.002	408.70	7.221E-01	
Tc-99m	140.51	102.	2.	0.001	576.19	3.895E-02	
U-235	143.79	111.	-6.	-0.003	275.44	-7.398E-01	P
CE-141	145.44	116.	-11.	-0.006	143.75	-3.076E-01	
Ba-140	162.66	48.	9.	0.005	117.75	2.035E+00	
U-235	163.38	80.	-15.	-0.009	109.07	-4.418E+00	P
CE-139	165.85	52.	7.	0.004	152.56	1.254E-01	
Cf-251	176.60	37.	1.	0.001	812.79	1.188E-01	
TH-229	193.51	20.	7.	0.004	115.68	2.684E+00	P
U-235	205.33	38.	2.	0.001	701.81	5.260E-01	P
TH-229	210.85	13.	16.	0.009	48.56	8.948E+00	
Cf-251	227.00	13.	7.	0.004	106.48	1.870E+00	
PB-214	242.00	80.	4.	0.002	361.43	8.962E-01	
TH-227	256.24	34.	-10.	-0.005	133.73	-2.672E+00	P
Cd-113m	263.70	48.	-8.	-0.004	132.38	-2.545E+03	
BI-210M	265.83	53.	5.	0.003	224.74	1.869E-01	
TL-208	277.28	39.	-7.	-0.004	192.25	-2.187E+00	P
Hg-203	279.20	46.	4.	0.002	227.28	1.102E-01	
I-131	284.30	22.	-1.	-0.001	883.18	-3.418E-01	
PB-214	295.09	20.	2.	0.001	506.03	1.779E-01	P
PB-212	300.03	36.	14.	0.008	68.01	9.093E+00	P
PA-231	300.07	50.	6.	0.003	169.36	5.390E+00	
PA-233	300.18	56.	6.	0.003	178.77	2.139E+00	
PA-231	302.65	62.	6.	0.003	187.32	4.643E+00	
BA-133	302.85	68.	6.	0.003	195.87	7.298E-01	
Ba-140	304.85	75.	2.	0.001	578.93	1.094E+00	P
Ir-192	308.44	126.	-10.	-0.006	161.66	-7.005E-01	
PA-233	312.01	67.	6.	0.003	192.45	3.826E-01	
Ir-192	316.49	49.	-10.	-0.006	103.41	-2.621E-01	
CR-51	320.08	47.	-2.	-0.001	767.97	-3.712E-01	P
La-140	328.76	26.	2.	0.001	480.88	2.292E-01	P
Cf-249	333.44	11.	6.	0.003	106.73	9.484E-01	
AC-228	338.32	8.	13.	0.007	42.16	2.489E+00	
Cs-136	340.57	20.	4.	0.002	179.70	1.887E-01	
EU-152	344.29	24.	4.	0.002	197.34	3.309E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	345.83	46.	6.	0.004	156.48	1.012E+00	
PB-214	351.93	63.	-11.	-0.006	96.53	-7.018E-01	P
BA-133	356.00	23.	6.	0.004	113.24	2.532E-01	
I-131	364.48	20.	-5.	-0.003	224.98	-1.441E-01	P
BA-133	383.84	37.	-1.	-0.001	653.83	-3.867E-01	
SN-113	391.69	56.	-10.	-0.006	107.10	-4.097E-01	P
SB-125	427.88	4.	4.	0.002	104.51	3.707E-01	
AG-108M	433.94	11.	-1.	-0.001	628.49	-3.128E-02	
pm-146	453.88	20.	-8.	-0.004	115.02	-3.598E-01	
SB-125	463.37	8.	3.	0.002	127.03	9.825E-01	P
Ir-192	468.06	11.	4.	0.002	127.21	2.334E-01	
HF-181	482.00	28.	-7.	-0.004	113.39	-2.655E-01	
La-140	487.02	24.	-10.	-0.006	101.00	-6.761E-01	
RU-103	497.05	4.	4.	0.002	111.29	1.363E-01	P
RH-106	511.86	20.	51.	0.028	26.38	8.133E+00	
Nd-147	531.00	24.	-10.	-0.006	97.51	-2.615E+00	
Ba-140	537.26	21.	-4.	-0.002	127.74	-4.848E-01	P
CS-134	563.24	20.	-10.	-0.006	46.33	-4.145E+00	P
PA-234	569.47	21.	-3.	-0.002	235.44	-1.191E+00	
BI-207	569.70	20.	4.	0.002	189.16	1.235E-01	
TL-208	583.02	16.	2.	0.001	397.91	8.302E-02	
SB-125	600.50	56.	8.	0.004	141.39	1.547E+00	
SB-124	602.73	64.	4.	0.002	293.44	1.434E-01	P
BI-214	609.31	73.	-6.	-0.003	216.34	-4.396E-01	P
I-131	636.97	27.	-11.	-0.006	111.41	-5.692E+00	P
AG-110M	657.76	7.	3.	0.002	129.56	1.283E-01	
PM-144	696.54	26.	-9.	-0.005	120.36	-3.637E-01	
NB-94	702.63	22.	-9.	-0.005	138.43	-3.616E-01	P
SB-124	722.79	14.	-1.	-0.001	538.52	-3.804E-01	
pm-146	735.72	0.	8.	0.004	37.66	1.428E+00	P
pm-146	747.16	13.	-1.	-0.001	273.94	-1.348E-01	P
ZR-95	756.73	9.	4.	0.002	162.06	3.085E-01	P
AG-110M	763.94	18.	-10.	-0.005	68.54	-1.901E+00	
NB-95	765.79	26.	1.	0.001	532.32	5.947E-02	
PA-234M	766.41	21.	4.	0.002	178.86	5.561E+01	P
EU-152	778.92	9.	-2.	-0.001	368.78	-5.601E-01	
BI-212	785.42	26.	-12.	-0.007	89.57	-4.191E+01	
CS-134	795.87	9.	-1.	0.000	909.67	-3.444E-02	
CO-58	810.78	9.	5.	0.003	95.93	2.289E-01	
La-140	815.77	14.	2.	0.001	347.50	3.069E-01	
MN-54	834.85	14.	-2.	-0.001	403.11	-9.163E-02	
Co-56	846.77	9.	2.	0.001	396.48	7.722E-02	
TL-208	860.56	10.	-5.	-0.003	132.48	-1.982E+00	P
PA-234	880.53	21.	-7.	-0.004	93.48	-5.940E+00	
PA-234	883.24	28.	-6.	-0.003	127.62	-3.084E+00	
y-88	898.04	14.	1.	0.001	800.00	5.166E-02	
AC-228	911.07	14.	1.	0.001	800.00	1.687E-01	
AG-110M	937.49	9.	-2.	-0.001	285.36	-3.396E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	946.02	9.	1.	0.000	979.80	2.505E-01		
EU-152	964.11	7.	6.	0.003	80.63	1.933E+00		
AC-228	968.97	22.	-2.	-0.001	437.29	-4.484E-01		
EU-154	996.33	10.	3.	0.002	169.88	1.400E+00		
PA-234M	1001.00	16.	-3.	-0.002	234.66	-1.999E+01		P
Co-56	1037.84	5.	-3.	-0.002	246.46	-1.161E+00		P
Cs-136	1048.07	12.	-3.	-0.002	158.75	-2.268E-01		
BI-207	1063.66	10.	1.	0.001	702.38	7.390E-02		
Ga-68	1077.40	5.	1.	0.001	501.66	1.980E+00		
FE-59	1099.25	5.	1.	0.000	608.03	8.291E-02		P
EU-152	1112.07	11.	-1.	0.000	569.21	-3.479E-01		
BI-214	1120.29	15.	-3.	-0.002	193.62	-1.119E+00		P
Ta-182	1189.05	15.	-7.	-0.004	80.27	-2.656E+00		P
Ta-182	1221.41	6.	2.	0.001	259.19	4.860E-01		P
Co-56	1238.28	1.	-1.	0.000	926.72	-5.744E-02		P
NA-22	1274.53	11.	-7.	-0.004	79.37	-4.221E-01		
FE-59	1291.60	11.	-7.	-0.004	117.90	-9.867E-01		
CO-60	1332.50	16.	-11.	-0.006	85.35	-7.444E-01		
K-40	1460.83	14.	-9.	-0.005	81.59	-5.733E+00		P
SB-124	1690.98	12.	-8.	-0.005	86.25	-1.384E+00		P
BI-214	1764.49	11.	-9.	-0.005	86.94	-4.635E+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	0.0000E+00	0.0000E+00	1.000E+03%	6.94E+00
NA-22	#A	-4.2215E-01	-4.2215E-01	7.937E+01%	1.14E+00
K-40	#A	-5.7326E+00	-5.7326E+00	8.159E+01%	1.32E+01
Sc-46	#A	-1.6017E-02	-1.6017E-02	2.504E+03%	1.45E+00
CR-51	#A	-3.7118E-01	-3.7118E-01	7.680E+02%	7.93E+00
MN-54	#A	-9.1634E-02	-9.1635E-02	4.031E+02%	9.23E-01
FE-59	#A	8.2911E-02	8.2912E-02	6.080E+02%	1.33E+00
Co-56	#A	7.7217E-02	7.7217E-02	3.965E+02%	7.85E-01
CO-57	#A	1.4114E-01	1.4114E-01	1.159E+02%	5.58E-01
CO-58	#A	2.2886E-01	2.2886E-01	9.593E+01%	7.64E-01
CO-60	#A	-7.4441E-01	-7.4441E-01	8.535E+01%	1.40E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.10E+00
NB-94	#A	-3.6156E-01	-3.6156E-01	1.384E+02%	1.01E+00
ZR-95	#A	3.0850E-01	3.0850E-01	1.621E+02%	1.31E+00
NB-95	#A	5.9473E-02	5.9474E-02	5.323E+02%	1.15E+00
RU-103	#A	1.3629E-01	1.3629E-01	1.113E+02%	4.14E-01
RH-106	#A	-1.8521E-01	-1.8521E-01	2.328E+03%	1.52E+01
AG-108M	#A	-3.1282E-02	-3.1282E-02	6.285E+02%	5.68E-01
AG-110M	#A	7.2559E-02	7.2559E-02	1.296E+02%	1.98E+00

SN-113	#A	-4.0974E-01	-4.0974E-01	1.071E+02%	1.54E+00
SB-124	#A	1.4342E-01	1.4342E-01	2.934E+02%	1.46E+00
SB-125	#A	8.4380E-01	8.4380E-01	7.230E+01%	1.10E+00
I-131	#A	-1.4411E-01	-1.4412E-01	2.250E+02%	7.16E-01
Gd-153	#A	-3.7001E-03	-3.7001E-03	1.054E+02%	1.98E+00
Ga-68	#A	1.9639E+00	1.9797E+00	5.017E+02%	2.60E+01
Tc-99m	#A	3.8889E-02	3.8948E-02	5.762E+02%	7.77E-01
BA-133	#A	3.6186E-01	3.6186E-01	1.131E+02%	9.92E-01
CS-134	#A	0.0000E+00	0.0000E+00	5.774E+02%	1.52E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.97E-01
CE-139	#A	1.2536E-01	1.2536E-01	1.526E+02%	6.59E-01
Ba-140	#A	1.5844E-01	1.5845E-01	1.178E+02%	3.23E+00
La-140	#A	6.2236E-02	6.2238E-02	3.475E+02%	5.83E-01
CE-141	#A	-3.0764E-01	-3.0765E-01	1.437E+02%	1.50E+00
CE-144	#A	-8.7633E-01	-8.7633E-01	1.670E+02%	5.03E+00
PM-144	#A	-3.6367E-01	-3.6367E-01	1.204E+02%	1.07E+00
EU-152	#A	9.0011E-01	9.0011E-01	8.063E+01%	2.32E+00
EU-154	#A	4.2333E-01	4.2333E-01	1.079E+02%	2.85E+00
EU-155	#A	-3.1616E-01	-3.1616E-01	3.081E+02%	2.57E+00
HF-181	#A	-1.8669E-02	-1.8670E-02	1.134E+02%	1.04E+00
Ta-182	#A	2.1198E-01	2.1198E-01	2.592E+02%	1.21E+00
Hg-203	#A	1.1022E-01	1.1022E-01	2.273E+02%	8.76E-01
TL-208	#A	8.3021E-02	8.3021E-02	3.979E+02%	8.86E-01
pm-146	#A	4.8741E-01	4.8741E-01	3.766E+01%	2.43E+00
y-88	#A	5.1656E-02	5.1656E-02	8.000E+02%	1.04E+00
Cd-113m	#A	-2.5447E+03	-2.5447E+03	1.324E+02%	1.16E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.39E+01
Cf-251	#A	1.1881E-01	1.1881E-01	8.128E+02%	2.76E+00
Cf-249	#A	1.8046E-01	1.8046E-01	1.067E+02%	1.25E+00
Sn-126	#A	1.6973E+00	1.6973E+00	1.133E+02%	6.55E+00
PB-210	#A	1.0222E+01	1.0222E+01	8.090E+01%	2.44E+01
PB-212	#A	-2.8893E-02	-2.8893E-02	1.898E+03%	1.92E+00
PB-214	#A	-7.0177E-01	-7.0177E-01	9.653E+01%	2.57E+00
BI-207	#A	1.0204E-01	1.0204E-01	1.892E+02%	8.34E-01
BI-212	#A	1.8236E-01	1.8236E-01	1.688E+03%	1.16E+01
BI-214	#A	-4.3958E-01	-4.3958E-01	2.163E+02%	3.33E+00
BI-210M	#A	1.8691E-01	1.8691E-01	2.247E+02%	1.46E+00
AC-228	#A	8.4834E-01	8.4834E-01	4.216E+01%	3.40E+00
TH-227	#A	5.8935E-01	5.8935E-01	5.099E+02%	9.04E+00
TH-229	#A	5.2187E+00	5.2187E+00	4.856E+01%	8.71E+00
TH-234	#A	-1.1742E+01	-1.1742E+01	4.909E+01%	2.15E+01
PA-231	#A	4.9867E+00	4.9867E+00	1.263E+02%	3.00E+01
PA-233	#A	6.4072E-01	6.4072E-01	1.313E+02%	2.54E+00
PA-234	#A	4.0791E-01	4.0791E-01	1.791E+02%	3.23E+00
PA-234M	#A	-3.3788E-01	-3.3788E-01	1.475E+02%	1.35E+02
U-235	#A	-3.4272E-01	-3.4272E-01	2.754E+02%	6.44E+00
AM-241	#A	-5.5448E-01	-5.5448E-01	1.109E+02%	1.78E+00
Np-237	#A	4.3893E-01	4.3893E-01	4.603E+02%	6.90E+00
Ir-192	#A	-2.6206E-01	-2.6206E-01	1.034E+02%	9.21E-01

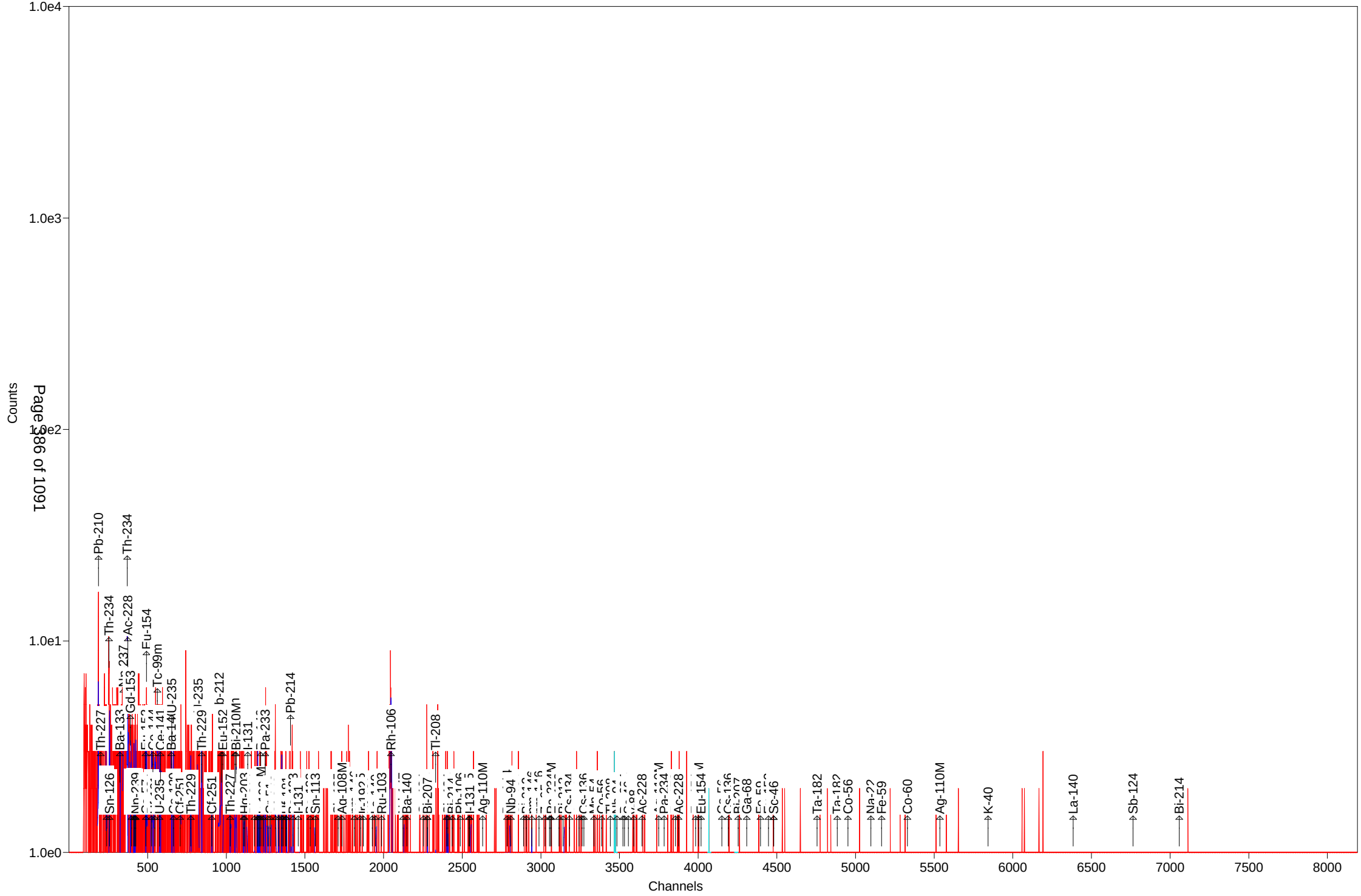
Cs-136 #A	4.4896E-02	4.4898E-02	1.797E+02%	9.77E-01
Np-239 #A	2.4766E-01	2.4770E-01	2.904E+02%	2.49E+00
Nd-147 #A	-2.6147E+00	-2.6148E+00	9.751E+01%	6.44E+00

- 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) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 0.0000000E+00 Bq/Sample

264540_Gamma_MB 160-264540~1-A. 17_Gamma_20161132.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162109

Sample Description: 264540_Gamma_LCS 160-264540~2-A
Detector: Detector #16
Batch ID: 264540
Work Order Number: Gamma
Lot Number: LCS 160-264540~2-A

Decay to Time: 9/1/2016 14:32 Live Time: 1800 sec
Acquisition Time: 9/1/2016 14:32:38 Real Time: 1830 sec
Analysis Time: 9/1/2016 15:03 Dead Time: 1.63 %
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	-1.475E+01	89.9	1.326E+01	1.328E+01	4.805E+01
NA-22	4.727E-01	109.0	5.151E-01	5.156E-01	1.766E+00
K-40	1.753E+00	398.6	6.988E+00	6.988E+00	1.688E+01
Sc-46	4.669E+00	29.3	1.367E+00	1.388E+00	2.763E+00
CR-51	-5.107E+00	247.6	1.264E+01	1.265E+01	4.210E+01
MN-54	-1.332E+00	120.0	1.599E+00	1.600E+00	3.467E+00
FE-59	-1.099E+00	72.7	7.986E-01	8.005E-01	7.299E+00
Co-56	1.607E+00	92.6	1.488E+00	1.490E+00	3.221E+00
CO-57	0.000E+00	1.#INF	4.089E-01	4.089E-01	2.246E+00
CO-58	-1.774E+00	75.2	1.334E+00	1.337E+00	4.416E+00
CO-60	1.994E+02	1.3	2.538E+00	1.033E+01	1.035E+00
ZN-65	2.223E+00	149.3	3.318E+00	3.320E+00	1.110E+01
NB-94	1.247E+00	84.4	1.053E+00	1.055E+00	3.497E+00
ZR-95	2.441E+00	84.4	2.060E+00	2.064E+00	4.627E+00
NB-95	0.000E+00	1.#INF	5.295E-01	5.295E-01	3.143E+00
RU-103	5.423E-01	244.8	1.328E+00	1.328E+00	3.103E+00
RH-106	1.251E+01	128.3	1.605E+01	1.607E+01	5.339E+01
AG-108M	5.964E-01	242.9	1.449E+00	1.449E+00	3.373E+00
AG-110M	-2.930E+00	78.8	2.308E+00	2.312E+00	7.641E+00
SN-113	8.806E-01	235.3	2.072E+00	2.072E+00	6.904E+00
SB-124	1.096E+00	121.5	1.332E+00	1.333E+00	4.938E+00
SB-125	5.935E+00	65.6	3.892E+00	3.904E+00	1.006E+01
I-131	-3.287E-01	58.3	1.915E-01	1.923E-01	3.259E+00
Gd-153	-2.582E+00	169.8	4.384E+00	4.387E+00	1.451E+01
Ga-68	-6.893E+01	99.8	6.878E+01	6.889E+01	1.441E+02
Tc-99m	-6.689E-01	200.2	1.340E+00	1.340E+00	4.441E+00
BA-133	-5.525E-01	93.0	5.139E-01	5.147E-01	5.588E+00
CS-134	2.342E+00	79.6	1.864E+00	1.868E+00	5.076E+00
CS-137	3.698E+02	1.2	4.259E+00	1.970E+01	2.975E+00
CE-139	-9.712E-01	94.8	9.211E-01	9.258E-01	3.051E+00
Ba-140	-1.248E+00	77.0	9.618E-01	9.639E-01	1.159E+01
La-140	9.402E-01	85.9	8.079E-01	8.095E-01	1.061E+00
CE-141	1.583E+00	146.5	2.319E+00	2.321E+00	7.683E+00

CE-144	-6.729E+00	149.2	1.004E+01	1.004E+01	3.325E+01
PM-144	-1.425E+00	72.5	1.033E+00	1.035E+00	3.418E+00
EU-152	-4.563E+00	28.9	1.320E+00	1.341E+00	1.991E+01
EU-154	1.002E+01	66.8	6.693E+00	6.713E+00	3.487E+01
EU-155	8.390E-07	718807755.3	6.031E+00	6.031E+00	2.002E+01
HF-181	1.709E+00	98.4	1.682E+00	1.685E+00	5.580E+00
Ta-182	-5.489E+00	92.4	5.073E+00	5.081E+00	1.686E+01
Hg-203	2.924E-01	355.9	1.041E+00	1.041E+00	3.482E+00
TL-208	3.660E+00	31.3	1.147E+00	1.163E+00	2.509E+00
pm-146	6.317E-01	284.3	1.796E+00	1.796E+00	7.722E+00
y-88	6.339E-02	26.7	1.694E-02	1.725E-02	3.841E+00
Cd-113m	-1.159E+04	118.1	1.369E+04	1.371E+04	4.552E+04
Cd-109	2.157E+01	89.2	1.925E+01	1.929E+01	6.371E+01
Cf-251	2.630E+00	165.5	4.351E+00	4.358E+00	1.100E+01
Cf-249	-1.992E+00	102.3	2.038E+00	2.041E+00	6.756E+00
Sn-126	-1.929E+01	220.1	4.248E+01	4.249E+01	1.403E+02
PB-210	9.995E+03	0.9	9.018E+01	5.938E+02	1.687E+02
PB-212	8.040E+00	24.6	1.980E+00	2.047E+00	4.552E+00
PB-214	6.730E+00	28.8	1.936E+00	1.968E+00	5.293E+00
BI-207	1.104E-01	788.4	8.706E-01	8.706E-01	2.951E+00
BI-212	1.628E+01	83.1	1.353E+01	1.355E+01	4.489E+01
BI-214	6.471E+00	21.7	1.405E+00	1.444E+00	3.451E+00
BI-210M	1.604E+00	99.9	1.602E+00	1.605E+00	5.319E+00
AC-228	1.339E+01	30.6	4.094E+00	4.151E+00	1.063E+01
TH-227	2.886E+01	77.0	2.221E+01	2.227E+01	7.333E+01
TH-229	-5.755E+00	335.4	1.930E+01	1.931E+01	4.887E+01
TH-234	-6.015E+01	146.4	8.808E+01	8.814E+01	3.640E+02
PA-231	1.433E+01	361.0	5.173E+01	5.173E+01	1.720E+02
PA-233	2.780E+00	120.3	3.346E+00	3.349E+00	1.110E+01
PA-234	4.184E+00	55.7	2.330E+00	2.340E+00	2.007E+01
PA-234M	-2.335E+01	615.9	1.438E+02	1.438E+02	6.549E+02
U-235	2.616E+00	398.3	1.042E+01	1.042E+01	3.460E+01
AM-241	1.227E+03	0.8	1.000E+01	6.446E+01	1.480E+01
Np-237	-2.121E+00	491.5	1.043E+01	1.043E+01	3.458E+01
Ir-192	1.670E+00	84.3	1.408E+00	1.412E+00	4.533E+00
Cs-136	6.068E-01	241.8	1.467E+00	1.468E+00	4.921E+00
Np-239	3.262E+00	164.7	5.373E+00	5.377E+00	1.779E+01
Nd-147	3.298E+00	104.5	3.447E+00	3.453E+00	1.750E+01
Total	1.199E+04				

Analyst: Mike Aldridge

Sample description
264540_Gamma_LCS 160-264540~2-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162109.An1

Acquisition information
Start time: 9/1/2016 2:32:38 PM
Live time: 1800
Real time: 1830
Dead time: 1.63 %
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 2:32:00 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. 35 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1445

***** 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
46.56	17986.	0.90	0.96	2.350E-02	46.54	4.250	9.995E+03	PB210
49.56	113.	74.93	0.96	2.594E-02	50.14	8.000	2.965E+01	TH227
59.55	26376.	0.82	1.00	3.328E-02	59.54	35.900	1.227E+03	AM241
74.36	111.	37.48	0.99	4.116E-02				
77.40	165.	24.80	0.99	4.235E-02				
81.09	65.	125.34	0.99	4.361E-02	80.99	34.060	PBC<MDA	BA133
87.89	296.	19.38	1.01	4.547E-02	86.94	9.040	4.013E+01	Sn126
					87.57	37.500	9.643E+00	Sn126
					88.04	3.790	9.519E+01	Cd109
91.14	68.	112.08	1.00	4.612E-02	91.10	28.300	PBC<MDA	Nd147
92.59	22.	337.93	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
106.13	64.	164.74	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
121.61	56.	86.98	1.03	4.731E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	7.617E-01	CO57
143.79	23.	398.30	1.05	4.466E-02	143.79	10.960	PBC<MDA	U235
145.44	61.	146.51	1.05	4.440E-02	145.44	48.200	PBC<MDA	CE141
157.90	43.	58.27	0.48	4.225E-02				
163.16	69.	43.92	0.74	4.127E-02	162.66	6.220	1.497E+01	Ba140
					163.38	5.080	1.839E+01	U235
176.60	32.	165.48	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
238.74	202.	24.63	1.53	3.216E-02	238.63	43.300	8.040E+00	PB212
265.83	43.	99.89	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
279.20	12.	355.87	1.17	2.876E-02	279.20	81.460	PBC<MDA	Hg203
284.30	48.	97.55	1.18	2.839E-02	284.30	6.140	PBC<MDA	I131
295.30	82.	50.45	0.36	2.765E-02	295.09	19.300	PBC<MDA	PB214
302.65	20.	361.01	1.19	2.715E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.252E+00	BA133
302.85	33.	219.87	1.19	2.714E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	3.712E+00	BA133
308.44	48.	117.63	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
312.01	48.	120.34	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
316.49	47.	120.84	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
338.50	95.	43.89	1.01	2.506E-02	338.32	12.010	PBC<MDA	AC228
352.11	109.	33.41	0.92	2.435E-02	351.93	37.600	6.586E+00	PB214
391.69	23.	235.29	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
427.88	52.	94.91	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
433.94	20.	242.92	1.31	2.093E-02	433.94	90.480	PBC<MDA	AG108M
454.36	18.	284.26	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
482.00	48.	98.45	1.35	1.939E-02	482.00	80.500	PBC<MDA	HF181
487.02	27.	184.34	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
497.05	17.	244.84	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
529.06	18.	176.45	1.40	1.807E-02	531.00	13.000	PBC<MDA	Nd147
569.70	3.	788.41	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.316E+00	PA234
					569.70	97.740	1.104E-01	BI207
583.31	94.	31.35	1.81	1.687E-02	583.02	84.500	3.660E+00	TL208
600.50	36.	119.36	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
602.73	36.	121.53	1.46	1.646E-02	602.73	98.260	PBC<MDA	SB124
604.71	26.	168.42	1.46	1.642E-02	604.71	97.620	PBC<MDA	CS134
609.50	88.	21.71	1.30	1.633E-02	609.31	46.090	6.471E+00	BI214
621.92	36.	128.30	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106
635.89	27.	124.34	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
661.82	8717.	1.15	1.54	1.536E-02	661.66	85.210	3.698E+02	CS137
702.74	32.	84.38	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
722.79	3.	817.56	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.416E-01	AG108M
					723.36	20.220	6.366E-01	EU154
727.17	32.	83.11	1.57	1.433E-02	727.17	7.550	PBC<MDA	BI212
747.13	3.	871.21	1.59	1.404E-02	747.16	34.000	PBC<MDA	pm146
756.95	33.	84.38	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
778.92	32.	83.51	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.42	28.	98.38	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
801.95	39.	79.59	1.64	1.332E-02	801.95	8.690	PBC<MDA	CS134
818.50	14.	241.85	1.65	1.312E-02	818.50	100.000	PBC<MDA	Cs136
846.37	65.	39.63	0.44	1.280E-02	846.77	99.935	2.824E+00	Co56
873.23	32.	91.57	1.70	1.251E-02	873.23	12.270	PBC<MDA	EU154
889.40	104.	29.29	2.16	1.234E-02	889.28	99.984	4.669E+00	Sc46
911.00	84.	38.87	1.34	1.211E-02	911.07	29.000	1.334E+01	AC228
945.45	17.	91.82	0.73	1.178E-02	946.02	13.400	PBC<MDA	PA234
964.11	33.	96.66	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.70	39.	70.51	1.78	1.157E-02	968.97	17.460	PBC<MDA	AC228
996.33	4.	820.06	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1004.77	33.	97.30	1.81	1.126E-02	1004.77	18.010	PBC<MDA	EU154
1112.07	38.	80.39	1.90	1.043E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	21.	149.28	1.90	1.041E-02	1115.55	50.600	PBC<MDA	ZN65
1121.36	38.	80.40	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	5.847E+00	Ta182
1173.54	3592.	1.84	1.88	1.002E-02	1173.24	99.900	1.994E+02	CO60
1221.41	6.	329.44	1.99	9.717E-03	1221.41	27.000	PBC<MDA	Ta182
1238.35	3.	519.99	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	8.	108.97	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.342E+00	EU154
1332.85	3265.	1.76	1.99	9.095E-03	1332.50	99.980	1.994E+02	CO60
1460.58	3.	398.61	2.19	8.482E-03	1460.83	10.670	PBC<MDA	K40
1596.21	8.	85.93	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1690.98	5.	171.28	2.37	7.585E-03	1690.98	47.790	PBC<MDA	SB124
1764.62	9.	81.28	2.43	7.342E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	14.	26.73	2.48	7.121E-03	1836.06	99.200	1.101E+00	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	
297.15	74.27	800.	121.	2.944E+03	34.24	0.985	-	sD
309.32	77.31	788.	188.	4.427E+03	22.42	0.988	-	sD
631.11	157.90	255.	43.	1.026E+03	58.27	0.475	-	s
652.13	163.16	322.	69.	1.680E+03	43.92	0.739	-	s
3780.92	945.45	85.	17.	1.443E+03	91.82	0.726	-	sc

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	4170.	17986.	9.992	0.90	0.959D
TH-227	200.26	50.14	3521.	110.	0.061	76.95	0.962D
AM-241	237.89	59.55	4584.	26376.	14.653	0.82	1.002
TH-234	252.82	63.29	36169.	-147.	-0.082	146.45	0.975
Sn-126	256.79	64.28	35962.	-122.	-0.068	220.14	0.976s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	323.60	80.99	3276.	65.	0.036	125.34	0.991s
Np-237	345.59	86.49	6150.	-23.	-0.013	491.53	0.996s
EU-155	345.80	86.54	1988.	-33.	-0.018	193.80	0.996s
Sn-126	347.39	86.94	1907.	48.	0.027	129.75	0.997
Sn-126	349.91	87.57	1756.	67.	0.037	66.07	0.997D
Cd-109	351.79	88.04	1752.	67.	0.037	89.24	0.998A
Nd-147	364.02	91.10	2829.	68.	0.038	112.08	1.001
TH-234	369.98	92.59	2750.	22.	0.012	337.93	1.002s
AC-228	373.02	93.35	6241.	-65.	-0.036	171.37	1.003
Gd-153	389.61	97.50	6176.	-66.	-0.036	169.82	1.007s
Np-239	397.61	99.50	6110.	-66.	-0.037	168.61	1.008s
Gd-153	412.40	103.20	6045.	-66.	-0.037	167.17	1.012
Np-239	414.40	103.70	5989.	-26.	-0.014	425.05	1.012s
Np-239	424.11	106.13	5448.	64.	0.035	164.74	1.014s
EU-152	486.67	121.78	1138.	56.	0.031	86.98	1.029s
CO-57	487.81	122.06	1193.	0.	0.000	1000.00	1.029
EU-154	491.96	123.10	1326.	-32.	-0.018	233.80	1.030s
PA-234	524.73	131.29	4116.	-62.	-0.034	147.30	1.038s
HF-181	531.64	133.02	4178.	-62.	-0.034	148.17	1.039s
CE-144	533.70	133.54	4240.	-62.	-0.034	149.19	1.040s
HF-181	544.74	136.30	4302.	-62.	-0.034	149.90	1.042s
CO-57	545.43	136.47	4364.	-62.	-0.034	150.97	1.042
Tc-99m	561.57	140.51	4426.	-47.	-0.026	200.25	1.046s
U-235	574.67	143.79	4203.	23.	0.013	398.30	1.049s
CE-141	581.29	145.44	3960.	61.	0.034	146.51	1.050s
Ba-140	650.14	162.66	1408.	53.	0.030	100.73	1.066s
U-235	653.01	163.38	1322.	-59.	-0.033	87.47	1.067s
CE-139	662.90	165.85	1486.	-58.	-0.032	94.85	1.069s
Cf-251	705.88	176.60	792.	32.	0.018	165.48	1.079s
TH-229	773.49	193.51	924.	-17.	-0.009	335.40	1.094s
U-235	820.76	205.33	906.	-60.	-0.034	94.14	1.105s
TH-229	842.82	210.85	899.	-31.	-0.017	292.72	1.110s
Cf-251	907.40	227.00	796.	-22.	-0.012	244.51	1.125s
PB-212	954.33	238.74	571.	202.	0.112	24.63	1.529s
PB-214	967.37	242.00	1777.	-55.	-0.031	109.00	1.139
EU-152	978.14	244.69	1781.	-57.	-0.032	105.44	1.141
TH-227	1024.32	256.24	760.	-33.	-0.019	148.31	1.152
Cd-113m	1054.15	263.70	962.	-38.	-0.021	118.13	1.158
BI-210M	1062.67	265.83	901.	43.	0.024	99.89	1.160
TL-208	1108.46	277.28	831.	-40.	-0.022	103.97	1.171
Hg-203	1116.13	279.20	957.	12.	0.007	355.87	1.173s
I-131	1136.52	284.30	556.	48.	0.027	97.55	1.177
PB-214	1180.52	295.30	425.	82.	0.046	50.45	0.361s
PB-212	1199.42	300.03	2690.	-51.	-0.028	43.58	1.191s
PA-231	1199.58	300.07	2674.	-33.	-0.018	223.25	1.192s
PA-231	1209.90	302.65	2640.	20.	0.011	361.01	1.194s
BA-133	1210.70	302.85	2653.	33.	0.018	219.87	1.194s
Ir-192	1233.05	308.44	1586.	48.	0.027	117.63	1.199s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	1247.34	312.01	1634.	48.	0.027	120.34	1.202s
Ir-192	1265.24	316.49	1559.	47.	0.026	120.84	1.206s
CR-51	1279.62	320.08	1729.	-24.	-0.013	247.57	1.210s
La-140	1314.31	328.76	2534.	-52.	-0.029	136.72	1.217s
Cf-249	1333.02	333.44	2481.	-53.	-0.029	134.85	1.222s
AC-228	1353.24	338.50	396.	95.	0.053	43.89	1.014s
Cs-136	1361.54	340.57	2429.	-53.	-0.029	132.72	1.228s
EU-152	1376.40	344.29	2486.	-54.	-0.030	28.92	1.231s
HF-181	1382.56	345.83	2565.	-54.	-0.030	28.78	1.233s
PB-214	1406.97	351.93	329.	96.	0.053	28.77	1.238D
BA-133	1423.24	356.00	1010.	-49.	-0.027	93.01	1.242s
I-131	1457.16	364.48	569.	-52.	-0.029	63.76	1.250s
BA-133	1534.57	383.84	1431.	-54.	-0.030	41.71	1.267s
Cf-249	1551.01	387.95	1484.	-54.	-0.030	102.32	1.271s
SN-113	1565.96	391.69	1437.	23.	0.013	235.29	1.274s
SB-125	1710.67	427.88	563.	52.	0.029	94.91	1.307
AG-108M	1734.91	433.94	581.	20.	0.011	242.92	1.312
pm-146	1814.67	453.88	624.	18.	0.010	284.26	1.330s
SB-125	1852.61	463.37	1212.	-48.	-0.026	103.09	1.338s
Ir-192	1871.38	468.06	1287.	-61.	-0.034	84.62	1.342s
BE-7	1909.51	477.60	1409.	-55.	-0.030	89.89	1.351s
HF-181	1927.12	482.00	1094.	48.	0.027	98.45	1.355s
La-140	1947.21	487.02	1182.	27.	0.015	184.34	1.359
RU-103	1987.33	497.05	403.	17.	0.009	244.84	1.368s
Nd-147	2123.10	531.00	234.	18.	0.010	176.45	1.398s
Ba-140	2148.14	537.26	360.	-35.	-0.020	116.58	1.404s
CS-134	2252.03	563.24	282.	-6.	-0.003	714.22	1.427s
CS-134	2276.36	569.32	316.	-19.	-0.011	132.07	1.432s
BI-207	2277.89	569.70	344.	3.	0.002	788.41	1.432s
TL-208	2332.30	583.31	175.	94.	0.052	31.35	1.813s
SB-125	2401.07	600.50	881.	36.	0.020	119.36	1.460s
SB-124	2409.99	602.73	916.	36.	0.020	121.53	1.462s
CS-134	2417.91	604.71	952.	26.	0.014	168.42	1.463s
BI-214	2437.05	609.50	89.	88.	0.049	21.71	1.303
RU-103	2440.26	610.30	978.	0.	0.000	1000.00	1.468
AG-108M	2456.19	614.28	1014.	-40.	-0.022	114.75	1.472s
PM-144	2471.31	618.06	1135.	-30.	-0.017	160.53	1.475
RH-106	2486.73	621.92	1047.	36.	0.020	128.30	1.479s
SB-125	2542.62	635.89	239.	27.	0.015	124.34	1.491
I-131	2546.96	636.97	364.	-41.	-0.023	67.38	1.492
AG-110M	2630.10	657.76	9109.	-25.	-0.014	547.55	1.510s
CS-137	2646.33	661.82	209.	8717.	4.843	1.15	1.540
PM-144	2785.22	696.54	352.	-38.	-0.021	72.47	1.544s
NB-94	2809.57	702.63	356.	32.	0.018	84.38	1.549s
SB-124	2890.19	722.79	370.	3.	0.002	817.56	1.567s
AG-108M	2890.80	722.94	373.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	373.	0.	0.000	1000.00	1.567s
BI-212	2907.73	727.17	331.	32.	0.018	83.11	1.570s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2987.69	747.16	187.	3.	0.002	871.21	1.588
ZR-95	3025.97	756.73	168.	33.	0.018	84.38	1.596s
NB-95	3062.21	765.79	260.	0.	0.000	1000.00	1.604
PA-234M	3064.70	766.41	260.	-40.	-0.022	66.13	1.605s
EU-152	3114.73	778.92	149.	32.	0.018	83.51	1.615
BI-212	3140.74	785.42	169.	28.	0.016	98.38	1.621s
CS-134	3182.53	795.87	399.	-38.	-0.021	76.72	1.630
CS-134	3206.86	801.95	452.	39.	0.021	79.59	1.635s
CO-58	3242.16	810.78	477.	-42.	-0.023	75.19	1.643s
La-140	3262.14	815.77	519.	-23.	-0.013	141.44	1.647s
Cs-136	3273.06	818.50	594.	14.	0.008	241.85	1.649
MN-54	3338.46	834.85	280.	-31.	-0.017	120.02	1.663s
Co-56	3386.15	846.77	235.	37.	0.021	92.56	1.674s
TL-208	3441.33	860.56	306.	-10.	-0.006	267.98	1.685
NB-94	3483.47	871.10	400.	-45.	-0.025	64.60	1.695s
EU-154	3492.00	873.23	403.	32.	0.018	91.57	1.696s
PA-234	3521.21	880.53	872.	-50.	-0.028	84.31	1.703s
PA-234	3532.05	883.24	821.	-50.	-0.028	81.80	1.705s
AG-110M	3537.82	884.68	675.	-47.	-0.026	78.77	1.706s
Sc-46	3556.69	889.40	158.	104.	0.058	29.29	2.160s
y-88	3591.26	898.04	270.	-21.	-0.012	135.57	1.718s
AC-228	3643.09	911.00	192.	84.	0.047	38.87	1.338
AG-110M	3749.09	937.49	375.	-53.	-0.029	81.89	1.751s
PA-234	3783.21	946.02	272.	44.	0.024	55.69	1.759s
EU-152	3855.58	964.11	487.	33.	0.018	96.66	1.774
AC-228	3875.02	968.97	351.	39.	0.021	70.51	1.778s
EU-154	3984.48	996.33	536.	4.	0.002	820.06	1.801s
PA-234M	4003.15	1001.00	544.	-4.	-0.002	615.86	1.805s
EU-154	4018.27	1004.77	499.	33.	0.018	97.30	1.808s
Co-56	4150.56	1037.84	268.	-28.	-0.015	30.39	1.836s
Cs-136	4191.49	1048.07	358.	-46.	-0.025	60.61	1.845s
RH-106	4200.65	1050.36	480.	-44.	-0.025	71.19	1.847s
BI-207	4253.86	1063.66	240.	-14.	-0.008	58.65	1.858s
Ga-68	4308.84	1077.40	261.	-37.	-0.021	99.78	1.870s
FE-59	4396.27	1099.25	262.	-12.	-0.007	72.70	1.888
EU-152	4447.58	1112.07	446.	38.	0.021	80.39	1.899
ZN-65	4461.46	1115.55	484.	21.	0.012	149.28	1.901
BI-214	4480.43	1120.29	508.	-3.	-0.002	286.01	1.906
Sc-46	4481.49	1120.55	450.	38.	0.021	80.40	1.906s
Ta-182	4484.49	1121.30	528.	-36.	-0.020	92.43	1.906s
CO-60	4693.53	1173.54	97.	3592.	1.995	1.84	1.876
Ta-182	4755.57	1189.05	136.	-23.	-0.013	120.73	1.963s
Ta-182	4885.06	1221.41	62.	6.	0.003	329.44	1.990s
Co-56	4952.57	1238.28	35.	3.	0.001	519.99	2.004s
NA-22	5097.62	1274.53	34.	8.	0.004	108.97	2.034s
EU-154	5097.68	1274.54	42.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	74.	-26.	-0.014	53.89	2.048s
CO-60	5330.99	1332.85	9.	3265.	1.814	1.76	1.985

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5631.75	1408.00	24.	-4.	-0.002	34.44	2.143s
K-40	5843.19	1460.83	28.	3.	0.002	398.61	2.186s
La-140	6385.02	1596.21	6.	8.	0.004	85.93	2.294s
SB-124	6764.37	1690.98	13.	5.	0.003	171.28	2.369s
BI-214	7058.61	1764.49	22.	9.	0.005	81.28	2.427s
Co-56	7086.08	1771.35	44.	-1.	-0.001	658.47	2.433s
y-88	7345.12	1836.06	0.	14.	0.008	26.73	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	-1.4753E+01				5.31E+01	
			477.60	-1.475E+01	&(P	4.805E+01 8.99E+01 1.05E+01	G
NA-22	C	4.7266E-01				9.50E+02	
			1274.53	4.727E-01	?(	1.766E+00 1.09E+02 9.99E+01	G
K-40	N	1.7531E+00				4.66E+11	
			1460.83	1.753E+00	?(P	1.688E+01 3.99E+02 1.07E+01	G
Sc-46	F	4.6694E+00				8.38E+01	
			889.28	4.669E+00	@(	2.763E+00 2.93E+01 1.00E+02	G
			1120.55	2.040E+00	-	5.439E+00 8.04E+01 1.00E+02	G
CR-51	F	-5.1073E+00				2.77E+01	
			320.08	-5.107E+00	&(	4.210E+01 2.48E+02 9.94E+00	G
MN-54	C	-1.3320E+00				3.12E+02	
			834.85	-1.332E+00	?(	3.467E+00 1.20E+02 1.00E+02	G
FE-59	F	-1.0986E+00				4.45E+01	
			1099.25	-1.099E+00	?(P	7.299E+00 7.27E+01 5.65E+01	G
			1291.60	-3.560E+00	+ P	5.900E+00 5.39E+01 4.32E+01	G
Co-56	C	1.6075E+00				7.73E+01	
			846.77	1.607E+00	?(	3.221E+00 9.26E+01 9.99E+01	G
			1238.28	2.333E-01	- P	2.659E+00 5.20E+02 6.61E+01	G
			1037.84	-9.876E+00	+ P	2.825E+01 3.04E+01 1.41E+01	G
			1771.35	-7.077E-01	-	1.656E+01 6.58E+02 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.7738E+00					7.09E+01	
			810.78	-1.774E+00	?(	4.416E+00	7.52E+01	9.95E+01 G
CO-60	F	1.9941E+02					1.93E+03	
			1332.50	1.994E+02	(	1.035E+00	1.76E+00	1.00E+02 G
			1173.24	1.994E+02	(P	2.701E+00	1.84E+00	9.99E+01 G
ZN-65	F	2.2227E+00					2.44E+02	
			1115.55	2.223E+00	&(	1.110E+01	1.49E+02	5.06E+01 G
NB-94	I	1.2474E+00					7.41E+06	
			702.63	1.247E+00	?(	3.497E+00	8.44E+01	9.79E+01 G
			871.10	-1.998E+00	+	4.258E+00	6.46E+01	9.99E+01 G
ZR-95	I	2.4412E+00					6.40E+01	
			756.73	2.441E+00	?(	4.627E+00	8.44E+01	5.45E+01 G
			724.20	1.313E-01	%	8.100E+00	1.82E+03	4.42E+01 G
RU-103	I	5.4226E-01					3.93E+01	
			497.05	5.423E-01	?(P	3.103E+00	2.45E+02	9.09E+01 G
			610.30	0.000E+00	&	8.793E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.2513E+01					3.74E+02	
			621.92	1.251E+01	?(	5.339E+01	1.28E+02	9.93E+00 G
			1050.36	-1.455E+02	+	3.426E+02	7.12E+01	1.56E+00 G
			511.86	2.993E-01	%	1.913E+01	3.51E+03	2.00E+01 GA
AG-108M	C	5.9637E-01					1.53E+05	
			433.94	5.964E-01	?(	3.373E+00	2.43E+02	9.05E+01 G
			722.94	0.000E+00	&	3.939E+00	1.00E+03	9.08E+01 G
			614.28	-1.509E+00	+	5.755E+00	1.15E+02	8.98E+01 G
AG-110M	F	-2.9296E+00					2.50E+02	
			884.68	-2.930E+00	?(	7.641E+00	7.88E+01	7.27E+01 G
			657.76	-9.381E-01	+	1.702E+01	5.48E+02	9.46E+01 G
			937.49	-7.191E+00	+	1.267E+01	8.19E+01	3.44E+01 G
			1384.30	-2.588E-01	%	5.819E+00	1.03E+03	2.43E+01 G
			763.94	1.805E-01	%	1.403E+01	2.28E+03	2.23E+01 G
SN-113	F	8.8061E-01					1.15E+02	
			391.69	8.806E-01	?(P	6.904E+00	2.35E+02	6.40E+01 G
SB-124	F	1.0962E+00					6.02E+01	
			602.73	1.221E+00	&(	4.938E+00	1.22E+02	9.83E+01 G
			1690.98	8.174E-01	?(	2.957E+00	1.71E+02	4.78E+01 G
			722.79	1.190E+00	&(	3.296E+01	8.18E+02	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	5.9347E+00					1.01E+03	
			427.88	4.580E+00	(P	1.006E+01	9.49E+01	2.96E+01 G
			600.50	6.693E+00	&(	2.657E+01	1.19E+02	1.79E+01 G
			635.89	8.282E+00	&(P	2.322E+01	1.24E+02	1.13E+01 G
			463.37	-1.264E+01	+ P	4.384E+01	1.03E+02	1.05E+01 G
I-131	I	-3.2869E-01					8.02E+00	
			364.48	-1.500E+00	&(P	3.259E+00	6.38E+01	8.17E+01 G
			284.30	1.526E+01	(P	3.589E+01	9.75E+01	6.14E+00 G
			636.97	-2.018E+01	+	4.492E+01	6.74E+01	7.17E+00 G
Gd-153	F	-2.5817E+00					2.42E+02	
			97.50	-2.582E+00	?(	1.451E+01	1.70E+02	3.00E+01 G
			103.20	-3.534E+00	&	1.956E+01	1.67E+02	2.18E+01 G
Ga-68	C	-6.8931E+01					4.71E-02	
			1077.40	-6.893E+01	?(	1.441E+02	9.98E+01	3.30E+00 G
Tc-99m	I	-6.6895E-01					2.51E-01	
			140.51	-6.689E-01	(	4.441E+00	2.00E+02	8.93E+01 G
BA-133	F	-5.5253E-01					3.85E+03	
			356.00	-1.812E+00	?(	5.588E+00	9.30E+01	6.20E+01 G
			302.85	3.712E+00	&(	2.711E+01	2.20E+02	1.83E+01 G
			383.84	-1.455E+01	+ P	4.861E+01	4.17E+01	8.94E+00 GA
			80.99	2.427E+00	&	1.008E+01	1.25E+02	3.41E+01 GA
CS-134	I	2.3422E+00					7.54E+02	
			604.71	9.039E-01	?(	5.076E+00	1.68E+02	9.76E+01 G
			795.87	-1.826E+00	+	4.641E+00	7.67E+01	8.55E+01 G
			569.32	-4.068E+00	&	1.801E+01	1.32E+02	1.54E+01 G
			801.95	1.850E+01	&(	4.882E+01	7.96E+01	8.69E+00 G
			563.24	-2.220E+00	+ P	3.112E+01	7.14E+02	8.35E+00 G
CS-137	I	3.6981E+02					1.10E+04	
			661.66	3.698E+02	(P	2.975E+00	1.15E+00	8.52E+01 G
CE-139	F	-9.7118E-01					1.38E+02	
			165.85	-9.712E-01	&(	3.051E+00	9.48E+01	7.99E+01 G
Ba-140	I	-1.2485E+00					1.28E+01	
			537.26	-4.496E+00	?(P	1.159E+01	1.17E+02	2.44E+01 G
			162.66	1.148E+01	?(	3.835E+01	1.01E+02	6.22E+00 G
			304.85	-9.145E-07	%	1.157E+02	3.80E+09	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	9.4025E-01					1.28E+01	
			1596.21	5.863E-01	?(	1.061E+00	8.59E+01	9.54E+01 G
			487.02	1.682E+00	&(	1.033E+01	1.84E+02	4.55E+01 G
			328.76	-5.598E+00	&	2.538E+01	1.37E+02	2.03E+01 G
			815.77	-4.177E+00	+	1.975E+01	1.41E+02	2.33E+01 G
CE-141	I	1.5829E+00					3.25E+01	
			145.44	1.583E+00	?(	7.683E+00	1.47E+02	4.82E+01 G
CE-144	I	-6.7290E+00					2.85E+02	
			133.54	-6.729E+00	&(	3.325E+01	1.49E+02	1.11E+01 G
PM-144	C	-1.4249E+00					3.63E+02	
			696.54	-1.425E+00	?(	3.418E+00	7.25E+01	9.90E+01 G
			618.06	-1.036E+00	+	5.540E+00	1.61E+02	9.91E+01 G
EU-152	F	-4.5635E+00					4.94E+03	
			344.29	-4.563E+00	?(P	1.991E+01	2.89E+01	2.65E+01 G
			1112.07	1.481E+01	+	3.948E+01	8.04E+01	1.36E+01 G
			121.78	2.280E+00	+	6.569E+00	8.70E+01	2.86E+01 G
			778.92	1.002E+01	+	1.881E+01	8.35E+01	1.29E+01 G
			964.11	1.076E+01	+	3.458E+01	9.67E+01	1.46E+01 G
			244.69	-1.324E+01	-	4.625E+01	1.05E+02	7.58E+00 G
			1408.00	-1.261E+00	+ P	7.766E+00	3.44E+01	2.10E+01 GA
EU-154	I	1.0018E+01					3.14E+03	
			873.23	1.145E+01	*(P	3.487E+01	9.16E+01	1.23E+01 G
			123.10	-9.183E-01	- P	4.974E+00	2.34E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.522E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	1.771E+01	1.00E+03	2.02E+01 G
			1004.77	9.042E+00	&(	2.927E+01	9.73E+01	1.80E+01 G
			996.33	1.850E+00	&	5.116E+01	8.20E+02	1.06E+01 G
EU-155	I	8.3904E-07					1.81E+03	
			105.31	8.390E-07	&(	2.002E+01	7.19E+08	2.12E+01 G
			86.54	-1.309E+00	+	8.434E+00	1.94E+02	3.07E+01 G
HF-181	F	1.7089E+00					4.24E+01	
			482.00	1.709E+00	?(	5.580E+00	9.84E+01	8.05E+01 G
			133.02	-1.720E+00	&	8.443E+00	1.48E+02	4.33E+01 G
			345.83	-8.119E+00	& P	3.567E+01	2.88E+01	1.51E+01 G
			136.30	-1.289E+01	+	6.400E+01	1.50E+02	5.85E+00 G
Ta-182	F	-5.4886E+00					1.14E+02	
			1121.30	-5.489E+00	?(	1.686E+01	9.24E+01	3.49E+01 G
			1221.41	1.200E+00	+	8.365E+00	3.29E+02	2.70E+01 G
			1189.05	-7.954E+00	+	1.973E+01	1.21E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	2.9244E-01					4.66E+01	
			279.20	2.924E-01	?(	3.482E+00	3.56E+02	8.15E+01 G
TL-208	N	3.6602E+00					6.98E+02	
			583.02	3.660E+00	(P	2.509E+00	3.13E+01	8.45E+01 G
			277.28	-1.208E+01	-	4.174E+01	1.04E+02	6.31E+00 G
			860.56	-3.710E+00	- P	2.982E+01	2.68E+02	1.24E+01 G
pm-146	C	6.3171E-01					2.02E+03	
			747.16	3.878E-01	?(	7.722E+00	8.71E+02	3.40E+01 G
			735.72	3.476E-01	%	1.097E+01	1.38E+03	2.25E+01 G
			453.88	7.593E-01	?(	5.025E+00	2.84E+02	6.50E+01 G
y-88	F	6.3393E-02					1.07E+02	
			898.04	-1.035E+00	&(P	3.841E+00	1.36E+02	9.37E+01 G
			1836.06	1.101E+00	?(	5.796E-01	2.67E+01	9.92E+01 G
Cd-113m		-1.1590E+04					5.33E+03	
			263.70	-1.159E+04	&(	4.552E+04	1.18E+02	6.00E-03 K
Cd-109	F	2.1571E+01					4.53E+02	
							Derived Ave Activity	
			88.04	2.157E+01	}(	6.371E+01	8.92E+01	3.79E+00 G
Cf-251	T	2.6295E+00					3.28E+05	
			176.60	2.630E+00	?(	1.100E+01	1.65E+02	1.70E+01 G
			227.00	-5.734E+00	+	3.550E+01	2.45E+02	6.30E+00 GA
Cf-249	T	-1.9918E+00					1.28E+05	
			387.95	-1.992E+00	&(	6.756E+00	1.02E+02	6.60E+01 G
			333.44	-7.427E+00	&	3.321E+01	1.35E+02	1.55E+01 G
Sn-126		-1.9295E+01					3.65E+07	
			87.57	2.196E+00	}	6.461E+00	6.61E+01	3.75E+01 GA
			64.28	-1.929E+01	&(	1.403E+02	2.20E+02	9.70E+00 G
			86.94	6.505E+00	&	2.801E+01	1.30E+02	9.04E+00 GA
PB-210	N	9.9952E+03					8.14E+03	
			46.54	9.995E+03	(P	1.687E+02	9.02E-01	4.25E+00 G
PB-212	N	8.0397E+00					6.98E+02	
			238.63	8.040E+00	*(P	4.552E+00	2.46E+01	4.33E+01 G
			300.03	-3.139E+01	& P	1.515E+02	4.36E+01	3.28E+00 GA
PB-214	N	6.7298E+00					5.84E+05	
			351.93	5.802E+00	(P	5.293E+00	2.88E+01	3.76E+01 G
			295.09	8.538E+00	(	1.028E+01	5.04E+01	1.93E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          242.00-1.294E+01 -   4.676E+01 1.09E+02 7.43E+00 GA

BI-207   C   1.1042E-01                                     1.18E+04
                          569.70 1.104E-01 ?(  2.951E+00 7.88E+02 9.77E+01 G
                         1063.66-9.986E-01 + P 5.183E+00 5.86E+01 7.45E+01 G

BI-212   N   1.6275E+01                                     6.98E+02
                          727.17 1.628E+01  (P 4.489E+01 8.31E+01 7.55E+00 G
                          785.42 9.139E+01 & P 2.027E+02 9.84E+01 1.28E+00 GA

BI-214   N   6.4705E+00                                     5.84E+05
                          609.31 6.471E+00  (P 3.451E+00 2.17E+01 4.61E+01 G
                         1120.29-1.116E+00 - P 3.822E+01 2.86E+02 1.51E+01 G
                         1764.49 4.374E+00 - P 1.197E+01 8.13E+01 1.54E+01 G

BI-210M  T   1.6040E+00                                     1.10E+09
                          265.83 1.604E+00 &(  5.319E+00 9.99E+01 5.00E+01 G
                          304.90 1.401E-07 %   1.772E+01 3.80E+09 2.80E+01 G

AC-228   N   1.3393E+01                                     2.10E+03
                          911.07 1.334E+01  (  1.063E+01 3.89E+01 2.90E+01 G
                          968.97 1.062E+01 ?(  2.477E+01 7.05E+01 1.75E+01 G
                          338.32 1.756E+01 *(  1.761E+01 4.39E+01 1.20E+01 G
                           93.35-1.404E+01 -   7.966E+01 1.71E+02 5.56E+00 XA

TH-227   N   2.8860E+01                                     7.95E+03
                           50.14 2.886E+01 &(  7.333E+01 7.70E+01 8.00E+00 G
                          256.24-8.692E+00 + P 3.406E+01 1.48E+02 7.00E+00 G

TH-229   N  -5.7551E+00                                     2.68E+06
                          193.51-5.755E+00 ?(  4.887E+01 3.35E+02 4.40E+00 G
                          210.85-1.660E+01 + P 7.540E+01 2.93E+02 2.99E+00 G

TH-234   N  -6.0146E+01                                     1.63E+12
                           63.29-6.015E+01 ?(P 3.640E+02 1.46E+02 3.81E+00 G
                           92.59 4.721E+00 + P 5.300E+01 3.38E+02 5.58E+00 G

PA-231   N   1.4328E+01                                     1.20E+07
                          302.65 1.433E+01 &(  1.720E+02 3.61E+02 2.88E+00 G
                          300.07-2.717E+01 &   2.015E+02 2.23E+02 2.46E+00 G

PA-233   C   2.7803E+00                                     7.82E+08
                          312.01 2.780E+00 ?(P 1.110E+01 1.20E+02 3.60E+01 G
                          300.18-2.503E-06 %   8.044E+01 9.64E+08 6.20E+00 G

PA-234   N   4.1840E+00                                     1.63E+12
                          131.29-4.113E+00 ?(  2.007E+01 1.47E+02 1.80E+01 G
                          946.02 1.533E+01 ?(P 2.801E+01 5.57E+01 1.34E+01 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47 9.210E-01 %   3.515E+01 1.12E+03 8.20E+00 G
                          883.24-2.348E+01 &   6.360E+01 8.18E+01 9.60E+00 G
                          880.53-3.743E+01 +   1.045E+02 8.43E+01 6.00E+00 GA

PA-234M  N  -2.3354E+01                                     1.63E+12
                         1001.00-2.335E+01 ?(P 6.549E+02 6.16E+02 8.37E-01 G
                          766.41-5.467E+02 + P 1.067E+03 6.61E+01 2.94E-01 G

U-235    N   2.6163E+00                                     2.57E+11
                          143.79 2.616E+00 &(P 3.460E+01 3.98E+02 1.10E+01 G
                          205.33-1.872E+01 +   4.431E+01 9.41E+01 5.01E+00 G
                          163.38-1.577E+01 +   4.566E+01 8.75E+01 5.08E+00 G

AM-241   T   1.2270E+03                                     1.58E+05
                           59.54 1.227E+03  (P 1.480E+01 8.15E-01 3.59E+01 G

Np-237   F  -2.1215E+00                                     2.14E+06
                           86.49-2.121E+00 ?(  3.458E+01 4.92E+02 1.31E+01 G

Ir-192   F   1.6705E+00                                     7.40E+01
                          316.49 1.130E+00 ?(  4.533E+00 1.21E+02 8.70E+01 G
                          468.06-3.286E+00 +   9.204E+00 8.46E+01 5.18E+01 G
                          308.44 3.151E+00 ?(  1.230E+01 1.18E+02 3.18E+01 G

Cs-136   F   6.0677E-01                                     1.30E+01
                          818.50 6.068E-01 ?(  4.921E+00 2.42E+02 1.00E+02 G
                         1048.07-2.897E+00 &   5.783E+00 6.06E+01 8.00E+01 G
                          340.57-2.507E+00 +   1.104E+01 1.33E+02 4.69E+01 G

Np-239   T   3.2617E+00                                     2.36E+00
                          103.70-1.254E+00 &   1.768E+01 4.25E+02 2.40E+01 X
                          106.13 3.262E+00 ?(  1.779E+01 1.65E+02 2.27E+01 G
                           99.50-5.151E+00 +   2.875E+01 1.69E+02 1.50E+01 X

Nd-147       3.2984E+00                                     1.11E+01
                          531.00 4.224E+00 &(  1.750E+01 1.76E+02 1.30E+01 G
                           91.10 2.873E+00 &(  1.066E+01 1.12E+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-234	63.29	36169.	-147.	-0.082	146.45	-6.015E+01	P
Np-237	86.49	6150.	-23.	-0.013	491.53	-2.121E+00	
EU-155	86.54	1988.	-33.	-0.018	193.80	-1.309E+00	
TH-234	92.59	2750.	22.	0.012	337.93	4.721E+00	P
Gd-153	97.50	6176.	-66.	-0.036	169.82	-2.582E+00	
Np-239	99.50	6110.	-66.	-0.037	168.61	-5.151E+00	
Gd-153	103.20	6045.	-66.	-0.037	167.17	-3.534E+00	
Np-239	103.70	5989.	-26.	-0.014	425.05	-1.254E+00	
Np-239	106.13	5448.	64.	0.035	164.74	3.262E+00	
EU-154	123.10	1326.	-32.	-0.018	233.80	-9.183E-01	P
PA-234	131.29	4116.	-62.	-0.034	147.30	-4.113E+00	
HF-181	133.02	4178.	-62.	-0.034	148.17	-1.720E+00	
CE-144	133.54	4240.	-62.	-0.034	149.19	-6.729E+00	
HF-181	136.30	4302.	-62.	-0.034	149.90	-1.289E+01	
CO-57	136.47	4364.	-62.	-0.034	150.97	-7.063E+00	
Tc-99m	140.51	4426.	-47.	-0.026	200.25	-6.689E-01	
U-235	143.79	4203.	23.	0.013	398.30	2.616E+00	P
CE-141	145.44	3960.	61.	0.034	146.51	1.583E+00	
Ba-140	162.66	1408.	53.	0.030	100.73	1.148E+01	
U-235	163.38	1322.	-59.	-0.033	87.47	-1.577E+01	
CE-139	165.85	1486.	-58.	-0.032	94.85	-9.712E-01	
Cf-251	176.60	792.	32.	0.018	165.48	2.630E+00	
TH-229	193.51	924.	-17.	-0.009	335.40	-5.755E+00	
U-235	205.33	906.	-60.	-0.034	94.14	-1.872E+01	
TH-229	210.85	899.	-31.	-0.017	292.72	-1.660E+01	P
Cf-251	227.00	796.	-22.	-0.012	244.51	-5.734E+00	
Cd-113m	263.70	962.	-38.	-0.021	118.13	-1.159E+04	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	901.	43.	0.024	99.89	1.604E+00	
Hg-203	279.20	957.	12.	0.007	355.87	2.924E-01	
PA-231	300.07	2674.	-33.	-0.018	223.25	-2.717E+01	
PA-231	302.65	2640.	20.	0.011	361.01	1.433E+01	
Ir-192	308.44	1586.	48.	0.027	117.63	3.151E+00	
PA-233	312.01	1634.	48.	0.027	120.34	2.780E+00	P
Ir-192	316.49	1559.	47.	0.026	120.84	1.130E+00	
CR-51	320.08	1729.	-24.	-0.013	247.57	-5.107E+00	
La-140	328.76	2534.	-52.	-0.029	136.72	-5.598E+00	
Cf-249	333.44	2481.	-53.	-0.029	134.85	-7.427E+00	
Cs-136	340.57	2429.	-53.	-0.029	132.72	-2.507E+00	
HF-181	345.83	2565.	-54.	-0.030	28.78	-8.119E+00	P
Cf-249	387.95	1484.	-54.	-0.030	102.32	-1.992E+00	
SN-113	391.69	1437.	23.	0.013	235.29	8.806E-01	P
SB-125	427.88	563.	52.	0.029	94.91	4.580E+00	P
AG-108M	433.94	581.	20.	0.011	242.92	5.964E-01	
SB-125	463.37	1212.	-48.	-0.026	103.09	-1.264E+01	P
Ir-192	468.06	1287.	-61.	-0.034	84.62	-3.286E+00	
BE-7	477.60	1409.	-55.	-0.030	89.89	-1.475E+01	P
HF-181	482.00	1094.	48.	0.027	98.45	1.709E+00	
La-140	487.02	1182.	27.	0.015	184.34	1.682E+00	
RU-103	497.05	403.	17.	0.009	244.84	5.423E-01	P
Ba-140	537.26	360.	-35.	-0.020	116.58	-4.496E+00	P
CS-134	563.24	282.	-6.	-0.003	714.22	-2.220E+00	P
CS-134	569.32	316.	-19.	-0.011	132.07	-4.068E+00	
BI-207	569.70	344.	3.	0.002	788.41	1.104E-01	
SB-125	600.50	881.	36.	0.020	119.36	6.693E+00	
SB-124	602.73	916.	36.	0.020	121.53	1.221E+00	
CS-134	604.71	952.	26.	0.014	168.42	9.039E-01	
AG-108M	614.28	1014.	-40.	-0.022	114.75	-1.509E+00	
PM-144	618.06	1135.	-30.	-0.017	160.53	-1.036E+00	
RH-106	621.92	1047.	36.	0.020	128.30	1.251E+01	
SB-125	635.89	239.	27.	0.015	124.34	8.282E+00	P
AG-110M	657.76	9109.	-25.	-0.014	547.55	-9.381E-01	
PM-144	696.54	352.	-38.	-0.021	72.47	-1.425E+00	
SB-124	722.79	370.	3.	0.002	817.56	1.190E+00	
BI-212	727.17	331.	32.	0.018	83.11	1.628E+01	P
PA-234M	766.41	260.	-40.	-0.022	66.13	-5.467E+02	P
BI-212	785.42	169.	28.	0.016	98.38	9.139E+01	P
CS-134	795.87	399.	-38.	-0.021	76.72	-1.826E+00	
CS-134	801.95	452.	39.	0.021	79.59	1.850E+01	
CO-58	810.78	477.	-42.	-0.023	75.19	-1.774E+00	
La-140	815.77	519.	-23.	-0.013	141.44	-4.177E+00	
Cs-136	818.50	594.	14.	0.008	241.85	6.068E-01	
MN-54	834.85	280.	-31.	-0.017	120.02	-1.332E+00	
EU-154	873.23	403.	32.	0.018	91.57	1.145E+01	P
PA-234	880.53	872.	-50.	-0.028	84.31	-3.743E+01	
PA-234	883.24	821.	-50.	-0.028	81.80	-2.348E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	884.68	675.	-47.	-0.026	78.77	-2.930E+00		
y-88	898.04	270.	-21.	-0.012	135.57	-1.035E+00		P
AG-110M	937.49	375.	-53.	-0.029	81.89	-7.191E+00		
PA-234	946.02	272.	44.	0.024	55.69	1.533E+01		P
EU-154	996.33	536.	4.	0.002	820.06	1.850E+00		
PA-234M	1001.00	544.	-4.	-0.002	615.86	-2.335E+01		P
EU-154	1004.77	499.	33.	0.018	97.30	9.042E+00		
Cs-136	1048.07	358.	-46.	-0.025	60.61	-2.897E+00		
RH-106	1050.36	480.	-44.	-0.025	71.19	-1.455E+02		
BI-207	1063.66	240.	-14.	-0.008	58.65	-9.986E-01		P
Ga-68	1077.40	261.	-37.	-0.021	99.78	-6.893E+01		
FE-59	1099.25	262.	-12.	-0.007	72.70	-1.099E+00		P
ZN-65	1115.55	484.	21.	0.012	149.28	2.223E+00		
Ta-182	1121.30	528.	-36.	-0.020	92.43	-5.489E+00		
Ta-182	1189.05	136.	-23.	-0.013	120.73	-7.954E+00		
Ta-182	1221.41	62.	6.	0.003	329.44	1.200E+00		
NA-22	1274.53	34.	8.	0.004	108.97	4.727E-01		
FE-59	1291.60	74.	-26.	-0.014	53.89	-3.560E+00		P
La-140	1596.21	6.	8.	0.004	85.93	5.863E-01		
SB-124	1690.98	13.	5.	0.003	171.28	8.174E-01		
y-88	1836.06	0.	14.	0.008	26.73	1.101E+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	-1.4753E+01	-1.4753E+01	8.989E+01%	4.81E+01
NA-22	#A	4.7266E-01	4.7266E-01	1.090E+02%	1.77E+00
K-40	#A	1.7531E+00	1.7531E+00	3.986E+02%	1.69E+01
Sc-46	#	4.6694E+00	4.6694E+00	2.929E+01%	2.76E+00
CR-51	#A	-5.1073E+00	-5.1073E+00	2.476E+02%	4.21E+01
MN-54	#A	-1.3320E+00	-1.3320E+00	1.200E+02%	3.47E+00
FE-59	#A	-1.0986E+00	-1.0986E+00	7.270E+01%	7.30E+00
Co-56	#A	1.6075E+00	1.6075E+00	9.256E+01%	3.22E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.25E+00
CO-58	#A	-1.7738E+00	-1.7738E+00	7.519E+01%	4.42E+00
CO-60		1.9941E+02	1.9941E+02	1.273E+00%	1.04E+00
ZN-65	#A	2.2227E+00	2.2227E+00	1.493E+02%	1.11E+01
NB-94	#A	1.2474E+00	1.2474E+00	8.438E+01%	3.50E+00
ZR-95	#A	2.4412E+00	2.4412E+00	8.438E+01%	4.63E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.14E+00
RU-103	#A	5.4225E-01	5.4226E-01	2.448E+02%	3.10E+00
RH-106	#A	1.2513E+01	1.2513E+01	1.283E+02%	5.34E+01
AG-108M	#A	5.9637E-01	5.9637E-01	2.429E+02%	3.37E+00
AG-110M	#A	-2.9296E+00	-2.9296E+00	7.877E+01%	7.64E+00

SN-113 #A	8.8061E-01	8.8061E-01	2.353E+02%		6.90E+00
SB-124 #A	1.0962E+00	1.0962E+00	1.215E+02%		4.94E+00
SB-125 #A	5.9347E+00	5.9347E+00	6.559E+01%		1.01E+01
I-131 A	-3.2867E-01	-3.2869E-01	5.827E+01%		3.26E+00
Gd-153 #A	-2.5817E+00	-2.5817E+00	1.698E+02%		1.45E+01
Ga-68 #A	-6.8486E+01	-6.8931E+01	9.978E+01%		1.44E+02
Tc-99m #A	-6.6814E-01	-6.6895E-01	2.002E+02%		4.44E+00
BA-133 #A	-5.5253E-01	-5.5253E-01	9.301E+01%		5.59E+00
CS-134 #A	2.3422E+00	2.3422E+00	7.959E+01%		5.08E+00
CS-137	3.6981E+02	3.6981E+02	1.152E+00%		2.98E+00
CE-139 #A	-9.7118E-01	-9.7118E-01	9.485E+01%		3.05E+00
Ba-140 #A	-1.2484E+00	-1.2485E+00	7.704E+01%		1.16E+01
La-140 #A	9.4023E-01	9.4025E-01	8.593E+01%		1.06E+00
CE-141 #A	1.5829E+00	1.5829E+00	1.465E+02%		7.68E+00
CE-144 #A	-6.7290E+00	-6.7290E+00	1.492E+02%		3.33E+01
PM-144 #A	-1.4249E+00	-1.4249E+00	7.247E+01%		3.42E+00
EU-152 A	-4.5635E+00	-4.5635E+00	2.892E+01%		1.99E+01
EU-154 #A	1.0018E+01	1.0018E+01	6.681E+01%		3.49E+01
EU-155 #A	8.3904E-07	8.3904E-07	7.188E+08%		2.00E+01
HF-181 #A	1.7089E+00	1.7089E+00	9.845E+01%		5.58E+00
Ta-182 #A	-5.4886E+00	-5.4886E+00	9.243E+01%		1.69E+01
Hg-203 #A	2.9244E-01	2.9244E-01	3.559E+02%		3.48E+00
TL-208	3.6602E+00	3.6602E+00	3.135E+01%		2.51E+00
pm-146 #A	6.3171E-01	6.3171E-01	2.843E+02%		7.72E+00
y-88 #A	6.3393E-02	6.3393E-02	2.673E+01%		3.84E+00
Cd-113m#A	-1.1590E+04	-1.1590E+04	1.181E+02%		4.55E+04
Cd-109 #A	2.1571E+01	2.1571E+01	8.924E+01%		6.37E+01
Cf-251 #A	2.6295E+00	2.6295E+00	1.655E+02%		1.10E+01
Cf-249 #A	-1.9918E+00	-1.9918E+00	1.023E+02%		6.76E+00
Sn-126 A	-1.9295E+01	-1.9295E+01	2.201E+02%		1.40E+02
PB-210	9.9952E+03	9.9952E+03	9.022E-01%		1.69E+02
PB-212 #	8.0397E+00	8.0397E+00	2.463E+01%		4.55E+00
PB-214	6.7298E+00	6.7298E+00	2.877E+01%		5.29E+00
BI-207 #A	1.1042E-01	1.1042E-01	7.884E+02%		2.95E+00
BI-212 #A	1.6275E+01	1.6275E+01	8.311E+01%		4.49E+01
BI-214	6.4705E+00	6.4705E+00	2.171E+01%		3.45E+00
BI-210M#A	1.6040E+00	1.6040E+00	9.989E+01%		5.32E+00
AC-228	1.3393E+01	1.3393E+01	3.057E+01%		1.06E+01
TH-227 #A	2.8860E+01	2.8860E+01	7.695E+01%		7.33E+01
TH-229 #A	-5.7551E+00	-5.7551E+00	3.354E+02%		4.89E+01
TH-234 #A	-6.0146E+01	-6.0146E+01	1.464E+02%		3.64E+02
PA-231 #A	1.4328E+01	1.4328E+01	3.610E+02%		1.72E+02
PA-233 #A	2.7803E+00	2.7803E+00	1.203E+02%		1.11E+01
PA-234 #A	4.1840E+00	4.1840E+00	5.569E+01%		2.01E+01
PA-234M#A	-2.3354E+01	-2.3354E+01	6.159E+02%		6.55E+02
U-235 #A	2.6163E+00	2.6163E+00	3.983E+02%		3.46E+01
AM-241	1.2270E+03	1.2270E+03	8.151E-01%		1.48E+01
Np-237 #A	-2.1215E+00	-2.1215E+00	4.915E+02%		3.46E+01
Ir-192 #A	1.6705E+00	1.6705E+00	8.432E+01%		4.53E+00

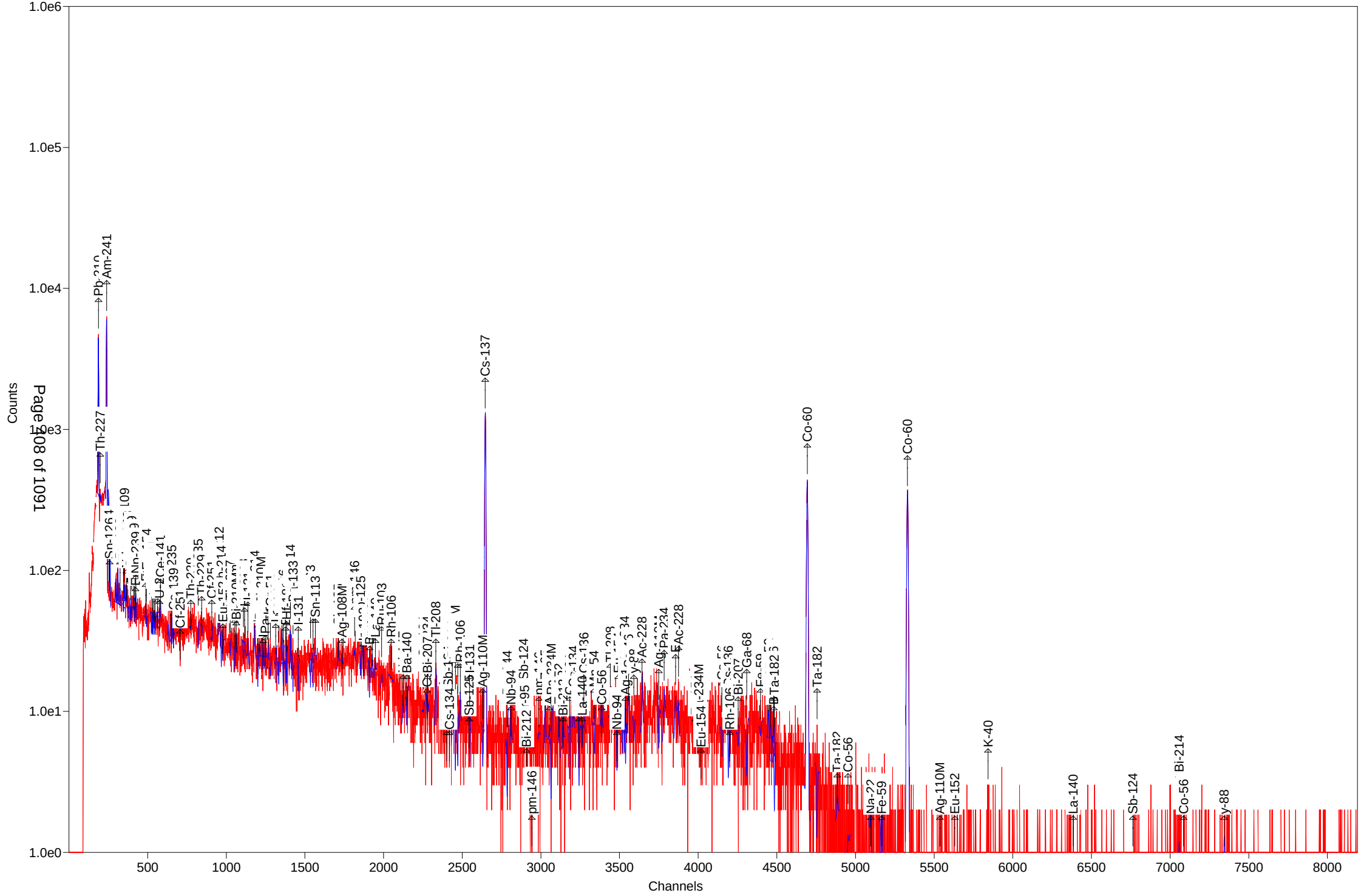
Cs-136 #A	6.0676E-01	6.0677E-01	2.418E+02%	4.92E+00
Np-239 #A	3.2613E+00	3.2617E+00	1.647E+02%	1.78E+01
Nd-147 #A	3.2983E+00	3.2984E+00	1.045E+02%	1.75E+01

- 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) 1.184E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 1.1838476E+04 Bq/Sample

264540_Gamma_LCS 160-264540~2-A. 16_Gamma_20162109.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161067

Sample Description: 264540_Gamma_160-18553-A-1-B
Detector: Detector #15
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-1-B

Decay to Time: 9/1/2016 14:33 Live Time: 1800 sec
Acquisition Time: 9/1/2016 14:33:32 Real Time: 1803 sec
Analysis Time: 9/1/2016 15:04 Dead Time: 0.14 %
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	4.059E+00	109.9	4.461E+00	4.466E+00	1.510E+01
NA-22	-1.768E+00	54.0	9.544E-01	9.585E-01	3.105E+00
K-40	2.210E+02	6.5	1.427E+01	1.821E+01	1.033E+01
Sc-46	6.110E-01	95.7	5.845E-01	5.854E-01	1.984E+00
CR-51	4.086E+00	158.4	6.474E+00	6.477E+00	2.178E+01
MN-54	-8.389E-01	94.2	7.903E-01	7.915E-01	1.825E+00
FE-59	3.582E-01	282.0	1.010E+00	1.010E+00	2.409E+00
Co-56	7.792E-01	84.9	6.618E-01	6.630E-01	1.004E+00
CO-57	1.856E-01	187.0	3.471E-01	3.472E-01	1.174E+00
CO-58	6.313E-01	86.7	5.475E-01	5.484E-01	1.847E+00
CO-60	5.924E-01	86.9	5.145E-01	5.154E-01	1.184E+00
ZN-65	1.609E+00	95.6	1.539E+00	1.541E+00	5.212E+00
NB-94	1.008E-01	71.4	7.193E-02	7.212E-02	1.516E+00
ZR-95	5.310E-01	96.4	5.116E-01	5.124E-01	1.275E+00
NB-95	-8.819E-01	76.6	6.753E-01	6.769E-01	2.252E+00
RU-103	9.765E-02	519.2	5.070E-01	5.071E-01	1.262E+00
RH-106	-5.645E+00	196.3	1.108E+01	1.109E+01	3.737E+01
AG-108M	-7.355E-01	90.4	6.645E-01	6.656E-01	1.633E+00
AG-110M	6.831E-01	39.4	2.689E-01	2.711E-01	3.300E+00
SN-113	-2.136E-01	442.3	9.447E-01	9.447E-01	2.634E+00
SB-124	4.348E-01	226.8	9.861E-01	9.863E-01	2.996E+00
SB-125	8.416E-01	70.8	5.962E-01	5.978E-01	4.592E+00
I-131	5.528E-02	316.4	1.749E-01	1.749E-01	1.278E+00
Gd-153	-1.502E+00	149.5	2.246E+00	2.248E+00	7.478E+00
Ga-68	1.289E+01	176.1	2.270E+01	2.271E+01	5.353E+01
Tc-99m	0.000E+00	1.#INF	2.957E-01	2.957E-01	2.382E+00
BA-133	2.985E-01	153.1	4.571E-01	4.574E-01	3.563E+00
CS-134	6.358E-01	92.4	5.874E-01	5.883E-01	3.091E+00
CS-137	-1.232E-01	970.3	1.196E+00	1.196E+00	1.961E+00
CE-139	-6.492E-02	651.4	4.229E-01	4.229E-01	1.444E+00
Ba-140	-1.014E+00	75.8	7.681E-01	7.699E-01	6.056E+00
La-140	2.431E-01	258.2	6.275E-01	6.276E-01	1.503E+00
CE-141	-5.735E-01	135.6	7.775E-01	7.780E-01	1.993E+00

CE-144	-3.464E+00	153.0	5.302E+00	5.305E+00	1.769E+01
PM-144	3.830E-01	95.4	3.653E-01	3.658E-01	8.598E-01
EU-152	1.412E+00	59.8	8.443E-01	8.475E-01	4.424E+00
EU-154	3.169E+00	70.5	2.234E+00	2.240E+00	1.193E+01
EU-155	-2.115E+00	153.7	3.252E+00	3.254E+00	1.083E+01
HF-181	5.143E-01	121.9	6.267E-01	6.273E-01	2.127E+00
Ta-182	9.733E-01	129.0	1.256E+00	1.257E+00	8.955E+00
Hg-203	-5.833E-01	100.3	5.852E-01	5.862E-01	1.959E+00
TL-208	6.861E+00	10.1	6.907E-01	7.771E-01	8.646E-01
pm-146	9.910E-01	150.4	1.490E+00	1.491E+00	3.580E+00
y-88	-1.008E+00	89.5	9.024E-01	9.039E-01	2.012E+00
Cd-113m	2.055E+03	231.7	4.761E+03	4.763E+03	1.646E+04
Cd-109	-1.509E-06	1280129054.3	1.931E+01	1.931E+01	6.471E+01
Cf-251	-6.387E-01	350.9	2.242E+00	2.242E+00	5.821E+00
Cf-249	5.805E-01	108.7	6.308E-01	6.315E-01	2.134E+00
Sn-126	4.469E+00	117.9	5.268E+00	5.273E+00	1.761E+01
PB-210	1.737E+01	58.0	1.007E+01	1.012E+01	2.804E+01
PB-212	1.804E+01	5.8	1.050E+00	1.570E+00	1.640E+00
PB-214	1.233E+01	9.7	1.192E+00	1.353E+00	2.574E+00
BI-207	-1.450E-02	2632.5	3.817E-01	3.817E-01	1.373E+00
BI-212	-1.217E+01	46.4	5.647E+00	5.682E+00	3.236E+01
BI-214	1.119E+01	12.0	1.341E+00	1.462E+00	2.202E+00
BI-210M	1.498E-01	568.3	8.512E-01	8.512E-01	2.250E+00
AC-228	1.317E+01	12.1	1.590E+00	1.726E+00	2.956E+00
TH-227	6.717E-01	433.4	2.911E+00	2.911E+00	2.406E+01
TH-229	-8.889E+00	101.7	9.038E+00	9.066E+00	2.313E+01
TH-234	4.075E+00	367.8	1.499E+01	1.499E+01	5.036E+01
PA-231	0.000E+00	1.#INF	3.785E+00	3.785E+00	7.526E+01
PA-233	0.000E+00	1.#INF	2.067E-01	2.067E-01	6.096E+00
PA-234	-2.118E+00	148.2	3.139E+00	3.141E+00	1.047E+01
PA-234M	1.082E+02	61.0	6.598E+01	6.621E+01	2.275E+02
U-235	1.630E+00	143.7	2.343E+00	2.344E+00	1.904E+01
AM-241	1.396E+00	116.8	1.630E+00	1.632E+00	5.445E+00
Np-237	-3.248E+00	174.9	5.679E+00	5.682E+00	1.892E+01
Ir-192	-5.500E-01	150.7	8.290E-01	8.297E-01	2.781E+00
Cs-136	-7.796E-01	91.5	7.130E-01	7.144E-01	2.399E+00
Np-239	-1.951E+00	155.0	3.025E+00	3.028E+00	1.007E+01
Nd-147	2.936E+00	95.1	2.792E+00	2.797E+00	6.828E+00
Total	2.516E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-1-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161067.An1

Acquisition information
Start time: 9/1/2016 2:33:32 PM
Live time: 1800
Real time: 1803
Dead time: 0.14 %
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 2:33:00 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. 14 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1142

***** 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	26.	57.99	0.68	1.957E-02	46.54	4.250	PBC<MDA	PB210
59.54	25.	116.78	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.29	8.	367.81	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
64.28	23.	117.88	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.83	162.	12.43	0.97	3.384E-02				
77.26	251.	9.40	0.97	3.458E-02				
93.19	54.	46.95	1.00	3.785E-02	93.35	5.561	PBC<MDA	AC228
121.78	16.	129.62	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
123.10	11.	186.97	1.02	3.846E-02	122.06	85.600	PBC<MDA	CO57
					123.10	40.790	3.902E-01	EU154
162.66	7.	302.71	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
205.33	14.	143.73	1.09	2.900E-02	205.33	5.010	PBC<MDA	U235
227.00	17.	95.96	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.72	359.	6.29	1.13	2.591E-02	238.63	43.300	1.779E+01	PB212
242.11	68.	19.93	1.12	2.565E-02	242.00	7.430	1.975E+01	PB214
256.24	3.	433.36	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
263.70	5.	231.67	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	2.	696.42	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
276.81	41.	35.77	1.57	2.313E-02	277.28	6.310	1.560E+01	TL208
284.30	5.	316.44	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.18	99.	15.00	1.36	2.205E-02	295.09	19.300	1.295E+01	PB214
300.15	32.	46.45	1.32	2.177E-02	300.03	3.280	PBC<MDA	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.07	2.460	3.286E+01	PA231
					300.18	6.200	1.304E+01	PA233
302.85	15.	153.14	1.18	2.161E-02	302.65	2.880	1.365E+01	PA231
					302.85	18.330	2.145E+00	BA133
304.85	15.	157.12	1.18	2.150E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.414E+00	BI210M
304.90	3.	898.24	1.18	2.150E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	2.511E-01	BI210M
320.08	15.	158.43	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
338.45	70.	17.96	1.46	1.983E-02	338.32	12.010	1.633E+01	AC228
351.91	156.	12.19	1.37	1.923E-02	351.93	37.600	1.201E+01	PB214
383.84	12.	101.20	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
387.95	12.	108.67	1.25	1.781E-02	387.95	66.000	PBC<MDA	Cf249
453.88	2.	519.22	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	14.	90.69	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
477.60	12.	109.92	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
482.00	11.	121.85	1.33	1.497E-02	482.00	80.500	PBC<MDA	HF181
497.05	2.	519.22	1.34	1.460E-02	497.05	90.900	PBC<MDA	RU103
511.86	31.	78.53	2.60	1.426E-02	511.86	20.000	PBC<MDA	RH106
531.00	10.	95.08	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
563.24	12.	92.38	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	298.43	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.382E+00	PA234
					569.70	97.740	1.160E-01	BI207
583.17	134.	10.07	1.41	1.282E-02	583.02	84.500	6.861E+00	TL208
600.50	8.	225.21	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	226.77	1.43	1.247E-02	602.73	98.260	PBC<MDA	SB124
604.71	9.	231.60	1.43	1.244E-02	604.71	97.620	PBC<MDA	CS134
609.40	115.	11.98	1.26	1.236E-02	609.31	46.090	1.119E+01	BI214
610.30	9.	235.86	1.43	1.235E-02	610.30	5.750	PBC<MDA	RU103
614.28	9.	239.64	1.43	1.228E-02	614.28	89.850	PBC<MDA	AG108M
618.06	9.	247.05	1.44	1.222E-02	618.06	99.100	PBC<MDA	PM144
635.89	8.	104.62	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
657.76	10.	59.99	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
696.54	7.	95.37	1.50	1.106E-02	696.54	99.000	PBC<MDA	PM144
722.79	2.	455.02	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	11.	83.39	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.024E-01	AG108M
					723.36	20.220	2.707E+00	EU154
723.36	11.	94.04	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.025E-01	AG108M
					723.36	20.220	2.708E+00	EU154
747.16	6.	150.38	1.54	1.043E-02	747.16	34.000	PBC<MDA	pm146
756.73	5.	96.36	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
763.94	15.	39.36	1.55	1.024E-02	763.94	22.280	PBC<MDA	AG110M
766.41	12.	74.65	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	2.193E+02	PA234M
778.92	5.	164.92	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
795.87	6.	154.18	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
810.78	11.	86.72	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
846.77	4.	184.30	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.50	1.	859.93	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
871.10	8.	71.36	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
873.23	4.	170.05	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
889.28	10.	95.67	1.64	8.996E-03	889.28	99.984	PBC<MDA	Sc46
911.17	55.	16.16	1.56	8.811E-03	911.07	29.000	1.186E+01	AC228
964.11	8.	141.04	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
968.86	49.	17.71	1.53	8.357E-03	968.97	17.460	1.864E+01	AC228
996.33	8.	83.50	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1001.00	8.	96.46	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	7.	74.23	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1077.40	5.	176.07	1.77	7.623E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	3.	282.01	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	11.	85.57	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	11.	95.64	1.80	7.395E-03	1115.55	50.600	PBC<MDA	ZN65
1119.81	10.	105.94	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	2.	586.27	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.489E-01	Sc46
					1121.30	34.900	4.270E-01	Ta182
1221.41	7.	129.03	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	13.	84.93	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	7.	86.85	1.94	6.325E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	10.	31.62	1.98	6.023E-03	1408.00	21.005	4.392E+00	EU152
1460.99	247.	6.45	1.82	5.828E-03	1460.83	10.670	2.210E+02	K40
1596.21	2.	258.18	2.09	5.382E-03	1596.21	95.400	PBC<MDA	La140
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
298.93	74.90	121.	162.	4.779E+03	12.43	0.972	- D
308.61	77.32	153.	251.	7.266E+03	9.40	0.975	- 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	71.	26.	0.014	57.99	0.678s
AM-241	237.79	59.54	403.	25.	0.014	116.78	0.958s
TH-234	252.78	63.29	445.	8.	0.005	367.81	0.962
Sn-126	256.75	64.28	361.	23.	0.013	117.88	0.963s
BA-133	323.54	80.99	1111.	-33.	-0.019	89.90	0.978s
Np-237	345.53	86.49	1199.	-28.	-0.016	174.85	0.983s
EU-155	345.74	86.54	1171.	-28.	-0.016	172.81	0.983s
Sn-126	347.33	86.94	1147.	-28.	-0.016	171.00	0.984s
Sn-126	349.84	87.57	1175.	-17.	-0.010	278.29	0.984s
TH-234	369.91	92.59	1117.	-54.	-0.030	57.53	0.989
AC-228	372.33	93.19	163.	54.	0.030	46.95	0.999
Gd-153	389.54	97.50	1063.	-31.	-0.017	149.52	0.993s
Np-239	397.53	99.50	1047.	-31.	-0.017	148.15	0.995s
Gd-153	412.32	103.20	1078.	-31.	-0.017	149.82	0.998s
Np-239	414.32	103.70	1109.	-31.	-0.017	151.88	0.999s
EU-155	420.77	105.31	1141.	-31.	-0.017	153.72	1.001s
Np-239	424.03	106.13	1133.	-31.	-0.017	155.03	1.001
EU-152	486.57	121.78	201.	16.	0.009	129.62	1.016s
CO-57	487.72	122.06	206.	11.	0.006	186.97	1.016s
EU-154	491.87	123.10	238.	-24.	-0.013	92.45	1.017s
PA-234	524.63	131.29	724.	-26.	-0.014	148.23	1.024s
HF-181	531.54	133.02	750.	-26.	-0.014	150.58	1.026s
CE-144	533.60	133.54	776.	-26.	-0.014	153.05	1.026s
HF-181	544.63	136.30	802.	-25.	-0.014	164.58	1.029s
CO-57	545.33	136.47	827.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	827.	0.	0.000	1000.00	1.032s
CE-141	581.17	145.44	165.	-18.	-0.010	135.57	1.037s
Ba-140	650.01	162.66	221.	7.	0.004	302.71	1.053s
U-235	652.88	163.38	228.	0.	0.000	1000.00	1.053s
CE-139	662.77	165.85	211.	-3.	-0.002	651.40	1.055s
Cf-251	705.73	176.60	139.	-6.	-0.004	350.94	1.065s
TH-229	773.33	193.51	128.	-21.	-0.012	101.68	1.080s
U-235	820.60	205.33	106.	14.	0.008	143.73	1.091s
Cf-251	907.22	227.00	73.	17.	0.010	95.96	1.110s
PB-212	953.72	238.63	43.	364.	0.202	5.82	1.120D
PB-214	967.17	242.00	57.	68.	0.038	19.93	1.123D
EU-152	977.95	244.69	635.	-20.	-0.011	176.69	1.126s
TH-227	1024.12	256.24	59.	3.	0.002	433.36	1.136
Cd-113m	1053.94	263.70	74.	5.	0.003	231.67	1.142s
BI-210M	1062.46	265.83	96.	2.	0.001	696.42	1.144s
TL-208	1106.35	276.81	40.	41.	0.023	35.77	1.572s
Hg-203	1115.91	279.20	185.	-20.	-0.011	100.32	1.156s
I-131	1136.30	284.30	64.	5.	0.003	316.44	1.160s
PB-214	1179.80	295.18	31.	99.	0.055	15.00	1.364s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	1199.68	300.15	44.	32.	0.018	46.45	1.317
PA-231	1199.35	300.07	317.	-10.	-0.006	253.77	1.174
PA-233	1199.79	300.18	307.	0.	0.000	1000.00	1.174
PA-231	1209.66	302.65	307.	0.	0.000	1000.00	1.176s
BA-133	1210.47	302.85	267.	15.	0.008	153.14	1.176s
Ba-140	1218.46	304.85	282.	15.	0.009	157.12	1.178s
BI-210M	1218.64	304.90	297.	3.	0.002	898.24	1.178s
Ir-192	1232.81	308.44	300.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	300.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	359.	-18.	-0.010	150.73	1.188s
CR-51	1279.37	320.08	280.	15.	0.008	158.43	1.191s
La-140	1314.06	328.76	304.	-12.	-0.006	205.93	1.199s
Cf-249	1332.77	333.44	292.	0.	0.000	1000.00	1.203s
AC-228	1352.81	338.45	24.	70.	0.039	17.96	1.463s
EU-152	1376.13	344.29	69.	-18.	-0.010	134.71	1.212s
HF-181	1382.30	345.83	103.	-3.	-0.002	747.71	1.213s
PB-214	1406.60	351.91	44.	156.	0.087	12.19	1.368
BA-133	1422.97	356.00	246.	-5.	-0.003	363.38	1.222s
I-131	1456.89	364.48	48.	-2.	-0.001	769.31	1.229
BA-133	1534.29	383.84	71.	12.	0.007	101.20	1.246
Cf-249	1550.72	387.95	83.	12.	0.007	108.67	1.249s
SN-113	1565.67	391.69	119.	-4.	-0.002	442.33	1.253
SB-125	1710.36	427.88	65.	-19.	-0.011	102.03	1.283s
AG-108M	1734.60	433.94	76.	-20.	-0.011	90.36	1.288s
pm-146	1814.35	453.88	35.	2.	0.001	519.22	1.304s
SB-125	1852.29	463.37	69.	14.	0.008	90.69	1.312s
Ir-192	1871.05	468.06	89.	-3.	-0.001	500.09	1.316s
BE-7	1909.18	477.60	75.	12.	0.006	109.92	1.324s
HF-181	1926.79	482.00	87.	11.	0.006	121.85	1.328s
La-140	1946.87	487.02	109.	-11.	-0.006	116.57	1.332s
RU-103	1987.00	497.05	35.	2.	0.001	519.22	1.340
RH-106	2046.22	511.86	84.	31.	0.017	78.53	2.602s
Nd-147	2122.75	531.00	17.	10.	0.005	95.08	1.368s
Ba-140	2147.78	537.26	52.	-17.	-0.009	75.77	1.373s
CS-134	2251.67	563.24	26.	12.	0.007	92.38	1.394s
CS-134	2276.00	569.32	30.	3.	0.001	298.43	1.399s
PA-234	2276.59	569.47	39.	-4.	-0.002	245.45	1.399s
TL-208	2331.39	583.17	9.	134.	0.074	10.07	1.412s
SB-125	2400.69	600.50	177.	8.	0.005	225.21	1.424s
SB-124	2409.62	602.73	185.	9.	0.005	226.77	1.425
CS-134	2417.53	604.71	194.	9.	0.005	231.60	1.427s
BI-214	2436.28	609.40	18.	115.	0.064	11.98	1.264
RU-103	2439.88	610.30	202.	9.	0.005	235.86	1.431s
AG-108M	2455.81	614.28	210.	9.	0.005	239.64	1.435s
PM-144	2470.93	618.06	219.	9.	0.005	247.05	1.437
RH-106	2486.35	621.92	284.	-12.	-0.007	196.29	1.440s
SB-125	2542.23	635.89	28.	8.	0.004	104.62	1.451
AG-110M	2629.71	657.76	14.	10.	0.006	59.99	1.469s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.30	661.66	47.	-2.	-0.001	970.32	1.472
PM-144	2784.82	696.54	9.	7.	0.004	95.37	1.499s
NB-94	2809.17	702.63	33.	-6.	-0.003	218.04	1.503s
SB-124	2889.79	722.79	32.	2.	0.001	455.02	1.519s
AG-108M	2890.40	722.94	33.	11.	0.006	83.39	1.519s
EU-154	2892.07	723.36	44.	11.	0.006	94.04	1.519s
ZR-95	2895.44	724.20	85.	-16.	-0.009	50.16	1.520s
BI-212	2907.33	727.17	90.	-18.	-0.010	46.41	1.522s
pm-146	2987.29	747.16	19.	6.	0.004	150.38	1.537s
ZR-95	3025.56	756.73	5.	5.	0.003	96.36	1.544s
AG-110M	3054.42	763.94	9.	15.	0.008	39.36	1.550s
NB-95	3061.80	765.79	69.	-16.	-0.009	76.58	1.551s
PA-234M	3064.30	766.41	33.	12.	0.007	74.65	1.552s
EU-152	3114.33	778.92	14.	5.	0.003	164.92	1.561s
BI-212	3140.33	785.42	28.	-9.	-0.005	129.10	1.566s
CS-134	3182.12	795.87	35.	6.	0.003	154.18	1.574s
CO-58	3241.75	810.78	40.	11.	0.006	86.72	1.585s
La-140	3261.74	815.77	51.	0.	0.000	1000.00	1.589s
Cs-136	3272.66	818.50	70.	-14.	-0.008	91.47	1.591s
MN-54	3338.05	834.85	37.	-14.	-0.008	94.21	1.603s
Co-56	3385.75	846.77	9.	4.	0.002	184.30	1.612s
TL-208	3440.93	860.56	24.	1.	0.001	859.93	1.622s
NB-94	3483.06	871.10	12.	8.	0.004	71.36	1.629s
EU-154	3491.60	873.23	21.	4.	0.002	170.05	1.631s
PA-234	3520.80	880.53	53.	-7.	-0.004	145.60	1.636s
PA-234	3531.64	883.24	61.	0.	0.000	1000.00	1.638s
AG-110M	3537.42	884.68	61.	0.	0.000	1000.00	1.639s
Sc-46	3555.81	889.28	40.	10.	0.005	95.67	1.642s
y-88	3590.85	898.04	35.	-15.	-0.008	89.51	1.649s
AC-228	3643.38	911.17	5.	55.	0.030	16.16	1.563
AG-110M	3748.69	937.49	25.	-6.	-0.003	187.70	1.677s
EU-152	3855.18	964.11	65.	8.	0.005	141.04	1.696s
AC-228	3874.20	968.86	7.	49.	0.027	17.71	1.531
EU-154	3984.09	996.33	21.	8.	0.005	83.50	1.718s
PA-234M	4002.77	1001.00	29.	8.	0.005	96.46	1.722s
EU-154	4017.88	1004.77	17.	0.	0.000	1000.00	1.724
Co-56	4150.18	1037.84	35.	-14.	-0.008	61.70	1.747s
Cs-136	4191.11	1048.07	10.	7.	0.004	74.23	1.754s
Ga-68	4308.47	1077.40	15.	5.	0.003	176.07	1.774s
FE-59	4395.90	1099.25	11.	3.	0.002	282.01	1.789s
EU-152	4447.22	1112.07	38.	11.	0.006	85.57	1.797s
ZN-65	4461.11	1115.55	48.	11.	0.006	95.64	1.800s
BI-214	4480.08	1120.29	56.	10.	0.006	105.94	1.803s
Sc-46	4481.13	1120.55	66.	2.	0.001	586.27	1.803s
Ta-182	4484.13	1121.30	69.	0.	0.000	1000.00	1.803s
CO-60	4691.97	1173.24	22.	-4.	-0.002	293.81	1.838s
Ta-182	4755.25	1189.05	21.	-4.	-0.002	246.99	1.848s
Ta-182	4884.75	1221.41	17.	7.	0.004	129.03	1.869s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4952.26	1238.28	21.	13.	0.007	84.93	1.879s
NA-22	5097.34	1274.53	53.	-21.	-0.012	53.98	1.902s
EU-154	5097.40	1274.54	74.	-6.	-0.004	194.26	1.902s
FE-59	5165.64	1291.60	21.	-9.	-0.005	117.15	1.913s
CO-60	5329.36	1332.50	5.	7.	0.004	86.85	1.938s
AG-110M	5536.68	1384.30	23.	-8.	-0.004	120.06	1.970s
EU-152	5631.56	1408.00	0.	10.	0.006	31.62	1.984s
K-40	5843.67	1460.99	4.	247.	0.137	6.45	1.815
La-140	6384.98	1596.21	6.	2.	0.001	258.18	2.092s
SB-124	6764.43	1690.98	0.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	33.	-15.	-0.008	27.10	2.181
Co-56	7086.23	1771.35	44.	-2.	-0.001	627.16	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	4.0588E+00				5.31E+01	
			477.60	4.059E+00	?(P	1.510E+01 1.10E+02 1.05E+01	G
NA-22	C	-1.7682E+00				9.50E+02	
			1274.53	-1.768E+00	?(	3.105E+00 5.40E+01 9.99E+01	G
K-40	N	2.2103E+02				4.66E+11	
			1460.83	2.210E+02	(P	1.033E+01 6.45E+00 1.07E+01	G
Sc-46	F	6.1096E-01				8.38E+01	
			889.28	6.110E-01	?(	1.984E+00 9.57E+01 1.00E+02	G
			1120.55	1.489E-01	-	3.060E+00 5.86E+02 1.00E+02	G
CR-51	F	4.0861E+00				2.77E+01	
			320.08	4.086E+00	?(P	2.178E+01 1.58E+02 9.94E+00	G
MN-54	C	-8.3892E-01				3.12E+02	
			834.85	-8.389E-01	?(	1.825E+00 9.42E+01 1.00E+02	G
FE-59	F	3.5817E-01				4.45E+01	
			1099.25	3.582E-01	?(P	2.409E+00 2.82E+02 5.65E+01	G
			1291.60	-1.846E+00	+	4.793E+00 1.17E+02 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	7.7922E-01					7.73E+01	
			846.77	2.173E-01	?(	1.004E+00	1.84E+02	9.99E+01 G
			1238.28	1.629E+00	?(	3.020E+00	8.49E+01	6.61E+01 G
			1037.84	-7.038E+00	+ P	1.514E+01	6.17E+01	1.41E+01 G
			1771.35	-1.099E+00	+	2.450E+01	6.27E+02	1.55E+01 A
CO-57	C	1.8562E-01					2.72E+02	
			122.06	1.856E-01	&(	1.174E+00	1.87E+02	8.56E+01 G
			136.47	0.000E+00	-	1.910E+01	1.00E+03	1.07E+01 G
CO-58	C	6.3131E-01					7.09E+01	
			810.78	6.313E-01	?(	1.847E+00	8.67E+01	9.95E+01 G
CO-60	F	5.9238E-01					1.93E+03	
			1332.50	5.924E-01	?(	1.184E+00	8.69E+01	1.00E+02 G
			1173.24	-2.966E-01	- P	1.922E+00	2.94E+02	9.99E+01 G
ZN-65	F	1.6093E+00					2.44E+02	
			1115.55	1.609E+00	?(	5.212E+00	9.56E+01	5.06E+01 G
NB-94	I	1.0081E-01					7.41E+06	
			702.63	-2.929E-01	&(	1.516E+00	2.18E+02	9.79E+01 G
			871.10	4.866E-01	?(	1.159E+00	7.14E+01	9.99E+01 G
ZR-95	I	5.3097E-01					6.40E+01	
			756.73	5.310E-01	?(P	1.275E+00	9.64E+01	5.45E+01 G
			724.20	-1.910E+00	+ P	5.374E+00	5.02E+01	4.42E+01 G
NB-95	I	-8.8190E-01					6.40E+01	
			765.79	-8.819E-01	?(	2.252E+00	7.66E+01	9.98E+01 G
RU-103	I	9.7655E-02					3.93E+01	
			497.05	9.765E-02	?(	1.262E+00	5.19E+02	9.09E+01 G
			610.30	6.744E+00	?	5.399E+01	2.36E+02	5.75E+00 GA
RH-106	I	-5.6453E+00					3.74E+02	
			621.92	-5.645E+00	?(	3.737E+01	1.96E+02	9.93E+00 G
			1050.36	-2.411E+00	% P	1.089E+02	1.66E+03	1.56E+00 G
			511.86	6.103E+00	?	8.848E+00	7.85E+01	2.00E+01 GA
AG-108M	C	-7.3545E-01					1.53E+05	
			433.94	-7.355E-01	?(	1.633E+00	9.04E+01	9.05E+01 G
			722.94	6.024E-01	+	1.693E+00	8.34E+01	9.08E+01 G
			614.28	4.349E-01	+	3.536E+00	2.40E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	6.8307E-01					2.50E+02	
			884.68	0.000E+00	?(	3.300E+00	1.00E+03	7.27E+01 G
			657.76	5.273E-01	?(	1.030E+00	6.00E+01	9.46E+01 G
			937.49	-1.128E+00	+	4.891E+00	1.88E+02	3.44E+01 G
			1384.30	-2.991E+00	+ P	9.373E+00	1.20E+02	2.43E+01 G
			763.94	3.573E+00	?(	4.129E+00	3.94E+01	2.23E+01 G
SN-113	F	-2.1357E-01					1.15E+02	
			391.69	-2.136E-01	?(P	2.634E+00	4.42E+02	6.40E+01 G
SB-124	F	4.3483E-01					6.02E+01	
			602.73	3.890E-01	&(	2.996E+00	2.27E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.677E+00	1.00E+03	4.78E+01 G
			722.79	8.515E-01	?(P	1.388E+01	4.55E+02	1.08E+01 G
SB-125	I	8.4159E-01					1.01E+03	
			427.88	-2.156E+00	?(P	4.592E+00	1.02E+02	2.96E+01 G
			600.50	2.100E+00	?(P	1.607E+01	2.25E+02	1.79E+01 G
			635.89	3.156E+00	&(	1.133E+01	1.05E+02	1.13E+01 G
			463.37	4.668E+00	?(P	1.423E+01	9.07E+01	1.05E+01 G
I-131	I	5.5276E-02					8.02E+00	
			364.48	-9.043E-02	?(P	1.278E+00	7.69E+02	8.17E+01 G
			284.30	1.994E+00	?(	1.595E+01	3.16E+02	6.14E+00 G
			636.97	-3.251E-01	&	1.930E+01	1.64E+03	7.17E+00 G
Gd-153	F	-1.5021E+00					2.42E+02	
			97.50	-1.502E+00	?(	7.478E+00	1.50E+02	3.00E+01 G
			103.20	-2.057E+00	+	1.026E+01	1.50E+02	2.18E+01 G
Ga-68	C	1.2895E+01					4.71E-02	
			1077.40	1.289E+01	?(	5.353E+01	1.76E+02	3.30E+00 G
BA-133	F	2.9852E-01					3.85E+03	
			356.00	-2.470E-01	(P	3.563E+00	3.63E+02	6.20E+01 G
			302.85	2.145E+00	?(	1.105E+01	1.53E+02	1.83E+01 G
			383.84	4.237E+00	&	1.449E+01	1.01E+02	8.94E+00 GA
			80.99	-1.535E+00	+ P	7.247E+00	8.99E+01	3.41E+01 GA
CS-134	I	6.3579E-01					7.54E+02	
			604.71	3.930E-01	?(	3.091E+00	2.32E+02	9.76E+01 G
			795.87	3.723E-01	?(	1.998E+00	1.54E+02	8.55E+01 G
			569.32	7.368E-01	?(	7.840E+00	2.98E+02	1.54E+01 G
			801.95	4.339E-01	%	2.102E+01	1.35E+03	8.69E+00 G
			563.24	5.987E+00	&(	1.335E+01	9.24E+01	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	-1.2321E-01					1.10E+04	
			661.66	-1.232E-01	(P	1.961E+00	9.70E+02	8.52E+01 G
CE-139	F	-6.4916E-02					1.38E+02	
			165.85	-6.492E-02	?(	1.444E+00	6.51E+02	7.99E+01 G
Ba-140	I	-1.0137E+00					1.28E+01	
			537.26	-2.815E+00	?(P	6.056E+00	7.58E+01	2.44E+01 G
			162.66	1.851E+00	&	1.904E+01	3.03E+02	6.22E+00 G
			304.85	9.226E+00	&(	4.876E+01	1.57E+02	4.29E+00 G
La-140	I	2.4305E-01					1.28E+01	
			1596.21	2.431E-01	?(P	1.503E+00	2.58E+02	9.54E+01 G
			487.02	-9.020E-01	+ P	4.224E+00	1.17E+02	4.55E+01 G
			328.76	-1.576E+00	+ P	1.133E+01	2.06E+02	2.03E+01 G
			815.77	0.000E+00	-	8.871E+00	1.00E+03	2.33E+01 G
CE-141	I	-5.7348E-01					3.25E+01	
			145.44	-5.735E-01	?(	1.993E+00	1.36E+02	4.82E+01 G
CE-144	I	-3.4643E+00					2.85E+02	
			133.54	-3.464E+00	&(	1.769E+01	1.53E+02	1.11E+01 G
PM-144	C	3.8302E-01					3.63E+02	
			696.54	3.738E-01	&(	8.598E-01	9.54E+01	9.90E+01 G
			618.06	3.922E-01	?(P	3.286E+00	2.47E+02	9.91E+01 G
EU-152	F	1.4121E+00					4.94E+03	
			344.29	-1.915E+00	?(P	4.424E+00	1.35E+02	2.65E+01 G
			1112.07	5.944E+00	?(	1.716E+01	8.56E+01	1.36E+01 G
			121.78	7.976E-01	&(P	3.476E+00	1.30E+02	2.86E+01 G
			778.92	2.132E+00	&(	8.590E+00	1.65E+02	1.29E+01 G
			964.11	3.779E+00	?(	1.826E+01	1.41E+02	1.46E+01 G
			244.69	-5.857E+00	+	3.461E+01	1.77E+02	7.58E+00 G
			1408.00	4.392E+00	?	3.237E+00	3.16E+01	2.10E+01 GA
EU-154	I	3.1691E+00					3.14E+03	
			873.23	1.977E+00	?(	1.193E+01	1.70E+02	1.23E+01 G
			123.10	-8.590E-01	+	2.649E+00	9.24E+01	4.08E+01 G
			1274.54	-1.538E+00	+	1.029E+01	1.94E+02	3.52E+01 G
			723.36	2.708E+00	?(	8.625E+00	9.40E+01	2.02E+01 G
			1004.77	0.000E+00	-	8.332E+00	1.00E+03	1.80E+01 G
			996.33	5.429E+00	?(	1.535E+01	8.35E+01	1.06E+01 G
EU-155	I	-2.1153E+00					1.81E+03	
			105.31	-2.115E+00	&(	1.083E+01	1.54E+02	2.12E+01 G
			86.54	-1.386E+00	+	7.977E+00	1.73E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	5.1433E-01					4.24E+01	
			482.00	5.143E-01	?(	2.127E+00	1.22E+02	8.05E+01 G
			133.02	-8.857E-01	&	4.449E+00	1.51E+02	4.33E+01 G
			345.83	-6.097E-01	+ P	9.455E+00	7.48E+02	1.51E+01 G
			136.30	-6.251E+00	+	3.434E+01	1.65E+02	5.85E+00 G
Ta-182	F	9.7329E-01					1.14E+02	
			1121.30	0.000E+00	(	8.955E+00	1.00E+03	3.49E+01 G
			1221.41	2.231E+00	?(P	6.535E+00	1.29E+02	2.70E+01 G
			1189.05	-2.125E+00	+	1.188E+01	2.47E+02	1.62E+01 G
Hg-203	F	-5.8334E-01					4.66E+01	
			279.20	-5.833E-01	&(	1.959E+00	1.00E+02	8.15E+01 G
TL-208	N	6.8610E+00					6.98E+02	
			583.02	6.861E+00	@(P	8.646E-01	1.01E+01	8.45E+01 G
			277.28	1.560E+01	+ P	1.226E+01	3.58E+01	6.31E+00 G
			860.56	5.823E-01	- P	1.230E+01	8.60E+02	1.24E+01 G
pm-146	C	9.9101E-01					2.02E+03	
			747.16	9.910E-01	?(P	3.580E+00	1.50E+02	3.40E+01 G
			735.72	-3.947E-03	% P	6.398E+00	4.86E+04	2.25E+01 G
			453.88	1.269E-01	-	1.640E+00	5.19E+02	6.50E+01 G
y-88	F	-1.0081E+00					1.07E+02	
			898.04	-1.008E+00	?(	2.012E+00	8.95E+01	9.37E+01 G
			1836.06	8.115E-01	+ P	8.706E-01	3.90E+01	9.92E+01 G
Cd-113m		2.0550E+03					5.33E+03	
			263.70	2.055E+03	&(	1.646E+04	2.32E+02	6.00E-03 K
Cd-109	F	-1.5087E-06					4.53E+02	
			88.04	-1.509E-06	%(	6.471E+01	1.28E+09	3.79E+00 G
Cf-251	T	-6.3873E-01					3.28E+05	
			176.60	-6.387E-01	?(	5.821E+00	3.51E+02	1.70E+01 G
			227.00	5.652E+00	?	1.396E+01	9.60E+01	6.30E+00 GA
Cf-249	T	5.8047E-01					1.28E+05	
			387.95	5.805E-01	?(	2.134E+00	1.09E+02	6.60E+01 G
			333.44	0.000E+00	-	1.470E+01	1.00E+03	1.55E+01 G
Sn-126		4.4689E+00					3.65E+07	
			87.57	-7.004E-01	-	6.508E+00	2.78E+02	3.75E+01 GA
			64.28	4.469E+00	?(	1.761E+01	1.18E+02	9.70E+00 G
			86.94	-4.697E+00	+	2.676E+01	1.71E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.7368E+01					8.14E+03	
			46.54	1.737E+01	(P	2.804E+01	5.80E+01	4.25E+00 G
PB-212	N	1.8038E+01					6.98E+02	
			238.63	1.804E+01	(	1.640E+00	5.82E+00	4.33E+01 G
			300.03	2.464E+01	+	2.625E+01	4.65E+01	3.28E+00 GA
PB-214	N	1.2331E+01					5.84E+05	
			351.93	1.201E+01	(P	2.574E+00	1.22E+01	3.76E+01 G
			295.09	1.295E+01	*(P	3.732E+00	1.50E+01	1.93E+01 G
			242.00	1.975E+01	+	1.107E+01	1.99E+01	7.43E+00 GA
BI-207	C	-1.4501E-02					1.18E+04	
			569.70	-1.450E-02	%(	1.373E+00	2.63E+03	9.77E+01 G
			1063.66	-5.814E-02	% P	2.043E+00	1.47E+03	7.45E+01 G
BI-212	N	-1.2167E+01					6.98E+02	
			727.17	-1.217E+01	(P	3.236E+01	4.64E+01	7.55E+00 G
			785.42	-3.907E+01	+	1.188E+02	1.29E+02	1.28E+00 GA
BI-214	N	1.1194E+01					5.84E+05	
			609.31	1.119E+01	(P	2.202E+00	1.20E+01	4.61E+01 G
			1120.29	5.204E+00	- P	1.870E+01	1.06E+02	1.51E+01 G
			1764.49	-1.082E+01	- P	2.156E+01	2.71E+01	1.54E+01 G
BI-210M	T	1.4978E-01					1.10E+09	
			265.83	9.304E-02	?(	2.250E+00	6.96E+02	5.00E+01 G
			304.90	2.511E-01	?(	7.665E+00	8.98E+02	2.80E+01 G
AC-228	N	1.3167E+01					2.10E+03	
			911.07	1.186E+01	(P	2.956E+00	1.62E+01	2.90E+01 G
			968.97	1.864E+01	+ P	5.740E+00	1.77E+01	1.75E+01 G
			338.32	1.633E+01	(	5.957E+00	1.80E+01	1.20E+01 G
			93.35	1.434E+01		1.640E+01	4.70E+01	5.56E+00 XA
TH-227	N	6.7166E-01					7.95E+03	
			50.14	3.169E-01	%(	2.406E+01	2.22E+03	8.00E+00 G
			256.24	1.077E+00	&(	1.241E+01	4.33E+02	7.00E+00 G
TH-229	N	-8.8894E+00					2.68E+06	
			193.51	-8.889E+00	?(	2.313E+01	1.02E+02	4.40E+00 G
			210.85	-8.712E-01	%	3.771E+01	1.66E+03	2.99E+00 G
TH-234	N	4.0747E+00					1.63E+12	
			63.29	4.075E+00	(P	5.036E+01	3.68E+02	3.81E+00 G
			92.59	-1.421E+01	+ P	4.175E+01	5.75E+01	5.58E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -2.1180E+00                                     1.63E+12
                         131.29-2.118E+00 ?(  1.047E+01 1.48E+02 1.80E+01 G
                         946.02 7.388E-02 % P 1.283E+01 7.29E+03 1.34E+01 G
                         569.47-1.901E+00 +   1.643E+01 2.45E+02 8.20E+00 G
                         883.24 0.000E+00 +   2.495E+01 1.00E+03 9.60E+00 G
                         880.53-7.485E+00 +   3.750E+01 1.46E+02 6.00E+00 GA

PA-234M  N   1.0820E+02                                     1.63E+12
                        1001.00 6.916E+01 ?(  2.275E+02 9.65E+01 8.37E-01 G
                         766.41 2.193E+02 ?(  5.471E+02 7.46E+01 2.94E-01 G

U-235    N   1.6299E+00                                     2.57E+11
                         143.79-1.374E-02 %(P 1.904E+01 2.08E+04 1.10E+01 G
                         205.33 5.226E+00 @(  1.941E+01 1.44E+02 5.01E+00 G
                         163.38 0.000E+00 -   2.374E+01 1.00E+03 5.08E+00 G

AM-241   T   1.3960E+00                                     1.58E+05
                          59.54 1.396E+00 *(  5.445E+00 1.17E+02 3.59E+01 G

Np-237   F  -3.2481E+00                                     2.14E+06
                          86.49-3.248E+00  (  1.892E+01 1.75E+02 1.31E+01 G

Ir-192   F  -5.5001E-01                                     7.40E+01
                         316.49-5.500E-01 ?(  2.781E+00 1.51E+02 8.70E+01 G
                         468.06-1.879E-01 +   3.263E+00 5.00E+02 5.18E+01 G
                         308.44 0.000E+00 +   6.851E+00 1.00E+03 3.18E+01 G

Cs-136   F  -7.7955E-01                                     1.30E+01
                         818.50-7.796E-01 ?(  2.399E+00 9.15E+01 1.00E+02 G
                        1048.07 6.226E-01 +   1.552E+00 7.42E+01 8.00E+01 G
                         340.57 2.290E-07 %   4.944E+00 6.33E+08 4.69E+01 G

Np-239   T  -1.9514E+00                                     2.36E+00
                         103.70-1.869E+00 +   9.448E+00 1.52E+02 2.40E+01 X
                         106.13-1.951E+00 ?(  1.007E+01 1.55E+02 2.27E+01 G
                          99.50-2.997E+00 &   1.479E+01 1.48E+02 1.50E+01 X

Nd-147       2.9362E+00                                     1.11E+01
                         531.00 2.936E+00 ?(  6.828E+00 9.51E+01 1.30E+01 G
                          91.10 1.994E-07 %   8.554E+00 1.28E+09 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	
AM-241	59.54	403.	25.	0.014	116.78	1.396E+00	
TH-234	63.29	445.	8.	0.005	367.81	4.075E+00	P
Sn-126	64.28	361.	23.	0.013	117.88	4.469E+00	
BA-133	80.99	1111.	-33.	-0.019	89.90	-1.535E+00	P
Np-237	86.49	1199.	-28.	-0.016	174.85	-3.248E+00	
EU-155	86.54	1171.	-28.	-0.016	172.81	-1.386E+00	
Sn-126	86.94	1147.	-28.	-0.016	171.00	-4.697E+00	
Sn-126	87.57	1175.	-17.	-0.010	278.29	-7.004E-01	
TH-234	92.59	1117.	-54.	-0.030	57.53	-1.421E+01	P
Gd-153	97.50	1063.	-31.	-0.017	149.52	-1.502E+00	
Np-239	99.50	1047.	-31.	-0.017	148.15	-2.997E+00	
Gd-153	103.20	1078.	-31.	-0.017	149.82	-2.057E+00	
Np-239	103.70	1109.	-31.	-0.017	151.88	-1.869E+00	
EU-155	105.31	1141.	-31.	-0.017	153.72	-2.115E+00	
Np-239	106.13	1133.	-31.	-0.017	155.03	-1.951E+00	
EU-152	121.78	201.	16.	0.009	129.62	7.976E-01	P
EU-154	123.10	238.	-24.	-0.013	92.45	-8.590E-01	
PA-234	131.29	724.	-26.	-0.014	148.23	-2.118E+00	
HF-181	133.02	750.	-26.	-0.014	150.58	-8.857E-01	
CE-144	133.54	776.	-26.	-0.014	153.05	-3.464E+00	
HF-181	136.30	802.	-25.	-0.014	164.58	-6.251E+00	
CE-141	145.44	165.	-18.	-0.010	135.57	-5.735E-01	
Ba-140	162.66	221.	7.	0.004	302.71	1.851E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-139	165.85	211.	-3.	-0.002	651.40	-6.492E-02	
Cf-251	176.60	139.	-6.	-0.004	350.94	-6.387E-01	
TH-229	193.51	128.	-21.	-0.012	101.68	-8.889E+00	
U-235	205.33	106.	14.	0.008	143.73	5.226E+00	
Cf-251	227.00	73.	17.	0.010	95.96	5.652E+00	
EU-152	244.69	635.	-20.	-0.011	176.69	-5.857E+00	
TH-227	256.24	59.	3.	0.002	433.36	1.077E+00	
Cd-113m	263.70	74.	5.	0.003	231.67	2.055E+03	
BI-210M	265.83	96.	2.	0.001	696.42	9.304E-02	
Hg-203	279.20	185.	-20.	-0.011	100.32	-5.833E-01	
I-131	284.30	64.	5.	0.003	316.44	1.994E+00	
PA-231	300.07	317.	-10.	-0.006	253.77	-1.038E+01	
BA-133	302.85	267.	15.	0.008	153.14	2.145E+00	
Ba-140	304.85	282.	15.	0.009	157.12	9.226E+00	
BI-210M	304.90	297.	3.	0.002	898.24	2.511E-01	
Ir-192	316.49	359.	-18.	-0.010	150.73	-5.500E-01	
CR-51	320.08	280.	15.	0.008	158.43	4.086E+00	P
La-140	328.76	304.	-12.	-0.006	205.93	-1.576E+00	P
EU-152	344.29	69.	-18.	-0.010	134.71	-1.915E+00	P
HF-181	345.83	103.	-3.	-0.002	747.71	-6.097E-01	P
BA-133	356.00	246.	-5.	-0.003	363.38	-2.470E-01	P
I-131	364.48	48.	-2.	-0.001	769.31	-9.043E-02	P
BA-133	383.84	71.	12.	0.007	101.20	4.237E+00	
Cf-249	387.95	83.	12.	0.007	108.67	5.805E-01	
SN-113	391.69	119.	-4.	-0.002	442.33	-2.136E-01	P
SB-125	427.88	65.	-19.	-0.011	102.03	-2.156E+00	P
AG-108M	433.94	76.	-20.	-0.011	90.36	-7.355E-01	
pm-146	453.88	35.	2.	0.001	519.22	1.269E-01	
SB-125	463.37	69.	14.	0.008	90.69	4.668E+00	P
Ir-192	468.06	89.	-3.	-0.001	500.09	-1.879E-01	
BE-7	477.60	75.	12.	0.006	109.92	4.059E+00	P
HF-181	482.00	87.	11.	0.006	121.85	5.143E-01	
La-140	487.02	109.	-11.	-0.006	116.57	-9.020E-01	P
RU-103	497.05	35.	2.	0.001	519.22	9.765E-02	
RH-106	511.86	84.	31.	0.017	78.53	6.103E+00	
Nd-147	531.00	17.	10.	0.005	95.08	2.936E+00	
Ba-140	537.26	52.	-17.	-0.009	75.77	-2.815E+00	P
CS-134	563.24	26.	12.	0.007	92.38	5.987E+00	
CS-134	569.32	30.	3.	0.001	298.43	7.368E-01	
PA-234	569.47	39.	-4.	-0.002	245.45	-1.901E+00	
SB-125	600.50	177.	8.	0.005	225.21	2.100E+00	P
SB-124	602.73	185.	9.	0.005	226.77	3.890E-01	
CS-134	604.71	194.	9.	0.005	231.60	3.930E-01	
RU-103	610.30	202.	9.	0.005	235.86	6.744E+00	
AG-108M	614.28	210.	9.	0.005	239.64	4.349E-01	
PM-144	618.06	219.	9.	0.005	247.05	3.922E-01	P
RH-106	621.92	284.	-12.	-0.007	196.29	-5.645E+00	
SB-125	635.89	28.	8.	0.004	104.62	3.156E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	657.76	14.	10.	0.006	59.99	5.273E-01	
CS-137	661.66	47.	-2.	-0.001	970.32	-1.232E-01	P
PM-144	696.54	9.	7.	0.004	95.37	3.738E-01	
NB-94	702.63	33.	-6.	-0.003	218.04	-2.929E-01	
SB-124	722.79	32.	2.	0.001	455.02	8.515E-01	P
AG-108M	722.94	33.	11.	0.006	83.39	6.024E-01	
EU-154	723.36	44.	11.	0.006	94.04	2.708E+00	
ZR-95	724.20	85.	-16.	-0.009	50.16	-1.910E+00	P
BI-212	727.17	90.	-18.	-0.010	46.41	-1.217E+01	P
pm-146	747.16	19.	6.	0.004	150.38	9.910E-01	P
ZR-95	756.73	5.	5.	0.003	96.36	5.310E-01	P
AG-110M	763.94	9.	15.	0.008	39.36	3.573E+00	
NB-95	765.79	69.	-16.	-0.009	76.58	-8.819E-01	
PA-234M	766.41	33.	12.	0.007	74.65	2.193E+02	
EU-152	778.92	14.	5.	0.003	164.92	2.132E+00	
BI-212	785.42	28.	-9.	-0.005	129.10	-3.907E+01	
CS-134	795.87	35.	6.	0.003	154.18	3.723E-01	
CO-58	810.78	40.	11.	0.006	86.72	6.313E-01	
Cs-136	818.50	70.	-14.	-0.008	91.47	-7.796E-01	
MN-54	834.85	37.	-14.	-0.008	94.21	-8.389E-01	
Co-56	846.77	9.	4.	0.002	184.30	2.173E-01	
NB-94	871.10	12.	8.	0.004	71.36	4.866E-01	
EU-154	873.23	21.	4.	0.002	170.05	1.977E+00	
PA-234	880.53	53.	-7.	-0.004	145.60	-7.485E+00	
Sc-46	889.28	40.	10.	0.005	95.67	6.110E-01	
y-88	898.04	35.	-15.	-0.008	89.51	-1.008E+00	
AG-110M	937.49	25.	-6.	-0.003	187.70	-1.128E+00	
EU-152	964.11	65.	8.	0.005	141.04	3.779E+00	
EU-154	996.33	21.	8.	0.005	83.50	5.429E+00	
PA-234M	1001.00	29.	8.	0.005	96.46	6.916E+01	
Co-56	1037.84	35.	-14.	-0.008	61.70	-7.038E+00	P
Cs-136	1048.07	10.	7.	0.004	74.23	6.226E-01	
Ga-68	1077.40	15.	5.	0.003	176.07	1.289E+01	
FE-59	1099.25	11.	3.	0.002	282.01	3.582E-01	P
EU-152	1112.07	38.	11.	0.006	85.57	5.944E+00	
ZN-65	1115.55	48.	11.	0.006	95.64	1.609E+00	
Sc-46	1120.55	66.	2.	0.001	586.27	1.489E-01	
CO-60	1173.24	22.	-4.	-0.002	293.81	-2.966E-01	P
Ta-182	1189.05	21.	-4.	-0.002	246.99	-2.125E+00	
Ta-182	1221.41	17.	7.	0.004	129.03	2.231E+00	P
Co-56	1238.28	21.	13.	0.007	84.93	1.629E+00	
NA-22	1274.53	53.	-21.	-0.012	53.98	-1.768E+00	
EU-154	1274.54	74.	-6.	-0.004	194.26	-1.538E+00	
FE-59	1291.60	21.	-9.	-0.005	117.15	-1.846E+00	
CO-60	1332.50	5.	7.	0.004	86.85	5.924E-01	
AG-110M	1384.30	23.	-8.	-0.004	120.06	-2.991E+00	P
EU-152	1408.00	0.	10.	0.006	31.62	4.392E+00	
La-140	1596.21	6.	2.	0.001	258.18	2.431E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1771.35	44.	-2.	-0.001	627.16	-1.099E+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	4.0588E+00	4.0588E+00	1.099E+02%	1.51E+01
NA-22	#A	-1.7682E+00	-1.7682E+00	5.398E+01%	3.10E+00
K-40		2.2103E+02	2.2103E+02	6.455E+00%	1.03E+01
Sc-46	#A	6.1096E-01	6.1096E-01	9.567E+01%	1.98E+00
CR-51	#A	4.0861E+00	4.0861E+00	1.584E+02%	2.18E+01
MN-54	#A	-8.3892E-01	-8.3892E-01	9.421E+01%	1.83E+00
FE-59	#A	3.5816E-01	3.5817E-01	2.820E+02%	2.41E+00
Co-56	#A	7.7921E-01	7.7922E-01	8.493E+01%	1.00E+00
CO-57	#A	1.8562E-01	1.8562E-01	1.870E+02%	1.17E+00
CO-58	#A	6.3131E-01	6.3131E-01	8.672E+01%	1.85E+00
CO-60	#A	5.9238E-01	5.9238E-01	8.685E+01%	1.18E+00
ZN-65	#A	1.6093E+00	1.6093E+00	9.564E+01%	5.21E+00
NB-94	#A	1.0081E-01	1.0081E-01	7.136E+01%	1.52E+00
ZR-95	#A	5.3097E-01	5.3097E-01	9.636E+01%	1.28E+00
NB-95	#A	-8.8190E-01	-8.8190E-01	7.658E+01%	2.25E+00
RU-103	#A	9.7654E-02	9.7655E-02	5.192E+02%	1.26E+00
RH-106	#A	-5.6453E+00	-5.6453E+00	1.963E+02%	3.74E+01
AG-108M	#A	-7.3545E-01	-7.3545E-01	9.036E+01%	1.63E+00
AG-110M	#A	6.8306E-01	6.8307E-01	3.936E+01%	3.30E+00
SN-113	#A	-2.1356E-01	-2.1357E-01	4.423E+02%	2.63E+00
SB-124	#A	4.3483E-01	4.3483E-01	2.268E+02%	3.00E+00
SB-125	#A	8.4159E-01	8.4159E-01	7.084E+01%	4.59E+00
I-131	#A	5.5274E-02	5.5276E-02	3.164E+02%	1.28E+00
Gd-153	#A	-1.5021E+00	-1.5021E+00	1.495E+02%	7.48E+00
Ga-68	#A	1.2824E+01	1.2895E+01	1.761E+02%	5.35E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.38E+00
BA-133	#A	2.9852E-01	2.9852E-01	1.531E+02%	3.56E+00
CS-134	#A	6.3579E-01	6.3579E-01	9.238E+01%	3.09E+00
CS-137	#A	-1.2321E-01	-1.2321E-01	9.703E+02%	1.96E+00
CE-139	#A	-6.4916E-02	-6.4916E-02	6.514E+02%	1.44E+00
Ba-140	#A	-1.0137E+00	-1.0137E+00	7.577E+01%	6.06E+00
La-140	#A	2.4305E-01	2.4305E-01	2.582E+02%	1.50E+00
CE-141	#A	-5.7347E-01	-5.7348E-01	1.356E+02%	1.99E+00
CE-144	#A	-3.4643E+00	-3.4643E+00	1.530E+02%	1.77E+01
PM-144	#A	3.8302E-01	3.8302E-01	9.537E+01%	8.60E-01
EU-152	#A	1.4121E+00	1.4121E+00	5.979E+01%	4.42E+00
EU-154	#A	3.1691E+00	3.1691E+00	7.050E+01%	1.19E+01
EU-155	#A	-2.1153E+00	-2.1153E+00	1.537E+02%	1.08E+01

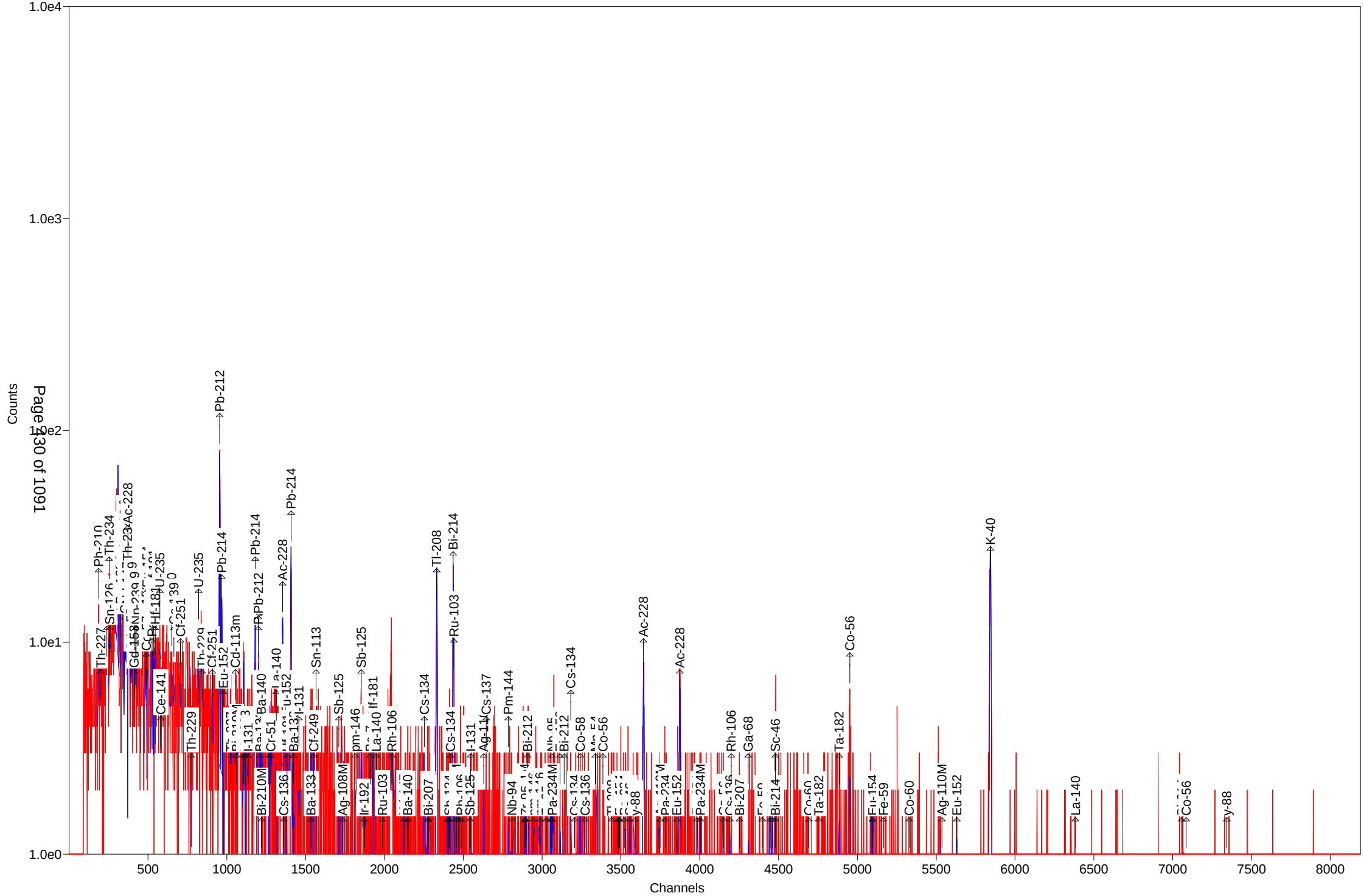
HF-181 #A	5.1433E-01	5.1433E-01	1.219E+02%	2.13E+00
Ta-182 #A	9.7329E-01	9.7329E-01	1.290E+02%	8.96E+00
Hg-203 #A	-5.8334E-01	-5.8334E-01	1.003E+02%	1.96E+00
TL-208	6.8610E+00	6.8610E+00	1.007E+01%	8.65E-01
pm-146 #A	9.9101E-01	9.9101E-01	1.504E+02%	3.58E+00
y-88 #A	-1.0081E+00	-1.0081E+00	8.951E+01%	2.01E+00
Cd-113m#A	2.0550E+03	2.0550E+03	2.317E+02%	1.65E+04
Cd-109 #A	-1.5087E-06	-1.5087E-06	1.280E+09%	6.47E+01
Cf-251 #A	-6.3873E-01	-6.3873E-01	3.509E+02%	5.82E+00
Cf-249 #A	5.8047E-01	5.8047E-01	1.087E+02%	2.13E+00
Sn-126 #A	4.4689E+00	4.4689E+00	1.179E+02%	1.76E+01
PB-210 #A	1.7368E+01	1.7368E+01	5.799E+01%	2.80E+01
PB-212	1.8038E+01	1.8038E+01	5.819E+00%	1.64E+00
PB-214	1.2331E+01	1.2331E+01	9.664E+00%	2.57E+00
BI-207 #A	-1.4501E-02	-1.4501E-02	2.632E+03%	1.37E+00
BI-212 #A	-1.2167E+01	-1.2167E+01	4.641E+01%	3.24E+01
BI-214	1.1194E+01	1.1194E+01	1.198E+01%	2.20E+00
BI-210M#A	1.4978E-01	1.4978E-01	5.683E+02%	2.25E+00
AC-228	1.3167E+01	1.3167E+01	1.208E+01%	2.96E+00
TH-227 #A	6.7166E-01	6.7166E-01	4.334E+02%	2.41E+01
TH-229 #A	-8.8894E+00	-8.8894E+00	1.017E+02%	2.31E+01
TH-234 #A	4.0747E+00	4.0747E+00	3.678E+02%	5.04E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.53E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.10E+00
PA-234 #A	-2.1180E+00	-2.1180E+00	1.482E+02%	1.05E+01
PA-234M#A	1.0820E+02	1.0820E+02	6.099E+01%	2.28E+02
U-235 #A	1.6299E+00	1.6299E+00	1.437E+02%	1.90E+01
AM-241 #A	1.3960E+00	1.3960E+00	1.168E+02%	5.44E+00
Np-237 #A	-3.2481E+00	-3.2481E+00	1.749E+02%	1.89E+01
Ir-192 #A	-5.5001E-01	-5.5001E-01	1.507E+02%	2.78E+00
Cs-136 #A	-7.7954E-01	-7.7955E-01	9.147E+01%	2.40E+00
Np-239 #A	-1.9512E+00	-1.9514E+00	1.550E+02%	1.01E+01
Nd-147 #A	2.9361E+00	2.9362E+00	9.508E+01%	6.83E+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) 3.000E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 2.9999048E+02 Bq/Sample

264540_Gamma_160-18553-A-1-B. 15_Gamma_20161067.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161133

Sample Description: 264540_Gamma_160-18553-A-1-C DU
Detector: Detector #17
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-1-C DU

Decay to Time: 9/1/2016 15:05 Live Time: 1800 sec
Acquisition Time: 9/1/2016 15:05:29 Real Time: 1839 sec
Analysis Time: 9/1/2016 15:37 Dead Time: 2.14 %
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	-2.066E+00	194.1	4.011E+00	4.012E+00	1.375E+01
NA-22	-1.900E-01	272.8	5.183E-01	5.184E-01	1.841E+00
K-40	2.651E+02	5.1	1.350E+01	1.914E+01	1.049E+01
Sc-46	2.800E-01	122.6	3.434E-01	3.437E-01	1.587E+00
CR-51	2.908E+00	114.5	3.330E+00	3.334E+00	1.125E+01
MN-54	-7.079E-01	92.5	6.551E-01	6.561E-01	1.508E+00
FE-59	6.825E-01	109.2	7.453E-01	7.460E-01	1.756E+00
Co-56	2.328E-01	79.3	1.847E-01	1.851E-01	1.360E+00
CO-57	-2.075E-01	147.6	3.062E-01	3.064E-01	1.033E+00
CO-58	-6.473E-01	89.1	5.765E-01	5.774E-01	1.936E+00
CO-60	1.608E-01	232.7	3.742E-01	3.743E-01	1.399E+00
ZN-65	-8.532E-01	179.7	1.534E+00	1.534E+00	5.255E+00
NB-94	8.225E-02	119.4	9.818E-02	9.827E-02	1.242E+00
ZR-95	1.964E-01	290.4	5.702E-01	5.703E-01	1.544E+00
NB-95	7.171E-03	7393.2	5.301E-01	5.301E-01	1.863E+00
RU-103	1.019E-01	421.5	4.297E-01	4.297E-01	1.106E+00
RH-106	1.145E+00	86.4	9.891E-01	9.909E-01	3.043E+01
AG-108M	-3.441E-01	129.7	4.462E-01	4.466E-01	1.166E+00
AG-110M	7.662E-01	82.6	6.330E-01	6.342E-01	2.010E+00
SN-113	-6.521E-01	120.5	7.856E-01	7.863E-01	2.623E+00
SB-124	-6.711E-02	73.4	4.923E-02	4.935E-02	3.041E+00
SB-125	-1.294E+00	117.4	1.519E+00	1.520E+00	3.938E+00
I-131	-2.252E-01	88.5	1.992E-01	1.996E-01	1.315E+00
Gd-153	3.050E-01	119.3	3.638E-01	3.643E-01	3.429E+00
Ga-68	-5.917E+00	370.9	2.195E+01	2.195E+01	5.130E+01
Tc-99m	2.990E-01	128.3	3.835E-01	3.839E-01	1.286E+00
BA-133	-4.819E-01	197.3	9.509E-01	9.513E-01	3.208E+00
CS-134	2.132E-01	100.7	2.148E-01	2.150E-01	3.000E+00
CS-137	4.683E-01	94.2	4.413E-01	4.420E-01	1.495E+00
CE-139	1.060E-01	362.1	3.840E-01	3.841E-01	1.306E+00
Ba-140	2.085E+00	76.9	1.604E+00	1.607E+00	3.970E+00
La-140	3.027E-01	105.2	3.184E-01	3.188E-01	1.123E+00
CE-141	-9.348E-02	644.9	6.029E-01	6.029E-01	1.650E+00

CE-144	-2.955E+00	134.9	3.986E+00	3.989E+00	1.331E+01
PM-144	2.694E-01	133.2	3.589E-01	3.592E-01	8.935E-01
EU-152	6.848E-01	169.7	1.162E+00	1.163E+00	6.655E+00
EU-154	-2.188E+00	170.2	3.724E+00	3.726E+00	1.294E+01
EU-155	1.102E+00	129.8	1.430E+00	1.431E+00	4.798E+00
HF-181	5.636E-01	102.7	5.787E-01	5.794E-01	1.427E+00
Ta-182	1.610E+00	87.7	1.413E+00	1.415E+00	5.041E+00
Hg-203	1.017E-01	406.2	4.133E-01	4.133E-01	1.420E+00
TL-208	6.379E+00	9.8	6.265E-01	7.085E-01	8.700E-01
pm-146	1.270E+00	98.0	1.245E+00	1.247E+00	3.030E+00
y-88	1.722E-02	2755.0	4.744E-01	4.744E-01	1.180E+00
Cd-113m	4.784E+03	99.7	4.769E+03	4.779E+03	1.605E+04
Cd-109	0.000E+00	1.#INF	1.454E+01	1.454E+01	4.888E+01
Cf-251	2.970E-02	6010.9	1.785E+00	1.785E+00	4.915E+00
Cf-249	8.138E-01	80.2	6.528E-01	6.541E-01	2.250E+00
Sn-126	3.731E+00	105.9	3.951E+00	3.956E+00	1.322E+01
PB-210	9.289E+00	112.6	1.046E+01	1.047E+01	3.084E+01
PB-212	1.738E+01	5.8	1.006E+00	1.508E+00	1.804E+00
PB-214	1.128E+01	10.9	1.231E+00	1.363E+00	2.269E+00
BI-207	3.528E-01	91.5	3.228E-01	3.233E-01	1.225E+00
BI-212	-5.471E-01	1253.0	6.855E+00	6.855E+00	2.400E+01
BI-214	1.264E+01	9.2	1.165E+00	1.337E+00	1.596E+00
BI-210M	5.453E-01	104.5	5.699E-01	5.708E-01	1.922E+00
AC-228	2.031E+01	7.5	1.524E+00	1.843E+00	2.587E+00
TH-227	-2.652E+00	224.6	5.956E+00	5.958E+00	1.710E+01
TH-229	5.942E+00	109.0	6.478E+00	6.496E+00	1.752E+01
TH-234	-5.534E+00	210.5	1.165E+01	1.165E+01	3.988E+01
PA-231	2.720E+00	333.2	9.063E+00	9.064E+00	5.814E+01
PA-233	-1.059E+00	105.4	1.117E+00	1.118E+00	3.749E+00
PA-234	4.884E-01	106.7	5.211E-01	5.217E-01	7.791E+00
PA-234M	-8.383E+01	83.8	7.024E+01	7.037E+01	2.399E+02
U-235	2.491E-01	1264.2	3.148E+00	3.148E+00	1.068E+01
AM-241	1.570E-01	779.6	1.224E+00	1.224E+00	3.521E+00
Np-237	-2.710E+00	171.7	4.652E+00	4.655E+00	1.551E+01
Ir-192	5.445E-01	78.9	4.298E-01	4.310E-01	1.273E+00
Cs-136	-6.194E-01	114.8	7.111E-01	7.120E-01	2.400E+00
Np-239	1.142E-01	1160.8	1.326E+00	1.326E+00	4.515E+00
Nd-147	2.387E+00	98.0	2.339E+00	2.343E+00	5.934E+00
Total	5.161E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-1-C DU

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161133.An1

Acquisition information
Start time: 9/1/2016 3:05:29 PM
Live time: 1800
Real time: 1839
Dead time: 2.14 %
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 3:05:00 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. 21 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1418

***** 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
46.88	15.	112.58	0.80	2.100E-02	46.54	4.250	PBC<MDA	PB210
59.54	3.	779.60	0.79	2.957E-02	59.54	35.900	PBC<MDA	AM241
63.29	-12.	210.54	0.79	3.164E-02	63.29	3.810	PBC<MDA	TH234
65.32	21.	105.89	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
74.73	159.	13.28	0.80	3.677E-02				
77.18	246.	9.27	0.80	3.764E-02				
80.99	20.	122.84	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
87.35	97.	18.05	0.81	4.045E-02	86.54	30.700	4.362E+00	EU155
					86.94	9.040	1.478E+01	Sn126
					87.57	37.500	3.551E+00	Sn126
					88.04	3.790	3.505E+01	Cd109
90.00	51.	34.07	0.82	4.098E-02				
93.12	100.	19.44	0.82	4.156E-02	93.35	5.561	2.415E+01	AC228
103.20	18.	119.29	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
103.70	18.	123.74	0.83	4.269E-02	103.70	24.000	PBC<MDA	Np239
105.31	18.	129.78	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155
140.51	19.	128.25	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	18.	115.21	0.88	3.813E-02	162.66	6.220	PBC<MDA	Ba140
165.85	6.	362.10	0.89	3.825E-02	165.85	79.900	PBC<MDA	CE139
185.55	62.	30.81	0.91	3.547E-02				
193.51	16.	109.02	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229
238.49	389.	6.50	1.06	2.990E-02	238.63	43.300	1.672E+01	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.88	19.	195.27	0.96	2.960E-02	242.00	7.430	PBC<MDA	PB214
244.69	18.	200.07	0.96	2.938E-02	244.69	7.580	PBC<MDA	EU152
263.70	14.	99.67	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	14.	104.50	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
277.40	10.	162.20	0.99	2.694E-02	277.28	6.310	PBC<MDA	TL208
279.20	4.	406.20	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
284.30	12.	140.41	1.00	2.648E-02	284.30	6.140	PBC<MDA	I131
295.19	142.	10.61	1.37	2.579E-02	295.09	19.300	1.580E+01	PB214
300.07	7.	333.17	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.905E+00	PA231
					300.18	6.200	2.343E+00	PA233
300.36	44.	28.22	1.83	2.550E-02	300.03	3.280	2.898E+01	PB212
					300.07	2.460	3.864E+01	PA231
					300.18	6.200	PBC<MDA	PA233
308.44	15.	120.48	1.02	2.501E-02	308.44	31.750	PBC<MDA	Ir192
316.49	14.	101.99	1.03	2.456E-02	316.49	87.040	PBC<MDA	Ir192
320.08	13.	114.51	1.03	2.437E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	105.19	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	102.77	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.34	109.	14.19	1.07	2.343E-02	338.32	12.010	2.151E+01	AC228
345.83	9.	249.97	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.91	174.	10.91	1.10	2.279E-02	351.93	37.600	1.128E+01	PB214
383.84	14.	117.53	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
387.95	14.	123.19	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
453.88	3.	436.74	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
482.00	11.	102.68	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
487.02	10.	108.32	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	421.48	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
510.76	98.	20.46	0.88	1.745E-02	511.86	20.000	1.557E+01	RH106
531.00	9.	97.98	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
537.26	11.	101.86	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
563.24	3.	462.29	1.25	1.624E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	288.68	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.261E+00	PA234
					569.70	97.740	1.059E-01	BI207
569.70	4.	220.92	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.892E+00	PA234
					569.70	97.740	1.588E-01	BI207
583.17	154.	9.82	1.13	1.584E-02	583.02	84.500	6.379E+00	TL208
609.32	161.	9.22	1.56	1.533E-02	609.31	46.090	1.264E+01	BI214
661.66	10.	94.24	1.33	1.443E-02	661.66	85.210	PBC<MDA	CS137
696.54	7.	133.23	1.36	1.389E-02	696.54	99.000	PBC<MDA	PM144
722.79	10.	116.62	1.39	1.351E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.527E-01	AG108M
					723.36	20.220	2.035E+00	EU154
724.20	2.	595.82	1.39	1.349E-02	724.20	44.150	PBC<MDA	ZR95
747.16	10.	98.01	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	3.	290.41	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	8.	107.78	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	7.	134.72	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
795.87	12.	100.71	1.45	1.257E-02	795.87	85.530	PBC<MDA	CS134
801.95	5.	187.90	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
860.43	11.	100.78	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
871.10	7.	119.37	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
880.53	7.	93.48	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
883.24	7.	106.69	1.52	1.162E-02	883.24	9.600	PBC<MDA	PA234
884.68	6.	138.20	1.52	1.161E-02	884.68	72.680	PBC<MDA	AG110M
911.20	123.	10.21	1.14	1.135E-02	911.07	29.000	2.070E+01	AC228
946.02	3.	280.36	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	4.	395.77	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
968.93	64.	14.17	1.36	1.083E-02	968.97	17.460	1.884E+01	AC228
1050.36	12.	86.36	1.66	1.019E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	91.49	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1099.25	7.	109.19	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1120.23	12.	109.52	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	10.	122.62	1.72	9.696E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.761E-01	Sc46
					1121.30	34.900	1.651E+00	Ta182
1121.24	10.	87.74	1.72	9.691E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.700E+00	Ta182
1173.24	1.	988.26	1.76	9.359E-03	1173.24	99.900	PBC<MDA	CO60
1186.26	4.	319.28	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	13.	91.66	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	4.	232.74	1.89	8.481E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	6.	90.56	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	2.	324.35	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1460.84	402.	5.09	1.94	7.894E-03	1460.83	10.670	2.651E+02	K40
1764.72	8.	87.67	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	92.15	2.22	6.783E-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
298.32	74.73	143.	159.	4.319E+03	13.28	0.802	- D
308.11	77.18	135.	246.	6.525E+03	9.27	0.804	- sD
358.42	89.99	119.	54.	1.324E+03	31.53	0.816	- D
741.44	185.55	91.	62.	1.740E+03	30.81	0.908	-
2041.93	510.76	84.	98.	5.596E+03	20.46	0.879	- 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	186.99	46.88	101.	15.	0.008	112.58	0.798s
TH-227	200.03	50.14	141.	-9.	-0.005	224.57	0.778s
AM-241	237.59	59.54	192.	3.	0.002	779.60	0.787s
TH-234	252.59	63.29	324.	-12.	-0.007	210.54	0.791s
Sn-126	256.56	64.28	236.	21.	0.012	105.89	0.792s
BA-133	323.36	80.99	204.	20.	0.011	122.84	0.807s
Np-237	345.35	86.49	962.	-26.	-0.014	171.69	0.813
EU-155	345.56	86.54	949.	-26.	-0.015	165.58	0.813s
Sn-126	347.15	86.94	174.	17.	0.009	115.48	0.813D
Sn-126	349.67	87.57	842.	88.	0.049	20.83	0.814D
Cd-109	351.55	88.04	811.	0.	0.000	1000.00	0.814A
Nd-147	363.79	91.10	829.	0.	0.000	1000.00	0.817s
TH-234	369.74	92.59	866.	-71.	-0.039	37.20	0.818s
AC-228	372.78	93.35	141.	100.	0.056	19.44	0.819D
Gd-153	389.37	97.50	261.	-6.	-0.003	382.97	0.823s
Np-239	397.37	99.50	286.	-12.	-0.007	201.38	0.825s
Gd-153	412.16	103.20	227.	18.	0.010	119.29	0.828s
Np-239	414.16	103.70	245.	18.	0.010	123.74	0.829s
EU-155	420.61	105.31	263.	18.	0.010	129.78	0.830s
EU-152	486.43	121.78	224.	-6.	-0.003	355.12	0.846s
CO-57	487.57	122.06	197.	-14.	-0.008	147.62	0.846s
PA-234	524.49	131.29	494.	-25.	-0.014	129.07	0.855
HF-181	531.41	133.02	519.	-25.	-0.014	131.92	0.856
CE-144	533.46	133.54	544.	-25.	-0.014	134.88	0.857
HF-181	544.50	136.30	569.	-25.	-0.014	137.40	0.859s
CO-57	545.20	136.47	570.	-25.	-0.014	137.61	0.859s
Tc-99m	561.34	140.51	294.	19.	0.011	128.25	0.863s
CE-141	581.05	145.44	141.	-3.	-0.002	644.92	0.868s
Ba-140	649.90	162.66	204.	18.	0.010	115.21	0.884s
U-235	652.78	163.38	214.	-17.	-0.009	154.76	0.885s
CE-139	662.67	165.85	220.	6.	0.003	362.10	0.887s
TH-229	773.25	193.51	94.	16.	0.009	109.02	0.913s
U-235	820.52	205.33	132.	-3.	-0.002	644.90	0.924s
TH-229	842.58	210.85	173.	-23.	-0.013	102.76	0.929s
Cf-251	907.16	227.00	137.	-21.	-0.012	101.44	0.944s
PB-212	953.67	238.63	71.	405.	0.225	5.79	0.954D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	967.13	242.00	666.	19.	0.010	195.27	0.958s
EU-152	977.91	244.69	659.	18.	0.010	200.07	0.960s
TH-227	1024.08	256.24	114.	-18.	-0.010	133.36	0.971s
Cd-113m	1053.91	263.70	96.	14.	0.008	99.67	0.978s
BI-210M	1062.44	265.83	94.	14.	0.008	104.50	0.979s
TL-208	1108.23	277.28	117.	10.	0.005	162.20	0.990s
Hg-203	1115.89	279.20	130.	4.	0.002	406.20	0.992s
I-131	1136.28	284.30	73.	12.	0.006	140.41	0.996s
PB-214	1179.83	295.19	23.	142.	0.079	10.61	1.375s
PB-212	1200.52	300.36	31.	44.	0.024	28.22	1.834s
PA-231	1199.35	300.07	243.	7.	0.004	333.17	1.011s
PA-233	1199.79	300.18	250.	0.	0.000	1000.00	1.011s
PA-231	1209.66	302.65	250.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	250.	0.	0.000	1000.00	1.013s
Ir-192	1232.82	308.44	147.	15.	0.008	120.48	1.019s
PA-233	1247.10	312.01	153.	-17.	-0.009	105.40	1.022s
Ir-192	1265.01	316.49	99.	14.	0.008	101.99	1.026s
CR-51	1279.38	320.08	99.	13.	0.007	114.51	1.029s
La-140	1314.07	328.76	63.	15.	0.008	105.19	1.037
Cf-249	1332.79	333.44	48.	13.	0.007	102.77	1.041s
AC-228	1352.38	338.34	34.	109.	0.061	14.19	1.072
Cs-136	1361.30	340.57	248.	-9.	-0.005	259.04	1.048s
EU-152	1376.16	344.29	231.	-9.	-0.005	250.15	1.051s
HF-181	1382.33	345.83	230.	9.	0.005	249.97	1.053s
PB-214	1406.64	351.91	48.	174.	0.097	10.91	1.103
BA-133	1423.00	356.00	282.	-12.	-0.007	197.35	1.062s
I-131	1456.93	364.48	75.	-18.	-0.010	107.68	1.070
BA-133	1534.34	383.84	121.	14.	0.008	117.53	1.087s
Cf-249	1550.77	387.95	135.	14.	0.008	123.19	1.091s
SN-113	1565.73	391.69	172.	-16.	-0.009	120.48	1.094
SB-125	1710.44	427.88	70.	-14.	-0.008	117.42	1.127s
AG-108M	1734.69	433.94	55.	-11.	-0.006	129.68	1.132s
pm-146	1814.44	453.88	44.	3.	0.002	436.74	1.150s
SB-125	1852.38	463.37	115.	-13.	-0.007	144.80	1.158s
Ir-192	1871.15	468.06	127.	0.	0.000	1000.00	1.163s
BE-7	1909.29	477.59	93.	-7.	-0.004	194.10	1.171s
HF-181	1926.89	482.00	56.	11.	0.006	102.68	1.175s
La-140	1946.98	487.02	28.	10.	0.006	108.32	1.180
RU-103	1987.11	497.05	40.	3.	0.002	421.48	1.188
RH-106	2046.35	511.86	215.	-16.	-0.009	131.99	2.452s
Nd-147	2122.88	531.00	20.	9.	0.005	97.98	1.219s
Ba-140	2147.92	537.26	33.	11.	0.006	101.86	1.224s
CS-134	2251.82	563.24	36.	3.	0.001	462.29	1.247s
CS-134	2276.15	569.32	36.	3.	0.002	288.68	1.252s
PA-234	2276.75	569.47	49.	-7.	-0.004	149.60	1.253s
BI-207	2277.67	569.70	47.	4.	0.002	220.92	1.253s
TL-208	2331.53	583.17	15.	154.	0.085	9.82	1.132s
SB-125	2400.86	600.50	370.	-15.	-0.008	186.14	1.280s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2409.78	602.73	298.	-13.	-0.007	89.00	1.282
CS-134	2417.70	604.71	284.	-13.	-0.007	191.03	1.284s
BI-214	2436.12	609.32	14.	161.	0.089	9.22	1.563s
AG-108M	2455.98	614.28	271.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	271.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	291.	-14.	-0.008	180.09	1.299
SB-125	2542.41	635.89	45.	-14.	-0.008	74.49	1.311s
I-131	2546.75	636.97	61.	-2.	-0.001	665.45	1.312s
AG-110M	2629.90	657.76	37.	-8.	-0.005	109.33	1.330s
CS-137	2645.49	661.66	43.	10.	0.006	94.24	1.333s
PM-144	2785.03	696.54	17.	7.	0.004	133.23	1.363
NB-94	2809.38	702.63	35.	-4.	-0.002	392.37	1.368s
SB-124	2890.01	722.79	63.	10.	0.006	116.62	1.386s
AG-108M	2890.61	722.94	73.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	73.	0.	0.000	1000.00	1.386
ZR-95	2895.66	724.20	70.	2.	0.001	595.82	1.387s
pm-146	2987.51	747.16	22.	10.	0.006	98.01	1.407
ZR-95	3025.79	756.73	13.	3.	0.001	290.41	1.415s
AG-110M	3054.64	763.94	60.	-14.	-0.007	85.91	1.421
PA-234M	3064.52	766.41	32.	8.	0.004	107.78	1.423s
EU-152	3114.56	778.92	43.	-11.	-0.006	122.23	1.434s
BI-212	3140.56	785.42	22.	7.	0.004	134.72	1.440s
CS-134	3182.35	795.87	30.	12.	0.006	100.71	1.448s
CS-134	3206.69	801.95	17.	5.	0.003	187.90	1.454s
CO-58	3241.99	810.78	75.	-14.	-0.008	89.05	1.461s
La-140	3261.97	815.77	89.	-14.	-0.008	96.28	1.465s
Cs-136	3272.90	818.50	117.	-14.	-0.008	114.82	1.467s
MN-54	3338.30	834.85	42.	-15.	-0.009	92.54	1.481
Co-56	3385.99	846.77	33.	-10.	-0.005	129.48	1.491s
TL-208	3441.18	860.56	24.	11.	0.006	100.78	1.503
NB-94	3483.32	871.10	28.	7.	0.004	119.37	1.512s
EU-154	3491.85	873.23	44.	-6.	-0.003	170.18	1.514s
PA-234	3521.06	880.53	21.	7.	0.004	93.48	1.520s
PA-234	3531.90	883.24	28.	7.	0.004	106.69	1.522
AG-110M	3537.67	884.68	36.	6.	0.004	138.20	1.523s
AC-228	3643.77	911.20	7.	123.	0.068	10.21	1.138s
AG-110M	3748.95	937.49	42.	-13.	-0.007	109.33	1.567s
PA-234	3783.07	946.02	19.	3.	0.002	280.36	1.574s
EU-152	3855.45	964.11	113.	4.	0.002	395.77	1.589s
AC-228	3874.74	968.93	4.	64.	0.036	14.17	1.361
EU-154	3984.36	996.33	51.	-3.	-0.002	360.79	1.616s
PA-234M	4003.04	1001.00	58.	-13.	-0.007	83.78	1.620s
EU-154	4018.15	1004.77	76.	0.	0.000	1000.00	1.623s
Co-56	4150.45	1037.84	30.	-14.	-0.008	79.44	1.650s
Cs-136	4191.39	1048.07	56.	-17.	-0.010	65.46	1.658s
RH-106	4200.55	1050.36	44.	12.	0.006	86.36	1.661s
BI-207	4253.77	1063.66	10.	8.	0.005	91.49	1.671s
Ga-68	4308.74	1077.40	25.	-3.	-0.002	370.93	1.683s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.18	1099.25	10.	7.	0.004	109.19	1.700s
EU-152	4447.49	1112.07	103.	-15.	-0.008	101.98	1.711s
ZN-65	4461.38	1115.55	89.	-8.	-0.004	179.75	1.713s
BI-214	4480.35	1120.29	76.	12.	0.006	109.52	1.717s
Sc-46	4481.41	1120.55	71.	10.	0.006	122.62	1.717s
Ta-182	4484.41	1121.30	36.	10.	0.006	87.74	1.718s
CO-60	4692.24	1173.24	20.	1.	0.001	988.26	1.760s
Ta-182	4755.52	1189.05	30.	4.	0.002	319.28	1.772s
Ta-182	4885.02	1221.41	54.	-14.	-0.008	88.54	1.798s
Co-56	4952.53	1238.28	27.	13.	0.007	91.66	1.812s
NA-22	5097.60	1274.53	32.	-3.	-0.002	272.85	1.840s
EU-154	5097.66	1274.54	35.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	27.	-7.	-0.004	180.28	1.854s
CO-60	5329.61	1332.50	16.	4.	0.002	232.74	1.886s
AG-110M	5536.92	1384.30	6.	6.	0.004	90.56	1.926s
EU-152	5631.79	1408.00	5.	2.	0.001	324.35	1.944s
K-40	5843.29	1460.84	8.	402.	0.223	5.09	1.938
La-140	6385.15	1596.21	6.	-2.	-0.001	983.14	2.087s
SB-124	6764.55	1690.98	6.	-2.	-0.001	863.47	2.157s
BI-214	7058.84	1764.49	22.	8.	0.005	87.67	2.211s
Co-56	7086.31	1771.35	21.	8.	0.004	92.15	2.216s
y-88	7345.39	1836.06	6.	-1.	-0.001	600.00	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	-2.0662E+00				5.31E+01	
			477.60	-2.066E+00	?(	1.375E+01 1.94E+02 1.05E+01	G
NA-22	C	-1.8997E-01				9.50E+02	
			1274.53	-1.900E-01	?(	1.841E+00 2.73E+02 9.99E+01	G
K-40	N	2.6513E+02				4.66E+11	
			1460.83	2.651E+02	(P	1.049E+01 5.09E+00 1.07E+01	G
Sc-46	F	2.8003E-01				8.38E+01	
			889.28	-1.602E-02	%(	1.587E+00 2.77E+03 1.00E+02	G
			1120.55	5.761E-01	?(	2.405E+00 1.23E+02 1.00E+02	G
CR-51	F	2.9081E+00				2.77E+01	
			320.08	2.908E+00	(P	1.125E+01 1.15E+02 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C -7.0793E-01					3.12E+02	
		834.85	-7.079E-01	(	1.508E+00	9.25E+01	1.00E+02 G
FE-59	F 6.8251E-01					4.45E+01	
		1099.25	6.825E-01	&(P	1.756E+00	1.09E+02	5.65E+01 G
		1291.60	-9.867E-01	&	3.963E+00	1.80E+02	4.32E+01 G
Co-56	C 2.3282E-01					7.73E+01	
		846.77	-4.479E-01	?(	1.360E+00	1.29E+02	9.99E+01 G
		1238.28	1.262E+00	?(P	2.534E+00	9.17E+01	6.61E+01 G
		1037.84	-5.389E+00	+ P	1.080E+01	7.94E+01	1.41E+01 G
		1771.35	4.079E+00	?	1.283E+01	9.21E+01	1.55E+01 A
CO-57	C -2.0745E-01					2.72E+02	
		122.06	-2.075E-01	(	1.033E+00	1.48E+02	8.56E+01 G
		136.47	-3.100E+00	+	1.425E+01	1.38E+02	1.07E+01 G
CO-58	C -6.4732E-01					7.09E+01	
		810.78	-6.473E-01	&(	1.936E+00	8.91E+01	9.95E+01 G
CO-60	F 1.6079E-01					1.93E+03	
		1332.50	2.621E-01	?(	1.399E+00	2.33E+02	1.00E+02 G
		1173.24	5.942E-02	&(	1.399E+00	9.88E+02	9.99E+01 G
ZN-65	F -8.5322E-01					2.44E+02	
		1115.55	-8.532E-01	?(	5.255E+00	1.80E+02	5.06E+01 G
NB-94	I 8.2246E-02					7.41E+06	
		702.63	-1.559E-01	?(P	1.242E+00	3.92E+02	9.79E+01 G
		871.10	3.157E-01	&(	1.303E+00	1.19E+02	9.99E+01 G
ZR-95	I 1.9636E-01					6.40E+01	
		756.73	2.043E-01	?(P	1.544E+00	2.90E+02	5.45E+01 G
		724.20	1.865E-01	?(	3.889E+00	5.96E+02	4.42E+01 G
NB-95	I 7.1707E-03					6.40E+01	
		765.79	7.171E-03	%(	1.863E+00	7.39E+03	9.98E+01 G
RU-103	I 1.0194E-01					3.93E+01	
		497.05	1.019E-01	?(P	1.106E+00	4.21E+02	9.09E+01 G
		610.30	-4.339E-01	%	5.017E+01	3.39E+03	5.75E+00 GA
RH-106	I 1.1452E+00					3.74E+02	
		621.92	-5.017E+00	?(	3.043E+01	1.80E+02	9.93E+00 G
		1050.36	4.037E+01	?(	1.175E+02	8.64E+01	1.56E+00 G
		511.86	-2.552E+00	+	1.133E+01	1.32E+02	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -3.4410E-01					1.53E+05	
		433.94	-3.441E-01	?(	1.166E+00	1.30E+02	9.05E+01 G
		722.94	0.000E+00	&	1.925E+00	1.00E+03	9.08E+01 G
		614.28	0.000E+00	+	3.222E+00	1.00E+03	8.98E+01 G
AG-110M	F 7.6618E-01					2.50E+02	
		884.68	4.198E-01	?(	2.010E+00	1.38E+02	7.27E+01 G
		657.76	-3.376E-01	&	1.263E+00	1.09E+02	9.46E+01 G
		937.49	-1.892E+00	+	4.789E+00	1.09E+02	3.44E+01 G
		1384.30	1.803E+00	&(P	3.801E+00	9.06E+01	2.43E+01 G
		763.94	-2.597E+00	+	7.493E+00	8.59E+01	2.23E+01 G
SN-113	F -6.5208E-01					1.15E+02	
		391.69	-6.521E-01	&(P	2.623E+00	1.20E+02	6.40E+01 G
SB-124	F -6.7115E-02					6.02E+01	
		602.73	-4.930E-01	?(P	3.041E+00	8.90E+01	9.83E+01 G
		1690.98	-3.924E-01	+ P	2.391E+00	8.63E+02	4.78E+01 G
		722.79	3.804E+00	?(	1.510E+01	1.17E+02	1.08E+01 G
SB-125	I -1.2937E+00					1.01E+03	
		427.88	-1.294E+00	(	3.938E+00	1.17E+02	2.96E+01 G
		600.50	-2.962E+00	+	1.853E+01	1.86E+02	1.79E+01 G
		635.89	-4.519E+00	+	1.123E+01	7.45E+01	1.13E+01 G
		463.37	-3.749E+00	+ P	1.495E+01	1.45E+02	1.05E+01 G
I-131	I -2.2518E-01					8.02E+00	
		364.48	-5.417E-01	?(P	1.315E+00	1.08E+02	8.17E+01 G
		284.30	3.987E+00	?(	1.456E+01	1.40E+02	6.14E+00 G
		636.97	-1.166E+00	& P	2.035E+01	6.65E+02	7.17E+00 G
Gd-153	F 3.0498E-01					2.42E+02	
		97.50	-2.638E-01	?(	3.429E+00	3.83E+02	3.00E+01 G
		103.20	1.088E+00	?(	4.354E+00	1.19E+02	2.18E+01 G
Ga-68	C -5.9170E+00					4.71E-02	
		1077.40	-5.917E+00	?(	5.130E+01	3.71E+02	3.30E+00 G
Tc-99m	I 2.9903E-01					2.51E-01	
		140.51	2.990E-01	(	1.286E+00	1.28E+02	8.93E+01 G
BA-133	F -4.8186E-01					3.85E+03	
		356.00	-4.819E-01	(	3.208E+00	1.97E+02	6.20E+01 G
		302.85	0.000E+00	+	9.139E+00	1.00E+03	1.83E+01 G
		383.84	3.950E+00	?	1.567E+01	1.18E+02	8.94E+00 GA
		80.99	8.364E-01	& P	2.910E+00	1.23E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	2.1324E-01					7.54E+02	
			604.71	-4.658E-01	?(	3.000E+00	1.91E+02	9.76E+01 G
			795.87	6.028E-01	?(	1.466E+00	1.01E+02	8.55E+01 G
			569.32	6.724E-01	&(	6.874E+00	2.89E+02	1.54E+01 G
			801.95	2.387E+00	?(	1.131E+01	1.88E+02	8.69E+00 G
			563.24	1.054E+00	?(P	1.263E+01	4.62E+02	8.35E+00 G
CS-137	I	4.6826E-01					1.10E+04	
			661.66	4.683E-01	?(	1.495E+00	9.42E+01	8.52E+01 G
CE-139	F	1.0604E-01					1.38E+02	
			165.85	1.060E-01	?(	1.306E+00	3.62E+02	7.99E+01 G
Ba-140	I	2.0854E+00					1.28E+01	
			537.26	1.547E+00	?(P	3.970E+00	1.02E+02	2.44E+01 G
			162.66	4.196E+00	?(	1.622E+01	1.15E+02	6.22E+00 G
			304.85	-2.258E-01	& P	3.926E+01	2.81E+03	4.29E+00 G
La-140	I	3.0272E-01					1.28E+01	
			1596.21	-1.648E-01	?(P	1.123E+00	9.83E+02	9.54E+01 G
			487.02	6.761E-01	&(	1.850E+00	1.08E+02	4.55E+01 G
			328.76	1.663E+00	&(P	4.532E+00	1.05E+02	2.03E+01 G
			815.77	-2.786E+00	+	9.027E+00	9.63E+01	2.33E+01 G
CE-141	I	-9.3484E-02					3.25E+01	
			145.44	-9.348E-02	?(	1.650E+00	6.45E+02	4.82E+01 G
CE-144	I	-2.9551E+00					2.85E+02	
			133.54	-2.955E+00	&(	1.331E+01	1.35E+02	1.11E+01 G
PM-144	C	2.6938E-01					3.63E+02	
			696.54	2.694E-01	?(	8.935E-01	1.33E+02	9.90E+01 G
			618.06	0.000E+00	-	2.935E+00	1.00E+03	9.91E+01 G
EU-152	F	6.8484E-01					4.94E+03	
			344.29	-7.849E-01	&(	6.655E+00	2.50E+02	2.65E+01 G
			1112.07	-6.084E+00	+	2.089E+01	1.02E+02	1.36E+01 G
			121.78	-2.727E-01	&	3.293E+00	3.55E+02	2.86E+01 G
			778.92	-3.808E+00	&	1.122E+01	1.22E+02	1.29E+01 G
			964.11	1.341E+00	?(	1.829E+01	3.96E+02	1.46E+01 G
			244.69	4.560E+00	&(	3.053E+01	2.00E+02	7.58E+00 G
			1408.00	5.426E-01	?	4.386E+00	3.24E+02	2.10E+01 GA
EU-154	I	-2.1885E+00					3.14E+03	
			873.23	-2.188E+00	?(	1.294E+01	1.70E+02	1.23E+01 G
			123.10	2.126E-02	&	2.392E+00	3.29E+03	4.08E+01 G
			1274.54	0.000E+00	+	5.445E+00	1.00E+03	3.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			723.36	0.000E+00	+	8.653E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	+	1.268E+01	1.00E+03	1.80E+01 G
			996.33	-1.400E+00	+	1.775E+01	3.61E+02	1.06E+01 G
EU-155	I	1.1018E+00					1.81E+03	
			105.31	1.102E+00	(P	4.798E+00	1.30E+02	2.12E+01 G
			86.54	-1.191E+00	+	6.573E+00	1.66E+02	3.07E+01 G
HF-181	F	5.6360E-01					4.24E+01	
			482.00	4.099E-01	&(	1.427E+00	1.03E+02	8.05E+01 G
			133.02	-7.556E-01	+	3.329E+00	1.32E+02	4.33E+01 G
			345.83	1.385E+00	&(	1.173E+01	2.50E+02	1.51E+01 G
			136.30	-5.657E+00	+	2.596E+01	1.37E+02	5.85E+00 G
Ta-182	F	1.6101E+00					1.14E+02	
			1121.30	1.700E+00	?(	5.041E+00	8.77E+01	3.49E+01 G
			1221.41	-3.143E+00	+ P	8.371E+00	8.85E+01	2.70E+01 G
			1189.05	1.417E+00	&(P	1.048E+01	3.19E+02	1.62E+01 G
Hg-203	F	1.0174E-01					4.66E+01	
			279.20	1.017E-01	?(	1.420E+00	4.06E+02	8.15E+01 G
TL-208	N	6.3788E+00					6.98E+02	
			583.02	6.379E+00	@(	8.700E-01	9.82E+00	8.45E+01 G
			277.28	3.151E+00	- P	1.738E+01	1.62E+02	6.31E+00 G
			860.56	4.063E+00	- P	9.683E+00	1.01E+02	1.24E+01 G
pm-146	C	1.2702E+00					2.02E+03	
			747.16	1.270E+00	?(P	3.030E+00	9.80E+01	3.40E+01 G
			735.72	-5.385E-02	% P	4.927E+00	5.13E+03	2.25E+01 G
			453.88	1.349E-01	-	1.512E+00	4.37E+02	6.50E+01 G
y-88	F	1.7219E-02					1.07E+02	
			898.04	1.722E-02	%(	1.180E+00	2.76E+03	9.37E+01 G
			1836.06	-8.494E-02	+	1.200E+00	6.00E+02	9.92E+01 G
Cd-113m		4.7842E+03					5.33E+03	
			263.70	4.784E+03	?(	1.605E+04	9.97E+01	6.00E-03 K
Cf-251	T	2.9702E-02					3.28E+05	
			176.60	2.970E-02	%(	4.915E+00	6.01E+03	1.70E+01 G
			227.00	-5.987E+00	+	1.630E+01	1.01E+02	6.30E+00 GA
Cf-249	T	8.1376E-01					1.28E+05	
			387.95	5.411E-01	?(	2.250E+00	1.23E+02	6.60E+01 G
			333.44	1.974E+00	&(	5.277E+00	1.03E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		3.7314E+00					3.65E+07	
			87.57	3.202E+00	}	5.045E+00	2.08E+01	3.75E+01 GA
			64.28	3.731E+00	&(	1.322E+01	1.06E+02	9.70E+00 G
			86.94	2.516E+00		9.766E+00	1.15E+02	9.04E+00 GA
PB-210	N	9.2888E+00					8.14E+03	
			46.54	9.289E+00	*(P	3.084E+01	1.13E+02	4.25E+00 G
PB-212	N	1.7380E+01					6.98E+02	
			238.63	1.738E+01	(P	1.804E+00	5.79E+00	4.33E+01 G
			300.03	2.898E+01	+ P	1.914E+01	2.82E+01	3.28E+00 GA
PB-214	N	1.1281E+01					5.84E+05	
			351.93	1.128E+01	(P	2.269E+00	1.09E+01	3.76E+01 G
			295.09	1.580E+01	+ P	2.818E+00	1.06E+01	1.93E+01 G
			242.00	4.755E+00	&	3.107E+01	1.95E+02	7.43E+00 GA
BI-207	C	3.5284E-01					1.18E+04	
			569.70	1.588E-01	?(	1.225E+00	2.21E+02	9.77E+01 G
			1063.66	6.074E-01	?(	1.289E+00	9.15E+01	7.45E+01 G
BI-212	N	-5.4709E-01					6.98E+02	
			727.17	-5.471E-01	%(	2.400E+01	1.25E+03	7.55E+00 G
			785.42	2.507E+01		8.341E+01	1.35E+02	1.28E+00 GA
BI-214	N	1.2636E+01					5.84E+05	
			609.31	1.264E+01	(P	1.596E+00	9.22E+00	4.61E+01 G
			1120.29	4.431E+00	- P	1.640E+01	1.10E+02	1.51E+01 G
			1764.49	4.403E+00	- P	1.309E+01	8.77E+01	1.54E+01 G
BI-210M	T	5.4532E-01					1.10E+09	
			265.83	5.453E-01	(	1.922E+00	1.05E+02	5.00E+01 G
			304.90	-3.690E-02	& P	6.017E+00	2.65E+03	2.80E+01 G
AC-228	N	2.0312E+01					2.10E+03	
			911.07	2.070E+01	(	2.587E+00	1.02E+01	2.90E+01 G
			968.97	1.884E+01	(	3.475E+00	1.42E+01	1.75E+01 G
			338.32	2.151E+01	(	5.898E+00	1.42E+01	1.20E+01 G
			93.35	2.415E+01		1.393E+01	1.94E+01	5.56E+00 XA
TH-227	N	-2.6521E+00					7.95E+03	
			50.14	-2.652E+00	?(	1.710E+01	2.25E+02	8.00E+00 G
			256.24	-4.904E+00	+ P	1.461E+01	1.33E+02	7.00E+00 G
TH-229	N	5.9423E+00					2.68E+06	
			193.51	5.942E+00	?(P	1.752E+01	1.09E+02	4.40E+00 G
			210.85	-1.330E+01	+	3.659E+01	1.03E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-5.5338E+00					1.63E+12	
			63.29	-5.534E+00	@(P	3.988E+01	2.11E+02	3.81E+00 G
			92.59	-1.699E+01	+ P	3.357E+01	3.72E+01	5.58E+00 G
PA-231	N	2.7202E+00					1.20E+07	
			302.65	0.000E+00	?(	5.814E+01	1.00E+03	2.88E+00 G
			300.07	5.905E+00	(	6.679E+01	3.33E+02	2.46E+00 G
PA-233	C	-1.0594E+00					7.82E+08	
			312.01	-1.059E+00	?(	3.749E+00	1.05E+02	3.60E+01 G
			300.18	0.000E+00	+	2.685E+01	1.00E+03	6.20E+00 G
PA-234	N	4.8841E-01					1.63E+12	
			131.29	-1.807E+00	?(	7.791E+00	1.29E+02	1.80E+01 G
			946.02	1.252E+00	&(	8.583E+00	2.80E+02	1.34E+01 G
			569.47	-2.873E+00	&	1.483E+01	1.50E+02	8.20E+00 G
			883.24	3.727E+00	?(	1.366E+01	1.07E+02	9.60E+00 G
			880.53	5.940E+00	?	1.899E+01	9.35E+01	6.00E+00 GA
PA-234M	N	-8.3833E+01					1.63E+12	
			1001.00	-8.383E+01	?(P	2.399E+02	8.38E+01	8.37E-01 G
			766.41	1.151E+02	+ P	4.250E+02	1.08E+02	2.94E-01 G
U-235	N	2.4905E-01					2.57E+11	
			143.79	2.491E-01	%(P	1.068E+01	1.26E+03	1.10E+01 G
			205.33	-9.247E-01	& P	1.882E+01	6.45E+02	5.01E+00 G
			163.38	-4.752E+00	+ P	2.037E+01	1.55E+02	5.08E+00 G
AM-241	T	1.5700E-01					1.58E+05	
			59.54	1.570E-01	?(	3.521E+00	7.80E+02	3.59E+01 G
Np-237	F	-2.7097E+00					2.14E+06	
			86.49	-2.710E+00	(	1.551E+01	1.72E+02	1.31E+01 G
Ir-192	F	5.4449E-01					7.40E+01	
			316.49	3.706E-01	?(	1.273E+00	1.02E+02	8.70E+01 G
			468.06	0.000E+00	&	3.194E+00	1.00E+03	5.18E+01 G
			308.44	1.021E+00	?(	4.147E+00	1.20E+02	3.18E+01 G
Cs-136	F	-6.1936E-01					1.30E+01	
			818.50	-6.194E-01	?(	2.400E+00	1.15E+02	1.00E+02 G
			1048.07	-1.177E+00	+	2.547E+00	6.55E+01	8.00E+01 G
			340.57	-4.401E-01	+	3.862E+00	2.59E+02	4.69E+01 G
Np-239	T	1.1422E-01					2.36E+00	
			103.70	9.878E-01	?	4.102E+00	1.24E+02	2.40E+01 X
			106.13	1.142E-01	%(	4.515E+00	1.16E+03	2.27E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		99.50	-1.050E+00	&	7.131E+00	2.01E+02	1.50E+01 X
Nd-147	2.3869E+00						1.11E+01
		531.00	2.387E+00	(	5.934E+00	9.80E+01	1.30E+01 G
		91.10	0.000E+00	-	6.524E+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	141.	-9.	-0.005	224.57	-2.652E+00	
AM-241	59.54	192.	3.	0.002	779.60	1.570E-01	
TH-234	63.29	324.	-12.	-0.007	210.54	-5.534E+00	P
BA-133	80.99	204.	20.	0.011	122.84	8.364E-01	P
Np-237	86.49	962.	-26.	-0.014	171.69	-2.710E+00	
EU-155	86.54	949.	-26.	-0.015	165.58	-1.191E+00	
TH-234	92.59	866.	-71.	-0.039	37.20	-1.699E+01	P
Gd-153	97.50	261.	-6.	-0.003	382.97	-2.638E-01	
Np-239	99.50	286.	-12.	-0.007	201.38	-1.050E+00	
Gd-153	103.20	227.	18.	0.010	119.29	1.088E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	103.70	245.	18.	0.010	123.74	9.878E-01	
EU-155	105.31	263.	18.	0.010	129.78	1.102E+00	P
EU-152	121.78	224.	-6.	-0.003	355.12	-2.727E-01	
CO-57	122.06	197.	-14.	-0.008	147.62	-2.075E-01	
PA-234	131.29	494.	-25.	-0.014	129.07	-1.807E+00	
HF-181	133.02	519.	-25.	-0.014	131.92	-7.556E-01	
CE-144	133.54	544.	-25.	-0.014	134.88	-2.955E+00	
HF-181	136.30	569.	-25.	-0.014	137.40	-5.657E+00	
CO-57	136.47	570.	-25.	-0.014	137.61	-3.100E+00	
Tc-99m	140.51	294.	19.	0.011	128.25	2.990E-01	
CE-141	145.44	141.	-3.	-0.002	644.92	-9.348E-02	
Ba-140	162.66	204.	18.	0.010	115.21	4.196E+00	
U-235	163.38	214.	-17.	-0.009	154.76	-4.752E+00	P
CE-139	165.85	220.	6.	0.003	362.10	1.060E-01	
TH-229	193.51	94.	16.	0.009	109.02	5.942E+00	P
U-235	205.33	132.	-3.	-0.002	644.90	-9.247E-01	P
TH-229	210.85	173.	-23.	-0.013	102.76	-1.330E+01	
Cf-251	227.00	137.	-21.	-0.012	101.44	-5.987E+00	
EU-152	244.69	659.	18.	0.010	200.07	4.560E+00	
TH-227	256.24	114.	-18.	-0.010	133.36	-4.904E+00	P
Cd-113m	263.70	96.	14.	0.008	99.67	4.784E+03	
BI-210M	265.83	94.	14.	0.008	104.50	5.453E-01	
Hg-203	279.20	130.	4.	0.002	406.20	1.017E-01	
I-131	284.30	73.	12.	0.006	140.41	3.987E+00	
PA-231	300.07	243.	7.	0.004	333.17	5.905E+00	
Ir-192	308.44	147.	15.	0.008	120.48	1.021E+00	
PA-233	312.01	153.	-17.	-0.009	105.40	-1.059E+00	
Ir-192	316.49	99.	14.	0.008	101.99	3.706E-01	
CR-51	320.08	99.	13.	0.007	114.51	2.908E+00	P
La-140	328.76	63.	15.	0.008	105.19	1.663E+00	P
Cf-249	333.44	48.	13.	0.007	102.77	1.974E+00	
Cs-136	340.57	248.	-9.	-0.005	259.04	-4.401E-01	
EU-152	344.29	231.	-9.	-0.005	250.15	-7.849E-01	
HF-181	345.83	230.	9.	0.005	249.97	1.385E+00	
BA-133	356.00	282.	-12.	-0.007	197.35	-4.819E-01	
I-131	364.48	75.	-18.	-0.010	107.68	-5.417E-01	P
BA-133	383.84	121.	14.	0.008	117.53	3.950E+00	
Cf-249	387.95	135.	14.	0.008	123.19	5.411E-01	
SN-113	391.69	172.	-16.	-0.009	120.48	-6.521E-01	P
SB-125	427.88	70.	-14.	-0.008	117.42	-1.294E+00	
AG-108M	433.94	55.	-11.	-0.006	129.68	-3.441E-01	
pm-146	453.88	44.	3.	0.002	436.74	1.349E-01	
SB-125	463.37	115.	-13.	-0.007	144.80	-3.749E+00	P
BE-7	477.59	93.	-7.	-0.004	194.10	-2.066E+00	
HF-181	482.00	56.	11.	0.006	102.68	4.099E-01	
La-140	487.02	28.	10.	0.006	108.32	6.761E-01	
RU-103	497.05	40.	3.	0.002	421.48	1.019E-01	P
RH-106	511.86	215.	-16.	-0.009	131.99	-2.552E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Nd-147	531.00	20.	9.	0.005	97.98	2.387E+00		
Ba-140	537.26	33.	11.	0.006	101.86	1.547E+00		P
CS-134	563.24	36.	3.	0.001	462.29	1.054E+00		P
CS-134	569.32	36.	3.	0.002	288.68	6.724E-01		
PA-234	569.47	49.	-7.	-0.004	149.60	-2.873E+00		
BI-207	569.70	47.	4.	0.002	220.92	1.588E-01		
SB-125	600.50	370.	-15.	-0.008	186.14	-2.962E+00		
SB-124	602.73	298.	-13.	-0.007	89.00	-4.930E-01		P
CS-134	604.71	284.	-13.	-0.007	191.03	-4.658E-01		
RH-106	621.92	291.	-14.	-0.008	180.09	-5.017E+00		
SB-125	635.89	45.	-14.	-0.008	74.49	-4.519E+00		
I-131	636.97	61.	-2.	-0.001	665.45	-1.166E+00		P
AG-110M	657.76	37.	-8.	-0.005	109.33	-3.376E-01		
CS-137	661.66	43.	10.	0.006	94.24	4.683E-01		
PM-144	696.54	17.	7.	0.004	133.23	2.694E-01		
NB-94	702.63	35.	-4.	-0.002	392.37	-1.559E-01		P
SB-124	722.79	63.	10.	0.006	116.62	3.804E+00		
ZR-95	724.20	70.	2.	0.001	595.82	1.865E-01		
pm-146	747.16	22.	10.	0.006	98.01	1.270E+00		P
ZR-95	756.73	13.	3.	0.001	290.41	2.043E-01		P
AG-110M	763.94	60.	-14.	-0.007	85.91	-2.597E+00		
PA-234M	766.41	32.	8.	0.004	107.78	1.151E+02		P
EU-152	778.92	43.	-11.	-0.006	122.23	-3.808E+00		
BI-212	785.42	22.	7.	0.004	134.72	2.507E+01		
CS-134	795.87	30.	12.	0.006	100.71	6.028E-01		
CS-134	801.95	17.	5.	0.003	187.90	2.387E+00		
CO-58	810.78	75.	-14.	-0.008	89.05	-6.473E-01		
La-140	815.77	89.	-14.	-0.008	96.28	-2.786E+00		
Cs-136	818.50	117.	-14.	-0.008	114.82	-6.194E-01		
MN-54	834.85	42.	-15.	-0.009	92.54	-7.079E-01		
Co-56	846.77	33.	-10.	-0.005	129.48	-4.479E-01		
NB-94	871.10	28.	7.	0.004	119.37	3.157E-01		
EU-154	873.23	44.	-6.	-0.003	170.18	-2.188E+00		
PA-234	880.53	21.	7.	0.004	93.48	5.940E+00		
PA-234	883.24	28.	7.	0.004	106.69	3.727E+00		
AG-110M	884.68	36.	6.	0.004	138.20	4.198E-01		
AG-110M	937.49	42.	-13.	-0.007	109.33	-1.892E+00		
PA-234	946.02	19.	3.	0.002	280.36	1.252E+00		
EU-152	964.11	113.	4.	0.002	395.77	1.341E+00		
EU-154	996.33	51.	-3.	-0.002	360.79	-1.400E+00		
PA-234M	1001.00	58.	-13.	-0.007	83.78	-8.383E+01		P
Co-56	1037.84	30.	-14.	-0.008	79.44	-5.389E+00		P
Cs-136	1048.07	56.	-17.	-0.010	65.46	-1.177E+00		
RH-106	1050.36	44.	12.	0.006	86.36	4.037E+01		
BI-207	1063.66	10.	8.	0.005	91.49	6.074E-01		
Ga-68	1077.40	25.	-3.	-0.002	370.93	-5.917E+00		
FE-59	1099.25	10.	7.	0.004	109.19	6.825E-01		P
EU-152	1112.07	103.	-15.	-0.008	101.98	-6.084E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZN-65	1115.55	89.	-8.	-0.004	179.75	-8.532E-01		
Sc-46	1120.55	71.	10.	0.006	122.62	5.761E-01		
CO-60	1173.24	20.	1.	0.001	988.26	5.942E-02		
Co-56	1238.28	27.	13.	0.007	91.66	1.262E+00		P
NA-22	1274.53	32.	-3.	-0.002	272.85	-1.900E-01		
FE-59	1291.60	27.	-7.	-0.004	180.28	-9.867E-01		
CO-60	1332.50	16.	4.	0.002	232.74	2.621E-01		
AG-110M	1384.30	6.	6.	0.004	90.56	1.803E+00		P
EU-152	1408.00	5.	2.	0.001	324.35	5.426E-01		
La-140	1596.21	6.	-2.	-0.001	983.14	-1.648E-01		P
SB-124	1690.98	6.	-2.	-0.001	863.47	-3.924E-01		P
Co-56	1771.35	21.	8.	0.004	92.15	4.079E+00		
y-88	1836.06	6.	-1.	-0.001	600.00	-8.494E-02		

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	-2.0662E+00	-2.0662E+00	1.941E+02%	1.37E+01
NA-22	#A	-1.8997E-01	-1.8997E-01	2.728E+02%	1.84E+00
K-40		2.6513E+02	2.6513E+02	5.091E+00%	1.05E+01
Sc-46	#A	2.8003E-01	2.8003E-01	1.226E+02%	1.59E+00
CR-51	#A	2.9081E+00	2.9081E+00	1.145E+02%	1.13E+01
MN-54	#A	-7.0793E-01	-7.0793E-01	9.254E+01%	1.51E+00
FE-59	#A	6.8250E-01	6.8251E-01	1.092E+02%	1.76E+00
Co-56	#A	2.3282E-01	2.3282E-01	7.932E+01%	1.36E+00
CO-57	#A	-2.0745E-01	-2.0745E-01	1.476E+02%	1.03E+00
CO-58	#A	-6.4732E-01	-6.4732E-01	8.905E+01%	1.94E+00
CO-60	#A	1.6079E-01	1.6079E-01	2.327E+02%	1.40E+00
ZN-65	#A	-8.5322E-01	-8.5322E-01	1.797E+02%	5.25E+00
NB-94	#A	8.2246E-02	8.2246E-02	1.194E+02%	1.24E+00
ZR-95	#A	1.9636E-01	1.9636E-01	2.904E+02%	1.54E+00
NB-95	#A	7.1707E-03	7.1707E-03	7.393E+03%	1.86E+00
RU-103	#A	1.0194E-01	1.0194E-01	4.215E+02%	1.11E+00
RH-106	#A	1.1452E+00	1.1452E+00	8.636E+01%	3.04E+01
AG-108M	#A	-3.4410E-01	-3.4410E-01	1.297E+02%	1.17E+00
AG-110M	#A	7.6618E-01	7.6618E-01	8.261E+01%	2.01E+00
SN-113	#A	-6.5208E-01	-6.5208E-01	1.205E+02%	2.62E+00
SB-124	#A	-6.7114E-02	-6.7115E-02	7.335E+01%	3.04E+00
SB-125	#A	-1.2937E+00	-1.2937E+00	1.174E+02%	3.94E+00
I-131	#A	-2.2517E-01	-2.2518E-01	8.847E+01%	1.31E+00
Gd-153	#A	3.0498E-01	3.0498E-01	1.193E+02%	3.43E+00
Ga-68	#A	-5.8878E+00	-5.9170E+00	3.709E+02%	5.13E+01
Tc-99m	#A	2.9876E-01	2.9903E-01	1.283E+02%	1.29E+00
BA-133	#A	-4.8186E-01	-4.8186E-01	1.973E+02%	3.21E+00

CS-134 #A	2.1324E-01	2.1324E-01	1.007E+02%	3.00E+00
CS-137 #A	4.6826E-01	4.6826E-01	9.424E+01%	1.50E+00
CE-139 #A	1.0604E-01	1.0604E-01	3.621E+02%	1.31E+00
Ba-140 #A	2.0854E+00	2.0854E+00	7.689E+01%	3.97E+00
La-140 #A	3.0272E-01	3.0272E-01	1.052E+02%	1.12E+00
CE-141 #A	-9.3483E-02	-9.3484E-02	6.449E+02%	1.65E+00
CE-144 #A	-2.9551E+00	-2.9551E+00	1.349E+02%	1.33E+01
PM-144 #A	2.6938E-01	2.6938E-01	1.332E+02%	8.93E-01
EU-152 #A	6.8484E-01	6.8484E-01	1.697E+02%	6.66E+00
EU-154 #A	-2.1885E+00	-2.1885E+00	1.702E+02%	1.29E+01
EU-155 #A	1.1018E+00	1.1018E+00	1.298E+02%	4.80E+00
HF-181 #A	5.6359E-01	5.6360E-01	1.027E+02%	1.43E+00
Ta-182 #A	1.6101E+00	1.6101E+00	8.774E+01%	5.04E+00
Hg-203 #A	1.0174E-01	1.0174E-01	4.062E+02%	1.42E+00
TL-208 #	6.3788E+00	6.3788E+00	9.821E+00%	8.70E-01
pm-146 #A	1.2702E+00	1.2702E+00	9.801E+01%	3.03E+00
y-88 #A	1.7219E-02	1.7219E-02	2.755E+03%	1.18E+00
Cd-113m#A	4.7842E+03	4.7842E+03	9.967E+01%	1.61E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	4.89E+01
Cf-251 #A	2.9702E-02	2.9702E-02	6.011E+03%	4.91E+00
Cf-249 #A	8.1376E-01	8.1376E-01	8.022E+01%	2.25E+00
Sn-126 A	3.7314E+00	3.7314E+00	1.059E+02%	1.32E+01
PB-210 #A	9.2888E+00	9.2888E+00	1.126E+02%	3.08E+01
PB-212	1.7380E+01	1.7380E+01	5.786E+00%	1.80E+00
PB-214	1.1281E+01	1.1281E+01	1.091E+01%	2.27E+00
BI-207 #A	3.5284E-01	3.5284E-01	9.149E+01%	1.22E+00
BI-212 #A	-5.4709E-01	-5.4709E-01	1.253E+03%	2.40E+01
BI-214	1.2636E+01	1.2636E+01	9.218E+00%	1.60E+00
BI-210M#A	5.4532E-01	5.4532E-01	1.045E+02%	1.92E+00
AC-228	2.0312E+01	2.0312E+01	7.502E+00%	2.59E+00
TH-227 #A	-2.6521E+00	-2.6521E+00	2.246E+02%	1.71E+01
TH-229 #A	5.9423E+00	5.9423E+00	1.090E+02%	1.75E+01
TH-234 #A	-5.5338E+00	-5.5338E+00	2.105E+02%	3.99E+01
PA-231 #A	2.7202E+00	2.7202E+00	3.332E+02%	5.81E+01
PA-233 #A	-1.0594E+00	-1.0594E+00	1.054E+02%	3.75E+00
PA-234 #A	4.8841E-01	4.8841E-01	1.067E+02%	7.79E+00
PA-234M#A	-8.3833E+01	-8.3833E+01	8.378E+01%	2.40E+02
U-235 #A	2.4905E-01	2.4905E-01	1.264E+03%	1.07E+01
AM-241 #A	1.5700E-01	1.5700E-01	7.796E+02%	3.52E+00
Np-237 #A	-2.7097E+00	-2.7097E+00	1.717E+02%	1.55E+01
Ir-192 #A	5.4449E-01	5.4449E-01	7.893E+01%	1.27E+00
Cs-136 #A	-6.1935E-01	-6.1936E-01	1.148E+02%	2.40E+00
Np-239 #A	1.1421E-01	1.1422E-01	1.161E+03%	4.52E+00
Nd-147 #A	2.3869E+00	2.3869E+00	9.798E+01%	5.93E+00

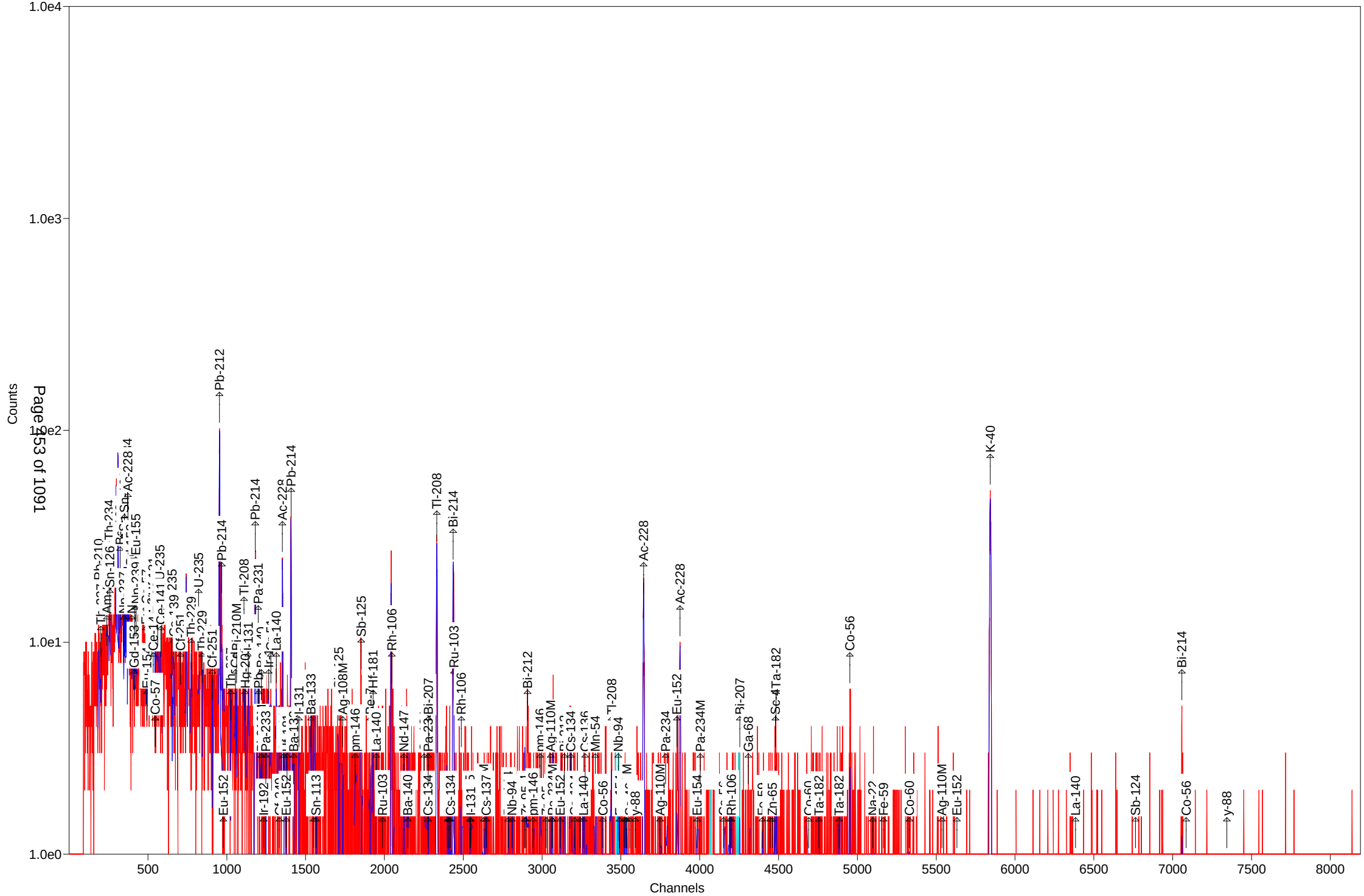
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - 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) 3.331E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.3311322E+02 Bq/Sample

264540_Gamma_160-18553-A-1-C DU. 17_Gamma_20161133.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20162252

Sample Description: 264540_Gamma_160-18553-A-2-B
Detector: Detector #14
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-2-B

Decay to Time: 9/1/2016 14:34 Live Time: 1800 sec
Acquisition Time: 9/1/2016 14:35:36 Real Time: 1809 sec
Analysis Time: 9/1/2016 15:06 Dead Time: 0.49 %
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	3.513E+00	98.5	3.461E+00	3.466E+00	1.171E+01
NA-22	4.813E-01	105.4	5.070E-01	5.076E-01	1.749E+00
K-40	2.498E+02	5.6	1.397E+01	1.893E+01	9.895E+00
Sc-46	4.060E-01	114.3	4.640E-01	4.645E-01	1.595E+00
CR-51	3.078E+00	108.7	3.345E+00	3.349E+00	1.130E+01
MN-54	-2.127E-01	307.1	6.532E-01	6.533E-01	1.683E+00
FE-59	-9.152E-01	33.7	3.081E-01	3.115E-01	3.428E+00
Co-56	6.306E-01	99.3	6.261E-01	6.269E-01	1.321E+00
CO-57	6.949E-02	416.7	2.896E-01	2.896E-01	9.881E-01
CO-58	-4.598E-01	139.2	6.400E-01	6.404E-01	1.902E+00
CO-60	1.763E-01	213.2	3.757E-01	3.758E-01	1.379E+00
ZN-65	9.011E-01	152.0	1.370E+00	1.371E+00	4.720E+00
NB-94	-3.122E-01	215.8	6.738E-01	6.740E-01	1.585E+00
ZR-95	4.905E-01	202.8	9.947E-01	9.950E-01	2.456E+00
NB-95	2.133E-02	2849.8	6.078E-01	6.078E-01	2.128E+00
RU-103	3.333E-01	127.5	4.249E-01	4.253E-01	1.077E+00
RH-106	-4.898E-01	1224.2	5.996E+00	5.996E+00	3.458E+01
AG-108M	-2.227E-02	1703.7	3.794E-01	3.794E-01	1.033E+00
AG-110M	3.519E-01	80.4	2.830E-01	2.835E-01	2.449E+00
SN-113	2.686E-01	265.4	7.130E-01	7.131E-01	2.440E+00
SB-124	2.692E-01	37.8	1.017E-01	1.027E-01	3.611E+00
SB-125	1.486E+00	69.4	1.032E+00	1.035E+00	3.262E+00
I-131	1.346E-01	108.1	1.455E-01	1.457E-01	1.351E+00
Gd-153	2.160E-01	330.6	7.141E-01	7.142E-01	3.583E+00
Ga-68	-1.125E+01	224.4	2.523E+01	2.524E+01	5.850E+01
Tc-99m	-6.638E-02	602.2	3.998E-01	3.998E-01	1.355E+00
BA-133	-6.519E-01	173.6	1.131E+00	1.132E+00	3.801E+00
CS-134	-3.817E-01	147.5	5.629E-01	5.632E-01	3.656E+00
CS-137	-1.026E-01	489.2	5.019E-01	5.019E-01	1.772E+00
CE-139	3.525E-01	116.4	4.101E-01	4.115E-01	1.374E+00
Ba-140	3.671E+00	37.2	1.364E+00	1.377E+00	3.135E+00
La-140	9.647E-01	32.0	3.088E-01	3.130E-01	6.716E-01
CE-141	5.224E-01	128.9	6.734E-01	6.739E-01	2.259E+00

CE-144	0.000E+00	1.#INF	1.283E+00	1.283E+00	1.198E+01
PM-144	-2.641E-01	250.0	6.603E-01	6.605E-01	1.347E+00
EU-152	1.325E+00	65.4	8.661E-01	8.688E-01	7.577E+00
EU-154	2.046E+00	111.4	2.279E+00	2.281E+00	1.102E+01
EU-155	-3.420E-02	3638.8	1.245E+00	1.245E+00	5.166E+00
HF-181	4.735E-01	104.2	4.935E-01	4.941E-01	1.671E+00
Ta-182	-2.447E+00	101.3	2.478E+00	2.481E+00	8.362E+00
Hg-203	3.485E-01	105.4	3.672E-01	3.677E-01	1.239E+00
TL-208	8.242E+00	7.5	6.173E-01	7.509E-01	4.049E-01
pm-146	1.418E+00	97.1	1.376E+00	1.378E+00	3.348E+00
y-88	2.788E-01	196.7	5.483E-01	5.485E-01	1.336E+00
Cd-113m	-1.706E+03	302.7	5.164E+03	5.165E+03	1.775E+04
Cd-109	1.062E-01	12066.4	1.282E+01	1.282E+01	4.318E+01
Cf-251	1.583E+00	108.5	1.718E+00	1.724E+00	4.631E+00
Cf-249	2.640E-01	224.9	5.939E-01	5.940E-01	2.427E+00
Sn-126	3.296E+00	131.1	4.321E+00	4.325E+00	1.449E+01
PB-210	2.215E+01	42.9	9.495E+00	9.584E+00	2.660E+01
PB-212	1.889E+01	5.6	1.065E+00	1.621E+00	1.937E+00
PB-214	1.558E+01	7.7	1.207E+00	1.453E+00	2.069E+00
BI-207	1.984E-01	158.2	3.139E-01	3.140E-01	1.097E+00
BI-212	3.095E+01	20.3	6.271E+00	6.473E+00	1.132E+01
BI-214	1.519E+01	8.3	1.263E+00	1.490E+00	1.633E+00
BI-210M	-7.915E-01	126.9	1.004E+00	1.006E+00	2.469E+00
AC-228	1.854E+01	10.8	2.010E+00	2.222E+00	2.120E+00
TH-227	1.445E+00	162.3	2.345E+00	2.346E+00	1.798E+01
TH-229	1.275E+00	595.6	7.592E+00	7.593E+00	2.081E+01
TH-234	6.739E+00	33.9	2.288E+00	2.315E+00	3.700E+01
PA-231	0.000E+00	1.#INF	6.805E+00	6.806E+00	6.136E+01
PA-233	8.577E-01	156.2	1.340E+00	1.340E+00	4.521E+00
PA-234	1.230E+00	96.3	1.185E+00	1.186E+00	7.243E+00
PA-234M	-1.187E+02	57.1	6.775E+01	6.802E+01	3.454E+02
U-235	2.134E+00	132.0	2.818E+00	2.820E+00	9.457E+00
AM-241	8.078E-01	154.5	1.248E+00	1.249E+00	3.546E+00
Np-237	0.000E+00	1.#INF	3.845E+00	3.845E+00	1.280E+01
Ir-192	7.834E-02	87.9	6.884E-02	6.900E-02	1.404E+00
Cs-136	5.162E-01	100.6	5.195E-01	5.203E-01	1.764E+00
Np-239	1.014E+00	116.7	1.183E+00	1.185E+00	3.971E+00
Nd-147	9.933E-01	161.8	1.607E+00	1.608E+00	6.970E+00
Total	4.261E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-2-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20162252.An1

Acquisition information
Start time: 9/1/2016 2:35:36 PM
Live time: 1800
Real time: 1809
Dead time: 0.49 %
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 2:34:00 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. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2088

***** 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
46.56	37.	42.86	1.57	2.171E-02	46.54	4.250	PBC<MDA	PB210
59.54	16.	154.49	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.27	26.	71.69	0.66	3.280E-02	63.29	3.810	PBC<MDA	TH234
64.46	19.	131.09	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.78	151.	15.85	0.78	3.813E-02				
77.19	317.	7.89	0.78	3.900E-02				
87.31	114.	22.97	0.96	4.181E-02	86.54	30.700	4.969E+00	EU155
					86.94	9.040	1.684E+01	Sn126
					87.57	37.500	4.046E+00	Sn126
					88.04	3.790	3.994E+01	Cd109
91.10	23.	161.77	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
93.00	108.	24.60	0.55	4.286E-02	92.59	5.584	1.952E+01	TH234
					93.35	5.561	2.526E+01	AC228
99.50	20.	107.27	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
103.20	8.	330.58	0.81	4.392E-02	103.20	21.800	PBC<MDA	Gd153
106.13	18.	116.74	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
121.78	18.	102.90	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
122.06	5.	416.72	0.83	4.378E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
143.79	17.	132.04	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
145.51	19.	128.90	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	20.	116.35	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
176.60	18.	108.54	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
193.51	3.	595.56	0.90	3.443E-02	193.51	4.400	PBC<MDA	TH229
238.24	448.	5.80	1.13	2.935E-02	238.63	43.300	1.920E+01	PB212
241.64	20.	191.91	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	20.	196.52	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
256.24	10.	162.28	0.96	2.775E-02	256.24	7.000	PBC<MDA	TH227
276.41	16.	76.42	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
279.20	13.	105.38	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
284.30	12.	108.05	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.79	139.	12.61	1.15	2.489E-02	295.09	19.300	1.567E+01	PB214
299.63	49.	23.15	0.95	2.455E-02	300.03	3.280	3.358E+01	PB212
					300.07	2.460	4.478E+01	PA231
312.01	13.	156.19	1.02	2.381E-02	312.01	36.000	PBC<MDA	PA233
320.08	13.	108.69	1.03	2.334E-02	320.08	9.940	PBC<MDA	CR51
328.76	32.	46.82	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	7.	224.92	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
337.82	120.	12.84	0.94	2.238E-02	338.32	12.010	2.494E+01	AC228
351.64	234.	8.01	1.17	2.169E-02	351.93	37.600	1.553E+01	PB214
383.84	14.	115.35	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	2.	904.42	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
391.69	6.	265.39	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	159.13	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
463.37	15.	69.45	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	107.86	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	98.52	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	104.23	1.18	1.691E-02	482.00	80.500	PBC<MDA	HF181
497.05	9.	127.50	1.19	1.650E-02	497.05	90.900	PBC<MDA	RU103
511.86	36.	57.95	2.46	1.612E-02	511.86	20.000	PBC<MDA	RH106
531.00	3.	324.89	1.23	1.566E-02	531.00	13.000	PBC<MDA	Nd147
537.26	25.	37.17	1.23	1.551E-02	537.26	24.390	3.671E+00	Ba140
563.24	5.	232.89	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.47	8.	96.29	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.736E+00	PA234
					569.70	97.740	3.135E-01	BI207
569.80	5.	158.23	1.26	1.481E-02	569.32	15.380	1.260E+00	CS134
					569.47	8.200	2.364E+00	PA234
					569.70	97.740	1.984E-01	BI207
582.94	182.	7.49	1.47	1.453E-02	583.02	84.500	8.242E+00	TL208
609.10	177.	8.32	1.54	1.403E-02	609.31	46.090	1.519E+01	BI214
635.89	2.	361.66	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
657.76	8.	80.40	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
722.79	8.	174.10	1.40	1.223E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.751E-01	AG108M
					723.36	20.220	1.686E+00	EU154
727.13	51.	20.26	1.84	1.217E-02	727.17	7.550	3.095E+01	BI212
747.16	10.	97.07	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
756.73	6.	202.79	1.43	1.179E-02	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	12.	85.96	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.978E+02	PA234M
818.50	10.	100.62	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136
846.77	11.	99.28	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
860.28	36.	16.67	0.40	1.062E-02	860.56	12.420	1.516E+01	TL208
880.53	9.	90.98	1.53	1.042E-02	880.53	6.000	PBC<MDA	PA234
883.24	3.	276.44	1.53	1.040E-02	883.24	9.600	PBC<MDA	PA234
889.28	8.	114.28	1.54	1.034E-02	889.28	99.984	PBC<MDA	Sc46
898.04	5.	196.66	1.54	1.026E-02	898.04	93.700	PBC<MDA	y88
910.92	98.	10.84	1.66	1.014E-02	911.07	29.000	1.845E+01	AC228
946.02	5.	164.92	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
964.11	8.	146.21	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.86	57.	19.29	1.60	9.642E-03	968.97	17.460	1.869E+01	AC228
1004.77	11.	111.37	1.63	9.360E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	3.	437.41	1.65	9.116E-03	1037.84	14.130	PBC<MDA	Co56
1112.07	8.	118.47	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	7.	152.03	1.71	8.592E-03	1115.55	50.600	PBC<MDA	ZN65
1120.17	22.	28.53	1.72	8.562E-03	1120.29	15.100	9.439E+00	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	1.	939.72	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	7.	145.80	1.79	7.975E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	7.	105.36	1.83	7.700E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.367E+00	EU154
1332.50	4.	213.16	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	4.	177.92	1.91	7.192E-03	1384.30	24.290	PBC<MDA	AG110M
1460.76	330.	5.59	1.81	6.879E-03	1460.83	10.670	2.498E+02	K40
1596.21	11.	32.01	2.04	6.391E-03	1596.21	95.400	9.647E-01	La140
1690.98	7.	37.80	2.10	6.091E-03	1690.98	47.790	PBC<MDA	SB124

********** 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
298.50	74.83	208.	151.	3.950E+03	15.85	0.777	- sD
308.13	77.23	155.	317.	8.138E+03	7.89	0.780	- 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	185.64	46.56	79.	37.	0.020	42.86	1.573s
AM-241	237.55	59.54	210.	16.	0.009	154.49	0.761s
TH-234	252.55	63.29	299.	-10.	-0.005	249.70	0.765
Sn-126	256.52	64.28	307.	19.	0.011	131.09	0.766s
BA-133	323.33	80.99	256.	-26.	-0.015	90.96	0.784s
Np-237	345.33	86.49	696.	0.	0.000	119.28	0.789A
EU-155	345.54	86.54	455.	-28.	-0.016	108.39	0.790s
Sn-126	349.65	87.57	482.	46.	0.026	43.92	0.791D
Nd-147	363.77	91.10	696.	23.	0.013	161.77	0.794s
TH-234	369.72	92.59	184.	61.	0.034	33.95	0.796D
AC-228	372.76	93.35	208.	39.	0.021	55.20	0.797D
Np-239	397.36	99.50	151.	20.	0.011	107.27	0.803s
Gd-153	412.15	103.20	317.	8.	0.004	330.58	0.807s
Np-239	414.15	103.70	325.	0.	0.000	1000.00	0.807s
Np-239	423.87	106.13	218.	18.	0.010	116.74	0.810s
EU-152	486.43	121.78	170.	18.	0.010	102.90	0.826s
CO-57	487.58	122.06	188.	5.	0.003	416.72	0.826s
EU-154	491.73	123.10	232.	-7.	-0.004	296.26	0.828s
PA-234	524.50	131.29	444.	-12.	-0.007	243.38	0.836s
HF-181	531.42	133.02	457.	0.	0.000	1000.00	0.838
CE-144	533.47	133.54	457.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	457.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	459.	-24.	-0.013	128.24	0.841s
Tc-99m	561.35	140.51	338.	-4.	-0.002	602.21	0.845s
U-235	574.45	143.79	257.	17.	0.010	132.04	0.849s
CE-141	581.07	145.44	281.	19.	0.010	128.90	0.850s
Ba-140	649.93	162.66	270.	-20.	-0.011	113.60	0.868
CE-139	662.70	165.85	251.	20.	0.011	116.35	0.871
Cf-251	705.68	176.60	113.	18.	0.010	108.54	0.882s
TH-229	773.30	193.51	135.	3.	0.002	595.56	0.899s
U-235	820.58	205.33	164.	-23.	-0.013	92.13	0.912s
TH-229	842.65	210.85	213.	-26.	-0.014	103.83	0.917s
Cf-251	907.23	227.00	137.	-5.	-0.003	448.18	0.933s
PB-212	953.75	238.63	80.	431.	0.240	5.64	0.945D
PB-214	967.21	242.00	730.	20.	0.011	191.91	0.948s
EU-152	977.99	244.69	729.	20.	0.011	196.52	0.951s
TH-227	1024.17	256.24	80.	10.	0.006	162.28	0.962
Cd-113m	1054.01	263.70	112.	-5.	-0.003	302.65	0.970s
BI-210M	1062.53	265.83	151.	-19.	-0.011	126.90	0.972s
TL-208	1108.33	277.28	67.	16.	0.009	76.42	0.983s
Hg-203	1115.99	279.20	91.	13.	0.007	105.38	0.985s
I-131	1136.39	284.30	48.	12.	0.007	108.05	0.990s
PB-214	1178.33	294.79	46.	135.	0.075	13.05	1.152s
PB-212	1197.71	299.63	21.	49.	0.027	23.15	0.946s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1199.46	300.07	268.	-10.	-0.005	241.50	1.006s
PA-233	1199.90	300.18	258.	0.	0.000	1000.00	1.006
PA-231	1209.78	302.65	258.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	258.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	258.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	258.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	258.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	207.	13.	0.007	156.19	1.018s
Ir-192	1265.13	316.49	111.	-11.	-0.006	138.77	1.022s
CR-51	1279.51	320.08	91.	13.	0.007	108.69	1.026s
La-140	1314.21	328.76	55.	32.	0.018	46.82	1.034
Cf-249	1332.92	333.44	62.	7.	0.004	224.92	1.039s
AC-228	1350.45	337.82	28.	120.	0.067	12.84	0.939s
Cs-136	1361.44	340.57	288.	-15.	-0.009	157.88	1.045s
EU-152	1376.30	344.29	273.	-16.	-0.009	149.12	1.049
PB-214	1405.73	351.64	35.	228.	0.127	8.35	1.166
BA-133	1423.15	356.00	360.	-16.	-0.009	173.56	1.060s
I-131	1457.08	364.48	71.	-6.	-0.003	333.16	1.069
BA-133	1534.50	383.84	126.	14.	0.008	115.35	1.087s
Cf-249	1550.94	387.95	140.	2.	0.001	904.42	1.091s
SN-113	1565.90	391.69	131.	6.	0.003	265.39	1.095s
SB-125	1710.63	427.88	40.	8.	0.004	159.13	1.129s
pm-146	1814.64	453.88	61.	-17.	-0.009	115.42	1.154s
SB-125	1852.59	463.37	44.	15.	0.008	69.45	1.163s
Ir-192	1871.36	468.06	71.	11.	0.006	107.86	1.167s
BE-7	1909.50	477.60	57.	11.	0.006	98.52	1.176
HF-181	1927.10	482.00	67.	12.	0.006	104.23	1.180s
La-140	1947.19	487.02	64.	-9.	-0.005	177.20	1.185s
RU-103	1987.33	497.05	32.	9.	0.005	127.50	1.194s
RH-106	2046.57	511.86	61.	36.	0.020	57.95	2.458s
Nd-147	2123.11	531.00	24.	3.	0.002	324.89	1.225s
Ba-140	2148.15	537.26	16.	25.	0.014	37.17	1.231s
CS-134	2252.06	563.24	33.	5.	0.003	232.89	1.255s
CS-134	2276.40	569.32	37.	-3.	-0.002	264.95	1.260s
PA-234	2276.99	569.47	27.	8.	0.005	96.29	1.261s
BI-207	2277.92	569.70	31.	5.	0.003	158.23	1.261s
TL-208	2330.88	582.94	2.	182.	0.101	7.49	1.472s
SB-125	2401.12	600.50	368.	-14.	-0.008	193.38	1.289s
SB-124	2410.04	602.73	354.	-14.	-0.008	189.40	1.291s
CS-134	2417.96	604.71	356.	-15.	-0.008	181.00	1.292s
BI-214	2435.53	609.10	12.	177.	0.098	8.32	1.545s
RU-103	2440.31	610.30	341.	-15.	-0.008	176.59	1.297s
AG-108M	2456.25	614.28	326.	-15.	-0.008	172.29	1.301s
PM-144	2471.37	618.06	312.	-2.	-0.001	850.64	1.304s
SB-125	2542.69	635.89	17.	2.	0.001	361.66	1.320s
I-131	2547.03	636.97	37.	-11.	-0.006	85.92	1.321s
AG-110M	2630.18	657.76	17.	8.	0.004	80.40	1.339s
CS-137	2645.77	661.66	50.	-2.	-0.001	489.16	1.343s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2785.32	696.54	35.	-6.	-0.003	249.98	1.374s
NB-94	2809.67	702.63	48.	-7.	-0.004	215.84	1.379
SB-124	2890.31	722.79	82.	8.	0.004	174.10	1.396
AG-108M	2890.91	722.94	89.	0.	0.000	1000.00	1.397s
EU-154	2892.59	723.36	89.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	89.	0.	0.000	1000.00	1.398s
BI-212	2907.66	727.13	12.	51.	0.028	20.26	1.839s
pm-146	2942.05	735.72	39.	-8.	-0.004	163.22	1.408s
pm-146	2987.81	747.16	22.	10.	0.006	97.07	1.417s
ZR-95	3026.09	756.73	30.	6.	0.003	202.79	1.426s
AG-110M	3054.96	763.94	53.	-14.	-0.008	77.49	1.432s
PA-234M	3064.83	766.41	49.	12.	0.007	85.96	1.434s
BI-212	3140.88	785.42	56.	-10.	-0.006	151.49	1.450s
CS-134	3207.01	801.95	42.	-15.	-0.008	93.59	1.464s
CO-58	3242.31	810.77	57.	-9.	-0.005	139.20	1.471s
La-140	3262.30	815.77	66.	0.	0.000	1000.00	1.475s
Cs-136	3273.22	818.50	48.	10.	0.006	100.62	1.478s
MN-54	3338.63	834.85	42.	-4.	-0.002	307.07	1.492s
Co-56	3386.32	846.77	24.	11.	0.006	99.28	1.501s
TL-208	3440.37	860.28	0.	36.	0.020	16.67	0.400s
PA-234	3521.39	880.53	30.	9.	0.005	90.98	1.529s
PA-234	3532.24	883.24	40.	3.	0.002	276.44	1.531s
AG-110M	3538.01	884.68	43.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	34.	8.	0.004	114.28	1.536s
y-88	3591.45	898.04	19.	5.	0.003	196.66	1.543s
AC-228	3643.00	910.92	3.	98.	0.054	10.84	1.656
AG-110M	3749.30	937.49	51.	-18.	-0.010	86.87	1.576s
PA-234	3783.42	946.02	14.	5.	0.003	164.92	1.582s
EU-152	3855.80	964.11	62.	8.	0.004	146.21	1.597s
AC-228	3875.25	968.97	31.	57.	0.031	19.29	1.601s
EU-154	3984.71	996.33	81.	-16.	-0.009	83.75	1.622s
PA-234M	4003.39	1001.00	98.	-17.	-0.009	57.06	1.626s
EU-154	4018.51	1004.77	74.	11.	0.006	111.37	1.629s
Co-56	4150.81	1037.84	25.	3.	0.001	437.41	1.655s
Cs-136	4191.74	1048.07	41.	-16.	-0.009	60.84	1.663s
RH-106	4200.91	1050.36	75.	-11.	-0.006	113.81	1.665s
BI-207	4254.12	1063.66	40.	-10.	-0.006	25.97	1.675s
Ga-68	4309.10	1077.40	25.	-5.	-0.003	224.35	1.685s
FE-59	4396.54	1099.25	35.	-8.	-0.004	33.67	1.702s
EU-152	4447.85	1112.07	46.	8.	0.005	118.47	1.712s
ZN-65	4461.74	1115.55	54.	7.	0.004	152.03	1.714s
BI-214	4480.72	1120.29	9.	22.	0.012	28.53	1.718D
Sc-46	4481.77	1120.55	84.	-12.	-0.007	112.25	1.718s
Ta-182	4484.77	1121.30	82.	-13.	-0.007	101.28	1.719s
CO-60	4692.60	1173.24	26.	1.	0.001	939.72	1.757s
Ta-182	4755.88	1189.05	35.	-11.	-0.006	122.02	1.769s
Ta-182	4885.38	1221.41	16.	7.	0.004	145.80	1.792
Co-56	4952.89	1238.28	48.	-5.	-0.003	174.41	1.805s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NA-22	5097.96	1274.53	21.	7.	0.004	105.36	1.831s
EU-154	5098.01	1274.54	28.	0.	0.000	1000.00	1.831s
CO-60	5329.96	1332.50	11.	4.	0.002	213.16	1.871s
AG-110M	5537.26	1384.30	11.	4.	0.002	177.92	1.907s
K-40	5843.27	1460.76	5.	330.	0.183	5.59	1.813
La-140	6385.44	1596.21	0.	11.	0.006	32.01	2.044s
SB-124	6764.81	1690.98	0.	7.	0.004	37.80	2.102s
BI-214	7059.07	1764.49	30.	-6.	-0.004	124.51	2.145s
Co-56	7086.53	1771.35	70.	-18.	-0.010	68.92	2.149s
y-88	7345.59	1836.06	6.	0.	0.000	1000.00	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	3.5131E+00					5.31E+01	
			477.60	3.513E+00	(	1.171E+01	9.85E+01 1.05E+01	G
NA-22	C	4.8127E-01					9.50E+02	
			1274.53	4.813E-01	?(	1.749E+00	1.05E+02 9.99E+01	G
K-40	N	2.4983E+02					4.66E+11	
			1460.83	2.498E+02	(P	9.895E+00	5.59E+00 1.07E+01	G
Sc-46	F	4.0600E-01					8.38E+01	
			889.28	4.060E-01	?(	1.595E+00	1.14E+02 1.00E+02	G
			1120.55	-7.757E-01	+	2.948E+00	1.12E+02 1.00E+02	G
CR-51	F	3.0779E+00					2.77E+01	
			320.08	3.078E+00	?(	1.130E+01	1.09E+02 9.94E+00	G
MN-54	C	-2.1272E-01					3.12E+02	
			834.85	-2.127E-01	?(P	1.683E+00	3.07E+02 1.00E+02	G
FE-59	F	-9.1524E-01					4.45E+01	
			1099.25	-9.152E-01	?(P	3.428E+00	3.37E+01 5.65E+01	G
			1291.60	-2.900E-02	% P	3.622E+00	5.59E+03 4.32E+01	G
Co-56	C	6.3063E-01					7.73E+01	
			846.77	5.643E-01	&(P	1.321E+00	9.93E+01 9.99E+01	G
			1238.28	-5.850E-01	+ P	3.749E+00	1.74E+02 6.61E+01	G
			1037.84	1.100E+00	?(P	1.131E+01	4.37E+02 1.41E+01	G
			1771.35	-1.122E+01	+	2.563E+01	6.89E+01 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	6.9488E-02					2.72E+02	
			122.06	6.949E-02	&(P	9.881E-01	4.17E+02	8.56E+01 G
			136.47	-2.934E+00	&	1.257E+01	1.28E+02	1.07E+01 G
CO-58	C	-4.5976E-01					7.09E+01	
			810.78	-4.598E-01	?(P	1.902E+00	1.39E+02	9.95E+01 G
CO-60	F	1.7627E-01					1.93E+03	
			1332.50	2.726E-01	?(P	1.379E+00	2.13E+02	1.00E+02 G
			1173.24	7.988E-02	?(P	1.780E+00	9.40E+02	9.99E+01 G
ZN-65	F	9.0114E-01					2.44E+02	
			1115.55	9.011E-01	?(	4.720E+00	1.52E+02	5.06E+01 G
NB-94	I	-3.1218E-01					7.41E+06	
			702.63	-3.122E-01	?(P	1.585E+00	2.16E+02	9.79E+01 G
			871.10	3.526E-02	%	1.455E+00	1.14E+03	9.99E+01 G
ZR-95	I	4.9049E-01					6.40E+01	
			756.73	4.905E-01	&(	2.456E+00	2.03E+02	5.45E+01 G
			724.20	0.000E+00	-	4.810E+00	1.00E+03	4.42E+01 G
NB-95	I	2.1329E-02					6.40E+01	
			765.79	2.133E-02	%(P	2.128E+00	2.85E+03	9.98E+01 G
RU-103	I	3.3327E-01					3.93E+01	
			497.05	3.333E-01	&(	1.077E+00	1.27E+02	9.09E+01 G
			610.30	-1.032E+01	+	6.124E+01	1.77E+02	5.75E+00 GA
RH-106	I	-4.8976E-01					3.74E+02	
			621.92	-4.898E-01	%(P	3.458E+01	1.22E+03	9.93E+00 G
			1050.36	-4.396E+01	+	1.698E+02	1.14E+02	1.56E+00 G
			511.86	6.167E+00	? P	6.728E+00	5.79E+01	2.00E+01 GA
AG-108M	C	-2.2271E-02					1.53E+05	
			433.94	-2.227E-02	%(	1.033E+00	1.70E+03	9.05E+01 G
			722.94	0.000E+00	+	2.334E+00	1.00E+03	9.08E+01 G
			614.28	-6.654E-01	+	3.855E+00	1.72E+02	8.98E+01 G
AG-110M	F	3.5195E-01					2.50E+02	
			884.68	0.000E+00	?(	2.449E+00	1.00E+03	7.27E+01 G
			657.76	3.589E-01	?(	9.754E-01	8.04E+01	9.46E+01 G
			937.49	-2.966E+00	+	5.892E+00	8.69E+01	3.44E+01 G
			1384.30	1.378E+00	?(	5.702E+00	1.78E+02	2.43E+01 G
			763.94	-3.020E+00	&	7.822E+00	7.75E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	2.6865E-01					1.15E+02	
			391.69	2.686E-01	?(	2.440E+00	2.65E+02	6.40E+01 G
SB-124	F	2.6915E-01					6.02E+01	
			602.73	-5.668E-01	?(	3.611E+00	1.89E+02	9.83E+01 G
			1690.98	1.336E+00	?(	1.407E+00	3.78E+01	4.78E+01 G
			722.79	3.152E+00	?(	1.882E+01	1.74E+02	1.08E+01 G
SB-125	I	1.4857E+00					1.01E+03	
			427.88	7.742E-01	(	3.262E+00	1.59E+02	2.96E+01 G
			600.50	-3.104E+00	+	2.019E+01	1.93E+02	1.79E+01 G
			635.89	6.038E-01	?(	8.011E+00	3.62E+02	1.13E+01 G
			463.37	4.450E+00	&(P	1.025E+01	6.94E+01	1.05E+01 G
I-131	I	1.3464E-01					8.02E+00	
			364.48	-1.847E-01	?(P	1.351E+00	3.33E+02	8.17E+01 G
			284.30	4.384E+00	&(P	1.233E+01	1.08E+02	6.14E+00 G
			636.97	-6.105E+00	+	1.770E+01	8.59E+01	7.17E+00 G
Gd-153	F	2.1601E-01					2.42E+02	
			97.50	4.973E-02	&(	3.583E+00	2.12E+03	3.00E+01 G
			103.20	4.448E-01	&(	4.974E+00	3.31E+02	2.18E+01 G
Ga-68	C	-1.1246E+01					4.71E-02	
			1077.40	-1.125E+01	&(	5.850E+01	2.24E+02	3.30E+00 G
Tc-99m	I	-6.6382E-02					2.51E-01	
			140.51	-6.638E-02	&(	1.355E+00	6.02E+02	8.93E+01 G
BA-133	F	-6.5187E-01					3.85E+03	
			356.00	-6.519E-01	&(	3.801E+00	1.74E+02	6.20E+01 G
			302.85	0.000E+00	+	9.646E+00	1.00E+03	1.83E+01 G
			383.84	4.341E+00	?	1.689E+01	1.15E+02	8.94E+00 GA
			80.99	-1.068E+00	+ P	3.137E+00	9.10E+01	3.41E+01 GA
CS-134	I	-3.8167E-01					7.54E+02	
			604.71	-6.008E-01	?(	3.656E+00	1.81E+02	9.76E+01 G
			795.87	1.914E-02	%	2.003E+00	4.23E+03	8.55E+01 G
			569.32	-8.128E-01	+	7.604E+00	2.65E+02	1.54E+01 G
			801.95	-8.682E+00	+	1.871E+01	9.36E+01	8.69E+00 G
			563.24	2.180E+00	?(P	1.315E+01	2.33E+02	8.35E+00 G
CS-137	I	-1.0261E-01					1.10E+04	
			661.66	-1.026E-01	?(	1.772E+00	4.89E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.5248E-01					1.38E+02	
			165.85	3.525E-01	&(	1.374E+00	1.16E+02	7.99E+01 G
Ba-140	I	3.6707E+00					1.28E+01	
			537.26	3.671E+00	?(	3.135E+00	3.72E+01	2.44E+01 G
			162.66	-4.714E+00	- P	1.839E+01	1.14E+02	6.22E+00 G
			304.85	0.000E+00	-	4.143E+01	1.00E+03	4.29E+00 G
La-140	I	9.6468E-01					1.28E+01	
			1596.21	9.647E-01	?(P	6.716E-01	3.20E+01	9.54E+01 G
			487.02	-6.551E-01	&	2.911E+00	1.77E+02	4.55E+01 G
			328.76	3.831E+00	+	4.462E+00	4.68E+01	2.03E+01 G
			815.77	0.000E+00	-	8.730E+00	1.00E+03	2.33E+01 G
CE-141	I	5.2239E-01					3.25E+01	
			145.44	5.224E-01	?(	2.259E+00	1.29E+02	4.82E+01 G
PM-144	C	-2.6415E-01					3.63E+02	
			696.54	-2.641E-01	?(P	1.347E+00	2.50E+02	9.90E+01 G
			618.06	-7.003E-02	+ P	3.435E+00	8.51E+02	9.91E+01 G
EU-152	F	1.3247E+00					4.94E+03	
			344.29	-1.511E+00	?(	7.577E+00	1.49E+02	2.65E+01 G
			1112.07	3.979E+00	?(	1.614E+01	1.18E+02	1.36E+01 G
			121.78	8.162E-01	&(P	2.815E+00	1.03E+02	2.86E+01 G
			778.92	3.729E-01	%	9.871E+00	1.05E+03	1.29E+01 G
			964.11	3.086E+00	?(	1.548E+01	1.46E+02	1.46E+01 G
			244.69	4.985E+00	?(	3.276E+01	1.97E+02	7.58E+00 G
			1408.00	1.243E-01	%	6.687E+00	2.23E+03	2.10E+01 GA
EU-154	I	2.0461E+00					3.14E+03	
			873.23	-4.314E-01	%(	1.102E+01	1.04E+03	1.23E+01 G
			123.10	-2.285E-01	+	2.297E+00	2.96E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.611E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.049E+01	1.00E+03	2.02E+01 G
			1004.77	3.734E+00	?(	1.410E+01	1.11E+02	1.80E+01 G
			996.33	-8.874E+00	+	2.488E+01	8.37E+01	1.06E+01 G
EU-155	I	-3.4203E-02					1.81E+03	
			105.31	-3.420E-02	%(P	5.166E+00	3.64E+03	2.12E+01 G
			86.54	-1.228E+00	&	4.437E+00	1.08E+02	3.07E+01 G
HF-181	F	4.7347E-01					4.24E+01	
			482.00	4.735E-01	?(	1.671E+00	1.04E+02	8.05E+01 G
			133.02	0.000E+00	-	3.065E+00	1.00E+03	4.33E+01 G
			345.83	-1.996E-01	%	1.299E+01	1.91E+03	1.51E+01 G
			136.30	0.000E+00	&	2.288E+01	1.00E+03	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	-2.4471E+00					1.14E+02	
			1121.30	-2.447E+00	?(	8.362E+00	1.01E+02	3.49E+01 G
			1221.41	1.681E+00	+ P	5.581E+00	1.46E+02	2.70E+01 G
			1189.05	-4.627E+00	+	1.274E+01	1.22E+02	1.62E+01 G
Hg-203	F	3.4846E-01					4.66E+01	
			279.20	3.485E-01	&(	1.239E+00	1.05E+02	8.15E+01 G
TL-208	N	8.2423E+00					6.98E+02	
			583.02	8.242E+00	@(P	4.049E-01	7.49E+00	8.45E+01 G
			277.28	5.413E+00	&	1.380E+01	7.64E+01	6.31E+00 G
			860.56	1.516E+01	+	3.104E+00	1.67E+01	1.24E+01 G
pm-146	C	1.4180E+00					2.02E+03	
			747.16	1.418E+00	(	3.348E+00	9.71E+01	3.40E+01 G
			735.72	-1.638E+00	+	6.515E+00	1.63E+02	2.25E+01 G
			453.88	-7.993E-01	- P	1.885E+00	1.15E+02	6.50E+01 G
y-88	F	2.7882E-01					1.07E+02	
			898.04	2.788E-01	?(P	1.336E+00	1.97E+02	9.37E+01 G
			1836.06	0.000E+00	-	1.391E+00	1.00E+03	9.92E+01 G
Cd-113m		-1.7061E+03					5.33E+03	
			263.70	-1.706E+03	?(	1.775E+04	3.03E+02	6.00E-03 K
Cd-109	F	1.0624E-01					4.53E+02	
								Derived Ave Activity
			88.04	1.062E-01	}(	4.318E+01	1.21E+04	3.79E+00 G
Cf-251	T	1.5831E+00					3.28E+05	
			176.60	1.583E+00	&(	4.631E+00	1.09E+02	1.70E+01 G
			227.00	-1.351E+00	&	1.655E+01	4.48E+02	6.30E+00 GA
Cf-249	T	2.6403E-01					1.28E+05	
			387.95	7.787E-02	?(	2.427E+00	9.04E+02	6.60E+01 G
			333.44	1.056E+00	?(	6.258E+00	2.25E+02	1.55E+01 G
Sn-126		3.2964E+00					3.65E+07	
			87.57	1.628E+00	}	3.716E+00	4.39E+01	3.75E+01 GA
			64.28	3.296E+00	?(	1.449E+01	1.31E+02	9.70E+00 G
			86.94	0.000E+00	}	1.418E+01	2.14E+03	9.04E+00 GA
PB-210	N	2.2153E+01					8.14E+03	
			46.54	2.215E+01	*(P	2.660E+01	4.29E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.8887E+01					6.98E+02	
			238.63	1.889E+01	(P	1.937E+00	5.64E+00	4.33E+01 G
			300.03	3.358E+01	+	1.672E+01	2.31E+01	3.28E+00 GA
PB-214	N	1.5579E+01					5.84E+05	
			351.93	1.553E+01	(P	2.069E+00	8.35E+00	3.76E+01 G
			295.09	1.567E+01	*(P	3.956E+00	1.31E+01	1.93E+01 G
			242.00	5.169E+00	&	3.317E+01	1.92E+02	7.43E+00 GA
BI-207	C	1.9836E-01					1.18E+04	
			569.70	1.984E-01	?(	1.097E+00	1.58E+02	9.77E+01 G
			1063.66	-8.484E-01	+ P	2.691E+00	2.60E+01	7.45E+01 G
BI-212	N	3.0951E+01					6.98E+02	
			727.17	3.095E+01	@(P	1.132E+01	2.03E+01	7.55E+00 G
			785.42	-3.922E+01	&	1.430E+02	1.51E+02	1.28E+00 GA
BI-214	N	1.5186E+01					5.84E+05	
			609.31	1.519E+01	@(P	1.633E+00	8.32E+00	4.61E+01 G
			1120.29	9.439E+00	- P	7.015E+00	2.85E+01	1.51E+01 G
			1764.49	-3.989E+00	-	1.720E+01	1.25E+02	1.54E+01 G
BI-210M	T	-7.9151E-01					1.10E+09	
			265.83	-7.915E-01	&(P	2.469E+00	1.27E+02	5.00E+01 G
			304.90	0.000E+00	+	6.348E+00	1.00E+03	2.80E+01 G
AC-228	N	1.8544E+01					2.10E+03	
			911.07	1.845E+01	(	2.120E+00	1.08E+01	2.90E+01 G
			968.97	1.869E+01	?(	9.505E+00	1.93E+01	1.75E+01 G
			338.32	2.494E+01	+	5.709E+00	1.28E+01	1.20E+01 G
			93.35	8.988E+00	-	1.627E+01	5.52E+01	5.56E+00 XA
TH-227	N	1.4452E+00					7.95E+03	
			50.14	2.067E-01	%(P	1.798E+01	3.01E+03	8.00E+00 G
			256.24	2.861E+00	?(	1.270E+01	1.62E+02	7.00E+00 G
TH-229	N	1.2748E+00					2.68E+06	
			193.51	1.275E+00	?(P	2.081E+01	5.96E+02	4.40E+00 G
			210.85	-1.470E+01	+	4.079E+01	1.04E+02	2.99E+00 G
TH-234	N	6.7391E+00					1.63E+12	
			63.29	-4.328E+00	?(P	3.700E+01	2.50E+02	3.81E+00 G
			92.59	1.429E+01	(P	1.533E+01	3.39E+01	5.58E+00 G
PA-233	C	8.5769E-01					7.82E+08	
			312.01	8.577E-01	&(	4.521E+00	1.56E+02	3.60E+01 G
			300.18	0.000E+00	-	2.832E+01	1.00E+03	6.20E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   1.2304E+00                                     1.63E+12
                          131.29-8.850E-01 &(  7.243E+00 2.43E+02 1.80E+01 G
                          946.02 2.108E+00 ?(  8.495E+00 1.65E+02 1.34E+01 G
                          569.47 3.736E+00 ?(  1.228E+01 9.63E+01 8.20E+00 G
                          883.24 1.831E+00 &(  1.785E+01 2.76E+02 9.60E+00 G
                          880.53 8.181E+00 ?   2.527E+01 9.10E+01 6.00E+00 GA

PA-234M  N  -1.1874E+02                                     1.63E+12
                         1001.00-1.187E+02 ?(P 3.454E+02 5.71E+01 8.37E-01 G
                          766.41 1.978E+02 &   5.723E+02 8.60E+01 2.94E-01 G

U-235    N   2.1343E+00                                     2.57E+11
                          143.79 2.134E+00  (P 9.457E+00 1.32E+02 1.10E+01 G
                          205.33-7.587E+00 + P 2.101E+01 9.21E+01 5.01E+00 G
                          163.38-2.195E-01 & P 2.340E+01 3.00E+03 5.08E+00 G

AM-241   T   8.0780E-01                                     1.58E+05
                           59.54 8.078E-01 ?(  3.546E+00 1.54E+02 3.59E+01 G

Ir-192   F   7.8339E-02                                     7.40E+01
                          316.49-2.982E-01 ?(  1.404E+00 1.39E+02 8.70E+01 G
                          468.06 7.116E-01 ?(  2.601E+00 1.08E+02 5.18E+01 G
                          308.44 0.000E+00 -   5.649E+00 1.00E+03 3.18E+01 G

Cs-136   F   5.1624E-01                                     1.30E+01
                          818.50 5.162E-01 ?(  1.764E+00 1.01E+02 1.00E+02 G
                         1048.07-1.256E+00 +   2.509E+00 6.08E+01 8.00E+01 G
                          340.57-8.213E-01 +   4.361E+00 1.58E+02 4.69E+01 G

Np-239   T   1.0137E+00                                     2.36E+00
                          103.70 0.000E+00 -   4.569E+00 1.00E+03 2.40E+01 X
                          106.13 1.014E+00 &(  3.971E+00 1.17E+02 2.27E+01 G
                           99.50 1.675E+00 &   5.093E+00 1.07E+02 1.50E+01 X

Nd-147       9.9325E-01                                     1.11E+01
                          531.00 8.187E-01 ?(  6.970E+00 3.25E+02 1.30E+01 G
                           91.10 1.073E+00 ?(  5.800E+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

- -

********** 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	
AM-241	59.54	210.	16.	0.009	154.49	8.078E-01	
BA-133	80.99	256.	-26.	-0.015	90.96	-1.068E+00	P
EU-155	86.54	455.	-28.	-0.016	108.39	-1.228E+00	
Nd-147	91.10	696.	23.	0.013	161.77	1.073E+00	
Np-239	99.50	151.	20.	0.011	107.27	1.675E+00	
Gd-153	103.20	317.	8.	0.004	330.58	4.448E-01	
Np-239	106.13	218.	18.	0.010	116.74	1.014E+00	
EU-152	121.78	170.	18.	0.010	102.90	8.162E-01	P
CO-57	122.06	188.	5.	0.003	416.72	6.949E-02	P
EU-154	123.10	232.	-7.	-0.004	296.26	-2.285E-01	
PA-234	131.29	444.	-12.	-0.007	243.38	-8.850E-01	
CO-57	136.47	459.	-24.	-0.013	128.24	-2.934E+00	
Tc-99m	140.51	338.	-4.	-0.002	602.21	-6.638E-02	
U-235	143.79	257.	17.	0.010	132.04	2.134E+00	P
CE-139	165.85	251.	20.	0.011	116.35	3.525E-01	
Cf-251	176.60	113.	18.	0.010	108.54	1.583E+00	
TH-229	193.51	135.	3.	0.002	595.56	1.275E+00	P
U-235	205.33	164.	-23.	-0.013	92.13	-7.587E+00	P
TH-229	210.85	213.	-26.	-0.014	103.83	-1.470E+01	
Cf-251	227.00	137.	-5.	-0.003	448.18	-1.351E+00	
EU-152	244.69	729.	20.	0.011	196.52	4.985E+00	
TH-227	256.24	80.	10.	0.006	162.28	2.861E+00	
Cd-113m	263.70	112.	-5.	-0.003	302.65	-1.706E+03	
BI-210M	265.83	151.	-19.	-0.011	126.90	-7.915E-01	P
Hg-203	279.20	91.	13.	0.007	105.38	3.485E-01	
I-131	284.30	48.	12.	0.007	108.05	4.384E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-231	300.07	268.	-10.	-0.005	241.50	-8.894E+00		
PA-233	312.01	207.	13.	0.007	156.19	8.577E-01		
Ir-192	316.49	111.	-11.	-0.006	138.77	-2.982E-01		
CR-51	320.08	91.	13.	0.007	108.69	3.078E+00		
Cf-249	333.44	62.	7.	0.004	224.92	1.056E+00		
Cs-136	340.57	288.	-15.	-0.009	157.88	-8.213E-01		
EU-152	344.29	273.	-16.	-0.009	149.12	-1.511E+00		
BA-133	356.00	360.	-16.	-0.009	173.56	-6.519E-01		
I-131	364.48	71.	-6.	-0.003	333.16	-1.847E-01		P
BA-133	383.84	126.	14.	0.008	115.35	4.341E+00		
Cf-249	387.95	140.	2.	0.001	904.42	7.787E-02		
SN-113	391.69	131.	6.	0.003	265.39	2.686E-01		
SB-125	427.88	40.	8.	0.004	159.13	7.742E-01		
pm-146	453.88	61.	-17.	-0.009	115.42	-7.993E-01		P
SB-125	463.37	44.	15.	0.008	69.45	4.450E+00		P
Ir-192	468.06	71.	11.	0.006	107.86	7.116E-01		
BE-7	477.60	57.	11.	0.006	98.52	3.513E+00		
HF-181	482.00	67.	12.	0.006	104.23	4.735E-01		
RU-103	497.05	32.	9.	0.005	127.50	3.333E-01		
RH-106	511.86	61.	36.	0.020	57.95	6.167E+00		P
Nd-147	531.00	24.	3.	0.002	324.89	8.187E-01		
CS-134	563.24	33.	5.	0.003	232.89	2.180E+00		P
CS-134	569.32	37.	-3.	-0.002	264.95	-8.128E-01		
PA-234	569.47	27.	8.	0.005	96.29	3.736E+00		
SB-125	600.50	368.	-14.	-0.008	193.38	-3.104E+00		
SB-124	602.73	354.	-14.	-0.008	189.40	-5.668E-01		
CS-134	604.71	356.	-15.	-0.008	181.00	-6.008E-01		
RU-103	610.30	341.	-15.	-0.008	176.59	-1.032E+01		
AG-108M	614.28	326.	-15.	-0.008	172.29	-6.654E-01		
PM-144	618.06	312.	-2.	-0.001	850.64	-7.003E-02		P
SB-125	635.89	17.	2.	0.001	361.66	6.038E-01		
I-131	636.97	37.	-11.	-0.006	85.92	-6.105E+00		
AG-110M	657.76	17.	8.	0.004	80.40	3.589E-01		
CS-137	661.66	50.	-2.	-0.001	489.16	-1.026E-01		
PM-144	696.54	35.	-6.	-0.003	249.98	-2.641E-01		P
NB-94	702.63	48.	-7.	-0.004	215.84	-3.122E-01		P
SB-124	722.79	82.	8.	0.004	174.10	3.152E+00		
pm-146	735.72	39.	-8.	-0.004	163.22	-1.638E+00		
pm-146	747.16	22.	10.	0.006	97.07	1.418E+00		
ZR-95	756.73	30.	6.	0.003	202.79	4.905E-01		
AG-110M	763.94	53.	-14.	-0.008	77.49	-3.020E+00		
PA-234M	766.41	49.	12.	0.007	85.96	1.978E+02		
CS-134	801.95	42.	-15.	-0.008	93.59	-8.682E+00		
CO-58	810.77	57.	-9.	-0.005	139.20	-4.598E-01		P
Cs-136	818.50	48.	10.	0.006	100.62	5.162E-01		
MN-54	834.85	42.	-4.	-0.002	307.07	-2.127E-01		P
Co-56	846.77	24.	11.	0.006	99.28	5.643E-01		P
PA-234	880.53	30.	9.	0.005	90.98	8.181E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	883.24	40.	3.	0.002	276.44	1.831E+00		
Sc-46	889.28	34.	8.	0.004	114.28	4.060E-01		
y-88	898.04	19.	5.	0.003	196.66	2.788E-01		P
AG-110M	937.49	51.	-18.	-0.010	86.87	-2.966E+00		
PA-234	946.02	14.	5.	0.003	164.92	2.108E+00		
EU-152	964.11	62.	8.	0.004	146.21	3.086E+00		
EU-154	996.33	81.	-16.	-0.009	83.75	-8.874E+00		
PA-234M	1001.00	98.	-17.	-0.009	57.06	-1.187E+02		P
EU-154	1004.77	74.	11.	0.006	111.37	3.734E+00		
Co-56	1037.84	25.	3.	0.001	437.41	1.100E+00		P
Cs-136	1048.07	41.	-16.	-0.009	60.84	-1.256E+00		
RH-106	1050.36	75.	-11.	-0.006	113.81	-4.396E+01		
Ga-68	1077.40	25.	-5.	-0.003	224.35	-1.125E+01		
FE-59	1099.25	35.	-8.	-0.004	33.67	-9.152E-01		P
EU-152	1112.07	46.	8.	0.005	118.47	3.979E+00		
ZN-65	1115.55	54.	7.	0.004	152.03	9.011E-01		
Sc-46	1120.55	84.	-12.	-0.007	112.25	-7.757E-01		
CO-60	1173.24	26.	1.	0.001	939.72	7.988E-02		P
Co-56	1238.28	48.	-5.	-0.003	174.41	-5.850E-01		P
NA-22	1274.53	21.	7.	0.004	105.36	4.813E-01		
CO-60	1332.50	11.	4.	0.002	213.16	2.726E-01		P
AG-110M	1384.30	11.	4.	0.002	177.92	1.378E+00		
SB-124	1690.98	0.	7.	0.004	37.80	1.336E+00		
Co-56	1771.35	70.	-18.	-0.010	68.92	-1.122E+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	3.5131E+00	3.5131E+00	9.852E+01%	1.17E+01
NA-22	#A	4.8127E-01	4.8127E-01	1.054E+02%	1.75E+00
K-40		2.4983E+02	2.4983E+02	5.590E+00%	9.89E+00
Sc-46	#A	4.0600E-01	4.0600E-01	1.143E+02%	1.60E+00
CR-51	#A	3.0778E+00	3.0779E+00	1.087E+02%	1.13E+01
MN-54	#A	-2.1272E-01	-2.1272E-01	3.071E+02%	1.68E+00
FE-59	#A	-9.1523E-01	-9.1524E-01	3.367E+01%	3.43E+00
Co-56	#A	6.3062E-01	6.3063E-01	9.928E+01%	1.32E+00
CO-57	#A	6.9488E-02	6.9488E-02	4.167E+02%	9.88E-01
CO-58	#A	-4.5975E-01	-4.5976E-01	1.392E+02%	1.90E+00
CO-60	#A	1.7627E-01	1.7627E-01	2.132E+02%	1.38E+00
ZN-65	#A	9.0114E-01	9.0114E-01	1.520E+02%	4.72E+00
NB-94	#A	-3.1218E-01	-3.1218E-01	2.158E+02%	1.59E+00
ZR-95	#A	4.9049E-01	4.9049E-01	2.028E+02%	2.46E+00
NB-95	#A	2.1329E-02	2.1329E-02	2.850E+03%	2.13E+00
RU-103	#A	3.3327E-01	3.3327E-01	1.275E+02%	1.08E+00

RH-106 #A	-4.8976E-01	-4.8976E-01	1.224E+03%	3.46E+01
AG-108M#A	-2.2271E-02	-2.2271E-02	1.704E+03%	1.03E+00
AG-110M#A	3.5195E-01	3.5195E-01	8.040E+01%	2.45E+00
SN-113 #A	2.6864E-01	2.6865E-01	2.654E+02%	2.44E+00
SB-124 #A	2.6915E-01	2.6915E-01	3.780E+01%	3.61E+00
SB-125 #A	1.4857E+00	1.4857E+00	6.945E+01%	3.26E+00
I-131 #A	1.3463E-01	1.3464E-01	1.081E+02%	1.35E+00
Gd-153 #A	2.1600E-01	2.1601E-01	3.306E+02%	3.58E+00
Ga-68 #A	-1.1064E+01	-1.1246E+01	2.244E+02%	5.85E+01
Tc-99m #A	-6.6179E-02	-6.6382E-02	6.022E+02%	1.35E+00
BA-133 #A	-6.5187E-01	-6.5187E-01	1.736E+02%	3.80E+00
CS-134 #A	-3.8167E-01	-3.8167E-01	1.475E+02%	3.66E+00
CS-137 #A	-1.0261E-01	-1.0261E-01	4.892E+02%	1.77E+00
CE-139 #A	3.5248E-01	3.5248E-01	1.164E+02%	1.37E+00
Ba-140 #	3.6705E+00	3.6707E+00	3.717E+01%	3.13E+00
La-140 #	9.6462E-01	9.6468E-01	3.201E+01%	6.72E-01
CE-141 #A	5.2238E-01	5.2239E-01	1.289E+02%	2.26E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.20E+01
PM-144 #A	-2.6415E-01	-2.6415E-01	2.500E+02%	1.35E+00
EU-152 #A	1.3247E+00	1.3247E+00	6.538E+01%	7.58E+00
EU-154 #A	2.0461E+00	2.0461E+00	1.114E+02%	1.10E+01
EU-155 #A	-3.4203E-02	-3.4203E-02	3.639E+03%	5.17E+00
HF-181 #A	4.7346E-01	4.7347E-01	1.042E+02%	1.67E+00
Ta-182 A	-2.4471E+00	-2.4471E+00	1.013E+02%	8.36E+00
Hg-203 #A	3.4845E-01	3.4846E-01	1.054E+02%	1.24E+00
TL-208	8.2422E+00	8.2423E+00	7.489E+00%	4.05E-01
pm-146 #A	1.4180E+00	1.4180E+00	9.707E+01%	3.35E+00
y-88 #A	2.7882E-01	2.7882E-01	1.967E+02%	1.34E+00
Cd-113m#A	-1.7061E+03	-1.7061E+03	3.027E+02%	1.78E+04
Cd-109 #A	1.0624E-01	1.0624E-01	1.207E+04%	4.32E+01
Cf-251 #A	1.5831E+00	1.5831E+00	1.085E+02%	4.63E+00
Cf-249 #A	2.6403E-01	2.6403E-01	2.249E+02%	2.43E+00
Sn-126 A	3.2964E+00	3.2964E+00	1.311E+02%	1.45E+01
PB-210 #A	2.2153E+01	2.2153E+01	4.286E+01%	2.66E+01
PB-212	1.8887E+01	1.8887E+01	5.640E+00%	1.94E+00
PB-214	1.5579E+01	1.5579E+01	7.746E+00%	2.07E+00
BI-207 #A	1.9836E-01	1.9836E-01	1.582E+02%	1.10E+00
BI-212 #	3.0951E+01	3.0951E+01	2.026E+01%	1.13E+01
BI-214	1.5186E+01	1.5186E+01	8.319E+00%	1.63E+00
BI-210M#A	-7.9151E-01	-7.9151E-01	1.269E+02%	2.47E+00
AC-228	1.8544E+01	1.8544E+01	1.084E+01%	2.12E+00
TH-227 #A	1.4452E+00	1.4452E+00	1.623E+02%	1.80E+01
TH-229 #A	1.2748E+00	1.2748E+00	5.956E+02%	2.08E+01
TH-234 #A	6.7391E+00	6.7391E+00	3.395E+01%	3.70E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.14E+01
PA-233 #A	8.5769E-01	8.5769E-01	1.562E+02%	4.52E+00
PA-234 #A	1.2304E+00	1.2304E+00	9.629E+01%	7.24E+00
PA-234M#A	-1.1874E+02	-1.1874E+02	5.706E+01%	3.45E+02
U-235 #A	2.1343E+00	2.1343E+00	1.320E+02%	9.46E+00

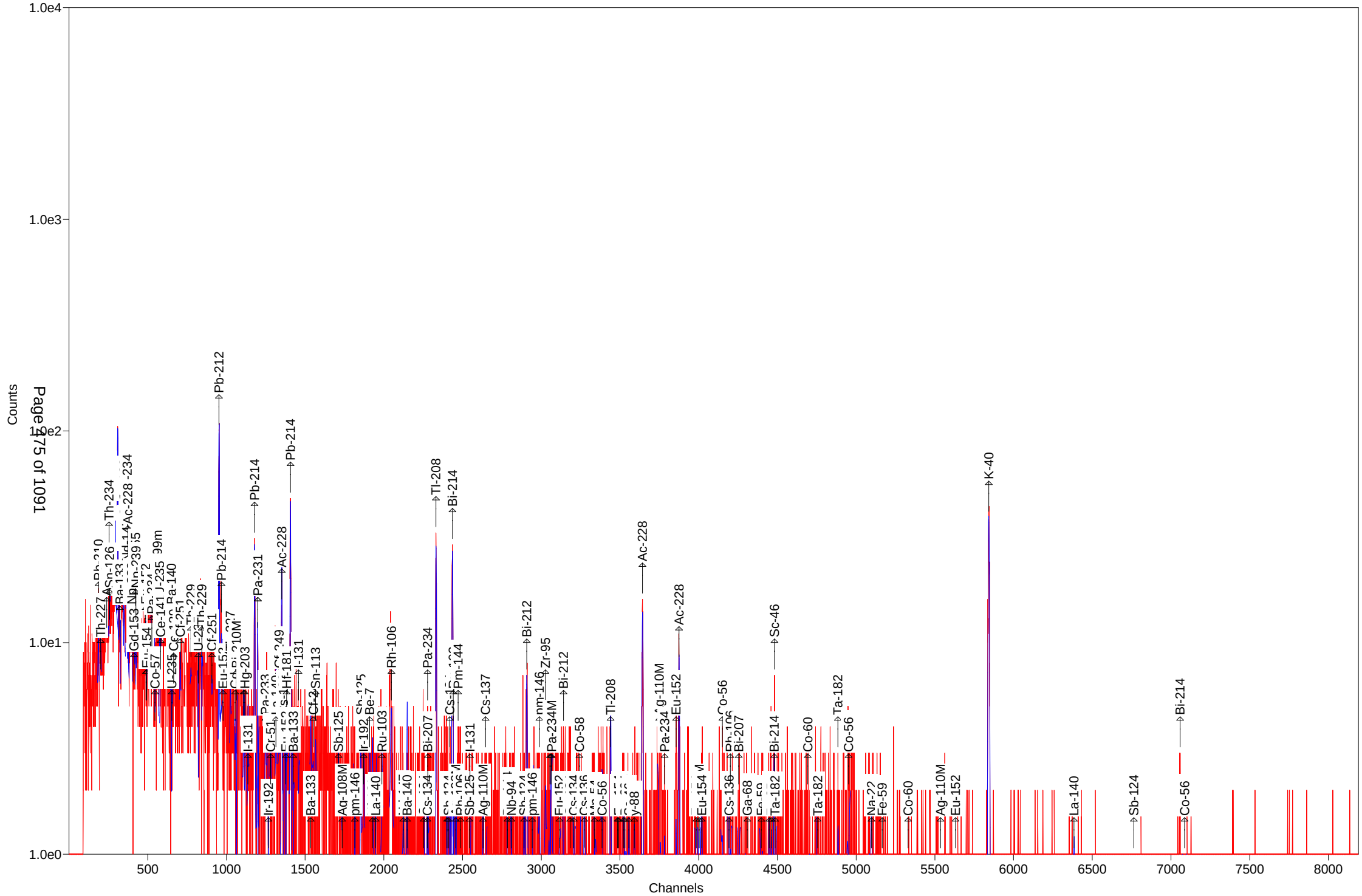
AM-241 #A	8.0780E-01	8.0780E-01	1.545E+02%	3.55E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.28E+01
Ir-192 #A	7.8338E-02	7.8339E-02	8.788E+01%	1.40E+00
Cs-136 #A	5.1621E-01	5.1624E-01	1.006E+02%	1.76E+00
Np-239 #A	1.0133E+00	1.0137E+00	1.167E+02%	3.97E+00
Nd-147 #A	9.9318E-01	9.9325E-01	1.618E+02%	6.97E+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) 3.794E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.7936850E+02 Bq/Sample

264540_Gamma_160-18553-A-2-B. 14_Gamma_20162252.spc.



Test America St. Louis Spectrum ID: 13_Gamma_20160734

Sample Description: 264540_Gamma_160-18553-A-3-B
Detector: Detector #13
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-3-B

Decay to Time: 9/1/2016 14:40 Live Time: 1800 sec
Acquisition Time: 9/1/2016 14:42:05 Real Time: 1803 sec
Analysis Time: 9/1/2016 15:12 Dead Time: 0.19 %
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	5.045E+00	58.2	2.934E+00	2.945E+00	9.619E+00
NA-22	3.578E-01	99.0	3.541E-01	3.546E-01	1.215E+00
K-40	2.362E+02	4.8	1.144E+01	1.664E+01	8.790E+00
Sc-46	3.893E-01	105.7	4.115E-01	4.120E-01	1.397E+00
CR-51	3.095E+00	89.1	2.758E+00	2.763E+00	9.221E+00
MN-54	-3.852E-01	137.4	5.294E-01	5.298E-01	1.190E+00
FE-59	7.932E-01	117.8	9.342E-01	9.351E-01	2.055E+00
Co-56	7.896E-01	67.4	5.320E-01	5.336E-01	9.213E-01
CO-57	1.464E-01	200.8	2.941E-01	2.942E-01	9.912E-01
CO-58	-5.735E-01	79.8	4.575E-01	4.585E-01	1.528E+00
CO-60	-4.279E-01	193.2	8.264E-01	8.267E-01	1.415E+00
ZN-65	-1.937E+00	79.1	1.533E+00	1.536E+00	5.101E+00
NB-94	3.498E-01	88.8	3.107E-01	3.112E-01	7.276E-01
ZR-95	4.812E-01	133.7	6.435E-01	6.440E-01	1.919E+00
NB-95	3.562E-01	104.0	3.704E-01	3.708E-01	1.256E+00
RU-103	-5.400E-01	68.6	3.704E-01	3.714E-01	1.116E+00
RH-106	4.681E+00	142.5	6.670E+00	6.674E+00	2.586E+01
AG-108M	-1.530E-02	2197.0	3.362E-01	3.362E-01	8.365E-01
AG-110M	1.024E+00	43.4	4.448E-01	4.479E-01	1.734E+00
SN-113	-6.356E-01	103.3	6.564E-01	6.572E-01	2.119E+00
SB-124	2.704E-01	209.9	5.674E-01	5.676E-01	2.545E+00
SB-125	2.124E+00	54.0	1.146E+00	1.152E+00	2.400E+00
I-131	2.335E-01	67.6	1.578E-01	1.582E-01	1.120E+00
Gd-153	-1.065E+00	145.4	1.549E+00	1.550E+00	5.157E+00
Ga-68	7.163E+00	301.2	2.157E+01	2.158E+01	4.786E+01
Tc-99m	-9.182E-08	515697944.8	4.735E-01	4.735E-01	1.593E+00
BA-133	-5.461E-01	160.7	8.777E-01	8.781E-01	2.942E+00
CS-134	4.238E-01	88.6	3.755E-01	3.762E-01	2.563E+00
CS-137	1.607E-01	315.1	5.063E-01	5.064E-01	1.193E+00
CE-139	1.662E-01	195.4	3.248E-01	3.252E-01	1.096E+00
Ba-140	1.336E+00	97.9	1.308E+00	1.310E+00	3.043E+00
La-140	-3.742E-01	367.5	1.375E+00	1.376E+00	1.414E+00
CE-141	6.874E-02	674.8	4.639E-01	4.639E-01	1.581E+00

CE-144	2.443E+00	145.1	3.545E+00	3.547E+00	1.182E+01
PM-144	2.054E-02	1610.9	3.309E-01	3.309E-01	1.171E+00
EU-152	1.326E+00	74.3	9.853E-01	9.877E-01	6.166E+00
EU-154	1.969E-01	1510.0	2.974E+00	2.974E+00	1.057E+01
EU-155	-1.812E-07	1134814049.0	2.056E+00	2.056E+00	6.903E+00
HF-181	7.901E-01	73.7	5.822E-01	5.836E-01	1.506E+00
Ta-182	2.328E+00	62.0	1.444E+00	1.449E+00	6.029E+00
Hg-203	8.367E-02	384.5	3.218E-01	3.218E-01	1.104E+00
TL-208	5.693E+00	9.3	5.315E-01	6.080E-01	8.032E-01
pm-146	6.962E-01	154.8	1.077E+00	1.078E+00	2.489E+00
y-88	3.970E-01	35.4	1.404E-01	1.418E-01	8.320E-01
Cd-113m	4.798E+03	70.9	3.403E+03	3.417E+03	1.130E+04
Cd-109	0.000E+00	1.#INF	1.531E+01	1.531E+01	5.095E+01
Cf-251	1.357E-01	1270.8	1.724E+00	1.724E+00	4.282E+00
Cf-249	5.387E-01	90.6	4.878E-01	4.886E-01	1.633E+00
Sn-126	4.428E+00	110.5	4.893E+00	4.899E+00	1.629E+01
PB-210	1.933E+00	636.4	1.230E+01	1.230E+01	4.172E+01
PB-212	1.832E+01	4.7	8.677E-01	1.469E+00	1.388E+00
PB-214	1.405E+01	7.4	1.033E+00	1.265E+00	1.628E+00
BI-207	-1.298E-01	238.2	3.090E-01	3.091E-01	1.072E+00
BI-212	2.254E+01	18.0	4.047E+00	4.212E+00	6.632E+00
BI-214	1.246E+01	7.7	9.540E-01	1.153E+00	1.597E+00
BI-210M	-2.235E-01	224.0	5.006E-01	5.007E-01	1.737E+00
AC-228	1.753E+01	11.1	1.942E+00	2.138E+00	3.122E+00
TH-227	3.205E+00	167.5	5.369E+00	5.372E+00	1.809E+01
TH-229	5.229E+00	99.8	5.217E+00	5.234E+00	1.778E+01
TH-234	-1.306E+01	38.4	5.020E+00	5.066E+00	4.198E+01
PA-231	8.932E+00	184.8	1.651E+01	1.651E+01	6.809E+01
PA-233	6.788E-01	187.7	1.274E+00	1.275E+00	5.615E+00
PA-234	2.277E+00	85.8	1.953E+00	1.956E+00	7.002E+00
PA-234M	-2.956E+00	2731.0	8.073E+01	8.073E+01	1.853E+02
U-235	2.498E+00	142.0	3.547E+00	3.549E+00	1.183E+01
AM-241	-1.441E+00	39.1	5.627E-01	5.676E-01	5.043E+00
Np-237	1.496E+00	287.4	4.301E+00	4.302E+00	1.435E+01
Ir-192	1.064E-01	513.3	5.463E-01	5.464E-01	1.847E+00
Cs-136	4.920E-01	72.7	3.576E-01	3.587E-01	1.645E+00
Np-239	-6.205E-01	308.6	1.915E+00	1.915E+00	6.405E+00
Nd-147	2.108E+00	99.3	2.093E+00	2.097E+00	5.072E+00
Total	5.197E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-3-B

Spectrum Filename: C:\User\SPC\Det13\13_Gamma_20160734.An1

Acquisition information
Start time: 9/1/2016 2:42:05 PM
Live time: 1800
Real time: 1803
Dead time: 0.19 %
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 2:40:00 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. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1751

***** 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
46.39	4.	636.40	1.02	2.705E-02	46.54	4.250	PBC<MDA	PB210
50.14	14.	167.51	1.02	3.033E-02	50.14	8.000	PBC<MDA	TH227
64.28	32.	110.51	1.03	4.135E-02	64.28	9.700	PBC<MDA	Sn126
74.63	240.	10.58	1.04	4.724E-02				
77.07	303.	8.67	1.05	4.836E-02				
86.96	135.	19.38	0.95	5.195E-02	86.49	13.100	1.108E+01	Np237
					86.54	30.700	4.725E+00	EU155
					86.94	9.040	1.601E+01	Sn126
					87.57	37.500	3.846E+00	Sn126
92.90	123.	19.55	1.77	5.353E-02	92.59	5.584	2.293E+01	TH234
					93.35	5.561	2.295E+01	AC228
121.78	27.	89.73	1.09	5.530E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.173E-01	CO57
122.06	12.	200.81	1.09	5.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.464E-01	CO57
131.29	24.	155.79	1.10	5.455E-02	131.29	18.000	PBC<MDA	PA234
133.02	26.	142.52	1.10	5.436E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.442E+00	CE144
133.54	26.	145.08	1.10	5.430E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.443E+00	CE144
136.30	23.	172.72	1.10	5.397E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.180E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
143.79	26.	142.01	1.11	5.293E-02	143.79	10.960	PBC<MDA	U235
145.44	3.	674.79	1.11	5.268E-02	145.44	48.200	PBC<MDA	CE141
165.85	12.	195.43	1.13	5.020E-02	165.85	79.900	PBC<MDA	CE139
193.51	5.	515.49	1.16	4.533E-02	193.51	4.400	PBC<MDA	TH229
210.85	25.	99.78	1.17	4.279E-02	210.85	2.990	PBC<MDA	TH229
238.48	524.	6.25	1.10	3.936E-02	238.63	43.300	1.710E+01	PB212
241.96	83.	19.61	1.20	3.897E-02	242.00	7.430	1.594E+01	PB214
263.70	19.	70.93	1.22	3.674E-02	263.70	0.006	PBC<MDA	Cd113m
277.09	30.	53.54	1.76	3.549E-02	277.28	6.310	PBC<MDA	TL208
279.20	4.	384.54	1.23	3.532E-02	279.20	81.460	PBC<MDA	Hg203
284.30	15.	110.69	1.24	3.488E-02	284.30	6.140	PBC<MDA	I131
295.21	157.	13.28	0.94	3.398E-02	295.09	19.300	1.332E+01	PB214
300.07	18.	184.80	1.25	3.359E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.242E+01	PA231
					300.18	6.200	4.930E+00	PA233
300.18	45.	25.64	1.25	3.360E-02	300.03	3.280	2.254E+01	PB212
					300.07	2.460	3.005E+01	PA231
					300.18	6.200	1.193E+01	PA233
302.65	10.	340.64	1.26	3.339E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	9.356E-01	BA133
316.49	5.	513.32	1.27	3.236E-02	316.49	87.040	PBC<MDA	Ir192
320.08	18.	89.09	1.27	3.211E-02	320.08	9.940	PBC<MDA	CR51
338.51	115.	20.28	1.02	3.087E-02	338.32	12.010	1.717E+01	AC228
340.57	21.	128.69	1.29	3.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	20.	133.81	1.29	3.050E-02	344.29	26.500	PBC<MDA	EU152
345.83	21.	130.50	1.29	3.040E-02	345.83	15.070	PBC<MDA	HF181
351.87	285.	7.35	1.40	3.003E-02	351.93	37.600	1.405E+01	PB214
387.95	18.	90.55	1.33	2.802E-02	387.95	66.000	PBC<MDA	Cf249
427.88	27.	53.98	1.37	2.611E-02	427.88	29.600	PBC<MDA	SB125
463.37	17.	85.80	1.40	2.465E-02	463.37	10.470	PBC<MDA	SB125
477.60	23.	58.15	1.41	2.411E-02	477.60	10.520	PBC<MDA	BE7
482.00	11.	140.36	1.42	2.395E-02	482.00	80.500	PBC<MDA	HF181
511.86	120.	19.55	2.69	2.292E-02	511.86	20.000	1.455E+01	RH106
531.00	11.	99.31	1.46	2.230E-02	531.00	13.000	PBC<MDA	Nd147
537.26	13.	97.91	1.46	2.211E-02	537.26	24.390	PBC<MDA	Ba140
563.24	2.	839.39	1.49	2.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	11.	88.61	1.49	2.118E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.519E+00	PA234
					569.70	97.740	2.953E-01	BI207
583.20	180.	9.34	1.52	2.081E-02	583.02	84.500	5.693E+00	TL208
600.50	13.	211.45	1.52	2.036E-02	600.50	17.860	PBC<MDA	SB125
602.85	13.	209.87	1.52	2.030E-02	602.73	98.260	PBC<MDA	SB124
604.83	13.	209.24	1.52	2.025E-02	604.71	97.620	PBC<MDA	CS134
609.36	241.	8.04	1.47	2.014E-02	609.31	46.090	1.443E+01	BI214
					610.30	5.750	1.158E+02	RU103
621.92	11.	237.01	1.54	1.983E-02	621.92	9.930	PBC<MDA	RH106
635.89	6.	158.11	1.55	1.951E-02	635.89	11.310	PBC<MDA	SB125
636.97	10.	101.53	1.55	1.948E-02	636.97	7.170	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
661.66	5.	315.06	1.57	1.893E-02	661.66	85.210	PBC<MDA	CS137
702.63	11.	88.82	1.60	1.809E-02	702.63	97.900	PBC<MDA	NB94
724.20	7.	200.21	1.62	1.769E-02	724.20	44.150	PBC<MDA	ZR95
727.59	54.	17.95	1.21	1.763E-02	727.17	7.550	2.254E+01	BI212
747.16	7.	154.75	1.64	1.727E-02	747.16	34.000	PBC<MDA	pm146
756.73	8.	177.36	1.65	1.710E-02	756.73	54.460	PBC<MDA	ZR95
763.94	22.	43.43	1.66	1.698E-02	763.94	22.280	PBC<MDA	AG110M
765.79	11.	103.97	1.66	1.695E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.210E+02	PA234M
778.92	8.	154.11	1.67	1.673E-02	778.92	12.940	PBC<MDA	EU152
786.56	14.	83.70	1.67	1.663E-02	785.42	1.280	PBC<MDA	BI212
795.87	5.	203.54	1.68	1.646E-02	795.87	85.530	PBC<MDA	CS134
818.50	9.	158.15	1.70	1.611E-02	818.50	100.000	PBC<MDA	Cs136
846.77	8.	141.88	1.72	1.569E-02	846.77	99.935	PBC<MDA	Co56
860.50	45.	15.21	0.84	1.550E-02	860.56	12.420	1.302E+01	TL208
880.53	4.	220.76	1.75	1.523E-02	880.53	6.000	PBC<MDA	PA234
883.24	11.	85.78	1.75	1.519E-02	883.24	9.600	PBC<MDA	PA234
884.68	11.	96.12	1.75	1.517E-02	884.68	72.680	PBC<MDA	AG110M
889.28	11.	105.73	1.76	1.511E-02	889.28	99.984	PBC<MDA	Sc46
898.04	7.	137.43	1.76	1.500E-02	898.04	93.700	PBC<MDA	y88
911.24	146.	9.35	0.76	1.483E-02	911.07	29.000	1.887E+01	AC228
969.06	90.	18.53	1.82	1.414E-02	968.97	17.460	2.031E+01	AC228
1037.84	11.	85.77	1.88	1.340E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	10.	77.22	1.88	1.330E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	5.	158.23	1.89	1.328E-02	1050.36	1.560	PBC<MDA	RH106
1077.40	5.	301.19	1.91	1.301E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	10.	117.78	1.92	1.281E-02	1099.25	56.500	PBC<MDA	FE59
1120.08	6.	319.25	1.94	1.262E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.09	15.	94.15	1.94	1.261E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.905E+00	Ta182
1189.05	15.	85.67	1.99	1.204E-02	1189.05	16.200	PBC<MDA	Ta182
1221.34	9.	135.74	2.02	1.179E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	14.	115.62	2.03	1.166E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	98.96	2.06	1.139E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.016E+00	EU154
1384.30	2.	424.26	2.14	1.066E-02	1384.30	24.290	PBC<MDA	AG110M
1460.77	463.	4.84	2.40	1.021E-02	1460.83	10.670	2.362E+02	K40
1690.81	1.	945.38	2.35	9.068E-03	1690.98	47.790	PBC<MDA	SB124
1764.51	27.	31.49	2.40	8.758E-03	1764.49	15.400	1.133E+01	BI214
1836.06	8.	35.36	2.45	8.477E-03	1836.06	99.200	5.285E-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	
298.23	74.64	203.	240.	5.084E+03	10.58	1.045	-	D
307.97	77.08	194.	303.	6.271E+03	8.67	1.047	-	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	185.92	46.54	322.	4.	0.002	636.40	1.018
TH-227	200.32	50.14	268.	14.	0.008	167.51	1.021
AM-241	237.89	59.54	676.	-35.	-0.020	39.06	1.030s
TH-234	252.89	63.29	603.	-36.	-0.020	38.43	1.034s
Sn-126	256.85	64.28	608.	32.	0.018	110.51	1.035
BA-133	323.66	80.99	1393.	-36.	-0.020	38.73	1.051s
Np-237	345.65	86.49	1372.	18.	0.010	287.44	1.056A
EU-155	345.86	86.54	1596.	-33.	-0.018	174.11	1.056
Sn-126	347.45	86.94	1507.	30.	0.017	78.16	1.056D
Sn-126	349.97	87.57	1398.	83.	0.046	27.28	1.057D
Cd-109	351.85	88.04	1474.	0.	0.000	167.18	1.057A
TH-234	370.04	92.59	1046.	-31.	-0.017	148.24	1.062s
AC-228	371.27	92.90	130.	123.	0.068	19.55	1.774s
Gd-153	389.67	97.50	1015.	-31.	-0.017	145.41	1.066
Np-239	397.67	99.50	984.	-31.	-0.017	142.94	1.068s
Gd-153	412.46	103.20	952.	-31.	-0.017	140.26	1.071
Np-239	414.46	103.70	925.	-12.	-0.007	358.18	1.072s
Np-239	424.18	106.13	926.	-14.	-0.008	308.55	1.074
EU-152	486.74	121.78	280.	27.	0.015	89.73	1.089s
CO-57	487.88	122.06	308.	12.	0.007	200.81	1.089s
EU-154	492.03	123.10	278.	-12.	-0.007	198.61	1.090s
PA-234	524.80	131.29	675.	24.	0.013	155.79	1.098s
HF-181	531.71	133.02	698.	26.	0.015	142.52	1.100s
CE-144	533.77	133.54	725.	26.	0.015	145.08	1.100s
HF-181	544.81	136.30	751.	23.	0.013	172.72	1.103s
U-235	574.74	143.79	673.	26.	0.014	142.01	1.110s
CE-141	581.36	145.44	223.	3.	0.002	674.79	1.111s
Ba-140	650.21	162.66	306.	-6.	-0.004	382.30	1.127s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	653.08	163.38	312.	0.	0.000	1000.00	1.128s
CE-139	662.98	165.85	269.	12.	0.007	195.43	1.130s
TH-229	773.56	193.51	172.	5.	0.003	515.49	1.156s
U-235	820.84	205.33	160.	-10.	-0.006	204.37	1.167s
TH-229	842.90	210.85	156.	25.	0.014	99.78	1.172s
Cf-251	907.48	227.00	148.	-4.	-0.002	597.56	1.186s
PB-212	953.99	238.63	73.	562.	0.312	4.74	1.197D
PB-214	967.44	242.00	91.	83.	0.046	19.61	1.200D
EU-152	978.22	244.69	973.	-26.	-0.014	63.95	1.203s
TH-227	1024.40	256.24	132.	-16.	-0.009	142.80	1.213s
Cd-113m	1054.23	263.70	82.	19.	0.011	70.93	1.220
BI-210M	1062.75	265.83	136.	-7.	-0.004	224.01	1.222s
TL-208	1107.77	277.09	57.	30.	0.017	53.54	1.762s
Hg-203	1116.21	279.20	137.	4.	0.002	384.54	1.234
I-131	1136.60	284.30	68.	15.	0.008	110.69	1.239s
PB-214	1179.75	295.09	50.	140.	0.078	11.11	1.249D
PB-212	1199.51	300.03	43.	45.	0.025	25.64	1.253D
PA-231	1199.67	300.07	574.	18.	0.010	184.80	1.253
PA-233	1200.11	300.18	592.	18.	0.010	187.71	1.253
PA-231	1209.98	302.65	611.	10.	0.006	340.64	1.255s
BA-133	1210.79	302.85	621.	0.	0.000	1000.00	1.256s
Ba-140	1218.78	304.85	621.	0.	0.000	1000.00	1.257
BI-210M	1218.97	304.90	621.	0.	0.000	1000.00	1.257
Ir-192	1233.14	308.44	621.	0.	0.000	1000.00	1.261s
Ir-192	1265.33	316.49	381.	5.	0.003	513.32	1.268s
CR-51	1279.70	320.08	116.	18.	0.010	89.09	1.271s
La-140	1314.40	328.76	457.	-22.	-0.012	73.19	1.279s
Cf-249	1333.11	333.44	436.	-15.	-0.008	203.14	1.283s
AC-228	1352.63	338.32	377.	20.	0.011	138.69	1.288
Cs-136	1361.62	340.57	356.	21.	0.012	128.69	1.290
EU-152	1376.48	344.29	349.	20.	0.011	133.81	1.293s
HF-181	1382.65	345.83	369.	21.	0.012	130.50	1.294
PB-214	1406.81	351.87	43.	285.	0.159	7.35	1.402
BA-133	1423.33	356.00	417.	-18.	-0.010	160.72	1.303s
I-131	1457.25	364.48	95.	-15.	-0.009	136.13	1.311s
BA-133	1534.67	383.84	173.	-3.	-0.002	658.88	1.328s
Cf-249	1551.10	387.95	123.	18.	0.010	90.55	1.332
SN-113	1566.06	391.69	196.	-20.	-0.011	103.27	1.335s
SB-125	1710.77	427.88	43.	27.	0.015	53.98	1.367s
pm-146	1814.77	453.88	69.	-11.	-0.006	152.88	1.390s
SB-125	1852.71	463.37	96.	17.	0.009	85.80	1.399s
Ir-192	1871.48	468.06	127.	-12.	-0.007	137.60	1.403s
BE-7	1909.62	477.60	78.	23.	0.013	58.15	1.411s
HF-181	1927.22	482.00	113.	11.	0.006	140.36	1.415s
La-140	1947.31	487.02	170.	-18.	-0.010	106.48	1.419
RU-103	1987.44	497.05	74.	-21.	-0.011	68.58	1.428s
RH-106	2046.68	511.86	63.	120.	0.067	19.55	2.691
Nd-147	2123.21	531.00	26.	11.	0.006	99.31	1.458s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	2148.25	537.26	33.	13.	0.007	97.91	1.463s
CS-134	2252.15	563.24	56.	2.	0.001	839.39	1.486
CS-134	2276.48	569.32	42.	11.	0.006	88.61	1.491
PA-234	2277.07	569.47	64.	-7.	-0.004	162.42	1.491s
BI-207	2278.00	569.70	64.	-5.	-0.003	238.16	1.491s
TL-208	2331.99	583.20	24.	180.	0.100	9.34	1.518s
SB-125	2401.19	600.50	367.	13.	0.007	211.45	1.518s
SB-124	2410.11	602.73	362.	13.	0.007	209.87	1.519s
CS-134	2418.03	604.71	361.	13.	0.007	209.24	1.521
BI-214	2436.43	609.31	26.	215.	0.119	7.66	1.525D
RU-103	2440.38	610.30	374.	9.	0.005	299.52	1.526s
AG-108M	2456.31	614.28	383.	0.	0.000	1000.00	1.529s
PM-144	2471.43	618.06	383.	0.	0.000	1000.00	1.533s
RH-106	2486.85	621.92	364.	11.	0.006	237.01	1.536s
SB-125	2542.74	635.89	42.	6.	0.003	158.11	1.548s
I-131	2547.08	636.97	43.	10.	0.005	101.53	1.549s
CS-137	2645.82	661.66	47.	5.	0.003	315.06	1.570s
NB-94	2809.70	702.63	19.	11.	0.006	88.82	1.604s
SB-124	2890.33	722.79	116.	-15.	-0.008	105.31	1.621
EU-154	2892.61	723.36	100.	0.	0.000	1000.00	1.622s
ZR-95	2895.98	724.20	90.	7.	0.004	200.21	1.622s
BI-212	2909.55	727.59	8.	54.	0.030	17.95	1.208s
pm-146	2942.07	735.72	71.	-22.	-0.012	124.94	1.632s
pm-146	2987.83	747.16	26.	7.	0.004	154.75	1.641s
ZR-95	3026.11	756.73	40.	8.	0.004	177.36	1.649s
AG-110M	3054.97	763.94	36.	22.	0.012	43.43	1.655s
NB-95	3062.35	765.79	58.	11.	0.006	103.97	1.657s
PA-234M	3064.84	766.41	80.	-13.	-0.007	102.34	1.657s
EU-152	3114.88	778.92	72.	8.	0.004	154.11	1.668s
BI-212	3140.88	785.42	64.	14.	0.008	83.70	1.673s
CS-134	3182.67	795.87	59.	5.	0.003	203.54	1.682
CO-58	3242.31	810.78	80.	-17.	-0.009	79.79	1.694s
La-140	3262.29	815.77	97.	-5.	-0.003	263.87	1.698s
Cs-136	3273.21	818.50	93.	9.	0.005	158.15	1.700s
MN-54	3338.61	834.85	45.	-11.	-0.006	137.42	1.714
Co-56	3386.31	846.77	25.	8.	0.004	141.88	1.723s
TL-208	3441.24	860.50	1.	45.	0.025	15.21	0.844s
NB-94	3483.63	871.10	42.	-6.	-0.003	158.11	1.743s
PA-234	3521.37	880.53	32.	4.	0.002	220.76	1.751s
PA-234	3532.21	883.24	36.	11.	0.006	85.78	1.753s
AG-110M	3537.98	884.68	46.	11.	0.006	96.12	1.754s
Sc-46	3556.37	889.28	57.	11.	0.006	105.73	1.758s
y-88	3591.42	898.04	15.	7.	0.004	137.43	1.765s
AC-228	3643.55	911.07	21.	123.	0.068	12.14	1.776s
AG-110M	3749.25	937.49	64.	-22.	-0.012	86.73	1.797s
PA-234	3783.37	946.02	33.	-5.	-0.003	314.92	1.803s
EU-152	3855.75	964.11	192.	-18.	-0.010	82.56	1.818s
AC-228	3875.20	968.97	95.	90.	0.050	18.53	1.822s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3984.66	996.33	54.	-4.	-0.002	254.56	1.844s
EU-154	4018.45	1004.77	48.	-15.	-0.008	108.12	1.850s
Co-56	4150.74	1037.84	16.	11.	0.006	85.77	1.876s
Cs-136	4191.67	1048.07	27.	10.	0.006	77.22	1.884s
RH-106	4200.83	1050.36	31.	5.	0.003	158.23	1.886s
BI-207	4254.05	1063.66	55.	-13.	-0.007	134.50	1.896s
Ga-68	4309.03	1077.40	37.	5.	0.003	301.19	1.907s
FE-59	4396.46	1099.25	27.	10.	0.006	117.78	1.924s
EU-152	4447.77	1112.07	167.	-22.	-0.012	84.69	1.934s
ZN-65	4461.66	1115.55	145.	-22.	-0.012	79.12	1.937s
BI-214	4480.63	1120.29	158.	6.	0.003	319.25	1.940s
Ta-182	4484.68	1121.30	93.	15.	0.008	94.15	1.941s
CO-60	4692.51	1173.24	34.	0.	0.000	1000.00	1.981s
Ta-182	4755.78	1189.05	29.	15.	0.008	85.67	1.993
Ta-182	4885.27	1221.41	29.	9.	0.005	135.74	2.017s
Co-56	4952.78	1238.28	46.	14.	0.008	115.62	2.030s
NA-22	5097.85	1274.53	23.	7.	0.004	98.96	2.057s
EU-154	5097.90	1274.54	30.	0.	0.000	1000.00	2.057s
FE-59	5166.14	1291.60	34.	-18.	-0.010	81.12	2.070s
CO-60	5329.84	1332.50	29.	-8.	-0.005	193.16	2.100s
AG-110M	5537.14	1384.30	12.	2.	0.001	424.26	2.138s
K-40	5843.18	1460.77	10.	463.	0.257	4.84	2.403
La-140	6385.31	1596.21	19.	-6.	-0.003	367.54	2.288s
SB-124	6764.67	1690.98	6.	1.	0.000	945.38	2.353s
BI-214	7058.94	1764.49	24.	27.	0.015	31.49	2.402s
y-88	7345.46	1836.06	0.	8.	0.004	35.36	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	5.0451E+00				5.31E+01	
			477.60	5.045E+00	&(	9.619E+00	5.82E+01 1.05E+01 G
NA-22	C	3.5781E-01				9.50E+02	
			1274.53	3.578E-01	?(	1.215E+00	9.90E+01 9.99E+01 G
K-40	N	2.3621E+02				4.66E+11	
			1460.83	2.362E+02	(P	8.790E+00	4.84E+00 1.07E+01 G
Sc-46	F	3.8926E-01				8.38E+01	
			889.28	3.893E-01	?(	1.397E+00	1.06E+02 1.00E+02 G
			1120.55	7.339E-02	%	2.596E+00	1.03E+03 1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	3.0954E+00					2.77E+01	
			320.08	3.095E+00	?(P	9.221E+00	8.91E+01	9.94E+00 G
MN-54	C	-3.8525E-01					3.12E+02	
			834.85	-3.852E-01	?(	1.190E+00	1.37E+02	1.00E+02 G
FE-59	F	7.9321E-01					4.45E+01	
			1099.25	7.932E-01	?(	2.055E+00	1.18E+02	5.65E+01 G
			1291.60	-2.012E+00	+	3.409E+00	8.11E+01	4.32E+01 G
Co-56	C	7.8963E-01					7.73E+01	
			846.77	2.834E-01	*(	9.213E-01	1.42E+02	9.99E+01 G
			1238.28	1.015E+00	?(P	2.473E+00	1.16E+02	6.61E+01 G
			1037.84	3.316E+00	?(	6.264E+00	8.58E+01	1.41E+01 G
			1771.35	-4.111E-01	%	1.493E+01	1.02E+03	1.55E+01 A
CO-57	C	1.4644E-01					2.72E+02	
			122.06	1.464E-01	&(	9.912E-01	2.01E+02	8.56E+01 G
			136.47	7.356E-07	%	1.276E+01	5.16E+08	1.07E+01 G
CO-58	C	-5.7345E-01					7.09E+01	
			810.78	-5.735E-01	?(	1.528E+00	7.98E+01	9.95E+01 G
CO-60	F	-4.2786E-01					1.93E+03	
			1332.50	-4.279E-01	?(P	1.415E+00	1.93E+02	1.00E+02 G
			1173.24	0.000E+00	+	1.366E+00	1.00E+03	9.99E+01 G
ZN-65	F	-1.9370E+00					2.44E+02	
			1115.55	-1.937E+00	?(	5.101E+00	7.91E+01	5.06E+01 G
NB-94	I	3.4983E-01					7.41E+06	
			702.63	3.498E-01	&(	7.276E-01	8.88E+01	9.79E+01 G
			871.10	-2.173E-01	-	1.192E+00	1.58E+02	9.99E+01 G
ZR-95	I	4.8120E-01					6.40E+01	
			756.73	4.771E-01	?(	1.919E+00	1.77E+02	5.45E+01 G
			724.20	4.862E-01	?(	3.341E+00	2.00E+02	4.42E+01 G
NB-95	I	3.5623E-01					6.40E+01	
			765.79	3.562E-01	?(	1.256E+00	1.04E+02	9.98E+01 G
RU-103	I	-5.4003E-01					3.93E+01	
			497.05	-5.400E-01	&(P	1.116E+00	6.86E+01	9.09E+01 G
			610.30	4.412E+00	?	4.458E+01	3.00E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	4.6809E+00					3.74E+02	
			621.92	3.239E+00	?(P	2.586E+01	2.37E+02	9.93E+00 G
			1050.36	1.386E+01	?(	7.668E+01	1.58E+02	1.56E+00 G
			511.86	1.455E+01		4.812E+00	1.96E+01	2.00E+01 GA
AG-108M	C	-1.5303E-02					1.53E+05	
			433.94	-1.530E-02	%(P	8.365E-01	2.20E+03	9.05E+01 G
			722.94	-3.186E-02	%	1.710E+00	1.54E+03	9.08E+01 G
			614.28	0.000E+00	+	2.901E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.0241E+00					2.50E+02	
			884.68	5.322E-01	&(	1.734E+00	9.61E+01	7.27E+01 G
			657.76	-1.267E-02	% P	1.316E+00	6.64E+03	9.46E+01 G
			937.49	-2.412E+00	+	4.457E+00	8.67E+01	3.44E+01 G
			1384.30	4.290E-01	?(	4.043E+00	4.24E+02	2.43E+01 G
			763.94	3.278E+00	?(	4.494E+00	4.34E+01	2.23E+01 G
SN-113	F	-6.3558E-01					1.15E+02	
			391.69	-6.356E-01	&(P	2.119E+00	1.03E+02	6.40E+01 G
SB-124	F	2.7038E-01					6.02E+01	
			602.73	3.603E-01	?(	2.545E+00	2.10E+02	9.83E+01 G
			1690.98	8.546E-02	?(	1.851E+00	9.45E+02	4.78E+01 G
			722.79	-4.327E+00	+	1.534E+01	1.05E+02	1.08E+01 G
SB-125	I	2.1238E+00					1.01E+03	
			427.88	1.917E+00	(	2.400E+00	5.40E+01	2.96E+01 G
			600.50	1.974E+00	&(	1.405E+01	2.11E+02	1.79E+01 G
			635.89	1.511E+00	(	8.287E+00	1.58E+02	1.13E+01 G
			463.37	3.626E+00	&(	1.041E+01	8.58E+01	1.05E+01 G
I-131	I	2.3350E-01					8.02E+00	
			364.48	-3.584E-01	?(P	1.120E+00	1.36E+02	8.17E+01 G
			284.30	3.892E+00	(	1.067E+01	1.11E+02	6.14E+00 G
			636.97	3.845E+00	?(	1.328E+01	1.02E+02	7.17E+00 G
Gd-153	F	-1.0651E+00					2.42E+02	
			97.50	-1.065E+00	(	5.157E+00	1.45E+02	3.00E+01 G
			103.20	-1.454E+00	&	6.789E+00	1.40E+02	2.18E+01 G
Ga-68	C	7.1630E+00					4.71E-02	
			1077.40	7.163E+00	?(	4.786E+01	3.01E+02	3.30E+00 G
Tc-99m	I	-9.1819E-08					2.51E-01	
			140.51	-9.182E-08	%(	1.593E+00	5.16E+08	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-5.4607E-01					3.85E+03	
			356.00	-5.461E-01	?(	2.942E+00	1.61E+02	6.20E+01 G
			302.85	0.000E+00	+	1.079E+01	1.00E+03	1.83E+01 G
			383.84	-6.237E-01	+	1.408E+01	6.59E+02	8.94E+00 GA
			80.99	-1.185E+00	+ P	5.767E+00	3.87E+01	3.41E+01 GA
CS-134	I	4.2383E-01					7.54E+02	
			604.71	3.640E-01	&(	2.563E+00	2.09E+02	9.76E+01 G
			795.87	2.147E-01	?(	1.514E+00	2.04E+02	8.55E+01 G
			569.32	1.876E+00	(	5.612E+00	8.86E+01	1.54E+01 G
			801.95	-1.716E-01	%	1.708E+01	2.84E+03	8.69E+00 G
			563.24	5.921E-01	(P	1.172E+01	8.39E+02	8.35E+00 G
CS-137	I	1.6070E-01					1.10E+04	
			661.66	1.607E-01	?(	1.193E+00	3.15E+02	8.52E+01 G
CE-139	F	1.6620E-01					1.38E+02	
			165.85	1.662E-01	?(	1.096E+00	1.95E+02	7.99E+01 G
Ba-140	I	1.3361E+00					1.28E+01	
			537.26	1.336E+00	(P	3.043E+00	9.79E+01	2.44E+01 G
			162.66	-1.170E+00	&	1.515E+01	3.82E+02	6.22E+00 G
			304.85	0.000E+00	-	4.632E+01	1.00E+03	4.29E+00 G
La-140	I	-3.7421E-01					1.28E+01	
			1596.21	-3.742E-01	?(P	1.414E+00	3.68E+02	9.54E+01 G
			487.02	-9.140E-01	+	3.266E+00	1.06E+02	4.55E+01 G
			328.76	-1.891E+00	& P	8.892E+00	7.32E+01	2.03E+01 G
			815.77	-7.894E-01	+	7.171E+00	2.64E+02	2.33E+01 G
CE-141	I	6.8742E-02					3.25E+01	
			145.44	6.874E-02	?(P	1.581E+00	6.75E+02	4.82E+01 G
CE-144	I	2.4431E+00					2.85E+02	
			133.54	2.443E+00	*(	1.182E+01	1.45E+02	1.11E+01 G
PM-144	C	2.0539E-02					3.63E+02	
			696.54	2.054E-02	&(	1.171E+00	1.61E+03	9.90E+01 G
			618.06	0.000E+00	-	2.642E+00	1.00E+03	9.91E+01 G
EU-152	F	1.3258E+00					4.94E+03	
			344.29	1.376E+00	?(P	6.166E+00	1.34E+02	2.65E+01 G
			1112.07	-7.156E+00	&	2.021E+01	8.47E+01	1.36E+01 G
			121.78	9.500E-01	?(	2.839E+00	8.97E+01	2.86E+01 G
			778.92	2.053E+00	?(	1.084E+01	1.54E+02	1.29E+01 G
			964.11	-4.870E+00	+ P	1.804E+01	8.26E+01	1.46E+01 G
			244.69	-4.838E+00	+ P	2.805E+01	6.39E+01	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-1.672E-01	% P	6.500E+00	2.47E+03	2.10E+01 GA
EU-154	I	1.9695E-01					3.14E+03	
			873.23	1.969E-01	&(	1.057E+01	1.51E+03	1.23E+01 G
			123.10	-2.959E-01	&	1.983E+00	1.99E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.912E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	7.654E+00	1.00E+03	2.02E+01 G
			1004.77	-3.366E+00	+	7.854E+00	1.08E+02	1.80E+01 G
			996.33	-1.578E+00	+	1.402E+01	2.55E+02	1.06E+01 G
EU-155	I	-1.8115E-07					1.81E+03	
			105.31	-1.812E-07	%(	6.903E+00	1.13E+09	2.12E+01 G
			86.54	-1.139E+00	+	6.594E+00	1.74E+02	3.07E+01 G
HF-181	F	7.9005E-01					4.24E+01	
			482.00	3.161E-01	?(	1.506E+00	1.40E+02	8.05E+01 G
			133.02	6.248E-01	(	2.971E+00	1.43E+02	4.33E+01 G
			345.83	2.559E+00	?(	1.118E+01	1.31E+02	1.51E+01 G
			136.30	3.979E+00	?(	2.295E+01	1.73E+02	5.85E+00 G
Ta-182	F	2.3278E+00					1.14E+02	
			1121.30	1.905E+00	&(	6.029E+00	9.42E+01	3.49E+01 G
			1221.41	1.656E+00	?(P	4.818E+00	1.36E+02	2.70E+01 G
			1189.05	4.357E+00	(P	7.863E+00	8.57E+01	1.62E+01 G
Hg-203	F	8.3674E-02					4.66E+01	
			279.20	8.367E-02	&(	1.104E+00	3.85E+02	8.15E+01 G
TL-208	N	5.6934E+00					6.98E+02	
			583.02	5.693E+00	@(P	8.032E-01	9.34E+00	8.45E+01 G
			277.28	7.443E+00	+	9.400E+00	5.35E+01	6.31E+00 G
			860.56	1.302E+01	+ P	2.127E+00	1.52E+01	1.24E+01 G
pm-146	C	6.9621E-01					2.02E+03	
			747.16	6.962E-01	?(P	2.489E+00	1.55E+02	3.40E+01 G
			735.72	-3.082E+00	+ P	5.915E+00	1.25E+02	2.25E+01 G
			453.88	-3.872E-01	+	1.418E+00	1.53E+02	6.50E+01 G
y-88	F	3.9699E-01					1.07E+02	
			898.04	2.577E-01	?(P	8.320E-01	1.37E+02	9.37E+01 G
			1836.06	5.285E-01	?(	4.869E-01	3.54E+01	9.92E+01 G
Cd-113m		4.7981E+03					5.33E+03	
			263.70	4.798E+03	?(	1.130E+04	7.09E+01	6.00E-03 K
Cf-251	T	1.3570E-01					3.28E+05	
			176.60	1.357E-01	%(	4.282E+00	1.27E+03	1.70E+01 G
			227.00	-8.665E-01	+	1.287E+01	5.98E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	5.3871E-01					1.28E+05	
			387.95	5.387E-01	?(	1.633E+00	9.06E+01	6.60E+01 G
			333.44	-1.682E+00	&	1.148E+01	2.03E+02	1.55E+01 G
Sn-126		4.4279E+00					3.65E+07	
			87.57	2.368E+00	}	5.028E+00	2.73E+01	3.75E+01 GA
			64.28	4.428E+00	(	1.629E+01	1.11E+02	9.70E+00 G
			86.94	3.543E+00	}	2.172E+01	7.82E+01	9.04E+00 GA
PB-210	N	1.9329E+00					8.14E+03	
			46.54	1.933E+00	?(	4.172E+01	6.36E+02	4.25E+00 G
PB-212	N	1.8323E+01					6.98E+02	
			238.63	1.832E+01	(	1.388E+00	4.74E+00	4.33E+01 G
			300.03	2.254E+01	+	1.683E+01	2.56E+01	3.28E+00 GA
PB-214	N	1.4047E+01					5.84E+05	
			351.93	1.405E+01	(P	1.628E+00	7.35E+00	3.76E+01 G
			295.09	1.188E+01	- P	3.011E+00	1.11E+01	1.93E+01 G
			242.00	1.594E+01	P	9.044E+00	1.96E+01	7.43E+00 GA
BI-207	C	-1.2975E-01					1.18E+04	
			569.70	-1.298E-01	&(	1.072E+00	2.38E+02	9.77E+01 G
			1063.66	-7.107E-01	+ P	2.106E+00	1.34E+02	7.45E+01 G
BI-212	N	2.2538E+01					6.98E+02	
			727.17	2.254E+01	(	6.632E+00	1.80E+01	7.55E+00 G
			785.42	3.720E+01	&	1.044E+02	8.37E+01	1.28E+00 GA
BI-214	N	1.2461E+01					5.84E+05	
			609.31	1.284E+01	(P	1.597E+00	7.66E+00	4.61E+01 G
			1120.29	1.637E+00	& P	1.785E+01	3.19E+02	1.51E+01 G
			1764.49	1.133E+01	?(P	1.042E+01	3.15E+01	1.54E+01 G
BI-210M	T	-2.2345E-01					1.10E+09	
			265.83	-2.235E-01	&(P	1.737E+00	2.24E+02	5.00E+01 G
			304.90	0.000E+00	+	7.098E+00	1.00E+03	2.80E+01 G
AC-228	N	1.7531E+01					2.10E+03	
			911.07	1.586E+01	?(P	3.122E+00	1.21E+01	2.90E+01 G
			968.97	2.031E+01	?(P	1.081E+01	1.85E+01	1.75E+01 G
			338.32	3.008E+00	- P	1.397E+01	1.39E+02	1.20E+01 G
			93.35	2.295E+01		1.042E+01	1.95E+01	5.56E+00 XA
TH-227	N	3.2053E+00					7.95E+03	
			50.14	3.205E+00	&(	1.809E+01	1.68E+02	8.00E+00 G
			256.24	-3.389E+00	+	1.191E+01	1.43E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	5.2286E+00					2.68E+06	
			193.51	1.393E+00	&(	1.778E+01	5.15E+02	4.40E+00 G
			210.85	1.087E+01	&(P	2.648E+01	9.98E+01	2.99E+00 G
TH-234	N	-1.3062E+01					1.63E+12	
			63.29	-1.306E+01	(P	4.198E+01	3.84E+01	3.81E+00 G
			92.59	-5.794E+00	+	2.860E+01	1.48E+02	5.58E+00 G
PA-231	N	8.9322E+00					1.20E+07	
			302.65	5.952E+00	?(	6.809E+01	3.41E+02	2.88E+00 G
			300.07	1.242E+01	(	7.686E+01	1.85E+02	2.46E+00 G
PA-233	C	6.7878E-01					7.82E+08	
			312.01	-5.336E-02	%(P	5.615E+00	1.39E+03	3.60E+01 G
			300.18	4.930E+00	(	3.098E+01	1.88E+02	6.20E+00 G
PA-234	N	2.2768E+00					1.63E+12	
			131.29	1.346E+00	?(P	7.002E+00	1.56E+02	1.80E+01 G
			946.02	-1.368E+00	+ P	8.455E+00	3.15E+02	1.34E+01 G
			569.47	-2.292E+00	+	1.281E+01	1.62E+02	8.20E+00 G
			883.24	4.022E+00	?(	1.164E+01	8.58E+01	9.60E+00 G
			880.53	2.267E+00	?	1.768E+01	2.21E+02	6.00E+00 GA
PA-234M	N	-2.9560E+00					1.63E+12	
			1001.00	-2.956E+00	&(P	1.853E+02	2.73E+03	8.37E-01 G
			766.41	-1.432E+02	&	4.947E+02	1.02E+02	2.94E-01 G
U-235	N	2.4978E+00					2.57E+11	
			143.79	2.498E+00	(P	1.183E+01	1.42E+02	1.10E+01 G
			205.33	-2.646E+00	+ P	1.571E+01	2.04E+02	5.01E+00 G
			163.38	0.000E+00	-	1.879E+01	1.00E+03	5.08E+00 G
AM-241	T	-1.4406E+00					1.58E+05	
			59.54	-1.441E+00	?(P	5.043E+00	3.91E+01	3.59E+01 G
Np-237	F	1.4963E+00					2.14E+06	
							Derived Ave Activity	
			86.49	1.496E+00	}(	1.435E+01	2.87E+02	1.31E+01 G
Ir-192	F	1.0643E-01					7.40E+01	
			316.49	1.064E-01	?(	1.847E+00	5.13E+02	8.70E+01 G
			468.06	-5.197E-01	+	2.422E+00	1.38E+02	5.18E+01 G
			308.44	0.000E+00	&	6.310E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.9204E-01					1.30E+01	
			818.50	3.047E-01	?(	1.645E+00	1.58E+02	1.00E+02 G
			1048.07	5.396E-01	?(	1.398E+00	7.72E+01	8.00E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		340.57	8.103E-01	?(	3.491E+00	1.29E+02	4.69E+01 G
Np-239	T -6.2051E-01						2.36E+00
		103.70	-5.068E-01	+	6.076E+00	3.58E+02	2.40E+01 X
		106.13	-6.205E-01	&(	6.405E+00	3.09E+02	2.27E+01 G
		99.50	-2.123E+00	+	1.011E+01	1.43E+02	1.50E+01 X
Nd-147	2.1078E+00						1.11E+01
		531.00	2.108E+00	?(	5.072E+00	9.93E+01	1.30E+01 G
		91.10	2.824E-07	%	6.511E+00	6.89E+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:	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-227	50.14	268.	14.	0.008	167.51	3.205E+00	
AM-241	59.54	676.	-35.	-0.020	39.06	-1.441E+00	P
TH-234	63.29	603.	-36.	-0.020	38.43	-1.306E+01	P
BA-133	80.99	1393.	-36.	-0.020	38.73	-1.185E+00	P
EU-155	86.54	1596.	-33.	-0.018	174.11	-1.139E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	92.59	1046.	-31.	-0.017	148.24	-5.794E+00	
Gd-153	97.50	1015.	-31.	-0.017	145.41	-1.065E+00	
Np-239	99.50	984.	-31.	-0.017	142.94	-2.123E+00	
Gd-153	103.20	952.	-31.	-0.017	140.26	-1.454E+00	
Np-239	103.70	925.	-12.	-0.007	358.18	-5.068E-01	
Np-239	106.13	926.	-14.	-0.008	308.55	-6.205E-01	
EU-152	121.78	280.	27.	0.015	89.73	9.500E-01	
CO-57	122.06	308.	12.	0.007	200.81	1.464E-01	
EU-154	123.10	278.	-12.	-0.007	198.61	-2.959E-01	
PA-234	131.29	675.	24.	0.013	155.79	1.346E+00	P
HF-181	133.02	698.	26.	0.015	142.52	6.248E-01	
CE-144	133.54	725.	26.	0.015	145.08	2.443E+00	
HF-181	136.30	751.	23.	0.013	172.72	3.979E+00	
U-235	143.79	673.	26.	0.014	142.01	2.498E+00	P
CE-141	145.44	223.	3.	0.002	674.79	6.874E-02	P
Ba-140	162.66	306.	-6.	-0.004	382.30	-1.170E+00	
CE-139	165.85	269.	12.	0.007	195.43	1.662E-01	
TH-229	193.51	172.	5.	0.003	515.49	1.393E+00	
U-235	205.33	160.	-10.	-0.006	204.37	-2.646E+00	P
TH-229	210.85	156.	25.	0.014	99.78	1.087E+01	P
Cf-251	227.00	148.	-4.	-0.002	597.56	-8.665E-01	
EU-152	244.69	973.	-26.	-0.014	63.95	-4.838E+00	P
TH-227	256.24	132.	-16.	-0.009	142.80	-3.389E+00	
Cd-113m	263.70	82.	19.	0.011	70.93	4.798E+03	
BI-210M	265.83	136.	-7.	-0.004	224.01	-2.235E-01	P
Hg-203	279.20	137.	4.	0.002	384.54	8.367E-02	
I-131	284.30	68.	15.	0.008	110.69	3.892E+00	
PA-231	300.07	574.	18.	0.010	184.80	1.242E+01	
PA-233	300.18	592.	18.	0.010	187.71	4.930E+00	
PA-231	302.65	611.	10.	0.006	340.64	5.952E+00	
Ir-192	316.49	381.	5.	0.003	513.32	1.064E-01	
CR-51	320.08	116.	18.	0.010	89.09	3.095E+00	P
La-140	328.76	457.	-22.	-0.012	73.19	-1.891E+00	P
Cf-249	333.44	436.	-15.	-0.008	203.14	-1.682E+00	
Cs-136	340.57	356.	21.	0.012	128.69	8.103E-01	
EU-152	344.29	349.	20.	0.011	133.81	1.376E+00	P
HF-181	345.83	369.	21.	0.012	130.50	2.559E+00	
BA-133	356.00	417.	-18.	-0.010	160.72	-5.461E-01	
I-131	364.48	95.	-15.	-0.009	136.13	-3.584E-01	P
BA-133	383.84	173.	-3.	-0.002	658.88	-6.237E-01	
Cf-249	387.95	123.	18.	0.010	90.55	5.387E-01	
SN-113	391.69	196.	-20.	-0.011	103.27	-6.356E-01	P
SB-125	427.88	43.	27.	0.015	53.98	1.917E+00	
pm-146	453.88	69.	-11.	-0.006	152.88	-3.872E-01	
SB-125	463.37	96.	17.	0.009	85.80	3.626E+00	
Ir-192	468.06	127.	-12.	-0.007	137.60	-5.197E-01	
BE-7	477.60	78.	23.	0.013	58.15	5.045E+00	
HF-181	482.00	113.	11.	0.006	140.36	3.161E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	487.02	170.	-18.	-0.010	106.48	-9.140E-01	
RU-103	497.05	74.	-21.	-0.011	68.58	-5.400E-01	P
RH-106	511.86	63.	120.	0.067	19.55	1.455E+01	
Nd-147	531.00	26.	11.	0.006	99.31	2.108E+00	
Ba-140	537.26	33.	13.	0.007	97.91	1.336E+00	P
PA-234	569.47	64.	-7.	-0.004	162.42	-2.292E+00	
BI-207	569.70	64.	-5.	-0.003	238.16	-1.298E-01	
SB-125	600.50	367.	13.	0.007	211.45	1.974E+00	
RU-103	610.30	374.	9.	0.005	299.52	4.412E+00	
RH-106	621.92	364.	11.	0.006	237.01	3.239E+00	P
SB-125	635.89	42.	6.	0.003	158.11	1.511E+00	
I-131	636.97	43.	10.	0.005	101.53	3.845E+00	
CS-137	661.66	47.	5.	0.003	315.06	1.607E-01	
NB-94	702.63	19.	11.	0.006	88.82	3.498E-01	
ZR-95	724.20	90.	7.	0.004	200.21	4.862E-01	
pm-146	735.72	71.	-22.	-0.012	124.94	-3.082E+00	P
pm-146	747.16	26.	7.	0.004	154.75	6.962E-01	P
ZR-95	756.73	40.	8.	0.004	177.36	4.771E-01	
AG-110M	763.94	36.	22.	0.012	43.43	3.278E+00	
NB-95	765.79	58.	11.	0.006	103.97	3.562E-01	
PA-234M	766.41	80.	-13.	-0.007	102.34	-1.432E+02	
EU-152	778.92	72.	8.	0.004	154.11	2.053E+00	
CO-58	810.78	80.	-17.	-0.009	79.79	-5.735E-01	
La-140	815.77	97.	-5.	-0.003	263.87	-7.894E-01	
Cs-136	818.50	93.	9.	0.005	158.15	3.047E-01	
MN-54	834.85	45.	-11.	-0.006	137.42	-3.852E-01	
Co-56	846.77	25.	8.	0.004	141.88	2.834E-01	
NB-94	871.10	42.	-6.	-0.003	158.11	-2.173E-01	
PA-234	880.53	32.	4.	0.002	220.76	2.267E+00	
PA-234	883.24	36.	11.	0.006	85.78	4.022E+00	
AG-110M	884.68	46.	11.	0.006	96.12	5.322E-01	
Sc-46	889.28	57.	11.	0.006	105.73	3.893E-01	
y-88	898.04	15.	7.	0.004	137.43	2.577E-01	P
AG-110M	937.49	64.	-22.	-0.012	86.73	-2.412E+00	
PA-234	946.02	33.	-5.	-0.003	314.92	-1.368E+00	P
EU-152	964.11	192.	-18.	-0.010	82.56	-4.870E+00	P
EU-154	996.33	54.	-4.	-0.002	254.56	-1.578E+00	
EU-154	1004.77	48.	-15.	-0.008	108.12	-3.366E+00	
Co-56	1037.84	16.	11.	0.006	85.77	3.316E+00	
Cs-136	1048.07	27.	10.	0.006	77.22	5.396E-01	
RH-106	1050.36	31.	5.	0.003	158.23	1.386E+01	
BI-207	1063.66	55.	-13.	-0.007	134.50	-7.107E-01	P
Ga-68	1077.40	37.	5.	0.003	301.19	7.163E+00	
FE-59	1099.25	27.	10.	0.006	117.78	7.932E-01	
EU-152	1112.07	167.	-22.	-0.012	84.69	-7.156E+00	
ZN-65	1115.55	145.	-22.	-0.012	79.12	-1.937E+00	
Co-56	1238.28	46.	14.	0.008	115.62	1.015E+00	P
NA-22	1274.53	23.	7.	0.004	98.96	3.578E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1291.60	34.	-18.	-0.010	81.12	-2.012E+00		
CO-60	1332.50	29.	-8.	-0.005	193.16	-4.279E-01		P
AG-110M	1384.30	12.	2.	0.001	424.26	4.290E-01		
La-140	1596.21	19.	-6.	-0.003	367.54	-3.742E-01		P
y-88	1836.06	0.	8.	0.004	35.36	5.285E-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	5.0450E+00	5.0451E+00	5.815E+01%	9.62E+00
NA-22	#A	3.5781E-01	3.5781E-01	9.896E+01%	1.21E+00
K-40		2.3621E+02	2.3621E+02	4.843E+00%	8.79E+00
Sc-46	#A	3.8925E-01	3.8926E-01	1.057E+02%	1.40E+00
CR-51	#A	3.0953E+00	3.0954E+00	8.909E+01%	9.22E+00
MN-54	#A	-3.8524E-01	-3.8525E-01	1.374E+02%	1.19E+00
FE-59	#A	7.9320E-01	7.9321E-01	1.178E+02%	2.06E+00
Co-56	#A	7.8962E-01	7.8963E-01	6.738E+01%	9.21E-01
CO-57	#A	1.4644E-01	1.4644E-01	2.008E+02%	9.91E-01
CO-58	#A	-5.7345E-01	-5.7345E-01	7.979E+01%	1.53E+00
CO-60	#A	-4.2786E-01	-4.2786E-01	1.932E+02%	1.42E+00
ZN-65	#A	-1.9370E+00	-1.9370E+00	7.912E+01%	5.10E+00
NB-94	#A	3.4983E-01	3.4983E-01	8.882E+01%	7.28E-01
ZR-95	#A	4.8119E-01	4.8120E-01	1.337E+02%	1.92E+00
NB-95	#A	3.5622E-01	3.5623E-01	1.040E+02%	1.26E+00
RU-103	#A	-5.4002E-01	-5.4003E-01	6.858E+01%	1.12E+00
RH-106	#A	4.6809E+00	4.6809E+00	1.425E+02%	2.59E+01
AG-108M	#A	-1.5303E-02	-1.5303E-02	2.197E+03%	8.36E-01
AG-110M	#A	1.0241E+00	1.0241E+00	4.343E+01%	1.73E+00
SN-113	#A	-6.3558E-01	-6.3558E-01	1.033E+02%	2.12E+00
SB-124	#A	2.7037E-01	2.7038E-01	2.099E+02%	2.55E+00
SB-125	#A	2.1238E+00	2.1238E+00	5.398E+01%	2.40E+00
I-131	#A	2.3347E-01	2.3350E-01	6.757E+01%	1.12E+00
Gd-153	#A	-1.0651E+00	-1.0651E+00	1.454E+02%	5.16E+00
Ga-68	#A	7.0120E+00	7.1630E+00	3.012E+02%	4.79E+01
Tc-99m	#A	-9.1452E-08	-9.1819E-08	5.157E+08%	1.59E+00
BA-133	#A	-5.4607E-01	-5.4607E-01	1.607E+02%	2.94E+00
CS-134	A	4.2383E-01	4.2383E-01	8.861E+01%	2.56E+00
CS-137	#A	1.6070E-01	1.6070E-01	3.151E+02%	1.19E+00
CE-139	#A	1.6620E-01	1.6620E-01	1.954E+02%	1.10E+00
Ba-140	#A	1.3360E+00	1.3361E+00	9.791E+01%	3.04E+00
La-140	#A	-3.7418E-01	-3.7421E-01	3.675E+02%	1.41E+00
CE-141	#A	6.8740E-02	6.8742E-02	6.748E+02%	1.58E+00
CE-144	#A	2.4431E+00	2.4431E+00	1.451E+02%	1.18E+01
PM-144	#A	2.0539E-02	2.0539E-02	1.611E+03%	1.17E+00

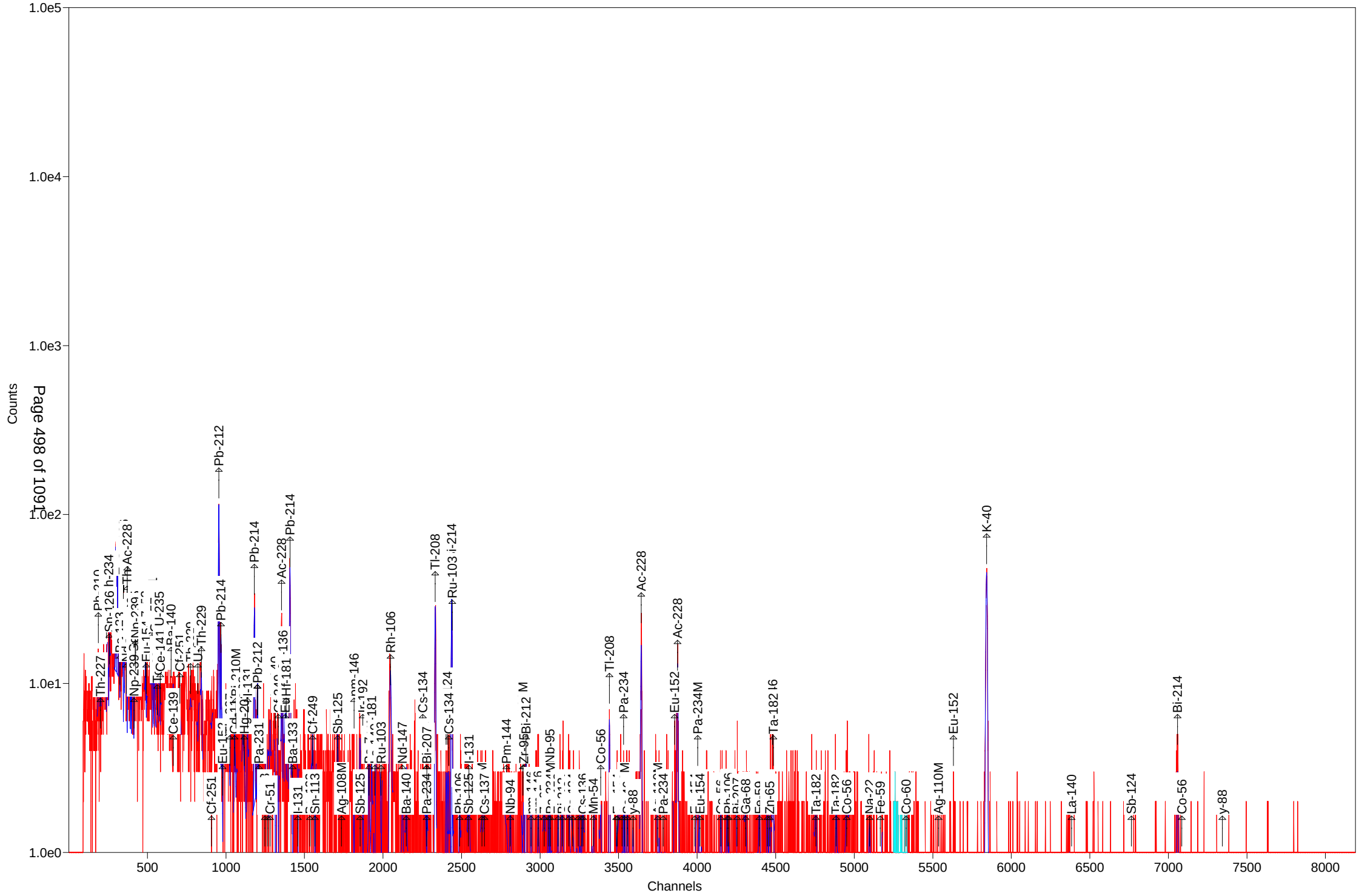
EU-152 #A	1.3258E+00	1.3258E+00	7.432E+01%	6.17E+00
EU-154 #A	1.9695E-01	1.9695E-01	1.510E+03%	1.06E+01
EU-155 #A	-1.8115E-07	-1.8115E-07	1.135E+09%	6.90E+00
HF-181 #A	7.9003E-01	7.9005E-01	7.369E+01%	1.51E+00
Ta-182 A	2.3278E+00	2.3278E+00	6.203E+01%	6.03E+00
Hg-203 #A	8.3672E-02	8.3674E-02	3.845E+02%	1.10E+00
TL-208	5.6934E+00	5.6934E+00	9.335E+00%	8.03E-01
pm-146 #A	6.9621E-01	6.9621E-01	1.548E+02%	2.49E+00
y-88 #A	3.9699E-01	3.9699E-01	3.536E+01%	8.32E-01
Cd-113m#A	4.7981E+03	4.7981E+03	7.093E+01%	1.13E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.09E+01
Cf-251 #A	1.3570E-01	1.3570E-01	1.271E+03%	4.28E+00
Cf-249 #A	5.3871E-01	5.3871E-01	9.055E+01%	1.63E+00
Sn-126 A	4.4279E+00	4.4279E+00	1.105E+02%	1.63E+01
PB-210 #A	1.9329E+00	1.9329E+00	6.364E+02%	4.17E+01
PB-212	1.8323E+01	1.8323E+01	4.736E+00%	1.39E+00
PB-214	1.4047E+01	1.4047E+01	7.351E+00%	1.63E+00
BI-207 #A	-1.2975E-01	-1.2975E-01	2.382E+02%	1.07E+00
BI-212	2.2538E+01	2.2538E+01	1.795E+01%	6.63E+00
BI-214	1.2461E+01	1.2461E+01	7.656E+00%	1.60E+00
BI-210M#A	-2.2345E-01	-2.2345E-01	2.240E+02%	1.74E+00
AC-228 #	1.7531E+01	1.7531E+01	1.107E+01%	3.12E+00
TH-227 #A	3.2053E+00	3.2053E+00	1.675E+02%	1.81E+01
TH-229 #A	5.2286E+00	5.2286E+00	9.978E+01%	1.78E+01
TH-234 #A	-1.3062E+01	-1.3062E+01	3.843E+01%	4.20E+01
PA-231 #A	8.9322E+00	8.9322E+00	1.848E+02%	6.81E+01
PA-233 #A	6.7878E-01	6.7878E-01	1.877E+02%	5.62E+00
PA-234 #A	2.2768E+00	2.2768E+00	8.578E+01%	7.00E+00
PA-234M#A	-2.9560E+00	-2.9560E+00	2.731E+03%	1.85E+02
U-235 #A	2.4978E+00	2.4978E+00	1.420E+02%	1.18E+01
AM-241 #A	-1.4406E+00	-1.4406E+00	3.906E+01%	5.04E+00
Np-237 A	1.4963E+00	1.4963E+00	2.874E+02%	1.43E+01
Ir-192 #A	1.0643E-01	1.0643E-01	5.133E+02%	1.85E+00
Cs-136 #A	4.9200E-01	4.9204E-01	7.268E+01%	1.64E+00
Np-239 #A	-6.2024E-01	-6.2051E-01	3.086E+02%	6.41E+00
Nd-147 #A	2.1076E+00	2.1078E+00	9.931E+01%	5.07E+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) 3.268E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.2680115E+02 Bq/Sample

264540_Gamma_160-18553-A-3-B. 13_Gamma_20160734.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161871

Sample Description: 264540_Gamma_160-18553-A-4-B
Detector: Detector #12
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-4-B

Decay to Time: 9/1/2016 14:39 Live Time: 1800 sec
Acquisition Time: 9/1/2016 14:40:00 Real Time: 1812 sec
Analysis Time: 9/1/2016 15:10 Dead Time: 0.68 %
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	2.911E+00	107.4	3.126E+00	3.130E+00	1.061E+01
NA-22	-3.494E-01	139.4	4.872E-01	4.875E-01	1.693E+00
K-40	2.782E+02	4.7	1.317E+01	1.939E+01	8.496E+00
Sc-46	-4.338E-01	127.6	5.536E-01	5.541E-01	1.886E+00
CR-51	1.718E+00	201.9	3.468E+00	3.470E+00	1.183E+01
MN-54	-6.009E-01	72.2	4.340E-01	4.351E-01	1.584E+00
FE-59	4.139E-01	88.0	3.642E-01	3.648E-01	2.471E+00
Co-56	9.291E-01	30.1	2.796E-01	2.836E-01	1.326E+00
CO-57	2.457E-01	157.8	3.878E-01	3.880E-01	9.885E-01
CO-58	1.517E-01	273.2	4.143E-01	4.144E-01	1.452E+00
CO-60	-3.525E-02	112.0	3.948E-02	3.952E-02	1.504E+00
ZN-65	-1.586E+00	102.5	1.626E+00	1.628E+00	5.469E+00
NB-94	2.659E-01	69.6	1.850E-01	1.855E-01	1.129E+00
ZR-95	-1.327E+00	66.5	8.822E-01	8.849E-01	2.697E+00
NB-95	1.976E-01	266.0	5.255E-01	5.256E-01	1.814E+00
RU-103	2.106E-02	2301.4	4.846E-01	4.846E-01	1.190E+00
RH-106	8.738E-02	67.3	5.883E-02	5.901E-02	3.005E+01
AG-108M	-5.308E-01	93.1	4.942E-01	4.949E-01	1.217E+00
AG-110M	0.000E+00	1.#INF	8.549E-02	8.549E-02	2.364E+00
SN-113	-3.174E-01	241.1	7.653E-01	7.655E-01	2.598E+00
SB-124	-9.915E-03	80.4	7.971E-03	7.987E-03	3.119E+00
SB-125	-4.874E-01	106.5	5.191E-01	5.197E-01	3.869E+00
I-131	-2.501E-01	154.8	3.871E-01	3.873E-01	1.257E+00
Gd-153	9.031E-01	149.2	1.347E+00	1.348E+00	4.505E+00
Ga-68	1.817E+01	96.3	1.750E+01	1.753E+01	3.880E+01
Tc-99m	3.345E-01	154.4	5.165E-01	5.168E-01	1.726E+00
BA-133	-1.206E-01	113.8	1.373E-01	1.374E-01	3.309E+00
CS-134	-1.199E-01	67.9	8.144E-02	8.168E-02	3.080E+00
CS-137	-5.671E-01	100.4	5.695E-01	5.702E-01	1.920E+00
CE-139	3.654E-01	101.7	3.716E-01	3.732E-01	1.243E+00
Ba-140	-5.413E-01	287.0	1.553E+00	1.554E+00	4.201E+00
La-140	7.228E-01	58.3	4.217E-01	4.234E-01	1.029E+00
CE-141	6.188E-01	152.3	9.426E-01	9.431E-01	3.149E+00

CE-144	0.000E+00	1.#INF	1.708E+00	1.708E+00	1.501E+01
PM-144	4.585E-01	96.4	4.420E-01	4.426E-01	1.023E+00
EU-152	1.514E+00	131.4	1.990E+00	1.991E+00	6.359E+00
EU-154	1.047E+00	92.1	9.645E-01	9.660E-01	1.100E+01
EU-155	-1.477E+00	133.4	1.970E+00	1.972E+00	6.577E+00
HF-181	-5.432E-01	102.3	5.555E-01	5.562E-01	1.868E+00
Ta-182	2.927E+00	60.8	1.781E+00	1.787E+00	8.278E+00
Hg-203	-4.716E-01	107.0	5.045E-01	5.053E-01	1.690E+00
TL-208	6.663E+00	9.4	6.282E-01	7.171E-01	9.231E-01
pm-146	1.477E+00	90.9	1.342E+00	1.344E+00	3.115E+00
y-88	-8.172E-01	51.0	4.171E-01	4.192E-01	1.611E+00
Cd-113m	-2.973E+03	177.1	5.265E+03	5.268E+03	1.789E+04
Cd-109	3.151E+00	440.5	1.388E+01	1.388E+01	4.654E+01
Cf-251	5.549E-01	333.5	1.851E+00	1.851E+00	4.804E+00
Cf-249	-6.853E-01	99.6	6.823E-01	6.832E-01	2.286E+00
Sn-126	-5.044E+00	118.6	5.981E+00	5.987E+00	1.993E+01
PB-210	-5.688E+00	241.8	1.375E+01	1.376E+01	4.713E+01
PB-212	1.760E+01	5.7	9.982E-01	1.514E+00	1.892E+00
PB-214	1.252E+01	9.5	1.186E+00	1.353E+00	2.071E+00
BI-207	-3.458E-01	108.5	3.753E-01	3.757E-01	1.274E+00
BI-212	3.851E+00	161.0	6.199E+00	6.202E+00	2.127E+01
BI-214	1.278E+01	8.6	1.104E+00	1.288E+00	1.502E+00
BI-210M	4.330E-01	138.5	5.995E-01	6.001E-01	2.031E+00
AC-228	2.009E+01	8.6	1.736E+00	2.016E+00	2.034E+00
TH-227	5.787E+00	115.0	6.654E+00	6.662E+00	2.228E+01
TH-229	-7.510E+00	111.3	8.358E+00	8.380E+00	2.136E+01
TH-234	1.659E+01	45.6	7.556E+00	7.606E+00	2.431E+01
PA-231	1.106E+01	169.8	1.878E+01	1.879E+01	6.312E+01
PA-233	7.491E-01	171.5	1.285E+00	1.285E+00	5.378E+00
PA-234	5.160E-01	103.0	5.313E-01	5.319E-01	8.933E+00
PA-234M	-1.773E+01	300.1	5.322E+01	5.323E+01	2.058E+02
U-235	2.193E+00	184.7	4.049E+00	4.051E+00	1.355E+01
AM-241	-1.522E+00	114.7	1.745E+00	1.747E+00	5.814E+00
Np-237	2.752E+00	148.7	4.093E+00	4.095E+00	1.365E+01
Ir-192	4.248E-01	95.6	4.062E-01	4.069E-01	1.937E+00
Cs-136	-1.983E-01	265.8	5.272E-01	5.273E-01	1.823E+00
Np-239	1.308E+00	135.6	1.773E+00	1.775E+00	5.923E+00
Nd-147	5.405E-01	607.5	3.283E+00	3.284E+00	8.080E+00
Total	4.332E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-4-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161871.An1

Acquisition information
Start time: 9/1/2016 2:40:00 PM
Live time: 1800
Real time: 1812
Dead time: 0.68 %
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 2:39:00 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. 28 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1309

***** 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	-10.	241.80	0.89	2.229E-02	46.54	4.250	PBC<MDA	PB210
50.14	21.	114.99	0.89	2.496E-02	50.14	8.000	PBC<MDA	TH227
63.30	38.	45.56	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
74.88	168.	13.42	0.92	3.878E-02				
77.13	298.	8.51	0.92	3.962E-02				
86.36	28.	148.70	0.93	4.242E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.174E+00	EU155
					86.94	9.040	3.978E+00	Sn126
87.44	30.	68.68	0.93	4.267E-02	87.57	37.500	PBC<MDA	Sn126
87.99	9.	440.47	0.93	4.278E-02	88.04	3.790	PBC<MDA	Cd109
93.00	130.	18.81	0.40	4.376E-02	92.59	5.584	2.255E+01	TH234
					93.35	5.561	2.953E+01	AC228
97.50	22.	149.15	0.94	4.443E-02	97.50	30.000	PBC<MDA	Gd153
106.13	24.	135.55	0.95	4.521E-02	106.13	22.700	PBC<MDA	Np239
121.78	10.	219.09	0.96	4.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.434E-01	CO57
123.10	21.	92.15	0.96	4.522E-02	123.10	40.790	PBC<MDA	EU154
136.47	23.	157.83	0.98	4.420E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.675E+00	CO57
140.51	23.	154.42	0.98	4.377E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	19.	184.67	0.98	4.338E-02	143.79	10.960	PBC<MDA	U235
145.44	23.	152.33	0.98	4.318E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	21.	101.71	1.00	4.089E-02	165.85	79.900	PBC<MDA	CE139
176.60	7.	333.50	1.01	3.926E-02	176.60	17.000	PBC<MDA	Cf251
202.45	24.	39.38	0.38	3.591E-02				
227.00	17.	118.31	1.06	3.329E-02	227.00	6.300	PBC<MDA	Cf251
238.60	442.	5.67	1.07	3.220E-02	238.63	43.300	1.760E+01	PB212
241.67	39.	40.24	1.07	3.192E-02	242.00	7.430	PBC<MDA	PB214
244.69	21.	178.93	1.08	3.166E-02	244.69	7.580	PBC<MDA	EU152
265.83	12.	138.48	1.10	2.994E-02	265.83	50.000	PBC<MDA	BI210M
276.98	65.	25.25	1.88	2.910E-02	277.28	6.310	1.978E+01	TL208
295.34	134.	15.58	1.27	2.787E-02	295.09	19.300	1.323E+01	PB214
300.08	29.	6.40	1.13	2.757E-02	300.03	3.280	1.760E+01	PB212
					300.07	2.460	2.347E+01	PA231
					300.18	6.200	PBC<MDA	PA233
300.18	16.	171.49	1.13	2.756E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.285E+01	PA231
					300.18	6.200	5.099E+00	PA233
302.70	16.	169.82	1.13	2.741E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.739E+00	BA133
302.85	16.	173.53	1.13	2.740E-02	302.65	2.880	1.106E+01	PA231
					302.85	18.330	1.739E+00	BA133
308.68	3.	825.23	1.14	2.706E-02	308.44	31.750	PBC<MDA	Ir192
317.62	16.	151.00	1.14	2.658E-02	316.49	87.040	PBC<MDA	Ir192
320.08	8.	201.89	1.15	2.638E-02	320.08	9.940	PBC<MDA	CR51
328.76	23.	58.34	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
333.44	4.	414.27	1.16	2.564E-02	333.44	15.510	PBC<MDA	Cf249
338.28	111.	15.99	1.24	2.538E-02	338.32	12.010	2.023E+01	AC228
344.29	5.	432.58	1.17	2.508E-02	344.29	26.500	PBC<MDA	EU152
351.80	203.	9.60	1.05	2.471E-02	351.93	37.600	1.215E+01	PB214
383.84	6.	329.54	1.20	2.325E-02	383.84	8.940	PBC<MDA	BA133
463.37	7.	176.31	1.28	2.035E-02	463.37	10.470	PBC<MDA	SB125
468.55	12.	95.61	1.28	2.020E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	107.41	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
511.86	119.	18.96	2.57	1.895E-02	511.86	20.000	1.745E+01	RH106
531.00	2.	607.52	1.34	1.845E-02	531.00	13.000	PBC<MDA	Nd147
569.32	13.	67.92	1.37	1.754E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.868E+00	PA234
					569.70	97.740	4.086E-01	BI207
569.47	4.	233.33	1.37	1.754E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.570E+00	PA234
					569.70	97.740	1.318E-01	BI207
583.05	175.	9.43	1.56	1.724E-02	583.02	84.500	6.663E+00	TL208
609.09	177.	8.64	1.29	1.669E-02	609.31	46.090	1.278E+01	BI214
618.06	16.	157.17	1.41	1.652E-02	618.06	99.100	PBC<MDA	PM144
636.97	2.	504.98	1.43	1.616E-02	636.97	7.170	PBC<MDA	I131
696.54	11.	111.63	1.48	1.513E-02	696.54	99.000	PBC<MDA	PM144
722.79	14.	80.39	1.50	1.472E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.746E-01	AG108M
					723.36	20.220	2.582E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
722.94	13.	91.99	1.50	1.471E-02	722.79	10.810	4.660E+00	SB124
					722.94	90.840	5.546E-01	AG108M
					723.36	20.220	2.493E+00	EU154
727.17	8.	160.99	1.51	1.465E-02	727.17	7.550	PBC<MDA	BI212
747.16	13.	90.86	1.52	1.436E-02	747.16	34.000	PBC<MDA	pm146
765.79	5.	265.95	1.54	1.410E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	21.	48.65	1.56	1.383E-02	785.42	1.280	PBC<MDA	BI212
795.87	3.	334.96	1.56	1.369E-02	795.87	85.530	PBC<MDA	CS134
810.78	4.	273.18	1.58	1.351E-02	810.78	99.460	PBC<MDA	CO58
860.56	25.	32.35	1.62	1.291E-02	860.56	12.420	8.828E+00	TL208
871.10	11.	69.58	1.63	1.279E-02	871.10	99.890	PBC<MDA	NB94
873.23	3.	285.11	1.63	1.277E-02	873.23	12.270	PBC<MDA	EU154
880.53	11.	85.29	1.63	1.269E-02	880.53	6.000	PBC<MDA	PA234
883.24	8.	128.53	1.64	1.266E-02	883.24	9.600	PBC<MDA	PA234
911.24	123.	10.06	1.43	1.237E-02	911.07	29.000	1.905E+01	AC228
946.02	2.	606.22	1.69	1.202E-02	946.02	13.400	PBC<MDA	PA234
964.11	12.	131.37	1.70	1.184E-02	964.11	14.605	PBC<MDA	EU152
969.25	80.	17.75	1.17	1.180E-02	968.97	17.460	2.171E+01	AC228
996.33	6.	165.86	1.73	1.155E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-3.	300.13	1.73	1.151E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	5.	176.07	1.76	1.119E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	11.	67.33	1.77	1.109E-02	1050.36	1.560	PBC<MDA	RH106
1077.40	10.	96.26	1.79	1.088E-02	1077.40	3.300	PBC<MDA	Ga68
1120.26	9.	174.09	1.83	1.055E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.28	19.	86.04	1.83	1.055E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.879E+00	Ta182
1173.24	5.	153.27	1.87	1.018E-02	1173.24	99.900	PBC<MDA	CO60
1218.85	14.	86.05	1.91	9.870E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	31.	30.09	1.92	9.765E-03	1238.28	66.070	2.694E+00	Co56
1291.60	10.	88.00	1.96	9.448E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	6.	166.25	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1460.91	458.	4.73	1.89	8.575E-03	1460.83	10.670	2.782E+02	K40
1596.21	5.	126.49	2.18	7.993E-03	1596.21	95.400	PBC<MDA	La140
1764.75	34.	18.80	2.30	7.376E-03	1764.49	15.400	1.654E+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
299.07	74.84	170.	168.	4.336E+03	13.42	0.917	- D
308.07	77.10	173.	298.	7.526E+03	8.51	0.919	- D
808.96	202.45	28.	24.	6.684E+02	39.38	0.376	- 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	185.80	46.54	278.	-10.	-0.005	241.80	0.889
TH-227	200.19	50.14	276.	21.	0.012	114.99	0.893s
AM-241	237.74	59.54	604.	-31.	-0.017	114.70	0.902s
TH-234	252.73	63.29	129.	38.	0.021	45.56	0.905D
Sn-126	256.70	64.28	612.	-30.	-0.017	118.57	0.906s
BA-133	323.48	80.99	1075.	-19.	-0.010	121.64	0.922s
Np-237	345.47	86.49	824.	28.	0.015	148.70	0.928A
EU-155	345.68	86.54	905.	-30.	-0.016	145.20	0.928s
Sn-126	347.27	86.94	875.	-30.	-0.016	142.81	0.928
Sn-126	349.78	87.57	786.	30.	0.016	68.68	0.929D
Cd-109	351.66	88.04	816.	9.	0.005	440.47	0.929A
Nd-147	363.89	91.10	813.	-8.	-0.004	527.09	0.932s
TH-234	369.85	92.59	227.	19.	0.010	115.93	0.933D
AC-228	372.88	93.35	713.	30.	0.016	129.03	0.934s
Gd-153	389.47	97.50	511.	22.	0.012	149.15	0.938s
Np-239	397.47	99.50	533.	0.	0.000	1000.00	0.940s
Gd-153	412.25	103.20	533.	0.	0.000	1000.00	0.944
Np-239	414.25	103.70	582.	-25.	-0.014	135.73	0.944
EU-155	420.70	105.31	564.	-25.	-0.014	133.43	0.946s
Np-239	423.96	106.13	524.	24.	0.013	135.55	0.946s
EU-152	486.50	121.78	235.	10.	0.006	219.09	0.961s
CO-57	487.64	122.06	202.	-4.	-0.002	504.98	0.962s
EU-154	491.79	123.10	179.	21.	0.012	92.15	0.963s
PA-234	524.55	131.29	738.	-25.	-0.014	156.37	0.970s
HF-181	531.46	133.02	763.	-22.	-0.012	177.01	0.972s
CE-144	533.51	133.54	785.	0.	0.000	1000.00	0.973s
HF-181	544.55	136.30	785.	0.	0.000	1000.00	0.975s
CO-57	545.24	136.47	632.	23.	0.013	157.83	0.975s
Tc-99m	561.38	140.51	609.	23.	0.013	154.42	0.979
U-235	574.47	143.79	591.	19.	0.010	184.67	0.982s
CE-141	581.09	145.44	612.	23.	0.013	152.33	0.984s
Ba-140	649.91	162.66	310.	-6.	-0.004	395.37	1.000s
CE-139	662.68	165.85	228.	21.	0.012	101.71	1.003s
Cf-251	705.64	176.60	139.	7.	0.004	333.50	1.013s
TH-229	773.22	193.51	165.	-22.	-0.012	111.29	1.029s
TH-229	842.54	210.85	194.	-26.	-0.015	100.94	1.046s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	907.10	227.00	106.	17.	0.009	118.31	1.061s
PB-212	953.60	238.63	92.	442.	0.245	5.67	1.071D
PB-214	967.05	242.00	736.	18.	0.010	216.60	1.075s
EU-152	977.83	244.69	729.	21.	0.012	178.93	1.077
TH-227	1023.99	256.24	106.	-11.	-0.006	172.79	1.088s
Cd-113m	1053.81	263.70	142.	-10.	-0.005	177.07	1.095s
BI-210M	1062.33	265.83	125.	12.	0.006	138.48	1.097s
TL-208	1106.90	276.98	47.	65.	0.036	25.25	1.881s
Hg-203	1115.78	279.20	220.	-20.	-0.011	107.00	1.109s
I-131	1136.16	284.30	107.	-22.	-0.012	75.69	1.114s
PB-214	1180.31	295.34	72.	128.	0.071	16.34	1.270
PB-212	1199.05	300.03	30.	29.	0.016	6.40	1.128A
PA-233	1199.65	300.18	354.	16.	0.009	171.49	1.128
PA-231	1209.52	302.65	348.	16.	0.009	169.82	1.131
BA-133	1210.33	302.85	364.	16.	0.009	173.53	1.131
BI-210M	1218.50	304.90	380.	0.	0.000	1000.00	1.133
Ir-192	1232.67	308.44	377.	3.	0.002	825.23	1.136s
Ir-192	1264.85	316.49	280.	16.	0.009	151.00	1.143s
CR-51	1279.22	320.08	130.	8.	0.005	201.89	1.147s
La-140	1313.91	328.76	77.	23.	0.013	58.34	1.155s
Cf-249	1332.62	333.44	153.	4.	0.002	414.27	1.159s
AC-228	1351.97	338.28	51.	111.	0.062	15.99	1.244s
Cs-136	1361.13	340.57	331.	-20.	-0.011	131.61	1.165s
EU-152	1375.98	344.29	248.	5.	0.003	432.58	1.169
HF-181	1382.15	345.83	317.	-20.	-0.011	125.84	1.170s
PB-214	1406.00	351.80	47.	203.	0.113	9.60	1.052s
BA-133	1422.81	356.00	355.	-18.	-0.010	147.28	1.180s
I-131	1456.73	364.48	81.	-13.	-0.007	154.79	1.187
BA-133	1534.13	383.84	162.	6.	0.003	329.54	1.205s
Cf-249	1550.56	387.95	166.	-19.	-0.010	99.56	1.209s
SN-113	1565.51	391.69	200.	-8.	-0.005	241.08	1.212s
SB-125	1710.19	427.88	80.	-15.	-0.008	119.57	1.245s
AG-108M	1734.43	433.94	72.	-18.	-0.010	93.10	1.250s
pm-146	1814.18	453.88	48.	-6.	-0.003	323.46	1.268s
SB-125	1852.11	463.37	73.	7.	0.004	176.31	1.277s
Ir-192	1870.88	468.06	58.	12.	0.007	95.61	1.281s
BE-7	1909.00	477.60	64.	11.	0.006	107.41	1.289
HF-181	1926.61	482.00	119.	-16.	-0.009	102.26	1.293s
La-140	1946.69	487.02	118.	-3.	-0.002	503.86	1.298s
RH-106	2046.04	511.86	60.	119.	0.066	18.96	2.570s
Nd-147	2122.56	531.00	48.	2.	0.001	607.52	1.337s
Ba-140	2147.60	537.26	44.	-4.	-0.002	286.99	1.342s
CS-134	2251.48	563.24	61.	-5.	-0.003	259.39	1.365s
CS-134	2275.81	569.32	30.	13.	0.007	67.92	1.370s
PA-234	2276.41	569.47	43.	4.	0.002	233.33	1.370s
BI-207	2277.34	569.70	62.	-11.	-0.006	108.52	1.371s
TL-208	2330.70	583.05	21.	175.	0.097	9.43	1.556
SB-125	2400.51	600.50	390.	-16.	-0.009	175.11	1.398s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2409.43	602.73	374.	-16.	-0.009	171.31	1.399
CS-134	2417.34	604.71	358.	-16.	-0.009	167.45	1.401s
BI-214	2434.85	609.09	15.	177.	0.098	8.64	1.287s
RU-103	2439.69	610.30	342.	-16.	-0.009	163.14	1.406s
AG-108M	2455.62	614.28	325.	-3.	-0.002	754.80	1.410s
PM-144	2470.74	618.06	290.	16.	0.009	157.17	1.413s
RH-106	2486.16	621.92	338.	-16.	-0.009	169.20	1.416s
SB-125	2542.05	635.89	39.	-5.	-0.003	182.21	1.428s
I-131	2546.39	636.97	50.	2.	0.001	504.98	1.429s
AG-110M	2629.52	657.76	63.	-5.	-0.003	215.42	1.447s
CS-137	2645.12	661.66	87.	-14.	-0.008	100.42	1.451s
PM-144	2784.64	696.54	28.	11.	0.006	111.63	1.481s
SB-124	2889.61	722.79	55.	14.	0.008	80.39	1.503s
AG-108M	2890.22	722.94	69.	13.	0.007	91.99	1.503s
ZR-95	2895.26	724.20	81.	0.	0.000	1000.00	1.504s
BI-212	2907.15	727.17	72.	8.	0.004	160.99	1.507s
pm-146	2941.34	735.72	93.	-24.	-0.013	89.48	1.514s
pm-146	2987.11	747.16	28.	13.	0.007	90.86	1.524s
ZR-95	3025.38	756.73	56.	-19.	-0.010	66.48	1.532
AG-110M	3054.24	763.94	80.	-20.	-0.011	60.73	1.538s
NB-95	3061.63	765.79	86.	5.	0.003	265.95	1.539s
PA-234M	3064.12	766.41	98.	-8.	-0.004	159.25	1.540s
BI-212	3140.15	785.42	19.	21.	0.012	48.65	1.556s
CS-134	3181.95	795.87	61.	3.	0.002	334.96	1.565s
CO-58	3241.58	810.78	48.	4.	0.002	273.18	1.577s
La-140	3261.56	815.77	60.	-15.	-0.008	79.54	1.581s
Cs-136	3272.49	818.50	79.	-5.	-0.003	265.78	1.583s
MN-54	3337.89	834.85	56.	-14.	-0.008	72.24	1.597s
Co-56	3385.58	846.77	37.	-8.	-0.005	159.35	1.607s
TL-208	3440.76	860.56	10.	25.	0.014	32.35	1.619s
NB-94	3482.90	871.10	25.	11.	0.006	69.58	1.627s
EU-154	3491.44	873.23	37.	3.	0.002	285.11	1.629s
PA-234	3520.64	880.53	41.	11.	0.006	85.29	1.635s
PA-234	3531.48	883.24	53.	8.	0.005	128.53	1.637s
AG-110M	3537.26	884.68	61.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	74.	-10.	-0.005	127.63	1.642s
y-88	3590.70	898.04	45.	-17.	-0.010	51.04	1.649s
AC-228	3643.51	911.24	5.	123.	0.068	10.06	1.429s
AG-110M	3748.54	937.49	70.	-22.	-0.012	40.14	1.682s
PA-234	3782.66	946.02	30.	2.	0.001	606.22	1.688s
EU-152	3855.05	964.11	115.	12.	0.007	131.37	1.703s
AC-228	3875.60	969.25	22.	80.	0.045	17.75	1.174s
EU-154	3983.96	996.33	41.	6.	0.003	165.86	1.729s
PA-234M	4002.64	1001.00	50.	-3.	-0.002	300.13	1.733s
EU-154	4017.76	1004.77	59.	-10.	-0.006	113.14	1.736s
Co-56	4150.07	1037.84	15.	5.	0.003	176.07	1.762s
Cs-136	4191.00	1048.07	30.	-1.	-0.001	781.02	1.771s
RH-106	4200.17	1050.36	20.	11.	0.006	67.33	1.772s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	4253.39	1063.66	45.	-19.	-0.010	49.18	1.783s
Ga-68	4308.37	1077.40	16.	10.	0.006	96.26	1.794
FE-59	4395.81	1099.25	27.	-3.	-0.002	313.31	1.811s
EU-152	4447.13	1112.07	134.	-19.	-0.011	89.25	1.821s
ZN-65	4461.03	1115.55	115.	-15.	-0.008	102.50	1.824s
BI-214	4480.00	1120.29	118.	9.	0.005	174.09	1.827
Ta-182	4484.05	1121.30	125.	19.	0.011	86.04	1.828s
CO-60	4691.91	1173.24	11.	5.	0.003	153.27	1.869s
Ta-182	4755.20	1189.05	48.	-5.	-0.003	318.12	1.881s
Ta-182	4884.72	1221.41	27.	14.	0.008	86.05	1.906s
Co-56	4952.24	1238.28	12.	31.	0.017	30.09	1.919s
NA-22	5097.34	1274.53	32.	-6.	-0.003	139.44	1.946s
EU-154	5097.39	1274.54	38.	0.	0.000	1000.00	1.946s
FE-59	5165.65	1291.60	11.	10.	0.005	88.00	1.959s
CO-60	5329.39	1332.50	23.	-6.	-0.003	163.38	1.990s
AG-110M	5536.74	1384.30	11.	-1.	-0.001	598.44	2.029s
EU-152	5631.64	1408.00	17.	6.	0.003	166.25	2.046s
K-40	5843.47	1460.91	6.	458.	0.255	4.73	1.889
La-140	6385.21	1596.21	6.	5.	0.003	126.49	2.182s
SB-124	6764.73	1690.98	0.	0.	0.000	1000.00	2.247s
BI-214	7059.14	1764.49	3.	34.	0.019	18.80	2.297s
Co-56	7086.61	1771.35	48.	-8.	-0.004	127.48	2.302s
y-88	7345.80	1836.06	6.	-2.	-0.001	275.72	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	2.9108E+00					5.31E+01	
			477.60	2.911E+00	?(	1.061E+01	1.07E+02 1.05E+01	G
NA-22	C	-3.4936E-01					9.50E+02	
			1274.53	-3.494E-01	?(	1.693E+00	1.39E+02 9.99E+01	G
K-40	N	2.7816E+02					4.66E+11	
			1460.83	2.782E+02	(P	8.496E+00	4.73E+00 1.07E+01	G
Sc-46	F	-4.3380E-01					8.38E+01	
			889.28	-4.338E-01	(	1.886E+00	1.28E+02 1.00E+02	G
			1120.55	-2.633E-02	%	2.590E+00	2.82E+03 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	1.7180E+00					2.77E+01	
			320.08	1.718E+00	?(	1.183E+01	2.02E+02	9.94E+00 G
MN-54	C	-6.0086E-01					3.12E+02	
			834.85	-6.009E-01	&(P	1.584E+00	7.22E+01	1.00E+02 G
FE-59	F	4.1387E-01					4.45E+01	
			1099.25	-2.730E-01	?(P	2.471E+00	3.13E+02	5.65E+01 G
			1291.60	1.312E+00	?(	2.504E+00	8.80E+01	4.32E+01 G
Co-56	C	9.2914E-01					7.73E+01	
			846.77	-3.544E-01	?(	1.326E+00	1.59E+02	9.99E+01 G
			1238.28	2.694E+00	?(P	1.607E+00	3.01E+01	6.61E+01 G
			1037.84	1.756E+00	?(	7.290E+00	1.76E+02	1.41E+01 G
			1771.35	-3.904E+00	+	1.708E+01	1.27E+02	1.55E+01 A
CO-57	C	2.4572E-01					2.72E+02	
			122.06	-5.735E-02	?(	9.885E-01	5.05E+02	8.56E+01 G
			136.47	2.675E+00	?(	1.411E+01	1.58E+02	1.07E+01 G
CO-58	C	1.5165E-01					7.09E+01	
			810.78	1.517E-01	?(	1.452E+00	2.73E+02	9.95E+01 G
CO-60	F	-3.5251E-02					1.93E+03	
			1332.50	-3.480E-01	?(P	1.504E+00	1.63E+02	1.00E+02 G
			1173.24	2.777E-01	?(P	9.877E-01	1.53E+02	9.99E+01 G
ZN-65	F	-1.5863E+00					2.44E+02	
			1115.55	-1.586E+00	?(	5.469E+00	1.02E+02	5.06E+01 G
NB-94	I	2.6591E-01					7.41E+06	
			702.63	3.532E-02	%(P	1.129E+00	1.31E+03	9.79E+01 G
			871.10	4.919E-01	?(	1.137E+00	6.96E+01	9.99E+01 G
ZR-95	I	-1.3271E+00					6.40E+01	
			756.73	-1.327E+00	?(P	2.697E+00	6.65E+01	5.45E+01 G
			724.20	0.000E+00	&	3.823E+00	1.00E+03	4.42E+01 G
NB-95	I	1.9758E-01					6.40E+01	
			765.79	1.976E-01	?(	1.814E+00	2.66E+02	9.98E+01 G
RU-103	I	2.1057E-02					3.93E+01	
			497.05	2.106E-02	%(	1.190E+00	2.30E+03	9.09E+01 G
			610.30	-9.394E+00	+	5.148E+01	1.63E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	8.7379E-02					3.74E+02	
			621.92	-5.284E+00	?(	3.005E+01	1.69E+02	9.93E+00 G
			1050.36	3.428E+01	?(	7.644E+01	6.73E+01	1.56E+00 G
			511.86	1.745E+01	?	5.690E+00	1.90E+01	2.00E+01 GA
AG-108M	C	-5.3081E-01					1.53E+05	
			433.94	-5.308E-01	?(	1.217E+00	9.31E+01	9.05E+01 G
			722.94	5.546E-01	&	1.718E+00	9.20E+01	9.08E+01 G
			614.28	-1.263E-01	&	3.233E+00	7.55E+02	8.98E+01 G
SN-113	F	-3.1745E-01					1.15E+02	
			391.69	-3.174E-01	?(	2.598E+00	2.41E+02	6.40E+01 G
SB-124	F	-9.9155E-03					6.02E+01	
			602.73	-5.421E-01	&(	3.119E+00	1.71E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.122E+00	1.00E+03	4.78E+01 G
			722.79	4.828E+00	&(	1.300E+01	8.04E+01	1.08E+01 G
SB-125	I	-4.8737E-01					1.01E+03	
			427.88	-1.307E+00	?(	3.869E+00	1.20E+02	2.96E+01 G
			600.50	-2.971E+00	+	1.747E+01	1.75E+02	1.79E+01 G
			635.89	-1.518E+00	+	9.659E+00	1.82E+02	1.13E+01 G
			463.37	1.831E+00	?(P	1.109E+01	1.76E+02	1.05E+01 G
I-131	I	-2.5010E-01					8.02E+00	
			364.48	-3.562E-01	?(P	1.257E+00	1.55E+02	8.17E+01 G
			284.30	-6.934E+00	+ P	1.613E+01	7.57E+01	6.14E+00 G
			636.97	9.591E-01	?(	1.710E+01	5.05E+02	7.17E+00 G
Gd-153	F	9.0309E-01					2.42E+02	
			97.50	9.031E-01	?(	4.505E+00	1.49E+02	3.00E+01 G
			103.20	0.000E+00	-	6.244E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.8174E+01					4.71E-02	
			1077.40	1.817E+01	?(	3.880E+01	9.63E+01	3.30E+00 G
Tc-99m	I	3.3446E-01					2.51E-01	
			140.51	3.345E-01	&(	1.726E+00	1.54E+02	8.93E+01 G
BA-133	F	-1.2061E-01					3.85E+03	
			356.00	-6.698E-01	&(	3.309E+00	1.47E+02	6.20E+01 G
			302.85	1.739E+00	?(	1.014E+01	1.74E+02	1.83E+01 G
			383.84	1.470E+00	&	1.655E+01	3.30E+02	8.94E+00 GA
			80.99	-7.414E-01	+ P	6.198E+00	1.22E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	-1.1990E-01					7.54E+02	
			604.71	-5.477E-01	?(	3.080E+00	1.67E+02	9.76E+01 G
			795.87	1.581E-01	+	1.850E+00	3.35E+02	8.55E+01 G
			569.32	2.595E+00	?(	5.843E+00	6.79E+01	1.54E+01 G
			801.95	4.695E-01	%	1.878E+01	1.14E+03	8.69E+00 G
			563.24	-1.814E+00	+ P	1.470E+01	2.59E+02	8.35E+00 G
CS-137	I	-5.6712E-01					1.10E+04	
			661.66	-5.671E-01	(	1.920E+00	1.00E+02	8.52E+01 G
CE-139	F	3.6536E-01					1.38E+02	
			165.85	3.654E-01	(	1.243E+00	1.02E+02	7.99E+01 G
Ba-140	I	-5.4127E-01					1.28E+01	
			537.26	-5.413E-01	?(P	4.201E+00	2.87E+02	2.44E+01 G
			162.66	-1.389E+00	&	1.860E+01	3.95E+02	6.22E+00 G
			304.85	1.094E-01	%	4.441E+01	1.20E+04	4.29E+00 G
La-140	I	7.2285E-01					1.28E+01	
			1596.21	3.643E-01	?(	1.029E+00	1.26E+02	9.54E+01 G
			487.02	-1.910E-01	-	3.320E+00	5.04E+02	4.55E+01 G
			328.76	2.408E+00	?(P	4.603E+00	5.83E+01	2.03E+01 G
			815.77	-2.582E+00	+	6.871E+00	7.95E+01	2.33E+01 G
CE-141	I	6.1881E-01					3.25E+01	
			145.44	6.188E-01	?(	3.149E+00	1.52E+02	4.82E+01 G
PM-144	C	4.5855E-01					3.63E+02	
			696.54	3.900E-01	?(P	1.023E+00	1.12E+02	9.90E+01 G
			618.06	5.271E-01	?(	2.786E+00	1.57E+02	9.91E+01 G
EU-152	F	1.5144E+00					4.94E+03	
			344.29	4.325E-01	(	6.359E+00	4.33E+02	2.65E+01 G
			1112.07	-7.289E+00	+	2.176E+01	8.92E+01	1.36E+01 G
			121.78	4.293E-01	?(	3.183E+00	2.19E+02	2.86E+01 G
			778.92	-1.028E-01	%	9.620E+00	3.89E+03	1.29E+01 G
			964.11	3.804E+00	?(	1.693E+01	1.31E+02	1.46E+01 G
			244.69	4.977E+00	&(	2.976E+01	1.79E+02	7.58E+00 G
			1408.00	1.797E+00	?	6.568E+00	1.66E+02	2.10E+01 GA
EU-154	I	1.0467E+00					3.14E+03	
			873.23	1.091E+00	?(P	1.100E+01	2.85E+02	1.23E+01 G
			123.10	6.371E-01	(	1.961E+00	9.21E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.198E+00	1.00E+03	3.52E+01 G
			723.36	3.113E-02	%	8.333E+00	7.63E+03	2.02E+01 G
			1004.77	-2.688E+00	+	1.035E+01	1.13E+02	1.80E+01 G
			996.33	2.571E+00	?(	1.482E+01	1.66E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-1.4765E+00					1.81E+03	
			105.31	-1.477E+00	(	6.577E+00	1.33E+02	2.12E+01 G
			86.54	-1.260E+00	&	6.094E+00	1.45E+02	3.07E+01 G
HF-181	F	-5.4319E-01					4.24E+01	
			482.00	-5.432E-01	(	1.868E+00	1.02E+02	8.05E+01 G
			133.02	-6.404E-01	+	3.787E+00	1.77E+02	4.33E+01 G
			345.83	-2.998E+00	+	1.264E+01	1.26E+02	1.51E+01 G
			136.30	0.000E+00	+	2.862E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.9269E+00					1.14E+02	
			1121.30	2.879E+00	?(	8.278E+00	8.60E+01	3.49E+01 G
			1221.41	2.988E+00	&(	5.582E+00	8.60E+01	2.70E+01 G
			1189.05	-1.701E+00	-	1.191E+01	3.18E+02	1.62E+01 G
Hg-203	F	-4.7156E-01					4.66E+01	
			279.20	-4.716E-01	?(	1.690E+00	1.07E+02	8.15E+01 G
TL-208	N	6.6631E+00					6.98E+02	
			583.02	6.663E+00	(P	9.231E-01	9.43E+00	8.45E+01 G
			277.28	1.978E+01	+ P	1.045E+01	2.53E+01	6.31E+00 G
			860.56	8.828E+00	+ P	5.919E+00	3.24E+01	1.24E+01 G
pm-146	C	1.4766E+00					2.02E+03	
			747.16	1.477E+00	?(	3.115E+00	9.09E+01	3.40E+01 G
			735.72	-4.001E+00	+	8.115E+00	8.95E+01	2.25E+01 G
			453.88	-2.503E-01	- P	1.449E+00	3.23E+02	6.50E+01 G
y-88	F	-8.1723E-01					1.07E+02	
			898.04	-8.172E-01	?(P	1.611E+00	5.10E+01	9.37E+01 G
			1836.06	-1.829E-01	+	1.132E+00	2.76E+02	9.92E+01 G
Cd-113m		-2.9733E+03					5.33E+03	
			263.70	-2.973E+03	?(	1.789E+04	1.77E+02	6.00E-03 K
Cd-109	F	3.1511E+00					4.53E+02	
							Derived Ave Activity	
			88.04	3.151E+00	}(	4.654E+01	4.40E+02	3.79E+00 G
Cf-251	T	5.5494E-01					3.28E+05	
			176.60	5.549E-01	(	4.804E+00	3.34E+02	1.70E+01 G
			227.00	4.415E+00	?	1.345E+01	1.18E+02	6.30E+00 GA
Cf-249	T	-6.8528E-01					1.28E+05	
			387.95	-6.853E-01	&(	2.286E+00	9.96E+01	6.60E+01 G
			333.44	5.935E-01	+	8.424E+00	4.14E+02	1.55E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Sn-126      -5.0439E+00                                     3.65E+07
                          87.57 1.027E+00 }   4.630E+00 6.87E+01 3.75E+01 GA
                          64.28-5.044E+00 ?(  1.993E+01 1.19E+02 9.70E+00 G
                          86.94-4.270E+00 }   2.032E+01 1.43E+02 9.04E+00 GA

PB-210   N  -5.6882E+00                                     8.14E+03
                          46.54-5.688E+00  (P 4.713E+01 2.42E+02 4.25E+00 G

PB-212   N   1.7604E+01                                     6.98E+02
                         238.63 1.760E+01  (P 1.892E+00 5.67E+00 4.33E+01 G
                         300.03 1.760E+01 } P 1.736E+01 6.40E+00 3.28E+00 GA

PB-214   N   1.2518E+01                                     5.84E+05
                         351.93 1.215E+01 *(P 2.071E+00 9.60E+00 3.76E+01 G
                         295.09 1.323E+01  (P 4.355E+00 1.63E+01 1.93E+01 G
                         242.00 4.178E+00 - P 3.027E+01 2.17E+02 7.43E+00 GA

BI-207   C  -3.4581E-01                                     1.18E+04
                         569.70-3.458E-01 ?(  1.274E+00 1.09E+02 9.77E+01 G
                        1063.66-1.279E+00 + P 2.312E+00 4.92E+01 7.45E+01 G

BI-212   N   3.8507E+00                                     6.98E+02
                         727.17 3.851E+00 *(  2.127E+01 1.61E+02 7.55E+00 G
                         785.42 6.630E+01 & P 7.203E+01 4.86E+01 1.28E+00 GA

BI-214   N   1.2776E+01                                     5.84E+05
                         609.31 1.278E+01 @(P 1.502E+00 8.64E+00 4.61E+01 G
                        1120.29 3.140E+00 - P 1.861E+01 1.74E+02 1.51E+01 G
                        1764.49 1.654E+01 + P 5.391E+00 1.88E+01 1.54E+01 G

BI-210M  T   4.3296E-01                                     1.10E+09
                         265.83 4.330E-01 ?(  2.031E+00 1.38E+02 5.00E+01 G
                         304.90 0.000E+00 -   6.806E+00 1.00E+03 2.80E+01 G

AC-228   N   2.0088E+01                                     2.10E+03
                         911.07 1.905E+01 @(  2.034E+00 1.01E+01 2.90E+01 G
                         968.97 2.171E+01 @(  6.692E+00 1.78E+01 1.75E+01 G
                         338.32 2.023E+01  (  6.558E+00 1.60E+01 1.20E+01 G
                          93.35 6.741E+00 -   2.899E+01 1.29E+02 5.56E+00 XA

TH-227   N   5.7867E+00                                     7.95E+03
                          50.14 5.787E+00 ?(  2.228E+01 1.15E+02 8.00E+00 G
                         256.24-2.931E+00 -   1.313E+01 1.73E+02 7.00E+00 G

TH-229   N  -7.5101E+00                                     2.68E+06
                         193.51-7.510E+00  (  2.136E+01 1.11E+02 4.40E+00 G
                         210.85-1.400E+01 +   3.597E+01 1.01E+02 2.99E+00 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   1.6586E+01                                      1.63E+12
                          63.29 1.659E+01  (P 2.431E+01 4.56E+01 3.81E+00 G
                          92.59 4.290E+00 - P 1.661E+01 1.16E+02 5.58E+00 G

PA-231   N   1.1061E+01                                      1.20E+07
                         302.65 1.106E+01 ?(  6.312E+01 1.70E+02 2.88E+00 G
                         300.07 0.000E+00 }   7.242E+01 1.22E+03 2.46E+00 G

PA-233   C   7.4911E-01                                      7.82E+08
                         312.01-4.386E-07 &(  5.378E+00 3.61E+08 3.60E+01 G
                         300.18 5.099E+00  (  2.938E+01 1.71E+02 6.20E+00 G

PA-234   N   5.1598E-01                                      1.63E+12
                         131.29-1.712E+00 ?(  8.933E+00 1.56E+02 1.80E+01 G
                         946.02 6.900E-01 +   9.741E+00 6.06E+02 1.34E+01 G
                         569.47 1.570E+00 ?(  1.284E+01 2.33E+02 8.20E+00 G
                         883.24 3.792E+00 ?(  1.670E+01 1.29E+02 9.60E+00 G
                         880.53 8.296E+00 &   2.384E+01 8.53E+01 6.00E+00 GA

PA-234M  N  -1.7733E+01                                      1.63E+12
                        1001.00-1.773E+01 ?(P 2.058E+02 3.00E+02 8.37E-01 G
                         766.41-1.043E+02 & P 6.545E+02 1.59E+02 2.94E-01 G

U-235    N   2.1929E+00                                      2.57E+11
                         143.79 2.193E+00  (P 1.355E+01 1.85E+02 1.10E+01 G
                         205.33-1.043E+00 % P 2.057E+01 1.04E+03 5.01E+00 G
                         163.38-1.947E-01 % P 2.309E+01 4.80E+03 5.08E+00 G

AM-241   T  -1.5216E+00                                      1.58E+05
                          59.54-1.522E+00  (  5.814E+00 1.15E+02 3.59E+01 G

Np-237   F   2.7523E+00                                      2.14E+06
                                                           Derived Ave Activity
                          86.49 2.752E+00 }(  1.365E+01 1.49E+02 1.31E+01 G

Ir-192   F   4.2482E-01                                      7.40E+01
                         316.49 3.816E-01 &(  1.937E+00 1.51E+02 8.70E+01 G
                         468.06 6.258E-01 ?(  2.022E+00 9.56E+01 5.18E+01 G
                         308.44 2.156E-01 ?(  6.024E+00 8.25E+02 3.18E+01 G

Cs-136   F  -1.9834E-01                                      1.30E+01
                         818.50-1.983E-01 &(  1.823E+00 2.66E+02 1.00E+02 G
                        1048.07-6.250E-02 +   1.765E+00 7.81E+02 8.00E+01 G
                         340.57-9.301E-01 +   4.102E+00 1.32E+02 4.69E+01 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   1.3081E+00                                      2.36E+00
                          103.70-1.305E+00 &   5.915E+00 1.36E+02 2.40E+01 X
                          106.13 1.308E+00 &(  5.923E+00 1.36E+02 2.27E+01 G
                           99.50 0.000E+00 -   9.147E+00 1.00E+03 1.50E+01 X

Nd-147       5.4047E-01                                      1.11E+01
                          531.00 5.405E-01 ?(  8.080E+00 6.08E+02 1.30E+01 G
                           91.10-3.467E-01 +   6.130E+00 5.27E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** 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	278.	-10.	-0.005	241.80	-5.688E+00	P
TH-227	50.14	276.	21.	0.012	114.99	5.787E+00	
AM-241	59.54	604.	-31.	-0.017	114.70	-1.522E+00	
BA-133	80.99	1075.	-19.	-0.010	121.64	-7.414E-01	P
EU-155	86.54	905.	-30.	-0.016	145.20	-1.260E+00	
Nd-147	91.10	813.	-8.	-0.004	527.09	-3.467E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Gd-153	97.50	511.	22.	0.012	149.15	9.031E-01		
Np-239	103.70	582.	-25.	-0.014	135.73	-1.305E+00		
EU-155	105.31	564.	-25.	-0.014	133.43	-1.477E+00		
Np-239	106.13	524.	24.	0.013	135.55	1.308E+00		
EU-152	121.78	235.	10.	0.006	219.09	4.293E-01		
CO-57	122.06	202.	-4.	-0.002	504.98	-5.735E-02		
EU-154	123.10	179.	21.	0.012	92.15	6.371E-01		
PA-234	131.29	738.	-25.	-0.014	156.37	-1.712E+00		
HF-181	133.02	763.	-22.	-0.012	177.01	-6.404E-01		
CO-57	136.47	632.	23.	0.013	157.83	2.675E+00		
Tc-99m	140.51	609.	23.	0.013	154.42	3.345E-01		
U-235	143.79	591.	19.	0.010	184.67	2.193E+00		P
CE-141	145.44	612.	23.	0.013	152.33	6.188E-01		
Ba-140	162.66	310.	-6.	-0.004	395.37	-1.389E+00		
CE-139	165.85	228.	21.	0.012	101.71	3.654E-01		
Cf-251	176.60	139.	7.	0.004	333.50	5.549E-01		
TH-229	193.51	165.	-22.	-0.012	111.29	-7.510E+00		
TH-229	210.85	194.	-26.	-0.015	100.94	-1.400E+01		
Cf-251	227.00	106.	17.	0.009	118.31	4.415E+00		
EU-152	244.69	729.	21.	0.012	178.93	4.977E+00		
TH-227	256.24	106.	-11.	-0.006	172.79	-2.931E+00		
Cd-113m	263.70	142.	-10.	-0.005	177.07	-2.973E+03		
BI-210M	265.83	125.	12.	0.006	138.48	4.330E-01		
Hg-203	279.20	220.	-20.	-0.011	107.00	-4.716E-01		
I-131	284.30	107.	-22.	-0.012	75.69	-6.934E+00		P
PA-233	300.18	354.	16.	0.009	171.49	5.099E+00		
BA-133	302.85	364.	16.	0.009	173.53	1.739E+00		
CR-51	320.08	130.	8.	0.005	201.89	1.718E+00		
La-140	328.76	77.	23.	0.013	58.34	2.408E+00		P
Cf-249	333.44	153.	4.	0.002	414.27	5.935E-01		
Cs-136	340.57	331.	-20.	-0.011	131.61	-9.301E-01		
EU-152	344.29	248.	5.	0.003	432.58	4.325E-01		
HF-181	345.83	317.	-20.	-0.011	125.84	-2.998E+00		
BA-133	356.00	355.	-18.	-0.010	147.28	-6.698E-01		
I-131	364.48	81.	-13.	-0.007	154.79	-3.562E-01		P
BA-133	383.84	162.	6.	0.003	329.54	1.470E+00		
Cf-249	387.95	166.	-19.	-0.010	99.56	-6.853E-01		
SN-113	391.69	200.	-8.	-0.005	241.08	-3.174E-01		
SB-125	427.88	80.	-15.	-0.008	119.57	-1.307E+00		
AG-108M	433.94	72.	-18.	-0.010	93.10	-5.308E-01		
pm-146	453.88	48.	-6.	-0.003	323.46	-2.503E-01		P
SB-125	463.37	73.	7.	0.004	176.31	1.831E+00		P
BE-7	477.60	64.	11.	0.006	107.41	2.911E+00		
HF-181	482.00	119.	-16.	-0.009	102.26	-5.432E-01		
La-140	487.02	118.	-3.	-0.002	503.86	-1.910E-01		
RH-106	511.86	60.	119.	0.066	18.96	1.745E+01		
Nd-147	531.00	48.	2.	0.001	607.52	5.405E-01		
Ba-140	537.26	44.	-4.	-0.002	286.99	-5.413E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	61.	-5.	-0.003	259.39	-1.814E+00	P
CS-134	569.32	30.	13.	0.007	67.92	2.595E+00	
PA-234	569.47	43.	4.	0.002	233.33	1.570E+00	
BI-207	569.70	62.	-11.	-0.006	108.52	-3.458E-01	
SB-125	600.50	390.	-16.	-0.009	175.11	-2.971E+00	
SB-124	602.73	374.	-16.	-0.009	171.31	-5.421E-01	
CS-134	604.71	358.	-16.	-0.009	167.45	-5.477E-01	
RU-103	610.30	342.	-16.	-0.009	163.14	-9.394E+00	
AG-108M	614.28	325.	-3.	-0.002	754.80	-1.263E-01	
PM-144	618.06	290.	16.	0.009	157.17	5.271E-01	
RH-106	621.92	338.	-16.	-0.009	169.20	-5.284E+00	
SB-125	635.89	39.	-5.	-0.003	182.21	-1.518E+00	
I-131	636.97	50.	2.	0.001	504.98	9.591E-01	
AG-110M	657.76	63.	-5.	-0.003	215.42	-1.984E-01	
CS-137	661.66	87.	-14.	-0.008	100.42	-5.671E-01	
PM-144	696.54	28.	11.	0.006	111.63	3.900E-01	P
SB-124	722.79	55.	14.	0.008	80.39	4.828E+00	
AG-108M	722.94	69.	13.	0.007	91.99	5.546E-01	
BI-212	727.17	72.	8.	0.004	160.99	3.851E+00	
pm-146	735.72	93.	-24.	-0.013	89.48	-4.001E+00	
pm-146	747.16	28.	13.	0.007	90.86	1.477E+00	
ZR-95	756.73	56.	-19.	-0.010	66.48	-1.327E+00	P
AG-110M	763.94	80.	-20.	-0.011	60.73	-3.587E+00	P
NB-95	765.79	86.	5.	0.003	265.95	1.976E-01	
PA-234M	766.41	98.	-8.	-0.004	159.25	-1.043E+02	P
BI-212	785.42	19.	21.	0.012	48.65	6.630E+01	P
CS-134	795.87	61.	3.	0.002	334.96	1.581E-01	
CO-58	810.78	48.	4.	0.002	273.18	1.517E-01	
La-140	815.77	60.	-15.	-0.008	79.54	-2.582E+00	
Cs-136	818.50	79.	-5.	-0.003	265.78	-1.983E-01	
MN-54	834.85	56.	-14.	-0.008	72.24	-6.009E-01	P
Co-56	846.77	37.	-8.	-0.005	159.35	-3.544E-01	
NB-94	871.10	25.	11.	0.006	69.58	4.919E-01	
EU-154	873.23	37.	3.	0.002	285.11	1.091E+00	P
PA-234	880.53	41.	11.	0.006	85.29	8.296E+00	
PA-234	883.24	53.	8.	0.005	128.53	3.792E+00	
Sc-46	889.28	74.	-10.	-0.005	127.63	-4.338E-01	
y-88	898.04	45.	-17.	-0.010	51.04	-8.172E-01	P
AG-110M	937.49	70.	-22.	-0.012	40.14	-2.937E+00	P
PA-234	946.02	30.	2.	0.001	606.22	6.900E-01	
EU-152	964.11	115.	12.	0.007	131.37	3.804E+00	
EU-154	996.33	41.	6.	0.003	165.86	2.571E+00	
PA-234M	1001.00	50.	-3.	-0.002	300.13	-1.773E+01	P
EU-154	1004.77	59.	-10.	-0.006	113.14	-2.688E+00	
Co-56	1037.84	15.	5.	0.003	176.07	1.756E+00	
Cs-136	1048.07	30.	-1.	-0.001	781.02	-6.250E-02	
RH-106	1050.36	20.	11.	0.006	67.33	3.428E+01	
BI-207	1063.66	45.	-19.	-0.010	49.18	-1.279E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ga-68	1077.40	16.	10.	0.006	96.26	1.817E+01		
FE-59	1099.25	27.	-3.	-0.002	313.31	-2.730E-01		P
EU-152	1112.07	134.	-19.	-0.011	89.25	-7.289E+00		
ZN-65	1115.55	115.	-15.	-0.008	102.50	-1.586E+00		
CO-60	1173.24	11.	5.	0.003	153.27	2.777E-01		P
Co-56	1238.28	12.	31.	0.017	30.09	2.694E+00		P
NA-22	1274.53	32.	-6.	-0.003	139.44	-3.494E-01		
FE-59	1291.60	11.	10.	0.005	88.00	1.312E+00		
CO-60	1332.50	23.	-6.	-0.003	163.38	-3.480E-01		P
AG-110M	1384.30	11.	-1.	-0.001	598.44	-3.408E-01		
EU-152	1408.00	17.	6.	0.003	166.25	1.797E+00		
La-140	1596.21	6.	5.	0.003	126.49	3.643E-01		
Co-56	1771.35	48.	-8.	-0.004	127.48	-3.904E+00		
y-88	1836.06	6.	-2.	-0.001	275.72	-1.829E-01		

P - Peakbackground subtraction

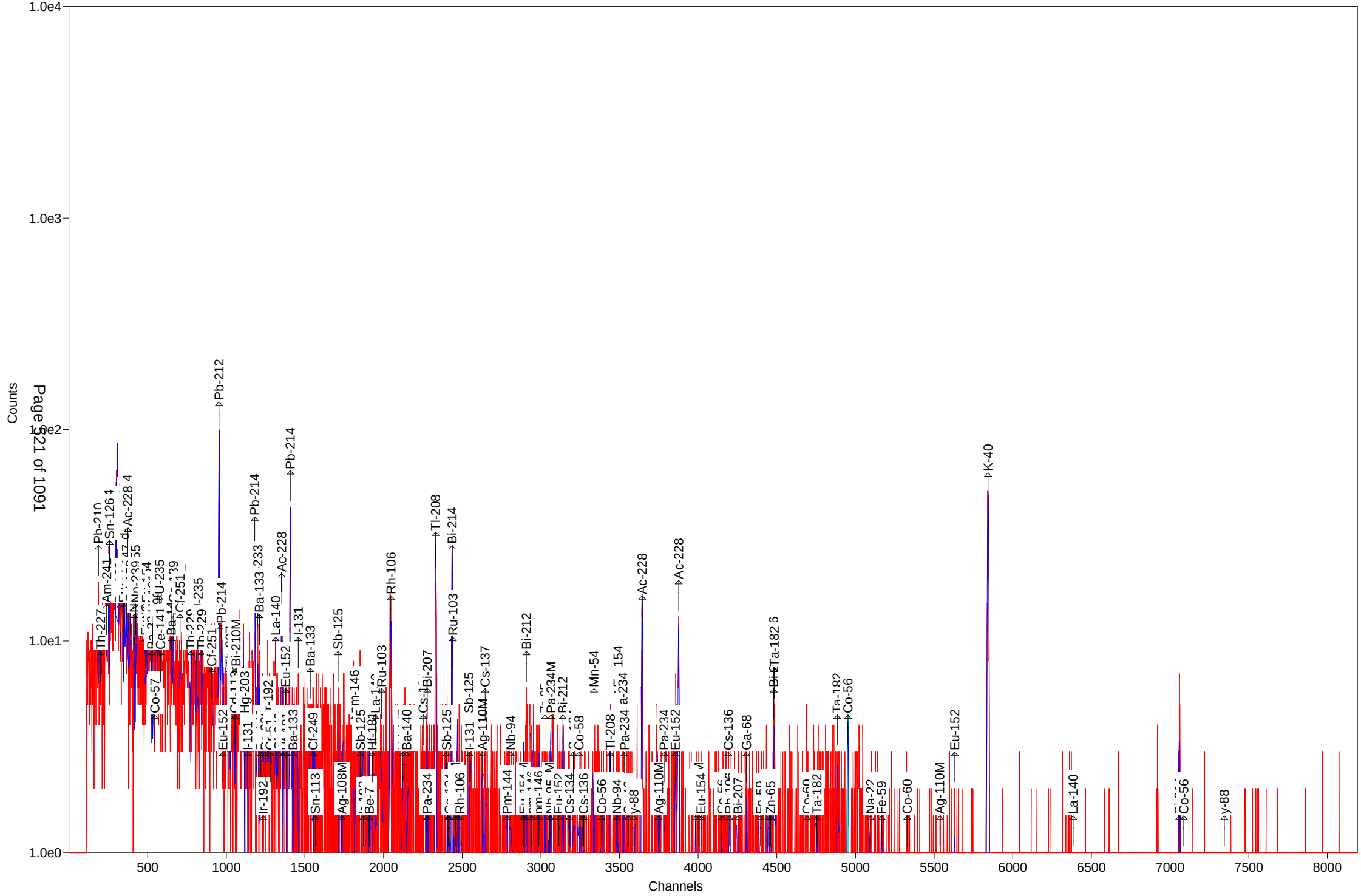
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.9108E+00	2.9108E+00	1.074E+02%	1.06E+01
NA-22	#A	-3.4936E-01	-3.4936E-01	1.394E+02%	1.69E+00
K-40		2.7816E+02	2.7816E+02	4.735E+00%	8.50E+00
Sc-46	#A	-4.3380E-01	-4.3380E-01	1.276E+02%	1.89E+00
CR-51	#A	1.7180E+00	1.7180E+00	2.019E+02%	1.18E+01
MN-54	#A	-6.0085E-01	-6.0086E-01	7.224E+01%	1.58E+00
FE-59	#A	4.1387E-01	4.1387E-01	8.800E+01%	2.47E+00
Co-56	#A	9.2914E-01	9.2914E-01	3.009E+01%	1.33E+00
CO-57	#A	2.4572E-01	2.4572E-01	1.578E+02%	9.89E-01
CO-58	#A	1.5165E-01	1.5165E-01	2.732E+02%	1.45E+00
CO-60	#A	-3.5251E-02	-3.5251E-02	1.120E+02%	1.50E+00
ZN-65	#A	-1.5863E+00	-1.5863E+00	1.025E+02%	5.47E+00
NB-94	#A	2.6591E-01	2.6591E-01	6.958E+01%	1.13E+00
ZR-95	#A	-1.3271E+00	-1.3271E+00	6.648E+01%	2.70E+00
NB-95	#A	1.9758E-01	1.9758E-01	2.660E+02%	1.81E+00
RU-103	#A	2.1056E-02	2.1057E-02	2.301E+03%	1.19E+00
RH-106	#A	8.7379E-02	8.7379E-02	6.733E+01%	3.00E+01
AG-108M	#A	-5.3081E-01	-5.3081E-01	9.310E+01%	1.22E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.36E+00
SN-113	#A	-3.1745E-01	-3.1745E-01	2.411E+02%	2.60E+00
SB-124	#A	-9.9154E-03	-9.9155E-03	8.039E+01%	3.12E+00
SB-125	#A	-4.8737E-01	-4.8737E-01	1.065E+02%	3.87E+00
I-131	#A	-2.5008E-01	-2.5010E-01	1.548E+02%	1.26E+00
Gd-153	#A	9.0309E-01	9.0309E-01	1.492E+02%	4.51E+00
Ga-68	#A	1.7990E+01	1.8174E+01	9.626E+01%	3.88E+01
Tc-99m	#A	3.3382E-01	3.3446E-01	1.544E+02%	1.73E+00

BA-133	#A	-1.2061E-01	-1.2061E-01	1.138E+02%	3.31E+00
CS-134	#A	-1.1990E-01	-1.1990E-01	6.792E+01%	3.08E+00
CS-137	#A	-5.6712E-01	-5.6712E-01	1.004E+02%	1.92E+00
CE-139	#A	3.6536E-01	3.6536E-01	1.017E+02%	1.24E+00
Ba-140	#A	-5.4125E-01	-5.4127E-01	2.870E+02%	4.20E+00
La-140	#A	7.2282E-01	7.2285E-01	5.834E+01%	1.03E+00
CE-141	#A	6.1880E-01	6.1881E-01	1.523E+02%	3.15E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+01
PM-144	#A	4.5855E-01	4.5855E-01	9.639E+01%	1.02E+00
EU-152	#A	1.5144E+00	1.5144E+00	1.314E+02%	6.36E+00
EU-154	#A	1.0467E+00	1.0467E+00	9.215E+01%	1.10E+01
EU-155	#A	-1.4765E+00	-1.4765E+00	1.334E+02%	6.58E+00
HF-181	#A	-5.4319E-01	-5.4319E-01	1.023E+02%	1.87E+00
Ta-182	#A	2.9269E+00	2.9269E+00	6.084E+01%	8.28E+00
Hg-203	#A	-4.7155E-01	-4.7156E-01	1.070E+02%	1.69E+00
TL-208		6.6631E+00	6.6631E+00	9.429E+00%	9.23E-01
pm-146	#A	1.4766E+00	1.4766E+00	9.086E+01%	3.11E+00
y-88	#A	-8.1723E-01	-8.1723E-01	5.104E+01%	1.61E+00
Cd-113m	#A	-2.9733E+03	-2.9733E+03	1.771E+02%	1.79E+04
Cd-109	#A	3.1511E+00	3.1511E+00	4.405E+02%	4.65E+01
Cf-251	#A	5.5494E-01	5.5494E-01	3.335E+02%	4.80E+00
Cf-249	#A	-6.8528E-01	-6.8528E-01	9.956E+01%	2.29E+00
Sn-126	#A	-5.0439E+00	-5.0439E+00	1.186E+02%	1.99E+01
PB-210	#A	-5.6882E+00	-5.6882E+00	2.418E+02%	4.71E+01
PB-212		1.7604E+01	1.7604E+01	5.670E+00%	1.89E+00
PB-214		1.2518E+01	1.2518E+01	9.477E+00%	2.07E+00
BI-207	#A	-3.4581E-01	-3.4581E-01	1.085E+02%	1.27E+00
BI-212	#A	3.8507E+00	3.8507E+00	1.610E+02%	2.13E+01
BI-214	#	1.2776E+01	1.2776E+01	8.639E+00%	1.50E+00
BI-210M	#A	4.3296E-01	4.3296E-01	1.385E+02%	2.03E+00
AC-228	#	2.0088E+01	2.0088E+01	8.641E+00%	2.03E+00
TH-227	#A	5.7867E+00	5.7867E+00	1.150E+02%	2.23E+01
TH-229	#A	-7.5101E+00	-7.5101E+00	1.113E+02%	2.14E+01
TH-234	A	1.6586E+01	1.6586E+01	4.556E+01%	2.43E+01
PA-231	#A	1.1061E+01	1.1061E+01	1.698E+02%	6.31E+01
PA-233	#A	7.4911E-01	7.4911E-01	1.715E+02%	5.38E+00
PA-234	#A	5.1598E-01	5.1598E-01	1.030E+02%	8.93E+00
PA-234M	#A	-1.7733E+01	-1.7733E+01	3.001E+02%	2.06E+02
U-235	#A	2.1929E+00	2.1929E+00	1.847E+02%	1.35E+01
AM-241	#A	-1.5216E+00	-1.5216E+00	1.147E+02%	5.81E+00
Np-237	#A	2.7523E+00	2.7523E+00	1.487E+02%	1.36E+01
Ir-192	#A	4.2481E-01	4.2482E-01	9.561E+01%	1.94E+00
Cs-136	#A	-1.9834E-01	-1.9834E-01	2.658E+02%	1.82E+00
Np-239	#A	1.3078E+00	1.3081E+00	1.356E+02%	5.92E+00
Nd-147	#A	5.4044E-01	5.4047E-01	6.075E+02%	8.08E+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)     3.644E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.4 keV) 3.6439389E+02  Bq/Sample
```

264540_Gamma_160-18553-A-4-B. 12_Gamma_20161871.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162110

Sample Description: 264540_Gamma_160-18553-A-5-B
Detector: Detector #16
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-5-B

Decay to Time: 9/1/2016 15:06 Live Time: 1800 sec
Acquisition Time: 9/1/2016 15:06:52 Real Time: 1820 sec
Analysis Time: 9/1/2016 15:37 Dead Time: 1.09 %
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	-6.229E+00	64.8	4.038E+00	4.050E+00	2.023E+01
NA-22	1.969E-02	2027.3	3.993E-01	3.993E-01	1.471E+00
K-40	2.331E+02	5.3	1.230E+01	1.713E+01	1.085E+01
Sc-46	-2.311E-01	241.4	5.579E-01	5.580E-01	1.929E+00
CR-51	3.649E+00	226.0	8.247E+00	8.249E+00	2.760E+01
MN-54	3.438E-01	187.7	6.453E-01	6.455E-01	1.460E+00
FE-59	1.777E-01	268.8	4.778E-01	4.778E-01	2.733E+00
Co-56	5.059E-01	141.6	7.165E-01	7.169E-01	1.227E+00
CO-57	6.950E-01	92.1	6.398E-01	6.408E-01	1.201E+00
CO-58	-8.452E-02	636.4	5.379E-01	5.379E-01	1.876E+00
CO-60	3.675E-01	125.9	4.628E-01	4.632E-01	1.339E+00
ZN-65	2.879E-01	559.7	1.612E+00	1.612E+00	5.565E+00
NB-94	8.437E-01	26.7	2.255E-01	2.297E-01	1.846E+00
ZR-95	7.368E-01	87.9	6.475E-01	6.486E-01	1.675E+00
NB-95	-2.795E-01	221.4	6.190E-01	6.191E-01	2.119E+00
RU-103	-6.911E-01	69.8	4.823E-01	4.837E-01	1.487E+00
RH-106	-5.929E+00	181.0	1.073E+01	1.074E+01	3.598E+01
AG-108M	6.664E-02	166.0	1.107E-01	1.107E-01	1.352E+00
AG-110M	5.805E-01	75.0	4.351E-01	4.361E-01	2.252E+00
SN-113	5.801E-01	142.6	8.270E-01	8.275E-01	2.783E+00
SB-124	3.490E-01	236.6	8.258E-01	8.260E-01	2.790E+00
SB-125	1.892E+00	29.4	5.560E-01	5.644E-01	4.879E+00
I-131	3.539E-01	113.8	4.029E-01	4.033E-01	1.008E+00
Gd-153	0.000E+00	1.#INF	2.837E-01	2.837E-01	8.167E+00
Ga-68	2.034E+01	88.0	1.790E+01	1.793E+01	3.948E+01
Tc-99m	4.850E-02	1337.3	6.485E-01	6.485E-01	2.174E+00
BA-133	-7.671E-01	137.0	1.051E+00	1.052E+00	3.519E+00
CS-134	8.863E-01	41.9	3.716E-01	3.745E-01	2.863E+00
CS-137	-7.464E-03	7157.7	5.343E-01	5.343E-01	1.874E+00
CE-139	5.127E-01	100.8	5.168E-01	5.191E-01	1.721E+00
Ba-140	-2.631E+00	72.7	1.912E+00	1.917E+00	5.601E+00
La-140	8.182E-01	85.9	7.030E-01	7.043E-01	1.061E+00
CE-141	-8.582E-01	88.9	7.629E-01	7.641E-01	2.536E+00

CE-144	3.140E+00	152.2	4.780E+00	4.783E+00	1.593E+01
PM-144	4.471E-01	82.7	3.697E-01	3.705E-01	1.493E+00
EU-152	2.136E+00	93.4	1.994E+00	1.997E+00	9.620E+00
EU-154	-3.166E-01	1282.0	4.059E+00	4.059E+00	1.190E+01
EU-155	0.000E+00	1.#INF	1.174E+00	1.174E+00	1.141E+01
HF-181	1.165E-01	105.5	1.229E-01	1.230E-01	2.772E+00
Ta-182	6.944E-01	180.7	1.255E+00	1.255E+00	8.124E+00
Hg-203	-3.798E-01	131.9	5.008E-01	5.013E-01	1.684E+00
TL-208	1.101E+01	6.7	7.366E-01	9.322E-01	9.262E-01
pm-146	7.811E-01	84.8	6.622E-01	6.635E-01	3.184E+00
y-88	3.748E-01	40.8	1.530E-01	1.542E-01	1.375E+00
Cd-113m	-7.870E+03	87.1	6.856E+03	6.875E+03	2.284E+04
Cd-109	0.000E+00	1.#INF	2.000E+01	2.000E+01	6.676E+01
Cf-251	6.848E-01	311.9	2.136E+00	2.137E+00	5.510E+00
Cf-249	0.000E+00	1.#INF	2.402E-01	2.403E-01	2.848E+00
Sn-126	5.275E+00	116.4	6.138E+00	6.145E+00	2.043E+01
PB-210	-8.513E+00	165.2	1.406E+01	1.407E+01	4.823E+01
PB-212	3.216E+01	4.0	1.288E+00	2.447E+00	2.108E+00
PB-214	1.289E+01	10.6	1.371E+00	1.526E+00	2.519E+00
BI-207	1.241E-01	73.7	9.148E-02	9.170E-02	1.377E+00
BI-212	5.254E+01	13.5	7.081E+00	7.589E+00	1.145E+01
BI-214	1.450E+01	8.4	1.220E+00	1.434E+00	1.782E+00
BI-210M	-9.515E-01	89.1	8.477E-01	8.496E-01	2.824E+00
AC-228	3.691E+01	6.0	2.211E+00	2.904E+00	3.683E+00
TH-227	-1.095E+00	650.2	7.117E+00	7.118E+00	2.410E+01
TH-229	3.385E-01	2634.4	8.918E+00	8.918E+00	2.312E+01
TH-234	-1.560E+01	98.8	1.542E+01	1.544E+01	5.235E+01
PA-231	-1.817E+01	146.0	2.653E+01	2.655E+01	8.854E+01
PA-233	1.208E+00	174.0	2.102E+00	2.103E+00	7.026E+00
PA-234	2.919E+00	87.9	2.564E+00	2.568E+00	9.461E+00
PA-234M	3.169E+01	111.9	3.547E+01	3.551E+01	2.451E+02
U-235	3.165E+00	153.4	4.856E+00	4.858E+00	1.618E+01
AM-241	1.465E+00	117.1	1.716E+00	1.718E+00	5.709E+00
Np-237	0.000E+00	1.#INF	6.078E+00	6.078E+00	2.020E+01
Ir-192	7.534E-01	88.3	6.654E-01	6.669E-01	2.982E+00
Cs-136	-1.411E-02	3876.8	5.471E-01	5.471E-01	1.916E+00
Np-239	-2.148E+00	170.8	3.669E+00	3.671E+00	1.218E+01
Nd-147	5.832E-01	179.6	1.048E+00	1.048E+00	1.010E+01
Total	4.830E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-5-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162110.An1

Acquisition information
Start time: 9/1/2016 3:06:52 PM
Live time: 1800
Real time: 1820
Dead time: 1.09 %
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 3:06:00 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. 22 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1350

***** 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
46.61	-15.	165.21	0.96	2.352E-02	46.54	4.250	PBC<MDA	PB210
59.54	31.	117.13	0.97	3.327E-02	59.54	35.900	PBC<MDA	AM241
64.28	33.	116.37	0.98	3.619E-02	64.28	9.700	PBC<MDA	Sn126
74.82	324.	9.11	0.99	4.135E-02				
77.24	466.	6.85	0.99	4.230E-02				
87.22	180.	15.58	1.11	4.532E-02	86.49	13.100	1.691E+01	Np237
					86.54	30.700	7.213E+00	EU155
					86.94	9.040	2.445E+01	Sn126
					87.57	37.500	5.874E+00	Sn126
					88.04	3.790	5.799E+01	Cd109
91.10	34.	179.62	1.00	4.612E-02	91.10	28.300	PBC<MDA	Nd147
92.99	152.	22.17	1.08	4.651E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.265E+01	AC228
121.78	27.	93.35	1.03	4.731E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.705E-01	CO57
122.06	27.	97.22	1.03	4.729E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.706E-01	CO57
131.29	29.	147.93	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	29.	150.02	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.138E+00	CE144
133.54	29.	152.25	1.04	4.612E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.140E+00	CE144

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
136.30	29.	154.13	1.04	4.576E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.295E+00	CO57
136.47	29.	156.35	1.04	4.573E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.295E+00	CO57
143.79	28.	153.43	1.05	4.466E-02	143.79	10.960	PBC<MDA	U235
165.85	31.	100.80	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
176.60	8.	311.92	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
186.00	93.	27.64	0.85	3.835E-02				
209.38	98.	25.37	0.39	3.528E-02				
238.65	806.	4.00	1.14	3.216E-02	238.63	43.300	3.216E+01	PB212
241.69	86.	21.69	1.14	3.187E-02	242.00	7.430	2.030E+01	PB214
244.69	25.	197.74	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
277.96	23.	76.62	1.17	2.890E-02	277.28	6.310	PBC<MDA	TL208
295.13	174.	11.97	0.97	2.764E-02	295.09	19.300	1.812E+01	PB214
299.98	64.	29.95	0.96	2.732E-02	300.03	3.280	3.973E+01	PB212
					300.07	2.460	5.297E+01	PA231
					300.18	6.200	PBC<MDA	PA233
308.44	21.	167.41	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
312.01	21.	173.96	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
316.49	21.	171.91	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
320.08	17.	226.03	1.21	2.608E-02	320.08	9.940	PBC<MDA	CR51
328.76	18.	187.00	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
338.10	206.	10.26	1.19	2.507E-02	338.32	12.010	3.805E+01	AC228
345.83	5.	426.88	1.23	2.467E-02	345.83	15.070	PBC<MDA	HF181
351.94	213.	10.63	1.15	2.436E-02	351.93	37.600	1.289E+01	PB214
364.48	12.	113.84	1.25	2.375E-02	364.48	81.700	PBC<MDA	I131
391.69	15.	142.55	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
453.88	12.	132.02	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
463.37	50.	29.39	1.34	1.996E-02	463.37	10.470	1.342E+01	SB125
468.06	14.	112.36	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
511.86	146.	18.38	2.63	1.856E-02	511.86	20.000	2.185E+01	RH106
563.24	28.	41.93	1.43	1.730E-02	563.24	8.350	1.073E+01	CS134
569.32	14.	64.87	1.43	1.717E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.558E+00	PA234
					569.70	97.740	4.664E-01	BI207
583.41	290.	6.43	1.22	1.686E-02	583.02	84.500	1.101E+01	TL208
600.50	8.	285.51	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	236.61	1.46	1.646E-02	602.73	98.260	PBC<MDA	SB124
604.71	10.	240.44	1.46	1.642E-02	604.71	97.620	PBC<MDA	CS134
609.53	192.	8.41	1.38	1.633E-02	609.31	46.090	1.416E+01	BI214
					610.30	5.750	1.136E+02	RU103
614.28	10.	247.10	1.47	1.623E-02	614.28	89.850	PBC<MDA	AG108M
618.06	10.	250.47	1.47	1.616E-02	618.06	99.100	PBC<MDA	PM144
657.76	13.	74.95	1.51	1.543E-02	657.76	94.640	PBC<MDA	AG110M
696.54	14.	82.70	1.54	1.479E-02	696.54	99.000	PBC<MDA	PM144
702.63	11.	124.73	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
724.20	7.	234.08	1.57	1.437E-02	724.20	44.150	PBC<MDA	ZR95
727.52	102.	13.48	1.40	1.433E-02	727.17	7.550	5.254E+01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
747.16	11.	106.41	1.59	1.404E-02	747.16	34.000	PBC<MDA	pm146
756.73	11.	87.87	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
766.41	14.	111.91	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.87	3.	384.97	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
834.85	8.	187.71	1.66	1.293E-02	834.85	99.980	PBC<MDA	MN54
860.15	56.	19.76	2.81	1.264E-02	860.56	12.420	1.988E+01	TL208
871.10	28.	26.73	1.69	1.253E-02	871.10	99.890	1.243E+00	NB94
880.53	10.	84.04	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
883.24	10.	94.81	1.71	1.240E-02	883.24	9.600	PBC<MDA	PA234
884.68	10.	104.50	1.71	1.238E-02	884.68	72.680	PBC<MDA	AG110M
898.04	6.	219.17	1.72	1.225E-02	898.04	93.700	PBC<MDA	y88
911.41	242.	8.13	1.47	1.211E-02	911.07	29.000	3.835E+01	AC228
964.11	12.	144.76	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152
969.14	123.	12.32	1.65	1.157E-02	968.97	17.460	3.374E+01	AC228
1037.84	8.	141.63	1.84	1.099E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	11.	90.47	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	11.	87.98	1.87	1.068E-02	1077.40	3.300	PBC<MDA	Ga68
1112.07	11.	129.42	1.90	1.043E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	3.	559.67	1.90	1.041E-02	1115.55	50.600	PBC<MDA	ZN65
1120.68	65.	15.74	2.49	1.037E-02	1120.29	15.100	2.295E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	9.934E+00	Ta182
1173.24	4.	314.71	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	6.	180.72	1.96	9.916E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	9.	168.49	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	4.	268.80	2.05	9.314E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	8.	125.93	2.08	9.097E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	3.	346.41	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	10.	86.66	2.14	8.723E-03	1408.00	21.005	PBC<MDA	EU152
1461.10	380.	5.28	1.89	8.482E-03	1460.83	10.670	2.331E+02	K40
1596.21	8.	85.93	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1764.80	32.	24.22	2.43	7.342E-03	1764.49	15.400	1.554E+01	BI214
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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.94	74.75	272.	324.	7.839E+03	9.11	0.985	-	sD
308.59	77.16	275.	466.	1.101E+04	6.85	0.988	-	D
743.45	186.00	157.	93.	2.430E+03	27.64	0.854	-	s
836.95	209.38	124.	98.	2.763E+03	25.37	0.388	-	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	185.86	46.54	325.	-15.	-0.009	165.21	0.959
TH-227	200.26	50.14	365.	-4.	-0.002	650.18	0.963s
AM-241	237.83	59.54	663.	31.	0.017	117.13	0.971s
TH-234	252.82	63.29	721.	-38.	-0.021	98.82	0.975s
Sn-126	256.79	64.28	736.	33.	0.019	116.37	0.976
BA-133	323.60	80.99	1901.	-39.	-0.022	159.02	0.991s
Np-237	345.59	86.49	2076.	0.	0.000	186.86	0.996A
EU-155	345.80	86.54	2041.	-35.	-0.019	185.31	0.996
Sn-126	347.39	86.94	1908.	23.	0.013	114.80	0.997D
Sn-126	349.91	87.57	1864.	94.	0.052	26.25	0.997D
Cd-109	351.79	88.04	1926.	0.	0.000	1000.00	0.998A
Nd-147	364.02	91.10	1899.	34.	0.019	179.62	1.001s
TH-234	369.98	92.59	1974.	-41.	-0.023	81.66	1.002s
AC-228	371.59	92.99	246.	152.	0.084	22.17	1.077s
Gd-153	389.61	97.50	1933.	0.	0.000	1000.00	1.007s
Np-239	397.61	99.50	1933.	0.	0.000	1000.00	1.008s
Gd-153	412.40	103.20	1933.	0.	0.000	1000.00	1.012s
Np-239	414.40	103.70	1933.	0.	0.000	1000.00	1.012s
EU-155	420.85	105.31	1933.	0.	0.000	1000.00	1.014s
Np-239	424.11	106.13	2533.	-42.	-0.023	170.75	1.014s
EU-152	486.67	121.78	304.	27.	0.015	93.35	1.029
CO-57	487.81	122.06	331.	27.	0.015	97.22	1.029
EU-154	491.96	123.10	321.	-11.	-0.006	310.36	1.030
PA-234	524.73	131.29	896.	29.	0.016	147.93	1.038
HF-181	531.64	133.02	925.	29.	0.016	150.02	1.039s
CE-144	533.70	133.54	954.	29.	0.016	152.25	1.040s
HF-181	544.74	136.30	983.	29.	0.016	154.13	1.042
CO-57	545.43	136.47	1012.	29.	0.016	156.35	1.042
U-235	574.67	143.79	901.	28.	0.015	153.43	1.049s
CE-141	581.29	145.44	415.	-33.	-0.018	88.90	1.050s
Ba-140	650.14	162.66	500.	-33.	-0.018	98.87	1.066
U-235	653.01	163.38	533.	-33.	-0.018	101.87	1.067s
CE-139	662.90	165.85	462.	31.	0.017	100.80	1.069
Cf-251	705.88	176.60	191.	8.	0.005	311.92	1.079s
U-235	820.76	205.33	384.	-6.	-0.003	451.30	1.105s
TH-229	842.82	210.85	466.	-29.	-0.016	90.30	1.110s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	907.40	227.00	169.	-7.	-0.004	366.50	1.125s
PB-212	953.91	238.63	116.	806.	0.448	4.00	1.136D
PB-214	967.37	242.00	147.	73.	0.041	26.22	1.139D
EU-152	978.14	244.69	1248.	25.	0.014	197.74	1.141s
TH-227	1024.32	256.24	180.	-27.	-0.015	118.18	1.152
Cd-113m	1054.15	263.70	233.	-25.	-0.014	87.12	1.158s
BI-210M	1062.67	265.83	245.	-26.	-0.014	89.09	1.160s
TL-208	1108.46	277.28	144.	23.	0.013	76.62	1.171s
Hg-203	1116.13	279.20	215.	-16.	-0.009	131.87	1.173s
I-131	1136.52	284.30	136.	-11.	-0.006	284.38	1.177
PB-214	1179.81	295.13	60.	174.	0.097	11.97	0.969s
PB-212	1199.22	299.98	73.	64.	0.036	29.95	0.962
PA-231	1199.58	300.07	736.	-26.	-0.014	151.54	1.192
PA-233	1200.02	300.18	710.	-26.	-0.014	148.93	1.192
PA-231	1209.90	302.65	684.	-26.	-0.014	146.00	1.194s
BA-133	1210.70	302.85	684.	-26.	-0.014	145.91	1.194s
Ba-140	1218.69	304.85	709.	-26.	-0.014	148.34	1.196
BI-210M	1218.88	304.90	735.	-26.	-0.014	150.95	1.196
Ir-192	1233.05	308.44	622.	21.	0.012	167.41	1.199s
PA-233	1247.34	312.01	644.	21.	0.012	173.96	1.202s
Ir-192	1265.24	316.49	665.	21.	0.012	171.91	1.206s
CR-51	1279.62	320.08	732.	17.	0.009	226.03	1.210s
La-140	1314.31	328.76	547.	18.	0.010	187.00	1.217s
Cf-249	1333.02	333.44	565.	0.	0.000	1000.00	1.222s
AC-228	1351.68	338.10	50.	206.	0.115	10.26	1.191
Cs-136	1361.54	340.57	565.	0.	0.000	1000.00	1.228
HF-181	1382.56	345.83	96.	5.	0.003	426.88	1.233s
PB-214	1406.99	351.94	69.	213.	0.118	10.63	1.152
BA-133	1423.24	356.00	392.	-21.	-0.012	137.04	1.242
I-131	1457.16	364.48	49.	12.	0.007	113.84	1.250
BA-133	1534.57	383.84	232.	-21.	-0.012	67.15	1.267s
Cf-249	1551.01	387.95	253.	0.	0.000	1000.00	1.271
SN-113	1565.96	391.69	223.	15.	0.008	142.55	1.274s
SB-125	1710.67	427.88	126.	-25.	-0.014	87.38	1.307s
AG-108M	1734.91	433.94	87.	-9.	-0.005	221.88	1.312s
pm-146	1814.67	453.88	61.	12.	0.007	132.02	1.330s
SB-125	1852.61	463.37	85.	50.	0.028	29.39	1.338s
Ir-192	1871.38	468.06	117.	14.	0.008	112.36	1.342s
BE-7	1909.51	477.60	239.	-23.	-0.013	64.83	1.351s
HF-181	1927.12	482.00	260.	-22.	-0.012	105.49	1.355s
RU-103	1987.33	497.05	87.	-21.	-0.012	69.79	1.368s
RH-106	2046.57	511.86	84.	146.	0.081	18.38	2.631s
Nd-147	2123.10	531.00	74.	-6.	-0.003	312.01	1.398s
Ba-140	2148.14	537.26	79.	-21.	-0.011	72.69	1.404
CS-134	2252.03	563.24	26.	28.	0.015	41.93	1.427s
CS-134	2276.36	569.32	35.	14.	0.008	64.87	1.432s
BI-207	2277.89	569.70	70.	-10.	-0.006	116.45	1.432s
TL-208	2332.72	583.41	20.	283.	0.157	6.69	1.217

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2401.07	600.50	276.	8.	0.005	285.51	1.460s
SB-124	2409.99	602.73	284.	10.	0.006	236.61	1.462s
CS-134	2417.91	604.71	294.	10.	0.006	240.44	1.463s
BI-214	2437.18	609.53	21.	192.	0.107	8.41	1.377
RU-103	2440.26	610.30	304.	10.	0.006	243.70	1.468s
AG-108M	2456.19	614.28	314.	10.	0.006	247.10	1.472s
PM-144	2471.31	618.06	325.	10.	0.006	250.47	1.475s
RH-106	2486.73	621.92	467.	-17.	-0.009	181.01	1.479s
I-131	2546.96	636.97	58.	-2.	-0.001	810.86	1.492s
AG-110M	2630.10	657.76	40.	13.	0.007	74.95	1.510s
PM-144	2785.22	696.54	62.	14.	0.008	82.70	1.544s
NB-94	2809.57	702.63	94.	11.	0.006	124.73	1.549s
SB-124	2890.19	722.79	157.	-4.	-0.002	445.81	1.567s
AG-108M	2890.80	722.94	153.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	153.	0.	0.000	1000.00	1.567s
ZR-95	2895.84	724.20	144.	7.	0.004	234.08	1.568s
BI-212	2909.14	727.52	18.	102.	0.057	13.48	1.401
pm-146	2941.93	735.72	51.	-10.	-0.006	150.34	1.578s
pm-146	2987.69	747.16	28.	11.	0.006	106.41	1.588
ZR-95	3025.97	756.73	19.	11.	0.006	87.87	1.596s
AG-110M	3054.82	763.94	92.	-22.	-0.012	66.62	1.602s
NB-95	3062.21	765.79	114.	-7.	-0.004	221.42	1.604s
PA-234M	3064.70	766.41	111.	14.	0.008	111.91	1.605s
EU-152	3114.73	778.92	56.	-11.	-0.006	147.43	1.615s
BI-212	3140.74	785.42	61.	-18.	-0.010	48.63	1.621
CS-134	3182.53	795.87	81.	3.	0.002	384.97	1.630s
CS-134	3206.86	801.95	102.	-3.	-0.002	432.67	1.635s
CO-58	3242.16	810.78	80.	-2.	-0.001	636.40	1.643s
La-140	3262.14	815.77	82.	0.	0.000	1000.00	1.647s
MN-54	3338.46	834.85	45.	8.	0.004	187.71	1.663s
Co-56	3386.15	846.77	30.	0.	0.000	1000.00	1.674s
TL-208	3439.66	860.15	12.	56.	0.031	19.76	2.805s
NB-94	3483.47	871.10	14.	28.	0.016	26.73	1.695s
PA-234	3521.21	880.53	32.	10.	0.006	84.04	1.703s
PA-234	3532.05	883.24	42.	10.	0.006	94.81	1.705s
AG-110M	3537.82	884.68	53.	10.	0.006	104.50	1.706s
Sc-46	3556.21	889.28	74.	-5.	-0.003	241.35	1.710s
y-88	3591.26	898.04	30.	6.	0.003	219.17	1.718s
AC-228	3644.73	911.41	20.	242.	0.135	8.13	1.470
AG-110M	3749.09	937.49	80.	-24.	-0.014	83.23	1.751s
EU-152	3855.58	964.11	153.	12.	0.007	144.76	1.774
AC-228	3875.71	969.14	25.	123.	0.068	12.32	1.654
EU-154	3984.48	996.33	64.	-2.	-0.001	570.09	1.801s
PA-234M	4003.15	1001.00	70.	-4.	-0.002	321.34	1.805s
EU-154	4018.27	1004.77	79.	-11.	-0.006	118.18	1.808s
Co-56	4150.56	1037.84	22.	8.	0.004	141.63	1.836s
Cs-136	4191.49	1048.07	78.	-22.	-0.012	60.07	1.845s
BI-207	4253.86	1063.66	16.	11.	0.006	90.47	1.858s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4308.84	1077.40	16.	11.	0.006	87.98	1.870
FE-59	4396.27	1099.25	32.	-1.	-0.001	688.50	1.888s
EU-152	4447.58	1112.07	104.	11.	0.006	129.42	1.899s
ZN-65	4461.46	1115.55	115.	3.	0.002	559.67	1.901s
BI-214	4481.99	1120.68	8.	65.	0.036	15.74	2.487s
Sc-46	4481.49	1120.55	118.	0.	0.000	1000.00	1.906s
Ta-182	4484.49	1121.30	116.	0.	0.000	1000.00	1.906
CO-60	4692.30	1173.24	36.	4.	0.002	314.71	1.950s
Ta-182	4755.57	1189.05	23.	6.	0.004	180.72	1.963
Ta-182	4885.06	1221.41	51.	-13.	-0.007	131.78	1.990
Co-56	4952.57	1238.28	41.	9.	0.005	168.49	2.004s
EU-154	5097.68	1274.54	23.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	23.	4.	0.002	268.80	2.048s
CO-60	5329.61	1332.50	17.	8.	0.004	125.93	2.081s
AG-110M	5536.89	1384.30	18.	3.	0.002	346.41	2.124s
EU-152	5631.75	1408.00	12.	10.	0.006	86.66	2.143s
K-40	5844.27	1461.10	10.	380.	0.211	5.28	1.895
La-140	6385.02	1596.21	6.	8.	0.004	85.93	2.294s
BI-214	7058.61	1764.49	13.	32.	0.018	24.22	2.427
Co-56	7086.08	1771.35	35.	0.	0.000	1000.00	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	-6.2288E+00					5.31E+01
			477.60	-6.229E+00	?(P	2.023E+01	6.48E+01 1.05E+01 G
NA-22	C	1.9694E-02					9.50E+02
			1274.53	1.969E-02	%(	1.471E+00	2.03E+03 9.99E+01 G
K-40	N	2.3307E+02					4.66E+11
			1460.83	2.331E+02	(P	1.085E+01	5.28E+00 1.07E+01 G
Sc-46	F	-2.3114E-01					8.38E+01
			889.28	-2.311E-01	?(	1.929E+00	2.41E+02 1.00E+02 G
			1120.55	0.000E+00	+	2.857E+00	1.00E+03 1.00E+02 G
CR-51	F	3.6485E+00					2.77E+01
			320.08	3.649E+00	&(	2.760E+01	2.26E+02 9.94E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	3.4375E-01					3.12E+02	
			834.85	3.438E-01	(	1.460E+00	1.88E+02	1.00E+02 G
FE-59	F	1.7773E-01					4.45E+01	
			1099.25	-1.329E-01	?(P	2.733E+00	6.89E+02	5.65E+01 G
			1291.60	5.840E-01	?(P	3.444E+00	2.69E+02	4.32E+01 G
Co-56	C	5.0586E-01					7.73E+01	
			846.77	0.000E+00	?(	1.227E+00	1.00E+03	9.99E+01 G
			1238.28	7.871E-01	?(P	2.846E+00	1.68E+02	6.61E+01 G
			1037.84	2.768E+00	?(P	8.838E+00	1.42E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.478E+01	1.00E+03	1.55E+01 A
CO-57	C	6.9500E-01					2.72E+02	
			122.06	3.706E-01	?(	1.201E+00	9.72E+01	8.56E+01 G
			136.47	3.295E+00	&(	1.717E+01	1.56E+02	1.07E+01 G
CO-58	C	-8.4525E-02					7.09E+01	
			810.78	-8.452E-02	?(	1.876E+00	6.36E+02	9.95E+01 G
CO-60	F	3.6751E-01					1.93E+03	
			1332.50	4.887E-01	?(	1.339E+00	1.26E+02	1.00E+02 G
			1173.24	2.462E-01	(P	1.693E+00	3.15E+02	9.99E+01 G
ZN-65	F	2.8794E-01					2.44E+02	
			1115.55	2.879E-01	?(	5.565E+00	5.60E+02	5.06E+01 G
NB-94	I	8.4372E-01					7.41E+06	
			702.63	4.363E-01	?(	1.846E+00	1.25E+02	9.79E+01 G
			871.10	1.243E+00	&(	8.944E-01	2.67E+01	9.99E+01 G
ZR-95	I	7.3684E-01					6.40E+01	
			756.73	8.137E-01	?(	1.675E+00	8.79E+01	5.45E+01 G
			724.20	6.420E-01	?(	5.127E+00	2.34E+02	4.42E+01 G
NB-95	I	-2.7955E-01					6.40E+01	
			765.79	-2.795E-01	?(	2.119E+00	2.21E+02	9.98E+01 G
RU-103	I	-6.9111E-01					3.93E+01	
			497.05	-6.911E-01	?(P	1.487E+00	6.98E+01	9.09E+01 G
			610.30	6.046E+00	?	4.976E+01	2.44E+02	5.75E+00 GA
RH-106	I	-5.9285E+00					3.74E+02	
			621.92	-5.929E+00	?(	3.598E+01	1.81E+02	9.93E+00 G
			1050.36	7.341E-01	%	1.496E+02	5.82E+03	1.56E+00 G
			511.86	2.185E+01	?	6.798E+00	1.84E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	6.6639E-02					1.53E+05	
			433.94	-2.542E-01	?(	1.352E+00	2.22E+02	9.05E+01 G
			722.94	0.000E+00	+	2.564E+00	1.00E+03	9.08E+01 G
			614.28	3.897E-01	&(	3.251E+00	2.47E+02	8.98E+01 G
AG-110M	F	5.8053E-01					2.50E+02	
			884.68	6.343E-01	?(	2.252E+00	1.05E+02	7.27E+01 G
			657.76	4.890E-01	&(	1.224E+00	7.50E+01	9.46E+01 G
			937.49	-3.321E+00	+	6.053E+00	8.32E+01	3.44E+01 G
			1384.30	7.765E-01	?(	5.819E+00	3.46E+02	2.43E+01 G
			763.94	-3.894E+00	+	8.579E+00	6.66E+01	2.23E+01 G
SN-113	F	5.8011E-01					1.15E+02	
			391.69	5.801E-01	?(P	2.783E+00	1.43E+02	6.40E+01 G
SB-124	F	3.4900E-01					6.02E+01	
			602.73	3.490E-01	&(	2.790E+00	2.37E+02	9.83E+01 G
			1690.98	-5.109E-02	%	2.213E+00	1.88E+03	4.78E+01 G
			722.79	-1.428E+00	+	2.181E+01	4.46E+02	1.08E+01 G
SB-125	I	1.8919E+00					1.01E+03	
			427.88	-2.185E+00	&(P	4.879E+00	8.74E+01	2.96E+01 G
			600.50	1.561E+00	+	1.509E+01	2.86E+02	1.79E+01 G
			635.89	2.120E-01	% P	1.271E+01	1.71E+03	1.13E+01 G
			463.37	1.342E+01	(P	1.211E+01	2.94E+01	1.05E+01 G
I-131	I	3.5389E-01					8.02E+00	
			364.48	3.539E-01	(P	1.008E+00	1.14E+02	8.17E+01 G
			284.30	-3.623E+00	+ P	1.821E+01	2.84E+02	6.14E+00 G
			636.97	-9.805E-01	+	1.873E+01	8.11E+02	7.17E+00 G
Ga-68	C	2.0342E+01					4.71E-02	
			1077.40	2.034E+01	?(	3.948E+01	8.80E+01	3.30E+00 G
Tc-99m	I	4.8495E-02					2.51E-01	
			140.51	4.850E-02	%(	2.174E+00	1.34E+03	8.93E+01 G
BA-133	F	-7.6712E-01					3.85E+03	
			356.00	-7.671E-01	&(	3.519E+00	1.37E+02	6.20E+01 G
			302.85	-2.857E+00	+	1.391E+01	1.46E+02	1.83E+01 G
			383.84	-5.707E+00	+ P	2.001E+01	6.72E+01	8.94E+00 GA
			80.99	-1.457E+00	+	7.700E+00	1.59E+02	3.41E+01 GA
CS-134	I	8.8631E-01					7.54E+02	
			604.71	3.526E-01	&(	2.863E+00	2.40E+02	9.76E+01 G
			795.87	1.616E-01	?(	2.160E+00	3.85E+02	8.55E+01 G
			569.32	2.963E+00	?(	6.343E+00	6.49E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	-1.599E+00	+	2.392E+01	4.33E+02	8.69E+00 G
			563.24	1.073E+01	*(P	1.020E+01	4.19E+01	8.35E+00 G
CS-137	I	-7.4640E-03					1.10E+04	
			661.66	-7.464E-03	&(P	1.874E+00	7.16E+03	8.52E+01 G
CE-139	F	5.1270E-01					1.38E+02	
			165.85	5.127E-01	?(	1.721E+00	1.01E+02	7.99E+01 G
Ba-140	I	-2.6307E+00					1.28E+01	
			537.26	-2.631E+00	?(P	5.601E+00	7.27E+01	2.44E+01 G
			162.66	-7.022E+00	+	2.310E+01	9.89E+01	6.22E+00 G
			304.85	-1.228E+01	+	6.081E+01	1.48E+02	4.29E+00 G
La-140	I	8.1815E-01					1.28E+01	
			1596.21	5.863E-01	?(	1.061E+00	8.59E+01	9.54E+01 G
			487.02	7.052E-02	%	4.686E+00	1.94E+03	4.55E+01 G
			328.76	1.908E+00	&(	1.195E+01	1.87E+02	2.03E+01 G
			815.77	0.000E+00	-	8.146E+00	1.00E+03	2.33E+01 G
CE-141	I	-8.5817E-01					3.25E+01	
			145.44	-8.582E-01	?(	2.536E+00	8.89E+01	4.82E+01 G
CE-144	I	3.1395E+00					2.85E+02	
			133.54	3.140E+00	?(	1.593E+01	1.52E+02	1.11E+01 G
PM-144	C	4.4710E-01					3.63E+02	
			696.54	5.386E-01	?(	1.493E+00	8.27E+01	9.90E+01 G
			618.06	3.557E-01	?(	3.007E+00	2.50E+02	9.91E+01 G
EU-152	F	2.1361E+00					4.94E+03	
			344.29	-7.964E-02	%(P	9.620E+00	3.85E+03	2.65E+01 G
			1112.07	4.465E+00	*(	1.960E+01	1.29E+02	1.36E+01 G
			121.78	1.109E+00	&(	3.450E+00	9.34E+01	2.86E+01 G
			778.92	-3.468E+00	+	1.185E+01	1.47E+02	1.29E+01 G
			964.11	4.042E+00	?(	1.979E+01	1.45E+02	1.46E+01 G
			244.69	5.891E+00	?(	3.882E+01	1.98E+02	7.58E+00 G
			1408.00	3.148E+00	? P	5.748E+00	8.67E+01	2.10E+01 GA
EU-154	I	-3.1659E-01					3.14E+03	
			873.23	-3.166E-01	&(P	1.190E+01	1.28E+03	1.23E+01 G
			123.10	-3.122E-01	& P	2.486E+00	3.10E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.205E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.153E+01	1.00E+03	2.02E+01 G
			1004.77	-3.014E+00	+	1.209E+01	1.18E+02	1.80E+01 G
			996.33	-9.252E-01	+	1.850E+01	5.70E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	1.1650E-01					4.24E+01	
			482.00	-7.860E-01	&(	2.772E+00	1.05E+02	8.05E+01 G
			133.02	8.026E-01	?(	4.012E+00	1.50E+02	4.33E+01 G
			345.83	6.769E-01	&(P	7.244E+00	4.27E+02	1.51E+01 G
			136.30	6.013E+00	(	3.088E+01	1.54E+02	5.85E+00 G
Ta-182	F	6.9437E-01					1.14E+02	
			1121.30	0.000E+00	(	8.124E+00	1.00E+03	3.49E+01 G
			1221.41	-2.753E+00	+	7.621E+00	1.32E+02	2.70E+01 G
			1189.05	2.190E+00	(	8.610E+00	1.81E+02	1.62E+01 G
Hg-203	F	-3.7977E-01					4.66E+01	
			279.20	-3.798E-01	?(	1.684E+00	1.32E+02	8.15E+01 G
TL-208	N	1.1013E+01					6.98E+02	
			583.02	1.101E+01	(P	9.262E-01	6.69E+00	8.45E+01 G
			277.28	7.011E+00	&	1.786E+01	7.66E+01	6.31E+00 G
			860.56	1.988E+01	+ P	6.627E+00	1.98E+01	1.24E+01 G
pm-146	C	7.8110E-01					2.02E+03	
			747.16	1.280E+00	?(	3.184E+00	1.06E+02	3.40E+01 G
			735.72	-1.796E+00	+	6.274E+00	1.50E+02	2.25E+01 G
			453.88	5.203E-01	?(	1.645E+00	1.32E+02	6.50E+01 G
y-88	F	3.7483E-01					1.07E+02	
			898.04	2.721E-01	?(P	1.375E+00	2.19E+02	9.37E+01 G
			1836.06	4.719E-01	?(	5.796E-01	4.08E+01	9.92E+01 G
Cd-113m		-7.8699E+03					5.33E+03	
			263.70	-7.870E+03	&(	2.284E+04	8.71E+01	6.00E-03 K
Cf-251	T	6.8477E-01					3.28E+05	
			176.60	6.848E-01	(	5.510E+00	3.12E+02	1.70E+01 G
			227.00	-1.764E+00	+	1.673E+01	3.67E+02	6.30E+00 GA
Sn-126		5.2749E+00					3.65E+07	
			87.57	3.071E+00	}	6.654E+00	2.62E+01	3.75E+01 GA
			64.28	5.275E+00	(	2.043E+01	1.16E+02	9.70E+00 G
			86.94	3.079E+00	}	2.801E+01	1.15E+02	9.04E+00 GA
PB-210	N	-8.5126E+00					8.14E+03	
			46.54	-8.513E+00	?(P	4.823E+01	1.65E+02	4.25E+00 G
PB-212	N	3.2163E+01					6.98E+02	
			238.63	3.216E+01	(P	2.108E+00	4.00E+00	4.33E+01 G
			300.03	3.973E+01	+ P	2.635E+01	2.99E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.2894E+01					5.84E+05	
			351.93	1.289E+01	(P	2.519E+00	1.06E+01	3.76E+01 G
			295.09	1.812E+01	+	4.040E+00	1.20E+01	1.93E+01 G
			242.00	1.716E+01	+	1.390E+01	2.62E+01	7.43E+00 GA
BI-207	C	1.2407E-01					1.18E+04	
			569.70	-3.478E-01	?(	1.377E+00	1.16E+02	9.77E+01 G
			1063.66	7.432E-01	&(P	1.494E+00	9.05E+01	7.45E+01 G
BI-212	N	5.2536E+01					6.98E+02	
			727.17	5.254E+01	(P	1.145E+01	1.35E+01	7.55E+00 G
			785.42	-5.828E+01	& P	1.256E+02	4.86E+01	1.28E+00 GA
BI-214	N	1.4505E+01					5.84E+05	
			609.31	1.416E+01	(P	1.782E+00	8.41E+00	4.61E+01 G
			1120.29	2.295E+01	+ P	5.727E+00	1.57E+01	1.51E+01 G
			1764.49	1.554E+01	?(P	9.706E+00	2.42E+01	1.54E+01 G
BI-210M	T	-9.5150E-01					1.10E+09	
			265.83	-9.515E-01	?(	2.824E+00	8.91E+01	5.00E+01 G
			304.90	-1.882E+00	+	9.481E+00	1.51E+02	2.80E+01 G
AC-228	N	3.6910E+01					2.10E+03	
			911.07	3.835E+01	(	3.683E+00	8.13E+00	2.90E+01 G
			968.97	3.374E+01	(	7.197E+00	1.23E+01	1.75E+01 G
			338.32	3.805E+01	(	6.572E+00	1.03E+01	1.20E+01 G
			93.35	3.265E+01		1.628E+01	2.22E+01	5.56E+00 XA
TH-227	N	-1.0947E+00					7.95E+03	
			50.14	-1.095E+00	&(	2.410E+01	6.50E+02	8.00E+00 G
			256.24	-7.095E+00	+ P	1.695E+01	1.18E+02	7.00E+00 G
TH-229	N	3.3854E-01					2.68E+06	
			193.51	3.385E-01	%(	2.312E+01	2.63E+03	4.40E+00 G
			210.85	-1.514E+01	+ P	5.469E+01	9.03E+01	2.99E+00 G
TH-234	N	-1.5604E+01					1.63E+12	
			63.29	-1.560E+01	*(P	5.235E+01	9.88E+01	3.81E+00 G
			92.59	-8.803E+00	+ P	4.499E+01	8.17E+01	5.58E+00 G
PA-231	N	-1.8172E+01					1.20E+07	
			302.65	-1.817E+01	?(	8.854E+01	1.46E+02	2.88E+00 G
			300.07	-2.110E+01	+	1.067E+02	1.52E+02	2.46E+00 G
PA-233	C	1.2082E+00					7.82E+08	
			312.01	1.208E+00	@(P	7.026E+00	1.74E+02	3.60E+01 G
			300.18	-8.376E+00	+	4.163E+01	1.49E+02	6.20E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   2.9185E+00                                      1.63E+12
                          131.29 1.919E+00  (  9.461E+00 1.48E+02 1.80E+01 G
                          946.02-4.224E-02 % P 9.175E+00 1.03E+04 1.34E+01 G
                          569.47-2.289E-01 %   1.466E+01 1.81E+03 8.20E+00 G
                          883.24 4.792E+00 ?(  1.540E+01 9.48E+01 9.60E+00 G
                          880.53 7.640E+00 ?   2.166E+01 8.40E+01 6.00E+00 GA

PA-234M  N   3.1695E+01                                      1.63E+12
                         1001.00-2.335E+01 ?(P 2.451E+02 3.21E+02 8.37E-01 G
                          766.41 1.884E+02 ?(P 7.111E+02 1.12E+02 2.94E-01 G

U-235    N   3.1647E+00                                      2.57E+11
                          143.79 3.165E+00 ?(P 1.618E+01 1.53E+02 1.10E+01 G
                          205.33-1.912E+00 &   2.915E+01 4.51E+02 5.01E+00 G
                          163.38-8.631E+00 +   2.926E+01 1.02E+02 5.08E+00 G

AM-241   T   1.4650E+00                                      1.58E+05
                           59.54 1.465E+00 &(P 5.709E+00 1.17E+02 3.59E+01 G

Ir-192   F   7.5342E-01                                      7.40E+01
                          316.49 5.189E-01 ?(  2.982E+00 1.72E+02 8.70E+01 G
                          468.06 7.584E-01 &(  2.874E+00 1.12E+02 5.18E+01 G
                          308.44 1.388E+00 ?(  7.770E+00 1.67E+02 3.18E+01 G

Cs-136   F  -1.4111E-02                                      1.30E+01
                          818.50-1.411E-02 %(  1.916E+00 3.88E+03 1.00E+02 G
                         1048.07-1.415E+00 +   2.793E+00 6.01E+01 8.00E+01 G
                          340.57 0.000E+00 +   5.389E+00 1.00E+03 4.69E+01 G

Np-239   T  -2.1485E+00                                      2.36E+00
                          103.70 0.000E+00 +   1.010E+01 1.00E+03 2.40E+01 X
                          106.13-2.148E+00 ?(  1.218E+01 1.71E+02 2.27E+01 G
                           99.50 0.000E+00 +   1.627E+01 1.00E+03 1.50E+01 X

Nd-147       5.8319E-01                                      1.11E+01
                          531.00-1.340E+00 *(  1.010E+01 3.12E+02 1.30E+01 G
                           91.10 1.467E+00 ?(  8.758E+00 1.80E+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	325.	-15.	-0.009	165.21	-8.513E+00	P
TH-227	50.14	365.	-4.	-0.002	650.18	-1.095E+00	
AM-241	59.54	663.	31.	0.017	117.13	1.465E+00	P
TH-234	63.29	721.	-38.	-0.021	98.82	-1.560E+01	P
BA-133	80.99	1901.	-39.	-0.022	159.02	-1.457E+00	
EU-155	86.54	2041.	-35.	-0.019	185.31	-1.387E+00	
Nd-147	91.10	1899.	34.	0.019	179.62	1.467E+00	
TH-234	92.59	1974.	-41.	-0.023	81.66	-8.803E+00	P
Np-239	106.13	2533.	-42.	-0.023	170.75	-2.148E+00	
EU-152	121.78	304.	27.	0.015	93.35	1.109E+00	
CO-57	122.06	331.	27.	0.015	97.22	3.706E-01	
EU-154	123.10	321.	-11.	-0.006	310.36	-3.122E-01	P
PA-234	131.29	896.	29.	0.016	147.93	1.919E+00	
HF-181	133.02	925.	29.	0.016	150.02	8.026E-01	
CE-144	133.54	954.	29.	0.016	152.25	3.140E+00	
HF-181	136.30	983.	29.	0.016	154.13	6.013E+00	
CO-57	136.47	1012.	29.	0.016	156.35	3.295E+00	
U-235	143.79	901.	28.	0.015	153.43	3.165E+00	P
CE-141	145.44	415.	-33.	-0.018	88.90	-8.582E-01	
Ba-140	162.66	500.	-33.	-0.018	98.87	-7.022E+00	
U-235	163.38	533.	-33.	-0.018	101.87	-8.631E+00	
CE-139	165.85	462.	31.	0.017	100.80	5.127E-01	
Cf-251	176.60	191.	8.	0.005	311.92	6.848E-01	
U-235	205.33	384.	-6.	-0.003	451.30	-1.912E+00	
TH-229	210.85	466.	-29.	-0.016	90.30	-1.514E+01	P
Cf-251	227.00	169.	-7.	-0.004	366.50	-1.764E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	244.69	1248.	25.	0.014	197.74	5.891E+00	
TH-227	256.24	180.	-27.	-0.015	118.18	-7.095E+00	P
Cd-113m	263.70	233.	-25.	-0.014	87.12	-7.870E+03	
BI-210M	265.83	245.	-26.	-0.014	89.09	-9.515E-01	
Hg-203	279.20	215.	-16.	-0.009	131.87	-3.798E-01	
I-131	284.30	136.	-11.	-0.006	284.38	-3.623E+00	P
PA-231	300.07	736.	-26.	-0.014	151.54	-2.110E+01	
PA-233	300.18	710.	-26.	-0.014	148.93	-8.376E+00	
PA-231	302.65	684.	-26.	-0.014	146.00	-1.817E+01	
BA-133	302.85	684.	-26.	-0.014	145.91	-2.857E+00	
Ba-140	304.85	709.	-26.	-0.014	148.34	-1.228E+01	
BI-210M	304.90	735.	-26.	-0.014	150.95	-1.882E+00	
Ir-192	308.44	622.	21.	0.012	167.41	1.388E+00	
PA-233	312.01	644.	21.	0.012	173.96	1.208E+00	P
Ir-192	316.49	665.	21.	0.012	171.91	5.189E-01	
CR-51	320.08	732.	17.	0.009	226.03	3.649E+00	
La-140	328.76	547.	18.	0.010	187.00	1.908E+00	
HF-181	345.83	96.	5.	0.003	426.88	6.769E-01	P
BA-133	356.00	392.	-21.	-0.012	137.04	-7.671E-01	
I-131	364.48	49.	12.	0.007	113.84	3.539E-01	P
BA-133	383.84	232.	-21.	-0.012	67.15	-5.707E+00	P
SN-113	391.69	223.	15.	0.008	142.55	5.801E-01	P
SB-125	427.88	126.	-25.	-0.014	87.38	-2.185E+00	P
AG-108M	433.94	87.	-9.	-0.005	221.88	-2.542E-01	
pm-146	453.88	61.	12.	0.007	132.02	5.203E-01	
SB-125	463.37	85.	50.	0.028	29.39	1.342E+01	P
Ir-192	468.06	117.	14.	0.008	112.36	7.584E-01	
BE-7	477.60	239.	-23.	-0.013	64.83	-6.229E+00	P
HF-181	482.00	260.	-22.	-0.012	105.49	-7.860E-01	
RU-103	497.05	87.	-21.	-0.012	69.79	-6.911E-01	P
RH-106	511.86	84.	146.	0.081	18.38	2.185E+01	
Nd-147	531.00	74.	-6.	-0.003	312.01	-1.340E+00	
Ba-140	537.26	79.	-21.	-0.011	72.69	-2.631E+00	P
CS-134	563.24	26.	28.	0.015	41.93	1.073E+01	P
CS-134	569.32	35.	14.	0.008	64.87	2.963E+00	
BI-207	569.70	70.	-10.	-0.006	116.45	-3.478E-01	
SB-125	600.50	276.	8.	0.005	285.51	1.561E+00	
SB-124	602.73	284.	10.	0.006	236.61	3.490E-01	
CS-134	604.71	294.	10.	0.006	240.44	3.526E-01	
RU-103	610.30	304.	10.	0.006	243.70	6.046E+00	
AG-108M	614.28	314.	10.	0.006	247.10	3.897E-01	
PM-144	618.06	325.	10.	0.006	250.47	3.557E-01	
RH-106	621.92	467.	-17.	-0.009	181.01	-5.929E+00	
I-131	636.97	58.	-2.	-0.001	810.86	-9.805E-01	
AG-110M	657.76	40.	13.	0.007	74.95	4.890E-01	
PM-144	696.54	62.	14.	0.008	82.70	5.386E-01	
NB-94	702.63	94.	11.	0.006	124.73	4.363E-01	
SB-124	722.79	157.	-4.	-0.002	445.81	-1.428E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZR-95	724.20	144.	7.	0.004	234.08	6.420E-01		
pm-146	735.72	51.	-10.	-0.006	150.34	-1.796E+00		
pm-146	747.16	28.	11.	0.006	106.41	1.280E+00		
ZR-95	756.73	19.	11.	0.006	87.87	8.137E-01		
AG-110M	763.94	92.	-22.	-0.012	66.62	-3.894E+00		
NB-95	765.79	114.	-7.	-0.004	221.42	-2.795E-01		
PA-234M	766.41	111.	14.	0.008	111.91	1.884E+02		P
EU-152	778.92	56.	-11.	-0.006	147.43	-3.468E+00		
CS-134	795.87	81.	3.	0.002	384.97	1.616E-01		
CS-134	801.95	102.	-3.	-0.002	432.67	-1.599E+00		
CO-58	810.78	80.	-2.	-0.001	636.40	-8.452E-02		
MN-54	834.85	45.	8.	0.004	187.71	3.438E-01		
NB-94	871.10	14.	28.	0.016	26.73	1.243E+00		
PA-234	880.53	32.	10.	0.006	84.04	7.640E+00		
PA-234	883.24	42.	10.	0.006	94.81	4.792E+00		
AG-110M	884.68	53.	10.	0.006	104.50	6.343E-01		
Sc-46	889.28	74.	-5.	-0.003	241.35	-2.311E-01		
y-88	898.04	30.	6.	0.003	219.17	2.721E-01		P
AG-110M	937.49	80.	-24.	-0.014	83.23	-3.321E+00		
EU-152	964.11	153.	12.	0.007	144.76	4.042E+00		
EU-154	996.33	64.	-2.	-0.001	570.09	-9.252E-01		
PA-234M	1001.00	70.	-4.	-0.002	321.34	-2.335E+01		P
EU-154	1004.77	79.	-11.	-0.006	118.18	-3.014E+00		
Co-56	1037.84	22.	8.	0.004	141.63	2.768E+00		P
Cs-136	1048.07	78.	-22.	-0.012	60.07	-1.415E+00		
BI-207	1063.66	16.	11.	0.006	90.47	7.432E-01		P
Ga-68	1077.40	16.	11.	0.006	87.98	2.034E+01		
FE-59	1099.25	32.	-1.	-0.001	688.50	-1.329E-01		P
EU-152	1112.07	104.	11.	0.006	129.42	4.465E+00		
ZN-65	1115.55	115.	3.	0.002	559.67	2.879E-01		
CO-60	1173.24	36.	4.	0.002	314.71	2.462E-01		P
Ta-182	1189.05	23.	6.	0.004	180.72	2.190E+00		
Ta-182	1221.41	51.	-13.	-0.007	131.78	-2.753E+00		
Co-56	1238.28	41.	9.	0.005	168.49	7.871E-01		P
FE-59	1291.60	23.	4.	0.002	268.80	5.840E-01		P
CO-60	1332.50	17.	8.	0.004	125.93	4.887E-01		
AG-110M	1384.30	18.	3.	0.002	346.41	7.765E-01		
EU-152	1408.00	12.	10.	0.006	86.66	3.148E+00		P
La-140	1596.21	6.	8.	0.004	85.93	5.863E-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 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-6.2287E+00	-6.2288E+00	6.483E+01%	2.02E+01
NA-22	#A	1.9694E-02	1.9694E-02	2.027E+03%	1.47E+00
K-40		2.3307E+02	2.3307E+02	5.277E+00%	1.08E+01
Sc-46	#A	-2.3114E-01	-2.3114E-01	2.414E+02%	1.93E+00
CR-51	#A	3.6485E+00	3.6485E+00	2.260E+02%	2.76E+01
MN-54	#A	3.4375E-01	3.4375E-01	1.877E+02%	1.46E+00
FE-59	#A	1.7773E-01	1.7773E-01	2.688E+02%	2.73E+00
Co-56	#A	5.0586E-01	5.0586E-01	1.416E+02%	1.23E+00
CO-57	#A	6.9500E-01	6.9500E-01	9.206E+01%	1.20E+00
CO-58	#A	-8.4524E-02	-8.4525E-02	6.364E+02%	1.88E+00
CO-60	#A	3.6751E-01	3.6751E-01	1.259E+02%	1.34E+00
ZN-65	#A	2.8794E-01	2.8794E-01	5.597E+02%	5.56E+00
NB-94	#A	8.4372E-01	8.4372E-01	2.673E+01%	1.85E+00
ZR-95	#A	7.3683E-01	7.3684E-01	8.787E+01%	1.67E+00
NB-95	#A	-2.7955E-01	-2.7955E-01	2.214E+02%	2.12E+00
RU-103	#A	-6.9111E-01	-6.9111E-01	6.979E+01%	1.49E+00
RH-106	#A	-5.9285E+00	-5.9285E+00	1.810E+02%	3.60E+01
AG-108M	#A	6.6639E-02	6.6639E-02	1.660E+02%	1.35E+00
AG-110M	#A	5.8053E-01	5.8053E-01	7.495E+01%	2.25E+00
SN-113	#A	5.8011E-01	5.8011E-01	1.426E+02%	2.78E+00
SB-124	#A	3.4900E-01	3.4900E-01	2.366E+02%	2.79E+00
SB-125	#A	1.8919E+00	1.8919E+00	2.939E+01%	4.88E+00
I-131	#A	3.5387E-01	3.5389E-01	1.138E+02%	1.01E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	8.17E+00
Ga-68	#A	2.0163E+01	2.0342E+01	8.798E+01%	3.95E+01
Tc-99m	#A	4.8414E-02	4.8495E-02	1.337E+03%	2.17E+00
BA-133	#A	-7.6712E-01	-7.6712E-01	1.370E+02%	3.52E+00
CS-134	#A	8.8631E-01	8.8631E-01	4.193E+01%	2.86E+00
CS-137	#A	-7.4640E-03	-7.4640E-03	7.158E+03%	1.87E+00
CE-139	#A	5.1269E-01	5.1270E-01	1.008E+02%	1.72E+00
Ba-140	#A	-2.6307E+00	-2.6307E+00	7.269E+01%	5.60E+00
La-140	#A	8.1812E-01	8.1815E-01	8.593E+01%	1.06E+00
CE-141	#A	-8.5816E-01	-8.5817E-01	8.890E+01%	2.54E+00
CE-144	#A	3.1395E+00	3.1395E+00	1.522E+02%	1.59E+01
PM-144	#A	4.4710E-01	4.4710E-01	8.270E+01%	1.49E+00
EU-152	#A	2.1361E+00	2.1361E+00	9.335E+01%	9.62E+00
EU-154	#A	-3.1659E-01	-3.1659E-01	1.282E+03%	1.19E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.14E+01
HF-181	#A	1.1649E-01	1.1650E-01	1.055E+02%	2.77E+00
Ta-182	#A	6.9437E-01	6.9437E-01	1.807E+02%	8.12E+00
Hg-203	#A	-3.7976E-01	-3.7977E-01	1.319E+02%	1.68E+00
TL-208		1.1013E+01	1.1013E+01	6.688E+00%	9.26E-01
pm-146	#A	7.8110E-01	7.8110E-01	8.478E+01%	3.18E+00

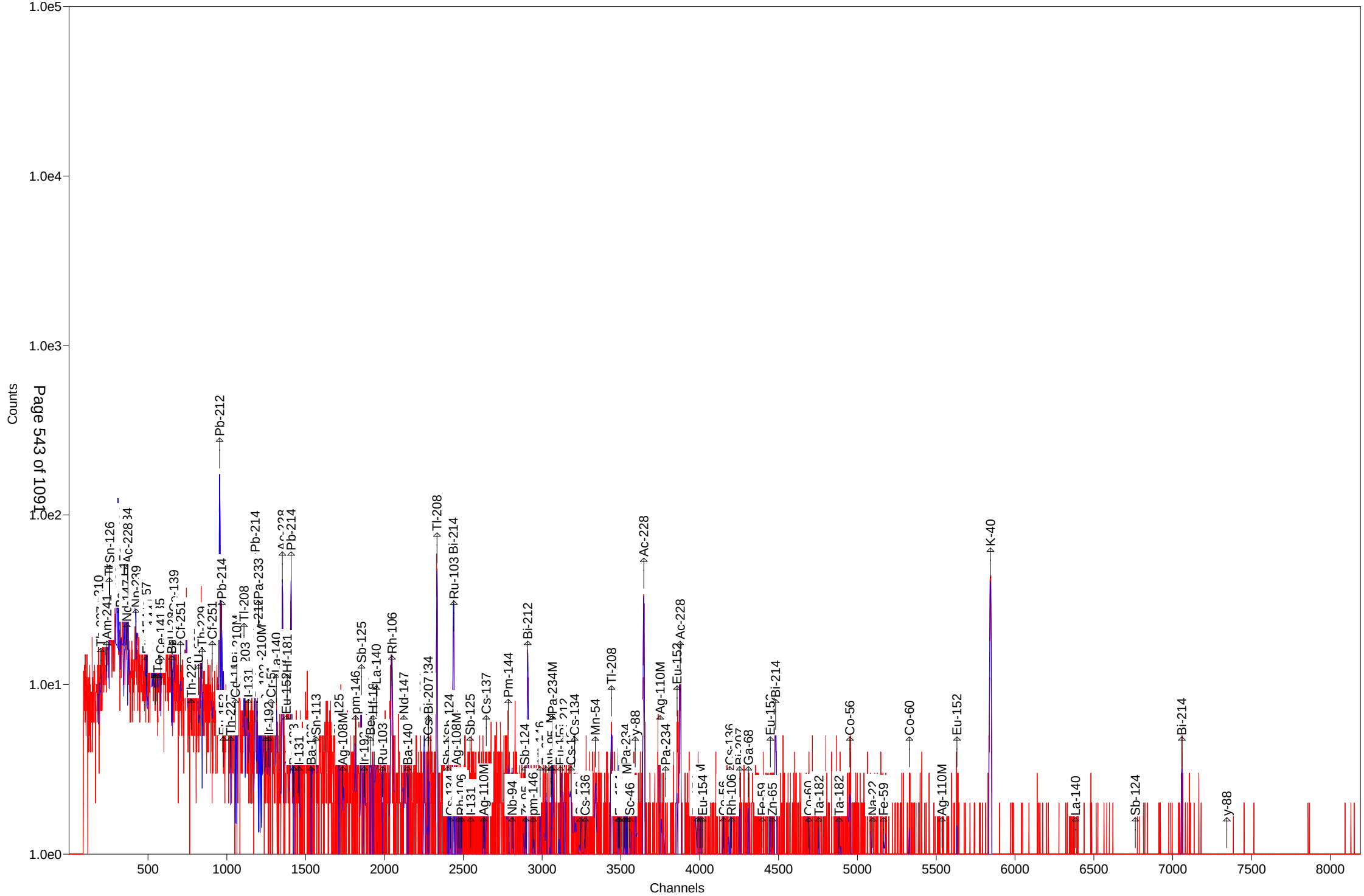
y-88 #A	3.7483E-01	3.7483E-01	4.082E+01%		1.37E+00
Cd-113m#A	-7.8699E+03	-7.8699E+03	8.712E+01%		2.28E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.68E+01
Cf-251 #A	6.8477E-01	6.8477E-01	3.119E+02%		5.51E+00
Cf-249 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.85E+00
Sn-126 A	5.2749E+00	5.2749E+00	1.164E+02%		2.04E+01
PB-210 #A	-8.5126E+00	-8.5126E+00	1.652E+02%		4.82E+01
PB-212	3.2163E+01	3.2163E+01	4.003E+00%		2.11E+00
PB-214	1.2894E+01	1.2894E+01	1.063E+01%		2.52E+00
BI-207 #A	1.2407E-01	1.2407E-01	7.373E+01%		1.38E+00
BI-212	5.2536E+01	5.2536E+01	1.348E+01%		1.15E+01
BI-214	1.4505E+01	1.4505E+01	8.413E+00%		1.78E+00
BI-210M#A	-9.5150E-01	-9.5150E-01	8.909E+01%		2.82E+00
AC-228	3.6910E+01	3.6910E+01	5.990E+00%		3.68E+00
TH-227 #A	-1.0947E+00	-1.0947E+00	6.502E+02%		2.41E+01
TH-229 #A	3.3854E-01	3.3854E-01	2.634E+03%		2.31E+01
TH-234 #A	-1.5604E+01	-1.5604E+01	9.882E+01%		5.23E+01
PA-231 #A	-1.8172E+01	-1.8172E+01	1.460E+02%		8.85E+01
PA-233 #A	1.2082E+00	1.2082E+00	1.740E+02%		7.03E+00
PA-234 #A	2.9185E+00	2.9185E+00	8.785E+01%		9.46E+00
PA-234M#A	3.1695E+01	3.1695E+01	1.119E+02%		2.45E+02
U-235 #A	3.1647E+00	3.1647E+00	1.534E+02%		1.62E+01
AM-241 #A	1.4650E+00	1.4650E+00	1.171E+02%		5.71E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.02E+01
Ir-192 #A	7.5341E-01	7.5342E-01	8.832E+01%		2.98E+00
Cs-136 #A	-1.4111E-02	-1.4111E-02	3.877E+03%		1.92E+00
Np-239 #A	-2.1481E+00	-2.1485E+00	1.708E+02%		1.22E+01
Nd-147 #A	5.8316E-01	5.8319E-01	1.796E+02%		1.01E+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) 3.931E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 3.9308685E+02 Bq/Sample

264540_Gamma_160-18553-A-5-B. 16_Gamma_20162110.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161068

Sample Description: 264540_Gamma_160-18553-A-6-B
Detector: Detector #15
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-6-B

Decay to Time: 9/1/2016 15:07 Live Time: 1800 sec
Acquisition Time: 9/1/2016 15:08:50 Real Time: 1803 sec
Analysis Time: 9/1/2016 15:39 Dead Time: 0.14 %
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	4.931E+00	112.3	5.538E+00	5.544E+00	1.867E+01
NA-22	2.817E-01	225.8	6.361E-01	6.362E-01	2.262E+00
K-40	2.347E+02	6.6	1.539E+01	1.952E+01	1.439E+01
Sc-46	4.524E-01	98.3	4.449E-01	4.455E-01	2.098E+00
CR-51	4.417E+00	156.6	6.918E+00	6.922E+00	2.324E+01
MN-54	5.658E-01	110.8	6.268E-01	6.274E-01	1.476E+00
FE-59	6.083E-01	107.8	6.555E-01	6.562E-01	3.550E+00
Co-56	1.812E+00	36.4	6.601E-01	6.666E-01	1.495E+00
CO-57	-4.911E-01	84.4	4.145E-01	4.153E-01	1.378E+00
CO-58	-9.488E-01	84.8	8.046E-01	8.061E-01	2.693E+00
CO-60	-9.371E-01	114.2	1.070E+00	1.071E+00	2.352E+00
ZN-65	0.000E+00	1.#INF	2.100E-01	2.100E-01	7.038E+00
NB-94	-1.723E-02	3892.3	6.705E-01	6.705E-01	1.612E+00
ZR-95	8.796E-02	1550.6	1.364E+00	1.364E+00	3.258E+00
NB-95	2.544E-01	249.3	6.341E-01	6.342E-01	2.201E+00
RU-103	-3.627E-01	166.1	6.026E-01	6.028E-01	1.460E+00
RH-106	6.098E+00	184.4	1.125E+01	1.125E+01	3.789E+01
AG-108M	-6.957E-01	90.5	6.297E-01	6.307E-01	1.551E+00
AG-110M	1.312E+00	48.4	6.349E-01	6.385E-01	2.854E+00
SN-113	-3.369E-01	344.7	1.161E+00	1.161E+00	2.963E+00
SB-124	6.340E-01	44.7	2.835E-01	2.854E-01	3.512E+00
SB-125	1.120E+00	90.0	1.009E+00	1.011E+00	4.848E+00
I-131	1.556E-01	91.4	1.422E-01	1.424E-01	1.580E+00
Gd-153	-1.821E+00	177.0	3.223E+00	3.225E+00	1.071E+01
Ga-68	2.280E+01	86.6	1.974E+01	1.978E+01	4.559E+01
Tc-99m	1.333E-07	615991967.2	8.209E-01	8.209E-01	2.752E+00
BA-133	-7.665E-01	144.3	1.106E+00	1.107E+00	4.487E+00
CS-134	-9.025E-02	115.8	1.045E-01	1.046E-01	4.049E+00
CS-137	7.570E-01	101.9	7.718E-01	7.728E-01	2.602E+00
CE-139	1.521E-01	324.8	4.939E-01	4.942E-01	1.673E+00
Ba-140	2.235E+00	94.5	2.111E+00	2.115E+00	4.744E+00
La-140	-4.767E-01	108.1	5.152E-01	5.158E-01	2.698E+00
CE-141	8.435E-01	91.9	7.752E-01	7.764E-01	2.583E+00

CE-144	-4.066E+00	152.1	6.185E+00	6.188E+00	2.060E+01
PM-144	-4.397E-01	170.6	7.502E-01	7.506E-01	1.753E+00
EU-152	1.492E+00	92.5	1.381E+00	1.383E+00	1.041E+01
EU-154	9.104E-01	82.2	7.482E-01	7.497E-01	2.105E+01
EU-155	-2.564E+00	181.6	4.657E+00	4.659E+00	1.547E+01
HF-181	1.613E-01	302.4	4.877E-01	4.878E-01	2.593E+00
Ta-182	2.712E+00	93.3	2.530E+00	2.534E+00	8.532E+00
Hg-203	-6.522E-01	86.7	5.656E-01	5.668E-01	1.887E+00
TL-208	9.571E+00	9.2	8.818E-01	1.012E+00	1.244E+00
pm-146	4.384E-01	178.9	7.845E-01	7.848E-01	4.289E+00
y-88	3.323E-01	201.7	6.702E-01	6.704E-01	1.565E+00
Cd-113m	3.468E+03	137.4	4.766E+03	4.771E+03	1.628E+04
Cd-109	0.000E+00	1.#INF	2.587E+01	2.587E+01	8.596E+01
Cf-251	-1.277E+00	200.0	2.554E+00	2.557E+00	6.573E+00
Cf-249	7.109E-01	110.7	7.867E-01	7.876E-01	2.649E+00
Sn-126	2.735E+00	245.0	6.702E+00	6.704E+00	2.248E+01
PB-210	2.895E+01	43.6	1.262E+01	1.274E+01	3.351E+01
PB-212	2.700E+01	4.9	1.311E+00	2.184E+00	2.169E+00
PB-214	2.085E+01	7.6	1.584E+00	1.919E+00	2.693E+00
BI-207	1.668E-01	266.2	4.440E-01	4.441E-01	1.554E+00
BI-212	2.752E+01	21.7	5.984E+00	6.153E+00	1.208E+01
BI-214	1.815E+01	10.1	1.828E+00	2.057E+00	2.705E+00
BI-210M	1.706E-01	408.5	6.968E-01	6.969E-01	2.403E+00
AC-228	2.769E+01	8.3	2.311E+00	2.709E+00	1.813E+00
TH-227	-8.296E+00	110.7	9.182E+00	9.194E+00	3.064E+01
TH-229	2.778E-01	3685.9	1.024E+01	1.024E+01	2.662E+01
TH-234	2.558E+01	40.4	1.033E+01	1.042E+01	3.307E+01
PA-231	0.000E+00	1.#INF	5.047E+00	5.047E+00	8.731E+01
PA-233	8.403E-01	249.4	2.096E+00	2.096E+00	7.055E+00
PA-234	2.662E-01	87.5	2.328E-01	2.332E-01	1.225E+01
PA-234M	8.517E+01	84.0	7.154E+01	7.167E+01	2.669E+02
U-235	-4.961E-01	65.5	3.250E-01	3.259E-01	2.088E+01
AM-241	-5.981E-01	340.0	2.034E+00	2.034E+00	6.827E+00
Np-237	0.000E+00	1.#INF	7.139E+00	7.139E+00	2.373E+01
Ir-192	3.962E-01	95.9	3.800E-01	3.807E-01	2.991E+00
Cs-136	7.060E-01	119.8	8.460E-01	8.470E-01	2.863E+00
Np-239	2.293E+00	183.6	4.210E+00	4.212E+00	1.399E+01
Nd-147	3.088E-01	1278.7	3.949E+00	3.949E+00	9.824E+00
Total	4.037E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-6-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161068.An1

Acquisition information
Start time: 9/1/2016 3:08:50 PM
Live time: 1800
Real time: 1803
Dead time: 0.14 %
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 3:07:00 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. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1598

***** 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	43.	43.61	0.90	1.957E-02	46.54	4.250	PBC<MDA	PB210
63.54	54.	47.57	0.59	2.935E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	1.049E+01	Sn126
74.74	230.	11.82	0.97	3.378E-02				
77.25	391.	7.38	0.97	3.455E-02				
87.22	161.	15.39	1.13	3.692E-02	86.49	13.100	1.856E+01	Np237
					86.54	30.700	7.919E+00	EU155
					86.94	9.040	2.684E+01	Sn126
					87.57	37.500	6.450E+00	Sn126
					88.04	3.790	6.368E+01	Cd109
92.53	35.	65.26	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
106.13	36.	183.60	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
121.78	26.	92.52	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
145.44	26.	91.90	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
162.66	24.	100.71	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	24.	104.75	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	7.	324.80	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
227.00	8.	270.99	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.67	506.	6.14	1.04	2.592E-02	238.63	43.300	2.503E+01	PB212
242.07	82.	21.58	1.12	2.565E-02	242.00	7.430	2.393E+01	PB214
256.24	12.	159.28	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
263.70	9.	137.44	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	4.	408.48	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
277.46	21.	59.06	0.71	2.313E-02	277.28	6.310	PBC<MDA	TL208
284.30	8.	232.29	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.25	144.	12.76	0.97	2.204E-02	295.09	19.300	1.882E+01	PB214
300.19	48.	26.73	1.27	2.177E-02	300.03	3.280	3.735E+01	PB212
					300.07	2.460	4.980E+01	PA231
					300.18	6.200	1.977E+01	PA233
312.43	12.	249.38	1.18	2.112E-02	312.01	36.000	PBC<MDA	PA233
320.08	16.	156.60	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
338.21	120.	14.07	1.10	1.984E-02	338.32	12.010	2.811E+01	AC228
345.83	5.	302.39	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.80	285.	8.25	1.24	1.923E-02	351.93	37.600	2.189E+01	PB214
383.84	15.	104.79	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
387.95	15.	110.66	1.25	1.781E-02	387.95	66.000	PBC<MDA	Cf249
453.88	8.	178.95	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	16.	90.04	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	15.	95.91	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
477.60	14.	112.31	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
487.02	9.	124.54	1.33	1.485E-02	487.02	45.500	PBC<MDA	La140
511.86	106.	20.85	2.60	1.426E-02	511.86	20.000	2.065E+01	RH106
537.26	7.	159.91	1.37	1.371E-02	537.26	24.390	PBC<MDA	Ba140
569.47	12.	93.17	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.307E+00	PA234
					569.70	97.740	5.293E-01	BI207
569.70	4.	266.25	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.987E+00	PA234
					569.70	97.740	1.668E-01	BI207
583.23	187.	9.21	1.29	1.282E-02	583.02	84.500	9.571E+00	TL208
600.50	8.	266.43	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	266.59	1.43	1.247E-02	602.73	98.260	PBC<MDA	SB124
609.37	186.	10.07	1.30	1.236E-02	609.31	46.090	1.815E+01	BI214
					610.30	5.750	1.457E+02	RU103
621.92	13.	184.44	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
635.89	2.	352.54	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
636.97	9.	91.39	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
661.66	13.	101.94	1.47	1.155E-02	661.66	85.210	PBC<MDA	CS137
723.36	6.	216.95	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.327E-01	AG108M
					723.36	20.220	1.496E+00	EU154
727.58	40.	21.74	1.29	1.067E-02	727.17	7.550	2.752E+01	BI212
735.72	5.	229.83	1.53	1.056E-02	735.72	22.500	PBC<MDA	pm146
765.79	5.	249.28	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.639E+01	PA234M
766.41	9.	89.55	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.730E+02	PA234M
785.80	12.	49.53	2.34	9.998E-03	785.42	1.280	PBC<MDA	BI212
795.87	3.	348.01	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
801.95	9.	116.15	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
818.50	12.	119.83	1.59	9.655E-03	818.50	100.000	PBC<MDA	Cs136
834.85	10.	110.78	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
846.77	5.	224.40	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.78	10.	131.21	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
898.04	5.	201.66	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
911.36	127.	9.00	1.11	8.811E-03	911.07	29.000	2.751E+01	AC228
946.02	2.	336.20	1.68	8.531E-03	946.02	13.400	PBC<MDA	PA234
964.11	10.	153.12	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
969.25	92.	11.36	1.06	8.357E-03	968.97	17.460	3.489E+01	AC228
996.33	10.	82.19	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1001.00	7.	142.13	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	8.	88.97	1.75	7.875E-03	1037.84	14.130	PBC<MDA	Co56
1077.40	9.	86.58	1.77	7.623E-03	1077.40	3.300	PBC<MDA	Ga68
1120.30	12.	93.39	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	13.	98.35	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.459E-01	Sc46
					1121.30	34.900	2.711E+00	Ta182
1121.32	13.	93.29	1.80	7.362E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.712E+00	Ta182
1221.37	-1.	342.22	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	29.	36.44	1.88	6.748E-03	1238.28	66.070	3.613E+00	Co56
1274.53	3.	225.83	1.90	6.579E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.999E-01	EU154
1291.60	7.	107.76	1.91	6.502E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	14.	48.39	1.97	6.114E-03	1384.30	24.290	PBC<MDA	AG110M
1460.97	263.	6.56	1.85	5.828E-03	1460.83	10.670	2.347E+02	K40
1690.98	5.	44.72	2.14	5.109E-03	1690.98	47.790	PBC<MDA	SB124
1764.46	42.	16.40	2.18	4.916E-03	1764.49	15.400	3.101E+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	
298.55	74.72	254.	230.	6.806E+03	11.82	0.972	-	D
308.59	77.23	220.	391.	1.130E+04	7.38	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	185.62	46.49	104.	43.	0.024	43.61	0.899
TH-227	200.23	50.14	407.	-26.	-0.015	110.69	0.950s
AM-241	237.79	59.54	642.	-11.	-0.006	340.02	0.958s
TH-234	252.78	63.29	186.	51.	0.028	40.40	0.962D
Sn-126	256.75	64.28	597.	14.	0.008	245.05	0.963s
BA-133	323.54	80.99	1471.	-19.	-0.010	112.04	0.978
Np-237	345.53	86.49	1900.	0.	0.000	187.93	0.983A
EU-155	345.74	86.54	2258.	-37.	-0.021	181.08	0.983s
Sn-126	347.33	86.94	2158.	16.	0.009	146.99	0.984D
Sn-126	349.84	87.57	2014.	68.	0.038	33.78	0.984D
Cd-109	351.72	88.04	2121.	0.	0.000	175.30	0.985A
Nd-147	363.95	91.10	2051.	-37.	-0.021	171.93	0.987s
TH-234	369.91	92.59	242.	35.	0.019	65.26	0.989D
AC-228	372.95	93.35	2165.	-38.	-0.021	176.21	0.990s
Gd-153	389.54	97.50	2202.	-38.	-0.021	177.02	0.993s
Np-239	397.53	99.50	2240.	-38.	-0.021	178.19	0.995s
Gd-153	412.32	103.20	2277.	-38.	-0.021	179.09	0.998s
Np-239	414.32	103.70	2315.	-38.	-0.021	180.48	0.999s
EU-155	420.77	105.31	2353.	-38.	-0.021	181.65	1.001s
Np-239	424.03	106.13	2205.	36.	0.020	183.60	1.001s
EU-152	486.57	121.78	280.	26.	0.015	92.52	1.016
CO-57	487.72	122.06	287.	-29.	-0.016	84.39	1.016s
EU-154	491.87	123.10	300.	-7.	-0.004	337.34	1.017s
PA-234	524.63	131.29	998.	-30.	-0.017	148.03	1.024s
HF-181	531.54	133.02	1028.	-30.	-0.017	150.01	1.026s
CE-144	533.60	133.54	1059.	-30.	-0.017	152.11	1.026s
HF-181	544.63	136.30	1089.	-15.	-0.009	305.17	1.029s
U-235	574.56	143.79	998.	-31.	-0.017	78.67	1.036s
CE-141	581.17	145.44	283.	26.	0.015	91.90	1.037
Ba-140	650.01	162.66	273.	24.	0.013	100.71	1.053s
U-235	652.88	163.38	297.	24.	0.013	104.75	1.053
CE-139	662.77	165.85	287.	7.	0.004	324.80	1.055s
Cf-251	705.73	176.60	180.	-13.	-0.007	199.96	1.065
U-235	820.60	205.33	154.	0.	0.000	1000.00	1.091s
TH-229	842.65	210.85	220.	-10.	-0.006	279.28	1.096s
Cf-251	907.22	227.00	132.	8.	0.004	270.99	1.110s
PB-212	953.72	238.63	78.	545.	0.303	4.85	1.120D
PB-214	967.17	242.00	116.	82.	0.046	21.58	1.123D
EU-152	977.95	244.69	980.	-26.	-0.014	171.73	1.126s
TH-227	1024.12	256.24	95.	12.	0.006	159.28	1.136s
Cd-113m	1053.94	263.70	72.	9.	0.005	137.44	1.142
BI-210M	1062.46	265.83	110.	4.	0.002	408.48	1.144s
TL-208	1108.95	277.46	44.	21.	0.012	59.06	0.709s
Hg-203	1115.91	279.20	171.	-22.	-0.012	86.72	1.156s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.30	284.30	88.	8.	0.004	232.29	1.160
PB-214	1180.08	295.25	49.	144.	0.080	12.76	0.972s
PB-212	1199.81	300.19	35.	48.	0.027	26.73	1.269
PA-231	1199.35	300.07	434.	-17.	-0.009	174.99	1.174
PA-233	1199.79	300.18	417.	0.	0.000	1000.00	1.174
PA-231	1209.66	302.65	417.	0.	0.000	1000.00	1.176s
BA-133	1210.47	302.85	417.	0.	0.000	1000.00	1.176s
Ba-140	1218.46	304.85	417.	0.	0.000	1000.00	1.178s
BI-210M	1218.64	304.90	417.	0.	0.000	1000.00	1.178s
Ir-192	1232.81	308.44	417.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	406.	12.	0.006	249.38	1.184s
Ir-192	1265.00	316.49	417.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	320.	16.	0.009	156.60	1.191s
La-140	1314.06	328.76	423.	-13.	-0.007	205.33	1.199s
Cf-249	1332.77	333.44	410.	0.	0.000	1000.00	1.203
AC-228	1351.82	338.21	34.	120.	0.067	14.07	1.096
Cs-136	1361.28	340.57	410.	0.	0.000	1000.00	1.209s
HF-181	1382.30	345.83	69.	5.	0.003	302.39	1.213s
PB-214	1406.19	351.80	48.	285.	0.158	8.25	1.242s
BA-133	1422.97	356.00	396.	-16.	-0.009	144.27	1.222s
I-131	1456.89	364.48	76.	-15.	-0.009	152.17	1.229s
BA-133	1534.29	383.84	116.	15.	0.008	104.79	1.246s
Cf-249	1550.72	387.95	131.	15.	0.008	110.66	1.249s
SN-113	1565.67	391.69	153.	-7.	-0.004	344.66	1.253s
SB-125	1710.36	427.88	73.	-8.	-0.004	293.01	1.283s
AG-108M	1734.60	433.94	68.	-18.	-0.010	90.52	1.288s
pm-146	1814.35	453.88	43.	8.	0.004	178.95	1.304s
SB-125	1852.29	463.37	92.	16.	0.009	90.04	1.312s
Ir-192	1871.05	468.06	98.	15.	0.008	95.91	1.316s
BE-7	1909.18	477.60	118.	14.	0.008	112.31	1.324s
HF-181	1926.79	482.00	132.	0.	0.000	1000.00	1.328s
La-140	1946.87	487.02	58.	9.	0.005	124.54	1.332s
RU-103	1987.00	497.05	48.	-9.	-0.005	166.12	1.340s
RH-106	2046.22	511.86	56.	106.	0.059	20.85	2.602s
Ba-140	2147.78	537.26	31.	7.	0.004	159.91	1.373
CS-134	2251.67	563.24	52.	-7.	-0.004	213.65	1.394s
CS-134	2276.00	569.32	61.	-9.	-0.005	131.56	1.399s
PA-234	2276.59	569.47	58.	12.	0.007	93.17	1.399s
BI-207	2277.52	569.70	50.	4.	0.002	266.25	1.399s
TL-208	2331.62	583.23	21.	187.	0.104	9.21	1.286
SB-125	2400.69	600.50	249.	8.	0.005	266.43	1.424s
SB-124	2409.62	602.73	257.	9.	0.005	266.59	1.425s
CS-134	2417.53	604.71	339.	-13.	-0.007	200.32	1.427s
BI-214	2436.18	609.37	29.	186.	0.103	10.07	1.297s
RU-103	2439.88	610.30	326.	-13.	-0.007	195.89	1.431s
AG-108M	2455.81	614.28	313.	-7.	-0.004	375.29	1.435s
PM-144	2470.93	618.06	314.	-14.	-0.008	131.80	1.437s
RH-106	2486.35	621.92	292.	13.	0.007	184.44	1.440s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2542.23	635.89	33.	2.	0.001	352.54	1.451s
I-131	2546.57	636.97	28.	9.	0.005	91.39	1.452s
AG-110M	2629.71	657.76	86.	-14.	-0.008	97.42	1.469s
CS-137	2645.30	661.66	87.	13.	0.007	101.94	1.472s
PM-144	2784.82	696.54	47.	-9.	-0.005	170.62	1.499s
SB-124	2889.79	722.79	95.	-8.	-0.005	166.90	1.519s
AG-108M	2890.40	722.94	87.	0.	0.000	1000.00	1.519s
EU-154	2892.07	723.36	77.	6.	0.003	216.95	1.519s
ZR-95	2895.44	724.20	87.	-5.	-0.003	254.36	1.520s
BI-212	2908.96	727.58	10.	40.	0.022	21.74	1.287
pm-146	2941.53	735.72	28.	5.	0.003	229.83	1.529s
AG-110M	3054.42	763.94	54.	-16.	-0.009	69.60	1.550s
NB-95	3061.80	765.79	65.	5.	0.003	249.28	1.551s
PA-234M	3064.30	766.41	30.	9.	0.005	89.55	1.552s
EU-152	3114.33	778.92	56.	-19.	-0.010	87.53	1.561s
BI-212	3141.86	785.80	7.	12.	0.007	49.53	2.336s
CS-134	3182.12	795.87	53.	3.	0.002	348.01	1.574s
CS-134	3206.46	801.95	46.	9.	0.005	116.15	1.578s
CO-58	3241.75	810.78	90.	-17.	-0.009	84.80	1.585s
La-140	3261.74	815.77	107.	-17.	-0.009	91.45	1.589s
Cs-136	3272.66	818.50	102.	12.	0.007	119.83	1.591s
MN-54	3338.05	834.85	23.	10.	0.005	110.78	1.603s
Co-56	3385.75	846.77	23.	5.	0.003	224.40	1.612s
TL-208	3440.93	860.56	38.	10.	0.006	131.21	1.622s
NB-94	3483.06	871.10	49.	-14.	-0.008	74.16	1.629s
EU-154	3491.60	873.23	73.	-8.	-0.005	151.87	1.631s
PA-234	3520.80	880.53	43.	-2.	-0.001	559.64	1.636s
PA-234	3531.64	883.24	44.	0.	0.000	1000.00	1.638s
AG-110M	3537.42	884.68	44.	0.	0.000	1000.00	1.639s
y-88	3590.85	898.04	20.	5.	0.003	201.66	1.649s
AC-228	3644.12	911.36	1.	127.	0.070	9.00	1.112s
AG-110M	3748.69	937.49	50.	-18.	-0.010	87.46	1.677s
PA-234	3782.81	946.02	11.	2.	0.001	336.20	1.683s
EU-152	3855.18	964.11	117.	10.	0.006	153.12	1.696s
AC-228	3875.75	969.25	4.	92.	0.051	11.36	1.062s
EU-154	3984.09	996.33	31.	10.	0.006	82.19	1.718s
PA-234M	4002.77	1001.00	41.	7.	0.004	142.13	1.722
EU-154	4017.88	1004.77	49.	0.	0.000	1000.00	1.724s
Co-56	4150.18	1037.84	10.	8.	0.005	88.97	1.747s
Cs-136	4191.11	1048.07	38.	-7.	-0.004	130.15	1.754s
RH-106	4200.27	1050.36	66.	-18.	-0.010	42.43	1.755s
BI-207	4253.49	1063.66	26.	-8.	-0.004	101.89	1.765
Ga-68	4308.47	1077.40	10.	9.	0.005	86.58	1.774
EU-152	4447.22	1112.07	101.	-9.	-0.005	163.38	1.797s
ZN-65	4461.11	1115.55	92.	0.	0.000	1000.00	1.800s
BI-214	4480.08	1120.29	58.	12.	0.007	93.39	1.803
Sc-46	4481.13	1120.55	70.	13.	0.007	98.35	1.803
Ta-182	4484.13	1121.30	62.	13.	0.007	93.29	1.803s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4691.97	1173.24	22.	-2.	-0.001	639.64	1.838s
Ta-182	4884.75	1221.41	33.	-1.	0.000	342.22	1.869s
Co-56	4952.26	1238.28	16.	29.	0.016	36.44	1.879s
NA-22	5097.34	1274.53	27.	3.	0.002	225.83	1.902
EU-154	5097.40	1274.54	30.	0.	0.000	1000.00	1.902
FE-59	5165.64	1291.60	11.	7.	0.004	107.76	1.913s
CO-60	5329.36	1332.50	27.	-11.	-0.006	114.22	1.938s
AG-110M	5536.68	1384.30	6.	14.	0.008	48.39	1.970s
EU-152	5631.56	1408.00	28.	-13.	-0.007	97.55	1.984s
K-40	5843.59	1460.97	8.	263.	0.146	6.56	1.851
La-140	6384.98	1596.21	23.	-10.	-0.005	176.70	2.092s
SB-124	6764.43	1690.98	0.	5.	0.003	44.72	2.142s
BI-214	7058.76	1764.49	3.	42.	0.023	16.40	2.181
Co-56	7086.23	1771.35	45.	0.	0.000	1000.00	2.184s
y-88	7345.35	1836.06	12.	-5.	-0.003	135.52	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	4.9310E+00				5.31E+01	
			477.60	4.931E+00	&(P	1.867E+01 1.12E+02 1.05E+01	G
NA-22	C	2.8165E-01				9.50E+02	
			1274.53	2.817E-01	?(	2.262E+00 2.26E+02 9.99E+01	G
K-40	N	2.3473E+02				4.66E+11	
			1460.83	2.347E+02	(P	1.439E+01 6.56E+00 1.07E+01	G
Sc-46	F	4.5235E-01				8.38E+01	
			889.28	-4.118E-02	%(	2.098E+00 1.43E+03 1.00E+02	G
			1120.55	9.459E-01	(	3.141E+00 9.83E+01 1.00E+02	G
CR-51	F	4.4174E+00				2.77E+01	
			320.08	4.417E+00	&(P	2.324E+01 1.57E+02 9.94E+00	G
MN-54	C	5.6579E-01				3.12E+02	
			834.85	5.658E-01	?(	1.476E+00 1.11E+02 1.00E+02	G
FE-59	F	6.0830E-01				4.45E+01	
			1099.25	-3.562E-02	%(P	3.550E+00 4.34E+03 5.65E+01	G
			1291.60	1.450E+00	?(	3.546E+00 1.08E+02 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	1.8115E+00					7.73E+01	
			846.77	2.766E-01	?(	1.495E+00	2.24E+02	9.99E+01 G
			1238.28	3.613E+00	?(	2.660E+00	3.64E+01	6.61E+01 G
			1037.84	4.242E+00	?(P	8.746E+00	8.90E+01	1.41E+01 G
			1771.35	0.000E+00	-	2.489E+01	1.00E+03	1.55E+01 A
CO-57	C	-4.9110E-01					2.72E+02	
			122.06	-4.911E-01	&(	1.378E+00	8.44E+01	8.56E+01 G
			136.47	-1.066E-06	&	2.201E+01	6.16E+08	1.07E+01 G
CO-58	C	-9.4879E-01					7.09E+01	
			810.78	-9.488E-01	?(	2.693E+00	8.48E+01	9.95E+01 G
CO-60	F	-9.3710E-01					1.93E+03	
			1332.50	-9.371E-01	?(	2.352E+00	1.14E+02	1.00E+02 G
			1173.24	-1.394E-01	+ P	1.922E+00	6.40E+02	9.99E+01 G
NB-94	I	-1.7226E-02					7.41E+06	
			702.63	-1.723E-02	%(	1.612E+00	3.89E+03	9.79E+01 G
			871.10	-8.706E-01	&	2.153E+00	7.42E+01	9.99E+01 G
ZR-95	I	8.7961E-02					6.40E+01	
			756.73	8.796E-02	&(P	3.258E+00	1.55E+03	5.45E+01 G
			724.20	-6.352E-01	& P	5.439E+00	2.54E+02	4.42E+01 G
NB-95	I	2.5436E-01					6.40E+01	
			765.79	2.544E-01	&(	2.201E+00	2.49E+02	9.98E+01 G
RU-103	I	-3.6272E-01					3.93E+01	
			497.05	-3.627E-01	?(	1.460E+00	1.66E+02	9.09E+01 G
			610.30	-1.030E+01	+	6.796E+01	1.96E+02	5.75E+00 GA
RH-106	I	6.0976E+00					3.74E+02	
			621.92	6.098E+00	?(	3.789E+01	1.84E+02	9.93E+00 G
			1050.36	-8.238E+01	+ P	1.854E+02	4.24E+01	1.56E+00 G
			511.86	2.065E+01	?	7.321E+00	2.09E+01	2.00E+01 GA
AG-108M	C	-6.9567E-01					1.53E+05	
			433.94	-6.957E-01	?(	1.551E+00	9.05E+01	9.05E+01 G
			722.94	0.000E+00	+	2.634E+00	1.00E+03	9.08E+01 G
			614.28	-3.373E-01	+	4.286E+00	3.75E+02	8.98E+01 G
AG-110M	F	1.3121E+00					2.50E+02	
			884.68	0.000E+00	?(	2.854E+00	1.00E+03	7.27E+01 G
			657.76	-7.083E-01	+	2.324E+00	9.74E+01	9.46E+01 G
			937.49	-3.468E+00	+	6.706E+00	8.75E+01	3.44E+01 G
			1384.30	5.238E+00	?(P	5.282E+00	4.84E+01	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	-3.898E+00	+	9.003E+00	6.96E+01	2.23E+01 G
SN-113	F	-3.3695E-01					1.15E+02	
			391.69	-3.369E-01	?(P	2.963E+00	3.45E+02	6.40E+01 G
SB-124	F	6.3398E-01					6.02E+01	
			602.73	3.890E-01	?(	3.512E+00	2.67E+02	9.83E+01 G
			1690.98	1.138E+00	?(	1.677E+00	4.47E+01	4.78E+01 G
			722.79	-3.936E+00	+ P	2.309E+01	1.67E+02	1.08E+01 G
SB-125	I	1.1205E+00					1.01E+03	
			427.88	-9.217E-01	?(P	4.848E+00	2.93E+02	2.96E+01 G
			600.50	2.100E+00	?(P	1.895E+01	2.66E+02	1.79E+01 G
			635.89	9.605E-01	?(	1.208E+01	3.53E+02	1.13E+01 G
			463.37	5.395E+00	(P	1.628E+01	9.00E+01	1.05E+01 G
I-131	I	1.5555E-01					8.02E+00	
			364.48	-5.630E-01	?(P	1.580E+00	1.52E+02	8.17E+01 G
			284.30	3.191E+00	(	1.852E+01	2.32E+02	6.14E+00 G
			636.97	5.744E+00	?(	1.785E+01	9.14E+01	7.17E+00 G
Gd-153	F	-1.8207E+00					2.42E+02	
			97.50	-1.821E+00	?(	1.071E+01	1.77E+02	3.00E+01 G
			103.20	-2.493E+00	&	1.483E+01	1.79E+02	2.18E+01 G
Ga-68	C	2.2800E+01					4.71E-02	
			1077.40	2.280E+01	?(	4.559E+01	8.66E+01	3.30E+00 G
Tc-99m	I	1.3327E-07					2.51E-01	
			140.51	1.333E-07	&(	2.752E+00	6.16E+08	8.93E+01 G
BA-133	F	-7.6653E-01					3.85E+03	
			356.00	-7.665E-01	?(P	4.487E+00	1.44E+02	6.20E+01 G
			302.85	0.000E+00	+	1.373E+01	1.00E+03	1.83E+01 G
			383.84	5.189E+00	?	1.830E+01	1.05E+02	8.94E+00 GA
			80.99	-8.508E-01	& P	8.318E+00	1.12E+02	3.41E+01 GA
CS-134	I	-9.0249E-02					7.54E+02	
			604.71	-6.004E-01	?(	4.049E+00	2.00E+02	9.76E+01 G
			795.87	1.971E-01	+	2.407E+00	3.48E+02	8.55E+01 G
			569.32	-2.395E+00	+	1.078E+01	1.32E+02	1.54E+01 G
			801.95	5.640E+00	&(	2.241E+01	1.16E+02	8.69E+00 G
			563.24	-3.531E+00	+	1.832E+01	2.14E+02	8.35E+00 G
CS-137	I	7.5705E-01					1.10E+04	
			661.66	7.570E-01	?(P	2.602E+00	1.02E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.5208E-01					1.38E+02	
			165.85	1.521E-01	&(	1.673E+00	3.25E+02	7.99E+01 G
Ba-140	I	2.2346E+00					1.28E+01	
			537.26	1.206E+00	?(P	4.744E+00	1.60E+02	2.44E+01 G
			162.66	6.268E+00	&(	2.108E+01	1.01E+02	6.22E+00 G
			304.85	0.000E+00	-	5.895E+01	1.00E+03	4.29E+00 G
La-140	I	-4.7665E-01					1.28E+01	
			1596.21	-1.055E+00	?(P	2.698E+00	1.77E+02	9.54E+01 G
			487.02	7.368E-01	(P	3.133E+00	1.25E+02	4.55E+01 G
			328.76	-1.688E+00	+ P	1.329E+01	2.05E+02	2.03E+01 G
			815.77	-4.085E+00	+	1.252E+01	9.14E+01	2.33E+01 G
CE-141	I	8.4349E-01					3.25E+01	
			145.44	8.435E-01	?(	2.583E+00	9.19E+01	4.82E+01 G
CE-144	I	-4.0657E+00					2.85E+02	
			133.54	-4.066E+00	@(	2.060E+01	1.52E+02	1.11E+01 G
PM-144	C	-4.3970E-01					3.63E+02	
			696.54	-4.397E-01	?(	1.753E+00	1.71E+02	9.90E+01 G
			618.06	-6.534E-01	+ P	3.913E+00	1.32E+02	9.91E+01 G
EU-152	F	1.4924E+00					4.94E+03	
			344.29	-5.374E-02	%(P	1.041E+01	5.13E+03	2.65E+01 G
			1112.07	-4.878E+00	+	2.719E+01	1.63E+02	1.36E+01 G
			121.78	1.323E+00	&(P	4.078E+00	9.25E+01	2.86E+01 G
			778.92	-8.017E+00	+	1.603E+01	8.75E+01	1.29E+01 G
			964.11	4.629E+00	?(	2.409E+01	1.53E+02	1.46E+01 G
			244.69	-7.477E+00	+	4.281E+01	1.72E+02	7.58E+00 G
			1408.00	-5.856E+00	+	1.208E+01	9.75E+01	2.10E+01 GA
EU-154	I	9.1043E-01					3.14E+03	
			873.23	-4.047E+00	?(	2.105E+01	1.52E+02	1.23E+01 G
			123.10	-2.590E-01	+	2.958E+00	3.37E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.775E+00	1.00E+03	3.52E+01 G
			723.36	1.496E+00	+	1.119E+01	2.17E+02	2.02E+01 G
			1004.77	0.000E+00	&	1.346E+01	1.00E+03	1.80E+01 G
			996.33	6.649E+00	?(	1.841E+01	8.22E+01	1.06E+01 G
EU-155	I	-2.5640E+00					1.81E+03	
			105.31	-2.564E+00	(	1.547E+01	1.82E+02	2.12E+01 G
			86.54	-1.833E+00	+	1.103E+01	1.81E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	1.6129E-01					4.24E+01	
			482.00	0.000E+00	?(	2.593E+00	1.00E+03	8.05E+01 G
			133.02	-1.039E+00	+	5.193E+00	1.50E+02	4.33E+01 G
			345.83	1.023E+00	?(P	7.811E+00	3.02E+02	1.51E+01 G
			136.30	-3.912E+00	+	3.989E+01	3.05E+02	5.85E+00 G
Ta-182	F	2.7122E+00					1.14E+02	
			1121.30	2.712E+00	?(	8.532E+00	9.33E+01	3.49E+01 G
			1221.41	-1.786E-01	- P	8.831E+00	3.42E+02	2.70E+01 G
			1189.05	3.269E-01	&	1.188E+01	1.58E+03	1.62E+01 G
Hg-203	F	-6.5221E-01					4.66E+01	
			279.20	-6.522E-01	?(	1.887E+00	8.67E+01	8.15E+01 G
TL-208	N	9.5705E+00					6.98E+02	
			583.02	9.571E+00	(P	1.244E+00	9.21E+00	8.45E+01 G
			277.28	7.981E+00	- P	1.280E+01	5.91E+01	6.31E+00 G
			860.56	4.934E+00	- P	1.516E+01	1.31E+02	1.24E+01 G
pm-146	C	4.3838E-01					2.02E+03	
			747.16	-1.327E-03	%(P	4.289E+00	1.35E+05	3.40E+01 G
			735.72	1.165E+00	?(P	6.398E+00	2.30E+02	2.25E+01 G
			453.88	4.170E-01	?(	1.816E+00	1.79E+02	6.50E+01 G
y-88	F	3.3232E-01					1.07E+02	
			898.04	3.323E-01	?(	1.565E+00	2.02E+02	9.37E+01 G
			1836.06	-6.060E-01	+ P	2.237E+00	1.36E+02	9.92E+01 G
Cd-113m		3.4678E+03					5.33E+03	
			263.70	3.468E+03	?(	1.628E+04	1.37E+02	6.00E-03 K
Cf-251	T	-1.2775E+00					3.28E+05	
			176.60	-1.277E+00	?(	6.573E+00	2.00E+02	1.70E+01 G
			227.00	2.622E+00	?	1.843E+01	2.71E+02	6.30E+00 GA
Cf-249	T	7.1092E-01					1.28E+05	
			387.95	7.109E-01	?(	2.649E+00	1.11E+02	6.60E+01 G
			333.44	0.000E+00	-	1.734E+01	1.00E+03	1.55E+01 G
Sn-126		2.7351E+00					3.65E+07	
			87.57	2.735E+00	}	8.487E+00	3.38E+01	3.75E+01 GA
			64.28	2.735E+00	?(	2.248E+01	2.45E+02	9.70E+00 G
			86.94	2.735E+00	}	3.654E+01	1.47E+02	9.04E+00 GA
PB-210	N	2.8947E+01					8.14E+03	
			46.54	2.895E+01	(P	3.351E+01	4.36E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.7003E+01					6.98E+02	
			238.63	2.700E+01	(	2.169E+00	4.85E+00	4.33E+01 G
			300.03	3.735E+01	+	2.356E+01	2.67E+01	3.28E+00 GA
PB-214	N	2.0849E+01					5.84E+05	
			351.93	2.189E+01	@(P	2.693E+00	8.25E+00	3.76E+01 G
			295.09	1.882E+01	@(P	4.605E+00	1.28E+01	1.93E+01 G
			242.00	2.393E+01		1.542E+01	2.16E+01	7.43E+00 GA
BI-207	C	1.6676E-01					1.18E+04	
			569.70	1.668E-01	(	1.554E+00	2.66E+02	9.77E+01 G
			1063.66	-7.353E-01	+ P	2.543E+00	1.02E+02	7.45E+01 G
BI-212	N	2.7524E+01					6.98E+02	
			727.17	2.752E+01	(P	1.208E+01	2.17E+01	7.55E+00 G
			785.42	5.209E+01	+	6.529E+01	4.95E+01	1.28E+00 GA
BI-214	N	1.8150E+01					5.84E+05	
			609.31	1.815E+01	@(P	2.705E+00	1.01E+01	4.61E+01 G
			1120.29	6.043E+00	- P	1.903E+01	9.34E+01	1.51E+01 G
			1764.49	3.101E+01	+ P	7.660E+00	1.64E+01	1.54E+01 G
BI-210M	T	1.7058E-01					1.10E+09	
			265.83	1.706E-01	&(	2.403E+00	4.08E+02	5.00E+01 G
			304.90	0.000E+00	-	9.032E+00	1.00E+03	2.80E+01 G
AC-228	N	2.7687E+01					2.10E+03	
			911.07	2.751E+01	*(P	1.813E+00	9.00E+00	2.90E+01 G
			968.97	3.489E+01	+ P	4.743E+00	1.14E+01	1.75E+01 G
			338.32	2.811E+01	(	7.017E+00	1.41E+01	1.20E+01 G
			93.35	-9.897E+00	-	5.794E+01	1.76E+02	5.56E+00 XA
TH-227	N	-8.2960E+00					7.95E+03	
			50.14	-8.296E+00	?(	3.064E+01	1.11E+02	8.00E+00 G
			256.24	3.770E+00	+	1.558E+01	1.59E+02	7.00E+00 G
TH-229	N	2.7780E-01					2.68E+06	
			193.51	2.778E-01	%(	2.662E+01	3.69E+03	4.40E+00 G
			210.85	-6.534E+00	&	4.694E+01	2.79E+02	2.99E+00 G
TH-234	N	2.5579E+01					1.63E+12	
			63.29	2.558E+01	(P	3.307E+01	4.04E+01	3.81E+00 G
			92.59	9.242E+00	- P	1.980E+01	6.53E+01	5.58E+00 G
PA-233	C	8.4033E-01					7.82E+08	
			312.01	8.403E-01	?(	7.055E+00	2.49E+02	3.60E+01 G
			300.18	0.000E+00	-	4.030E+01	1.00E+03	6.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	2.6618E-01					1.63E+12	
			131.29	-2.486E+00	?(	1.225E+01	1.48E+02	1.80E+01 G
			946.02	1.046E+00	+ P	8.776E+00	3.36E+02	1.34E+01 G
			569.47	6.307E+00	(	1.983E+01	9.32E+01	8.20E+00 G
			883.24	0.000E+00	-	2.158E+01	1.00E+03	9.60E+00 G
			880.53	-1.701E+00	+	3.383E+01	5.60E+02	6.00E+00 GA
PA-234M	N	8.5171E+01					1.63E+12	
			1001.00	5.433E+01	?(	2.669E+02	1.42E+02	8.37E-01 G
			766.41	1.730E+02	?(	5.253E+02	8.95E+01	2.94E-01 G
U-235	N	-4.9611E-01					2.57E+11	
			143.79	-4.296E+00	?(P	2.088E+01	7.87E+01	1.10E+01 G
			205.33	0.000E+00	+	2.315E+01	1.00E+03	5.01E+00 G
			163.38	7.703E+00	?(	2.695E+01	1.05E+02	5.08E+00 G
AM-241	T	-5.9809E-01					1.58E+05	
			59.54	-5.981E-01	&(	6.827E+00	3.40E+02	3.59E+01 G
Ir-192	F	3.9618E-01					7.40E+01	
			316.49	0.000E+00	?(	2.991E+00	1.00E+03	8.70E+01 G
			468.06	1.063E+00	(	3.425E+00	9.59E+01	5.18E+01 G
			308.44	0.000E+00	-	8.037E+00	1.00E+03	3.18E+01 G
Cs-136	F	7.0603E-01					1.30E+01	
			818.50	7.060E-01	&(	2.863E+00	1.20E+02	1.00E+02 G
			1048.07	-6.226E-01	+	2.796E+00	1.30E+02	8.00E+01 G
			340.57	0.000E+00	-	5.829E+00	1.00E+03	4.69E+01 G
Np-239	T	2.2928E+00					2.36E+00	
			103.70	-2.265E+00	&	1.358E+01	1.80E+02	2.40E+01 X
			106.13	2.293E+00	&(	1.399E+01	1.84E+02	2.27E+01 G
			99.50	-3.634E+00	+	2.151E+01	1.78E+02	1.50E+01 X
Nd-147		3.0881E-01					1.11E+01	
			531.00	3.088E-01	%(	9.824E+00	1.28E+03	1.30E+01 G
			91.10	-1.957E+00	+	1.118E+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 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	407.	-26.	-0.015	110.69	-8.296E+00	
AM-241	59.54	642.	-11.	-0.006	340.02	-5.981E-01	
BA-133	80.99	1471.	-19.	-0.010	112.04	-8.508E-01	P
EU-155	86.54	2258.	-37.	-0.021	181.08	-1.833E+00	
Nd-147	91.10	2051.	-37.	-0.021	171.93	-1.957E+00	
Gd-153	97.50	2202.	-38.	-0.021	177.02	-1.821E+00	
Np-239	99.50	2240.	-38.	-0.021	178.19	-3.634E+00	
Gd-153	103.20	2277.	-38.	-0.021	179.09	-2.493E+00	
Np-239	103.70	2315.	-38.	-0.021	180.48	-2.265E+00	
EU-155	105.31	2353.	-38.	-0.021	181.65	-2.564E+00	
Np-239	106.13	2205.	36.	0.020	183.60	2.293E+00	
EU-152	121.78	280.	26.	0.015	92.52	1.323E+00	P
CO-57	122.06	287.	-29.	-0.016	84.39	-4.911E-01	
EU-154	123.10	300.	-7.	-0.004	337.34	-2.590E-01	
PA-234	131.29	998.	-30.	-0.017	148.03	-2.486E+00	
HF-181	133.02	1028.	-30.	-0.017	150.01	-1.039E+00	
CE-144	133.54	1059.	-30.	-0.017	152.11	-4.066E+00	
HF-181	136.30	1089.	-15.	-0.009	305.17	-3.912E+00	
U-235	143.79	998.	-31.	-0.017	78.67	-4.296E+00	P
CE-141	145.44	283.	26.	0.015	91.90	8.435E-01	
Ba-140	162.66	273.	24.	0.013	100.71	6.268E+00	
U-235	163.38	297.	24.	0.013	104.75	7.703E+00	
CE-139	165.85	287.	7.	0.004	324.80	1.521E-01	
Cf-251	176.60	180.	-13.	-0.007	199.96	-1.277E+00	
TH-229	210.85	220.	-10.	-0.006	279.28	-6.534E+00	
Cf-251	227.00	132.	8.	0.004	270.99	2.622E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	244.69	980.	-26.	-0.014	171.73	-7.477E+00	
TH-227	256.24	95.	12.	0.006	159.28	3.770E+00	
Cd-113m	263.70	72.	9.	0.005	137.44	3.468E+03	
BI-210M	265.83	110.	4.	0.002	408.48	1.706E-01	
Hg-203	279.20	171.	-22.	-0.012	86.72	-6.522E-01	
I-131	284.30	88.	8.	0.004	232.29	3.191E+00	
PA-231	300.07	434.	-17.	-0.009	174.99	-1.764E+01	
CR-51	320.08	320.	16.	0.009	156.60	4.417E+00	P
La-140	328.76	423.	-13.	-0.007	205.33	-1.688E+00	P
HF-181	345.83	69.	5.	0.003	302.39	1.023E+00	P
BA-133	356.00	396.	-16.	-0.009	144.27	-7.665E-01	P
I-131	364.48	76.	-15.	-0.009	152.17	-5.630E-01	P
BA-133	383.84	116.	15.	0.008	104.79	5.189E+00	
Cf-249	387.95	131.	15.	0.008	110.66	7.109E-01	
SN-113	391.69	153.	-7.	-0.004	344.66	-3.369E-01	P
SB-125	427.88	73.	-8.	-0.004	293.01	-9.217E-01	P
AG-108M	433.94	68.	-18.	-0.010	90.52	-6.957E-01	
pm-146	453.88	43.	8.	0.004	178.95	4.170E-01	
SB-125	463.37	92.	16.	0.009	90.04	5.395E+00	P
Ir-192	468.06	98.	15.	0.008	95.91	1.063E+00	
BE-7	477.60	118.	14.	0.008	112.31	4.931E+00	P
La-140	487.02	58.	9.	0.005	124.54	7.368E-01	P
RU-103	497.05	48.	-9.	-0.005	166.12	-3.627E-01	
RH-106	511.86	56.	106.	0.059	20.85	2.065E+01	
Ba-140	537.26	31.	7.	0.004	159.91	1.206E+00	P
CS-134	563.24	52.	-7.	-0.004	213.65	-3.531E+00	
CS-134	569.32	61.	-9.	-0.005	131.56	-2.395E+00	
PA-234	569.47	58.	12.	0.007	93.17	6.307E+00	
BI-207	569.70	50.	4.	0.002	266.25	1.668E-01	
SB-125	600.50	249.	8.	0.005	266.43	2.100E+00	P
SB-124	602.73	257.	9.	0.005	266.59	3.890E-01	
CS-134	604.71	339.	-13.	-0.007	200.32	-6.004E-01	
RU-103	610.30	326.	-13.	-0.007	195.89	-1.030E+01	
AG-108M	614.28	313.	-7.	-0.004	375.29	-3.373E-01	
PM-144	618.06	314.	-14.	-0.008	131.80	-6.534E-01	P
RH-106	621.92	292.	13.	0.007	184.44	6.098E+00	
SB-125	635.89	33.	2.	0.001	352.54	9.605E-01	
I-131	636.97	28.	9.	0.005	91.39	5.744E+00	
AG-110M	657.76	86.	-14.	-0.008	97.42	-7.083E-01	
CS-137	661.66	87.	13.	0.007	101.94	7.570E-01	P
PM-144	696.54	47.	-9.	-0.005	170.62	-4.397E-01	
SB-124	722.79	95.	-8.	-0.005	166.90	-3.936E+00	P
EU-154	723.36	77.	6.	0.003	216.95	1.496E+00	
ZR-95	724.20	87.	-5.	-0.003	254.36	-6.352E-01	P
pm-146	735.72	28.	5.	0.003	229.83	1.165E+00	P
AG-110M	763.94	54.	-16.	-0.009	69.60	-3.898E+00	
NB-95	765.79	65.	5.	0.003	249.28	2.544E-01	
PA-234M	766.41	30.	9.	0.005	89.55	1.730E+02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	778.92	56.	-19.	-0.010	87.53	-8.017E+00		
CS-134	795.87	53.	3.	0.002	348.01	1.971E-01		
CS-134	801.95	46.	9.	0.005	116.15	5.640E+00		
CO-58	810.78	90.	-17.	-0.009	84.80	-9.488E-01		
La-140	815.77	107.	-17.	-0.009	91.45	-4.085E+00		
Cs-136	818.50	102.	12.	0.007	119.83	7.060E-01		
MN-54	834.85	23.	10.	0.005	110.78	5.658E-01		
NB-94	871.10	49.	-14.	-0.008	74.16	-8.706E-01		
EU-154	873.23	73.	-8.	-0.005	151.87	-4.047E+00		
PA-234	880.53	43.	-2.	-0.001	559.64	-1.701E+00		
y-88	898.04	20.	5.	0.003	201.66	3.323E-01		
AG-110M	937.49	50.	-18.	-0.010	87.46	-3.468E+00		
PA-234	946.02	11.	2.	0.001	336.20	1.046E+00		P
EU-152	964.11	117.	10.	0.006	153.12	4.629E+00		
EU-154	996.33	31.	10.	0.006	82.19	6.649E+00		
PA-234M	1001.00	41.	7.	0.004	142.13	5.433E+01		
Cs-136	1048.07	38.	-7.	-0.004	130.15	-6.226E-01		
RH-106	1050.36	66.	-18.	-0.010	42.43	-8.238E+01		P
BI-207	1063.66	26.	-8.	-0.004	101.89	-7.353E-01		P
Ga-68	1077.40	10.	9.	0.005	86.58	2.280E+01		
EU-152	1112.07	101.	-9.	-0.005	163.38	-4.878E+00		
Sc-46	1120.55	70.	13.	0.007	98.35	9.459E-01		
CO-60	1173.24	22.	-2.	-0.001	639.64	-1.394E-01		P
NA-22	1274.53	27.	3.	0.002	225.83	2.817E-01		
FE-59	1291.60	11.	7.	0.004	107.76	1.450E+00		
CO-60	1332.50	27.	-11.	-0.006	114.22	-9.371E-01		
AG-110M	1384.30	6.	14.	0.008	48.39	5.238E+00		P
EU-152	1408.00	28.	-13.	-0.007	97.55	-5.856E+00		
La-140	1596.21	23.	-10.	-0.005	176.70	-1.055E+00		P
SB-124	1690.98	0.	5.	0.003	44.72	1.138E+00		
y-88	1836.06	12.	-5.	-0.003	135.52	-6.060E-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	4.9309E+00	4.9310E+00	1.123E+02%	1.87E+01
NA-22	#A	2.8165E-01	2.8165E-01	2.258E+02%	2.26E+00
K-40		2.3473E+02	2.3473E+02	6.557E+00%	1.44E+01
Sc-46	#A	4.5235E-01	4.5235E-01	9.835E+01%	2.10E+00
CR-51	#A	4.4172E+00	4.4174E+00	1.566E+02%	2.32E+01
MN-54	#A	5.6579E-01	5.6579E-01	1.108E+02%	1.48E+00
FE-59	#A	6.0829E-01	6.0830E-01	1.078E+02%	3.55E+00
Co-56	#C	1.8115E+00	1.8115E+00	3.644E+01%	1.49E+00
CO-57	#A	-4.9110E-01	-4.9110E-01	8.439E+01%	1.38E+00

CO-58	#A	-9.4878E-01	-9.4879E-01	8.480E+01%	2.69E+00
CO-60	#A	-9.3710E-01	-9.3710E-01	1.142E+02%	2.35E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.04E+00
NB-94	#A	-1.7226E-02	-1.7226E-02	3.892E+03%	1.61E+00
ZR-95	#A	8.7960E-02	8.7961E-02	1.551E+03%	3.26E+00
NB-95	#A	2.5436E-01	2.5436E-01	2.493E+02%	2.20E+00
RU-103	#A	-3.6271E-01	-3.6272E-01	1.661E+02%	1.46E+00
RH-106	#A	6.0976E+00	6.0976E+00	1.844E+02%	3.79E+01
AG-108M	#A	-6.9567E-01	-6.9567E-01	9.052E+01%	1.55E+00
AG-110M	#A	1.3121E+00	1.3121E+00	4.839E+01%	2.85E+00
SN-113	#A	-3.3695E-01	-3.3695E-01	3.447E+02%	2.96E+00
SB-124	#A	6.3397E-01	6.3398E-01	4.472E+01%	3.51E+00
SB-125	#A	1.1205E+00	1.1205E+00	9.004E+01%	4.85E+00
I-131	#A	1.5553E-01	1.5555E-01	9.139E+01%	1.58E+00
Gd-153	#A	-1.8206E+00	-1.8207E+00	1.770E+02%	1.07E+01
Ga-68	#A	2.2377E+01	2.2800E+01	8.658E+01%	4.56E+01
Tc-99m	#A	1.3280E-07	1.3327E-07	6.160E+08%	2.75E+00
BA-133	#A	-7.6653E-01	-7.6653E-01	1.443E+02%	4.49E+00
CS-134	#A	-9.0249E-02	-9.0249E-02	1.158E+02%	4.05E+00
CS-137	#A	7.5705E-01	7.5705E-01	1.019E+02%	2.60E+00
CE-139	#A	1.5207E-01	1.5208E-01	3.248E+02%	1.67E+00
Ba-140	#A	2.2345E+00	2.2346E+00	9.449E+01%	4.74E+00
La-140	#A	-4.7662E-01	-4.7665E-01	1.081E+02%	2.70E+00
CE-141	#A	8.4347E-01	8.4349E-01	9.190E+01%	2.58E+00
CE-144	#A	-4.0657E+00	-4.0657E+00	1.521E+02%	2.06E+01
PM-144	#A	-4.3970E-01	-4.3970E-01	1.706E+02%	1.75E+00
EU-152	#A	1.4924E+00	1.4924E+00	9.252E+01%	1.04E+01
EU-154	#A	9.1043E-01	9.1043E-01	8.219E+01%	2.11E+01
EU-155	#A	-2.5640E+00	-2.5640E+00	1.816E+02%	1.55E+01
HF-181	#A	1.6129E-01	1.6129E-01	3.024E+02%	2.59E+00
Ta-182	#A	2.7122E+00	2.7122E+00	9.329E+01%	8.53E+00
Hg-203	#A	-6.5220E-01	-6.5221E-01	8.672E+01%	1.89E+00
TL-208		9.5705E+00	9.5705E+00	9.214E+00%	1.24E+00
pm-146	#A	4.3838E-01	4.3838E-01	1.789E+02%	4.29E+00
y-88	#A	3.3232E-01	3.3232E-01	2.017E+02%	1.57E+00
Cd-113m	#A	3.4678E+03	3.4678E+03	1.374E+02%	1.63E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.60E+01
Cf-251	#A	-1.2775E+00	-1.2775E+00	2.000E+02%	6.57E+00
Cf-249	#A	7.1092E-01	7.1092E-01	1.107E+02%	2.65E+00
Sn-126	#A	2.7351E+00	2.7351E+00	2.450E+02%	2.25E+01
PB-210	A	2.8947E+01	2.8947E+01	4.361E+01%	3.35E+01
PB-212		2.7003E+01	2.7003E+01	4.854E+00%	2.17E+00
PB-214		2.0849E+01	2.0849E+01	7.596E+00%	2.69E+00
BI-207	#A	1.6676E-01	1.6676E-01	2.662E+02%	1.55E+00
BI-212		2.7524E+01	2.7524E+01	2.174E+01%	1.21E+01
BI-214	#	1.8150E+01	1.8150E+01	1.007E+01%	2.71E+00
BI-210M	#A	1.7058E-01	1.7058E-01	4.085E+02%	2.40E+00
AC-228		2.7687E+01	2.7687E+01	8.349E+00%	1.81E+00
TH-227	#A	-8.2960E+00	-8.2960E+00	1.107E+02%	3.06E+01

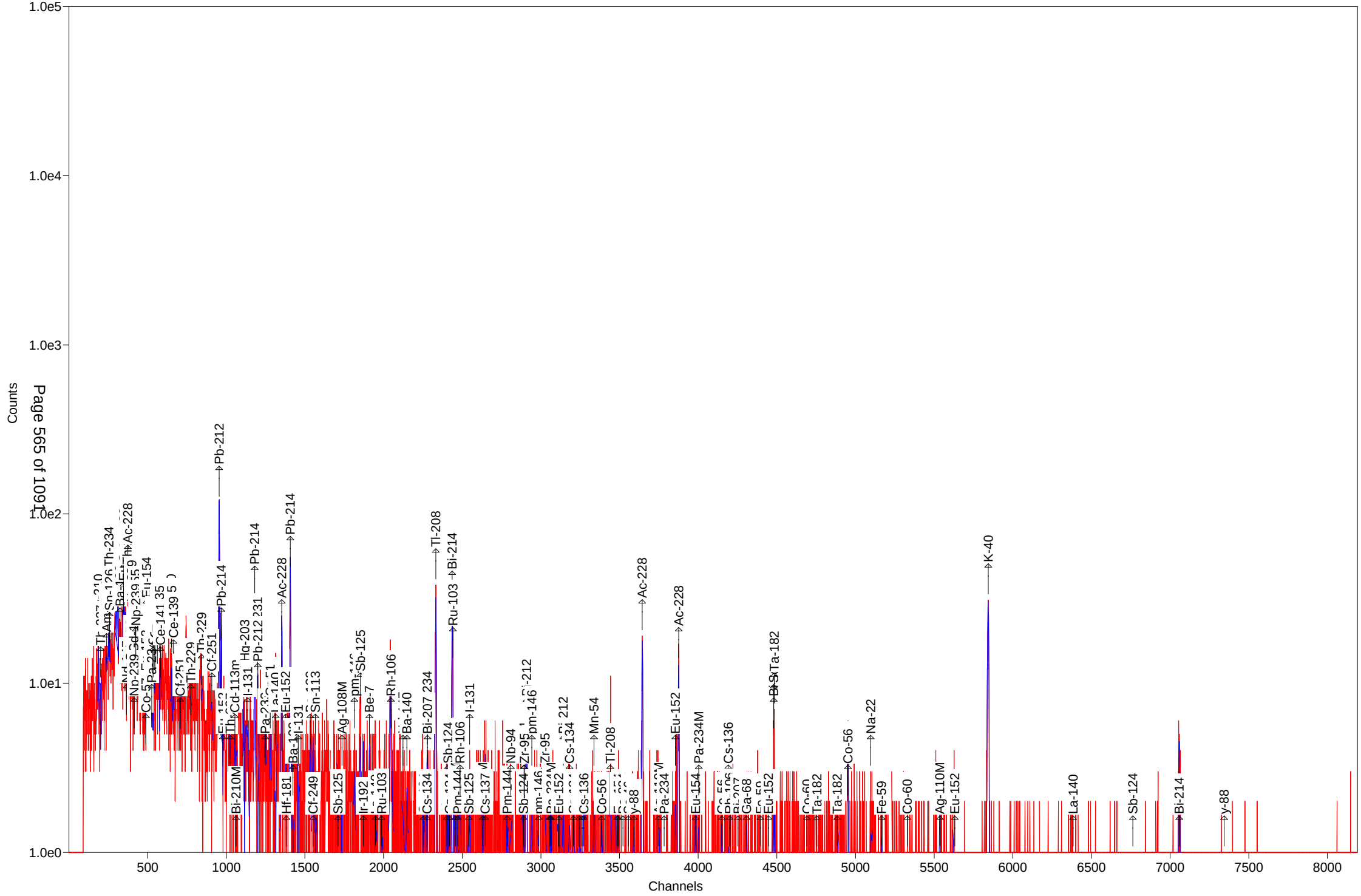
TH-229 #A	2.7780E-01	2.7780E-01	3.686E+03%		2.66E+01
TH-234 A	2.5579E+01	2.5579E+01	4.040E+01%		3.31E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		8.73E+01
PA-233 #A	8.4033E-01	8.4033E-01	2.494E+02%		7.06E+00
PA-234 #A	2.6618E-01	2.6618E-01	8.746E+01%		1.23E+01
PA-234M#A	8.5171E+01	8.5171E+01	8.399E+01%		2.67E+02
U-235 #A	-4.9611E-01	-4.9611E-01	6.550E+01%		2.09E+01
AM-241 #A	-5.9809E-01	-5.9809E-01	3.400E+02%		6.83E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.37E+01
Ir-192 #A	3.9618E-01	3.9618E-01	9.591E+01%		2.99E+00
Cs-136 #A	7.0598E-01	7.0603E-01	1.198E+02%		2.86E+00
Np-239 #A	2.2919E+00	2.2928E+00	1.836E+02%		1.40E+01
Nd-147 #A	3.0878E-01	3.0881E-01	1.279E+03%		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) 4.200E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.2003717E+02 Bq/Sample

264540_Gamma_160-18553-A-6-B. 15_Gamma_20161068.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20162253

Sample Description: 264540_Gamma_160-18553-A-7-B
Detector: Detector #14
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-7-B

Decay to Time: 9/1/2016 15:09 Live Time: 1800 sec
Acquisition Time: 9/1/2016 15:10:49 Real Time: 1807 sec
Analysis Time: 9/1/2016 15:41 Dead Time: 0.39 %
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	1.963E+00	146.1	2.869E+00	2.871E+00	9.938E+00
NA-22	4.597E-01	64.8	2.979E-01	2.988E-01	9.725E-01
K-40	2.021E+02	6.2	1.261E+01	1.631E+01	9.895E+00
Sc-46	1.081E-03	94.3	1.019E-03	1.021E-03	2.955E+00
CR-51	2.674E+00	131.5	3.515E+00	3.518E+00	1.193E+01
MN-54	5.955E-02	1045.2	6.224E-01	6.225E-01	1.502E+00
FE-59	3.960E-01	105.4	4.174E-01	4.179E-01	2.946E+00
Co-56	5.060E-02	225.8	1.142E-01	1.143E-01	1.321E+00
CO-57	1.795E-01	171.7	3.082E-01	3.083E-01	1.041E+00
CO-58	-5.883E-02	676.0	3.977E-01	3.977E-01	1.579E+00
CO-60	3.948E-01	108.9	4.299E-01	4.303E-01	1.059E+00
ZN-65	0.000E+00	1.#INF	1.807E-01	1.807E-01	5.639E+00
NB-94	2.925E-01	179.1	5.240E-01	5.242E-01	1.291E+00
ZR-95	4.905E-01	155.7	7.639E-01	7.643E-01	1.914E+00
NB-95	-3.070E-01	122.6	3.765E-01	3.769E-01	2.265E+00
RU-103	-7.406E-02	591.6	4.382E-01	4.382E-01	1.136E+00
RH-106	-6.333E+00	82.3	5.210E+00	5.220E+00	1.841E+01
AG-108M	7.795E-02	489.9	3.819E-01	3.819E-01	1.033E+00
AG-110M	6.490E-01	33.3	2.163E-01	2.189E-01	3.821E+00
SN-113	-7.414E-01	119.3	8.846E-01	8.854E-01	2.972E+00
SB-124	3.033E-01	250.0	7.581E-01	7.583E-01	2.875E+00
SB-125	1.131E+00	90.3	1.021E+00	1.023E+00	3.262E+00
I-131	1.662E-03	83.1	1.382E-03	1.384E-03	1.318E+00
Gd-153	2.282E-01	293.4	6.694E-01	6.695E-01	3.154E+00
Ga-68	1.803E+01	93.8	1.692E+01	1.695E+01	3.932E+01
Tc-99m	-3.369E-01	130.6	4.401E-01	4.405E-01	1.472E+00
BA-133	4.655E-01	220.6	1.027E+00	1.027E+00	3.465E+00
CS-134	5.718E-01	89.6	5.122E-01	5.131E-01	2.952E+00
CS-137	2.813E-01	219.7	6.181E-01	6.183E-01	2.134E+00
CE-139	5.327E-01	44.2	2.354E-01	2.408E-01	6.598E-01
Ba-140	-2.202E+00	97.6	2.150E+00	2.153E+00	5.332E+00
La-140	-9.241E-01	59.5	5.499E-01	5.521E-01	2.738E+00
CE-141	5.479E-01	133.7	7.324E-01	7.329E-01	2.454E+00

CE-144	1.792E+00	172.0	3.083E+00	3.084E+00	1.036E+01
PM-144	3.320E-01	97.7	3.243E-01	3.248E-01	9.913E-01
EU-152	1.178E+00	95.2	1.122E+00	1.124E+00	6.631E+00
EU-154	-2.157E+00	201.0	4.336E+00	4.337E+00	1.510E+01
EU-155	-3.420E-02	4669.2	1.597E+00	1.597E+00	4.815E+00
HF-181	1.623E-01	136.0	2.208E-01	2.209E-01	1.612E+00
Ta-182	1.741E+00	110.0	1.915E+00	1.917E+00	5.918E+00
Hg-203	4.024E-01	101.8	4.098E-01	4.104E-01	1.378E+00
TL-208	7.699E+00	8.7	6.672E-01	7.776E-01	8.465E-01
pm-146	1.878E-01	133.2	2.502E-01	2.504E-01	3.633E+00
y-88	-5.689E-01	125.2	7.121E-01	7.127E-01	1.814E+00
Cd-113m	-5.517E+03	130.5	7.202E+03	7.211E+03	2.422E+04
Cd-109	-9.113E+00	161.5	1.472E+01	1.473E+01	4.909E+01
Cf-251	1.239E+00	147.4	1.826E+00	1.830E+00	4.943E+00
Cf-249	-1.035E-01	305.5	3.160E-01	3.160E-01	2.650E+00
Sn-126	9.329E-01	442.9	4.132E+00	4.132E+00	1.402E+01
PB-210	-9.697E-01	1248.7	1.211E+01	1.211E+01	3.573E+01
PB-212	1.910E+01	5.8	1.105E+00	1.658E+00	2.155E+00
PB-214	1.361E+01	8.7	1.186E+00	1.381E+00	2.663E+00
BI-207	-1.024E-01	355.8	3.642E-01	3.643E-01	1.286E+00
BI-212	2.158E+01	21.8	4.702E+00	4.834E+00	8.714E+00
BI-214	9.931E+00	12.0	1.188E+00	1.296E+00	2.085E+00
BI-210M	-7.251E-01	143.7	1.042E+00	1.043E+00	2.864E+00
AC-228	1.899E+01	8.6	1.630E+00	1.896E+00	3.432E+00
TH-227	-3.780E+00	151.7	5.734E+00	5.737E+00	1.752E+01
TH-229	-7.866E+00	98.2	7.727E+00	7.752E+00	2.130E+01
TH-234	2.972E+00	382.4	1.137E+01	1.137E+01	3.274E+01
PA-231	0.000E+00	1.#INF	8.216E+00	8.216E+00	6.082E+01
PA-233	4.495E-01	342.7	1.540E+00	1.540E+00	5.220E+00
PA-234	1.794E+00	89.9	1.614E+00	1.616E+00	5.996E+00
PA-234M	5.878E+01	87.2	5.128E+01	5.137E+01	2.689E+02
U-235	-2.387E+00	106.9	2.552E+00	2.555E+00	1.206E+01
AM-241	-2.019E-01	611.9	1.236E+00	1.236E+00	3.546E+00
Np-237	2.516E+00	160.3	4.033E+00	4.036E+00	1.346E+01
Ir-192	8.387E-02	89.3	7.485E-02	7.502E-02	1.276E+00
Cs-136	5.368E-01	33.1	1.775E-01	1.802E-01	1.623E+00
Np-239	1.061E+00	118.8	1.260E+00	1.262E+00	4.224E+00
Nd-147	-8.188E-01	373.7	3.059E+00	3.060E+00	7.934E+00
Total	3.990E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-7-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20162253.An1

Acquisition information
Start time: 9/1/2016 3:10:49 PM
Live time: 1800
Real time: 1807
Dead time: 0.39 %
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 3:09:00 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. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2778

***** 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
46.44	4.	319.11	0.40	2.164E-02	46.54	4.250	PBC<MDA	PB210
63.29	7.	382.43	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
64.28	5.	442.90	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.82	200.	11.84	0.78	3.811E-02				
77.24	232.	10.16	0.78	3.899E-02				
87.21	101.	23.66	0.89	4.178E-02	86.49	13.100	1.026E+01	Np237
					86.54	30.700	4.375E+00	EU155
					86.94	9.040	1.483E+01	Sn126
					87.57	37.500	3.562E+00	Sn126
92.95	131.	16.96	1.61	4.291E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.054E+01	AC228
99.50	19.	107.31	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
103.20	8.	293.37	0.81	4.392E-02	103.20	21.800	PBC<MDA	Gd153
103.70	9.	256.50	0.81	4.395E-02	103.70	24.000	PBC<MDA	Np239
106.13	19.	118.76	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
121.78	17.	115.94	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
122.06	12.	171.67	0.83	4.378E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
131.61	19.	132.31	0.84	4.301E-02	131.29	18.000	PBC<MDA	PA234
133.02	19.	136.02	0.84	4.283E-02	133.02	43.300	PBC<MDA	HF181
133.54	15.	172.00	0.84	4.277E-02	133.54	11.090	PBC<MDA	CE144

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	20.	133.67	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
166.13	30.	44.19	0.50	3.872E-02	165.85	79.900	PBC<MDA	CE139
176.60	14.	147.37	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
238.15	461.	6.61	1.09	2.936E-02	238.63	43.300	1.979E+01	PB212
241.59	44.	81.08	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	14.	251.70	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
256.24	2.	977.75	0.96	2.775E-02	256.24	7.000	PBC<MDA	TH227
269.71	46.	27.78	0.57	2.667E-02				
279.20	15.	101.85	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
294.79	120.	12.92	0.57	2.489E-02	295.09	19.300	1.342E+01	PB214
312.01	7.	342.67	1.02	2.381E-02	312.01	36.000	PBC<MDA	PA233
320.08	11.	131.46	1.03	2.334E-02	320.08	9.940	PBC<MDA	CR51
328.76	20.	73.56	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	3.	506.37	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
337.83	106.	14.47	1.05	2.238E-02	338.32	12.010	2.197E+01	AC228
351.47	208.	10.63	1.24	2.170E-02	351.93	37.600	1.371E+01	PB214
356.00	11.	220.60	1.06	2.148E-02	356.00	62.050	PBC<MDA	BA133
427.88	6.	213.84	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	489.90	1.13	1.838E-02	433.94	90.480	PBC<MDA	AG108M
453.88	2.	675.39	1.15	1.774E-02	453.88	65.000	PBC<MDA	pm146
463.37	11.	90.29	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	106.88	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
477.60	6.	146.14	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
511.86	29.	63.66	2.46	1.612E-02	511.86	20.000	PBC<MDA	RH106
563.24	10.	106.44	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.32	9.	89.58	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.117E+00	PA234
					569.70	97.740	3.455E-01	BI207
583.06	170.	8.67	1.03	1.453E-02	583.02	84.500	7.699E+00	TL208
602.73	8.	259.09	1.29	1.415E-02	602.73	98.260	PBC<MDA	SB124
609.18	116.	11.97	1.75	1.403E-02	609.31	46.090	9.931E+00	BI214
618.06	6.	206.44	1.30	1.387E-02	618.06	99.100	PBC<MDA	PM144
635.89	1.	501.25	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
636.97	6.	83.13	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
661.66	6.	219.70	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
696.54	9.	97.69	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
702.63	6.	179.14	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
726.76	36.	21.79	1.08	1.217E-02	727.17	7.550	2.158E+01	BI212
735.72	7.	133.23	1.41	1.206E-02	735.72	22.500	PBC<MDA	pm146
756.73	6.	155.74	1.43	1.179E-02	756.73	54.460	PBC<MDA	ZR95
766.41	15.	87.25	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.423E+02	PA234M
860.00	24.	38.86	1.51	1.062E-02	860.56	12.420	1.011E+01	TL208
910.90	93.	12.92	1.77	1.014E-02	911.07	29.000	1.757E+01	AC228
945.87	6.	121.84	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
964.11	11.	123.49	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.61	58.	16.93	1.09	9.642E-03	968.97	17.460	1.931E+01	AC228
1048.07	16.	33.07	1.66	9.043E-03	1048.07	80.000	1.229E+00	Cs136

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1077.40	8.	93.82	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1120.45	11.	92.42	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	8.	101.05	1.72	8.561E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.485E-01	Sc46
1121.46	8.	109.98	1.72	8.556E-03	1121.30	34.900	PBC<MDA	Ta182
1173.24	6.	183.53	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1188.70	5.	201.66	1.77	8.153E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	4.	336.74	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
1291.60	5.	105.41	1.84	7.616E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	5.	117.25	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	9.	33.33	1.91	7.192E-03	1384.30	24.290	2.862E+00	AG110M
1408.00	7.	87.75	1.92	7.092E-03	1408.00	21.005	PBC<MDA	EU152
1460.77	267.	6.24	1.82	6.879E-03	1460.83	10.670	2.021E+02	K40
1690.98	1.	427.57	2.10	6.091E-03	1690.98	47.790	PBC<MDA	SB124
1764.47	31.	17.96	2.14	5.878E-03	1764.49	15.400	1.902E+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
185.19	46.44	68.	4.	1.048E+03	319.11	0.398	- lc
298.65	74.78	181.	200.	5.251E+03	11.84	0.777	- sD
308.34	77.20	161.	232.	5.945E+03	10.16	0.780	- sD
348.63	87.21	131.	96.	2.306E+03	19.63	0.790	- D
1078.05	269.71	32.	46.	1.725E+03	27.78	0.572	- 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
TH-227	199.98	50.14	159.	-13.	-0.007	151.70	0.751s
AM-241	237.55	59.54	210.	-4.	-0.002	611.86	0.761s
TH-234	252.55	63.29	232.	7.	0.004	382.43	0.765s
Sn-126	256.52	64.28	287.	5.	0.003	442.90	0.766
BA-133	323.33	80.99	214.	-8.	-0.005	312.25	0.784s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.33	86.49	771.	25.	0.014	160.34	0.789s
EU-155	345.54	86.54	431.	-26.	-0.015	112.63	0.790s
Sn-126	347.13	86.94	405.	-26.	-0.015	109.19	0.790
Sn-126	349.65	87.57	517.	-30.	-0.017	109.68	0.791
Cd-109	351.53	88.04	875.	-26.	-0.014	161.51	0.791
Nd-147	363.77	91.10	848.	-26.	-0.015	158.49	0.794s
TH-234	369.72	92.59	831.	-51.	-0.029	52.17	0.796s
AC-228	371.16	92.95	115.	131.	0.073	16.96	1.612s
Np-239	397.36	99.50	142.	19.	0.011	107.31	0.803s
Gd-153	412.15	103.20	295.	8.	0.005	293.37	0.807s
Np-239	414.15	103.70	272.	9.	0.005	256.50	0.807s
Np-239	423.87	106.13	248.	19.	0.011	118.76	0.810s
EU-152	486.43	121.78	192.	17.	0.010	115.94	0.826
CO-57	487.58	122.06	210.	12.	0.007	171.67	0.826
EU-154	491.73	123.10	247.	-20.	-0.011	111.58	0.828s
PA-234	524.50	131.29	301.	19.	0.010	132.31	0.836
HF-181	531.42	133.02	320.	19.	0.010	136.02	0.838s
CE-144	533.47	133.54	339.	15.	0.009	172.00	0.838s
CO-57	545.21	136.47	393.	-21.	-0.012	136.05	0.841
Tc-99m	561.35	140.51	401.	-22.	-0.012	130.61	0.845
U-235	574.45	143.79	425.	-20.	-0.011	106.89	0.849
CE-141	581.07	145.44	334.	20.	0.011	133.67	0.850s
Ba-140	649.93	162.66	276.	-8.	-0.004	261.48	0.868s
U-235	652.81	163.38	273.	-21.	-0.012	97.74	0.869
CE-139	663.81	166.13	53.	30.	0.016	44.19	0.502s
Cf-251	705.68	176.60	130.	14.	0.008	147.37	0.882s
TH-229	773.30	193.51	141.	-21.	-0.012	98.22	0.899s
U-235	820.58	205.33	127.	-15.	-0.008	140.71	0.912s
TH-229	842.65	210.85	150.	-21.	-0.012	104.19	0.917s
Cf-251	907.23	227.00	140.	-21.	-0.012	102.51	0.933s
PB-212	953.75	238.63	100.	436.	0.242	5.79	0.945D
PB-214	967.21	242.00	607.	44.	0.024	81.08	0.948s
EU-152	977.99	244.69	650.	14.	0.008	251.70	0.951
TH-227	1024.17	256.24	83.	2.	0.001	977.75	0.962s
Cd-113m	1054.01	263.70	215.	-16.	-0.009	130.55	0.970s
BI-210M	1062.53	265.83	206.	-18.	-0.010	143.69	0.972s
TL-208	1108.33	277.28	125.	-14.	-0.008	116.06	0.983s
Hg-203	1115.99	279.20	114.	15.	0.009	101.85	0.985s
I-131	1136.39	284.30	99.	-8.	-0.004	315.93	0.990s
PB-214	1178.36	294.79	32.	116.	0.064	13.46	0.570s
PB-212	1199.30	300.03	237.	-16.	-0.009	141.44	1.006s
PA-233	1199.90	300.18	253.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	253.	0.	0.000	1000.00	1.008
BA-133	1210.59	302.85	253.	0.	0.000	1000.00	1.009
Ba-140	1218.57	304.85	253.	0.	0.000	1000.00	1.011
BI-210M	1218.76	304.90	253.	0.	0.000	1000.00	1.011
Ir-192	1232.94	308.44	281.	-17.	-0.010	139.29	1.014s
PA-233	1247.22	312.01	279.	7.	0.004	342.67	1.018s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1265.13	316.49	91.	-10.	-0.005	142.97	1.022s
CR-51	1279.51	320.08	102.	11.	0.006	131.46	1.026
La-140	1314.21	328.76	55.	20.	0.011	73.56	1.034
Cf-249	1332.92	333.44	51.	3.	0.001	506.37	1.039s
AC-228	1350.47	337.83	27.	106.	0.059	14.47	1.050
Cs-136	1361.44	340.57	251.	-14.	-0.008	161.47	1.045s
EU-152	1376.30	344.29	207.	-9.	-0.005	230.33	1.049s
HF-181	1382.47	345.83	228.	-14.	-0.008	153.38	1.050s
PB-214	1405.04	351.47	61.	201.	0.112	11.07	1.237
BA-133	1423.15	356.00	298.	11.	0.006	220.60	1.060s
I-131	1457.08	364.48	67.	-10.	-0.006	221.93	1.069s
BA-133	1534.50	383.84	153.	-16.	-0.009	115.07	1.087s
Cf-249	1550.94	387.95	169.	-5.	-0.003	341.78	1.091s
SN-113	1565.90	391.69	198.	-17.	-0.009	119.31	1.095
SB-125	1710.63	427.88	40.	6.	0.003	213.84	1.129s
AG-108M	1734.87	433.94	37.	2.	0.001	489.90	1.135s
pm-146	1814.64	453.88	45.	2.	0.001	675.39	1.154s
SB-125	1852.59	463.37	46.	11.	0.006	90.29	1.163s
Ir-192	1871.36	468.06	60.	11.	0.006	106.88	1.167s
BE-7	1909.50	477.60	40.	6.	0.004	146.14	1.176s
HF-181	1927.10	482.00	62.	-1.	-0.001	841.87	1.180s
La-140	1947.19	487.02	36.	-2.	-0.001	591.61	1.185s
RU-103	1987.33	497.05	36.	-2.	-0.001	591.61	1.194s
RH-106	2046.57	511.86	47.	29.	0.016	63.66	2.458s
Nd-147	2123.11	531.00	32.	-3.	-0.002	373.67	1.225s
Ba-140	2148.15	537.26	52.	-15.	-0.008	97.60	1.231s
CS-134	2252.06	563.24	25.	10.	0.005	106.44	1.255s
CS-134	2276.40	569.32	28.	9.	0.005	89.58	1.260s
PA-234	2276.99	569.47	42.	-4.	-0.002	217.71	1.261
BI-207	2277.92	569.70	44.	-3.	-0.001	355.76	1.261s
TL-208	2331.35	583.06	12.	170.	0.095	8.67	1.026
SB-125	2401.12	600.50	252.	-12.	-0.007	191.63	1.289s
SB-124	2410.04	602.73	221.	8.	0.005	259.09	1.291s
CS-134	2417.96	604.71	229.	0.	0.000	1000.00	1.292s
BI-214	2435.82	609.18	21.	116.	0.064	11.97	1.753s
PM-144	2471.37	618.06	79.	6.	0.003	206.44	1.304s
RH-106	2486.79	621.92	84.	-16.	-0.009	82.27	1.308s
SB-125	2542.69	635.89	22.	1.	0.001	501.25	1.320s
I-131	2547.03	636.97	11.	6.	0.004	83.13	1.321s
AG-110M	2630.18	657.76	57.	-12.	-0.006	95.83	1.339s
CS-137	2645.77	661.66	75.	6.	0.003	219.70	1.343s
PM-144	2785.32	696.54	18.	9.	0.005	97.69	1.374s
NB-94	2809.67	702.63	31.	6.	0.004	179.14	1.379s
SB-124	2890.31	722.79	99.	-15.	-0.008	100.10	1.396
AG-108M	2890.91	722.94	84.	-15.	-0.008	92.98	1.397
ZR-95	2895.96	724.20	79.	-12.	-0.007	106.03	1.398s
BI-212	2906.19	726.76	6.	36.	0.020	21.79	1.078
pm-146	2942.05	735.72	17.	7.	0.004	133.23	1.408s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2987.81	747.16	26.	-3.	-0.002	351.72	1.417s
ZR-95	3026.09	756.73	17.	6.	0.003	155.74	1.426s
AG-110M	3054.96	763.94	72.	-18.	-0.010	70.68	1.432s
NB-95	3062.34	765.79	92.	-6.	-0.004	122.65	1.433s
PA-234M	3064.83	766.41	78.	15.	0.008	87.25	1.434s
EU-152	3114.87	778.92	30.	-8.	-0.005	139.28	1.444s
BI-212	3140.88	785.42	35.	-10.	-0.005	128.42	1.450s
CS-134	3182.67	795.87	56.	-2.	-0.001	659.85	1.459s
CS-134	3207.01	801.95	37.	-14.	-0.008	94.21	1.464s
CO-58	3242.31	810.77	38.	-1.	-0.001	676.03	1.471
La-140	3262.30	815.77	39.	0.	0.000	1000.00	1.475s
Co-56	3386.32	846.77	24.	-4.	-0.002	300.81	1.501s
TL-208	3441.51	860.56	14.	24.	0.013	38.86	1.513s
NB-94	3483.65	871.10	28.	-6.	-0.003	131.23	1.522s
EU-154	3492.19	873.23	48.	-5.	-0.003	201.00	1.523s
PA-234	3521.39	880.53	82.	-15.	-0.008	89.16	1.529s
PA-234	3532.24	883.24	96.	-15.	-0.008	95.71	1.531s
Sc-46	3556.40	889.28	126.	-10.	-0.006	159.16	1.536s
y-88	3591.45	898.04	38.	-10.	-0.005	125.18	1.543s
AC-228	3642.92	910.90	11.	93.	0.052	12.92	1.771
AG-110M	3749.30	937.49	33.	-11.	-0.006	117.72	1.576s
PA-234	3783.42	946.02	9.	6.	0.003	121.84	1.582s
EU-152	3855.80	964.11	88.	11.	0.006	123.49	1.597s
AC-228	3873.80	968.61	10.	58.	0.032	16.93	1.090s
EU-154	3984.71	996.33	51.	-6.	-0.003	177.74	1.622s
Cs-136	4191.74	1048.07	6.	16.	0.009	33.07	1.663s
RH-106	4200.91	1050.36	29.	-6.	-0.003	133.33	1.665s
Ga-68	4309.10	1077.40	10.	8.	0.004	93.82	1.685s
ZN-65	4461.74	1115.55	79.	0.	0.000	1000.00	1.714s
BI-214	4480.72	1120.29	47.	11.	0.006	92.42	1.718s
Sc-46	4481.77	1120.55	32.	8.	0.005	101.05	1.718s
Ta-182	4484.77	1121.30	39.	8.	0.005	109.98	1.719s
CO-60	4692.60	1173.24	26.	6.	0.003	183.53	1.757s
Ta-182	4755.88	1189.05	20.	5.	0.003	201.66	1.769s
Ta-182	4885.38	1221.41	27.	-1.	-0.001	990.55	1.792
Co-56	4952.89	1238.28	38.	4.	0.002	336.74	1.805s
NA-22	5097.96	1274.53	5.	6.	0.004	64.82	1.831s
FE-59	5166.25	1291.60	6.	5.	0.003	105.41	1.843s
CO-60	5329.96	1332.50	6.	5.	0.003	117.25	1.871s
AG-110M	5537.26	1384.30	0.	9.	0.005	33.33	1.907s
EU-152	5632.13	1408.00	5.	7.	0.004	87.75	1.923s
K-40	5843.34	1460.77	5.	267.	0.148	6.24	1.822
La-140	6385.44	1596.21	34.	-18.	-0.010	93.55	2.044s
SB-124	6764.81	1690.98	6.	1.	0.001	427.57	2.102s
BI-214	7059.07	1764.49	0.	31.	0.017	17.96	2.145s
Co-56	7086.53	1771.35	42.	-7.	-0.004	127.46	2.149s
y-88	7345.59	1836.06	6.	0.	0.000	1000.00	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 -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   1.9632E+00                                        5.31E+01
                            477.60 1.963E+00 ?(  9.938E+00 1.46E+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   2.0214E+02                                        4.66E+11
                           1460.83 2.021E+02  (P 9.895E+00 6.24E+00 1.07E+01 G

Sc-46    F   1.0814E-03                                        8.38E+01
                            889.28-5.463E-01 ?(  2.955E+00 1.59E+02 1.00E+02 G
                           1120.55 5.485E-01 ?(  1.893E+00 1.01E+02 1.00E+02 G

CR-51    F   2.6739E+00                                        2.77E+01
                            320.08 2.674E+00 &(  1.193E+01 1.31E+02 9.94E+00 G

MN-54    C   5.9555E-02                                        3.12E+02
                            834.85 5.955E-02 %(P 1.502E+00 1.05E+03 1.00E+02 G

FE-59    F   3.9597E-01                                        4.45E+01
                           1099.25-1.070E-02 %(P 2.946E+00 1.05E+04 5.65E+01 G
                           1291.60 9.278E-01 ?(P 2.304E+00 1.05E+02 4.32E+01 G

Co-56    C   5.0596E-02                                        7.73E+01
                            846.77-2.107E-01 ?(P 1.321E+00 3.01E+02 9.99E+01 G
                           1238.28 4.458E-01 ?(P 3.345E+00 3.37E+02 6.61E+01 G
                           1037.84 2.372E-01 % P 1.026E+01 1.80E+03 1.41E+01 G
                           1771.35-4.579E+00 +   2.008E+01 1.27E+02 1.55E+01  A

CO-57    C   1.7951E-01                                        2.72E+02
                            122.06 1.795E-01 ?(P 1.041E+00 1.72E+02 8.56E+01 G
                            136.47-2.560E+00 +   1.166E+01 1.36E+02 1.07E+01 G

CO-58    C  -5.8832E-02                                        7.09E+01
                            810.78-5.883E-02 ?(P 1.579E+00 6.76E+02 9.95E+01 G

CO-60    F   3.9478E-01                                        1.93E+03
                           1332.50 3.724E-01 ?(P 1.059E+00 1.17E+02 1.00E+02 G
                           1173.24 4.172E-01 ?(P 1.780E+00 1.84E+02 9.99E+01 G
```

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	2.9252E-01					7.41E+06	
			702.63	2.925E-01	&(P	1.291E+00	1.79E+02	9.79E+01 G
			871.10	-3.173E-01	+	1.448E+00	1.31E+02	9.99E+01 G
ZR-95	I	4.9049E-01					6.40E+01	
			756.73	4.905E-01	?(	1.914E+00	1.56E+02	5.45E+01 G
			724.20	-1.271E+00	+	4.556E+00	1.06E+02	4.42E+01 G
NB-95	I	-3.0701E-01					6.40E+01	
			765.79	-3.070E-01	?(P	2.265E+00	1.23E+02	9.98E+01 G
RU-103	I	-7.4061E-02					3.93E+01	
			497.05	-7.406E-02	?(	1.136E+00	5.92E+02	9.09E+01 G
			610.30	5.261E-06	%	5.050E+01	2.81E+08	5.75E+00 GA
RH-106	I	-6.3325E+00					3.74E+02	
			621.92	-6.333E+00	?(P	1.841E+01	8.23E+01	9.93E+00 G
			1050.36	-2.367E+01	+	1.097E+02	1.33E+02	1.56E+00 G
			511.86	4.965E+00	+ P	6.000E+00	6.37E+01	2.00E+01 GA
AG-108M	C	7.7949E-02					1.53E+05	
			433.94	7.795E-02	?(	1.033E+00	4.90E+02	9.05E+01 G
			722.94	-7.285E-01	+	2.277E+00	9.30E+01	9.08E+01 G
			614.28	-3.384E-07	%	3.248E+00	2.81E+08	8.98E+01 G
AG-110M	F	6.4900E-01					2.50E+02	
			884.68	-9.061E-02	%(	3.821E+00	1.22E+03	7.27E+01 G
			657.76	-5.190E-01	&	1.681E+00	9.58E+01	9.46E+01 G
			937.49	-1.741E+00	&	4.790E+00	1.18E+02	3.44E+01 G
			1384.30	2.862E+00	?(	2.344E+00	3.33E+01	2.43E+01 G
			763.94	-3.827E+00	+	8.979E+00	7.07E+01	2.23E+01 G
SN-113	F	-7.4144E-01					1.15E+02	
			391.69	-7.414E-01	&(	2.972E+00	1.19E+02	6.40E+01 G
SB-124	F	3.0329E-01					6.02E+01	
			602.73	3.270E-01	?(	2.875E+00	2.59E+02	9.83E+01 G
			1690.98	2.545E-01	?(	2.634E+00	4.28E+02	4.78E+01 G
			722.79	-6.120E+00	+	2.062E+01	1.00E+02	1.08E+01 G
SB-125	I	1.1309E+00					1.01E+03	
			427.88	5.723E-01	&(	3.262E+00	2.14E+02	2.96E+01 G
			600.50	-2.597E+00	+	1.680E+01	1.92E+02	1.79E+01 G
			635.89	4.831E-01	?(	8.841E+00	5.01E+02	1.13E+01 G
			463.37	3.410E+00	?(P	1.039E+01	9.03E+01	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	1.6620E-03					8.02E+00	
			364.48	-3.245E-01	?(P	1.318E+00	2.22E+02	8.17E+01 G
			284.30	-2.831E+00	+ P	1.735E+01	3.16E+02	6.14E+00 G
			636.97	3.718E+00	?(	1.053E+01	8.31E+01	7.17E+00 G
Gd-153	F	2.2817E-01					2.42E+02	
			97.50	4.262E-02	%(	3.154E+00	2.17E+03	3.00E+01 G
			103.20	4.835E-01	?(	4.799E+00	2.93E+02	2.18E+01 G
Ga-68	C	1.8031E+01					4.71E-02	
			1077.40	1.803E+01	?(	3.932E+01	9.38E+01	3.30E+00 G
Tc-99m	I	-3.3693E-01					2.51E-01	
			140.51	-3.369E-01	(	1.472E+00	1.31E+02	8.93E+01 G
BA-133	F	4.6548E-01					3.85E+03	
			356.00	4.655E-01	?(	3.465E+00	2.21E+02	6.20E+01 G
			302.85	0.000E+00	&	9.561E+00	1.00E+03	1.83E+01 G
			383.84	-4.784E+00	+	1.852E+01	1.15E+02	8.94E+00 GA
			80.99	-3.331E-01	+ P	2.877E+00	3.12E+02	3.41E+01 GA
CS-134	I	5.7177E-01					7.54E+02	
			604.71	0.000E+00	&(	2.952E+00	1.00E+03	9.76E+01 G
			795.87	-1.340E-01	+	2.163E+00	6.60E+02	8.55E+01 G
			569.32	2.195E+00	&(	6.674E+00	8.96E+01	1.54E+01 G
			801.95	-8.149E+00	+	1.773E+01	9.42E+01	8.69E+00 G
			563.24	4.267E+00	(P	1.160E+01	1.06E+02	8.35E+00 G
CS-137	I	2.8134E-01					1.10E+04	
			661.66	2.813E-01	?(	2.134E+00	2.20E+02	8.52E+01 G
CE-139	F	5.3272E-01					1.38E+02	
			165.85	5.327E-01	(	6.598E-01	4.42E+01	7.99E+01 G
Ba-140	I	-2.2024E+00					1.28E+01	
			537.26	-2.202E+00	(	5.332E+00	9.76E+01	2.44E+01 G
			162.66	-1.855E+00	& P	1.858E+01	2.61E+02	6.22E+00 G
			304.85	0.000E+00	+	4.107E+01	1.00E+03	4.29E+00 G
La-140	I	-9.2415E-01					1.28E+01	
			1596.21	-1.625E+00	?(P	2.738E+00	9.35E+01	9.54E+01 G
			487.02	-1.456E-01	+	2.233E+00	5.92E+02	4.55E+01 G
			328.76	2.371E+00	?(	4.462E+00	7.36E+01	2.03E+01 G
			815.77	0.000E+00	+	6.846E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	5.4789E-01					3.25E+01	
			145.44	5.479E-01	?(	2.454E+00	1.34E+02	4.82E+01 G
CE-144	I	1.7922E+00					2.85E+02	
			133.54	1.792E+00	?(	1.036E+01	1.72E+02	1.11E+01 G
PM-144	C	3.3198E-01					3.63E+02	
			696.54	4.136E-01	?(P	9.913E-01	9.77E+01	9.90E+01 G
			618.06	2.505E-01	?(P	1.779E+00	2.06E+02	9.91E+01 G
EU-152	F	1.1781E+00					4.94E+03	
			344.29	-8.488E-01	(	6.631E+00	2.30E+02	2.65E+01 G
			1112.07	4.365E-01	%	2.074E+01	1.36E+03	1.36E+01 G
			121.78	7.679E-01	?(P	2.989E+00	1.16E+02	2.86E+01 G
			778.92	-3.107E+00	+	1.058E+01	1.39E+02	1.29E+01 G
			964.11	4.364E+00	(	1.829E+01	1.23E+02	1.46E+01 G
			244.69	3.673E+00	?(	3.099E+01	2.52E+02	7.58E+00 G
			1408.00	2.486E+00	&	5.024E+00	8.77E+01	2.10E+01 GA
EU-154	I	-2.1572E+00					3.14E+03	
			873.23	-2.157E+00	?(	1.510E+01	2.01E+02	1.23E+01 G
			123.10	-6.336E-01	+	2.368E+00	1.12E+02	4.08E+01 G
			1274.54	6.132E-02	%	3.824E+00	1.63E+03	3.52E+01 G
			723.36	-1.952E-01	%	9.365E+00	1.37E+03	2.02E+01 G
			1004.77	3.295E-01	%	8.571E+00	1.10E+03	1.80E+01 G
			996.33	-3.244E+00	+	1.998E+01	1.78E+02	1.06E+01 G
EU-155	I	-3.4203E-02					1.81E+03	
			105.31	-3.420E-02	&(P	4.815E+00	4.67E+03	2.12E+01 G
			86.54	-1.150E+00	+	4.323E+00	1.13E+02	3.07E+01 G
HF-181	F	1.6231E-01					4.24E+01	
			482.00	-5.441E-02	?(	1.612E+00	8.42E+02	8.05E+01 G
			133.02	5.652E-01	?(	2.578E+00	1.36E+02	4.33E+01 G
			345.83	-2.373E+00	+	1.227E+01	1.53E+02	1.51E+01 G
			136.30	-8.533E-07	%	2.022E+01	6.98E+08	5.85E+00 G
Ta-182	F	1.7408E+00					1.14E+02	
			1121.30	1.573E+00	?(	5.918E+00	1.10E+02	3.49E+01 G
			1221.41	-2.969E-01	- P	6.964E+00	9.91E+02	2.70E+01 G
			1189.05	2.103E+00	?(	9.905E+00	2.02E+02	1.62E+01 G
Hg-203	F	4.0236E-01					4.66E+01	
			279.20	4.024E-01	?(	1.378E+00	1.02E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	7.6994E+00					6.98E+02	
			583.02	7.699E+00	(P	8.465E-01	8.67E+00	8.45E+01 G
			277.28	-4.723E+00	&	1.849E+01	1.16E+02	6.31E+00 G
			860.56	1.011E+01	+	8.486E+00	3.89E+01	1.24E+01 G
pm-146	C	1.8782E-01					2.02E+03	
			747.16	-4.117E-01	?(	3.633E+00	3.52E+02	3.40E+01 G
			735.72	1.365E+00	?(	4.528E+00	1.33E+02	2.25E+01 G
			453.88	9.381E-02	?(P	1.638E+00	6.75E+02	6.50E+01 G
y-88	F	-5.6891E-01					1.07E+02	
			898.04	-5.689E-01	?(P	1.814E+00	1.25E+02	9.37E+01 G
			1836.06	0.000E+00	+	1.391E+00	1.00E+03	9.92E+01 G
Cd-113m		-5.5169E+03					5.33E+03	
			263.70	-5.517E+03	?(	2.422E+04	1.31E+02	6.00E-03 K
Cd-109	F	-9.1130E+00					4.53E+02	
			88.04	-9.113E+00	?(	4.909E+01	1.62E+02	3.79E+00 G
Cf-251	T	1.2393E+00					3.28E+05	
			176.60	1.239E+00	(	4.943E+00	1.47E+02	1.70E+01 G
			227.00	-6.085E+00	+	1.675E+01	1.03E+02	6.30E+00 GA
Cf-249	T	-1.0345E-01					1.28E+05	
			387.95	-2.270E-01	?(	2.650E+00	3.42E+02	6.60E+01 G
			333.44	4.225E-01	?(	5.719E+00	5.06E+02	1.55E+01 G
Sn-126		9.3289E-01					3.65E+07	
			87.57	-1.052E+00	+	3.844E+00	1.10E+02	3.75E+01 GA
			64.28	9.329E-01	(	1.402E+01	4.43E+02	9.70E+00 G
			86.94	-3.899E+00	+	1.420E+01	1.09E+02	9.04E+00 GA
PB-210	N	-9.6967E-01					8.14E+03	
			46.54	-9.697E-01	%(P	3.573E+01	1.25E+03	4.25E+00 G
PB-212	N	1.9099E+01					6.98E+02	
			238.63	1.910E+01	(P	2.155E+00	5.79E+00	4.33E+01 G
			300.03	-1.079E+01	-	5.133E+01	1.41E+02	3.28E+00 GA
PB-214	N	1.3612E+01					5.84E+05	
			351.93	1.371E+01	(P	2.663E+00	1.11E+01	3.76E+01 G
			295.09	1.342E+01	(P	3.370E+00	1.35E+01	1.93E+01 G
			242.00	1.128E+01	&	3.029E+01	8.11E+01	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C -1.0238E-01					1.18E+04	
		569.70	-1.024E-01	?(	1.286E+00	3.56E+02	9.77E+01 G
		1063.66	-1.374E-02	% P	1.973E+00	6.05E+03	7.45E+01 G
BI-212	N 2.1579E+01					6.98E+02	
		727.17	2.158E+01	(P	8.714E+00	2.18E+01	7.55E+00 G
		785.42	-3.669E+01	-	1.144E+02	1.28E+02	1.28E+00 GA
BI-214	N 9.9314E+00					5.84E+05	
		609.31	9.931E+00	(P	2.085E+00	1.20E+01	4.61E+01 G
		1120.29	4.777E+00	- P	1.491E+01	9.24E+01	1.51E+01 G
		1764.49	1.902E+01	+	4.523E+00	1.80E+01	1.54E+01 G
BI-210M	T -7.2507E-01					1.10E+09	
		265.83	-7.251E-01	?(P	2.864E+00	1.44E+02	5.00E+01 G
		304.90	0.000E+00	+	6.292E+00	1.00E+03	2.80E+01 G
AC-228	N 1.8993E+01					2.10E+03	
		911.07	1.757E+01	(	3.432E+00	1.29E+01	2.90E+01 G
		968.97	1.931E+01	(	5.634E+00	1.69E+01	1.75E+01 G
		338.32	2.197E+01	(	5.556E+00	1.45E+01	1.20E+01 G
		93.35	3.054E+01	+	1.226E+01	1.70E+01	5.56E+00 XA
TH-227	N -3.7795E+00					7.95E+03	
		50.14	-3.780E+00	(P	1.752E+01	1.52E+02	8.00E+00 G
		256.24	4.768E-01	&	1.294E+01	9.78E+02	7.00E+00 G
TH-229	N -7.8664E+00					2.68E+06	
		193.51	-7.866E+00	&(P	2.130E+01	9.82E+01	4.40E+00 G
		210.85	-1.232E+01	&	3.445E+01	1.04E+02	2.99E+00 G
TH-234	N 2.9722E+00					1.63E+12	
		63.29	2.972E+00	(P	3.274E+01	3.82E+02	3.81E+00 G
		92.59	-1.194E+01	+ P	3.186E+01	5.22E+01	5.58E+00 G
PA-233	C 4.4949E-01					7.82E+08	
		312.01	4.495E-01	?(	5.220E+00	3.43E+02	3.60E+01 G
		300.18	0.000E+00	-	2.807E+01	1.00E+03	6.20E+00 G
PA-234	N 1.7944E+00					1.63E+12	
		131.29	1.351E+00	?(	5.996E+00	1.32E+02	1.80E+01 G
		946.02	2.389E+00	?(	7.146E+00	1.22E+02	1.34E+01 G
		569.47	-1.982E+00	+	1.511E+01	2.18E+02	8.20E+00 G
		883.24	-8.383E+00	+	2.697E+01	9.57E+01	9.60E+00 G
		880.53	-1.336E+01	+	3.998E+01	8.92E+01	6.00E+00 GA

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   5.8777E+01                                      1.63E+12
                        1001.00-5.683E+00 &(P 2.689E+02 1.54E+03 8.37E-01 G
                         766.41 2.423E+02 ?(  7.092E+02 8.72E+01 2.94E-01 G

U-235    N  -2.3872E+00                                      2.57E+11
                         143.79-2.387E+00  (P 1.206E+01 1.07E+02 1.10E+01 G
                         205.33-5.056E+00 + P 1.861E+01 1.41E+02 5.01E+00 G
                         163.38-6.115E+00 + P 2.271E+01 9.77E+01 5.08E+00 G

AM-241   T  -2.0195E-01                                      1.58E+05
                          59.54-2.019E-01  (  3.546E+00 6.12E+02 3.59E+01 G

Np-237   F   2.5156E+00                                      2.14E+06
                          86.49 2.516E+00 ?(  1.346E+01 1.60E+02 1.31E+01 G

Ir-192   F   8.3868E-02                                      7.40E+01
                         316.49-2.620E-01 ?(  1.276E+00 1.43E+02 8.70E+01 G
                         468.06 6.656E-01 ?(  2.415E+00 1.07E+02 5.18E+01 G
                         308.44-1.258E+00 &   5.883E+00 1.39E+02 3.18E+01 G

Cs-136   F   5.3682E-01                                      1.30E+01
                         818.50-1.674E-02 &(  1.623E+00 2.70E+03 1.00E+02 G
                        1048.07 1.229E+00 &(  1.085E+00 3.31E+01 8.00E+01 G
                         340.57-7.497E-01 +   4.079E+00 1.61E+02 4.69E+01 G

Np-239   T   1.0609E+00                                      2.36E+00
                         103.70 4.830E-01 ?   4.191E+00 2.56E+02 2.40E+01 X
                         106.13 1.061E+00  (  4.224E+00 1.19E+02 2.27E+01 G
                          99.50 1.624E+00     4.944E+00 1.07E+02 1.50E+01 X

Nd-147      -8.1875E-01                                      1.11E+01
                         531.00-8.188E-01 ?(  7.934E+00 3.74E+02 1.30E+01 G
                          91.10-1.209E+00 +   6.389E+00 1.58E+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	159.	-13.	-0.007	151.70	-3.780E+00	P
AM-241	59.54	210.	-4.	-0.002	611.86	-2.019E-01	
TH-234	63.29	232.	7.	0.004	382.43	2.972E+00	P
BA-133	80.99	214.	-8.	-0.005	312.25	-3.331E-01	P
EU-155	86.54	431.	-26.	-0.015	112.63	-1.150E+00	
Cd-109	88.04	875.	-26.	-0.014	161.51	-9.113E+00	
Nd-147	91.10	848.	-26.	-0.015	158.49	-1.209E+00	
TH-234	92.59	831.	-51.	-0.029	52.17	-1.194E+01	P
Np-239	99.50	142.	19.	0.011	107.31	1.624E+00	
Gd-153	103.20	295.	8.	0.005	293.37	4.835E-01	
Np-239	103.70	272.	9.	0.005	256.50	4.830E-01	
Np-239	106.13	248.	19.	0.011	118.76	1.061E+00	
EU-152	121.78	192.	17.	0.010	115.94	7.679E-01	P
CO-57	122.06	210.	12.	0.007	171.67	1.795E-01	P
EU-154	123.10	247.	-20.	-0.011	111.58	-6.336E-01	
HF-181	133.02	320.	19.	0.010	136.02	5.652E-01	
CE-144	133.54	339.	15.	0.009	172.00	1.792E+00	
CO-57	136.47	393.	-21.	-0.012	136.05	-2.560E+00	
Tc-99m	140.51	401.	-22.	-0.012	130.61	-3.369E-01	
U-235	143.79	425.	-20.	-0.011	106.89	-2.387E+00	P
CE-141	145.44	334.	20.	0.011	133.67	5.479E-01	
Ba-140	162.66	276.	-8.	-0.004	261.48	-1.855E+00	P
U-235	163.38	273.	-21.	-0.012	97.74	-6.115E+00	P
Cf-251	176.60	130.	14.	0.008	147.37	1.239E+00	
TH-229	193.51	141.	-21.	-0.012	98.22	-7.866E+00	P
U-235	205.33	127.	-15.	-0.008	140.71	-5.056E+00	P
TH-229	210.85	150.	-21.	-0.012	104.19	-1.232E+01	
Cf-251	227.00	140.	-21.	-0.012	102.51	-6.085E+00	
EU-152	244.69	650.	14.	0.008	251.70	3.673E+00	
TH-227	256.24	83.	2.	0.001	977.75	4.768E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	263.70	215.	-16.	-0.009	130.55	-5.517E+03	
BI-210M	265.83	206.	-18.	-0.010	143.69	-7.251E-01	P
Hg-203	279.20	114.	15.	0.009	101.85	4.024E-01	
I-131	284.30	99.	-8.	-0.004	315.93	-2.831E+00	P
Ir-192	308.44	281.	-17.	-0.010	139.29	-1.258E+00	
PA-233	312.01	279.	7.	0.004	342.67	4.495E-01	
Ir-192	316.49	91.	-10.	-0.005	142.97	-2.620E-01	
CR-51	320.08	102.	11.	0.006	131.46	2.674E+00	
La-140	328.76	55.	20.	0.011	73.56	2.371E+00	
Cf-249	333.44	51.	3.	0.001	506.37	4.225E-01	
Cs-136	340.57	251.	-14.	-0.008	161.47	-7.497E-01	
EU-152	344.29	207.	-9.	-0.005	230.33	-8.488E-01	
HF-181	345.83	228.	-14.	-0.008	153.38	-2.373E+00	
BA-133	356.00	298.	11.	0.006	220.60	4.655E-01	
I-131	364.48	67.	-10.	-0.006	221.93	-3.245E-01	P
BA-133	383.84	153.	-16.	-0.009	115.07	-4.784E+00	
Cf-249	387.95	169.	-5.	-0.003	341.78	-2.270E-01	
SN-113	391.69	198.	-17.	-0.009	119.31	-7.414E-01	
SB-125	427.88	40.	6.	0.003	213.84	5.723E-01	
AG-108M	433.94	37.	2.	0.001	489.90	7.795E-02	
pm-146	453.88	45.	2.	0.001	675.39	9.381E-02	P
SB-125	463.37	46.	11.	0.006	90.29	3.410E+00	P
Ir-192	468.06	60.	11.	0.006	106.88	6.656E-01	
BE-7	477.60	40.	6.	0.004	146.14	1.963E+00	
HF-181	482.00	62.	-1.	-0.001	841.87	-5.441E-02	
La-140	487.02	36.	-2.	-0.001	591.61	-1.456E-01	
RU-103	497.05	36.	-2.	-0.001	591.61	-7.406E-02	
RH-106	511.86	47.	29.	0.016	63.66	4.965E+00	P
Nd-147	531.00	32.	-3.	-0.002	373.67	-8.188E-01	
Ba-140	537.26	52.	-15.	-0.008	97.60	-2.202E+00	
CS-134	563.24	25.	10.	0.005	106.44	4.267E+00	P
CS-134	569.32	28.	9.	0.005	89.58	2.195E+00	
BI-207	569.70	44.	-3.	-0.001	355.76	-1.024E-01	
SB-125	600.50	252.	-12.	-0.007	191.63	-2.597E+00	
SB-124	602.73	221.	8.	0.005	259.09	3.270E-01	
PM-144	618.06	79.	6.	0.003	206.44	2.505E-01	P
RH-106	621.92	84.	-16.	-0.009	82.27	-6.333E+00	P
SB-125	635.89	22.	1.	0.001	501.25	4.831E-01	
I-131	636.97	11.	6.	0.004	83.13	3.718E+00	
AG-110M	657.76	57.	-12.	-0.006	95.83	-5.190E-01	
CS-137	661.66	75.	6.	0.003	219.70	2.813E-01	
PM-144	696.54	18.	9.	0.005	97.69	4.136E-01	P
NB-94	702.63	31.	6.	0.004	179.14	2.925E-01	P
SB-124	722.79	99.	-15.	-0.008	100.10	-6.120E+00	
AG-108M	722.94	84.	-15.	-0.008	92.98	-7.285E-01	
ZR-95	724.20	79.	-12.	-0.007	106.03	-1.271E+00	
pm-146	735.72	17.	7.	0.004	133.23	1.365E+00	
pm-146	747.16	26.	-3.	-0.002	351.72	-4.117E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZR-95	756.73	17.	6.	0.003	155.74	4.905E-01		
AG-110M	763.94	72.	-18.	-0.010	70.68	-3.827E+00		
NB-95	765.79	92.	-6.	-0.004	122.65	-3.070E-01		P
PA-234M	766.41	78.	15.	0.008	87.25	2.423E+02		
EU-152	778.92	30.	-8.	-0.005	139.28	-3.107E+00		
CS-134	795.87	56.	-2.	-0.001	659.85	-1.340E-01		
CS-134	801.95	37.	-14.	-0.008	94.21	-8.149E+00		
CO-58	810.77	38.	-1.	-0.001	676.03	-5.883E-02		P
Co-56	846.77	24.	-4.	-0.002	300.81	-2.107E-01		P
NB-94	871.10	28.	-6.	-0.003	131.23	-3.173E-01		
EU-154	873.23	48.	-5.	-0.003	201.00	-2.157E+00		
Sc-46	889.28	126.	-10.	-0.006	159.16	-5.463E-01		
y-88	898.04	38.	-10.	-0.005	125.18	-5.689E-01		P
AG-110M	937.49	33.	-11.	-0.006	117.72	-1.741E+00		
EU-152	964.11	88.	11.	0.006	123.49	4.364E+00		
EU-154	996.33	51.	-6.	-0.003	177.74	-3.244E+00		
Cs-136	1048.07	6.	16.	0.009	33.07	1.229E+00		
RH-106	1050.36	29.	-6.	-0.003	133.33	-2.367E+01		
Ga-68	1077.40	10.	8.	0.004	93.82	1.803E+01		
Sc-46	1120.55	32.	8.	0.005	101.05	5.485E-01		
CO-60	1173.24	26.	6.	0.003	183.53	4.172E-01		P
Co-56	1238.28	38.	4.	0.002	336.74	4.458E-01		P
NA-22	1274.53	5.	6.	0.004	64.82	4.597E-01		
FE-59	1291.60	6.	5.	0.003	105.41	9.278E-01		P
CO-60	1332.50	6.	5.	0.003	117.25	3.724E-01		P
AG-110M	1384.30	0.	9.	0.005	33.33	2.862E+00		
EU-152	1408.00	5.	7.	0.004	87.75	2.486E+00		
La-140	1596.21	34.	-18.	-0.010	93.55	-1.625E+00		P
SB-124	1690.98	6.	1.	0.001	427.57	2.545E-01		
Co-56	1771.35	42.	-7.	-0.004	127.46	-4.579E+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	1.9632E+00	1.9632E+00	1.461E+02%	9.94E+00
NA-22	#A	4.5968E-01	4.5968E-01	6.482E+01%	9.73E-01
K-40		2.0214E+02	2.0214E+02	6.237E+00%	9.89E+00
Sc-46	#A	1.0814E-03	1.0814E-03	9.426E+01%	2.95E+00
CR-51	#A	2.6738E+00	2.6739E+00	1.315E+02%	1.19E+01
MN-54	#A	5.9554E-02	5.9555E-02	1.045E+03%	1.50E+00
FE-59	#A	3.9596E-01	3.9597E-01	1.054E+02%	2.95E+00
Co-56	#A	5.0596E-02	5.0596E-02	2.258E+02%	1.32E+00
CO-57	#A	1.7950E-01	1.7951E-01	1.717E+02%	1.04E+00
CO-58	#A	-5.8831E-02	-5.8832E-02	6.760E+02%	1.58E+00

CO-60	#A	3.9478E-01	3.9478E-01	1.089E+02%	1.06E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.64E+00
NB-94	#A	2.9252E-01	2.9252E-01	1.791E+02%	1.29E+00
ZR-95	#A	4.9049E-01	4.9049E-01	1.557E+02%	1.91E+00
NB-95	#A	-3.0701E-01	-3.0701E-01	1.226E+02%	2.26E+00
RU-103	#A	-7.4059E-02	-7.4061E-02	5.916E+02%	1.14E+00
RH-106	#A	-6.3325E+00	-6.3325E+00	8.227E+01%	1.84E+01
AG-108M	#A	7.7949E-02	7.7949E-02	4.899E+02%	1.03E+00
AG-110M	#A	6.4899E-01	6.4900E-01	3.333E+01%	3.82E+00
SN-113	#A	-7.4143E-01	-7.4144E-01	1.193E+02%	2.97E+00
SB-124	#A	3.0328E-01	3.0329E-01	2.500E+02%	2.87E+00
SB-125	#A	1.1309E+00	1.1309E+00	9.029E+01%	3.26E+00
I-131	#A	1.6618E-03	1.6620E-03	8.313E+01%	1.32E+00
Gd-153	#A	2.2817E-01	2.2817E-01	2.934E+02%	3.15E+00
Ga-68	#A	1.7699E+01	1.8031E+01	9.382E+01%	3.93E+01
Tc-99m	#A	-3.3576E-01	-3.3693E-01	1.306E+02%	1.47E+00
BA-133	#A	4.6548E-01	4.6548E-01	2.206E+02%	3.47E+00
CS-134	#A	5.7177E-01	5.7177E-01	8.958E+01%	2.95E+00
CS-137	#A	2.8134E-01	2.8134E-01	2.197E+02%	2.13E+00
CE-139	A	5.3271E-01	5.3272E-01	4.419E+01%	6.60E-01
Ba-140	#A	-2.2023E+00	-2.2024E+00	9.760E+01%	5.33E+00
La-140	#A	-9.2409E-01	-9.2415E-01	5.950E+01%	2.74E+00
CE-141	#A	5.4788E-01	5.4789E-01	1.337E+02%	2.45E+00
CE-144	#A	1.7922E+00	1.7922E+00	1.720E+02%	1.04E+01
PM-144	#A	3.3198E-01	3.3198E-01	9.769E+01%	9.91E-01
EU-152	#A	1.1781E+00	1.1781E+00	9.523E+01%	6.63E+00
EU-154	#A	-2.1572E+00	-2.1572E+00	2.010E+02%	1.51E+01
EU-155	#A	-3.4203E-02	-3.4203E-02	4.669E+03%	4.82E+00
HF-181	#A	1.6231E-01	1.6231E-01	1.360E+02%	1.61E+00
Ta-182	#A	1.7408E+00	1.7408E+00	1.100E+02%	5.92E+00
Hg-203	#A	4.0236E-01	4.0236E-01	1.018E+02%	1.38E+00
TL-208		7.6994E+00	7.6994E+00	8.665E+00%	8.47E-01
pm-146	#A	1.8782E-01	1.8782E-01	1.332E+02%	3.63E+00
y-88	#A	-5.6890E-01	-5.6891E-01	1.252E+02%	1.81E+00
Cd-113m	#A	-5.5169E+03	-5.5169E+03	1.305E+02%	2.42E+04
Cd-109	#A	-9.1130E+00	-9.1130E+00	1.615E+02%	4.91E+01
Cf-251	#A	1.2393E+00	1.2393E+00	1.474E+02%	4.94E+00
Cf-249	#A	-1.0345E-01	-1.0345E-01	3.055E+02%	2.65E+00
Sn-126	A	9.3289E-01	9.3289E-01	4.429E+02%	1.40E+01
PB-210	#A	-9.6967E-01	-9.6967E-01	1.249E+03%	3.57E+01
PB-212		1.9099E+01	1.9099E+01	5.785E+00%	2.15E+00
PB-214		1.3612E+01	1.3612E+01	8.716E+00%	2.66E+00
BI-207	#A	-1.0238E-01	-1.0238E-01	3.558E+02%	1.29E+00
BI-212		2.1579E+01	2.1579E+01	2.179E+01%	8.71E+00
BI-214		9.9314E+00	9.9314E+00	1.197E+01%	2.09E+00
BI-210M	#A	-7.2507E-01	-7.2507E-01	1.437E+02%	2.86E+00
AC-228		1.8993E+01	1.8993E+01	8.581E+00%	3.43E+00
TH-227	#A	-3.7795E+00	-3.7795E+00	1.517E+02%	1.75E+01
TH-229	#A	-7.8664E+00	-7.8664E+00	9.822E+01%	2.13E+01

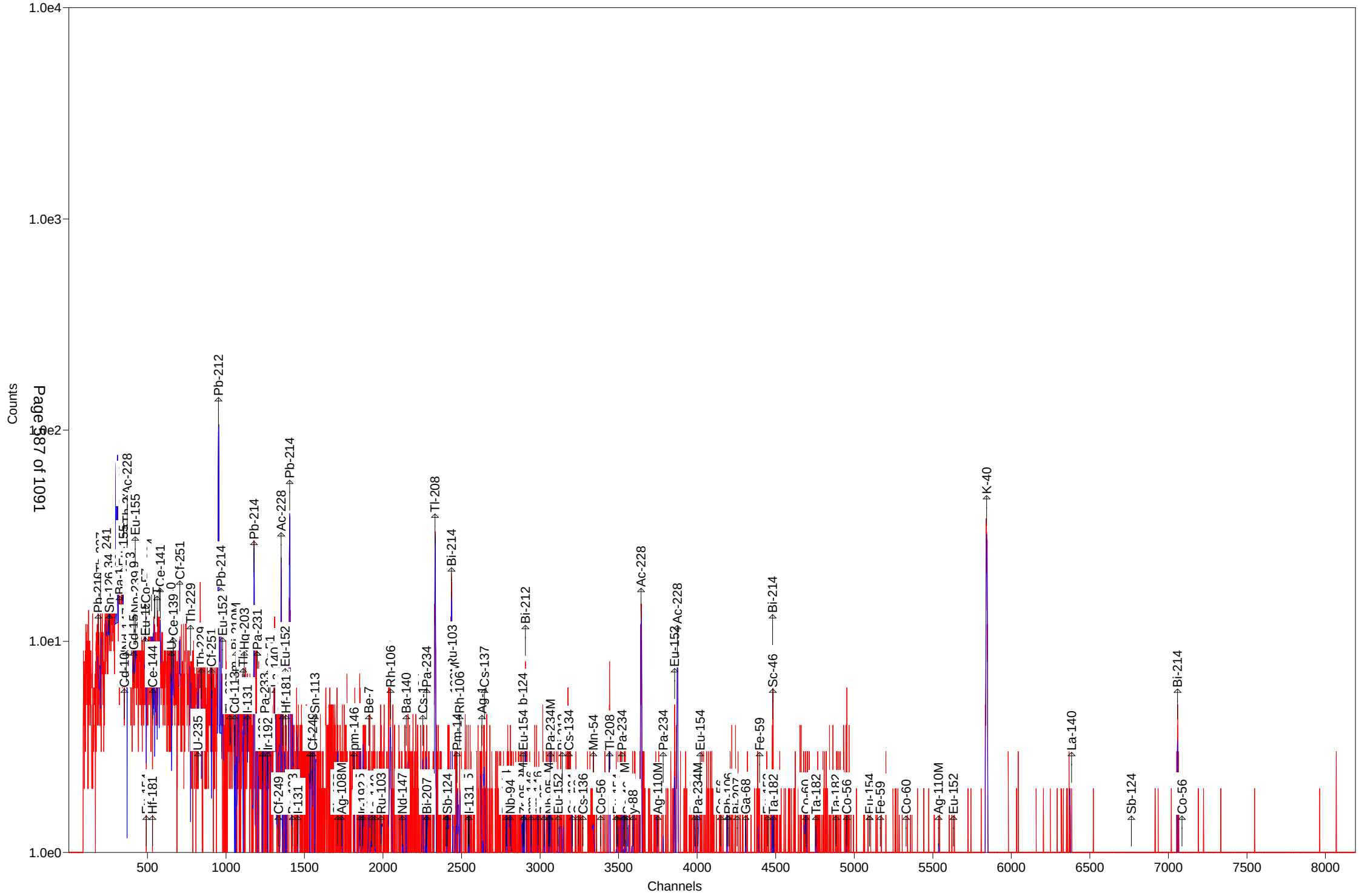
TH-234 #A	2.9722E+00	2.9722E+00	3.824E+02%		3.27E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.08E+01
PA-233 #A	4.4949E-01	4.4949E-01	3.427E+02%		5.22E+00
PA-234 #A	1.7944E+00	1.7944E+00	8.993E+01%		6.00E+00
PA-234M#A	5.8777E+01	5.8777E+01	8.725E+01%		2.69E+02
U-235 #A	-2.3872E+00	-2.3872E+00	1.069E+02%		1.21E+01
AM-241 #A	-2.0195E-01	-2.0195E-01	6.119E+02%		3.55E+00
Np-237 #A	2.5156E+00	2.5156E+00	1.603E+02%		1.35E+01
Ir-192 #A	8.3867E-02	8.3868E-02	8.925E+01%		1.28E+00
Cs-136 #A	5.3678E-01	5.3682E-01	3.307E+01%		1.62E+00
Np-239 #A	1.0605E+00	1.0609E+00	1.188E+02%		4.22E+00
Nd-147 #A	-8.1869E-01	-8.1875E-01	3.737E+02%		7.93E+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) 2.936E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 2.9358844E+02 Bq/Sample

264540_Gamma_160-18553-A-7-B. 14_Gamma_20162253.spc.



Test America St. Louis Spectrum ID: 13_Gamma_20160735

Sample Description: 264540_Gamma_160-18553-A-8-B
Detector: Detector #13
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-8-B

Decay to Time: 9/1/2016 15:14 Live Time: 1800 sec
Acquisition Time: 9/1/2016 15:15:03 Real Time: 1803 sec
Analysis Time: 9/1/2016 15:45 Dead Time: 0.19 %
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	-4.684E+00	98.7	4.625E+00	4.631E+00	1.546E+01
NA-22	-5.205E-01	88.9	4.629E-01	4.636E-01	1.564E+00
K-40	2.123E+02	5.2	1.101E+01	1.547E+01	9.101E+00
Sc-46	-5.505E-01	87.0	4.789E-01	4.797E-01	1.606E+00
CR-51	-7.349E-01	423.8	3.114E+00	3.115E+00	1.041E+01
MN-54	2.802E-01	177.4	4.969E-01	4.971E-01	1.127E+00
FE-59	9.383E-01	63.8	5.983E-01	6.001E-01	1.639E+00
Co-56	4.256E-01	85.7	3.649E-01	3.655E-01	1.000E+00
CO-57	-3.039E-01	114.7	3.487E-01	3.490E-01	1.164E+00
CO-58	-1.721E-01	240.8	4.145E-01	4.146E-01	1.435E+00
CO-60	-5.725E-02	1272.3	7.284E-01	7.284E-01	1.140E+00
ZN-65	-1.937E+00	84.9	1.644E+00	1.647E+00	5.483E+00
NB-94	4.667E-01	56.0	2.615E-01	2.626E-01	1.511E+00
ZR-95	6.561E-01	122.0	8.005E-01	8.013E-01	1.806E+00
NB-95	-9.074E-01	69.8	6.333E-01	6.350E-01	2.097E+00
RU-103	1.422E-01	285.0	4.051E-01	4.052E-01	9.855E-01
RH-106	2.353E+00	313.9	7.387E+00	7.388E+00	2.495E+01
AG-108M	1.668E-01	238.4	3.976E-01	3.977E-01	9.636E-01
AG-110M	1.975E-01	175.6	3.469E-01	3.470E-01	1.878E+00
SN-113	-3.819E-01	136.1	5.197E-01	5.200E-01	2.121E+00
SB-124	-1.185E-01	44.7	5.299E-02	5.335E-02	2.751E+00
SB-125	1.572E+00	74.1	1.164E+00	1.167E+00	2.804E+00
I-131	1.137E-01	339.4	3.860E-01	3.860E-01	9.358E-01
Gd-153	-4.891E-01	410.3	2.007E+00	2.007E+00	6.692E+00
Ga-68	4.050E+00	398.4	1.614E+01	1.614E+01	3.681E+01
Tc-99m	-4.079E-01	135.6	5.533E-01	5.538E-01	1.841E+00
BA-133	-3.306E-01	263.9	8.727E-01	8.729E-01	2.938E+00
CS-134	5.641E-01	77.2	4.356E-01	4.366E-01	2.720E+00
CS-137	-1.377E-01	280.6	3.865E-01	3.866E-01	1.347E+00
CE-139	-1.708E-01	197.4	3.373E-01	3.377E-01	1.137E+00
Ba-140	-2.210E+00	72.6	1.604E+00	1.608E+00	4.568E+00
La-140	3.322E-01	109.1	3.623E-01	3.627E-01	1.414E+00
CE-141	-7.681E-01	45.4	3.491E-01	3.513E-01	3.468E+00

CE-144	0.000E+00	1.#INF	1.019E+00	1.019E+00	1.323E+01
PM-144	4.844E-01	79.7	3.861E-01	3.869E-01	1.290E+00
EU-152	1.518E+00	108.8	1.651E+00	1.653E+00	7.463E+00
EU-154	1.575E+00	56.4	8.881E-01	8.918E-01	8.481E+00
EU-155	0.000E+00	1.#INF	8.415E-01	8.415E-01	9.354E+00
HF-181	-6.179E-01	103.1	6.370E-01	6.378E-01	2.131E+00
Ta-182	-3.072E+00	74.1	2.278E+00	2.283E+00	7.561E+00
Hg-203	3.862E-01	85.5	3.303E-01	3.311E-01	1.103E+00
TL-208	7.336E+00	7.9	5.782E-01	6.922E-01	8.032E-01
pm-146	6.642E-01	62.1	4.124E-01	4.138E-01	1.695E+00
y-88	-6.910E-01	57.3	3.957E-01	3.973E-01	1.416E+00
Cd-113m	-1.176E+03	379.7	4.466E+03	4.466E+03	1.529E+04
Cd-109	0.000E+00	1.#INF	1.645E+01	1.645E+01	5.467E+01
Cf-251	-1.357E-01	1329.8	1.804E+00	1.804E+00	4.473E+00
Cf-249	5.204E-01	99.9	5.197E-01	5.204E-01	1.744E+00
Sn-126	1.555E-01	3091.5	4.808E+00	4.808E+00	1.621E+01
PB-210	1.108E+01	107.8	1.194E+01	1.196E+01	3.992E+01
PB-212	2.050E+01	4.5	9.230E-01	1.616E+00	1.499E+00
PB-214	1.445E+01	6.7	9.617E-01	1.220E+00	1.934E+00
BI-207	3.682E-01	67.6	2.490E-01	2.497E-01	8.251E-01
BI-212	2.838E+01	14.6	4.132E+00	4.387E+00	5.480E+00
BI-214	1.298E+01	9.9	1.280E+00	1.447E+00	2.036E+00
BI-210M	-8.080E-01	70.7	5.716E-01	5.736E-01	2.053E+00
AC-228	2.255E+01	6.9	1.556E+00	1.935E+00	2.658E+00
TH-227	4.357E+00	86.4	3.764E+00	3.771E+00	1.869E+01
TH-229	3.572E+00	184.5	6.590E+00	6.596E+00	1.855E+01
TH-234	9.910E+00	109.8	1.088E+01	1.090E+01	3.628E+01
PA-231	0.000E+00	1.#INF	3.744E+00	3.744E+00	7.465E+01
PA-233	-5.336E-02	1578.3	8.421E-01	8.421E-01	6.105E+00
PA-234	7.935E-01	303.3	2.406E+00	2.407E+00	8.050E+00
PA-234M	1.788E+01	90.6	1.620E+01	1.622E+01	1.869E+02
U-235	-3.321E+00	40.1	1.331E+00	1.342E+00	1.446E+01
AM-241	9.678E-01	136.6	1.322E+00	1.323E+00	4.417E+00
Np-237	0.000E+00	1.#INF	4.942E+00	4.942E+00	1.643E+01
Ir-192	3.902E-01	148.8	5.805E-01	5.810E-01	1.944E+00
Cs-136	-3.564E-01	130.9	4.666E-01	4.670E-01	1.587E+00
Np-239	1.004E+00	257.3	2.584E+00	2.585E+00	8.607E+00
Nd-147	-1.405E+00	212.2	2.981E+00	2.982E+00	7.221E+00
Total	3.864E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-8-B

Spectrum Filename: C:\User\SPC\Det13\13_Gamma_20160735.An1

Acquisition information
Start time: 9/1/2016 3:15:03 PM
Live time: 1800
Real time: 1803
Dead time: 0.19 %
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 3:14:00 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. 22 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0796

***** 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.	107.80	1.02	2.705E-02	46.54	4.250	PBC<MDA	PB210
50.14	24.	103.81	1.02	3.033E-02	50.14	8.000	PBC<MDA	TH227
59.54	24.	136.61	1.03	3.802E-02	59.54	35.900	PBC<MDA	AM241
63.29	28.	109.82	1.03	4.068E-02	63.29	3.810	PBC<MDA	TH234
74.69	271.	9.86	1.04	4.725E-02				
77.03	418.	7.09	1.05	4.833E-02				
87.04	126.	20.65	0.99	5.197E-02	86.49	13.100	1.035E+01	Np237
					86.54	30.700	4.417E+00	EU155
					86.94	9.040	1.497E+01	Sn126
					87.57	37.500	3.595E+00	Sn126
					88.04	3.790	3.548E+01	Cd109
92.90	158.	19.04	1.66	5.353E-02	92.59	5.584	2.955E+01	TH234
					93.35	5.561	2.958E+01	AC228
106.13	23.	257.30	1.07	5.524E-02	106.13	22.700	PBC<MDA	Np239
123.10	31.	88.55	1.09	5.523E-02	123.10	40.790	PBC<MDA	EU154
131.29	14.	303.26	1.10	5.455E-02	131.29	18.000	PBC<MDA	PA234
163.08	18.	142.29	1.13	4.950E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	3.977E+00	U235
193.51	5.	538.76	1.16	4.533E-02	193.51	4.400	PBC<MDA	TH229
210.85	16.	184.46	1.17	4.279E-02	210.85	2.990	PBC<MDA	TH229
238.51	589.	5.79	1.02	3.936E-02	238.63	43.300	1.921E+01	PB212
241.93	101.	18.52	1.20	3.897E-02	242.00	7.430	1.932E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
256.24	15.	138.08	1.21	3.747E-02	256.24	7.000	PBC<MDA	TH227
279.20	20.	85.54	1.23	3.532E-02	279.20	81.460	PBC<MDA	Hg203
295.04	193.	11.80	1.01	3.399E-02	295.09	19.300	1.637E+01	PB214
300.05	61.	21.95	1.25	3.360E-02	300.03	3.280	3.058E+01	PB212
					300.07	2.460	4.078E+01	PA231
					300.18	6.200	1.619E+01	PA233
316.49	20.	148.76	1.27	3.236E-02	316.49	87.040	PBC<MDA	Ir192
338.70	161.	11.12	1.48	3.088E-02	338.32	12.010	2.413E+01	AC228
351.97	290.	8.59	0.94	3.003E-02	351.93	37.600	1.428E+01	PB214
364.48	5.	339.43	1.31	2.929E-02	364.48	81.700	PBC<MDA	I131
383.84	17.	94.16	1.33	2.823E-02	383.84	8.940	PBC<MDA	BA133
387.95	17.	99.86	1.33	2.802E-02	387.95	66.000	PBC<MDA	Cf249
427.88	10.	156.97	1.37	2.611E-02	427.88	29.600	PBC<MDA	SB125
433.94	7.	238.36	1.37	2.585E-02	433.94	90.480	PBC<MDA	AG108M
453.88	14.	101.97	1.39	2.502E-02	453.88	65.000	PBC<MDA	pm146
463.37	18.	74.06	1.40	2.465E-02	463.37	10.470	PBC<MDA	SB125
487.02	18.	109.07	1.42	2.377E-02	487.02	45.500	PBC<MDA	La140
497.05	5.	284.98	1.43	2.341E-02	497.05	90.900	PBC<MDA	RU103
511.86	104.	26.75	2.69	2.292E-02	511.86	20.000	1.261E+01	RH106
563.24	13.	113.03	1.49	2.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	2.	419.18	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	14.	67.64	1.49	2.117E-02	569.32	15.380	2.339E+00	CS134
					569.47	8.200	4.387E+00	PA234
					569.70	97.740	3.682E-01	BI207
583.13	232.	7.88	1.36	2.081E-02	583.02	84.500	7.336E+00	TL208
609.35	217.	9.86	1.61	2.014E-02	609.31	46.090	1.298E+01	BI214
					610.30	5.750	1.042E+02	RU103
621.92	8.	313.91	1.54	1.983E-02	621.92	9.930	PBC<MDA	RH106
657.76	2.	401.39	1.57	1.902E-02	657.76	94.640	PBC<MDA	AG110M
696.54	16.	79.70	1.60	1.821E-02	696.54	99.000	PBC<MDA	PM144
702.63	16.	91.03	1.60	1.809E-02	702.63	97.900	PBC<MDA	NB94
727.08	68.	14.56	1.51	1.763E-02	727.17	7.550	2.838E+01	BI212
747.16	11.	70.85	1.64	1.727E-02	747.16	34.000	PBC<MDA	pm146
756.73	11.	122.02	1.65	1.710E-02	756.73	54.460	PBC<MDA	ZR95
766.41	17.	90.59	1.66	1.694E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.928E+02	PA234M
795.87	14.	77.22	1.68	1.646E-02	795.87	85.530	PBC<MDA	CS134
801.95	10.	94.84	1.69	1.636E-02	801.95	8.690	PBC<MDA	CS134
834.85	8.	177.36	1.71	1.587E-02	834.85	99.980	PBC<MDA	MN54
860.24	44.	22.68	1.21	1.550E-02	860.56	12.420	1.264E+01	TL208
871.10	12.	65.36	1.74	1.536E-02	871.10	99.890	PBC<MDA	NB94
873.23	7.	120.90	1.74	1.533E-02	873.23	12.270	PBC<MDA	EU154
880.53	12.	81.10	1.75	1.523E-02	880.53	6.000	PBC<MDA	PA234
911.18	163.	9.49	1.48	1.483E-02	911.07	29.000	2.109E+01	AC228
964.11	16.	108.79	1.82	1.419E-02	964.11	14.605	PBC<MDA	EU152
969.14	106.	14.66	1.82	1.414E-02	968.97	17.460	2.388E+01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
996.33	11.	78.56	1.84	1.384E-02	996.33	10.600	PBC<MDA	EU154
1037.84	1.	914.69	1.88	1.340E-02	1037.84	14.130	PBC<MDA	Co56
1077.40	3.	398.43	1.91	1.301E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	10.	96.26	1.92	1.281E-02	1099.25	56.500	PBC<MDA	FE59
1120.38	65.	12.73	2.00	1.262E-02	1120.29	15.100	1.883E+01	BI214
					1120.55	99.987	2.844E+00	Sc46
					1121.30	34.900	8.153E+00	Ta182
1221.41	5.	206.25	2.02	1.179E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	17.	85.73	2.03	1.166E-02	1238.28	66.070	PBC<MDA	Co56
1291.60	10.	83.64	2.07	1.127E-02	1291.60	43.200	PBC<MDA	FE59
1384.30	6.	175.59	2.14	1.066E-02	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	96.31	2.16	1.052E-02	1408.00	21.005	PBC<MDA	EU152
1460.92	416.	5.19	2.85	1.021E-02	1460.83	10.670	2.123E+02	K40
1690.98	5.	44.72	2.35	9.068E-03	1690.98	47.790	PBC<MDA	SB124
1764.17	51.	14.80	2.69	8.758E-03	1764.49	15.400	2.108E+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
298.46	74.66	220.	271.	5.727E+03	9.86	1.045	- D
307.85	77.01	230.	418.	8.644E+03	7.09	1.047	- 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	185.92	46.54	294.	23.	0.013	107.80	1.018s
TH-227	200.32	50.14	287.	24.	0.013	103.81	1.021s
AM-241	237.89	59.54	515.	24.	0.013	136.61	1.030s
TH-234	252.89	63.29	447.	28.	0.015	109.82	1.034s
BA-133	323.66	80.99	1522.	-37.	-0.021	82.06	1.051
Np-237	345.65	86.49	1806.	0.	0.000	177.43	1.056A
EU-155	345.86	86.54	1884.	-36.	-0.020	171.57	1.056s
Sn-126	349.97	87.57	1649.	5.	0.003	467.49	1.057D
Cd-109	351.85	88.04	1701.	0.	0.000	162.88	1.057A
Nd-147	364.09	91.10	1651.	-36.	-0.020	160.08	1.060s
TH-234	370.04	92.59	1688.	-36.	-0.020	161.59	1.062s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	371.29	92.90	180.	158.	0.088	19.04	1.658s
Gd-153	389.67	97.50	1724.	-14.	-0.008	410.33	1.066s
Np-239	397.67	99.50	1738.	0.	0.000	1000.00	1.068s
Gd-153	412.46	103.20	1738.	0.	0.000	1000.00	1.071
Np-239	414.46	103.70	1738.	0.	0.000	1000.00	1.072s
EU-155	420.91	105.31	1738.	0.	0.000	1000.00	1.074s
Np-239	424.18	106.13	1689.	23.	0.013	257.30	1.074s
EU-152	486.74	121.78	396.	-32.	-0.018	89.40	1.089
CO-57	487.88	122.06	428.	-26.	-0.014	114.72	1.089
EU-154	492.03	123.10	350.	31.	0.017	88.55	1.090s
PA-234	524.80	131.29	897.	14.	0.008	303.26	1.098
HF-181	531.71	133.02	911.	0.	0.000	1000.00	1.100s
CE-144	533.77	133.54	911.	0.	0.000	1000.00	1.100s
HF-181	544.81	136.30	911.	0.	0.000	1000.00	1.103
CO-57	545.50	136.47	911.	0.	0.000	1000.00	1.103s
Tc-99m	561.64	140.51	1044.	-34.	-0.019	135.64	1.106s
U-235	574.74	143.79	1013.	-35.	-0.019	40.09	1.110s
CE-141	581.36	145.44	1117.	-35.	-0.020	45.45	1.111s
Ba-140	650.21	162.66	324.	-14.	-0.007	190.37	1.127s
U-235	653.08	163.38	319.	18.	0.010	142.29	1.128
CE-139	662.98	165.85	290.	-12.	-0.007	197.45	1.130
TH-229	773.56	193.51	188.	5.	0.003	538.76	1.156
U-235	820.84	205.33	196.	-8.	-0.005	190.74	1.167
TH-229	842.90	210.85	212.	16.	0.009	184.46	1.172s
Cf-251	907.48	227.00	184.	-6.	-0.003	444.51	1.186s
PB-212	953.99	238.63	86.	629.	0.349	4.50	1.197D
PB-214	967.44	242.00	123.	101.	0.056	18.52	1.200D
EU-152	978.22	244.69	1028.	-5.	-0.003	385.55	1.203s
TH-227	1024.40	256.24	108.	15.	0.008	138.08	1.213s
Cd-113m	1054.23	263.70	155.	-5.	-0.003	379.71	1.220s
BI-210M	1062.75	265.83	193.	-27.	-0.015	70.75	1.222s
TL-208	1108.54	277.28	169.	-7.	-0.004	259.36	1.232s
Hg-203	1116.21	279.20	136.	20.	0.011	85.54	1.234
I-131	1136.60	284.30	136.	-4.	-0.002	573.00	1.239s
PB-214	1179.75	295.09	69.	174.	0.097	10.17	1.249D
PB-212	1199.51	300.03	58.	61.	0.034	21.95	1.253D
PA-231	1199.67	300.07	780.	-22.	-0.012	182.68	1.253
PA-233	1200.11	300.18	759.	-22.	-0.012	181.58	1.253
PA-231	1209.98	302.65	737.	0.	0.000	1000.00	1.255s
BA-133	1210.79	302.85	737.	0.	0.000	1000.00	1.256s
Ba-140	1218.78	304.85	737.	0.	0.000	1000.00	1.257s
BI-210M	1218.97	304.90	737.	0.	0.000	1000.00	1.257s
Ir-192	1233.14	308.44	737.	0.	0.000	1000.00	1.261s
Ir-192	1265.33	316.49	423.	20.	0.011	148.76	1.268s
CR-51	1279.70	320.08	150.	-4.	-0.002	423.76	1.271s
La-140	1314.40	328.76	581.	-24.	-0.013	74.83	1.279s
Cf-249	1333.11	333.44	557.	-23.	-0.013	145.57	1.283s
AC-228	1354.13	338.70	36.	161.	0.089	11.12	1.480s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	1361.62	340.57	534.	-19.	-0.011	171.49	1.290s
PB-214	1407.23	351.97	62.	290.	0.161	8.59	0.937s
BA-133	1423.33	356.00	416.	-11.	-0.006	263.95	1.303s
I-131	1457.25	364.48	65.	5.	0.003	339.43	1.311s
BA-133	1534.67	383.84	124.	17.	0.010	94.16	1.328s
Cf-249	1551.10	387.95	141.	17.	0.010	99.86	1.332s
SN-113	1566.06	391.69	196.	-12.	-0.007	136.09	1.335s
SB-125	1710.77	427.88	61.	10.	0.006	156.97	1.367s
AG-108M	1735.01	433.94	66.	7.	0.004	238.36	1.373s
pm-146	1814.77	453.88	43.	14.	0.008	101.97	1.390s
SB-125	1852.71	463.37	82.	18.	0.010	74.06	1.399s
Ir-192	1871.48	468.06	150.	-12.	-0.007	145.01	1.403s
BE-7	1909.62	477.60	212.	-21.	-0.012	98.73	1.411s
HF-181	1927.22	482.00	234.	-21.	-0.012	103.09	1.415s
La-140	1947.31	487.02	179.	18.	0.010	109.07	1.419s
RU-103	1987.44	497.05	57.	5.	0.003	284.98	1.428s
RH-106	2046.68	511.86	98.	104.	0.058	26.75	2.691s
Nd-147	2123.21	531.00	56.	-7.	-0.004	212.16	1.458s
Ba-140	2148.25	537.26	80.	-21.	-0.012	72.56	1.463s
CS-134	2252.15	563.24	47.	13.	0.007	113.03	1.486
CS-134	2276.48	569.32	47.	2.	0.001	419.18	1.491s
PA-234	2277.07	569.47	56.	-4.	-0.002	305.73	1.491s
BI-207	2278.00	569.70	36.	14.	0.008	67.64	1.491s
TL-208	2331.72	583.13	24.	232.	0.129	7.88	1.357
SB-125	2401.19	600.50	413.	-5.	-0.003	540.83	1.518s
SB-124	2410.11	602.73	425.	-18.	-0.010	168.15	1.519s
BI-214	2436.58	609.35	45.	217.	0.120	9.86	1.612
RU-103	2440.38	610.30	379.	-18.	-0.010	151.57	1.526s
AG-108M	2456.31	614.28	360.	-15.	-0.009	177.19	1.529s
PM-144	2471.43	618.06	384.	-22.	-0.012	128.03	1.533s
RH-106	2486.85	621.92	339.	8.	0.005	313.91	1.536s
SB-125	2542.74	635.89	46.	-8.	-0.004	133.67	1.548s
I-131	2547.08	636.97	61.	-6.	-0.003	193.57	1.549s
AG-110M	2630.23	657.76	40.	2.	0.001	401.39	1.566
CS-137	2645.82	661.66	61.	-4.	-0.002	280.62	1.570s
PM-144	2785.35	696.54	71.	16.	0.009	79.70	1.599
NB-94	2809.70	702.63	95.	16.	0.009	91.03	1.604s
SB-124	2890.33	722.79	124.	-15.	-0.008	108.74	1.621s
AG-108M	2890.93	722.94	109.	-9.	-0.005	165.86	1.621s
EU-154	2892.61	723.36	100.	0.	0.000	1000.00	1.622s
ZR-95	2895.98	724.20	114.	-16.	-0.009	94.96	1.622s
BI-212	2907.50	727.08	5.	68.	0.038	14.56	1.514
pm-146	2987.83	747.16	11.	11.	0.006	70.85	1.641s
ZR-95	3026.11	756.73	35.	11.	0.006	122.02	1.649s
AG-110M	3054.97	763.94	130.	-26.	-0.015	64.05	1.655s
NB-95	3062.35	765.79	172.	-28.	-0.015	69.79	1.657
PA-234M	3064.84	766.41	114.	17.	0.010	90.59	1.657s
EU-152	3114.88	778.92	103.	-17.	-0.010	87.09	1.668s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3140.88	785.42	129.	-6.	-0.003	278.63	1.673s
CS-134	3182.67	795.87	54.	14.	0.008	77.22	1.682s
CS-134	3207.01	801.95	41.	10.	0.006	94.84	1.687s
CO-58	3242.31	810.78	70.	-5.	-0.003	240.83	1.694s
La-140	3262.29	815.77	75.	0.	0.000	1000.00	1.698s
Cs-136	3273.21	818.50	86.	-10.	-0.006	130.91	1.700s
MN-54	3338.61	834.85	40.	8.	0.004	177.36	1.714s
Co-56	3386.31	846.77	30.	-2.	-0.001	606.22	1.723s
TL-208	3440.18	860.24	10.	44.	0.024	22.68	1.212s
NB-94	3483.63	871.10	25.	12.	0.007	65.36	1.743s
EU-154	3492.16	873.23	31.	7.	0.004	120.90	1.745s
PA-234	3521.37	880.53	43.	12.	0.007	81.10	1.751s
AG-110M	3537.98	884.68	55.	0.	0.000	1000.00	1.754s
Sc-46	3556.37	889.28	77.	-15.	-0.008	86.99	1.758s
y-88	3591.42	898.04	50.	-17.	-0.010	57.26	1.765s
AC-228	3644.00	911.18	15.	163.	0.091	9.49	1.475
AG-110M	3749.25	937.49	53.	-18.	-0.010	93.51	1.797s
PA-234	3783.37	946.02	33.	-2.	-0.001	887.75	1.803s
EU-152	3855.75	964.11	151.	16.	0.009	108.79	1.818s
AC-228	3875.20	968.97	68.	106.	0.059	14.66	1.822
EU-154	3984.66	996.33	32.	11.	0.006	78.56	1.844s
PA-234M	4003.33	1001.00	60.	-9.	-0.005	172.46	1.847s
EU-154	4018.45	1004.77	57.	-2.	-0.001	586.20	1.850s
Co-56	4150.74	1037.84	16.	1.	0.001	914.69	1.876s
Cs-136	4191.67	1048.07	40.	-8.	-0.004	121.66	1.884s
RH-106	4200.83	1050.36	56.	-4.	-0.002	257.56	1.886
BI-207	4254.05	1063.66	44.	-20.	-0.011	79.10	1.896s
Ga-68	4309.03	1077.40	21.	3.	0.001	398.43	1.907s
FE-59	4396.46	1099.25	16.	10.	0.006	96.26	1.924s
EU-152	4447.77	1112.07	168.	-20.	-0.011	93.53	1.934s
ZN-65	4461.66	1115.55	169.	-22.	-0.012	84.89	1.937s
BI-214	4480.98	1120.38	1.	65.	0.036	12.73	1.999
Sc-46	4481.68	1120.55	146.	-22.	-0.012	79.29	1.941
Ta-182	4484.68	1121.30	151.	-24.	-0.014	74.13	1.941
CO-60	4692.51	1173.24	68.	-24.	-0.013	83.58	1.981s
Ta-182	4755.78	1189.05	40.	-1.	0.000	949.30	1.993
Ta-182	4885.27	1221.41	17.	5.	0.003	206.25	2.017
Co-56	4952.78	1238.28	35.	17.	0.009	85.73	2.030s
NA-22	5097.85	1274.53	40.	-11.	-0.006	88.94	2.057s
EU-154	5097.90	1274.54	50.	0.	0.000	1000.00	2.057s
FE-59	5166.14	1291.60	11.	10.	0.006	83.64	2.070s
AG-110M	5537.14	1384.30	18.	6.	0.003	175.59	2.138s
EU-152	5632.00	1408.00	7.	7.	0.004	96.31	2.155s
K-40	5843.78	1460.92	11.	416.	0.231	5.19	2.855s
SB-124	6764.67	1690.98	0.	5.	0.003	44.72	2.353s
BI-214	7057.66	1764.17	3.	51.	0.028	14.80	2.685
Co-56	7086.40	1771.35	66.	-5.	-0.003	249.90	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	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.6841E+00				5.31E+01	
			477.60	-4.684E+00	?(	1.546E+01 9.87E+01	1.05E+01 G
NA-22	C	-5.2046E-01				9.50E+02	
			1274.53	-5.205E-01	?(	1.564E+00 8.89E+01	9.99E+01 G
K-40	N	2.1233E+02				4.66E+11	
			1460.83	2.123E+02	@(P	9.101E+00 5.19E+00	1.07E+01 G
Sc-46	F	-5.5049E-01				8.38E+01	
			889.28	-5.505E-01	?(	1.606E+00 8.70E+01	1.00E+02 G
			1120.55	-9.857E-01	+	2.602E+00 7.93E+01	1.00E+02 G
CR-51	F	-7.3493E-01				2.77E+01	
			320.08	-7.349E-01	?(P	1.041E+01 4.24E+02	9.94E+00 G
MN-54	C	2.8018E-01				3.12E+02	
			834.85	2.802E-01	&(	1.127E+00 1.77E+02	1.00E+02 G
FE-59	F	9.3830E-01				4.45E+01	
			1099.25	7.676E-01	?(	1.639E+00 9.63E+01	5.65E+01 G
			1291.60	1.162E+00	?(	2.099E+00 8.36E+01	4.32E+01 G
Co-56	C	4.2558E-01				7.73E+01	
			846.77	-7.084E-02	?(	1.000E+00 6.06E+02	9.99E+01 G
			1238.28	1.205E+00	(P	2.172E+00 8.57E+01	6.61E+01 G
			1037.84	2.934E-01	?(	6.264E+00 9.15E+02	1.41E+01 G
			1771.35	-1.918E+00	+	1.664E+01 2.50E+02	1.55E+01 A
CO-57	C	-3.0392E-01				2.72E+02	
			122.06	-3.039E-01	?(	1.164E+00 1.15E+02	8.56E+01 G
			136.47	0.000E+00	&	1.382E+01 1.00E+03	1.07E+01 G
CO-58	C	-1.7212E-01				7.09E+01	
			810.78	-1.721E-01	?(	1.435E+00 2.41E+02	9.95E+01 G
CO-60	F	-5.7246E-02				1.93E+03	
			1332.50	-5.725E-02	%(P	1.140E+00 1.27E+03	1.00E+02 G
			1173.24	-1.091E+00	&	1.880E+00 8.36E+01	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.9370E+00					2.44E+02	
			1115.55	-1.937E+00	?(	5.483E+00	8.49E+01	5.06E+01 G
NB-94	I	4.6665E-01					7.41E+06	
			702.63	4.948E-01	?(	1.511E+00	9.10E+01	9.79E+01 G
			871.10	4.391E-01	?(	9.477E-01	6.54E+01	9.99E+01 G
ZR-95	I	6.5605E-01					6.40E+01	
			756.73	6.561E-01	?(	1.806E+00	1.22E+02	5.45E+01 G
			724.20	-1.174E+00	+	3.741E+00	9.50E+01	4.42E+01 G
NB-95	I	-9.0738E-01					6.40E+01	
			765.79	-9.074E-01	&(	2.097E+00	6.98E+01	9.98E+01 G
RU-103	I	1.4217E-01					3.93E+01	
			497.05	1.422E-01	&(P	9.855E-01	2.85E+02	9.09E+01 G
			610.30	-8.826E+00	+	4.486E+01	1.52E+02	5.75E+00 GA
RH-106	I	2.3533E+00					3.74E+02	
			621.92	2.353E+00	?(P	2.495E+01	3.14E+02	9.93E+00 G
			1050.36	-1.118E+01	+	1.004E+02	2.58E+02	1.56E+00 G
			511.86	1.261E+01	?	5.921E+00	2.67E+01	2.00E+01 GA
AG-108M	C	1.6682E-01					1.53E+05	
			433.94	1.668E-01	?(P	9.636E-01	2.38E+02	9.05E+01 G
			722.94	-3.139E-01	+	1.774E+00	1.66E+02	9.08E+01 G
			614.28	-4.729E-01	+	2.816E+00	1.77E+02	8.98E+01 G
AG-110M	F	1.9753E-01					2.50E+02	
			884.68	0.000E+00	?(	1.878E+00	1.00E+03	7.27E+01 G
			657.76	6.964E-02	?(P	9.904E-01	4.01E+02	9.46E+01 G
			937.49	-2.043E+00	+	4.095E+00	9.35E+01	3.44E+01 G
			1384.30	1.287E+00	?(	4.822E+00	1.76E+02	2.43E+01 G
			763.94	-3.873E+00	+	8.185E+00	6.41E+01	2.23E+01 G
SN-113	F	-3.8187E-01					1.15E+02	
			391.69	-3.819E-01	?(P	2.121E+00	1.36E+02	6.40E+01 G
SB-124	F	-1.1849E-01					6.02E+01	
			602.73	-4.879E-01	&(	2.751E+00	1.68E+02	9.83E+01 G
			1690.98	6.410E-01	?(	9.448E-01	4.47E+01	4.78E+01 G
			722.79	-4.327E+00	+	1.584E+01	1.09E+02	1.08E+01 G
SB-125	I	1.5721E+00					1.01E+03	
			427.88	7.428E-01	(	2.804E+00	1.57E+02	2.96E+01 G
			600.50	-8.148E-01	&	1.489E+01	5.41E+02	1.79E+01 G
			635.89	-1.889E+00	+	8.684E+00	1.34E+02	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	3.917E+00	(	9.650E+00	7.41E+01	1.05E+01 G
I-131	I	1.1371E-01					8.02E+00	
			364.48	1.137E-01	?(P	9.358E-01	3.39E+02	8.17E+01 G
			284.30	-1.038E+00	&	1.480E+01	5.73E+02	6.14E+00 G
			636.97	-2.320E+00	&	1.553E+01	1.94E+02	7.17E+00 G
Gd-153	F	-4.8914E-01					2.42E+02	
			97.50	-4.891E-01	?(	6.692E+00	4.10E+02	3.00E+01 G
			103.20	0.000E+00	+	9.127E+00	1.00E+03	2.18E+01 G
Ga-68	C	4.0501E+00					4.71E-02	
			1077.40	4.050E+00	?(	3.681E+01	3.98E+02	3.30E+00 G
Tc-99m	I	-4.0789E-01					2.51E-01	
			140.51	-4.079E-01	&(	1.841E+00	1.36E+02	8.93E+01 G
BA-133	F	-3.3065E-01					3.85E+03	
			356.00	-3.306E-01	?(	2.938E+00	2.64E+02	6.20E+01 G
			302.85	0.000E+00	+	1.173E+01	1.00E+03	1.83E+01 G
			383.84	3.803E+00	?	1.200E+01	9.42E+01	8.94E+00 GA
			80.99	-1.209E+00	+ P	6.023E+00	8.21E+01	3.41E+01 GA
CS-134	I	5.6413E-01					7.54E+02	
			604.71	-1.818E-02	&(	2.720E+00	4.42E+03	9.76E+01 G
			795.87	5.653E-01	?(	1.458E+00	7.72E+01	8.55E+01 G
			569.32	3.979E-01	&(	5.890E+00	4.19E+02	1.54E+01 G
			801.95	3.969E+00	?(	1.276E+01	9.48E+01	8.69E+00 G
			563.24	4.123E+00	?(P	1.077E+01	1.13E+02	8.35E+00 G
CS-137	I	-1.3774E-01					1.10E+04	
			661.66	-1.377E-01	?(	1.347E+00	2.81E+02	8.52E+01 G
CE-139	F	-1.7082E-01					1.38E+02	
			165.85	-1.708E-01	&(	1.137E+00	1.97E+02	7.99E+01 G
Ba-140	I	-2.2104E+00					1.28E+01	
			537.26	-2.210E+00	?(P	4.568E+00	7.26E+01	2.44E+01 G
			162.66	-2.429E+00	&	1.557E+01	1.90E+02	6.22E+00 G
			304.85	0.000E+00	&	5.037E+01	1.00E+03	4.29E+00 G
La-140	I	3.3218E-01					1.28E+01	
			1596.21	5.471E-02	%(P	1.414E+00	1.22E+03	9.54E+01 G
			487.02	9.140E-01	&(	3.345E+00	1.09E+02	4.55E+01 G
			328.76	-2.086E+00	+ P	9.995E+00	7.48E+01	2.03E+01 G
			815.77	0.000E+00	-	6.364E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-7.6810E-01					3.25E+01	
			145.44	-7.681E-01	?(P	3.468E+00	4.54E+01	4.82E+01 G
PM-144	C	4.8443E-01					3.63E+02	
			696.54	4.844E-01	?(	1.290E+00	7.97E+01	9.90E+01 G
			618.06	-6.180E-01	-	2.647E+00	1.28E+02	9.91E+01 G
EU-152	F	1.5180E+00					4.94E+03	
			344.29	-7.248E-02	%(P	7.463E+00	3.05E+03	2.65E+01 G
			1112.07	-6.473E+00	+	2.024E+01	9.35E+01	1.36E+01 G
			121.78	-1.129E+00	+	3.355E+00	8.94E+01	2.86E+01 G
			778.92	-4.405E+00	&	1.284E+01	8.71E+01	1.29E+01 G
			964.11	4.404E+00	?(P	1.609E+01	1.09E+02	1.46E+01 G
			244.69	-9.181E-01	+ P	2.882E+01	3.86E+02	7.58E+00 G
			1408.00	1.718E+00	? P	3.706E+00	9.63E+01	2.10E+01 GA
EU-154	I	1.5746E+00					3.14E+03	
			873.23	2.032E+00	&(	8.481E+00	1.21E+02	1.23E+01 G
			123.10	7.533E-01	?(	2.218E+00	8.86E+01	4.08E+01 G
			1274.54	0.000E+00	-	4.957E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	7.654E+00	1.00E+03	2.02E+01 G
			1004.77	-4.114E-01	-	8.492E+00	5.86E+02	1.80E+01 G
			996.33	4.206E+00	?(	1.109E+01	7.86E+01	1.06E+01 G
HF-181	F	-6.1787E-01					4.24E+01	
			482.00	-6.179E-01	?(	2.131E+00	1.03E+02	8.05E+01 G
			133.02	0.000E+00	&	3.384E+00	1.00E+03	4.33E+01 G
			345.83	-9.251E-07	&	1.315E+01	4.21E+08	1.51E+01 G
			136.30	0.000E+00	&	2.523E+01	1.00E+03	5.85E+00 G
Ta-182	F	-3.0725E+00					1.14E+02	
			1121.30	-3.072E+00	(	7.561E+00	7.41E+01	3.49E+01 G
			1221.41	8.415E-01	+ P	3.845E+00	2.06E+02	2.70E+01 G
			1189.05	-2.481E-01	+ P	9.154E+00	9.49E+02	1.62E+01 G
Hg-203	F	3.8618E-01					4.66E+01	
			279.20	3.862E-01	&(	1.103E+00	8.55E+01	8.15E+01 G
TL-208	N	7.3360E+00					6.98E+02	
			583.02	7.336E+00	(P	8.032E-01	7.88E+00	8.45E+01 G
			277.28	-1.778E+00	-	1.571E+01	2.59E+02	6.31E+00 G
			860.56	1.264E+01	+ P	5.080E+00	2.27E+01	1.24E+01 G
pm-146	C	6.6421E-01					2.02E+03	
			747.16	1.041E+00	?(P	1.695E+00	7.09E+01	3.40E+01 G
			735.72	5.842E-02	% P	4.578E+00	3.38E+03	2.25E+01 G
			453.88	4.669E-01	*(	1.141E+00	1.02E+02	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	-6.9105E-01					1.07E+02	
			898.04	-6.910E-01	&(P	1.416E+00	5.73E+01	9.37E+01 G
			1836.06	-1.101E-01	+	9.740E-01	4.02E+02	9.92E+01 G
Cd-113m		-1.1760E+03					5.33E+03	
			263.70	-1.176E+03	?(	1.529E+04	3.80E+02	6.00E-03 K
Cf-251	T	-1.3570E-01					3.28E+05	
			176.60	-1.357E-01	%(	4.473E+00	1.33E+03	1.70E+01 G
			227.00	-1.300E+00	&	1.428E+01	4.45E+02	6.30E+00 GA
Cf-249	T	5.2044E-01					1.28E+05	
			387.95	5.204E-01	?(	1.744E+00	9.99E+01	6.60E+01 G
			333.44	-2.661E+00	+	1.294E+01	1.46E+02	1.55E+01 G
Sn-126		1.5553E-01					3.65E+07	
			87.57	1.555E-01	}	5.454E+00	4.67E+02	3.75E+01 GA
			64.28	1.555E-01	%(	1.621E+01	3.09E+03	9.70E+00 G
			86.94	1.555E-01	}	2.330E+01	1.86E+03	9.04E+00 GA
PB-210	N	1.1079E+01					8.14E+03	
			46.54	1.108E+01	(	3.992E+01	1.08E+02	4.25E+00 G
PB-212	N	2.0503E+01					6.98E+02	
			238.63	2.050E+01	(	1.499E+00	4.50E+00	4.33E+01 G
			300.03	3.058E+01	+	1.931E+01	2.20E+01	3.28E+00 GA
PB-214	N	1.4452E+01					5.84E+05	
			351.93	1.428E+01	(P	1.934E+00	8.59E+00	3.76E+01 G
			295.09	1.478E+01	(P	3.496E+00	1.02E+01	1.93E+01 G
			242.00	1.932E+01	+ P	1.045E+01	1.85E+01	7.43E+00 GA
BI-207	C	3.6818E-01					1.18E+04	
			569.70	3.682E-01	?(	8.251E-01	6.76E+01	9.77E+01 G
			1063.66	-1.126E+00	+ P	1.904E+00	7.91E+01	7.45E+01 G
BI-212	N	2.8381E+01					6.98E+02	
			727.17	2.838E+01	(	5.480E+00	1.46E+01	7.55E+00 G
			785.42	-1.523E+01	-	1.453E+02	2.79E+02	1.28E+00 GA
BI-214	N	1.2980E+01					5.84E+05	
			609.31	1.298E+01	(P	2.036E+00	9.86E+00	4.61E+01 G
			1120.29	1.883E+01	+ P	2.403E+00	1.27E+01	1.51E+01 G
			1764.49	2.108E+01	+ P	4.347E+00	1.48E+01	1.54E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T -8.0803E-01					1.10E+09	
		265.83	-8.080E-01	&(P	2.053E+00	7.07E+01	5.00E+01 G
		304.90	0.000E+00	&	7.718E+00	1.00E+03	2.80E+01 G
AC-228	N 2.2549E+01					2.10E+03	
		911.07	2.109E+01	(P	2.658E+00	9.49E+00	2.90E+01 G
		968.97	2.388E+01	?(P	9.249E+00	1.47E+01	1.75E+01 G
		338.32	2.413E+01	(P	4.589E+00	1.11E+01	1.20E+01 G
		93.35	2.958E+01	+	1.219E+01	1.90E+01	5.56E+00 XA
TH-227	N 4.3574E+00					7.95E+03	
		50.14	5.390E+00	?(	1.869E+01	1.04E+02	8.00E+00 G
		256.24	3.177E+00	@(	1.083E+01	1.38E+02	7.00E+00 G
TH-229	N 3.5724E+00					2.68E+06	
		193.51	1.393E+00	(	1.855E+01	5.39E+02	4.40E+00 G
		210.85	6.780E+00	&(P	3.067E+01	1.84E+02	2.99E+00 G
TH-234	N 9.9101E+00					1.63E+12	
		63.29	9.910E+00	*(P	3.628E+01	1.10E+02	3.81E+00 G
		92.59	-6.737E+00	-	3.619E+01	1.62E+02	5.58E+00 G
PA-233	C -5.3357E-02					7.82E+08	
		312.01	-5.336E-02	&(P	6.105E+00	1.58E+03	3.60E+01 G
		300.18	-5.764E+00	+	3.497E+01	1.82E+02	6.20E+00 G
PA-234	N 7.9350E-01					1.63E+12	
		131.29	7.935E-01	(P	8.050E+00	3.03E+02	1.80E+01 G
		946.02	-5.044E-01	+ P	8.455E+00	8.88E+02	1.34E+01 G
		569.47	-1.120E+00	&	1.197E+01	3.06E+02	8.20E+00 G
		883.24	6.013E-02	%	1.418E+01	6.64E+03	9.60E+00 G
		880.53	7.403E+00	?	2.016E+01	8.11E+01	6.00E+00 GA
PA-234M	N 1.7877E+01					1.63E+12	
		1001.00	-4.358E+01	?(P	1.869E+02	1.72E+02	8.37E-01 G
		766.41	1.928E+02	?(	5.853E+02	9.06E+01	2.94E-01 G
U-235	N -3.3213E+00					2.57E+11	
		143.79	-3.321E+00	?(P	1.446E+01	4.01E+01	1.10E+01 G
		205.33	-2.137E+00	+ P	1.731E+01	1.91E+02	5.01E+00 G
		163.38	3.977E+00	+	1.899E+01	1.42E+02	5.08E+00 G
AM-241	T 9.6780E-01					1.58E+05	
		59.54	9.678E-01	?(P	4.417E+00	1.37E+02	3.59E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ir-192   F   3.9025E-01                                      7.40E+01
                          316.49 3.902E-01 ?(  1.944E+00 1.49E+02 8.70E+01 G
                          468.06-5.350E-01 +   2.625E+00 1.45E+02 5.18E+01 G
                          308.44 0.000E+00 -   6.861E+00 1.00E+03 3.18E+01 G

Cs-136   F  -3.5639E-01                                      1.30E+01
                          818.50-3.564E-01 ?(  1.587E+00 1.31E+02 1.00E+02 G
                         1048.07-4.004E-01 +   1.674E+00 1.22E+02 8.00E+01 G
                          340.57-7.412E-01 +   4.256E+00 1.71E+02 4.69E+01 G

Np-239   T   1.0044E+00                                      2.36E+00
                          103.70 0.000E+00 -   8.285E+00 1.00E+03 2.40E+01 X
                          106.13 1.004E+00 &(  8.607E+00 2.57E+02 2.27E+01 G
                           99.50 0.000E+00 -   1.337E+01 1.00E+03 1.50E+01 X

Nd-147      -1.4051E+00                                      1.11E+01
                          531.00-1.405E+00 ?(  7.221E+00 2.12E+02 1.30E+01 G
                           91.10-1.336E+00 +   7.110E+00 1.60E+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 Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	294.	23.	0.013	107.80	1.108E+01	
TH-227	50.14	287.	24.	0.013	103.81	5.390E+00	
AM-241	59.54	515.	24.	0.013	136.61	9.678E-01	P
TH-234	63.29	447.	28.	0.015	109.82	9.910E+00	P
BA-133	80.99	1522.	-37.	-0.021	82.06	-1.209E+00	P
EU-155	86.54	1884.	-36.	-0.020	171.57	-1.255E+00	
Sn-126	87.57	1649.	5.	0.003	467.49	1.555E-01	
Nd-147	91.10	1651.	-36.	-0.020	160.08	-1.336E+00	
TH-234	92.59	1688.	-36.	-0.020	161.59	-6.737E+00	
Gd-153	97.50	1724.	-14.	-0.008	410.33	-4.891E-01	
Np-239	106.13	1689.	23.	0.013	257.30	1.004E+00	
EU-152	121.78	396.	-32.	-0.018	89.40	-1.129E+00	
CO-57	122.06	428.	-26.	-0.014	114.72	-3.039E-01	
EU-154	123.10	350.	31.	0.017	88.55	7.533E-01	
PA-234	131.29	897.	14.	0.008	303.26	7.935E-01	P
Tc-99m	140.51	1044.	-34.	-0.019	135.64	-4.079E-01	
CE-141	145.44	1117.	-35.	-0.020	45.45	-7.681E-01	P
Ba-140	162.66	324.	-14.	-0.007	190.37	-2.429E+00	
CE-139	165.85	290.	-12.	-0.007	197.45	-1.708E-01	
TH-229	193.51	188.	5.	0.003	538.76	1.393E+00	
TH-229	210.85	212.	16.	0.009	184.46	6.780E+00	P
Cf-251	227.00	184.	-6.	-0.003	444.51	-1.300E+00	
EU-152	244.69	1028.	-5.	-0.003	385.55	-9.181E-01	P
TH-227	256.24	108.	15.	0.008	138.08	3.177E+00	
Cd-113m	263.70	155.	-5.	-0.003	379.71	-1.176E+03	
BI-210M	265.83	193.	-27.	-0.015	70.75	-8.080E-01	P
Hg-203	279.20	136.	20.	0.011	85.54	3.862E-01	
I-131	284.30	136.	-4.	-0.002	573.00	-1.038E+00	
PA-231	300.07	780.	-22.	-0.012	182.68	-1.464E+01	
PA-233	300.18	759.	-22.	-0.012	181.58	-5.764E+00	
Ir-192	316.49	423.	20.	0.011	148.76	3.902E-01	
CR-51	320.08	150.	-4.	-0.002	423.76	-7.349E-01	P
La-140	328.76	581.	-24.	-0.013	74.83	-2.086E+00	P
Cf-249	333.44	557.	-23.	-0.013	145.57	-2.661E+00	
Cs-136	340.57	534.	-19.	-0.011	171.49	-7.412E-01	
BA-133	356.00	416.	-11.	-0.006	263.95	-3.306E-01	
I-131	364.48	65.	5.	0.003	339.43	1.137E-01	P
BA-133	383.84	124.	17.	0.010	94.16	3.803E+00	
Cf-249	387.95	141.	17.	0.010	99.86	5.204E-01	
SN-113	391.69	196.	-12.	-0.007	136.09	-3.819E-01	P
SB-125	427.88	61.	10.	0.006	156.97	7.428E-01	
AG-108M	433.94	66.	7.	0.004	238.36	1.668E-01	P
pm-146	453.88	43.	14.	0.008	101.97	4.669E-01	
SB-125	463.37	82.	18.	0.010	74.06	3.917E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	468.06	150.	-12.	-0.007	145.01	-5.350E-01	
BE-7	477.60	212.	-21.	-0.012	98.73	-4.684E+00	
HF-181	482.00	234.	-21.	-0.012	103.09	-6.179E-01	
La-140	487.02	179.	18.	0.010	109.07	9.140E-01	
RU-103	497.05	57.	5.	0.003	284.98	1.422E-01	P
RH-106	511.86	98.	104.	0.058	26.75	1.261E+01	
Nd-147	531.00	56.	-7.	-0.004	212.16	-1.405E+00	
Ba-140	537.26	80.	-21.	-0.012	72.56	-2.210E+00	P
CS-134	563.24	47.	13.	0.007	113.03	4.123E+00	P
CS-134	569.32	47.	2.	0.001	419.18	3.979E-01	
PA-234	569.47	56.	-4.	-0.002	305.73	-1.120E+00	
BI-207	569.70	36.	14.	0.008	67.64	3.682E-01	
SB-125	600.50	413.	-5.	-0.003	540.83	-8.148E-01	
SB-124	602.73	425.	-18.	-0.010	168.15	-4.879E-01	
RU-103	610.30	379.	-18.	-0.010	151.57	-8.826E+00	
AG-108M	614.28	360.	-15.	-0.009	177.19	-4.729E-01	
PM-144	618.06	384.	-22.	-0.012	128.03	-6.180E-01	
RH-106	621.92	339.	8.	0.005	313.91	2.353E+00	P
SB-125	635.89	46.	-8.	-0.004	133.67	-1.889E+00	
I-131	636.97	61.	-6.	-0.003	193.57	-2.320E+00	
AG-110M	657.76	40.	2.	0.001	401.39	6.964E-02	P
CS-137	661.66	61.	-4.	-0.002	280.62	-1.377E-01	
PM-144	696.54	71.	16.	0.009	79.70	4.844E-01	
NB-94	702.63	95.	16.	0.009	91.03	4.948E-01	
SB-124	722.79	124.	-15.	-0.008	108.74	-4.327E+00	
AG-108M	722.94	109.	-9.	-0.005	165.86	-3.139E-01	
ZR-95	724.20	114.	-16.	-0.009	94.96	-1.174E+00	
pm-146	747.16	11.	11.	0.006	70.85	1.041E+00	P
ZR-95	756.73	35.	11.	0.006	122.02	6.561E-01	
AG-110M	763.94	130.	-26.	-0.015	64.05	-3.873E+00	
NB-95	765.79	172.	-28.	-0.015	69.79	-9.074E-01	
PA-234M	766.41	114.	17.	0.010	90.59	1.928E+02	
EU-152	778.92	103.	-17.	-0.010	87.09	-4.405E+00	
CS-134	795.87	54.	14.	0.008	77.22	5.653E-01	
CS-134	801.95	41.	10.	0.006	94.84	3.969E+00	
CO-58	810.78	70.	-5.	-0.003	240.83	-1.721E-01	
Cs-136	818.50	86.	-10.	-0.006	130.91	-3.564E-01	
MN-54	834.85	40.	8.	0.004	177.36	2.802E-01	
Co-56	846.77	30.	-2.	-0.001	606.22	-7.084E-02	
NB-94	871.10	25.	12.	0.007	65.36	4.391E-01	
EU-154	873.23	31.	7.	0.004	120.90	2.032E+00	
PA-234	880.53	43.	12.	0.007	81.10	7.403E+00	
Sc-46	889.28	77.	-15.	-0.008	86.99	-5.505E-01	
y-88	898.04	50.	-17.	-0.010	57.26	-6.910E-01	P
AG-110M	937.49	53.	-18.	-0.010	93.51	-2.043E+00	
PA-234	946.02	33.	-2.	-0.001	887.75	-5.044E-01	P
EU-152	964.11	151.	16.	0.009	108.79	4.404E+00	P
EU-154	996.33	32.	11.	0.006	78.56	4.206E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	1001.00	60.	-9.	-0.005	172.46	-4.358E+01	P
EU-154	1004.77	57.	-2.	-0.001	586.20	-4.114E-01	
Co-56	1037.84	16.	1.	0.001	914.69	2.934E-01	
Cs-136	1048.07	40.	-8.	-0.004	121.66	-4.004E-01	
RH-106	1050.36	56.	-4.	-0.002	257.56	-1.118E+01	
BI-207	1063.66	44.	-20.	-0.011	79.10	-1.126E+00	P
Ga-68	1077.40	21.	3.	0.001	398.43	4.050E+00	
FE-59	1099.25	16.	10.	0.006	96.26	7.676E-01	
EU-152	1112.07	168.	-20.	-0.011	93.53	-6.473E+00	
ZN-65	1115.55	169.	-22.	-0.012	84.89	-1.937E+00	
Sc-46	1120.55	146.	-22.	-0.012	79.29	-9.857E-01	
Ta-182	1121.30	151.	-24.	-0.014	74.13	-3.072E+00	
CO-60	1173.24	68.	-24.	-0.013	83.58	-1.091E+00	
Ta-182	1189.05	40.	-1.	0.000	949.30	-2.481E-01	P
Ta-182	1221.41	17.	5.	0.003	206.25	8.415E-01	P
Co-56	1238.28	35.	17.	0.009	85.73	1.205E+00	P
NA-22	1274.53	40.	-11.	-0.006	88.94	-5.205E-01	
FE-59	1291.60	11.	10.	0.006	83.64	1.162E+00	
AG-110M	1384.30	18.	6.	0.003	175.59	1.287E+00	
EU-152	1408.00	7.	7.	0.004	96.31	1.718E+00	P
SB-124	1690.98	0.	5.	0.003	44.72	6.410E-01	
Co-56	1771.35	66.	-5.	-0.003	249.90	-1.918E+00	
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	-4.6840E+00	-4.6841E+00	9.873E+01%	1.55E+01
NA-22	#A	-5.2046E-01	-5.2046E-01	8.894E+01%	1.56E+00
K-40	#	2.1233E+02	2.1233E+02	5.186E+00%	9.10E+00
Sc-46	#A	-5.5049E-01	-5.5049E-01	8.699E+01%	1.61E+00
CR-51	#A	-7.3492E-01	-7.3493E-01	4.238E+02%	1.04E+01
MN-54	#A	2.8018E-01	2.8018E-01	1.774E+02%	1.13E+00
FE-59	#A	9.3829E-01	9.3830E-01	6.376E+01%	1.64E+00
Co-56	#A	4.2558E-01	4.2558E-01	8.573E+01%	1.00E+00
CO-57	#A	-3.0392E-01	-3.0392E-01	1.147E+02%	1.16E+00
CO-58	#A	-1.7212E-01	-1.7212E-01	2.408E+02%	1.44E+00
CO-60	#A	-5.7246E-02	-5.7246E-02	1.272E+03%	1.14E+00
ZN-65	#A	-1.9370E+00	-1.9370E+00	8.489E+01%	5.48E+00
NB-94	#A	4.6665E-01	4.6665E-01	5.603E+01%	1.51E+00
ZR-95	#A	6.5605E-01	6.5605E-01	1.220E+02%	1.81E+00
NB-95	#A	-9.0737E-01	-9.0738E-01	6.979E+01%	2.10E+00
RU-103	#A	1.4216E-01	1.4217E-01	2.850E+02%	9.86E-01
RH-106	#A	2.3533E+00	2.3533E+00	3.139E+02%	2.50E+01

AG-108M#A	1.6682E-01	1.6682E-01	2.384E+02%	9.64E-01
AG-110M#A	1.9753E-01	1.9753E-01	1.756E+02%	1.88E+00
SN-113 #A	-3.8186E-01	-3.8187E-01	1.361E+02%	2.12E+00
SB-124 #A	-1.1849E-01	-1.1849E-01	4.472E+01%	2.75E+00
SB-125 #A	1.5721E+00	1.5721E+00	7.406E+01%	2.80E+00
I-131 #A	1.1370E-01	1.1371E-01	3.394E+02%	9.36E-01
Gd-153 #A	-4.8914E-01	-4.8914E-01	4.103E+02%	6.69E+00
Ga-68 #A	4.0069E+00	4.0501E+00	3.984E+02%	3.68E+01
Tc-99m #A	-4.0707E-01	-4.0789E-01	1.356E+02%	1.84E+00
BA-133 #A	-3.3065E-01	-3.3065E-01	2.639E+02%	2.94E+00
CS-134 #A	5.6413E-01	5.6413E-01	7.722E+01%	2.72E+00
CS-137 #A	-1.3774E-01	-1.3774E-01	2.806E+02%	1.35E+00
CE-139 #A	-1.7082E-01	-1.7082E-01	1.974E+02%	1.14E+00
Ba-140 #A	-2.2103E+00	-2.2104E+00	7.256E+01%	4.57E+00
La-140 #A	3.3217E-01	3.3218E-01	1.091E+02%	1.41E+00
CE-141 #A	-7.6809E-01	-7.6810E-01	4.545E+01%	3.47E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+01
PM-144 #A	4.8443E-01	4.8443E-01	7.970E+01%	1.29E+00
EU-152 #A	1.5180E+00	1.5180E+00	1.088E+02%	7.46E+00
EU-154 #A	1.5746E+00	1.5746E+00	5.640E+01%	8.48E+00
EU-155 #A	0.0000E+00	0.0000E+00	1.000E+03%	9.35E+00
HF-181 #A	-6.1787E-01	-6.1787E-01	1.031E+02%	2.13E+00
Ta-182 #A	-3.0725E+00	-3.0725E+00	7.413E+01%	7.56E+00
Hg-203 #A	3.8618E-01	3.8618E-01	8.554E+01%	1.10E+00
TL-208	7.3360E+00	7.3360E+00	7.882E+00%	8.03E-01
pm-146 #A	6.6421E-01	6.6421E-01	6.209E+01%	1.69E+00
y-88 #A	-6.9104E-01	-6.9105E-01	5.726E+01%	1.42E+00
Cd-113m#A	-1.1760E+03	-1.1760E+03	3.797E+02%	1.53E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.47E+01
Cf-251 #A	-1.3570E-01	-1.3570E-01	1.330E+03%	4.47E+00
Cf-249 #A	5.2044E-01	5.2044E-01	9.986E+01%	1.74E+00
Sn-126 A	1.5553E-01	1.5553E-01	3.092E+03%	1.62E+01
PB-210 #A	1.1079E+01	1.1079E+01	1.078E+02%	3.99E+01
PB-212	2.0503E+01	2.0503E+01	4.502E+00%	1.50E+00
PB-214	1.4452E+01	1.4452E+01	6.654E+00%	1.93E+00
BI-207 #A	3.6818E-01	3.6818E-01	6.764E+01%	8.25E-01
BI-212	2.8381E+01	2.8381E+01	1.456E+01%	5.48E+00
BI-214	1.2980E+01	1.2980E+01	9.864E+00%	2.04E+00
BI-210M#A	-8.0803E-01	-8.0803E-01	7.075E+01%	2.05E+00
AC-228	2.2549E+01	2.2549E+01	6.902E+00%	2.66E+00
TH-227 #A	4.3574E+00	4.3574E+00	8.638E+01%	1.87E+01
TH-229 #A	3.5724E+00	3.5724E+00	1.845E+02%	1.86E+01
TH-234 #A	9.9101E+00	9.9101E+00	1.098E+02%	3.63E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.46E+01
PA-233 #A	-5.3357E-02	-5.3357E-02	1.578E+03%	6.10E+00
PA-234 #A	7.9350E-01	7.9350E-01	3.033E+02%	8.05E+00
PA-234M#A	1.7877E+01	1.7877E+01	9.059E+01%	1.87E+02
U-235 #A	-3.3213E+00	-3.3213E+00	4.009E+01%	1.45E+01
AM-241 #A	9.6780E-01	9.6780E-01	1.366E+02%	4.42E+00

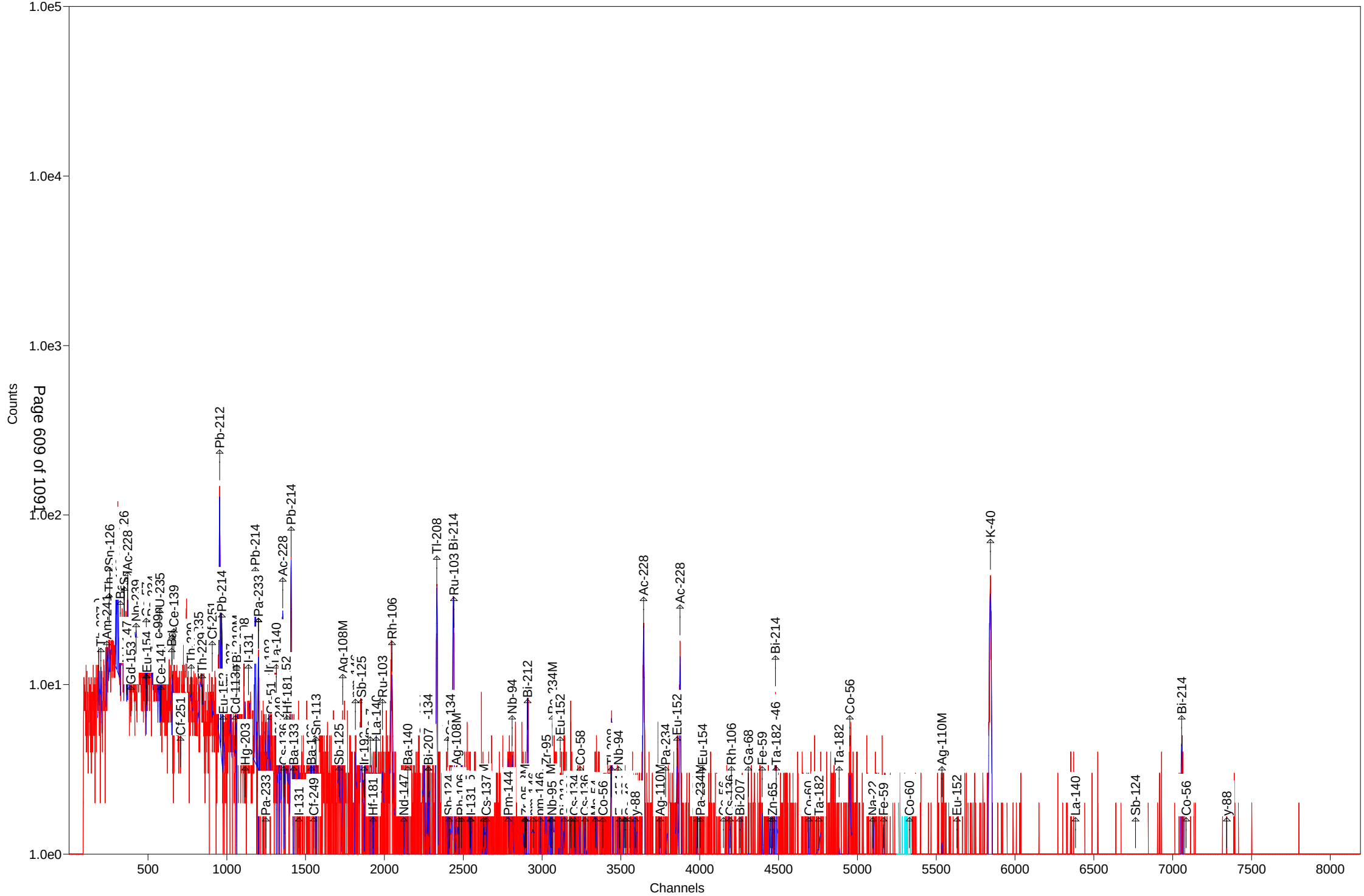
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.64E+01
Ir-192 #A	3.9025E-01	3.9025E-01	1.488E+02%		1.94E+00
Cs-136 #A	-3.5637E-01	-3.5639E-01	1.309E+02%		1.59E+00
Np-239 #A	1.0042E+00	1.0044E+00	2.573E+02%		8.61E+00
Nd-147 #A	-1.4051E+00	-1.4051E+00	2.122E+02%		7.22E+00

- 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) 3.185E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.1853091E+02 Bq/Sample

264540_Gamma_160-18553-A-8-B. 13_Gamma_20160735.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161872

Sample Description: 264540_Gamma_160-18553-A-9-B
Detector: Detector #12
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-9-B

Decay to Time: 9/1/2016 15:14 Live Time: 1800 sec
Acquisition Time: 9/1/2016 15:14:16 Real Time: 1811 sec
Analysis Time: 9/1/2016 15:44 Dead Time: 0.61 %
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	-1.414E+00	273.0	3.861E+00	3.862E+00	1.328E+01
NA-22	2.717E-01	147.4	4.006E-01	4.008E-01	1.411E+00
K-40	2.053E+02	5.5	1.137E+01	1.548E+01	8.496E+00
Sc-46	5.715E-01	63.5	3.632E-01	3.643E-01	1.745E+00
CR-51	-3.960E+00	155.8	6.171E+00	6.175E+00	2.068E+01
MN-54	5.601E-01	88.9	4.977E-01	4.985E-01	1.156E+00
FE-59	-1.763E+00	53.8	9.492E-01	9.533E-01	3.222E+00
Co-56	1.207E+00	20.4	2.463E-01	2.540E-01	3.135E-01
CO-57	-7.324E-02	446.8	3.272E-01	3.273E-01	1.112E+00
CO-58	2.757E-01	152.5	4.204E-01	4.207E-01	1.452E+00
CO-60	-4.685E-01	111.4	5.219E-01	5.224E-01	1.504E+00
ZN-65	0.000E+00	1.#INF	2.540E-01	2.540E-01	4.762E+00
NB-94	3.833E-01	107.1	4.104E-01	4.109E-01	9.774E-01
ZR-95	3.068E-01	287.8	8.829E-01	8.831E-01	2.107E+00
NB-95	-3.555E-01	132.9	4.723E-01	4.727E-01	1.614E+00
RU-103	3.513E-01	98.3	3.452E-01	3.457E-01	8.361E-01
RH-106	5.296E+00	146.5	7.757E+00	7.762E+00	2.610E+01
AG-108M	2.577E-01	94.6	2.436E-01	2.440E-01	9.268E-01
AG-110M	4.482E-01	37.8	1.694E-01	1.710E-01	2.694E+00
SN-113	-6.179E-01	114.3	7.062E-01	7.069E-01	2.374E+00
SB-124	1.904E-01	40.8	7.774E-02	7.836E-02	3.173E+00
SB-125	1.062E+00	115.1	1.222E+00	1.223E+00	2.673E+00
I-131	9.415E-01	35.7	3.363E-01	3.398E-01	7.798E-01
Gd-153	-9.888E-01	137.6	1.361E+00	1.362E+00	4.547E+00
Ga-68	1.804E+01	96.3	1.736E+01	1.739E+01	3.851E+01
Tc-99m	-3.856E-01	154.9	5.972E-01	5.976E-01	1.992E+00
BA-133	-4.811E-01	186.6	8.977E-01	8.980E-01	3.024E+00
CS-134	4.639E-01	43.1	1.999E-01	2.013E-01	3.130E+00
CS-137	5.918E-01	83.2	4.926E-01	4.936E-01	1.651E+00
CE-139	-3.749E-01	108.0	4.048E-01	4.064E-01	1.354E+00
Ba-140	-9.032E-01	71.8	6.485E-01	6.502E-01	4.894E+00
La-140	-5.523E-01	71.9	3.969E-01	3.980E-01	2.057E+00
CE-141	-7.356E-01	157.3	1.157E+00	1.158E+00	3.858E+00

CE-144	-2.948E+00	155.9	4.596E+00	4.599E+00	1.533E+01
PM-144	2.539E-01	181.9	4.619E-01	4.621E-01	1.096E+00
EU-152	8.399E-01	243.4	2.044E+00	2.045E+00	6.663E+00
EU-154	1.369E+00	82.3	1.126E+00	1.128E+00	1.087E+01
EU-155	-1.452E+00	150.8	2.190E+00	2.191E+00	7.309E+00
HF-181	0.000E+00	1.#INF	2.791E-01	2.791E-01	1.789E+00
Ta-182	2.034E+00	68.1	1.386E+00	1.390E+00	5.466E+00
Hg-203	-4.058E-01	96.4	3.912E-01	3.918E-01	1.312E+00
TL-208	8.462E+00	7.8	6.573E-01	7.904E-01	8.385E-01
pm-146	4.718E-01	110.8	5.227E-01	5.233E-01	3.340E+00
y-88	6.627E-01	44.3	2.936E-01	2.956E-01	6.240E-01
Cd-113m	-6.079E+03	91.3	5.551E+03	5.565E+03	1.856E+04
Cd-109	1.008E+01	135.0	1.360E+01	1.361E+01	4.533E+01
Cf-251	2.775E-02	6539.6	1.815E+00	1.815E+00	4.744E+00
Cf-249	7.536E-01	91.8	6.915E-01	6.926E-01	1.988E+00
Sn-126	-4.122E+00	135.8	5.598E+00	5.603E+00	1.870E+01
PB-210	1.591E+01	65.8	1.047E+01	1.051E+01	2.917E+01
PB-212	2.084E+01	5.0	1.036E+00	1.701E+00	1.727E+00
PB-214	1.217E+01	8.2	9.942E-01	1.178E+00	2.006E+00
BI-207	1.202E-01	99.0	1.190E-01	1.192E-01	1.319E+00
BI-212	5.882E+00	88.6	5.214E+00	5.223E+00	1.758E+01
BI-214	1.086E+01	11.2	1.214E+00	1.339E+00	2.116E+00
BI-210M	4.737E-01	136.2	6.452E-01	6.458E-01	2.181E+00
AC-228	2.371E+01	8.5	2.019E+00	2.354E+00	2.886E+00
TH-227	7.679E-01	153.3	1.177E+00	1.178E+00	2.235E+01
TH-229	1.479E+00	505.2	7.472E+00	7.473E+00	1.945E+01
TH-234	1.663E+01	49.5	8.236E+00	8.281E+00	2.670E+01
PA-231	5.283E+00	188.2	9.941E+00	9.945E+00	6.361E+01
PA-233	0.000E+00	1.#INF	2.439E-01	2.439E-01	5.196E+00
PA-234	2.585E+00	75.7	1.956E+00	1.961E+00	8.185E+00
PA-234M	5.820E+00	948.3	5.519E+01	5.519E+01	1.959E+02
U-235	-3.570E+00	73.3	2.615E+00	2.621E+00	1.619E+01
AM-241	-1.372E+00	125.5	1.721E+00	1.722E+00	5.740E+00
Np-237	0.000E+00	1.#INF	4.234E+00	4.234E+00	1.418E+01
Ir-192	-4.674E-01	156.9	7.333E-01	7.338E-01	2.456E+00
Cs-136	7.905E-01	34.6	2.733E-01	2.770E-01	1.444E+00
Np-239	1.308E+00	154.7	2.023E+00	2.025E+00	6.756E+00
Nd-147	-1.158E+00	258.8	2.998E+00	2.998E+00	7.368E+00
Total	3.861E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-9-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161872.An1

Acquisition information
Start time: 9/1/2016 3:14:16 PM
Live time: 1800
Real time: 1811
Dead time: 0.61 %
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 3:14:00 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: 0.1259

***** 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
46.71	27.	65.79	0.40	2.242E-02	46.54	4.250	PBC<MDA	PB210
63.25	38.	49.53	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
74.78	183.	13.31	0.92	3.876E-02				
77.15	318.	7.80	0.92	3.964E-02				
87.23	146.	14.94	1.09	4.259E-02	86.49	13.100	1.460E+01	Np237
					86.54	30.700	6.227E+00	EU155
					86.94	9.040	2.110E+01	Sn126
					87.57	37.500	5.069E+00	Sn126
					88.04	3.790	5.003E+01	Cd109
91.10	5.	760.83	0.93	4.341E-02	91.10	28.300	PBC<MDA	Nd147
93.05	128.	19.22	1.49	4.376E-02	92.59	5.584	2.232E+01	TH234
					93.35	5.561	2.930E+01	AC228
106.13	24.	154.67	0.95	4.521E-02	106.13	22.700	PBC<MDA	Np239
123.10	20.	98.18	0.96	4.522E-02	123.10	40.790	PBC<MDA	EU154
131.29	22.	158.52	0.97	4.468E-02	131.29	18.000	PBC<MDA	PA234
135.73	16.	66.05	0.56	4.427E-02	136.30	5.850	3.401E+00	HF181
					136.47	10.680	1.863E+00	CO57
162.66	21.	104.75	1.00	4.072E-02	162.66	6.220	PBC<MDA	Ba140
163.38	17.	130.44	1.00	4.061E-02	163.38	5.080	PBC<MDA	U235
192.96	4.	505.15	1.03	3.699E-02	193.51	4.400	PBC<MDA	TH229
238.60	511.	5.65	1.13	3.220E-02	238.63	43.300	2.038E+01	PB212
241.98	88.	16.73	1.07	3.189E-02	242.00	7.430	2.072E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	16.	243.38	1.08	3.166E-02	244.69	7.580	PBC<MDA	EU152
256.24	11.	153.28	1.09	3.069E-02	256.24	7.000	PBC<MDA	TH227
265.83	13.	136.21	1.10	2.994E-02	265.83	50.000	PBC<MDA	BI210M
277.44	35.	40.10	1.58	2.910E-02	277.28	6.310	1.056E+01	TL208
294.99	135.	12.94	0.82	2.789E-02	295.09	19.300	1.394E+01	PB214
300.07	14.	188.17	1.13	2.757E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.147E+01	PA231
					300.18	6.200	4.551E+00	PA233
300.34	42.	31.34	1.03	2.757E-02	300.03	3.280	2.588E+01	PB212
					300.07	2.460	3.451E+01	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	16.	104.95	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	103.14	1.16	2.564E-02	333.44	15.510	PBC<MDA	Cf249
338.25	123.	13.91	1.00	2.538E-02	338.32	12.010	2.247E+01	AC228
351.79	188.	9.97	1.34	2.471E-02	351.93	37.600	1.126E+01	PB214
364.57	33.	35.72	1.19	2.410E-02	364.48	81.700	9.415E-01	I131
383.84	15.	100.84	1.20	2.325E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	151.79	1.21	2.307E-02	387.95	66.000	PBC<MDA	Cf249
427.88	8.	151.04	1.24	2.153E-02	427.88	29.600	PBC<MDA	SB125
463.01	53.	19.95	1.45	2.036E-02	463.37	10.470	1.365E+01	SB125
497.05	11.	98.26	1.31	1.935E-02	497.05	90.900	PBC<MDA	RU103
510.82	111.	16.35	1.34	1.897E-02	511.86	20.000	1.621E+01	RH106
563.24	11.	95.64	1.36	1.768E-02	563.24	8.350	PBC<MDA	CS134
569.32	9.	121.49	1.37	1.754E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.412E+00	PA234
					569.70	97.740	2.864E-01	BI207
569.47	13.	75.67	1.37	1.754E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.868E+00	PA234
					569.70	97.740	4.086E-01	BI207
583.27	222.	7.77	1.43	1.723E-02	583.02	84.500	8.462E+00	TL208
609.37	150.	11.17	1.43	1.669E-02	609.31	46.090	1.086E+01	BI214
621.92	16.	146.47	1.42	1.644E-02	621.92	9.930	PBC<MDA	RH106
661.66	14.	83.24	1.45	1.571E-02	661.66	85.210	PBC<MDA	CS137
696.54	7.	181.90	1.48	1.513E-02	696.54	99.000	PBC<MDA	PM144
702.63	10.	107.08	1.49	1.503E-02	702.63	97.900	PBC<MDA	NB94
722.79	12.	85.03	1.50	1.472E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.856E-01	AG108M
					723.36	20.220	2.183E+00	EU154
722.94	12.	94.56	1.50	1.471E-02	722.79	10.810	4.080E+00	SB124
					722.94	90.840	4.856E-01	AG108M
					723.36	20.220	2.183E+00	EU154
723.36	12.	103.19	1.50	1.471E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.857E-01	AG108M
					723.36	20.220	2.183E+00	EU154
727.17	12.	88.64	1.51	1.465E-02	727.17	7.550	PBC<MDA	BI212
735.72	10.	110.78	1.51	1.452E-02	735.72	22.500	PBC<MDA	pm146
756.73	4.	287.75	1.53	1.422E-02	756.73	54.460	PBC<MDA	ZR95
785.13	6.	198.49	1.56	1.383E-02	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
795.87	22.	43.08	1.56	1.369E-02	795.87	85.530	PBC<MDA	CS134
810.78	7.	152.48	1.58	1.351E-02	810.78	99.460	PBC<MDA	CO58
818.50	11.	93.56	1.58	1.341E-02	818.50	100.000	PBC<MDA	Cs136
834.85	13.	88.86	1.60	1.321E-02	834.85	99.980	PBC<MDA	MN54
846.77	24.	20.41	1.61	1.307E-02	846.77	99.935	1.021E+00	Co56
860.70	33.	20.78	1.29	1.291E-02	860.56	12.420	1.160E+01	TL208
889.28	13.	91.93	1.64	1.260E-02	889.28	99.984	PBC<MDA	Sc46
898.04	14.	44.30	1.65	1.250E-02	898.04	93.700	6.627E-01	y88
911.33	156.	9.83	1.91	1.237E-02	911.07	29.000	2.422E+01	AC228
968.85	51.	28.73	1.71	1.180E-02	968.97	17.460	1.372E+01	AC228
996.33	10.	82.26	1.73	1.155E-02	996.33	10.600	PBC<MDA	EU154
1001.00	1.	948.25	1.73	1.151E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	9.	87.10	1.76	1.119E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	19.	34.57	1.77	1.111E-02	1048.07	80.000	1.208E+00	Cs136
1063.66	9.	117.64	1.78	1.099E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	10.	96.26	1.79	1.088E-02	1077.40	3.300	PBC<MDA	Ga68
1120.07	7.	141.44	1.83	1.055E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	11.	87.75	1.83	1.055E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.798E-01	Sc46
					1121.30	34.900	1.662E+00	Ta182
1189.05	8.	95.58	1.88	1.008E-02	1189.05	16.200	PBC<MDA	Ta182
1238.28	17.	49.98	1.92	9.765E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	5.	147.43	1.95	9.547E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.717E-01	EU154
1384.30	7.	37.80	2.03	8.948E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	86.91	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1461.11	338.	5.54	2.01	8.576E-03	1460.83	10.670	2.053E+02	K40
1690.98	6.	40.82	2.25	7.633E-03	1690.98	47.790	PBC<MDA	SB124
1764.62	8.	91.59	2.30	7.376E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	90.53	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
298.66	74.77	203.	183.	4.710E+03	13.31	0.916	- D
308.15	77.15	148.	318.	8.013E+03	7.80	0.919	- sD
542.28	135.73	43.	16.	3.576E+02	66.05	0.561	- s
1850.66	463.01	13.	53.	2.587E+03	19.95	1.449	- s
2041.87	510.82	69.	111.	5.826E+03	16.35	1.344	- 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	186.46	46.71	102.	27.	0.015	65.79	0.397s
TH-227	200.19	50.14	278.	-4.	-0.002	675.22	0.893s
AM-241	237.74	59.54	589.	-28.	-0.015	125.48	0.902s
TH-234	252.73	63.29	157.	38.	0.021	49.53	0.905D
Sn-126	256.70	64.28	537.	-24.	-0.014	135.82	0.906s
BA-133	323.48	80.99	1182.	-31.	-0.017	77.93	0.922s
Np-237	345.47	86.49	891.	0.	0.000	380.43	0.928A
EU-155	345.68	86.54	892.	-29.	-0.016	145.06	0.928s
Sn-126	347.27	86.94	773.	29.	0.016	75.11	0.928D
Sn-126	349.78	87.57	748.	29.	0.016	73.96	0.929D
Cd-109	351.66	88.04	773.	29.	0.016	135.00	0.929A
Nd-147	363.89	91.10	803.	5.	0.003	760.83	0.932s
TH-234	369.85	92.59	239.	8.	0.004	292.67	0.934D
AC-228	372.88	93.35	755.	30.	0.016	132.71	0.934s
Gd-153	389.47	97.50	521.	-24.	-0.013	137.63	0.938s
Np-239	397.47	99.50	621.	-26.	-0.015	136.33	0.940s
Gd-153	412.25	103.20	647.	-26.	-0.015	138.58	0.944
Np-239	414.25	103.70	673.	-26.	-0.015	141.24	0.944
EU-155	420.70	105.31	700.	-25.	-0.014	150.78	0.946s
Np-239	423.96	106.13	687.	24.	0.013	154.67	0.946s
EU-152	486.50	121.78	235.	-23.	-0.013	96.98	0.961s
CO-57	487.64	122.06	258.	-5.	-0.003	446.83	0.962s
EU-154	491.79	123.10	184.	20.	0.011	98.18	0.963s
PA-234	524.55	131.29	617.	22.	0.012	158.52	0.970s
CE-144	533.51	133.54	820.	-26.	-0.015	155.93	0.973s
HF-181	544.55	136.30	793.	-26.	-0.015	153.05	0.975s
CO-57	545.24	136.47	793.	-26.	-0.015	152.98	0.975s
Tc-99m	561.38	140.51	819.	-26.	-0.015	154.85	0.979s
U-235	574.47	143.79	849.	-31.	-0.017	73.26	0.982s
CE-141	581.09	145.44	926.	-28.	-0.015	157.33	0.984
Ba-140	649.91	162.66	228.	21.	0.012	104.75	1.000s
U-235	652.79	163.38	250.	17.	0.010	130.44	1.001s
CE-139	662.68	165.85	272.	-22.	-0.012	108.00	1.003
TH-229	773.22	193.51	136.	4.	0.002	505.15	1.029s
U-235	820.49	205.33	148.	-22.	-0.012	105.93	1.040s
TH-229	842.54	210.85	216.	-28.	-0.016	100.42	1.046s
Cf-251	907.10	227.00	99.	-3.	-0.002	623.16	1.061s
PB-212	953.60	238.63	76.	523.	0.291	4.97	1.071D
PB-214	967.05	242.00	65.	88.	0.049	16.73	1.075D
EU-152	977.83	244.69	780.	16.	0.009	243.38	1.077s
TH-227	1023.99	256.24	73.	11.	0.006	153.28	1.088s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1053.81	263.70	153.	-20.	-0.011	91.32	1.095s
BI-210M	1062.33	265.83	145.	13.	0.007	136.21	1.097s
TL-208	1108.74	277.44	39.	35.	0.019	40.10	1.576s
Hg-203	1115.78	279.20	129.	-17.	-0.010	96.38	1.109s
PB-214	1178.91	294.99	42.	135.	0.075	12.94	0.823s
PB-212	1200.30	300.34	38.	42.	0.023	31.34	1.026
PA-231	1199.21	300.07	340.	14.	0.008	188.17	1.128
PA-233	1199.65	300.18	354.	0.	0.000	1000.00	1.128
PA-231	1209.52	302.65	354.	0.	0.000	1000.00	1.131s
BA-133	1210.33	302.85	354.	0.	0.000	1000.00	1.131s
Ba-140	1218.32	304.85	354.	0.	0.000	1000.00	1.133
BI-210M	1218.50	304.90	354.	0.	0.000	1000.00	1.133s
Ir-192	1232.67	308.44	354.	0.	0.000	1000.00	1.136s
PA-233	1246.95	312.01	354.	0.	0.000	1000.00	1.139s
Ir-192	1264.85	316.49	456.	-19.	-0.011	156.88	1.143s
CR-51	1279.22	320.08	415.	-19.	-0.010	155.83	1.147s
La-140	1313.91	328.76	126.	16.	0.009	104.95	1.155s
Cf-249	1332.62	333.44	138.	17.	0.009	103.14	1.159s
AC-228	1351.84	338.25	37.	123.	0.069	13.91	1.001s
Cs-136	1361.13	340.57	278.	-5.	-0.003	473.71	1.165s
EU-152	1375.98	344.29	273.	0.	0.000	1000.00	1.169s
HF-181	1382.15	345.83	273.	0.	0.000	1000.00	1.170s
PB-214	1405.99	351.79	44.	188.	0.105	9.97	1.345s
BA-133	1422.81	356.00	295.	-13.	-0.007	186.58	1.180s
I-131	1456.73	364.48	29.	33.	0.019	35.72	1.187s
BA-133	1534.13	383.84	108.	15.	0.008	100.84	1.205s
Cf-249	1550.56	387.95	123.	11.	0.006	151.79	1.209
SN-113	1565.51	391.69	166.	-16.	-0.009	114.29	1.212
SB-125	1710.19	427.88	36.	8.	0.004	151.04	1.245
pm-146	1814.18	453.88	64.	-10.	-0.006	118.89	1.268s
SB-125	1852.11	463.37	93.	8.	0.004	173.75	1.277s
Ir-192	1870.88	468.06	107.	-7.	-0.004	212.37	1.281s
BE-7	1909.00	477.60	103.	-5.	-0.003	273.00	1.289s
HF-181	1926.61	482.00	109.	0.	0.000	1000.00	1.293s
La-140	1946.69	487.02	109.	0.	0.000	1000.00	1.298s
RU-103	1986.82	497.05	26.	11.	0.006	98.26	1.307s
RH-106	2046.04	511.86	232.	-25.	-0.014	87.62	2.570s
Nd-147	2122.56	531.00	39.	-5.	-0.003	258.84	1.337s
Ba-140	2147.60	537.26	62.	-18.	-0.010	98.23	1.342
CS-134	2251.48	563.24	26.	11.	0.006	95.64	1.365s
CS-134	2275.81	569.32	53.	9.	0.005	121.49	1.370
PA-234	2276.41	569.47	39.	13.	0.007	75.67	1.370
BI-207	2277.34	569.70	66.	-7.	-0.004	159.30	1.371s
TL-208	2331.59	583.27	17.	222.	0.123	7.77	1.427
SB-125	2400.51	600.50	405.	-18.	-0.010	164.19	1.398s
SB-124	2409.43	602.73	387.	-18.	-0.010	160.48	1.399s
CS-134	2417.34	604.71	370.	-18.	-0.010	156.69	1.401s
BI-214	2435.98	609.37	33.	150.	0.084	11.17	1.433

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2439.69	610.30	352.	-18.	-0.010	152.47	1.406s
AG-108M	2455.62	614.28	335.	-18.	-0.010	148.34	1.410s
PM-144	2470.74	618.06	317.	-5.	-0.003	513.06	1.413s
RH-106	2486.16	621.92	252.	16.	0.009	146.47	1.416s
SB-125	2542.05	635.89	54.	-17.	-0.010	65.06	1.428
I-131	2546.39	636.97	77.	-4.	-0.002	330.90	1.429s
AG-110M	2629.52	657.76	72.	-9.	-0.005	142.26	1.447s
CS-137	2645.12	661.66	63.	14.	0.008	83.24	1.451s
PM-144	2784.64	696.54	33.	7.	0.004	181.90	1.481s
NB-94	2808.99	702.63	25.	10.	0.006	107.08	1.486s
SB-124	2889.61	722.79	44.	12.	0.006	85.03	1.503s
AG-108M	2890.22	722.94	55.	12.	0.006	94.56	1.503s
EU-154	2891.89	723.36	67.	12.	0.006	103.19	1.503s
ZR-95	2895.26	724.20	173.	-25.	-0.014	78.50	1.504s
BI-212	2907.15	727.17	48.	12.	0.007	88.64	1.507s
pm-146	2941.34	735.72	23.	10.	0.005	110.78	1.514s
pm-146	2987.11	747.16	33.	-3.	-0.001	458.77	1.524s
ZR-95	3025.38	756.73	33.	4.	0.002	287.75	1.532s
AG-110M	3054.24	763.94	42.	-1.	-0.001	942.39	1.538s
NB-95	3061.63	765.79	67.	-9.	-0.005	132.87	1.539s
EU-152	3114.15	778.92	37.	-11.	-0.006	118.16	1.550s
BI-212	3140.15	785.42	28.	6.	0.003	198.49	1.556s
CS-134	3181.95	795.87	35.	22.	0.012	43.08	1.565s
CS-134	3206.28	801.95	100.	-16.	-0.009	89.93	1.570s
CO-58	3241.58	810.78	48.	7.	0.004	152.48	1.577s
La-140	3261.56	815.77	71.	-16.	-0.009	80.55	1.581s
Cs-136	3272.49	818.50	48.	11.	0.006	93.56	1.583s
MN-54	3337.89	834.85	28.	13.	0.007	88.86	1.597s
Co-56	3385.58	846.77	0.	24.	0.013	20.41	1.607s
TL-208	3441.30	860.70	4.	33.	0.019	20.78	1.294
NB-94	3482.90	871.10	30.	-4.	-0.002	200.00	1.627s
EU-154	3491.44	873.23	36.	-1.	-0.001	746.41	1.629s
PA-234	3520.64	880.53	72.	-8.	-0.005	148.43	1.635s
PA-234	3531.48	883.24	81.	0.	0.000	1000.00	1.637s
AG-110M	3537.26	884.68	81.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	63.	13.	0.007	91.93	1.642s
y-88	3590.70	898.04	5.	14.	0.008	44.30	1.649s
AC-228	3643.88	911.33	12.	156.	0.087	9.83	1.909
AG-110M	3748.54	937.49	50.	-19.	-0.010	33.51	1.682s
EU-152	3855.05	964.11	194.	-32.	-0.018	63.13	1.703s
AC-228	3874.49	968.97	81.	51.	0.028	28.73	1.707s
EU-154	3983.96	996.33	32.	10.	0.006	82.26	1.729s
PA-234M	4002.64	1001.00	45.	1.	0.001	948.25	1.733s
EU-154	4017.76	1004.77	78.	-15.	-0.008	88.63	1.736s
Co-56	4150.07	1037.84	10.	9.	0.005	87.10	1.762s
Cs-136	4191.00	1048.07	13.	19.	0.011	34.57	1.771s
RH-106	4200.17	1050.36	39.	-5.	-0.003	187.92	1.772s
BI-207	4253.39	1063.66	20.	9.	0.005	117.64	1.783s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4308.37	1077.40	16.	10.	0.006	96.26	1.794s
FE-59	4395.81	1099.25	48.	-19.	-0.011	53.83	1.811s
EU-152	4447.13	1112.07	91.	-5.	-0.003	282.55	1.821s
ZN-65	4461.03	1115.55	86.	0.	0.000	1000.00	1.824s
BI-214	4480.00	1120.29	44.	7.	0.004	141.44	1.827
Sc-46	4481.05	1120.55	41.	11.	0.006	87.75	1.828
Ta-182	4484.05	1121.30	52.	11.	0.006	97.10	1.828
Ta-182	4755.20	1189.05	11.	8.	0.005	95.58	1.881
Ta-182	4884.72	1221.41	32.	-4.	-0.002	325.32	1.906
Co-56	4952.24	1238.28	12.	17.	0.010	49.98	1.919s
NA-22	5097.34	1274.53	21.	5.	0.003	147.43	1.946s
EU-154	5097.39	1274.54	26.	0.	0.000	1000.00	1.946s
FE-59	5165.65	1291.60	28.	-8.	-0.005	153.75	1.959s
CO-60	5329.39	1332.50	23.	-8.	-0.004	111.39	1.990s
AG-110M	5536.74	1384.30	0.	7.	0.004	37.80	2.029s
EU-152	5631.64	1408.00	6.	7.	0.004	86.91	2.046s
K-40	5844.26	1461.11	6.	338.	0.188	5.54	2.009
La-140	6385.21	1596.21	30.	-14.	-0.008	98.20	2.182s
SB-124	6764.73	1690.98	0.	6.	0.003	40.82	2.247s
BI-214	7059.14	1764.49	24.	8.	0.005	91.59	2.297s
Co-56	7086.61	1771.35	22.	8.	0.004	90.53	2.302s

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	-1.4144E+00				5.31E+01	
			477.60	-1.414E+00	&(	1.328E+01 2.73E+02 1.05E+01	G
NA-22	C	2.7172E-01				9.50E+02	
			1274.53	2.717E-01	?(	1.411E+00 1.47E+02 9.99E+01	G
K-40	N	2.0530E+02				4.66E+11	
			1460.83	2.053E+02	(P	8.496E+00 5.54E+00 1.07E+01	G
Sc-46	F	5.7153E-01				8.38E+01	
			889.28	5.633E-01	?(	1.745E+00 9.19E+01 1.00E+02	G
			1120.55	5.798E-01	?(	1.717E+00 8.78E+01 1.00E+02	G
CR-51	F	-3.9602E+00				2.77E+01	
			320.08	-3.960E+00	&(	2.068E+01 1.56E+02 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 5.6012E-01					3.12E+02	
		834.85	5.601E-01	&(P	1.156E+00	8.89E+01	1.00E+02 G
FE-59	F -1.7631E+00					4.45E+01	
		1099.25	-1.763E+00	?(P	3.222E+00	5.38E+01	5.65E+01 G
		1291.60	-1.134E+00	+	3.745E+00	1.54E+02	4.32E+01 G
Co-56	C 1.2068E+00					7.73E+01	
		846.77	1.021E+00	?(	3.135E-01	2.04E+01	9.99E+01 G
		1238.28	1.488E+00	?(P	1.607E+00	5.00E+01	6.61E+01 G
		1037.84	3.044E+00	&	6.127E+00	8.71E+01	1.41E+01 G
		1771.35	3.911E+00	+	1.206E+01	9.05E+01	1.55E+01 A
CO-57	C -7.3238E-02					2.72E+02	
		122.06	-7.324E-02	?(	1.112E+00	4.47E+02	8.56E+01 G
		136.47	-3.089E+00	&	1.576E+01	1.53E+02	1.07E+01 G
CO-58	C 2.7573E-01					7.09E+01	
		810.78	2.757E-01	?(	1.452E+00	1.52E+02	9.95E+01 G
CO-60	F -4.6850E-01					1.93E+03	
		1332.50	-4.685E-01	?(P	1.504E+00	1.11E+02	1.00E+02 G
		1173.24	2.427E-02	% P	1.329E+00	2.37E+03	9.99E+01 G
NB-94	I 3.8329E-01					7.41E+06	
		702.63	3.833E-01	?(P	9.774E-01	1.07E+02	9.79E+01 G
		871.10	-1.739E-01	&	1.227E+00	2.00E+02	9.99E+01 G
ZR-95	I 3.0683E-01					6.40E+01	
		756.73	3.068E-01	?(P	2.107E+00	2.88E+02	5.45E+01 G
		724.20	-2.100E+00	+	5.481E+00	7.85E+01	4.42E+01 G
NB-95	I -3.5547E-01					6.40E+01	
		765.79	-3.555E-01	?(	1.614E+00	1.33E+02	9.98E+01 G
RU-103	I 3.5133E-01					3.93E+01	
		497.05	3.513E-01	?(	8.361E-01	9.83E+01	9.09E+01 G
		610.30	-1.021E+01	+	5.225E+01	1.52E+02	5.75E+00 GA
RH-106	I 5.2961E+00					3.74E+02	
		621.92	5.296E+00	?(	2.610E+01	1.46E+02	9.93E+00 G
		1050.36	-1.552E+01	&	1.019E+02	1.88E+02	1.56E+00 G
		511.86	-3.704E+00	+	1.081E+01	8.76E+01	2.00E+01 GA
AG-108M	C 2.5765E-01					1.53E+05	
		433.94	2.880E-02	%(	9.268E-01	1.24E+03	9.05E+01 G
		722.94	4.856E-01	?(	1.551E+00	9.46E+01	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	-6.583E-01	+	3.277E+00	1.48E+02	8.98E+01 G
AG-110M	F	4.4820E-01					2.50E+02	
			884.68	0.000E+00	&(	2.694E+00	1.00E+03	7.27E+01 G
			657.76	-3.224E-01	+	1.568E+00	1.42E+02	9.46E+01 G
			937.49	-2.484E+00	+ P	4.769E+00	3.35E+01	3.44E+01 G
			1384.30	1.789E+00	?(	1.884E+00	3.78E+01	2.43E+01 G
			763.94	-2.313E-01	+ P	5.831E+00	9.42E+02	2.23E+01 G
SN-113	F	-6.1789E-01					1.15E+02	
			391.69	-6.179E-01	?(	2.374E+00	1.14E+02	6.40E+01 G
SB-124	F	1.9042E-01					6.02E+01	
			602.73	-5.893E-01	&(	3.173E+00	1.60E+02	9.83E+01 G
			1690.98	9.138E-01	?(	1.122E+00	4.08E+01	4.78E+01 G
			722.79	4.080E+00	?(	1.168E+01	8.50E+01	1.08E+01 G
SB-125	I	1.0616E+00					1.01E+03	
			427.88	6.973E-01	?(	2.673E+00	1.51E+02	2.96E+01 G
			600.50	-3.230E+00	+	1.779E+01	1.64E+02	1.79E+01 G
			635.89	-5.222E+00	+	1.122E+01	6.51E+01	1.13E+01 G
			463.37	2.092E+00	?(P	1.242E+01	1.74E+02	1.05E+01 G
I-131	I	9.4152E-01					8.02E+00	
			364.48	9.415E-01	?(P	7.798E-01	3.57E+01	8.17E+01 G
			284.30	-2.537E-02	% P	1.190E+01	1.74E+04	6.14E+00 G
			636.97	-1.823E+00	-	2.093E+01	3.31E+02	7.17E+00 G
Gd-153	F	-9.8882E-01					2.42E+02	
			97.50	-9.888E-01	&(	4.547E+00	1.38E+02	3.00E+01 G
			103.20	-1.485E+00	+	6.865E+00	1.39E+02	2.18E+01 G
Ga-68	C	1.8037E+01					4.71E-02	
			1077.40	1.804E+01	?(	3.851E+01	9.63E+01	3.30E+00 G
Tc-99m	I	-3.8565E-01					2.51E-01	
			140.51	-3.856E-01	&(	1.992E+00	1.55E+02	8.93E+01 G
BA-133	F	-4.8111E-01					3.85E+03	
			356.00	-4.811E-01	?(	3.024E+00	1.87E+02	6.20E+01 G
			302.85	0.000E+00	+	9.999E+00	1.00E+03	1.83E+01 G
			383.84	4.036E+00	?	1.369E+01	1.01E+02	8.94E+00 GA
			80.99	-1.246E+00	+ P	6.495E+00	7.79E+01	3.41E+01 GA
CS-134	I	4.6395E-01					7.54E+02	
			604.71	-5.954E-01	?(	3.130E+00	1.57E+02	9.76E+01 G
			795.87	1.053E+00	?(	1.430E+00	4.31E+01	8.55E+01 G
			569.32	1.819E+00	&(	7.555E+00	1.21E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	-7.686E+00	+	2.317E+01	8.99E+01	8.69E+00 G
			563.24	4.316E+00	&(P	9.989E+00	9.56E+01	8.35E+00 G
CS-137	I	5.9181E-01					1.10E+04	
			661.66	5.918E-01	&(	1.651E+00	8.32E+01	8.52E+01 G
CE-139	F	-3.7485E-01					1.38E+02	
			165.85	-3.749E-01	?(	1.354E+00	1.08E+02	7.99E+01 G
Ba-140	I	-9.0320E-01					1.28E+01	
			537.26	-2.300E+00	&(P	4.894E+00	9.82E+01	2.44E+01 G
			162.66	4.572E+00	?(	1.603E+01	1.05E+02	6.22E+00 G
			304.85	0.000E+00	+	4.292E+01	1.00E+03	4.29E+00 G
La-140	I	-5.5229E-01					1.28E+01	
			1596.21	-1.020E+00	?(	2.057E+00	9.82E+01	9.54E+01 G
			487.02	0.000E+00	&	3.189E+00	1.00E+03	4.55E+01 G
			328.76	1.646E+00	&(P	5.807E+00	1.05E+02	2.03E+01 G
			815.77	-2.761E+00	+	7.435E+00	8.05E+01	2.33E+01 G
CE-141	I	-7.3558E-01					3.25E+01	
			145.44	-7.356E-01	?(	3.858E+00	1.57E+02	4.82E+01 G
CE-144	I	-2.9477E+00					2.85E+02	
			133.54	-2.948E+00	?(	1.533E+01	1.56E+02	1.11E+01 G
PM-144	C	2.5394E-01					3.63E+02	
			696.54	2.539E-01	?(P	1.096E+00	1.82E+02	9.90E+01 G
			618.06	-1.672E-01	+	2.907E+00	5.13E+02	9.91E+01 G
EU-152	F	8.3992E-01					4.94E+03	
			344.29	0.000E+00	?(	6.663E+00	1.00E+03	2.65E+01 G
			1112.07	-1.854E+00	&	1.808E+01	2.83E+02	1.36E+01 G
			121.78	-9.828E-01	+	3.183E+00	9.70E+01	2.86E+01 G
			778.92	-3.496E+00	+	9.620E+00	1.18E+02	1.29E+01 G
			964.11	-1.042E+01	+	2.169E+01	6.31E+01	1.46E+01 G
			244.69	3.776E+00	*(	3.075E+01	2.43E+02	7.58E+00 G
			1408.00	2.133E+00	&	4.135E+00	8.69E+01	2.10E+01 GA
EU-154	I	1.3687E+00					3.14E+03	
			873.23	-3.331E-01	?(P	1.087E+01	7.46E+02	1.23E+01 G
			123.10	6.044E-01	?(	1.986E+00	9.82E+01	4.08E+01 G
			1274.54	0.000E+00	-	4.377E+00	1.00E+03	3.52E+01 G
			723.36	2.183E+00	?(	7.625E+00	1.03E+02	2.02E+01 G
			1004.77	-3.975E+00	+	1.183E+01	8.86E+01	1.80E+01 G
			996.33	4.726E+00	?(	1.310E+01	8.23E+01	1.06E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	-1.4523E+00						1.81E+03	
			105.31	-1.452E+00	(7.309E+00		1.51E+02	2.12E+01	G
			86.54	-1.252E+00	& 6.052E+00		1.45E+02	3.07E+01	G
Ta-182	F	2.0344E+00						1.14E+02	
			1121.30	1.662E+00	&(5.466E+00		9.71E+01	3.49E+01	G
			1221.41	-8.339E-01	- 6.061E+00		3.25E+02	2.70E+01	G
			1189.05	2.836E+00	(6.101E+00		9.56E+01	1.62E+01	G
Hg-203	F	-4.0585E-01						4.66E+01	
			279.20	-4.058E-01	?(1.312E+00		9.64E+01	8.15E+01	G
TL-208	N	8.4619E+00						6.98E+02	
			583.02	8.462E+00	(P 8.385E-01		7.77E+00	8.45E+01	G
			277.28	1.056E+01	+ P 9.639E+00		4.01E+01	6.31E+00	G
			860.56	1.160E+01	+ P 3.966E+00		2.08E+01	1.24E+01	G
pm-146	C	4.7184E-01						2.02E+03	
			747.16	-3.035E-01	&(3.340E+00		4.59E+02	3.40E+01	G
			735.72	1.643E+00	?(4.288E+00		1.11E+02	2.25E+01	G
			453.88	-4.158E-01	+ P 1.656E+00		1.19E+02	6.50E+01	G
y-88	F	6.6269E-01						1.07E+02	
			898.04	6.627E-01	?(P 6.240E-01		4.43E+01	9.37E+01	G
			1836.06	-2.613E-02	% 1.132E+00		1.88E+03	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	1.0077E+01						4.53E+02	
								Derived Ave Activity	
			88.04	1.008E+01	}(4.533E+01		1.35E+02	3.79E+00	G
Cf-251	T	2.7747E-02						3.28E+05	
			176.60	2.775E-02	%(4.744E+00		6.54E+03	1.70E+01	G
			227.00	-7.948E-01	+ 1.300E+01		6.23E+02	6.30E+00	GA
Cf-249	T	7.5363E-01						1.28E+05	
			387.95	3.856E-01	(1.988E+00		1.52E+02	6.60E+01	G
			333.44	2.320E+00	*(8.036E+00		1.03E+02	1.55E+01	G
Sn-126		-4.1221E+00						3.65E+07	
			87.57	1.020E+00	} 4.520E+00		7.40E+01	3.75E+01	GA
			64.28	-4.122E+00	?(1.870E+01		1.36E+02	9.70E+00	G
			86.94	4.244E+00	} 1.911E+01		7.51E+01	9.04E+00	GA

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-210   N   1.5911E+01                                      8.14E+03
                           46.54 1.591E+01  (P 2.917E+01 6.58E+01 4.25E+00 G

PB-212   N   2.0844E+01                                      6.98E+02
                          238.63 2.084E+01  (P 1.727E+00 4.97E+00 4.33E+01 G
                          300.03 2.588E+01 + P 1.928E+01 3.13E+01 3.28E+00 GA

PB-214   N   1.2171E+01                                      5.84E+05
                          351.93 1.126E+01  (P 2.006E+00 9.97E+00 3.76E+01 G
                          295.09 1.394E+01 *(P 3.395E+00 1.29E+01 1.93E+01 G
                          242.00 2.072E+01 + P 9.418E+00 1.67E+01 7.43E+00 GA

BI-207   C   1.2023E-01                                      1.18E+04
                          569.70-2.411E-01  (  1.319E+00 1.59E+02 9.77E+01 G
                         1063.66 5.942E-01 ?(P 1.607E+00 1.18E+02 7.45E+01 G

BI-212   N   5.8822E+00                                      6.98E+02
                          727.17 5.882E+00 ?(  1.758E+01 8.86E+01 7.55E+00 G
                          785.42 1.819E+01 ? P 8.617E+01 1.98E+02 1.28E+00 GA

BI-214   N   1.0863E+01                                      5.84E+05
                          609.31 1.086E+01  (P 2.116E+00 1.12E+01 4.61E+01 G
                         1120.29 2.406E+00 - P 1.171E+01 1.41E+02 1.51E+01 G
                         1764.49 3.974E+00 - P 1.238E+01 9.16E+01 1.54E+01 G

BI-210M  T   4.7370E-01                                      1.10E+09
                          265.83 4.737E-01 &(  2.181E+00 1.36E+02 5.00E+01 G
                          304.90 0.000E+00 -   6.576E+00 1.00E+03 2.80E+01 G

AC-228   N   2.3708E+01                                      2.10E+03
                          911.07 2.422E+01  (  2.886E+00 9.83E+00 2.90E+01 G
                          968.97 1.372E+01 -   1.207E+01 2.87E+01 1.75E+01 G
                          338.32 2.247E+01 @(  5.636E+00 1.39E+01 1.20E+01 G
                           93.35 6.741E+00 -   2.981E+01 1.33E+02 5.56E+00 XA

TH-227   N   7.6788E-01                                      7.95E+03
                           50.14-9.737E-01  (  2.235E+01 6.75E+02 8.00E+00 G
                          256.24 2.758E+00 *(  1.102E+01 1.53E+02 7.00E+00 G

TH-229   N   1.4793E+00                                      2.68E+06
                          193.51 1.479E+00 &(  1.945E+01 5.05E+02 4.40E+00 G
                          210.85-1.483E+01 +   3.787E+01 1.00E+02 2.99E+00 G

TH-234   N   1.6629E+01                                      1.63E+12
                           63.29 1.663E+01  (P 2.670E+01 4.95E+01 3.81E+00 G
                           92.59 1.723E+00 - P 1.704E+01 2.93E+02 5.58E+00 G
```

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	5.2828E+00					1.20E+07	
			302.65	0.000E+00	?(	6.361E+01	1.00E+03	2.88E+00 G
			300.07	1.147E+01	(	7.260E+01	1.88E+02	2.46E+00 G
PA-234	N	2.5851E+00					1.63E+12	
			131.29	1.545E+00	(	8.185E+00	1.59E+02	1.80E+01 G
			946.02	-3.450E-01	%	9.741E+00	1.21E+03	1.34E+01 G
			569.47	4.868E+00	&(	1.231E+01	7.57E+01	8.20E+00 G
			883.24	0.000E+00	-	2.037E+01	1.00E+03	9.60E+00 G
			880.53	-6.080E+00	+	3.090E+01	1.48E+02	6.00E+00 GA
PA-234M	N	5.8202E+00					1.63E+12	
			1001.00	5.820E+00	?(P	1.959E+02	9.48E+02	8.37E-01 G
			766.41	-1.488E+01	% P	5.958E+02	1.12E+03	2.94E-01 G
U-235	N	-3.5696E+00					2.57E+11	
			143.79	-3.570E+00	?(P	1.619E+01	7.33E+01	1.10E+01 G
			205.33	-6.706E+00	+ P	1.849E+01	1.06E+02	5.01E+00 G
			163.38	4.694E+00	& P	2.055E+01	1.30E+02	5.08E+00 G
AM-241	T	-1.3716E+00					1.58E+05	
			59.54	-1.372E+00	(	5.740E+00	1.25E+02	3.59E+01 G
Ir-192	F	-4.6740E-01					7.40E+01	
			316.49	-4.674E-01	?(	2.456E+00	1.57E+02	8.70E+01 G
			468.06	-3.720E-01	&	2.706E+00	2.12E+02	5.18E+01 G
			308.44	0.000E+00	+	5.846E+00	1.00E+03	3.18E+01 G
Cs-136	F	7.9048E-01					1.30E+01	
			818.50	4.562E-01	?(	1.444E+00	9.36E+01	1.00E+02 G
			1048.07	1.208E+00	?(	1.206E+00	3.46E+01	8.00E+01 G
			340.57	-2.344E-01	-	3.769E+00	4.74E+02	4.69E+01 G
Np-239	T	1.3082E+00					2.36E+00	
			103.70	-1.348E+00	&	6.353E+00	1.41E+02	2.40E+01 X
			106.13	1.308E+00	&(	6.756E+00	1.55E+02	2.27E+01 G
			99.50	-2.166E+00	+	9.855E+00	1.36E+02	1.50E+01 X
Nd-147		-1.1581E+00					1.11E+01	
			531.00	-1.158E+00	?(	7.368E+00	2.59E+02	1.30E+01 G
			91.10	2.385E-01	+	6.093E+00	7.61E+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	278.	-4.	-0.002	675.22	-9.737E-01	
AM-241	59.54	589.	-28.	-0.015	125.48	-1.372E+00	
BA-133	80.99	1182.	-31.	-0.017	77.93	-1.246E+00	P
EU-155	86.54	892.	-29.	-0.016	145.06	-1.252E+00	
Nd-147	91.10	803.	5.	0.003	760.83	2.385E-01	
Gd-153	97.50	521.	-24.	-0.013	137.63	-9.888E-01	
Np-239	99.50	621.	-26.	-0.015	136.33	-2.166E+00	
Gd-153	103.20	647.	-26.	-0.015	138.58	-1.485E+00	
Np-239	103.70	673.	-26.	-0.015	141.24	-1.348E+00	
EU-155	105.31	700.	-25.	-0.014	150.78	-1.452E+00	
Np-239	106.13	687.	24.	0.013	154.67	1.308E+00	
EU-152	121.78	235.	-23.	-0.013	96.98	-9.828E-01	
CO-57	122.06	258.	-5.	-0.003	446.83	-7.324E-02	
EU-154	123.10	184.	20.	0.011	98.18	6.044E-01	
PA-234	131.29	617.	22.	0.012	158.52	1.545E+00	
CE-144	133.54	820.	-26.	-0.015	155.93	-2.948E+00	
HF-181	136.30	793.	-26.	-0.015	153.05	-5.637E+00	
CO-57	136.47	793.	-26.	-0.015	152.98	-3.089E+00	
Tc-99m	140.51	819.	-26.	-0.015	154.85	-3.856E-01	
U-235	143.79	849.	-31.	-0.017	73.26	-3.570E+00	P
CE-141	145.44	926.	-28.	-0.015	157.33	-7.356E-01	
Ba-140	162.66	228.	21.	0.012	104.75	4.572E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	163.38	250.	17.	0.010	130.44	4.694E+00	P
CE-139	165.85	272.	-22.	-0.012	108.00	-3.749E-01	
U-235	205.33	148.	-22.	-0.012	105.93	-6.706E+00	P
Cf-251	227.00	99.	-3.	-0.002	623.16	-7.948E-01	
EU-152	244.69	780.	16.	0.009	243.38	3.776E+00	
TH-227	256.24	73.	11.	0.006	153.28	2.758E+00	
Cd-113m	263.70	153.	-20.	-0.011	91.32	-6.079E+03	
BI-210M	265.83	145.	13.	0.007	136.21	4.737E-01	
Hg-203	279.20	129.	-17.	-0.010	96.38	-4.058E-01	
PA-231	300.07	340.	14.	0.008	188.17	1.147E+01	
Ir-192	316.49	456.	-19.	-0.011	156.88	-4.674E-01	
CR-51	320.08	415.	-19.	-0.010	155.83	-3.960E+00	
La-140	328.76	126.	16.	0.009	104.95	1.646E+00	P
Cf-249	333.44	138.	17.	0.009	103.14	2.320E+00	
Cs-136	340.57	278.	-5.	-0.003	473.71	-2.344E-01	
BA-133	356.00	295.	-13.	-0.007	186.58	-4.811E-01	
BA-133	383.84	108.	15.	0.008	100.84	4.036E+00	
Cf-249	387.95	123.	11.	0.006	151.79	3.856E-01	
SN-113	391.69	166.	-16.	-0.009	114.29	-6.179E-01	
SB-125	427.88	36.	8.	0.004	151.04	6.973E-01	
pm-146	453.88	64.	-10.	-0.006	118.89	-4.158E-01	P
SB-125	463.37	93.	8.	0.004	173.75	2.092E+00	P
Ir-192	468.06	107.	-7.	-0.004	212.37	-3.720E-01	
BE-7	477.60	103.	-5.	-0.003	273.00	-1.414E+00	
RU-103	497.05	26.	11.	0.006	98.26	3.513E-01	
RH-106	511.86	232.	-25.	-0.014	87.62	-3.704E+00	
Nd-147	531.00	39.	-5.	-0.003	258.84	-1.158E+00	
Ba-140	537.26	62.	-18.	-0.010	98.23	-2.300E+00	P
CS-134	563.24	26.	11.	0.006	95.64	4.316E+00	P
CS-134	569.32	53.	9.	0.005	121.49	1.819E+00	
PA-234	569.47	39.	13.	0.007	75.67	4.868E+00	
BI-207	569.70	66.	-7.	-0.004	159.30	-2.411E-01	
SB-125	600.50	405.	-18.	-0.010	164.19	-3.230E+00	
SB-124	602.73	387.	-18.	-0.010	160.48	-5.893E-01	
CS-134	604.71	370.	-18.	-0.010	156.69	-5.954E-01	
RU-103	610.30	352.	-18.	-0.010	152.47	-1.021E+01	
AG-108M	614.28	335.	-18.	-0.010	148.34	-6.583E-01	
PM-144	618.06	317.	-5.	-0.003	513.06	-1.672E-01	
RH-106	621.92	252.	16.	0.009	146.47	5.296E+00	
SB-125	635.89	54.	-17.	-0.010	65.06	-5.222E+00	
AG-110M	657.76	72.	-9.	-0.005	142.26	-3.224E-01	
CS-137	661.66	63.	14.	0.008	83.24	5.918E-01	
PM-144	696.54	33.	7.	0.004	181.90	2.539E-01	P
NB-94	702.63	25.	10.	0.006	107.08	3.833E-01	P
SB-124	722.79	44.	12.	0.006	85.03	4.080E+00	
AG-108M	722.94	55.	12.	0.006	94.56	4.856E-01	
EU-154	723.36	67.	12.	0.006	103.19	2.183E+00	
ZR-95	724.20	173.	-25.	-0.014	78.50	-2.100E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
pm-146	735.72	23.	10.	0.005	110.78	1.643E+00		
pm-146	747.16	33.	-3.	-0.001	458.77	-3.035E-01		
ZR-95	756.73	33.	4.	0.002	287.75	3.068E-01		P
AG-110M	763.94	42.	-1.	-0.001	942.39	-2.313E-01		P
NB-95	765.79	67.	-9.	-0.005	132.87	-3.555E-01		
EU-152	778.92	37.	-11.	-0.006	118.16	-3.496E+00		
CS-134	795.87	35.	22.	0.012	43.08	1.053E+00		
CS-134	801.95	100.	-16.	-0.009	89.93	-7.686E+00		
CO-58	810.78	48.	7.	0.004	152.48	2.757E-01		
La-140	815.77	71.	-16.	-0.009	80.55	-2.761E+00		
Cs-136	818.50	48.	11.	0.006	93.56	4.562E-01		
MN-54	834.85	28.	13.	0.007	88.86	5.601E-01		P
NB-94	871.10	30.	-4.	-0.002	200.00	-1.739E-01		
EU-154	873.23	36.	-1.	-0.001	746.41	-3.331E-01		P
PA-234	880.53	72.	-8.	-0.005	148.43	-6.080E+00		
Sc-46	889.28	63.	13.	0.007	91.93	5.633E-01		
AG-110M	937.49	50.	-19.	-0.010	33.51	-2.484E+00		P
EU-152	964.11	194.	-32.	-0.018	63.13	-1.042E+01		
EU-154	996.33	32.	10.	0.006	82.26	4.726E+00		
PA-234M	1001.00	45.	1.	0.001	948.25	5.820E+00		P
EU-154	1004.77	78.	-15.	-0.008	88.63	-3.975E+00		
Cs-136	1048.07	13.	19.	0.011	34.57	1.208E+00		
RH-106	1050.36	39.	-5.	-0.003	187.92	-1.552E+01		
BI-207	1063.66	20.	9.	0.005	117.64	5.942E-01		P
Ga-68	1077.40	16.	10.	0.006	96.26	1.804E+01		
FE-59	1099.25	48.	-19.	-0.011	53.83	-1.763E+00		P
EU-152	1112.07	91.	-5.	-0.003	282.55	-1.854E+00		
Sc-46	1120.55	41.	11.	0.006	87.75	5.798E-01		
Ta-182	1121.30	52.	11.	0.006	97.10	1.662E+00		
Ta-182	1189.05	11.	8.	0.005	95.58	2.836E+00		
Ta-182	1221.41	32.	-4.	-0.002	325.32	-8.339E-01		
NA-22	1274.53	21.	5.	0.003	147.43	2.717E-01		
FE-59	1291.60	28.	-8.	-0.005	153.75	-1.134E+00		
CO-60	1332.50	23.	-8.	-0.004	111.39	-4.685E-01		P
AG-110M	1384.30	0.	7.	0.004	37.80	1.789E+00		
EU-152	1408.00	6.	7.	0.004	86.91	2.133E+00		
La-140	1596.21	30.	-14.	-0.008	98.20	-1.020E+00		
SB-124	1690.98	0.	6.	0.003	40.82	9.138E-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	-1.4144E+00	-1.4144E+00	2.730E+02%	1.33E+01
NA-22	#A	2.7172E-01	2.7172E-01	1.474E+02%	1.41E+00
K-40		2.0530E+02	2.0530E+02	5.537E+00%	8.50E+00
Sc-46	#A	5.7153E-01	5.7153E-01	6.354E+01%	1.74E+00
CR-51	#A	-3.9602E+00	-3.9602E+00	1.558E+02%	2.07E+01
MN-54	#A	5.6012E-01	5.6012E-01	8.886E+01%	1.16E+00
FE-59	#A	-1.7631E+00	-1.7631E+00	5.383E+01%	3.22E+00
Co-56	#	1.2068E+00	1.2068E+00	2.041E+01%	3.13E-01
CO-57	#A	-7.3238E-02	-7.3238E-02	4.468E+02%	1.11E+00
CO-58	#A	2.7573E-01	2.7573E-01	1.525E+02%	1.45E+00
CO-60	#A	-4.6850E-01	-4.6850E-01	1.114E+02%	1.50E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.76E+00
NB-94	#A	3.8329E-01	3.8329E-01	1.071E+02%	9.77E-01
ZR-95	#A	3.0683E-01	3.0683E-01	2.878E+02%	2.11E+00
NB-95	#A	-3.5547E-01	-3.5547E-01	1.329E+02%	1.61E+00
RU-103	#A	3.5133E-01	3.5133E-01	9.826E+01%	8.36E-01
RH-106	#A	5.2961E+00	5.2961E+00	1.465E+02%	2.61E+01
AG-108M	#A	2.5765E-01	2.5765E-01	9.456E+01%	9.27E-01
AG-110M	#A	4.4820E-01	4.4820E-01	3.780E+01%	2.69E+00
SN-113	#A	-6.1789E-01	-6.1789E-01	1.143E+02%	2.37E+00
SB-124	#A	1.9042E-01	1.9042E-01	4.082E+01%	3.17E+00
SB-125	#A	1.0616E+00	1.0616E+00	1.151E+02%	2.67E+00
I-131	#	9.4150E-01	9.4152E-01	3.572E+01%	7.80E-01
Gd-153	#A	-9.8882E-01	-9.8882E-01	1.376E+02%	4.55E+00
Ga-68	#A	1.7988E+01	1.8037E+01	9.626E+01%	3.85E+01
Tc-99m	#A	-3.8545E-01	-3.8565E-01	1.549E+02%	1.99E+00
BA-133	#A	-4.8111E-01	-4.8111E-01	1.866E+02%	3.02E+00
CS-134	#A	4.6395E-01	4.6395E-01	4.308E+01%	3.13E+00
CS-137	#A	5.9181E-01	5.9181E-01	8.324E+01%	1.65E+00
CE-139	#A	-3.7485E-01	-3.7485E-01	1.080E+02%	1.35E+00
Ba-140	#A	-9.0319E-01	-9.0320E-01	7.180E+01%	4.89E+00
La-140	#A	-5.5229E-01	-5.5229E-01	7.186E+01%	2.06E+00
CE-141	#A	-7.3558E-01	-7.3558E-01	1.573E+02%	3.86E+00
CE-144	#A	-2.9476E+00	-2.9477E+00	1.559E+02%	1.53E+01
PM-144	#A	2.5394E-01	2.5394E-01	1.819E+02%	1.10E+00
EU-152	#A	8.3992E-01	8.3992E-01	2.434E+02%	6.66E+00
EU-154	#A	1.3687E+00	1.3687E+00	8.226E+01%	1.09E+01
EU-155	#A	-1.4523E+00	-1.4523E+00	1.508E+02%	7.31E+00
HF-181	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.79E+00
Ta-182	#A	2.0344E+00	2.0344E+00	6.813E+01%	5.47E+00
Hg-203	#A	-4.0585E-01	-4.0585E-01	9.638E+01%	1.31E+00
TL-208		8.4619E+00	8.4619E+00	7.767E+00%	8.38E-01
pm-146	#A	4.7184E-01	4.7184E-01	1.108E+02%	3.34E+00

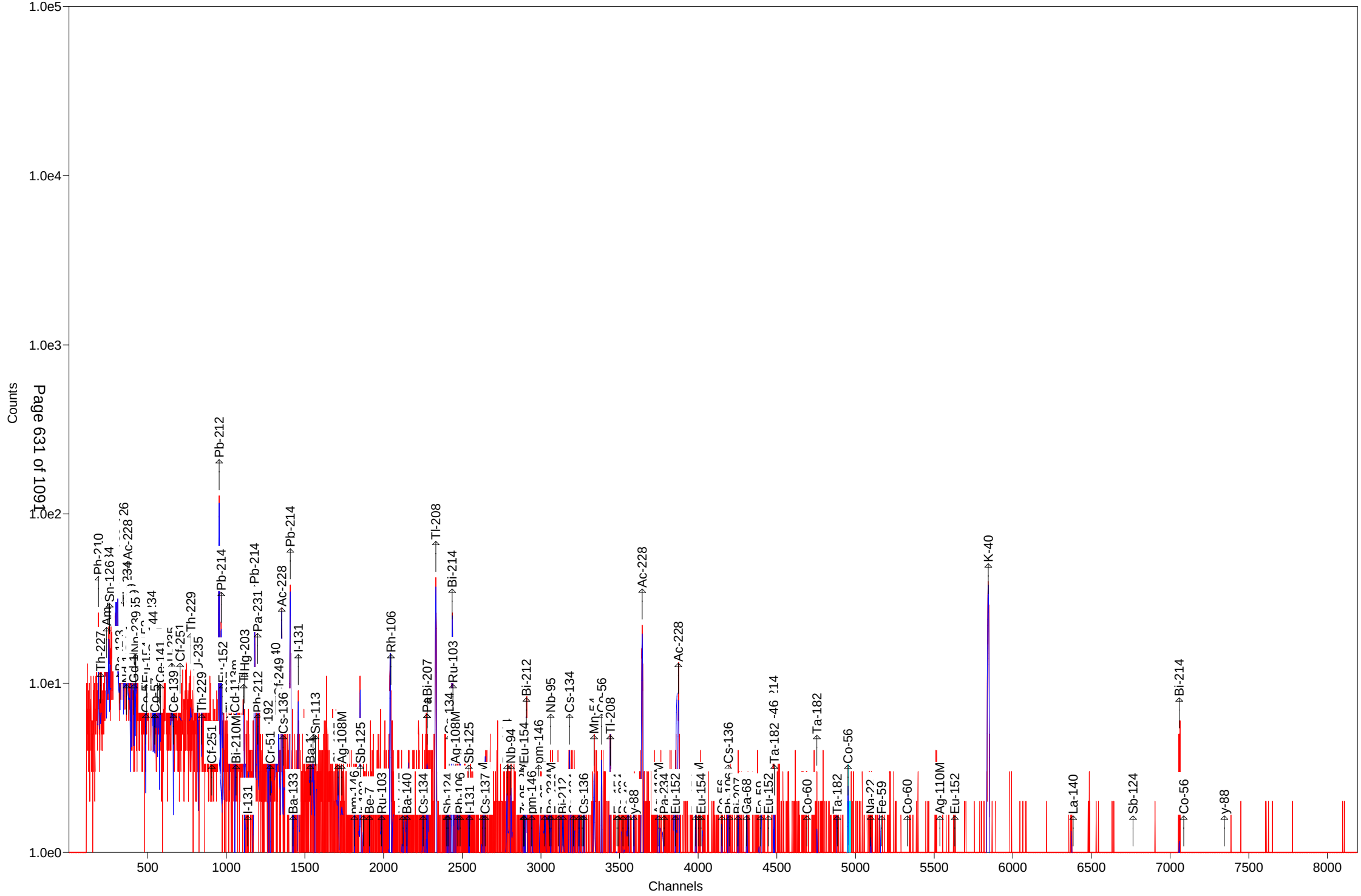
y-88	#	6.6269E-01	6.6269E-01	4.430E+01%	6.24E-01
Cd-113m	#A	-6.0791E+03	-6.0791E+03	9.132E+01%	1.86E+04
Cd-109	#A	1.0077E+01	1.0077E+01	1.350E+02%	4.53E+01
Cf-251	#A	2.7747E-02	2.7747E-02	6.540E+03%	4.74E+00
Cf-249	#A	7.5363E-01	7.5363E-01	9.176E+01%	1.99E+00
Sn-126	A	-4.1221E+00	-4.1221E+00	1.358E+02%	1.87E+01
PB-210	A	1.5911E+01	1.5911E+01	6.579E+01%	2.92E+01
PB-212		2.0844E+01	2.0844E+01	4.971E+00%	1.73E+00
PB-214	#	1.2171E+01	1.2171E+01	8.168E+00%	2.01E+00
BI-207	#A	1.2023E-01	1.2023E-01	9.902E+01%	1.32E+00
BI-212	#A	5.8822E+00	5.8822E+00	8.864E+01%	1.76E+01
BI-214		1.0863E+01	1.0863E+01	1.117E+01%	2.12E+00
BI-210M	#A	4.7370E-01	4.7370E-01	1.362E+02%	2.18E+00
AC-228		2.3708E+01	2.3708E+01	8.517E+00%	2.89E+00
TH-227	#A	7.6788E-01	7.6788E-01	1.533E+02%	2.23E+01
TH-229	A	1.4793E+00	1.4793E+00	5.052E+02%	1.95E+01
TH-234	A	1.6629E+01	1.6629E+01	4.953E+01%	2.67E+01
PA-231	#A	5.2828E+00	5.2828E+00	1.882E+02%	6.36E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.20E+00
PA-234	#A	2.5851E+00	2.5851E+00	7.567E+01%	8.19E+00
PA-234M	#A	5.8202E+00	5.8202E+00	9.483E+02%	1.96E+02
U-235	#A	-3.5696E+00	-3.5696E+00	7.326E+01%	1.62E+01
AM-241	#A	-1.3716E+00	-1.3716E+00	1.255E+02%	5.74E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.42E+01
Ir-192	#A	-4.6739E-01	-4.6740E-01	1.569E+02%	2.46E+00
Cs-136	#A	7.9048E-01	7.9048E-01	3.457E+01%	1.44E+00
Np-239	#A	1.3082E+00	1.3082E+00	1.547E+02%	6.76E+00
Nd-147	#A	-1.1581E+00	-1.1581E+00	2.588E+02%	7.37E+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 (37.6 to 1999.4 keV) 3.148E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 3.1482999E+02 Bq/Sample

264540_Gamma_160-18553-A-9-B. 12_Gamma_20161872.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161134

Sample Description: 264540_Gamma_160-18553-A-10-B
Detector: Detector #17
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-10-B

Decay to Time: 9/1/2016 16:10 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:11:12 Real Time: 1843 sec
Analysis Time: 9/1/2016 16:42 Dead Time: 2.34 %
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	3.105E+00	110.9	3.445E+00	3.449E+00	1.170E+01
NA-22	-8.232E-01	70.1	5.769E-01	5.784E-01	1.917E+00
K-40	3.146E+02	4.7	1.466E+01	2.177E+01	1.049E+01
Sc-46	4.706E-01	105.8	4.980E-01	4.986E-01	2.222E+00
CR-51	-1.342E+00	231.3	3.104E+00	3.105E+00	1.482E+01
MN-54	1.100E+00	51.0	5.611E-01	5.640E-01	1.254E+00
FE-59	3.423E-02	185.7	6.356E-02	6.358E-02	2.607E+00
Co-56	8.879E-01	65.1	5.776E-01	5.794E-01	1.058E+00
CO-57	2.606E-01	139.9	3.646E-01	3.648E-01	1.224E+00
CO-58	-7.237E-01	88.6	6.415E-01	6.426E-01	2.150E+00
CO-60	-3.494E-01	201.6	7.043E-01	7.045E-01	1.588E+00
ZN-65	6.724E-01	235.5	1.583E+00	1.584E+00	5.444E+00
NB-94	-5.997E-02	726.1	4.354E-01	4.354E-01	1.169E+00
ZR-95	2.043E-01	404.4	8.263E-01	8.264E-01	2.082E+00
NB-95	-7.888E-02	726.7	5.732E-01	5.732E-01	1.996E+00
RU-103	3.424E-01	108.7	3.723E-01	3.727E-01	9.405E-01
RH-106	4.424E+00	214.2	9.478E+00	9.480E+00	3.195E+01
AG-108M	7.299E-02	489.9	3.576E-01	3.576E-01	9.675E-01
AG-110M	-1.103E+00	84.3	9.298E-01	9.315E-01	3.111E+00
SN-113	-2.718E-01	196.7	5.346E-01	5.348E-01	2.396E+00
SB-124	-5.474E-01	73.7	4.035E-01	4.045E-01	3.568E+00
SB-125	-7.257E-01	190.4	1.382E+00	1.382E+00	3.635E+00
I-131	8.252E-01	74.1	6.119E-01	6.133E-01	1.043E+00
Gd-153	-8.903E-02	89.2	7.944E-02	7.962E-02	4.070E+00
Ga-68	3.975E+00	654.2	2.600E+01	2.600E+01	6.018E+01
Tc-99m	2.910E-01	152.6	4.441E-01	4.444E-01	1.489E+00
BA-133	-7.010E-01	173.0	1.213E+00	1.214E+00	4.066E+00
CS-134	8.618E-01	29.8	2.566E-01	2.604E-01	3.536E+00
CS-137	-2.787E-01	209.2	5.831E-01	5.833E-01	2.008E+00
CE-139	1.818E-02	2700.0	4.908E-01	4.908E-01	1.665E+00
Ba-140	4.635E-01	367.4	1.703E+00	1.703E+00	4.388E+00
La-140	5.481E-01	53.9	2.953E-01	2.967E-01	1.123E+00
CE-141	1.231E-01	653.4	8.041E-01	8.041E-01	2.719E+00

CE-144	-3.202E+00	134.0	4.292E+00	4.295E+00	1.432E+01
PM-144	0.000E+00	1.#INF	1.143E-01	1.143E-01	1.285E+00
EU-152	1.703E+00	77.9	1.326E+00	1.329E+00	7.965E+00
EU-154	2.042E+00	83.5	1.705E+00	1.709E+00	1.157E+01
EU-155	-1.612E-02	8780.8	1.415E+00	1.415E+00	5.754E+00
HF-181	7.139E-01	97.6	6.970E-01	6.980E-01	1.469E+00
Ta-182	9.815E-01	161.8	1.588E+00	1.589E+00	5.509E+00
Hg-203	-4.556E-01	108.3	4.934E-01	4.941E-01	1.656E+00
TL-208	8.039E+00	8.9	7.127E-01	8.258E-01	1.047E+00
pm-146	-8.195E-02	171.1	1.402E-01	1.403E-01	3.742E+00
y-88	3.788E-01	130.3	4.937E-01	4.940E-01	1.180E+00
Cd-113m	3.651E+03	148.5	5.423E+03	5.429E+03	1.840E+04
Cd-109	0.000E+00	1.#INF	1.522E+01	1.522E+01	5.114E+01
Cf-251	1.277E+00	152.7	1.950E+00	1.953E+00	5.270E+00
Cf-249	-6.877E-01	89.8	6.175E-01	6.185E-01	2.068E+00
Sn-126	4.570E+00	108.9	4.976E+00	4.982E+00	1.661E+01
PB-210	1.333E+01	85.6	1.142E+01	1.144E+01	3.366E+01
PB-212	2.247E+01	5.1	1.150E+00	1.854E+00	2.082E+00
PB-214	1.995E+01	7.2	1.429E+00	1.765E+00	2.297E+00
BI-207	4.116E-01	89.5	3.685E-01	3.691E-01	1.096E+00
BI-212	6.994E+00	88.3	6.176E+00	6.187E+00	2.079E+01
BI-214	1.861E+01	7.3	1.351E+00	1.662E+00	1.596E+00
BI-210M	-8.065E-01	98.3	7.931E-01	7.946E-01	2.654E+00
AC-228	2.459E+01	8.7	2.139E+00	2.480E+00	1.997E+00
TH-227	4.236E-01	219.5	9.299E-01	9.302E-01	1.953E+01
TH-229	-1.625E+00	506.7	8.235E+00	8.236E+00	2.327E+01
TH-234	1.430E+01	36.1	5.159E+00	5.213E+00	2.925E+01
PA-231	0.000E+00	1.#INF	6.458E+00	6.458E+00	6.141E+01
PA-233	7.496E-01	149.4	1.120E+00	1.121E+00	3.790E+00
PA-234	1.265E+00	51.3	6.492E-01	6.525E-01	8.474E+00
PA-234M	6.551E+01	85.2	5.580E+01	5.590E+01	1.996E+02
U-235	-7.398E-01	393.8	2.913E+00	2.914E+00	1.222E+01
AM-241	-1.099E+00	138.5	1.522E+00	1.523E+00	4.302E+00
Np-237	0.000E+00	1.#INF	5.002E+00	5.002E+00	1.666E+01
Ir-192	1.357E-02	66.6	9.043E-03	9.079E-03	1.553E+00
Cs-136	6.412E-01	69.3	4.446E-01	4.462E-01	2.131E+00
Np-239	-1.439E+00	117.6	1.692E+00	1.695E+00	5.651E+00
Nd-147	7.560E-01	416.8	3.151E+00	3.151E+00	8.110E+00
Total	4.194E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-10-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161134.An1

Acquisition information
Start time: 9/1/2016 4:11:12 PM
Live time: 1800
Real time: 1843
Dead time: 2.34 %
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 4:10:00 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. 23 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0918

***** 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	21.	85.63	0.83	2.108E-02	46.54	4.250	PBC<MDA	PB210
63.27	38.	55.79	0.65	3.163E-02	63.29	3.810	PBC<MDA	TH234
64.28	26.	108.88	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
74.87	175.	13.48	0.80	3.681E-02				
77.18	267.	8.96	0.80	3.763E-02				
80.99	7.	367.29	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
87.23	104.	24.78	0.84	4.042E-02	86.49	13.100	1.096E+01	Np237
					86.54	30.700	4.674E+00	EU155
					86.94	9.040	1.584E+01	Sn126
					87.57	37.500	3.805E+00	Sn126
					88.04	3.790	3.755E+01	Cd109
92.81	157.	17.67	1.26	4.148E-02	92.59	5.584	2.729E+01	TH234
					93.35	5.561	3.774E+01	AC228
99.09	77.	22.79	2.22	4.229E-02	99.50	15.000	6.766E+00	Np239
103.20	20.	134.30	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
119.08	28.	44.58	0.38	4.288E-02				
122.06	17.	139.91	0.85	4.276E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.606E-01	CO57
140.51	19.	152.59	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	-6.	393.79	0.87	4.080E-02	143.79	10.960	PBC<MDA	U235
145.44	4.	653.40	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
176.60	14.	152.66	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.83	92.	24.28	0.97	3.544E-02				
217.54	18.	46.48	0.47	3.184E-02				
227.00	4.	426.84	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.54	517.	6.20	1.01	2.990E-02	238.63	43.300	2.219E+01	PB212
241.89	77.	21.28	0.96	2.960E-02	242.00	7.430	1.946E+01	PB214
256.24	8.	219.53	0.97	2.846E-02	256.24	7.000	PBC<MDA	TH227
263.70	11.	148.55	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m
277.22	53.	20.86	1.57	2.694E-02	277.28	6.310	1.726E+01	TL208
295.11	144.	12.66	0.81	2.580E-02	295.09	19.300	1.602E+01	PB214
299.77	48.	27.82	1.66	2.550E-02	300.03	3.280	3.186E+01	PB212
					300.07	2.460	4.248E+01	PA231
					300.18	6.200	PBC<MDA	PA233
312.01	12.	149.40	1.02	2.481E-02	312.01	36.000	PBC<MDA	PA233
328.76	33.	53.88	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
338.10	132.	14.94	0.82	2.345E-02	338.32	12.010	2.605E+01	AC228
340.57	15.	165.98	1.05	2.333E-02	340.57	46.900	PBC<MDA	Cs136
345.41	15.	164.23	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.88	308.	7.16	1.09	2.279E-02	351.93	37.600	1.995E+01	PB214
364.48	11.	121.88	1.07	2.223E-02	364.48	81.700	PBC<MDA	I131
433.94	2.	489.90	1.13	1.963E-02	433.94	90.480	PBC<MDA	AG108M
453.88	4.	258.74	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
468.06	16.	98.22	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	110.94	1.17	1.832E-02	477.60	10.520	PBC<MDA	BE7
481.13	11.	105.64	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
487.02	4.	313.58	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
497.05	10.	108.75	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	78.	27.64	2.45	1.742E-02	511.86	20.000	1.248E+01	RH106
531.00	3.	416.78	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
537.26	3.	367.40	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
563.24	11.	98.93	1.25	1.624E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	255.73	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.401E+00	PA234
					569.70	97.740	1.176E-01	BI207
569.47	3.	252.19	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.401E+00	PA234
					569.70	97.740	1.176E-01	BI207
569.70	2.	435.89	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	8.409E-01	PA234
					569.70	97.740	7.057E-02	BI207
583.20	194.	8.87	1.07	1.583E-02	583.02	84.500	8.039E+00	TL208
609.30	237.	7.26	1.13	1.533E-02	609.31	46.090	1.861E+01	BI214
					610.30	5.750	1.494E+02	RU103
621.92	12.	214.21	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
636.97	12.	84.49	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
723.36	14.	107.47	1.39	1.350E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.112E-01	AG108M
					723.36	20.220	2.747E+00	EU154
727.17	13.	88.31	1.39	1.345E-02	727.17	7.550	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
756.73	3.	404.42	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
766.41	9.	96.82	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	11.	99.31	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152
785.42	1.	905.54	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
795.87	31.	29.77	1.45	1.257E-02	795.87	85.530	1.602E+00	CS134
801.95	11.	110.13	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
818.50	12.	111.68	1.47	1.231E-02	818.50	100.000	PBC<MDA	Cs136
834.85	24.	51.03	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
846.77	10.	93.67	1.49	1.200E-02	846.77	99.935	PBC<MDA	Co56
860.66	13.	98.57	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
880.53	3.	375.65	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
889.28	7.	185.94	1.53	1.156E-02	889.28	99.984	PBC<MDA	Sc46
898.04	7.	130.32	1.53	1.148E-02	898.04	93.700	PBC<MDA	y88
911.30	142.	8.92	1.68	1.135E-02	911.07	29.000	2.399E+01	AC228
946.02	15.	51.33	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	15.	107.18	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
968.94	63.	17.60	0.98	1.083E-02	968.97	17.460	1.850E+01	AC228
996.33	10.	86.41	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1001.00	7.	140.18	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	143.53	1.62	1.054E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	10.	69.35	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	12.	89.52	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	2.	654.15	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	6.	228.61	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	235.47	1.71	9.729E-03	1115.55	50.600	PBC<MDA	ZN65
1120.16	7.	137.09	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	10.	105.82	1.72	9.696E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.928E-01	Sc46
					1121.30	34.900	1.699E+00	Ta182
1121.09	6.	161.84	1.72	9.691E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	9.815E-01	Ta182
1238.28	16.	90.30	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1274.54	11.	83.50	1.84	8.779E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.918E+00	EU154
1291.60	3.	229.35	1.85	8.689E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	1.	670.83	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	86.62	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1460.87	477.	4.66	2.01	7.894E-03	1460.83	10.670	3.146E+02	K40
1763.67	29.	28.16	2.21	6.804E-03	1764.49	15.400	1.542E+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	
298.91	74.84	190.	175.	4.756E+03	13.48	0.802	-	D
308.12	77.14	151.	267.	7.085E+03	8.96	0.804	-	D
395.74	99.00	74.	77.	1.829E+03	22.79	2.216	-	s
475.66	119.08	53.	28.	6.452E+02	44.58	0.385	-	s
742.53	185.83	122.	92.	2.609E+03	24.28	0.970	-	
869.35	217.54	26.	18.	5.653E+02	46.48	0.472	-	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	186.07	46.65	122.	21.	0.012	85.63	0.829
TH-227	200.03	50.14	186.	-4.	-0.002	576.09	0.778
AM-241	237.59	59.54	291.	-21.	-0.012	138.46	0.787s
TH-234	252.51	63.27	170.	38.	0.021	55.79	0.653
Sn-126	256.56	64.28	378.	26.	0.014	108.88	0.792
BA-133	323.36	80.99	225.	7.	0.004	367.29	0.807s
Np-237	345.35	86.49	1113.	0.	0.000	164.91	0.813A
EU-155	345.56	86.54	1015.	-29.	-0.016	157.53	0.813s
Sn-126	349.67	87.57	860.	53.	0.030	38.67	0.814D
Cd-109	351.55	88.04	889.	0.	0.000	1000.00	0.814A
Nd-147	363.79	91.10	901.	0.	0.000	1000.00	0.817s
TH-234	369.74	92.59	239.	50.	0.028	45.72	0.818D
AC-228	372.78	93.35	825.	28.	0.016	146.09	0.819s
Gd-153	389.37	97.50	372.	-24.	-0.013	117.50	0.823s
Np-239	397.37	99.50	362.	-23.	-0.013	117.37	0.825s
Gd-153	412.16	103.20	363.	20.	0.011	134.30	0.828s
Np-239	414.16	103.70	383.	0.	0.000	1000.00	0.829s
Np-239	423.88	106.13	426.	-25.	-0.014	117.59	0.831s
EU-152	486.43	121.78	339.	-11.	-0.006	231.78	0.846s
CO-57	487.57	122.06	280.	17.	0.010	139.91	0.846s
EU-154	491.73	123.10	345.	-17.	-0.010	154.94	0.847s
PA-234	524.49	131.29	587.	-27.	-0.015	129.70	0.855s
HF-181	531.41	133.02	605.	-27.	-0.015	131.30	0.856s
CE-144	533.46	133.54	632.	-27.	-0.015	134.04	0.857

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	544.50	136.30	661.	-27.	-0.015	136.61	0.859s
CO-57	545.20	136.47	729.	-28.	-0.016	135.32	0.859s
Tc-99m	561.34	140.51	396.	19.	0.010	152.59	0.863s
U-235	574.43	143.79	421.	-6.	-0.003	393.79	0.866s
CE-141	581.05	145.44	399.	4.	0.002	653.40	0.868s
Ba-140	649.90	162.66	348.	-23.	-0.013	114.64	0.884
U-235	652.78	163.38	376.	-26.	-0.014	91.56	0.885
Cf-251	705.64	176.60	147.	14.	0.008	152.66	0.897s
TH-229	773.25	193.51	170.	-4.	-0.002	506.72	0.913s
U-235	820.52	205.33	168.	-24.	-0.014	92.33	0.924s
TH-229	842.58	210.85	203.	-25.	-0.014	102.60	0.929s
Cf-251	907.16	227.00	107.	4.	0.002	426.84	0.944s
PB-212	953.67	238.63	97.	523.	0.291	5.12	0.954D
PB-214	967.13	242.00	96.	77.	0.043	21.28	0.957D
EU-152	977.91	244.69	921.	-8.	-0.005	508.66	0.960
TH-227	1024.08	256.24	97.	8.	0.004	219.53	0.971s
Cd-113m	1053.91	263.70	128.	11.	0.006	148.55	0.978s
BI-210M	1062.44	265.83	186.	-20.	-0.011	98.34	0.979
TL-208	1107.97	277.22	24.	53.	0.029	20.86	1.572s
Hg-203	1115.89	279.20	179.	-18.	-0.010	108.30	0.992s
I-131	1136.28	284.30	125.	-15.	-0.008	144.80	0.996s
PB-214	1179.49	295.11	55.	144.	0.080	12.66	0.814
PB-212	1198.14	299.77	36.	48.	0.027	27.82	1.662s
PA-231	1199.35	300.07	293.	-13.	-0.007	193.06	1.011
PA-233	1199.79	300.18	280.	0.	0.000	1000.00	1.011
PA-231	1209.66	302.65	280.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	280.	0.	0.000	1000.00	1.013s
Ir-192	1232.82	308.44	134.	-18.	-0.010	93.80	1.019s
PA-233	1247.10	312.01	156.	12.	0.007	149.40	1.022s
Ir-192	1265.01	316.49	150.	-20.	-0.011	90.04	1.026s
CR-51	1279.38	320.08	177.	-6.	-0.003	231.27	1.029s
La-140	1314.07	328.76	81.	33.	0.018	53.88	1.037s
Cf-249	1332.79	333.44	77.	-2.	-0.001	823.86	1.041s
AC-228	1351.41	338.10	55.	132.	0.073	14.94	0.823
Cs-136	1361.30	340.57	285.	15.	0.008	165.98	1.048s
EU-152	1376.16	344.29	335.	-17.	-0.010	152.87	1.051
HF-181	1382.33	345.83	281.	15.	0.008	164.23	1.053s
PB-214	1406.53	351.88	49.	308.	0.171	7.16	1.089
BA-133	1423.00	356.00	460.	-18.	-0.010	173.04	1.062
I-131	1456.93	364.48	45.	11.	0.006	121.88	1.070s
Cf-249	1550.77	387.95	113.	-17.	-0.010	89.79	1.091s
SN-113	1565.73	391.69	142.	-7.	-0.004	196.71	1.094s
SB-125	1710.44	427.88	59.	-8.	-0.004	190.36	1.127s
AG-108M	1734.69	433.94	37.	2.	0.001	489.90	1.132s
pm-146	1814.44	453.88	28.	4.	0.002	258.74	1.150s
SB-125	1852.38	463.37	111.	-3.	-0.002	384.96	1.158s
Ir-192	1871.15	468.06	110.	16.	0.009	98.22	1.163s
BE-7	1909.29	477.59	66.	11.	0.006	110.94	1.171s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	1926.89	482.00	60.	11.	0.006	105.64	1.175s
La-140	1946.98	487.02	40.	4.	0.002	313.58	1.180s
RU-103	1987.11	497.05	28.	10.	0.006	108.75	1.188s
RH-106	2046.35	511.86	60.	78.	0.043	27.64	2.452s
Nd-147	2122.88	531.00	40.	3.	0.002	416.78	1.219s
Ba-140	2147.92	537.26	41.	3.	0.002	367.40	1.224s
CS-134	2251.82	563.24	28.	11.	0.006	98.93	1.247s
CS-134	2276.15	569.32	35.	3.	0.002	255.73	1.252s
PA-234	2276.75	569.47	34.	3.	0.002	252.19	1.253
BI-207	2277.67	569.70	37.	2.	0.001	435.89	1.253s
TL-208	2331.65	583.20	23.	194.	0.108	8.87	1.066
SB-125	2400.86	600.50	427.	-14.	-0.008	209.50	1.280s
SB-124	2409.78	602.73	414.	-15.	-0.008	73.71	1.282s
CS-134	2417.70	604.71	399.	-14.	-0.008	202.01	1.284s
BI-214	2436.06	609.30	14.	237.	0.132	7.26	1.135
RU-103	2440.05	610.30	385.	-7.	-0.004	394.66	1.288s
AG-108M	2455.98	614.28	378.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	378.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	321.	12.	0.007	214.21	1.299s
SB-125	2542.41	635.89	59.	-8.	-0.004	145.83	1.311
I-131	2546.75	636.97	49.	12.	0.007	84.49	1.312s
AG-110M	2629.90	657.76	65.	-5.	-0.003	232.38	1.330
CS-137	2645.49	661.66	80.	-6.	-0.003	209.25	1.333s
PM-144	2785.03	696.54	39.	0.	0.000	1000.00	1.363s
NB-94	2809.38	702.63	30.	-1.	-0.001	726.09	1.368s
SB-124	2890.01	722.79	108.	-8.	-0.004	198.89	1.386s
AG-108M	2890.61	722.94	115.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	98.	14.	0.007	107.47	1.386s
ZR-95	2895.66	724.20	97.	0.	0.000	1000.00	1.387s
BI-212	2907.54	727.17	57.	13.	0.007	88.31	1.390s
pm-146	2941.74	735.72	31.	-9.	-0.005	123.24	1.397s
pm-146	2987.51	747.16	35.	-5.	-0.003	223.99	1.407s
ZR-95	3025.79	756.73	26.	3.	0.001	404.42	1.415s
AG-110M	3054.64	763.94	72.	-8.	-0.005	144.81	1.421s
NB-95	3062.03	765.79	88.	-2.	-0.001	726.70	1.423s
PA-234M	3064.52	766.41	35.	9.	0.005	96.82	1.423s
EU-152	3114.56	778.92	26.	11.	0.006	99.31	1.434s
BI-212	3140.56	785.42	35.	1.	0.001	905.54	1.440s
CS-134	3182.35	795.87	13.	31.	0.017	29.77	1.448s
CS-134	3206.69	801.95	35.	11.	0.006	110.13	1.454s
CO-58	3241.99	810.78	93.	-16.	-0.009	88.64	1.461s
La-140	3261.97	815.77	109.	-16.	-0.009	95.14	1.465s
Cs-136	3272.90	818.50	91.	12.	0.007	111.68	1.467s
MN-54	3338.30	834.85	28.	24.	0.013	51.03	1.481s
Co-56	3385.99	846.77	19.	10.	0.006	93.67	1.491s
TL-208	3441.18	860.56	34.	13.	0.007	98.57	1.503s
NB-94	3483.32	871.10	28.	-3.	-0.002	232.38	1.512s
EU-154	3491.85	873.23	34.	-2.	-0.001	557.11	1.514s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3521.06	880.53	62.	3.	0.002	375.65	1.520s
PA-234	3531.90	883.24	65.	0.	0.000	1000.00	1.522s
AG-110M	3537.67	884.68	91.	-17.	-0.009	84.31	1.523s
Sc-46	3556.06	889.28	87.	7.	0.004	185.94	1.527s
y-88	3591.11	898.04	19.	7.	0.004	130.32	1.534
AC-228	3644.14	911.30	4.	142.	0.079	8.92	1.681
AG-110M	3748.95	937.49	65.	-20.	-0.011	86.95	1.567s
PA-234	3783.07	946.02	9.	15.	0.008	51.33	1.574s
EU-152	3855.45	964.11	116.	15.	0.008	107.18	1.589s
AC-228	3874.76	968.94	15.	63.	0.035	17.60	0.978s
EU-154	3984.36	996.33	30.	10.	0.005	86.41	1.616s
PA-234M	4003.04	1001.00	39.	7.	0.004	140.18	1.620s
EU-154	4018.15	1004.77	30.	6.	0.003	143.53	1.623s
Co-56	4150.45	1037.84	35.	-11.	-0.006	83.60	1.650s
Cs-136	4191.39	1048.07	19.	10.	0.006	69.35	1.658s
RH-106	4200.55	1050.36	37.	-3.	-0.001	328.13	1.661s
BI-207	4253.77	1063.66	20.	12.	0.006	89.52	1.671s
Ga-68	4308.74	1077.40	35.	2.	0.001	654.15	1.683s
FE-59	4396.18	1099.25	25.	-3.	-0.002	292.01	1.700s
EU-152	4447.49	1112.07	90.	6.	0.003	228.61	1.711s
ZN-65	4461.38	1115.55	95.	6.	0.003	235.47	1.713s
BI-214	4480.35	1120.29	47.	7.	0.004	137.09	1.717s
Sc-46	4481.41	1120.55	55.	10.	0.006	105.82	1.717s
Ta-182	4484.41	1121.30	44.	6.	0.003	161.84	1.718
CO-60	4692.24	1173.24	40.	-10.	-0.006	142.59	1.760s
Ta-182	4755.52	1189.05	35.	-5.	-0.003	196.44	1.772
Ta-182	4885.02	1221.41	49.	-14.	-0.008	75.60	1.798
Co-56	4952.53	1238.28	38.	16.	0.009	90.30	1.812s
NA-22	5097.60	1274.53	35.	-13.	-0.007	70.08	1.840s
EU-154	5097.66	1274.54	34.	11.	0.006	83.50	1.840s
FE-59	5165.90	1291.60	11.	3.	0.002	229.35	1.854s
CO-60	5329.61	1332.50	21.	-5.	-0.003	201.56	1.886s
AG-110M	5536.92	1384.30	11.	1.	0.001	670.83	1.926s
EU-152	5631.79	1408.00	5.	7.	0.004	86.62	1.944s
K-40	5843.38	1460.87	8.	477.	0.265	4.66	2.012
SB-124	6764.55	1690.98	6.	-2.	-0.001	241.44	2.157s
BI-214	7058.84	1764.49	19.	29.	0.016	28.16	2.211s
Co-56	7086.31	1771.35	63.	-10.	-0.006	114.92	2.216s
y-88	7345.39	1836.06	12.	-6.	-0.003	145.30	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 -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   3.1052E+00                                     5.31E+01
                           477.60 3.105E+00 ?(  1.170E+01 1.11E+02 1.05E+01 G

NA-22    C  -8.2319E-01                                     9.50E+02
                          1274.53-8.232E-01 &(  1.917E+00 7.01E+01 9.99E+01 G

K-40     N   3.1459E+02                                     4.66E+11
                          1460.83 3.146E+02  (P 1.049E+01 4.66E+00 1.07E+01 G

Sc-46    F   4.7062E-01                                     8.38E+01
                           889.28 3.484E-01 ?(  2.222E+00 1.86E+02 1.00E+02 G
                          1120.55 5.928E-01 ?(  2.131E+00 1.06E+02 1.00E+02 G

CR-51    F  -1.3420E+00                                     2.77E+01
                           320.08-1.342E+00 ?(P 1.482E+01 2.31E+02 9.94E+00 G

MN-54    C   1.0996E+00                                     3.12E+02
                           834.85 1.100E+00 &(  1.254E+00 5.10E+01 1.00E+02 G

FE-59    F   3.4235E-02                                     4.45E+01
                          1099.25-3.168E-01 &(P 2.607E+00 2.92E+02 5.65E+01 G
                          1291.60 4.934E-01 ?(  2.654E+00 2.29E+02 4.32E+01 G

Co-56    C   8.8794E-01                                     7.73E+01
                           846.77 4.805E-01 ?(  1.058E+00 9.37E+01 9.99E+01 G
                          1238.28 1.504E+00 ?(P 2.943E+00 9.03E+01 6.61E+01 G
                          1037.84-4.220E+00 + P 1.158E+01 8.36E+01 1.41E+01 G
                          1771.35-5.379E+00 +   2.103E+01 1.15E+02 1.55E+01  A

CO-57    C   2.6058E-01                                     2.72E+02
                           122.06 2.606E-01 ?(  1.224E+00 1.40E+02 8.56E+01 G
                           136.47-3.560E+00 +   1.606E+01 1.35E+02 1.07E+01 G

CO-58    C  -7.2373E-01                                     7.09E+01
                           810.78-7.237E-01 ?(  2.150E+00 8.86E+01 9.95E+01 G

CO-60    F  -3.4944E-01                                     1.93E+03
                          1332.50-3.494E-01 ?(  1.588E+00 2.02E+02 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
ZN-65	F	6.7244E-01					2.44E+02	
			1115.55	6.724E-01	?(	5.444E+00	2.35E+02	5.06E+01 G
NB-94	I	-5.9969E-02					7.41E+06	
			702.63	-5.997E-02	?(P	1.169E+00	7.26E+02	9.79E+01 G
			871.10	-1.578E-01	+	1.303E+00	2.32E+02	9.99E+01 G
ZR-95	I	2.0432E-01					6.40E+01	
			756.73	2.043E-01	&(P	2.082E+00	4.04E+02	5.45E+01 G
			724.20	0.000E+00	-	4.534E+00	1.00E+03	4.42E+01 G
NB-95	I	-7.8878E-02					6.40E+01	
			765.79	-7.888E-02	?(	1.996E+00	7.27E+02	9.98E+01 G
RU-103	I	3.4237E-01					3.93E+01	
			497.05	3.424E-01	?(P	9.405E-01	1.09E+02	9.09E+01 G
			610.30	-4.457E+00	+	5.940E+01	3.95E+02	5.75E+00 GA
RH-106	I	4.4244E+00					3.74E+02	
			621.92	4.424E+00	?(	3.195E+01	2.14E+02	9.93E+00 G
			1050.36	-9.285E+00	+	1.081E+02	3.28E+02	1.56E+00 G
			511.86	1.248E+01	?	6.188E+00	2.76E+01	2.00E+01 GA
AG-108M	C	7.2991E-02					1.53E+05	
			433.94	7.299E-02	?(	9.675E-01	4.90E+02	9.05E+01 G
			722.94	0.000E+00	-	2.385E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.785E+00	1.00E+03	8.98E+01 G
AG-110M	F	-1.1029E+00					2.50E+02	
			884.68	-1.103E+00	?(	3.111E+00	8.43E+01	7.27E+01 G
			657.76	-2.026E-01	+	1.632E+00	2.32E+02	9.46E+01 G
			937.49	-2.968E+00	+	5.876E+00	8.69E+01	3.44E+01 G
			1384.30	3.119E-01	+ P	5.023E+00	6.71E+02	2.43E+01 G
			763.94	-1.635E+00	+	8.101E+00	1.45E+02	2.23E+01 G
SN-113	F	-2.7179E-01					1.15E+02	
			391.69	-2.718E-01	?(P	2.396E+00	1.97E+02	6.40E+01 G
SB-124	F	-5.4740E-01					6.02E+01	
			602.73	-5.474E-01	?(P	3.568E+00	7.37E+01	9.83E+01 G
			1690.98	-3.924E-01	+ P	2.391E+00	2.41E+02	4.78E+01 G
			722.79	-2.853E+00	+	1.941E+01	1.99E+02	1.08E+01 G
SB-125	I	-7.2572E-01					1.01E+03	
			427.88	-7.257E-01	?(	3.635E+00	1.90E+02	2.96E+01 G
			600.50	-2.824E+00	+	1.988E+01	2.09E+02	1.79E+01 G
			635.89	-2.535E+00	+	1.270E+01	1.46E+02	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	-9.617E-01	+ P	1.471E+01	3.85E+02	1.05E+01 G
I-131	I	8.2518E-01					8.02E+00	
			364.48	3.249E-01	*(P	1.043E+00	1.22E+02	8.17E+01 G
			284.30	-5.013E+00	+	1.871E+01	1.45E+02	6.14E+00 G
			636.97	6.526E+00	?(P	1.852E+01	8.45E+01	7.17E+00 G
Gd-153	F	-8.9033E-02					2.42E+02	
			97.50	-1.037E+00	?(	4.070E+00	1.17E+02	3.00E+01 G
			103.20	1.215E+00	?(	5.464E+00	1.34E+02	2.18E+01 G
Ga-68	C	3.9749E+00					4.71E-02	
			1077.40	3.975E+00	?(	6.018E+01	6.54E+02	3.30E+00 G
Tc-99m	I	2.9102E-01					2.51E-01	
			140.51	2.910E-01	?(	1.489E+00	1.53E+02	8.93E+01 G
BA-133	F	-7.0098E-01					3.85E+03	
			356.00	-7.010E-01	(	4.066E+00	1.73E+02	6.20E+01 G
			302.85	0.000E+00	+	9.653E+00	1.00E+03	1.83E+01 G
			383.84	-2.900E-01	%	1.717E+01	1.72E+03	8.94E+00 GA
			80.99	2.904E-01	P	3.050E+00	3.67E+02	3.41E+01 GA
CS-134	I	8.6181E-01					7.54E+02	
			604.71	-5.208E-01	?(	3.536E+00	2.02E+02	9.76E+01 G
			795.87	1.602E+00	*(	1.008E+00	2.98E+01	8.55E+01 G
			569.32	7.471E-01	*(	6.757E+00	2.56E+02	1.54E+01 G
			801.95	5.796E+00	?(	1.542E+01	1.10E+02	8.69E+00 G
			563.24	4.523E+00	?(P	1.129E+01	9.89E+01	8.35E+00 G
CS-137	I	-2.7867E-01					1.10E+04	
			661.66	-2.787E-01	?(	2.008E+00	2.09E+02	8.52E+01 G
CE-139	F	1.8178E-02					1.38E+02	
			165.85	1.818E-02	&(	1.665E+00	2.70E+03	7.99E+01 G
Ba-140	I	4.6352E-01					1.28E+01	
			537.26	4.635E-01	?(P	4.388E+00	3.67E+02	2.44E+01 G
			162.66	-5.480E+00	+	2.100E+01	1.15E+02	6.22E+00 G
			304.85	-2.258E-01	% P	4.147E+01	3.05E+03	4.29E+00 G
La-140	I	5.4805E-01					1.28E+01	
			1596.21	-6.630E-03	%(P	1.123E+00	6.75E+03	9.54E+01 G
			487.02	2.704E-01	(	2.176E+00	3.14E+02	4.55E+01 G
			328.76	3.777E+00	*(P	5.110E+00	5.39E+01	2.03E+01 G
			815.77	-3.115E+00	+	9.950E+00	9.51E+01	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	1.2306E-01					3.25E+01	
			145.44	1.231E-01	?(	2.719E+00	6.53E+02	4.82E+01 G
CE-144	I	-3.2018E+00					2.85E+02	
			133.54	-3.202E+00	?(	1.432E+01	1.34E+02	1.11E+01 G
EU-152	F	1.7032E+00					4.94E+03	
			344.29	-1.552E+00	?(	7.965E+00	1.53E+02	2.65E+01 G
			1112.07	2.484E+00	?(	1.954E+01	2.29E+02	1.36E+01 G
			121.78	-5.151E-01	+	4.025E+00	2.32E+02	2.86E+01 G
			778.92	3.696E+00	?(	8.895E+00	9.93E+01	1.29E+01 G
			964.11	5.114E+00	(	1.846E+01	1.07E+02	1.46E+01 G
			244.69	-2.110E+00	+	3.597E+01	5.09E+02	7.58E+00 G
			1408.00	2.202E+00	?	4.386E+00	8.66E+01	2.10E+01 GA
EU-154	I	2.0425E+00					3.14E+03	
			873.23	-5.793E-01	?(	1.157E+01	5.57E+02	1.23E+01 G
			123.10	-5.475E-01	&	2.848E+00	1.55E+02	4.08E+01 G
			1274.54	1.918E+00	&(	5.398E+00	8.35E+01	3.52E+01 G
			723.36	2.747E+00	*(	9.962E+00	1.07E+02	2.02E+01 G
			1004.77	1.652E+00	&(	8.262E+00	1.44E+02	1.80E+01 G
			996.33	4.809E+00	?(	1.405E+01	8.64E+01	1.06E+01 G
EU-155	I	-1.6116E-02					1.81E+03	
			105.31	-1.612E-02	%(P	5.754E+00	8.78E+03	2.12E+01 G
			86.54	-1.294E+00	&	6.793E+00	1.58E+02	3.07E+01 G
HF-181	F	7.1390E-01					4.24E+01	
			482.00	4.099E-01	&(	1.469E+00	1.06E+02	8.05E+01 G
			133.02	-8.187E-01	+	3.586E+00	1.31E+02	4.33E+01 G
			345.83	2.338E+00	?(	1.292E+01	1.64E+02	1.51E+01 G
			136.30	-6.130E+00	&	2.793E+01	1.37E+02	5.85E+00 G
Ta-182	F	9.8146E-01					1.14E+02	
			1121.30	9.815E-01	(	5.509E+00	1.62E+02	3.49E+01 G
			1221.41	-3.067E+00	+ P	7.977E+00	7.56E+01	2.70E+01 G
			1189.05	-1.915E+00	+ P	1.124E+01	1.96E+02	1.62E+01 G
Hg-203	F	-4.5559E-01					4.66E+01	
			279.20	-4.556E-01	?(	1.656E+00	1.08E+02	8.15E+01 G
TL-208	N	8.0392E+00					6.98E+02	
			583.02	8.039E+00	(	1.047E+00	8.87E+00	8.45E+01 G
			277.28	1.726E+01	+ P	8.376E+00	2.09E+01	6.31E+00 G
			860.56	4.871E+00	- P	1.121E+01	9.86E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	-8.1950E-02					2.02E+03	
			747.16	-5.894E-01	?(P	3.742E+00	2.24E+02	3.40E+01 G
			735.72	-1.597E+00	+ P	5.277E+00	1.23E+02	2.25E+01 G
			453.88	1.835E-01	?(	1.231E+00	2.59E+02	6.50E+01 G
y-88	F	3.7881E-01					1.07E+02	
			898.04	3.788E-01	&(	1.180E+00	1.30E+02	9.37E+01 G
			1836.06	-5.097E-01	+	1.601E+00	1.45E+02	9.92E+01 G
Cd-113m		3.6510E+03					5.33E+03	
			263.70	3.651E+03	?(	1.840E+04	1.49E+02	6.00E-03 K
Cf-251	T	1.2772E+00					3.28E+05	
			176.60	1.277E+00	&(	5.270E+00	1.53E+02	1.70E+01 G
			227.00	1.235E+00	?	1.449E+01	4.27E+02	6.30E+00 GA
Cf-249	T	-6.8767E-01					1.28E+05	
			387.95	-6.877E-01	?(	2.068E+00	8.98E+01	6.60E+01 G
			333.44	-3.026E-01	&	6.596E+00	8.24E+02	1.55E+01 G
Sn-126		4.5700E+00					3.65E+07	
			87.57	1.945E+00	}	5.098E+00	3.87E+01	3.75E+01 GA
			64.28	4.570E+00	(	1.661E+01	1.09E+02	9.70E+00 G
			86.94	0.000E+00	}	2.214E+01	2.15E+03	9.04E+00 GA
PB-210	N	1.3334E+01					8.14E+03	
			46.54	1.333E+01	(P	3.366E+01	8.56E+01	4.25E+00 G
PB-212	N	2.2471E+01					6.98E+02	
			238.63	2.247E+01	(P	2.082E+00	5.12E+00	4.33E+01 G
			300.03	3.186E+01	+ P	2.038E+01	2.78E+01	3.28E+00 GA
PB-214	N	1.9946E+01					5.84E+05	
			351.93	1.995E+01	(P	2.297E+00	7.16E+00	3.76E+01 G
			295.09	1.602E+01	- P	4.173E+00	1.27E+01	1.93E+01 G
			242.00	1.946E+01		1.221E+01	2.13E+01	7.43E+00 GA
BI-207	C	4.1162E-01					1.18E+04	
			569.70	7.057E-02	*(	1.096E+00	4.36E+02	9.77E+01 G
			1063.66	8.591E-01	?(	1.740E+00	8.95E+01	7.45E+01 G
BI-212	N	6.9936E+00					6.98E+02	
			727.17	6.994E+00	(	2.079E+01	8.83E+01	7.55E+00 G
			785.42	4.558E+00	&	1.031E+02	9.06E+02	1.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	1.8611E+01					5.84E+05	
			609.31	1.861E+01	(P	1.596E+00	7.26E+00	4.61E+01 G
			1120.29	2.805E+00	- P	1.319E+01	1.37E+02	1.51E+01 G
			1764.49	1.542E+01	- P	1.218E+01	2.82E+01	1.54E+01 G
BI-210M	T	-8.0654E-01					1.10E+09	
			265.83	-8.065E-01	?(	2.654E+00	9.83E+01	5.00E+01 G
			304.90	-3.690E-02	% P	6.355E+00	2.87E+03	2.80E+01 G
AC-228	N	2.4593E+01					2.10E+03	
			911.07	2.399E+01	(	1.997E+00	8.92E+00	2.90E+01 G
			968.97	1.850E+01	-	6.096E+00	1.76E+01	1.75E+01 G
			338.32	2.605E+01	(	7.356E+00	1.49E+01	1.20E+01 G
			93.35	6.738E+00	-	3.282E+01	1.46E+02	5.56E+00 XA
TH-227	N	4.2359E-01					7.95E+03	
			50.14	-1.179E+00	(	1.953E+01	5.76E+02	8.00E+00 G
			256.24	2.255E+00	(P	1.355E+01	2.20E+02	7.00E+00 G
TH-229	N	-1.6252E+00					2.68E+06	
			193.51	-1.625E+00	?(P	2.327E+01	5.07E+02	4.40E+00 G
			210.85	-1.440E+01	+	3.950E+01	1.03E+02	2.99E+00 G
TH-234	N	1.4305E+01					1.63E+12	
			63.29	1.751E+01	(P	2.925E+01	5.58E+01	3.81E+00 G
			92.59	1.212E+01	(P	1.795E+01	4.57E+01	5.58E+00 G
PA-233	C	7.4960E-01					7.82E+08	
			312.01	7.496E-01	&(	3.790E+00	1.49E+02	3.60E+01 G
			300.18	0.000E+00	-	2.836E+01	1.00E+03	6.20E+00 G
PA-234	N	1.2649E+00					1.63E+12	
			131.29	-1.958E+00	?(	8.474E+00	1.30E+02	1.80E+01 G
			946.02	5.511E+00	?(	6.367E+00	5.13E+01	1.34E+01 G
			569.47	1.401E+00	&(	1.251E+01	2.52E+02	8.20E+00 G
			883.24	0.000E+00	-	2.005E+01	1.00E+03	9.60E+00 G
			880.53	2.384E+00	?	3.132E+01	3.76E+02	6.00E+00 GA
PA-234M	N	6.5506E+01					1.63E+12	
			1001.00	4.128E+01	&(P	1.996E+02	1.40E+02	8.37E-01 G
			766.41	1.345E+02	?(P	4.426E+02	9.68E+01	2.94E-01 G
U-235	N	-7.3982E-01					2.57E+11	
			143.79	-7.398E-01	?(P	1.222E+01	3.94E+02	1.10E+01 G
			205.33	-8.190E+00	+ P	2.115E+01	9.23E+01	5.01E+00 G
			163.38	-7.443E+00	& P	2.676E+01	9.16E+01	5.08E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T -1.0990E+00					1.58E+05	
		59.54	-1.099E+00	?(	4.302E+00	1.38E+02	3.59E+01 G
Ir-192	F 1.3574E-02					7.40E+01	
		316.49	-5.159E-01	?(	1.553E+00	9.00E+01	8.70E+01 G
		468.06	9.041E-01	&(	2.984E+00	9.82E+01	5.18E+01 G
		308.44	-1.263E+00	+	3.968E+00	9.38E+01	3.18E+01 G
Cs-136	F 6.4120E-01					1.30E+01	
		818.50	5.641E-01	?(	2.131E+00	1.12E+02	1.00E+02 G
		1048.07	6.798E-01	?(	1.567E+00	6.93E+01	8.00E+01 G
		340.57	7.397E-01	&(	4.133E+00	1.66E+02	4.69E+01 G
Np-239	T -1.4393E+00					2.36E+00	
		103.70	0.000E+00	&	5.094E+00	1.00E+03	2.40E+01 X
		106.13	-1.439E+00	?(	5.651E+00	1.18E+02	2.27E+01 G
		99.50	-2.037E+00	+	7.992E+00	1.17E+02	1.50E+01 X
Nd-147	7.5599E-01					1.11E+01	
		531.00	7.560E-01	?(	8.110E+00	4.17E+02	1.30E+01 G
		91.10	0.000E+00	-	6.796E+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
R - Coincidence Corrected
H - Halflife limit exceeded
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	186.	-4.	-0.002	576.09	-1.179E+00	
AM-241	59.54	291.	-21.	-0.012	138.46	-1.099E+00	
BA-133	80.99	225.	7.	0.004	367.29	2.904E-01	P
EU-155	86.54	1015.	-29.	-0.016	157.53	-1.294E+00	
Gd-153	97.50	372.	-24.	-0.013	117.50	-1.037E+00	
Np-239	99.50	362.	-23.	-0.013	117.37	-2.037E+00	
Gd-153	103.20	363.	20.	0.011	134.30	1.215E+00	
Np-239	106.13	426.	-25.	-0.014	117.59	-1.439E+00	
EU-152	121.78	339.	-11.	-0.006	231.78	-5.151E-01	
CO-57	122.06	280.	17.	0.010	139.91	2.606E-01	
EU-154	123.10	345.	-17.	-0.010	154.94	-5.475E-01	
PA-234	131.29	587.	-27.	-0.015	129.70	-1.958E+00	
CE-144	133.54	632.	-27.	-0.015	134.04	-3.202E+00	
CO-57	136.47	729.	-28.	-0.016	135.32	-3.560E+00	
Tc-99m	140.51	396.	19.	0.010	152.59	2.910E-01	
U-235	143.79	421.	-6.	-0.003	393.79	-7.398E-01	P
CE-141	145.44	399.	4.	0.002	653.40	1.231E-01	
Ba-140	162.66	348.	-23.	-0.013	114.64	-5.480E+00	
U-235	163.38	376.	-26.	-0.014	91.56	-7.443E+00	P
Cf-251	176.60	147.	14.	0.008	152.66	1.277E+00	
TH-229	193.51	170.	-4.	-0.002	506.72	-1.625E+00	P
U-235	205.33	168.	-24.	-0.014	92.33	-8.190E+00	P
TH-229	210.85	203.	-25.	-0.014	102.60	-1.440E+01	
Cf-251	227.00	107.	4.	0.002	426.84	1.235E+00	
EU-152	244.69	921.	-8.	-0.005	508.66	-2.110E+00	
TH-227	256.24	97.	8.	0.004	219.53	2.255E+00	P
Cd-113m	263.70	128.	11.	0.006	148.55	3.651E+03	
BI-210M	265.83	186.	-20.	-0.011	98.34	-8.065E-01	
Hg-203	279.20	179.	-18.	-0.010	108.30	-4.556E-01	
I-131	284.30	125.	-15.	-0.008	144.80	-5.013E+00	
PA-231	300.07	293.	-13.	-0.007	193.06	-1.122E+01	
Ir-192	308.44	134.	-18.	-0.010	93.80	-1.263E+00	
PA-233	312.01	156.	12.	0.007	149.40	7.496E-01	
Ir-192	316.49	150.	-20.	-0.011	90.04	-5.159E-01	
CR-51	320.08	177.	-6.	-0.003	231.27	-1.342E+00	P
La-140	328.76	81.	33.	0.018	53.88	3.777E+00	P
Cf-249	333.44	77.	-2.	-0.001	823.86	-3.026E-01	
Cs-136	340.57	285.	15.	0.008	165.98	7.397E-01	
EU-152	344.29	335.	-17.	-0.010	152.87	-1.552E+00	
BA-133	356.00	460.	-18.	-0.010	173.04	-7.010E-01	
I-131	364.48	45.	11.	0.006	121.88	3.249E-01	P
Cf-249	387.95	113.	-17.	-0.010	89.79	-6.877E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	142.	-7.	-0.004	196.71	-2.718E-01	P
SB-125	427.88	59.	-8.	-0.004	190.36	-7.257E-01	
AG-108M	433.94	37.	2.	0.001	489.90	7.299E-02	
pm-146	453.88	28.	4.	0.002	258.74	1.835E-01	
SB-125	463.37	111.	-3.	-0.002	384.96	-9.617E-01	P
Ir-192	468.06	110.	16.	0.009	98.22	9.041E-01	
BE-7	477.59	66.	11.	0.006	110.94	3.105E+00	
La-140	487.02	40.	4.	0.002	313.58	2.704E-01	
RU-103	497.05	28.	10.	0.006	108.75	3.424E-01	P
RH-106	511.86	60.	78.	0.043	27.64	1.248E+01	
Nd-147	531.00	40.	3.	0.002	416.78	7.560E-01	
Ba-140	537.26	41.	3.	0.002	367.40	4.635E-01	P
CS-134	563.24	28.	11.	0.006	98.93	4.523E+00	P
CS-134	569.32	35.	3.	0.002	255.73	7.471E-01	
PA-234	569.47	34.	3.	0.002	252.19	1.401E+00	
BI-207	569.70	37.	2.	0.001	435.89	7.057E-02	
SB-125	600.50	427.	-14.	-0.008	209.50	-2.824E+00	
SB-124	602.73	414.	-15.	-0.008	73.71	-5.474E-01	P
CS-134	604.71	399.	-14.	-0.008	202.01	-5.208E-01	
RU-103	610.30	385.	-7.	-0.004	394.66	-4.457E+00	
RH-106	621.92	321.	12.	0.007	214.21	4.424E+00	
SB-125	635.89	59.	-8.	-0.004	145.83	-2.535E+00	
I-131	636.97	49.	12.	0.007	84.49	6.526E+00	P
AG-110M	657.76	65.	-5.	-0.003	232.38	-2.026E-01	
CS-137	661.66	80.	-6.	-0.003	209.25	-2.787E-01	
NB-94	702.63	30.	-1.	-0.001	726.09	-5.997E-02	P
SB-124	722.79	108.	-8.	-0.004	198.89	-2.853E+00	
EU-154	723.36	98.	14.	0.007	107.47	2.747E+00	
BI-212	727.17	57.	13.	0.007	88.31	6.994E+00	
pm-146	735.72	31.	-9.	-0.005	123.24	-1.597E+00	P
pm-146	747.16	35.	-5.	-0.003	223.99	-5.894E-01	P
ZR-95	756.73	26.	3.	0.001	404.42	2.043E-01	P
AG-110M	763.94	72.	-8.	-0.005	144.81	-1.635E+00	
NB-95	765.79	88.	-2.	-0.001	726.70	-7.888E-02	
PA-234M	766.41	35.	9.	0.005	96.82	1.345E+02	P
EU-152	778.92	26.	11.	0.006	99.31	3.696E+00	
BI-212	785.42	35.	1.	0.001	905.54	4.558E+00	
CS-134	795.87	13.	31.	0.017	29.77	1.602E+00	
CS-134	801.95	35.	11.	0.006	110.13	5.796E+00	
CO-58	810.78	93.	-16.	-0.009	88.64	-7.237E-01	
La-140	815.77	109.	-16.	-0.009	95.14	-3.115E+00	
Cs-136	818.50	91.	12.	0.007	111.68	5.641E-01	
MN-54	834.85	28.	24.	0.013	51.03	1.100E+00	
Co-56	846.77	19.	10.	0.006	93.67	4.805E-01	
NB-94	871.10	28.	-3.	-0.002	232.38	-1.578E-01	
EU-154	873.23	34.	-2.	-0.001	557.11	-5.793E-01	
PA-234	880.53	62.	3.	0.002	375.65	2.384E+00	
AG-110M	884.68	91.	-17.	-0.009	84.31	-1.103E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Sc-46	889.28	87.	7.	0.004	185.94	3.484E-01		
y-88	898.04	19.	7.	0.004	130.32	3.788E-01		
AG-110M	937.49	65.	-20.	-0.011	86.95	-2.968E+00		
PA-234	946.02	9.	15.	0.008	51.33	5.511E+00		
EU-152	964.11	116.	15.	0.008	107.18	5.114E+00		
EU-154	996.33	30.	10.	0.005	86.41	4.809E+00		
PA-234M	1001.00	39.	7.	0.004	140.18	4.128E+01		P
EU-154	1004.77	30.	6.	0.003	143.53	1.652E+00		
Co-56	1037.84	35.	-11.	-0.006	83.60	-4.220E+00		P
Cs-136	1048.07	19.	10.	0.006	69.35	6.798E-01		
RH-106	1050.36	37.	-3.	-0.001	328.13	-9.285E+00		
BI-207	1063.66	20.	12.	0.006	89.52	8.591E-01		
Ga-68	1077.40	35.	2.	0.001	654.15	3.975E+00		
FE-59	1099.25	25.	-3.	-0.002	292.01	-3.168E-01		P
EU-152	1112.07	90.	6.	0.003	228.61	2.484E+00		
ZN-65	1115.55	95.	6.	0.003	235.47	6.724E-01		
Sc-46	1120.55	55.	10.	0.006	105.82	5.928E-01		
Ta-182	1121.30	44.	6.	0.003	161.84	9.815E-01		
CO-60	1173.24	40.	-10.	-0.006	142.59	-5.942E-01		
Ta-182	1189.05	35.	-5.	-0.003	196.44	-1.915E+00		P
Ta-182	1221.41	49.	-14.	-0.008	75.60	-3.067E+00		P
Co-56	1238.28	38.	16.	0.009	90.30	1.504E+00		P
NA-22	1274.53	35.	-13.	-0.007	70.08	-8.232E-01		
EU-154	1274.54	34.	11.	0.006	83.50	1.918E+00		
FE-59	1291.60	11.	3.	0.002	229.35	4.934E-01		
CO-60	1332.50	21.	-5.	-0.003	201.56	-3.494E-01		
AG-110M	1384.30	11.	1.	0.001	670.83	3.119E-01		P
EU-152	1408.00	5.	7.	0.004	86.62	2.202E+00		
SB-124	1690.98	6.	-2.	-0.001	241.44	-3.924E-01		P
Co-56	1771.35	63.	-10.	-0.006	114.92	-5.379E+00		
y-88	1836.06	12.	-6.	-0.003	145.30	-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 Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.1052E+00	3.1052E+00	1.109E+02%	1.17E+01
NA-22	#A	-8.2319E-01	-8.2319E-01	7.008E+01%	1.92E+00
K-40		3.1459E+02	3.1459E+02	4.659E+00%	1.05E+01
Sc-46	#A	4.7062E-01	4.7062E-01	1.058E+02%	2.22E+00
CR-51	#A	-1.3420E+00	-1.3420E+00	2.313E+02%	1.48E+01
MN-54	#A	1.0996E+00	1.0996E+00	5.103E+01%	1.25E+00
FE-59	#A	3.4234E-02	3.4235E-02	1.857E+02%	2.61E+00
Co-56	#A	8.8794E-01	8.8794E-01	6.505E+01%	1.06E+00
CO-57	#A	2.6058E-01	2.6058E-01	1.399E+02%	1.22E+00

CO-58	#A	-7.2372E-01	-7.2373E-01	8.864E+01%	2.15E+00
CO-60	#A	-3.4944E-01	-3.4944E-01	2.016E+02%	1.59E+00
ZN-65	#A	6.7244E-01	6.7244E-01	2.355E+02%	5.44E+00
NB-94	#A	-5.9969E-02	-5.9969E-02	7.261E+02%	1.17E+00
ZR-95	#A	2.0431E-01	2.0432E-01	4.044E+02%	2.08E+00
NB-95	#A	-7.8877E-02	-7.8878E-02	7.267E+02%	2.00E+00
RU-103	#A	3.4237E-01	3.4237E-01	1.087E+02%	9.40E-01
RH-106	#A	4.4244E+00	4.4244E+00	2.142E+02%	3.19E+01
AG-108M	#A	7.2991E-02	7.2991E-02	4.899E+02%	9.67E-01
AG-110M	#A	-1.1029E+00	-1.1029E+00	8.431E+01%	3.11E+00
SN-113	#A	-2.7179E-01	-2.7179E-01	1.967E+02%	2.40E+00
SB-124	#A	-5.4739E-01	-5.4740E-01	7.371E+01%	3.57E+00
SB-125	#A	-7.2572E-01	-7.2572E-01	1.904E+02%	3.64E+00
I-131	#A	8.2512E-01	8.2518E-01	7.415E+01%	1.04E+00
Gd-153	#A	-8.9033E-02	-8.9033E-02	8.922E+01%	4.07E+00
Ga-68	#A	3.9264E+00	3.9749E+00	6.542E+02%	6.02E+01
Tc-99m	#A	2.9035E-01	2.9102E-01	1.526E+02%	1.49E+00
BA-133	#A	-7.0098E-01	-7.0098E-01	1.730E+02%	4.07E+00
CS-134	#A	8.6181E-01	8.6181E-01	2.977E+01%	3.54E+00
CS-137	#A	-2.7867E-01	-2.7867E-01	2.092E+02%	2.01E+00
CE-139	#A	1.8178E-02	1.8178E-02	2.700E+03%	1.67E+00
Ba-140	#A	4.6350E-01	4.6352E-01	3.674E+02%	4.39E+00
La-140	#A	5.4803E-01	5.4805E-01	5.388E+01%	1.12E+00
CE-141	#A	1.2306E-01	1.2306E-01	6.534E+02%	2.72E+00
CE-144	#A	-3.2018E+00	-3.2018E+00	1.340E+02%	1.43E+01
PM-144	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.29E+00
EU-152	#A	1.7032E+00	1.7032E+00	7.786E+01%	7.96E+00
EU-154	#A	2.0425E+00	2.0425E+00	8.350E+01%	1.16E+01
EU-155	#A	-1.6116E-02	-1.6116E-02	8.781E+03%	5.75E+00
HF-181	A	7.1389E-01	7.1390E-01	9.764E+01%	1.47E+00
Ta-182	#A	9.8145E-01	9.8146E-01	1.618E+02%	5.51E+00
Hg-203	#A	-4.5558E-01	-4.5559E-01	1.083E+02%	1.66E+00
TL-208		8.0392E+00	8.0392E+00	8.865E+00%	1.05E+00
pm-146	#A	-8.1950E-02	-8.1950E-02	1.711E+02%	3.74E+00
y-88	#A	3.7881E-01	3.7881E-01	1.303E+02%	1.18E+00
Cd-113m	#A	3.6510E+03	3.6510E+03	1.485E+02%	1.84E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.11E+01
Cf-251	#A	1.2772E+00	1.2772E+00	1.527E+02%	5.27E+00
Cf-249	#A	-6.8767E-01	-6.8767E-01	8.979E+01%	2.07E+00
Sn-126	A	4.5700E+00	4.5700E+00	1.089E+02%	1.66E+01
PB-210	A	1.3334E+01	1.3334E+01	8.563E+01%	3.37E+01
PB-212		2.2471E+01	2.2471E+01	5.119E+00%	2.08E+00
PB-214		1.9946E+01	1.9946E+01	7.163E+00%	2.30E+00
BI-207	#A	4.1162E-01	4.1162E-01	8.952E+01%	1.10E+00
BI-212	#A	6.9936E+00	6.9936E+00	8.831E+01%	2.08E+01
BI-214		1.8611E+01	1.8611E+01	7.262E+00%	1.60E+00
BI-210M	#A	-8.0654E-01	-8.0654E-01	9.834E+01%	2.65E+00
AC-228		2.4593E+01	2.4593E+01	8.697E+00%	2.00E+00
TH-227	#A	4.2359E-01	4.2359E-01	2.195E+02%	1.95E+01

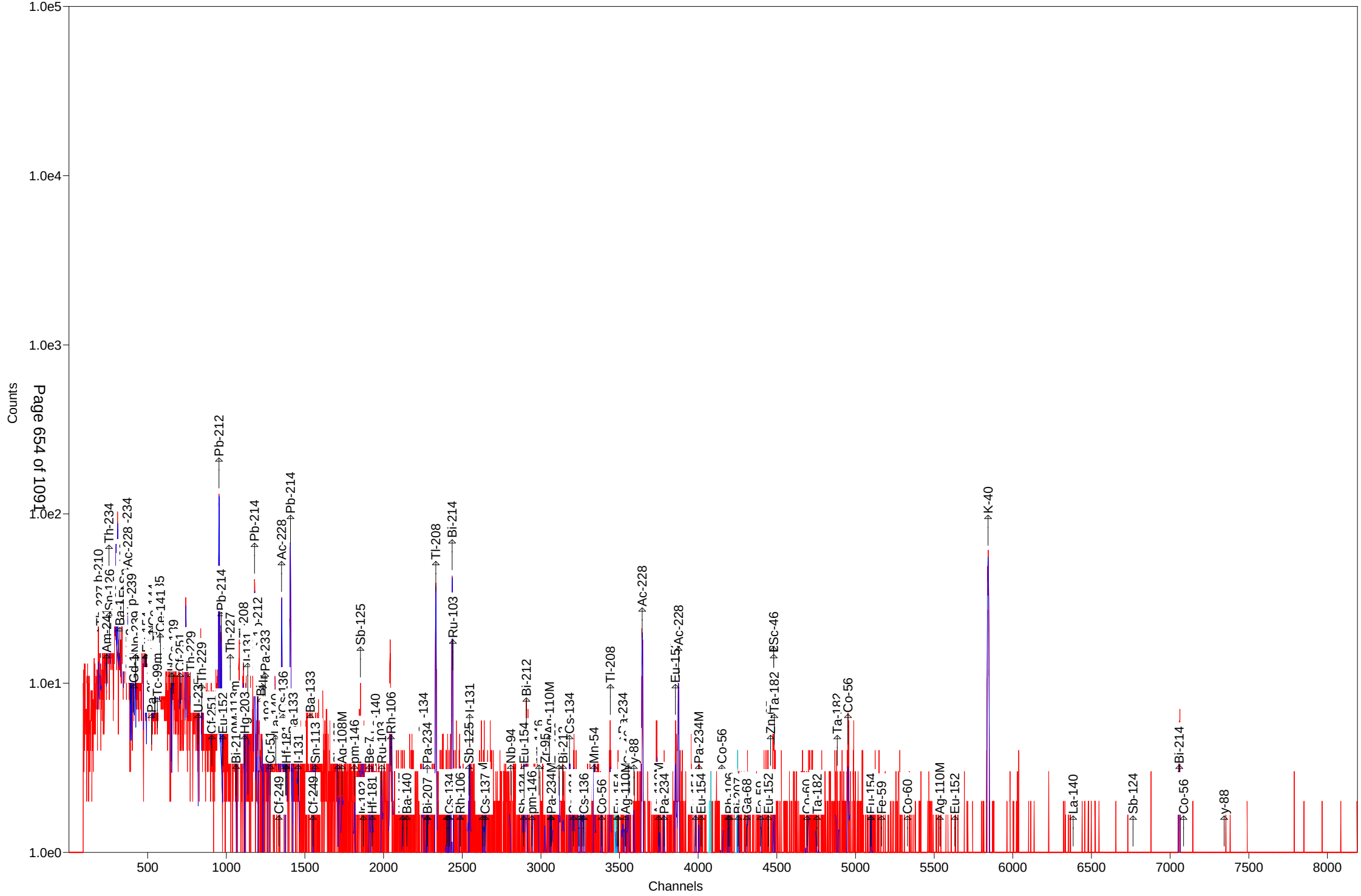
TH-229	#A	-1.6252E+00	-1.6252E+00	5.067E+02%	2.33E+01
TH-234	A	1.4305E+01	1.4305E+01	3.607E+01%	2.92E+01
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.14E+01
PA-233	#A	7.4960E-01	7.4960E-01	1.494E+02%	3.79E+00
PA-234	#A	1.2649E+00	1.2649E+00	5.133E+01%	8.47E+00
PA-234M	#A	6.5506E+01	6.5506E+01	8.518E+01%	2.00E+02
U-235	#A	-7.3982E-01	-7.3982E-01	3.938E+02%	1.22E+01
AM-241	#A	-1.0990E+00	-1.0990E+00	1.385E+02%	4.30E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.67E+01
Ir-192	#A	1.3574E-02	1.3574E-02	6.662E+01%	1.55E+00
Cs-136	#A	6.4117E-01	6.4120E-01	6.935E+01%	2.13E+00
Np-239	#A	-1.4390E+00	-1.4393E+00	1.176E+02%	5.65E+00
Nd-147	#A	7.5595E-01	7.5599E-01	4.168E+02%	8.11E+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) 4.226E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.2255649E+02 Bq/Sample

264540_Gamma_160-18553-A-10-B. 17_Gamma_20161134.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162111

Sample Description: 264540_Gamma_160-18553-A-11-B
Detector: Detector #16
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-11-B

Decay to Time: 9/1/2016 16:08 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:09:28 Real Time: 1821 sec
Analysis Time: 9/1/2016 16:40 Dead Time: 1.17 %
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	-3.788E+00	109.6	4.152E+00	4.156E+00	1.596E+01
NA-22	1.536E+00	19.6	3.013E-01	3.109E-01	4.354E-01
K-40	2.251E+02	5.4	1.210E+01	1.670E+01	1.085E+01
Sc-46	4.504E-01	103.9	4.681E-01	4.687E-01	1.591E+00
CR-51	4.226E+00	185.6	7.843E+00	7.846E+00	2.623E+01
MN-54	0.000E+00	1.#INF	1.215E-01	1.215E-01	1.301E+00
FE-59	-1.067E+00	108.3	1.156E+00	1.158E+00	3.284E+00
Co-56	5.252E-01	104.4	5.482E-01	5.489E-01	1.130E+00
CO-57	5.398E-01	41.6	2.246E-01	2.264E-01	6.116E-01
CO-58	-7.241E-01	81.9	5.934E-01	5.946E-01	1.983E+00
CO-60	-2.240E-01	309.0	6.920E-01	6.921E-01	1.521E+00
ZN-65	-1.564E+00	116.6	1.823E+00	1.825E+00	6.141E+00
NB-94	6.237E-01	89.2	5.561E-01	5.570E-01	1.864E+00
ZR-95	1.222E-01	915.2	1.118E+00	1.118E+00	2.647E+00
NB-95	-8.244E-01	87.2	7.187E-01	7.200E-01	2.400E+00
RU-103	5.027E-01	94.0	4.725E-01	4.732E-01	1.126E+00
RH-106	-6.688E+00	172.0	1.151E+01	1.151E+01	3.852E+01
AG-108M	1.955E-02	2781.0	5.438E-01	5.438E-01	1.320E+00
AG-110M	2.151E-01	119.2	2.563E-01	2.566E-01	2.377E+00
SN-113	2.080E-01	344.9	7.172E-01	7.173E-01	2.447E+00
SB-124	-9.630E-02	196.4	1.892E-01	1.892E-01	3.559E+00
SB-125	2.365E+00	39.5	9.337E-01	9.414E-01	3.688E+00
I-131	6.761E-02	746.4	5.046E-01	5.047E-01	1.276E+00
Gd-153	8.275E-01	122.3	1.012E+00	1.013E+00	7.594E+00
Ga-68	4.342E+01	38.0	1.648E+01	1.666E+01	3.336E+01
Tc-99m	-4.325E-01	144.7	6.257E-01	6.262E-01	2.084E+00
BA-133	6.354E-01	200.1	1.271E+00	1.272E+00	3.775E+00
CS-134	7.911E-01	78.3	6.191E-01	6.205E-01	3.554E+00
CS-137	-7.867E-01	45.9	3.611E-01	3.634E-01	2.075E+00
CE-139	3.932E-01	103.3	4.063E-01	4.080E-01	1.357E+00
Ba-140	-2.720E+00	68.9	1.874E+00	1.879E+00	5.601E+00
La-140	1.627E-01	82.2	1.337E-01	1.340E-01	1.691E+00
CE-141	-8.316E-01	145.2	1.207E+00	1.208E+00	4.019E+00

CE-144	-3.283E+00	150.6	4.944E+00	4.947E+00	1.647E+01
PM-144	-6.132E-01	88.0	5.398E-01	5.407E-01	1.809E+00
EU-152	2.037E+00	141.9	2.890E+00	2.892E+00	8.045E+00
EU-154	1.059E+00	72.9	7.717E-01	7.736E-01	1.073E+01
EU-155	1.449E+00	128.1	1.856E+00	1.858E+00	6.194E+00
HF-181	2.301E-01	155.5	3.577E-01	3.579E-01	2.181E+00
Ta-182	2.205E+00	83.1	1.832E+00	1.835E+00	7.819E+00
Hg-203	-2.338E-02	2248.5	5.258E-01	5.258E-01	1.795E+00
TL-208	7.343E+00	9.6	7.069E-01	8.030E-01	1.093E+00
pm-146	2.715E-01	624.5	1.695E+00	1.695E+00	4.019E+00
y-88	-5.994E-01	83.4	4.998E-01	5.007E-01	1.651E+00
Cd-113m	2.782E+03	210.5	5.856E+03	5.859E+03	1.989E+04
Cd-109	0.000E+00	1.#INF	1.938E+01	1.938E+01	6.443E+01
Cf-251	1.945E+00	105.8	2.057E+00	2.065E+00	5.250E+00
Cf-249	4.120E-01	177.2	7.302E-01	7.305E-01	2.475E+00
Sn-126	-5.550E+00	96.1	5.334E+00	5.342E+00	1.773E+01
PB-210	1.271E+01	82.3	1.045E+01	1.048E+01	3.458E+01
PB-212	2.210E+01	5.0	1.111E+00	1.811E+00	2.048E+00
PB-214	1.925E+01	6.8	1.303E+00	1.643E+00	2.539E+00
BI-207	3.986E-01	95.6	3.811E-01	3.816E-01	1.278E+00
BI-212	2.857E+01	19.4	5.553E+00	5.748E+00	1.107E+01
BI-214	2.224E+01	7.9	1.754E+00	2.100E+00	2.433E+00
BI-210M	7.522E-01	87.8	6.601E-01	6.616E-01	2.205E+00
AC-228	2.019E+01	9.6	1.942E+00	2.198E+00	1.962E+00
TH-227	-7.297E+00	111.5	8.135E+00	8.144E+00	2.713E+01
TH-229	1.121E+00	153.9	1.724E+00	1.727E+00	2.291E+01
TH-234	2.125E+01	42.7	9.076E+00	9.144E+00	2.927E+01
PA-231	-9.853E+00	248.1	2.445E+01	2.445E+01	8.201E+01
PA-233	1.109E+00	186.1	2.063E+00	2.064E+00	6.904E+00
PA-234	3.604E+00	49.3	1.776E+00	1.785E+00	7.888E+00
PA-234M	5.790E+01	87.3	5.057E+01	5.065E+01	2.308E+02
U-235	8.572E-01	91.0	7.799E-01	7.811E-01	1.690E+01
AM-241	-2.643E-02	6196.2	1.638E+00	1.638E+00	5.518E+00
Np-237	-3.269E+00	183.9	6.013E+00	6.015E+00	1.998E+01
Ir-192	6.910E-01	128.1	8.849E-01	8.859E-01	2.928E+00
Cs-136	-1.452E-01	108.8	1.580E-01	1.582E-01	1.522E+00
Np-239	-1.619E+00	105.0	1.700E+00	1.702E+00	5.659E+00
Nd-147	3.725E-01	424.4	1.581E+00	1.581E+00	8.914E+00
Total	3.294E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-11-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162111.An1

Acquisition information
Start time: 9/1/2016 4:09:28 PM
Live time: 1800
Real time: 1821
Dead time: 1.17 %
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 4:08:00 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. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1799

***** 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
46.43	23.	82.27	0.96	2.352E-02	46.54	4.250	PBC<MDA	PB210
63.36	72.	40.38	0.88	3.565E-02	63.29	3.810	2.945E+01	TH234
					64.28	9.700	1.138E+01	Sn126
74.75	225.	12.31	0.99	4.136E-02				
77.19	376.	7.93	0.99	4.231E-02				
87.51	34.	72.50	1.00	4.540E-02	87.57	37.500	PBC<MDA	Sn126
91.10	14.	424.38	1.00	4.612E-02	91.10	28.300	PBC<MDA	Nd147
93.05	139.	21.67	1.02	4.646E-02	92.59	5.584	2.108E+01	TH234
					93.35	5.561	2.993E+01	AC228
97.50	10.	562.65	1.01	4.707E-02	97.50	30.000	PBC<MDA	Gd153
103.20	26.	122.26	1.01	4.755E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.280E+00	Np239
103.70	26.	125.27	1.01	4.758E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.281E+00	Np239
105.31	26.	128.07	1.01	4.766E-02	105.31	21.200	PBC<MDA	EU155
122.51	39.	41.61	0.56	4.729E-02	122.06	85.600	PBC<MDA	CO57
131.29	48.	74.90	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	24.	155.46	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.572E+00	CE144
162.66	25.	99.35	1.07	4.136E-02	162.66	6.220	PBC<MDA	Ba140
163.38	25.	103.25	1.07	4.123E-02	163.38	5.080	PBC<MDA	U235
165.85	24.	103.32	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	24.	105.79	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
210.85	15.	173.30	1.11	3.511E-02	210.85	2.990	PBC<MDA	TH229
227.00	22.	94.06	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.66	554.	5.03	1.14	3.216E-02	238.63	43.300	2.211E+01	PB212
241.82	126.	14.90	1.14	3.187E-02	242.00	7.430	2.957E+01	PB214
244.69	21.	206.08	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
263.70	9.	210.53	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	20.	87.75	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
295.23	224.	10.06	1.20	2.764E-02	295.09	19.300	2.332E+01	PB214
302.88	8.	441.78	1.19	2.714E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.836E-01	BA133
308.44	20.	178.81	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
312.01	19.	186.07	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
316.49	20.	183.35	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
320.08	20.	185.59	1.21	2.608E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	174.13	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
333.44	15.	177.24	1.22	2.533E-02	333.44	15.510	PBC<MDA	Cf249
338.30	137.	16.36	1.86	2.506E-02	338.32	12.010	2.532E+01	AC228
340.57	15.	179.93	1.23	2.494E-02	340.57	46.900	PBC<MDA	Cs136
344.29	14.	195.08	1.23	2.475E-02	344.29	26.500	PBC<MDA	EU152
351.91	354.	7.02	1.28	2.436E-02	351.93	37.600	2.149E+01	PB214
355.93	15.	200.09	1.24	2.416E-02	356.00	62.050	PBC<MDA	BA133
364.48	2.	746.43	1.25	2.375E-02	364.48	81.700	PBC<MDA	I131
383.84	5.	363.29	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
391.69	5.	344.85	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
463.37	17.	88.66	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
487.02	17.	104.36	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
497.05	16.	94.01	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.86	125.	21.86	2.63	1.856E-02	511.86	20.000	1.871E+01	RH106
569.32	11.	99.06	1.43	1.717E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.276E+00	PA234
					569.70	97.740	3.589E-01	BI207
569.47	11.	92.83	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.394E+00	PA234
					569.70	97.740	3.688E-01	BI207
583.23	188.	9.63	1.36	1.687E-02	583.02	84.500	7.343E+00	TL208
609.47	291.	7.89	1.23	1.633E-02	609.31	46.090	2.147E+01	BI214
					610.30	5.750	1.723E+02	RU103
635.89	21.	39.47	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
657.76	10.	119.16	1.51	1.543E-02	657.76	94.640	PBC<MDA	AG110M
702.63	16.	89.16	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
727.63	56.	19.44	1.77	1.433E-02	727.17	7.550	2.857E+01	BI212
747.16	2.	624.50	1.59	1.404E-02	747.16	34.000	PBC<MDA	pm146
756.73	2.	915.20	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
766.41	18.	87.33	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.87	16.	78.26	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
801.95	15.	87.86	1.64	1.332E-02	801.95	8.690	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
846.77	11.	104.38	1.67	1.280E-02	846.77	99.935	PBC<MDA	Co56
860.33	32.	31.83	2.01	1.264E-02	860.56	12.420	1.127E+01	TL208
880.53	6.	187.04	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
889.28	10.	103.92	1.71	1.234E-02	889.28	99.984	PBC<MDA	Sc46
911.39	128.	9.62	1.64	1.211E-02	911.07	29.000	2.019E+01	AC228
946.02	10.	87.28	1.76	1.178E-02	946.02	13.400	PBC<MDA	PA234
969.14	98.	13.13	1.53	1.157E-02	968.97	17.460	2.705E+01	AC228
996.33	13.	78.97	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-1.	738.95	1.81	1.129E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	2.	496.42	1.84	1.099E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	5.	182.21	1.84	1.091E-02	1048.07	80.000	PBC<MDA	Cs136
1063.61	13.	95.59	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	23.	37.96	1.87	1.068E-02	1077.40	3.300	4.342E+01	Ga68
1120.44	69.	16.57	1.58	1.037E-02	1120.29	15.100	2.460E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.40	16.	93.44	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.494E+00	Ta182
1189.05	5.	213.78	1.96	9.916E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	10.	87.78	1.99	9.717E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	26.	19.61	2.03	9.409E-03	1274.53	99.940	1.536E+00	NA22
					1274.54	35.190	4.363E+00	EU154
1291.60	5.	202.97	2.05	9.314E-03	1291.60	43.200	PBC<MDA	FE59
1461.17	367.	5.37	1.85	8.482E-03	1460.83	10.670	2.251E+02	K40
1690.98	3.	242.22	2.37	7.585E-03	1690.98	47.790	PBC<MDA	SB124
1764.76	28.	30.82	2.43	7.342E-03	1764.49	15.400	1.390E+01	BI214
1836.06	3.	204.94	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.65	74.76	270.	224.	5.407E+03	12.39	0.985	- sD
308.41	77.20	257.	373.	8.808E+03	8.01	0.988	- 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	185.86	46.54	163.	23.	0.013	82.27	0.959D
TH-227	200.26	50.14	466.	-28.	-0.015	111.48	0.963s
TH-234	252.82	63.29	218.	52.	0.029	42.71	0.975D
Sn-126	256.79	64.28	551.	-35.	-0.019	96.11	0.976s
BA-133	323.60	80.99	1699.	-40.	-0.022	146.51	0.991s
Np-237	345.59	86.49	2031.	-35.	-0.019	183.95	0.996s
EU-155	345.80	86.54	1861.	-34.	-0.019	180.64	0.996s
Sn-126	347.39	86.94	1827.	-34.	-0.019	178.96	0.997
Sn-126	349.91	87.57	1634.	34.	0.019	72.50	0.997D
Cd-109	351.79	88.04	1793.	0.	0.000	177.10	0.998A
Nd-147	364.02	91.10	1664.	14.	0.008	424.38	1.001s
TH-234	369.98	92.59	249.	50.	0.028	47.64	1.002D
AC-228	373.02	93.35	1634.	34.	0.019	168.32	1.003s
Gd-153	389.61	97.50	1668.	10.	0.006	562.65	1.007s
Gd-153	412.40	103.20	504.	26.	0.015	122.26	1.012s
Np-239	414.40	103.70	530.	26.	0.015	125.27	1.012s
EU-155	420.85	105.31	557.	26.	0.015	128.07	1.014s
Np-239	424.11	106.13	532.	-32.	-0.018	105.01	1.014s
EU-152	486.67	121.78	391.	-29.	-0.016	98.09	1.029s
CO-57	489.59	122.51	81.	39.	0.022	41.61	0.557s
EU-154	491.96	123.10	322.	-31.	-0.017	76.37	1.030s
PA-234	524.73	131.29	618.	48.	0.027	74.90	1.038s
HF-181	531.64	133.02	666.	24.	0.013	155.46	1.039s
CE-144	533.70	133.54	1021.	-30.	-0.017	150.59	1.040s
HF-181	544.74	136.30	991.	-30.	-0.017	148.02	1.042s
CO-57	545.43	136.47	944.	-30.	-0.017	144.57	1.042s
Tc-99m	561.57	140.51	953.	-30.	-0.017	144.66	1.046s
U-235	574.67	143.79	984.	-16.	-0.009	149.84	1.049s
CE-141	581.29	145.44	1065.	-32.	-0.018	145.18	1.050
Ba-140	650.14	162.66	292.	25.	0.014	99.35	1.066s
U-235	653.01	163.38	317.	25.	0.014	103.25	1.067s
CE-139	662.90	165.85	283.	24.	0.013	103.32	1.069s
Cf-251	705.88	176.60	172.	24.	0.013	105.79	1.079s
TH-229	773.49	193.51	194.	-10.	-0.006	254.30	1.094s
TH-229	842.82	210.85	188.	15.	0.008	173.30	1.110
Cf-251	907.40	227.00	117.	22.	0.012	94.06	1.125s
PB-212	953.91	238.63	109.	554.	0.308	5.03	1.136D
PB-214	967.37	242.00	116.	119.	0.066	15.71	1.139D
EU-152	978.14	244.69	925.	21.	0.012	206.08	1.141s
TH-227	1024.32	256.24	140.	-5.	-0.003	508.32	1.152
Cd-113m	1054.15	263.70	175.	9.	0.005	210.53	1.158s
BI-210M	1062.67	265.83	146.	20.	0.011	87.75	1.160s
TL-208	1108.46	277.28	215.	-27.	-0.015	80.10	1.171
I-131	1136.52	284.30	124.	-14.	-0.008	194.31	1.177

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1180.24	295.23	63.	224.	0.124	10.06	1.200
PB-212	1199.42	300.03	533.	-23.	-0.013	51.60	1.191s
PA-231	1199.58	300.07	540.	-23.	-0.013	146.37	1.192s
PA-233	1200.02	300.18	562.	-23.	-0.013	149.35	1.192s
PA-231	1209.90	302.65	585.	-14.	-0.008	248.12	1.194s
BA-133	1210.70	302.85	607.	8.	0.004	441.78	1.194s
Ba-140	1218.69	304.85	599.	0.	0.000	1000.00	1.196s
BI-210M	1218.88	304.90	599.	0.	0.000	1000.00	1.196s
Ir-192	1233.05	308.44	601.	20.	0.011	178.81	1.199s
PA-233	1247.34	312.01	621.	19.	0.011	186.07	1.202s
Ir-192	1265.24	316.49	640.	20.	0.011	183.35	1.206s
CR-51	1279.62	320.08	660.	20.	0.011	185.59	1.210s
La-140	1314.31	328.76	345.	15.	0.008	174.13	1.217s
Cf-249	1333.02	333.44	360.	15.	0.009	177.24	1.222s
AC-228	1352.46	338.30	63.	137.	0.076	16.36	1.857s
Cs-136	1361.54	340.57	376.	15.	0.009	179.93	1.228s
EU-152	1376.40	344.29	392.	14.	0.008	195.08	1.231
HF-181	1382.56	345.83	447.	-7.	-0.004	403.05	1.233s
PB-214	1406.97	351.93	71.	317.	0.176	6.77	1.238D
BA-133	1423.24	356.00	453.	15.	0.008	200.09	1.242s
I-131	1457.16	364.48	81.	2.	0.001	746.43	1.250s
BA-133	1534.57	383.84	184.	5.	0.003	363.29	1.267
Cf-249	1551.01	387.95	189.	0.	0.000	1000.00	1.271s
SN-113	1565.96	391.69	171.	5.	0.003	344.85	1.274
SB-125	1852.61	463.37	108.	17.	0.010	88.66	1.338s
Ir-192	1871.38	468.06	142.	-9.	-0.005	188.77	1.342s
BE-7	1909.51	477.60	146.	-14.	-0.008	109.61	1.351s
HF-181	1927.12	482.00	158.	0.	0.000	1000.00	1.355s
La-140	1947.21	487.02	150.	17.	0.009	104.36	1.359s
RU-103	1987.33	497.05	48.	16.	0.009	94.01	1.368s
RH-106	2046.57	511.86	91.	125.	0.069	21.86	2.631s
Ba-140	2148.14	537.26	79.	-21.	-0.012	68.89	1.404s
CS-134	2276.36	569.32	52.	11.	0.006	99.06	1.432s
PA-234	2276.96	569.47	48.	11.	0.006	92.83	1.432s
TL-208	2331.99	583.23	30.	188.	0.105	9.63	1.363
SB-125	2401.07	600.50	485.	-16.	-0.009	195.71	1.460s
SB-124	2409.99	602.73	469.	-10.	-0.006	309.26	1.462s
CS-134	2417.91	604.71	459.	0.	0.000	1000.00	1.463s
BI-214	2436.95	609.47	42.	291.	0.162	7.89	1.227
RU-103	2440.26	610.30	459.	0.	0.000	1000.00	1.468s
AG-108M	2456.19	614.28	459.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	459.	0.	0.000	1000.00	1.475s
RH-106	2486.73	621.92	538.	-19.	-0.011	172.04	1.479
SB-125	2542.62	635.89	25.	21.	0.012	39.47	1.491
I-131	2546.96	636.97	71.	-16.	-0.009	80.52	1.492s
AG-110M	2630.10	657.76	66.	10.	0.006	119.16	1.510s
CS-137	2645.69	661.66	98.	-19.	-0.010	45.90	1.513
PM-144	2785.22	696.54	93.	-16.	-0.009	88.02	1.544s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	2809.57	702.63	96.	16.	0.009	89.16	1.549s
SB-124	2890.19	722.79	139.	-11.	-0.006	150.26	1.567s
AG-108M	2890.80	722.94	128.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	128.	0.	0.000	1000.00	1.567s
ZR-95	2895.84	724.20	142.	-15.	-0.008	115.28	1.568s
BI-212	2909.57	727.63	16.	56.	0.031	19.44	1.771
pm-146	2987.69	747.16	47.	2.	0.001	624.50	1.588s
ZR-95	3025.97	756.73	51.	2.	0.001	915.20	1.596s
AG-110M	3054.82	763.94	123.	-25.	-0.014	66.15	1.602s
NB-95	3062.21	765.79	148.	-20.	-0.011	87.18	1.604s
PA-234M	3064.70	766.41	115.	18.	0.010	87.33	1.605
EU-152	3114.73	778.92	47.	-10.	-0.005	153.32	1.615s
BI-212	3140.74	785.42	57.	-4.	-0.002	451.66	1.621
CS-134	3182.53	795.87	71.	16.	0.009	78.26	1.630s
CS-134	3206.86	801.95	79.	15.	0.008	87.86	1.635s
CO-58	3242.16	810.78	90.	-17.	-0.010	81.94	1.643s
Cs-136	3273.06	818.50	51.	-13.	-0.007	122.53	1.649s
MN-54	3338.46	834.85	35.	0.	0.000	1000.00	1.663s
Co-56	3386.15	846.77	25.	11.	0.006	104.38	1.674s
TL-208	3440.41	860.33	12.	32.	0.018	31.83	2.007
NB-94	3483.47	871.10	22.	0.	0.000	1000.00	1.695s
EU-154	3492.00	873.23	33.	-8.	-0.005	122.45	1.696s
PA-234	3521.21	880.53	53.	6.	0.003	187.04	1.703s
PA-234	3532.05	883.24	59.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	59.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	49.	10.	0.006	103.92	1.710s
y-88	3591.26	898.04	45.	-12.	-0.007	83.38	1.718s
AC-228	3644.67	911.39	4.	128.	0.071	9.62	1.641
AG-110M	3749.09	937.49	65.	-22.	-0.012	83.50	1.751s
PA-234	3783.21	946.02	15.	10.	0.006	87.28	1.759
EU-152	3855.58	964.11	194.	-21.	-0.012	94.76	1.774s
AC-228	3875.69	969.14	15.	98.	0.055	13.13	1.530
EU-154	3984.48	996.33	43.	13.	0.007	78.97	1.801s
PA-234M	4003.15	1001.00	61.	-1.	-0.001	738.95	1.805s
EU-154	4018.27	1004.77	70.	-2.	-0.001	595.82	1.808s
Co-56	4150.56	1037.84	28.	2.	0.001	496.42	1.836s
Cs-136	4191.49	1048.07	39.	5.	0.003	182.21	1.845s
RH-106	4200.65	1050.36	61.	-12.	-0.007	96.47	1.847s
BI-207	4253.86	1063.66	27.	13.	0.007	95.59	1.858s
Ga-68	4308.84	1077.40	11.	23.	0.013	37.96	1.870s
FE-59	4396.27	1099.25	48.	-11.	-0.006	108.33	1.888s
EU-152	4447.58	1112.07	160.	-19.	-0.010	98.68	1.899
ZN-65	4461.46	1115.55	142.	-15.	-0.008	116.56	1.901s
BI-214	4481.04	1120.44	15.	69.	0.039	16.57	1.581
Sc-46	4481.49	1120.55	127.	0.	0.000	1000.00	1.906
Ta-182	4484.49	1121.30	107.	16.	0.009	93.44	1.906
CO-60	4692.30	1173.24	53.	-22.	-0.012	53.18	1.950s
Ta-182	4755.57	1189.05	23.	5.	0.003	213.78	1.963

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4885.06	1221.41	11.	10.	0.005	87.78	1.990
Co-56	4952.57	1238.28	81.	-5.	-0.003	252.62	2.004s
NA-22	5097.62	1274.53	0.	26.	0.014	19.61	2.034s
EU-154	5097.68	1274.54	26.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	17.	5.	0.003	202.97	2.048
CO-60	5329.61	1332.50	23.	-4.	-0.002	308.96	2.081s
AG-110M	5536.89	1384.30	42.	-16.	-0.009	100.97	2.124s
EU-152	5631.75	1408.00	42.	-19.	-0.011	52.08	2.143s
K-40	5844.56	1461.17	10.	367.	0.204	5.37	1.853
La-140	6385.02	1596.21	19.	-8.	-0.004	139.85	2.294s
SB-124	6764.37	1690.98	6.	3.	0.001	242.22	2.369
BI-214	7058.61	1764.49	24.	28.	0.016	30.82	2.427s
Co-56	7086.08	1771.35	64.	-11.	-0.006	108.63	2.433s
y-88	7345.12	1836.06	7.	3.	0.002	204.94	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	-3.7876E+00				5.31E+01	
			477.60	-3.788E+00	&(P	1.596E+01 1.10E+02 1.05E+01	G
NA-22	C	1.5361E+00				9.50E+02	
			1274.53	1.536E+00	?(	4.354E-01 1.96E+01 9.99E+01	G
K-40	N	2.2509E+02				4.66E+11	
			1460.83	2.251E+02	(P	1.085E+01 5.37E+00 1.07E+01	G
Sc-46	F	4.5043E-01				8.38E+01	
			889.28	4.504E-01	?(	1.591E+00 1.04E+02 1.00E+02	G
			1120.55	0.000E+00	-	2.959E+00 1.00E+03 1.00E+02	G
CR-51	F	4.2258E+00				2.77E+01	
			320.08	4.226E+00	?(	2.623E+01 1.86E+02 9.94E+00	G
FE-59	F	-1.0674E+00				4.45E+01	
			1099.25	-1.067E+00	?(P	3.284E+00 1.08E+02 5.65E+01	G
			1291.60	6.760E-01	+ P	3.035E+00 2.03E+02 4.32E+01	G
Co-56	C	5.2522E-01				7.73E+01	
			846.77	4.779E-01	?(	1.130E+00 1.04E+02 9.99E+01	G
			1238.28	-4.079E-01	- P	3.897E+00 2.53E+02 6.61E+01	G
			1037.84	8.599E-01	?(P	9.730E+00 4.96E+02 1.41E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1771.35	-5.311E+00	+	1.958E+01	1.09E+02	1.55E+01 A
CO-57	C	5.3984E-01					2.72E+02	
			122.06	5.398E-01	(	6.116E-01	4.16E+01	8.56E+01 G
			136.47	-3.446E+00	-	1.660E+01	1.45E+02	1.07E+01 G
CO-58	C	-7.2414E-01					7.09E+01	
			810.78	-7.241E-01	?(	1.983E+00	8.19E+01	9.95E+01 G
CO-60	F	-2.2398E-01					1.93E+03	
			1332.50	-2.240E-01	?(	1.521E+00	3.09E+02	1.00E+02 G
			1173.24	-1.216E+00	+ P	2.026E+00	5.32E+01	9.99E+01 G
ZN-65	F	-1.5640E+00					2.44E+02	
			1115.55	-1.564E+00	?(	6.141E+00	1.17E+02	5.06E+01 G
NB-94	I	6.2372E-01					7.41E+06	
			702.63	6.237E-01	?(	1.864E+00	8.92E+01	9.79E+01 G
			871.10	0.000E+00	-	1.091E+00	1.00E+03	9.99E+01 G
ZR-95	I	1.2221E-01					6.40E+01	
			756.73	1.222E-01	?(	2.647E+00	9.15E+02	5.45E+01 G
			724.20	-1.313E+00	+	5.099E+00	1.15E+02	4.42E+01 G
NB-95	I	-8.2439E-01					6.40E+01	
			765.79	-8.244E-01	&(	2.400E+00	8.72E+01	9.98E+01 G
RU-103	I	5.0267E-01					3.93E+01	
			497.05	5.027E-01	?(P	1.126E+00	9.40E+01	9.09E+01 G
			610.30	0.000E+00	-	6.074E+01	1.00E+03	5.75E+00 GA
RH-106	I	-6.6883E+00					3.74E+02	
			621.92	-6.688E+00	?(	3.852E+01	1.72E+02	9.93E+00 G
			1050.36	-3.925E+01	+	1.279E+02	9.65E+01	1.56E+00 G
			511.86	1.871E+01	?	7.059E+00	2.19E+01	2.00E+01 GA
AG-108M	C	1.9553E-02					1.53E+05	
			433.94	1.955E-02	&(	1.320E+00	2.78E+03	9.05E+01 G
			722.94	0.000E+00	-	2.355E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.906E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.1512E-01					2.50E+02	
			884.68	0.000E+00	?(	2.377E+00	1.00E+03	7.27E+01 G
			657.76	3.803E-01	?(	1.543E+00	1.19E+02	9.46E+01 G
			937.49	-2.994E+00	+	5.492E+00	8.35E+01	3.44E+01 G
			1384.30	-4.141E+00	+	8.518E+00	1.01E+02	2.43E+01 G
			763.94	-4.497E+00	+	9.830E+00	6.61E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	2.0798E-01					1.15E+02	
			391.69	2.080E-01	&(P	2.447E+00	3.45E+02	6.40E+01 G
SB-124	F	-9.6302E-02					6.02E+01	
			602.73	-3.419E-01	?(	3.559E+00	3.09E+02	9.83E+01 G
			1690.98	4.087E-01	?(	2.213E+00	2.42E+02	4.78E+01 G
			722.79	-4.046E+00	+	2.061E+01	1.50E+02	1.08E+01 G
SB-125	I	2.3654E+00					1.01E+03	
			427.88	-4.420E-02	%(P	3.688E+00	3.75E+03	2.96E+01 G
			600.50	-3.024E+00	&	1.985E+01	1.96E+02	1.79E+01 G
			635.89	6.627E+00	&(P	8.023E+00	3.95E+01	1.13E+01 G
			463.37	4.574E+00	*(P	1.357E+01	8.87E+01	1.05E+01 G
I-131	I	6.7607E-02					8.02E+00	
			364.48	6.761E-02	*(P	1.276E+00	7.46E+02	8.17E+01 G
			284.30	-4.580E+00	& P	1.743E+01	1.94E+02	6.14E+00 G
			636.97	-7.627E+00	+	2.053E+01	8.05E+01	7.17E+00 G
Gd-153	F	8.2753E-01					2.42E+02	
			97.50	4.045E-01	?(	7.594E+00	5.63E+02	3.00E+01 G
			103.20	1.410E+00	&(	5.752E+00	1.22E+02	2.18E+01 G
Ga-68	C	4.3421E+01					4.71E-02	
			1077.40	4.342E+01	?(	3.336E+01	3.80E+01	3.30E+00 G
Tc-99m	I	-4.3253E-01					2.51E-01	
			140.51	-4.325E-01	&(	2.084E+00	1.45E+02	8.93E+01 G
BA-133	F	6.3535E-01					3.85E+03	
			356.00	5.620E-01	?(	3.775E+00	2.00E+02	6.20E+01 G
			302.85	8.836E-01	?(	1.312E+01	4.42E+02	1.83E+01 G
			383.84	1.444E+00	P	1.789E+01	3.63E+02	8.94E+00 GA
			80.99	-1.497E+00	&	7.285E+00	1.47E+02	3.41E+01 GA
CS-134	I	7.9108E-01					7.54E+02	
			604.71	0.000E+00	?(	3.554E+00	1.00E+03	9.76E+01 G
			795.87	7.769E-01	?(	2.030E+00	7.83E+01	8.55E+01 G
			569.32	2.279E+00	?(	7.652E+00	9.91E+01	1.54E+01 G
			801.95	7.183E+00	?(	2.118E+01	8.79E+01	8.69E+00 G
			563.24	2.156E-01	% P	1.285E+01	2.40E+03	8.35E+00 G
CS-137	I	-7.8673E-01					1.10E+04	
			661.66	-7.867E-01	&(P	2.075E+00	4.59E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.9322E-01					1.38E+02	
			165.85	3.932E-01	*(	1.357E+00	1.03E+02	7.99E+01 G
Ba-140	I	-2.7201E+00					1.28E+01	
			537.26	-2.720E+00	?(P	5.601E+00	6.89E+01	2.44E+01 G
			162.66	5.368E+00	+	1.780E+01	9.93E+01	6.22E+00 G
			304.85	0.000E+00	+	5.598E+01	1.00E+03	4.29E+00 G
La-140	I	1.6271E-01					1.28E+01	
			1596.21	-5.877E-01	?(	1.691E+00	1.40E+02	9.54E+01 G
			487.02	1.081E+00	?(	3.787E+00	1.04E+02	4.55E+01 G
			328.76	1.632E+00	&(	9.551E+00	1.74E+02	2.03E+01 G
			815.77	-1.570E-01	&	9.241E+00	1.69E+03	2.33E+01 G
CE-141	I	-8.3160E-01					3.25E+01	
			145.44	-8.316E-01	&(	4.019E+00	1.45E+02	4.82E+01 G
CE-144	I	-3.2834E+00					2.85E+02	
			133.54	-3.283E+00	&(	1.647E+01	1.51E+02	1.11E+01 G
PM-144	C	-6.1321E-01					3.63E+02	
			696.54	-6.132E-01	?(	1.809E+00	8.80E+01	9.90E+01 G
			618.06	0.000E+00	+	3.557E+00	1.00E+03	9.91E+01 G
EU-152	F	2.0371E+00					4.94E+03	
			344.29	1.227E+00	?(P	8.045E+00	1.95E+02	2.65E+01 G
			1112.07	-7.292E+00	+	2.411E+01	9.87E+01	1.36E+01 G
			121.78	-1.193E+00	&	3.899E+00	9.81E+01	2.86E+01 G
			778.92	-3.048E+00	+	1.089E+01	1.53E+02	1.29E+01 G
			964.11	-7.000E+00	+	2.217E+01	9.48E+01	1.46E+01 G
			244.69	4.868E+00	?(	3.350E+01	2.06E+02	7.58E+00 G
			1408.00	-5.809E+00	+ P	9.996E+00	5.21E+01	2.10E+01 GA
EU-154	I	1.0592E+00					3.14E+03	
			873.23	-3.032E+00	(P	1.073E+01	1.22E+02	1.23E+01 G
			123.10	-8.961E-01	& P	2.491E+00	7.64E+01	4.08E+01 G
			1274.54	0.000E+00	+	4.442E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.059E+01	1.00E+03	2.02E+01 G
			1004.77	-5.480E-01	+	1.143E+01	5.96E+02	1.80E+01 G
			996.33	5.795E+00	?(	1.534E+01	7.90E+01	1.06E+01 G
EU-155	I	1.4494E+00					1.81E+03	
			105.31	1.449E+00	*(	6.194E+00	1.28E+02	2.12E+01 G
			86.54	-1.359E+00	&	8.164E+00	1.81E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	2.3011E-01					4.24E+01	
			482.00	0.000E+00	(	2.181E+00	1.00E+03	8.05E+01 G
			133.02	6.579E-01	&(	3.416E+00	1.55E+02	4.33E+01 G
			345.83	-1.049E+00	& P	1.513E+01	4.03E+02	1.51E+01 G
			136.30	-6.289E+00	&	3.100E+01	1.48E+02	5.85E+00 G
Ta-182	F	2.2047E+00					1.14E+02	
			1121.30	2.494E+00	(	7.819E+00	9.34E+01	3.49E+01 G
			1221.41	2.047E+00	(	3.896E+00	8.78E+01	2.70E+01 G
			1189.05	1.844E+00	(	8.610E+00	2.14E+02	1.62E+01 G
Hg-203	F	-2.3383E-02					4.66E+01	
			279.20	-2.338E-02	%(	1.795E+00	2.25E+03	8.15E+01 G
TL-208	N	7.3431E+00					6.98E+02	
			583.02	7.343E+00	(P	1.093E+00	9.63E+00	8.45E+01 G
			277.28	-8.127E+00	-	2.164E+01	8.01E+01	6.31E+00 G
			860.56	1.127E+01	+ P	6.706E+00	3.18E+01	1.24E+01 G
pm-146	C	2.7146E-01					2.02E+03	
			747.16	2.715E-01	?(	4.019E+00	6.25E+02	3.40E+01 G
			735.72	-5.793E-02	%	5.420E+00	3.89E+03	2.25E+01 G
			453.88	-2.812E-02	%	1.801E+00	2.63E+03	6.50E+01 G
y-88	F	-5.9940E-01					1.07E+02	
			898.04	-5.994E-01	?(P	1.651E+00	8.34E+01	9.37E+01 G
			1836.06	2.622E-01	+	1.159E+00	2.05E+02	9.92E+01 G
Cd-113m		2.7816E+03					5.33E+03	
			263.70	2.782E+03	?(	1.989E+04	2.11E+02	6.00E-03 K
Cf-251	T	1.9448E+00					3.28E+05	
			176.60	1.945E+00	?(	5.250E+00	1.06E+02	1.70E+01 G
			227.00	5.853E+00	&	1.408E+01	9.41E+01	6.30E+00 GA
Cf-249	T	4.1197E-01					1.28E+05	
			387.95	0.000E+00	?(	2.475E+00	1.00E+03	6.60E+01 G
			333.44	2.165E+00	?(	1.290E+01	1.77E+02	1.55E+01 G
Sn-126		-5.5504E+00					3.65E+07	
			87.57	1.108E+00	}	6.235E+00	7.25E+01	3.75E+01 GA
			64.28	-5.550E+00	&(	1.773E+01	9.61E+01	9.70E+00 G
			86.94	-4.608E+00	+	2.742E+01	1.79E+02	9.04E+00 GA
PB-210	N	1.2708E+01					8.14E+03	
			46.54	1.271E+01	(P	3.458E+01	8.23E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.2103E+01					6.98E+02	
			238.63	2.210E+01	(P	2.048E+00	5.03E+00	4.33E+01 G
			300.03	-1.411E+01	- P	6.838E+01	5.16E+01	3.28E+00 GA
PB-214	N	1.9252E+01					5.84E+05	
			351.93	1.925E+01	(P	2.539E+00	6.77E+00	3.76E+01 G
			295.09	2.332E+01	+	4.133E+00	1.01E+01	1.93E+01 G
			242.00	2.799E+01	+	1.241E+01	1.57E+01	7.43E+00 GA
BI-207	C	3.9864E-01					1.18E+04	
			569.70	2.320E-02	%(	1.278E+00	1.56E+03	9.77E+01 G
			1063.66	8.912E-01	?(P	1.865E+00	9.56E+01	7.45E+01 G
BI-212	N	2.8573E+01					6.98E+02	
			727.17	2.857E+01	(P	1.107E+01	1.94E+01	7.55E+00 G
			785.42	-1.124E+01	- P	1.210E+02	4.52E+02	1.28E+00 GA
BI-214	N	2.2239E+01					5.84E+05	
			609.31	2.147E+01	(P	2.433E+00	7.89E+00	4.61E+01 G
			1120.29	2.460E+01	(P	7.287E+00	1.66E+01	1.51E+01 G
			1764.49	1.390E+01	- P	1.248E+01	3.08E+01	1.54E+01 G
BI-210M	T	7.5223E-01					1.10E+09	
			265.83	7.522E-01	*(	2.205E+00	8.78E+01	5.00E+01 G
			304.90	0.000E+00	-	8.578E+00	1.00E+03	2.80E+01 G
AC-228	N	2.0188E+01					2.10E+03	
			911.07	2.019E+01	(	1.962E+00	9.62E+00	2.90E+01 G
			968.97	2.705E+01	+	5.654E+00	1.31E+01	1.75E+01 G
			338.32	2.532E+01	+	7.318E+00	1.64E+01	1.20E+01 G
			93.35	7.333E+00	-	4.104E+01	1.68E+02	5.56E+00 XA
TH-227	N	-7.2968E+00					7.95E+03	
			50.14	-7.297E+00	?(	2.713E+01	1.11E+02	8.00E+00 G
			256.24	-1.424E+00	+ P	1.504E+01	5.08E+02	7.00E+00 G
TH-229	N	1.1207E+00					2.68E+06	
			193.51	-3.498E+00	?(	2.291E+01	2.54E+02	4.40E+00 G
			210.85	7.918E+00	?(P	3.525E+01	1.73E+02	2.99E+00 G
TH-234	N	2.1249E+01					1.63E+12	
			63.29	2.125E+01	(P	2.927E+01	4.27E+01	3.81E+00 G
			92.59	1.064E+01	- P	1.635E+01	4.76E+01	5.58E+00 G
PA-231	N	-9.8534E+00					1.20E+07	
			302.65	-9.853E+00	?(	8.201E+01	2.48E+02	2.88E+00 G
			300.07	-1.875E+01	&	9.174E+01	1.46E+02	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	1.1090E+00					7.82E+08	
			312.01	1.109E+00	*(P	6.904E+00	1.86E+02	3.60E+01 G
			300.18	-7.442E+00	&	3.715E+01	1.49E+02	6.20E+00 G
PA-234	N	3.6040E+00					1.63E+12	
			131.29	3.183E+00	?(	7.888E+00	7.49E+01	1.80E+01 G
			946.02	3.686E+00	?(P	7.332E+00	8.73E+01	1.34E+01 G
			569.47	4.394E+00	?(	1.379E+01	9.28E+01	8.20E+00 G
			883.24	0.000E+00	-	1.797E+01	1.00E+03	9.60E+00 G
			880.53	4.222E+00	&	2.737E+01	1.87E+02	6.00E+00 GA
PA-234M	N	5.7904E+01					1.63E+12	
			1001.00	-8.814E+00	?(P	2.308E+02	7.39E+02	8.37E-01 G
			766.41	2.478E+02	?(P	7.236E+02	8.73E+01	2.94E-01 G
U-235	N	8.5719E-01					2.57E+11	
			143.79	-1.804E+00	&(P	1.690E+01	1.50E+02	1.10E+01 G
			205.33	-1.033E-01	%	2.040E+01	7.60E+03	5.01E+00 G
			163.38	6.598E+00	(	2.274E+01	1.03E+02	5.08E+00 G
AM-241	T	-2.6430E-02					1.58E+05	
			59.54	-2.643E-02	&(P	5.518E+00	6.20E+03	3.59E+01 G
Np-237	F	-3.2687E+00					2.14E+06	
			86.49	-3.269E+00	&(	1.998E+01	1.84E+02	1.31E+01 G
Ir-192	F	6.9105E-01					7.40E+01	
			316.49	4.773E-01	&(	2.928E+00	1.83E+02	8.70E+01 G
			468.06	-4.915E-01	+	3.157E+00	1.89E+02	5.18E+01 G
			308.44	1.277E+00	(	7.640E+00	1.79E+02	3.18E+01 G
Cs-136	F	-1.4516E-01					1.30E+01	
			818.50	-5.560E-01	?(	1.522E+00	1.23E+02	1.00E+02 G
			1048.07	3.184E-01	+	2.026E+00	1.82E+02	8.00E+01 G
			340.57	7.309E-01	?(	4.418E+00	1.80E+02	4.69E+01 G
Np-239	T	-1.6185E+00					2.36E+00	
			103.70	1.281E+00	+	5.354E+00	1.25E+02	2.40E+01 X
			106.13	-1.619E+00	?(	5.659E+00	1.05E+02	2.27E+01 G
			99.50	8.968E-07	%	1.517E+01	5.06E+08	1.50E+01 X
Nd-147		3.7252E-01					1.11E+01	
			531.00	-7.885E-02	%(	8.914E+00	4.60E+03	1.30E+01 G
			91.10	5.799E-01	?(	8.207E+00	4.24E+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 Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	466.	-28.	-0.015	111.48	-7.297E+00	
Np-237	86.49	2031.	-35.	-0.019	183.95	-3.269E+00	
EU-155	86.54	1861.	-34.	-0.019	180.64	-1.359E+00	
Nd-147	91.10	1664.	14.	0.008	424.38	5.799E-01	
Gd-153	97.50	1668.	10.	0.006	562.65	4.045E-01	
Gd-153	103.20	504.	26.	0.015	122.26	1.410E+00	
Np-239	103.70	530.	26.	0.015	125.27	1.281E+00	
EU-155	105.31	557.	26.	0.015	128.07	1.449E+00	
Np-239	106.13	532.	-32.	-0.018	105.01	-1.619E+00	
EU-152	121.78	391.	-29.	-0.016	98.09	-1.193E+00	
EU-154	123.10	322.	-31.	-0.017	76.37	-8.961E-01	P
PA-234	131.29	618.	48.	0.027	74.90	3.183E+00	
HF-181	133.02	666.	24.	0.013	155.46	6.579E-01	
CE-144	133.54	1021.	-30.	-0.017	150.59	-3.283E+00	
HF-181	136.30	991.	-30.	-0.017	148.02	-6.289E+00	
Tc-99m	140.51	953.	-30.	-0.017	144.66	-4.325E-01	
U-235	143.79	984.	-16.	-0.009	149.84	-1.804E+00	P
CE-141	145.44	1065.	-32.	-0.018	145.18	-8.316E-01	
Ba-140	162.66	292.	25.	0.014	99.35	5.368E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	163.38	317.	25.	0.014	103.25	6.598E+00	
CE-139	165.85	283.	24.	0.013	103.32	3.932E-01	
Cf-251	176.60	172.	24.	0.013	105.79	1.945E+00	
TH-229	193.51	194.	-10.	-0.006	254.30	-3.498E+00	
TH-229	210.85	188.	15.	0.008	173.30	7.918E+00	P
Cf-251	227.00	117.	22.	0.012	94.06	5.853E+00	
EU-152	244.69	925.	21.	0.012	206.08	4.868E+00	
TH-227	256.24	140.	-5.	-0.003	508.32	-1.424E+00	P
Cd-113m	263.70	175.	9.	0.005	210.53	2.782E+03	
BI-210M	265.83	146.	20.	0.011	87.75	7.522E-01	
I-131	284.30	124.	-14.	-0.008	194.31	-4.580E+00	P
PA-231	300.07	540.	-23.	-0.013	146.37	-1.875E+01	
PA-233	300.18	562.	-23.	-0.013	149.35	-7.442E+00	
PA-231	302.65	585.	-14.	-0.008	248.12	-9.853E+00	
Ir-192	308.44	601.	20.	0.011	178.81	1.277E+00	
PA-233	312.01	621.	19.	0.011	186.07	1.109E+00	P
Ir-192	316.49	640.	20.	0.011	183.35	4.773E-01	
CR-51	320.08	660.	20.	0.011	185.59	4.226E+00	
La-140	328.76	345.	15.	0.008	174.13	1.632E+00	
Cf-249	333.44	360.	15.	0.009	177.24	2.165E+00	
Cs-136	340.57	376.	15.	0.009	179.93	7.309E-01	
EU-152	344.29	392.	14.	0.008	195.08	1.227E+00	P
HF-181	345.83	447.	-7.	-0.004	403.05	-1.049E+00	P
I-131	364.48	81.	2.	0.001	746.43	6.761E-02	P
SN-113	391.69	171.	5.	0.003	344.85	2.080E-01	P
SB-125	463.37	108.	17.	0.010	88.66	4.574E+00	P
Ir-192	468.06	142.	-9.	-0.005	188.77	-4.915E-01	
BE-7	477.60	146.	-14.	-0.008	109.61	-3.788E+00	P
La-140	487.02	150.	17.	0.009	104.36	1.081E+00	
RU-103	497.05	48.	16.	0.009	94.01	5.027E-01	P
RH-106	511.86	91.	125.	0.069	21.86	1.871E+01	
Ba-140	537.26	79.	-21.	-0.012	68.89	-2.720E+00	P
CS-134	569.32	52.	11.	0.006	99.06	2.279E+00	
PA-234	569.47	48.	11.	0.006	92.83	4.394E+00	
SB-125	600.50	485.	-16.	-0.009	195.71	-3.024E+00	
SB-124	602.73	469.	-10.	-0.006	309.26	-3.419E-01	
RH-106	621.92	538.	-19.	-0.011	172.04	-6.688E+00	
SB-125	635.89	25.	21.	0.012	39.47	6.627E+00	P
I-131	636.97	71.	-16.	-0.009	80.52	-7.627E+00	
AG-110M	657.76	66.	10.	0.006	119.16	3.803E-01	
CS-137	661.66	98.	-19.	-0.010	45.90	-7.867E-01	P
PM-144	696.54	93.	-16.	-0.009	88.02	-6.132E-01	
NB-94	702.63	96.	16.	0.009	89.16	6.237E-01	
SB-124	722.79	139.	-11.	-0.006	150.26	-4.046E+00	
ZR-95	724.20	142.	-15.	-0.008	115.28	-1.313E+00	
pm-146	747.16	47.	2.	0.001	624.50	2.715E-01	
ZR-95	756.73	51.	2.	0.001	915.20	1.222E-01	
AG-110M	763.94	123.	-25.	-0.014	66.15	-4.497E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-95	765.79	148.	-20.	-0.011	87.18	-8.244E-01		
PA-234M	766.41	115.	18.	0.010	87.33	2.478E+02		P
EU-152	778.92	47.	-10.	-0.005	153.32	-3.048E+00		
CS-134	795.87	71.	16.	0.009	78.26	7.769E-01		
CS-134	801.95	79.	15.	0.008	87.86	7.183E+00		
CO-58	810.78	90.	-17.	-0.010	81.94	-7.241E-01		
Cs-136	818.50	51.	-13.	-0.007	122.53	-5.560E-01		
Co-56	846.77	25.	11.	0.006	104.38	4.779E-01		
EU-154	873.23	33.	-8.	-0.005	122.45	-3.032E+00		P
PA-234	880.53	53.	6.	0.003	187.04	4.222E+00		
Sc-46	889.28	49.	10.	0.006	103.92	4.504E-01		
y-88	898.04	45.	-12.	-0.007	83.38	-5.994E-01		P
AG-110M	937.49	65.	-22.	-0.012	83.50	-2.994E+00		
PA-234	946.02	15.	10.	0.006	87.28	3.686E+00		P
EU-152	964.11	194.	-21.	-0.012	94.76	-7.000E+00		
EU-154	996.33	43.	13.	0.007	78.97	5.795E+00		
PA-234M	1001.00	61.	-1.	-0.001	738.95	-8.814E+00		P
EU-154	1004.77	70.	-2.	-0.001	595.82	-5.480E-01		
Co-56	1037.84	28.	2.	0.001	496.42	8.599E-01		P
Cs-136	1048.07	39.	5.	0.003	182.21	3.184E-01		
RH-106	1050.36	61.	-12.	-0.007	96.47	-3.925E+01		
FE-59	1099.25	48.	-11.	-0.006	108.33	-1.067E+00		P
EU-152	1112.07	160.	-19.	-0.010	98.68	-7.292E+00		
ZN-65	1115.55	142.	-15.	-0.008	116.56	-1.564E+00		
Ta-182	1121.30	107.	16.	0.009	93.44	2.494E+00		
CO-60	1173.24	53.	-22.	-0.012	53.18	-1.216E+00		P
Ta-182	1189.05	23.	5.	0.003	213.78	1.844E+00		
Ta-182	1221.41	11.	10.	0.005	87.78	2.047E+00		
Co-56	1238.28	81.	-5.	-0.003	252.62	-4.079E-01		P
FE-59	1291.60	17.	5.	0.003	202.97	6.760E-01		P
CO-60	1332.50	23.	-4.	-0.002	308.96	-2.240E-01		
AG-110M	1384.30	42.	-16.	-0.009	100.97	-4.141E+00		
EU-152	1408.00	42.	-19.	-0.011	52.08	-5.809E+00		P
La-140	1596.21	19.	-8.	-0.004	139.85	-5.877E-01		
SB-124	1690.98	6.	3.	0.001	242.22	4.087E-01		
Co-56	1771.35	64.	-11.	-0.006	108.63	-5.311E+00		
y-88	1836.06	7.	3.	0.002	204.94	2.622E-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	-3.7876E+00	-3.7876E+00	1.096E+02%	1.60E+01
NA-22	#	1.5361E+00	1.5361E+00	1.961E+01%	4.35E-01
K-40		2.2509E+02	2.2509E+02	5.375E+00%	1.08E+01
Sc-46	#A	4.5042E-01	4.5043E-01	1.039E+02%	1.59E+00
CR-51	#A	4.2257E+00	4.2258E+00	1.856E+02%	2.62E+01
MN-54	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.30E+00
FE-59	#A	-1.0674E+00	-1.0674E+00	1.083E+02%	3.28E+00
Co-56	#A	5.2522E-01	5.2522E-01	1.044E+02%	1.13E+00
CO-57	A	5.3984E-01	5.3984E-01	4.161E+01%	6.12E-01
CO-58	#A	-7.2414E-01	-7.2414E-01	8.194E+01%	1.98E+00
CO-60	#A	-2.2398E-01	-2.2398E-01	3.090E+02%	1.52E+00
ZN-65	#A	-1.5640E+00	-1.5640E+00	1.166E+02%	6.14E+00
NB-94	#A	6.2372E-01	6.2372E-01	8.916E+01%	1.86E+00
ZR-95	#A	1.2220E-01	1.2221E-01	9.152E+02%	2.65E+00
NB-95	#A	-8.2438E-01	-8.2439E-01	8.718E+01%	2.40E+00
RU-103	#A	5.0266E-01	5.0267E-01	9.401E+01%	1.13E+00
RH-106	#A	-6.6883E+00	-6.6883E+00	1.720E+02%	3.85E+01
AG-108M	#A	1.9553E-02	1.9553E-02	2.781E+03%	1.32E+00
AG-110M	#A	2.1512E-01	2.1512E-01	1.192E+02%	2.38E+00
SN-113	#A	2.0798E-01	2.0798E-01	3.449E+02%	2.45E+00
SB-124	#A	-9.6300E-02	-9.6302E-02	1.964E+02%	3.56E+00
SB-125	#A	2.3654E+00	2.3654E+00	3.947E+01%	3.69E+00
I-131	#A	6.7601E-02	6.7607E-02	7.464E+02%	1.28E+00
Gd-153	#A	8.2753E-01	8.2753E-01	1.223E+02%	7.59E+00
Ga-68	#	4.2775E+01	4.3421E+01	3.796E+01%	3.34E+01
Tc-99m	#A	-4.3131E-01	-4.3253E-01	1.447E+02%	2.08E+00
BA-133	A	6.3535E-01	6.3535E-01	2.001E+02%	3.78E+00
CS-134	#A	7.9108E-01	7.9108E-01	7.826E+01%	3.55E+00
CS-137	#A	-7.8673E-01	-7.8673E-01	4.590E+01%	2.08E+00
CE-139	#A	3.9322E-01	3.9322E-01	1.033E+02%	1.36E+00
Ba-140	#A	-2.7199E+00	-2.7201E+00	6.889E+01%	5.60E+00
La-140	#A	1.6271E-01	1.6271E-01	8.217E+01%	1.69E+00
CE-141	#A	-8.3158E-01	-8.3160E-01	1.452E+02%	4.02E+00
CE-144	#A	-3.2834E+00	-3.2834E+00	1.506E+02%	1.65E+01
PM-144	#A	-6.1321E-01	-6.1321E-01	8.802E+01%	1.81E+00
EU-152	#A	2.0371E+00	2.0371E+00	1.419E+02%	8.05E+00
EU-154	#A	1.0592E+00	1.0592E+00	7.285E+01%	1.07E+01
EU-155	#A	1.4494E+00	1.4494E+00	1.281E+02%	6.19E+00
HF-181	#A	2.3010E-01	2.3011E-01	1.555E+02%	2.18E+00
Ta-182	#A	2.2047E+00	2.2047E+00	8.309E+01%	7.82E+00
Hg-203	#A	-2.3383E-02	-2.3383E-02	2.249E+03%	1.80E+00
TL-208		7.3431E+00	7.3431E+00	9.627E+00%	1.09E+00
pm-146	#A	2.7146E-01	2.7146E-01	6.245E+02%	4.02E+00

y-88	#A	-5.9940E-01	-5.9940E-01	8.338E+01%	1.65E+00
Cd-113m	#A	2.7816E+03	2.7816E+03	2.105E+02%	1.99E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.44E+01
Cf-251	#A	1.9448E+00	1.9448E+00	1.058E+02%	5.25E+00
Cf-249	#A	4.1197E-01	4.1197E-01	1.772E+02%	2.48E+00
Sn-126	#A	-5.5504E+00	-5.5504E+00	9.611E+01%	1.77E+01
PB-210	A	1.2708E+01	1.2708E+01	8.227E+01%	3.46E+01
PB-212		2.2103E+01	2.2103E+01	5.027E+00%	2.05E+00
PB-214		1.9252E+01	1.9252E+01	6.770E+00%	2.54E+00
BI-207	#A	3.9864E-01	3.9864E-01	9.559E+01%	1.28E+00
BI-212		2.8573E+01	2.8573E+01	1.944E+01%	1.11E+01
BI-214		2.2239E+01	2.2239E+01	7.886E+00%	2.43E+00
BI-210M	#A	7.5223E-01	7.5223E-01	8.775E+01%	2.21E+00
AC-228		2.0188E+01	2.0188E+01	9.618E+00%	1.96E+00
TH-227	#A	-7.2968E+00	-7.2968E+00	1.115E+02%	2.71E+01
TH-229	#A	1.1207E+00	1.1207E+00	1.539E+02%	2.29E+01
TH-234	A	2.1249E+01	2.1249E+01	4.271E+01%	2.93E+01
PA-231	#A	-9.8534E+00	-9.8534E+00	2.481E+02%	8.20E+01
PA-233	#A	1.1090E+00	1.1090E+00	1.861E+02%	6.90E+00
PA-234	#A	3.6040E+00	3.6040E+00	4.927E+01%	7.89E+00
PA-234M	#A	5.7904E+01	5.7904E+01	8.733E+01%	2.31E+02
U-235	#A	8.5719E-01	8.5719E-01	9.099E+01%	1.69E+01
AM-241	#A	-2.6430E-02	-2.6430E-02	6.196E+03%	5.52E+00
Np-237	#A	-3.2687E+00	-3.2687E+00	1.839E+02%	2.00E+01
Ir-192	#A	6.9104E-01	6.9105E-01	1.281E+02%	2.93E+00
Cs-136	#A	-1.4515E-01	-1.4516E-01	1.088E+02%	1.52E+00
Np-239	#A	-1.6180E+00	-1.6185E+00	1.050E+02%	5.66E+00
Nd-147	#A	3.7250E-01	3.7252E-01	4.244E+02%	8.91E+00

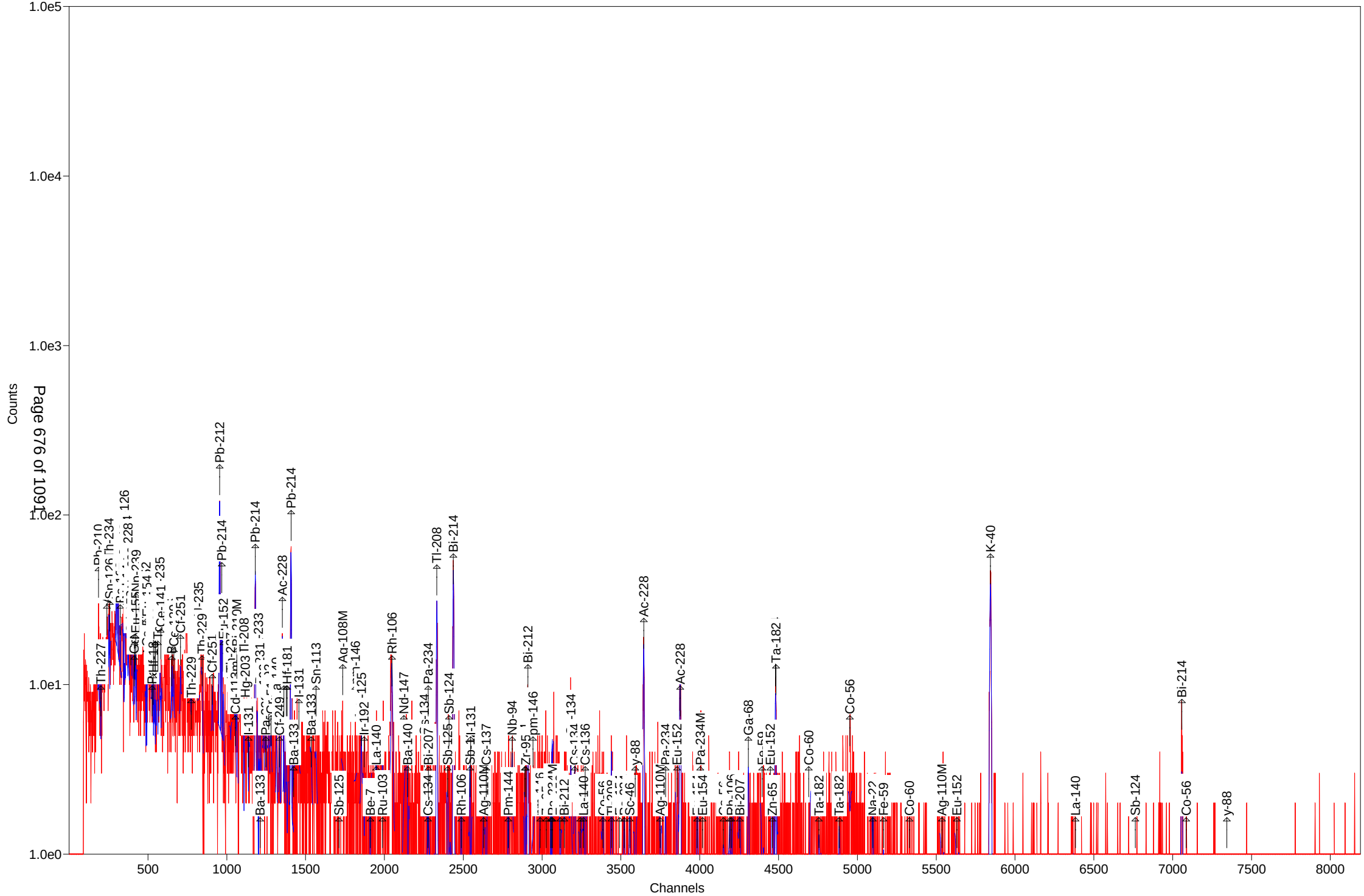
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 3.666E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 3.6657477E+02 Bq/Sample

(Page 21 of 21)

264540_Gamma_160-18553-A-11-B. 16_Gamma_20162111.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161069

Sample Description: 264540_Gamma_160-18553-A-12-B
Detector: Detector #15
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-12-B

Decay to Time: 9/1/2016 16:07 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:08:17 Real Time: 1803 sec
Analysis Time: 9/1/2016 16:39 Dead Time: 0.14 %
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	4.353E+00	109.3	4.756E+00	4.761E+00	1.607E+01
NA-22	4.225E-01	121.7	5.140E-01	5.144E-01	1.804E+00
K-40	2.837E+02	6.0	1.707E+01	2.241E+01	1.521E+01
Sc-46	-7.086E-01	130.8	9.269E-01	9.276E-01	3.143E+00
CR-51	-3.169E+00	148.2	4.696E+00	4.699E+00	2.650E+01
MN-54	4.682E-01	105.3	4.932E-01	4.938E-01	1.179E+00
FE-59	5.129E-01	141.6	7.264E-01	7.268E-01	3.221E+00
Co-56	1.677E+00	34.8	5.841E-01	5.904E-01	1.739E+00
CO-57	-5.226E-01	94.9	4.957E-01	4.965E-01	1.650E+00
CO-58	-2.870E-01	204.9	5.881E-01	5.883E-01	2.047E+00
CO-60	1.171E-01	563.5	6.600E-01	6.601E-01	1.575E+00
ZN-65	-1.237E+00	158.8	1.964E+00	1.965E+00	6.718E+00
NB-94	1.723E-02	4350.8	7.495E-01	7.495E-01	1.785E+00
ZR-95	9.119E-01	104.9	9.567E-01	9.579E-01	2.265E+00
NB-95	-6.090E-01	134.0	8.161E-01	8.167E-01	2.769E+00
RU-103	4.775E-01	95.9	4.580E-01	4.586E-01	1.108E+00
RH-106	4.609E+00	90.6	4.174E+00	4.181E+00	1.018E+01
AG-108M	-7.546E-01	90.3	6.813E-01	6.823E-01	1.673E+00
AG-110M	1.181E+00	98.8	1.167E+00	1.168E+00	3.931E+00
SN-113	-3.036E-01	326.2	9.903E-01	9.904E-01	2.804E+00
SB-124	7.611E-01	151.8	1.155E+00	1.156E+00	3.651E+00
SB-125	2.838E+00	53.1	1.508E+00	1.515E+00	2.503E+00
I-131	-4.540E-01	160.7	7.296E-01	7.300E-01	1.541E+00
Gd-153	7.263E-01	124.7	9.056E-01	9.067E-01	8.748E+00
Ga-68	-1.040E+01	329.0	3.420E+01	3.420E+01	7.869E+01
Tc-99m	-4.318E-01	189.1	8.165E-01	8.168E-01	2.722E+00
BA-133	-2.519E-01	108.6	2.737E-01	2.740E-01	4.199E+00
CS-134	5.912E-01	87.7	5.186E-01	5.195E-01	3.754E+00
CS-137	-4.571E-01	202.2	9.244E-01	9.247E-01	2.493E+00
CE-139	3.143E-01	149.4	4.696E-01	4.705E-01	1.580E+00
Ba-140	-1.635E-02	86.4	1.412E-02	1.414E-02	6.283E+00
La-140	8.348E-01	102.8	8.586E-01	8.597E-01	1.503E+00
CE-141	-6.691E-01	137.1	9.176E-01	9.182E-01	2.343E+00

CE-144	-3.895E+00	155.5	6.057E+00	6.061E+00	2.018E+01
PM-144	6.993E-01	92.0	6.433E-01	6.443E-01	1.489E+00
EU-152	2.980E+00	102.4	3.052E+00	3.056E+00	1.015E+01
EU-154	-6.607E+00	91.4	6.042E+00	6.052E+00	2.034E+01
EU-155	0.000E+00	1.#INF	1.243E+00	1.243E+00	7.660E+00
HF-181	-7.670E-01	104.6	8.020E-01	8.029E-01	2.694E+00
Ta-182	-3.043E-01	96.1	2.924E-01	2.928E-01	1.003E+01
Hg-203	5.139E-01	105.5	5.423E-01	5.431E-01	1.821E+00
TL-208	8.511E+00	9.5	8.045E-01	9.177E-01	1.154E+00
pm-146	1.246E+00	96.2	1.199E+00	1.200E+00	3.580E+00
y-88	-1.171E-02	425.6	4.984E-02	4.985E-02	1.565E+00
Cd-113m	1.368E+04	36.8	5.031E+03	5.108E+03	1.580E+04
Cd-109	0.000E+00	1.#INF	2.247E+01	2.247E+01	7.474E+01
Cf-251	9.077E-01	250.8	2.276E+00	2.278E+00	5.893E+00
Cf-249	1.067E+00	95.3	1.017E+00	1.018E+00	2.110E+00
Sn-126	1.941E+00	339.3	6.585E+00	6.586E+00	2.213E+01
PB-210	2.092E+01	80.2	1.677E+01	1.682E+01	5.546E+01
PB-212	2.702E+01	4.8	1.285E+00	2.169E+00	1.983E+00
PB-214	1.585E+01	8.9	1.412E+00	1.634E+00	2.361E+00
BI-207	5.182E-01	72.7	3.765E-01	3.775E-01	1.256E+00
BI-212	4.718E+01	14.1	6.670E+00	7.106E+00	8.757E+00
BI-214	1.470E+01	10.8	1.588E+00	1.762E+00	2.590E+00
BI-210M	-8.271E-01	97.8	8.086E-01	8.101E-01	2.711E+00
AC-228	2.151E+01	10.9	2.340E+00	2.584E+00	4.165E+00
TH-227	9.017E+00	43.1	3.886E+00	3.917E+00	2.657E+01
TH-229	6.243E+00	139.3	8.699E+00	8.713E+00	2.405E+01
TH-234	6.148E+00	261.1	1.605E+01	1.606E+01	5.379E+01
PA-231	1.662E+01	112.4	1.867E+01	1.869E+01	8.427E+01
PA-233	-1.560E-01	112.5	1.755E-01	1.757E-01	7.523E+00
PA-234	-4.069E-02	96.1	3.912E-02	3.918E-02	1.271E+01
PA-234M	6.869E+01	90.2	6.193E+01	6.203E+01	3.203E+02
U-235	9.473E-01	264.0	2.501E+00	2.501E+00	2.198E+01
AM-241	3.110E+00	50.1	1.558E+00	1.566E+00	3.804E+00
Np-237	3.296E+00	188.1	6.199E+00	6.202E+00	2.064E+01
Ir-192	5.434E-03	88.8	4.823E-03	4.834E-03	3.078E+00
Cs-136	7.554E-01	95.2	7.192E-01	7.205E-01	2.077E+00
Np-239	1.568E+00	125.9	1.975E+00	1.977E+00	6.596E+00
Nd-147	2.882E+00	132.9	3.829E+00	3.833E+00	9.310E+00
Total	1.427E+04				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-12-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161069.An1

Acquisition information
Start time: 9/1/2016 4:08:17 PM
Live time: 1800
Real time: 1803
Dead time: 0.14 %
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 4:07:00 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. 23 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1330

***** 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	31.	80.19	0.95	1.957E-02	46.54	4.250	PBC<MDA	PB210
50.14	22.	113.32	0.95	2.192E-02	50.14	8.000	PBC<MDA	TH227
59.93	55.	50.09	0.56	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.29	12.	261.12	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
64.28	10.	339.35	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.94	227.	11.41	0.97	3.385E-02				
77.21	346.	7.94	0.97	3.454E-02				
86.47	29.	188.11	0.98	3.678E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.406E+00	EU155
					86.94	9.040	4.765E+00	Sn126
87.55	48.	47.51	0.98	3.698E-02	87.57	37.500	PBC<MDA	Sn126
93.12	132.	19.56	2.09	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.493E+01	AC228
99.50	26.	121.99	1.00	3.846E-02	99.50	15.000	PBC<MDA	Np239
103.20	26.	124.69	1.00	3.867E-02	103.20	21.800	PBC<MDA	Gd153
103.70	17.	199.36	1.00	3.870E-02	103.70	24.000	PBC<MDA	Np239
106.13	25.	125.95	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
123.10	10.	268.28	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
129.04	85.	27.81	0.45	3.795E-02				
162.66	24.	100.71	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	9.	263.97	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	15.	149.38	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	9.	250.80	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251
193.51	12.	191.54	1.08	3.030E-02	193.51	4.400	PBC<MDA	TH229
209.18	77.	24.99	0.54	2.860E-02				
210.85	13.	202.41	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229
227.00	10.	188.81	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.69	500.	5.97	1.10	2.591E-02	238.63	43.300	2.478E+01	PB212
242.10	21.	190.64	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
244.69	22.	186.01	1.13	2.543E-02	244.69	7.580	PBC<MDA	EU152
256.24	35.	43.09	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
263.70	36.	36.78	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	17.	105.54	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
295.03	115.	15.10	1.06	2.205E-02	295.09	19.300	1.502E+01	PB214
300.07	17.	155.39	1.17	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.796E+01	PA231
					300.18	6.200	7.127E+00	PA233
300.16	32.	46.82	0.55	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.320E+01	PA231
					300.18	6.200	1.318E+01	PA233
300.18	17.	159.04	1.17	2.176E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.796E+01	PA231
					300.18	6.200	7.129E+00	PA233
302.65	17.	162.33	1.18	2.162E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.432E+00	BA133
302.85	13.	220.02	1.18	2.161E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.829E+00	BA133
328.76	15.	170.29	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	161.34	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
338.43	91.	17.83	0.90	1.983E-02	338.32	12.010	2.119E+01	AC228
340.57	17.	164.19	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
344.29	16.	172.54	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
351.91	212.	9.44	1.66	1.923E-02	351.93	37.600	1.628E+01	PB214
387.95	13.	101.57	1.25	1.781E-02	387.95	66.000	PBC<MDA	Cf249
427.88	17.	53.14	1.28	1.647E-02	427.88	29.600	PBC<MDA	SB125
463.37	16.	89.88	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	15.	96.93	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
477.60	12.	109.26	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
497.05	11.	95.91	1.34	1.460E-02	497.05	90.900	PBC<MDA	RU103
511.86	28.	109.31	2.60	1.426E-02	511.86	20.000	PBC<MDA	RH106
531.00	9.	132.86	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
563.24	10.	131.34	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
569.57	10.	106.42	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.097E+00	PA234
					569.70	97.740	4.278E-01	BI207
569.70	12.	72.66	1.40	1.307E-02	569.32	15.380	3.291E+00	CS134
					569.47	8.200	6.175E+00	PA234
					569.70	97.740	5.182E-01	BI207
583.14	166.	9.45	1.68	1.282E-02	583.02	84.500	8.511E+00	TL208
600.50	11.	207.15	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
602.73	11.	218.15	1.43	1.247E-02	602.73	98.260	PBC<MDA	SB124
609.40	151.	10.80	1.62	1.236E-02	609.31	46.090	1.470E+01	BI214
621.92	10.	90.56	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
657.76	6.	175.07	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
696.54	14.	91.99	1.50	1.106E-02	696.54	99.000	PBC<MDA	PM144
722.79	7.	211.19	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
727.66	68.	14.14	0.33	1.067E-02	727.17	7.550	4.718E+01	BI212
735.72	7.	119.95	1.53	1.056E-02	735.72	22.500	PBC<MDA	pm146
747.16	6.	150.38	1.54	1.043E-02	747.16	34.000	PBC<MDA	pm146
756.73	9.	104.91	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
766.41	14.	90.16	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.642E+02	PA234M
778.92	4.	285.04	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
795.87	4.	262.20	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
801.95	10.	87.72	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
818.50	11.	96.41	1.59	9.655E-03	818.50	100.000	PBC<MDA	Cs136
834.85	8.	105.33	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
860.17	25.	38.36	1.62	9.252E-03	860.56	12.420	1.186E+01	TL208
884.68	14.	98.81	1.64	9.036E-03	884.68	72.680	PBC<MDA	AG110M
911.66	100.	12.47	1.14	8.811E-03	911.07	29.000	2.164E+01	AC228
945.82	1.	754.31	1.68	8.531E-03	946.02	13.400	PBC<MDA	PA234
964.11	10.	148.78	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
969.53	80.	13.37	1.08	8.357E-03	968.97	17.460	3.038E+01	AC228
1004.77	10.	107.08	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	19.	34.84	1.75	7.875E-03	1037.84	14.130	9.438E+00	Co56
1063.66	1.	794.59	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1120.24	51.	17.64	1.48	7.368E-03	1120.29	15.100	2.533E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	8.	145.05	1.85	6.994E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	26.	40.09	1.88	6.748E-03	1238.28	66.070	3.240E+00	Co56
1274.86	5.	121.66	1.90	6.579E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.200E+00	EU154
1291.60	8.	141.62	1.91	6.502E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	1.	563.47	1.94	6.325E-03	1332.50	99.980	PBC<MDA	CO60
1461.16	318.	6.02	0.83	5.827E-03	1460.83	10.670	2.837E+02	K40
1596.21	5.	115.37	2.09	5.382E-03	1596.21	95.400	PBC<MDA	La140
1764.22	30.	19.83	3.25	4.916E-03	1764.49	15.400	2.220E+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
299.36	74.93	221.	227.	6.695E+03	11.41	0.973	- sD

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
308.44	77.20	204.	346.	1.001E+04	7.94	0.975	- D
515.93	129.04	122.	69.	1.811E+03	25.70	1.022	- sD
835.98	209.18	80.	77.	2.692E+03	24.99	0.538	- 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	185.84	46.54	297.	31.	0.017	80.19	0.946s
TH-227	200.23	50.14	303.	22.	0.012	113.32	0.950s
AM-241	239.36	59.93	192.	55.	0.031	50.09	0.558s
TH-234	252.78	63.29	509.	12.	0.007	261.12	0.962s
Sn-126	256.75	64.28	578.	10.	0.006	339.35	0.963
BA-133	323.54	80.99	1390.	-35.	-0.019	92.92	0.978s
Np-237	345.53	86.49	1431.	29.	0.016	188.11	0.983s
EU-155	345.74	86.54	1660.	-31.	-0.017	184.92	0.983s
Sn-126	347.33	86.94	1629.	-31.	-0.017	183.14	0.984
Sn-126	349.84	87.57	1481.	48.	0.027	47.51	0.984D
Cd-109	351.72	88.04	1598.	0.	0.000	181.18	0.985A
Nd-147	363.95	91.10	1462.	0.	0.000	1000.00	0.987s
TH-234	369.91	92.59	1485.	-23.	-0.013	143.80	0.989s
AC-228	372.03	93.12	147.	132.	0.074	19.56	2.087s
Np-239	397.53	99.50	494.	26.	0.015	121.99	0.995s
Gd-153	412.32	103.20	520.	26.	0.015	124.69	0.998s
Np-239	414.32	103.70	546.	17.	0.009	199.36	0.999s
EU-155	420.77	105.31	563.	0.	0.000	1000.00	1.001s
Np-239	424.03	106.13	477.	25.	0.014	125.95	1.001s
EU-152	486.57	121.78	385.	-31.	-0.017	106.27	1.016s
CO-57	487.72	122.06	416.	-31.	-0.017	94.85	1.016s
EU-154	491.87	123.10	350.	10.	0.006	268.28	1.017s
PA-234	524.63	131.29	1074.	-29.	-0.016	160.17	1.024s
HF-181	531.54	133.02	1045.	-29.	-0.016	157.77	1.026s
CE-144	533.60	133.54	1015.	-29.	-0.016	155.51	1.026
HF-181	544.63	136.30	1024.	-29.	-0.016	155.76	1.029s
CO-57	545.33	136.47	1053.	-29.	-0.016	157.94	1.029s
Tc-99m	561.46	140.51	1082.	-25.	-0.014	189.08	1.032s
CE-141	581.17	145.44	231.	-21.	-0.012	137.15	1.037
Ba-140	650.01	162.66	273.	24.	0.013	100.71	1.053s
U-235	652.88	163.38	297.	9.	0.005	263.97	1.053s
CE-139	662.77	165.85	255.	15.	0.009	149.38	1.055s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	705.73	176.60	143.	9.	0.005	250.80	1.065s
TH-229	773.33	193.51	139.	12.	0.006	191.54	1.080s
U-235	820.60	205.33	311.	-11.	-0.006	222.17	1.091s
TH-229	842.65	210.85	322.	13.	0.007	202.41	1.096s
Cf-251	907.22	227.00	99.	10.	0.006	188.81	1.110s
PB-212	953.72	238.63	64.	546.	0.303	4.76	1.120D
PB-214	967.17	242.00	792.	21.	0.012	190.64	1.123
EU-152	977.95	244.69	810.	22.	0.012	186.01	1.126s
TH-227	1024.12	256.24	55.	35.	0.019	43.09	1.136s
Cd-113m	1053.94	263.70	68.	36.	0.020	36.78	1.142s
BI-210M	1062.46	265.83	142.	-18.	-0.010	97.76	1.144s
TL-208	1108.25	277.28	150.	-20.	-0.011	73.53	1.154
Hg-203	1115.91	279.20	159.	17.	0.010	105.54	1.156s
I-131	1136.30	284.30	92.	-12.	-0.007	159.14	1.160s
PB-214	1179.19	295.03	49.	115.	0.064	15.10	1.062
PB-212	1199.72	300.16	55.	32.	0.018	46.82	0.552s
PA-231	1199.35	300.07	353.	17.	0.010	155.39	1.174s
PA-233	1199.79	300.18	370.	17.	0.010	159.04	1.174s
PA-231	1209.66	302.65	388.	17.	0.010	162.33	1.176s
BA-133	1210.47	302.85	405.	13.	0.007	220.02	1.176s
Ba-140	1218.46	304.85	418.	0.	0.000	1000.00	1.178
BI-210M	1218.64	304.90	418.	0.	0.000	1000.00	1.178
Ir-192	1232.81	308.44	482.	-19.	-0.011	162.85	1.181s
PA-233	1247.09	312.01	463.	-19.	-0.011	159.23	1.184s
Ir-192	1265.00	316.49	442.	-20.	-0.011	148.72	1.188s
CR-51	1279.37	320.08	420.	-12.	-0.007	148.15	1.191s
La-140	1314.06	328.76	340.	15.	0.009	170.29	1.199s
Cf-249	1332.77	333.44	355.	17.	0.009	161.34	1.203s
AC-228	1352.74	338.43	41.	91.	0.050	17.83	0.896s
Cs-136	1361.28	340.57	372.	17.	0.009	164.19	1.209s
EU-152	1376.13	344.29	390.	16.	0.009	172.54	1.212s
HF-181	1382.30	345.83	434.	-18.	-0.010	152.78	1.213
PB-214	1406.63	351.91	36.	212.	0.118	9.44	1.657s
BA-133	1422.97	356.00	346.	-18.	-0.010	108.64	1.222s
I-131	1456.89	364.48	72.	-12.	-0.007	160.73	1.229
BA-133	1534.29	383.84	145.	-9.	-0.005	192.13	1.246s
Cf-249	1550.72	387.95	81.	13.	0.007	101.57	1.249
SN-113	1565.67	391.69	136.	-6.	-0.003	326.18	1.253s
SB-125	1710.36	427.88	17.	17.	0.009	53.14	1.283s
AG-108M	1734.60	433.94	80.	-20.	-0.011	90.29	1.288s
pm-146	1814.35	453.88	39.	-4.	-0.002	322.59	1.304s
SB-125	1852.29	463.37	100.	16.	0.009	89.88	1.312
Ir-192	1871.05	468.06	99.	15.	0.008	96.93	1.316s
BE-7	1909.18	477.60	86.	12.	0.007	109.26	1.324s
HF-181	1926.79	482.00	143.	-17.	-0.009	104.56	1.328s
La-140	1946.87	487.02	153.	-17.	-0.009	80.09	1.332s
RU-103	1987.00	497.05	26.	11.	0.006	95.91	1.340s
RH-106	2046.22	511.86	133.	28.	0.016	109.31	2.602s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	2122.75	531.00	35.	9.	0.005	132.86	1.368s
Ba-140	2147.78	537.26	57.	-10.	-0.005	140.33	1.373s
CS-134	2251.67	563.24	39.	10.	0.006	131.34	1.394s
CS-134	2276.00	569.32	51.	-6.	-0.004	164.85	1.399s
PA-234	2276.59	569.47	50.	10.	0.005	106.42	1.399s
BI-207	2277.52	569.70	32.	12.	0.007	72.66	1.399s
TL-208	2331.26	583.14	18.	166.	0.092	9.45	1.679s
SB-125	2400.69	600.50	251.	11.	0.006	207.15	1.424s
SB-124	2409.62	602.73	279.	11.	0.006	218.15	1.425s
CS-134	2417.53	604.71	290.	0.	0.000	1000.00	1.427s
BI-214	2436.27	609.40	26.	151.	0.084	10.80	1.617s
RU-103	2439.88	610.30	290.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	290.	0.	0.000	1000.00	1.435s
RH-106	2486.35	621.92	17.	10.	0.006	90.56	1.440s
SB-125	2542.23	635.89	41.	-5.	-0.003	175.89	1.451s
I-131	2546.57	636.97	62.	-12.	-0.007	93.58	1.452
AG-110M	2629.71	657.76	62.	6.	0.004	175.07	1.469s
CS-137	2645.30	661.66	79.	-8.	-0.004	202.23	1.472s
PM-144	2784.82	696.54	33.	14.	0.008	91.99	1.499s
SB-124	2889.79	722.79	94.	7.	0.004	211.19	1.519s
AG-108M	2890.40	722.94	101.	0.	0.000	1000.00	1.519s
EU-154	2892.07	723.36	101.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	117.	-12.	-0.007	114.78	1.520s
BI-212	2909.31	727.66	5.	68.	0.038	14.14	0.328s
pm-146	2941.53	735.72	14.	7.	0.004	119.95	1.529s
pm-146	2987.29	747.16	19.	6.	0.004	150.38	1.537s
ZR-95	3025.56	756.73	19.	9.	0.005	104.91	1.544s
AG-110M	3054.42	763.94	84.	-20.	-0.011	68.04	1.550s
NB-95	3061.80	765.79	106.	-11.	-0.006	134.01	1.551s
PA-234M	3064.30	766.41	76.	14.	0.008	90.16	1.552s
EU-152	3114.33	778.92	28.	4.	0.002	285.04	1.561s
CS-134	3182.12	795.87	53.	4.	0.002	262.20	1.574
CS-134	3206.46	801.95	30.	10.	0.005	87.72	1.578s
CO-58	3241.75	810.78	50.	-5.	-0.003	204.94	1.585s
La-140	3261.74	815.77	54.	-7.	-0.004	153.20	1.589s
Cs-136	3272.66	818.50	51.	11.	0.006	96.41	1.591s
MN-54	3338.05	834.85	14.	8.	0.004	105.33	1.603
Co-56	3385.75	846.77	33.	-8.	-0.004	162.22	1.612s
TL-208	3440.93	860.56	14.	25.	0.014	38.36	1.622s
NB-94	3483.06	871.10	43.	-9.	-0.005	106.61	1.629s
EU-154	3491.60	873.23	68.	-13.	-0.007	91.45	1.631s
PA-234	3520.80	880.53	96.	-17.	-0.009	84.72	1.636
PA-234	3531.64	883.24	113.	-17.	-0.009	91.27	1.638
AG-110M	3537.42	884.68	88.	14.	0.008	98.81	1.639s
Sc-46	3555.81	889.28	107.	-11.	-0.006	130.80	1.642s
y-88	3590.85	898.04	20.	-2.	-0.001	496.66	1.649s
AC-228	3645.35	911.66	12.	100.	0.055	12.47	1.137s
AG-110M	3748.69	937.49	55.	-19.	-0.011	87.32	1.677s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3782.81	946.02	16.	1.	0.001	754.31	1.683s
EU-152	3855.18	964.11	110.	10.	0.006	148.78	1.696s
AC-228	3876.86	969.53	6.	80.	0.044	13.37	1.080s
EU-154	3984.09	996.33	52.	-10.	-0.005	109.97	1.718s
PA-234M	4002.77	1001.00	61.	0.	0.000	1000.00	1.722s
EU-154	4017.88	1004.77	52.	10.	0.006	107.08	1.724s
Co-56	4150.18	1037.84	5.	19.	0.011	34.84	1.747s
RH-106	4200.27	1050.36	36.	-8.	-0.004	85.09	1.755s
BI-207	4253.49	1063.66	26.	1.	0.001	794.59	1.765s
Ga-68	4308.47	1077.40	35.	-4.	-0.002	328.98	1.774s
FE-59	4395.90	1099.25	22.	-2.	-0.001	577.12	1.789s
EU-152	4447.22	1112.07	96.	-13.	-0.007	114.30	1.797s
ZN-65	4461.11	1115.55	83.	-8.	-0.005	158.76	1.800s
BI-214	4479.88	1120.24	5.	51.	0.028	17.64	1.484
Sc-46	4481.13	1120.55	75.	0.	0.000	1000.00	1.803
Ta-182	4484.13	1121.30	88.	-11.	-0.006	126.06	1.803
CO-60	4691.97	1173.24	27.	-1.	-0.001	813.26	1.838s
Ta-182	4755.25	1189.05	27.	8.	0.005	145.05	1.848
Ta-182	4884.75	1221.41	49.	-17.	-0.009	54.74	1.869
Co-56	4952.26	1238.28	16.	26.	0.014	40.09	1.879s
NA-22	5097.34	1274.53	16.	5.	0.003	121.66	1.902s
EU-154	5097.40	1274.54	21.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	21.	8.	0.004	141.62	1.913s
CO-60	5329.36	1332.50	11.	1.	0.001	563.47	1.938s
AG-110M	5536.68	1384.30	23.	-13.	-0.007	70.24	1.970s
K-40	5844.34	1461.16	9.	318.	0.176	6.02	0.831s
La-140	6384.98	1596.21	6.	5.	0.003	115.37	2.092s
SB-124	6764.43	1690.98	24.	-15.	-0.008	83.47	2.142s
BI-214	7057.67	1764.22	3.	30.	0.017	19.83	3.247s
Co-56	7086.23	1771.35	44.	-6.	-0.004	148.76	2.184s
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	4.3532E+00				5.31E+01	
			477.60	4.353E+00	&(P	1.607E+01 1.09E+02 1.05E+01 G	
NA-22	C	4.2248E-01				9.50E+02	
			1274.53	4.225E-01	?(	1.804E+00 1.22E+02 9.99E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	2.8372E+02					4.66E+11	
			1460.83	2.837E+02	(P	1.521E+01	6.02E+00	1.07E+01 G
Sc-46	F	-7.0863E-01					8.38E+01	
			889.28	-7.086E-01	?(	3.143E+00	1.31E+02	1.00E+02 G
			1120.55	0.000E+00	+	3.248E+00	1.00E+03	1.00E+02 G
CR-51	F	-3.1695E+00					2.77E+01	
			320.08	-3.169E+00	?(P	2.650E+01	1.48E+02	9.94E+00 G
MN-54	C	4.6824E-01					3.12E+02	
			834.85	4.682E-01	&(	1.179E+00	1.05E+02	1.00E+02 G
FE-59	F	5.1288E-01					4.45E+01	
			1099.25	-2.544E-01	?(P	3.221E+00	5.77E+02	5.65E+01 G
			1291.60	1.516E+00	?(	4.793E+00	1.42E+02	4.32E+01 G
Co-56	C	1.6765E+00					7.73E+01	
			846.77	-4.544E-01	?(	1.739E+00	1.62E+02	9.99E+01 G
			1238.28	3.240E+00	?(	2.660E+00	4.01E+01	6.61E+01 G
			1037.84	9.438E+00	?(P	6.605E+00	3.48E+01	1.41E+01 G
			1771.35	-4.762E+00	+	2.450E+01	1.49E+02	1.55E+01 A
CO-57	C	-5.2259E-01					2.72E+02	
			122.06	-5.226E-01	?(	1.650E+00	9.49E+01	8.56E+01 G
			136.47	-4.087E+00	&	2.150E+01	1.58E+02	1.07E+01 G
CO-58	C	-2.8696E-01					7.09E+01	
			810.78	-2.870E-01	?(	2.047E+00	2.05E+02	9.95E+01 G
CO-60	F	1.1714E-01					1.93E+03	
			1332.50	1.171E-01	?(	1.575E+00	5.63E+02	1.00E+02 G
			1173.24	-8.705E-02	+ P	2.120E+00	8.13E+02	9.99E+01 G
ZN-65	F	-1.2371E+00					2.44E+02	
			1115.55	-1.237E+00	?(	6.718E+00	1.59E+02	5.06E+01 G
NB-94	I	1.7227E-02					7.41E+06	
			702.63	1.723E-02	%(	1.785E+00	4.35E+03	9.79E+01 G
			871.10	-5.568E-01	+	2.024E+00	1.07E+02	9.99E+01 G
ZR-95	I	9.1192E-01					6.40E+01	
			756.73	9.119E-01	?(P	2.265E+00	1.05E+02	5.45E+01 G
			724.20	-1.436E+00	+ P	6.237E+00	1.15E+02	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-95	I	-6.0897E-01					6.40E+01	
			765.79	-6.090E-01	?(	2.769E+00	1.34E+02	9.98E+01 G
RU-103	I	4.7750E-01					3.93E+01	
			497.05	4.775E-01	?(	1.108E+00	9.59E+01	9.09E+01 G
			610.30	0.000E+00	-	6.423E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.6094E+00					3.74E+02	
			621.92	4.609E+00	?(	1.018E+01	9.06E+01	9.93E+00 G
			1050.36	-3.592E+01	+ P	1.399E+02	8.51E+01	1.56E+00 G
			511.86	5.454E+00	?	1.100E+01	1.09E+02	2.00E+01 GA
AG-108M	C	-7.5456E-01					1.53E+05	
			433.94	-7.546E-01	?(	1.673E+00	9.03E+01	9.05E+01 G
			722.94	0.000E+00	+	2.826E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	4.132E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.1809E+00					2.50E+02	
			884.68	1.181E+00	?(	3.931E+00	9.88E+01	7.27E+01 G
			657.76	3.289E-01	-	1.986E+00	1.75E+02	9.46E+01 G
			937.49	-3.637E+00	+	7.009E+00	8.73E+01	3.44E+01 G
			1384.30	-4.862E+00	+ P	9.373E+00	7.02E+01	2.43E+01 G
			763.94	-4.912E+00	+	1.107E+01	6.80E+01	2.23E+01 G
SN-113	F	-3.0359E-01					1.15E+02	
			391.69	-3.036E-01	?(P	2.804E+00	3.26E+02	6.40E+01 G
SB-124	F	7.6106E-01					6.02E+01	
			602.73	4.957E-01	?(	3.651E+00	2.18E+02	9.83E+01 G
			1690.98	-3.393E+00	+	5.811E+00	8.35E+01	4.78E+01 G
			722.79	3.173E+00	(P	2.300E+01	2.11E+02	1.08E+01 G
SB-125	I	2.8382E+00					1.01E+03	
			427.88	1.926E+00	?(P	2.503E+00	5.31E+01	2.96E+01 G
			600.50	2.721E+00	?(P	1.904E+01	2.07E+02	1.79E+01 G
			635.89	-2.195E+00	-	1.345E+01	1.76E+02	1.13E+01 G
			463.37	5.616E+00	(P	1.691E+01	8.99E+01	1.05E+01 G
I-131	I	-4.5396E-01					8.02E+00	
			364.48	-4.540E-01	?(P	1.541E+00	1.61E+02	8.17E+01 G
			284.30	-4.786E+00	+	1.891E+01	1.59E+02	6.14E+00 G
			636.97	-8.129E+00	+	2.566E+01	9.36E+01	7.17E+00 G
Gd-153	F	7.2626E-01					2.42E+02	
			97.50	1.845E-07	%(	8.748E+00	1.42E+09	3.00E+01 G
			103.20	1.726E+00	?(	7.181E+00	1.25E+02	2.18E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C -1.0395E+01					4.71E-02	
		1077.40	-1.040E+01	?(	7.869E+01	3.29E+02	3.30E+00 G
Tc-99m	I -4.3181E-01					2.51E-01	
		140.51	-4.318E-01	(	2.722E+00	1.89E+02	8.93E+01 G
BA-133	F -2.5190E-01					3.85E+03	
		356.00	-8.665E-01	?(P	4.199E+00	1.09E+02	6.20E+01 G
		302.85	1.829E+00	?(	1.353E+01	2.20E+02	1.83E+01 G
		383.84	-3.114E+00	+	2.035E+01	1.92E+02	8.94E+00 GA
		80.99	-1.591E+00	+ P	8.090E+00	9.29E+01	3.41E+01 GA
CS-134	I 5.9119E-01					7.54E+02	
		604.71	0.000E+00	?(	3.754E+00	1.00E+03	9.76E+01 G
		795.87	2.628E-01	?(	2.407E+00	2.62E+02	8.55E+01 G
		569.32	-1.750E+00	&	9.974E+00	1.65E+02	1.54E+01 G
		801.95	6.185E+00	?(	1.837E+01	8.77E+01	8.69E+00 G
		563.24	5.045E+00	(	1.605E+01	1.31E+02	8.35E+00 G
CS-137	I -4.5709E-01					1.10E+04	
		661.66	-4.571E-01	?(P	2.493E+00	2.02E+02	8.52E+01 G
CE-139	F 3.1433E-01					1.38E+02	
		165.85	3.143E-01	&(	1.580E+00	1.49E+02	7.99E+01 G
Ba-140	I -1.6349E-02					1.28E+01	
		537.26	-1.619E+00	?(P	6.283E+00	1.40E+02	2.44E+01 G
		162.66	6.267E+00	?(	2.108E+01	1.01E+02	6.22E+00 G
		304.85	0.000E+00	&	5.902E+01	1.00E+03	4.29E+00 G
La-140	I 8.3484E-01					1.28E+01	
		1596.21	5.677E-01	?(P	1.503E+00	1.15E+02	9.54E+01 G
		487.02	-1.399E+00	+ P	4.968E+00	8.01E+01	4.55E+01 G
		328.76	2.090E+00	&(P	1.196E+01	1.70E+02	2.03E+01 G
		815.77	-1.725E+00	&	9.109E+00	1.53E+02	2.33E+01 G
CE-141	I -6.6906E-01					3.25E+01	
		145.44	-6.691E-01	&(	2.343E+00	1.37E+02	4.82E+01 G
CE-144	I -3.8950E+00					2.85E+02	
		133.54	-3.895E+00	&(	2.018E+01	1.56E+02	1.11E+01 G
PM-144	C 6.9931E-01					3.63E+02	
		696.54	6.993E-01	&(	1.489E+00	9.20E+01	9.90E+01 G
		618.06	-4.883E-03	% P	3.766E+00	1.53E+04	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	2.9805E+00					4.94E+03	
			344.29	1.752E+00	?(P	1.015E+01	1.73E+02	2.65E+01 G
			1112.07	-6.864E+00	&	2.654E+01	1.14E+02	1.36E+01 G
			121.78	-1.575E+00	+ P	4.757E+00	1.06E+02	2.86E+01 G
			778.92	1.706E+00	?(	1.167E+01	2.85E+02	1.29E+01 G
			964.11	4.629E+00	?(	2.341E+01	1.49E+02	1.46E+01 G
			244.69	6.276E+00	&(	3.899E+01	1.86E+02	7.58E+00 G
			1408.00	-1.464E-01	%	8.080E+00	2.37E+03	2.10E+01 GA
EU-154	I	-6.6072E+00					3.14E+03	
			873.23	-6.607E+00	?(	2.034E+01	9.14E+01	1.23E+01 G
			123.10	3.523E-01	+	3.188E+00	2.68E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.775E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.270E+01	1.00E+03	2.02E+01 G
			1004.77	3.809E+00	+	1.387E+01	1.07E+02	1.80E+01 G
			996.33	-6.210E+00	+	2.326E+01	1.10E+02	1.06E+01 G
HF-181	F	-7.6703E-01					4.24E+01	
			482.00	-7.670E-01	&(	2.694E+00	1.05E+02	8.05E+01 G
			133.02	-9.958E-01	&	5.234E+00	1.58E+02	4.33E+01 G
			345.83	-3.495E+00	+ P	1.888E+01	1.53E+02	1.51E+01 G
			136.30	-7.459E+00	+	3.870E+01	1.56E+02	5.85E+00 G
Ta-182	F	-3.0431E-01					1.14E+02	
			1121.30	-2.342E+00	(	1.003E+01	1.26E+02	3.49E+01 G
			1221.41	-4.998E+00	+ P	1.060E+01	5.47E+01	2.70E+01 G
			1189.05	4.086E+00	(	1.313E+01	1.45E+02	1.62E+01 G
Hg-203	F	5.1386E-01					4.66E+01	
			279.20	5.139E-01	?(	1.821E+00	1.06E+02	8.15E+01 G
TL-208	N	8.5106E+00					6.98E+02	
			583.02	8.511E+00	@(P	1.154E+00	9.45E+00	8.45E+01 G
			277.28	-7.627E+00	- P	2.276E+01	7.35E+01	6.31E+00 G
			860.56	1.186E+01	+ P	9.879E+00	3.84E+01	1.24E+01 G
pm-146	C	1.2463E+00					2.02E+03	
			747.16	9.910E-01	?(P	3.580E+00	1.50E+02	3.40E+01 G
			735.72	1.632E+00	?(P	4.711E+00	1.20E+02	2.25E+01 G
			453.88	-2.176E-01	&	1.730E+00	3.23E+02	6.50E+01 G
y-88	F	-1.1712E-02					1.07E+02	
			898.04	-1.329E-01	?(	1.565E+00	4.97E+02	9.37E+01 G
			1836.06	1.028E-01	?(P	1.683E+00	6.91E+02	9.92E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-113m		1.3679E+04					5.33E+03	
			263.70	1.368E+04	?(	1.580E+04	3.68E+01	6.00E-03 K
Cf-251	T	9.0767E-01					3.28E+05	
			176.60	9.077E-01	&(	5.893E+00	2.51E+02	1.70E+01 G
			227.00	3.277E+00	?	1.608E+01	1.89E+02	6.30E+00 GA
Cf-249	T	1.0667E+00					1.28E+05	
			387.95	6.157E-01	?(	2.110E+00	1.02E+02	6.60E+01 G
			333.44	2.986E+00	?(	1.618E+01	1.61E+02	1.55E+01 G
Sn-126		1.9405E+00					3.65E+07	
			87.57	1.941E+00	}	7.293E+00	4.75E+01	3.75E+01 GA
			64.28	1.941E+00	(	2.213E+01	3.39E+02	9.70E+00 G
			86.94	-5.221E+00	+	3.181E+01	1.83E+02	9.04E+00 GA
PB-210	N	2.0918E+01					8.14E+03	
			46.54	2.092E+01	(P	5.546E+01	8.02E+01	4.25E+00 G
PB-212	N	2.7016E+01					6.98E+02	
			238.63	2.702E+01	(	1.983E+00	4.76E+00	4.33E+01 G
			300.03	2.490E+01		2.900E+01	4.68E+01	3.28E+00 GA
PB-214	N	1.5850E+01					5.84E+05	
			351.93	1.628E+01	(P	2.361E+00	9.44E+00	3.76E+01 G
			295.09	1.502E+01	(P	4.612E+00	1.51E+01	1.93E+01 G
			242.00	6.128E+00	-	3.903E+01	1.91E+02	7.43E+00 GA
BI-207	C	5.1821E-01					1.18E+04	
			569.70	5.182E-01	&(	1.256E+00	7.27E+01	9.77E+01 G
			1063.66	1.353E-01	- P	2.543E+00	7.95E+02	7.45E+01 G
BI-212	N	4.7180E+01					6.98E+02	
			727.17	4.718E+01	@(P	8.757E+00	1.41E+01	7.55E+00 G
			785.42	-1.447E+00	%	1.354E+02	3.89E+03	1.28E+00 GA
BI-214	N	1.4704E+01					5.84E+05	
			609.31	1.470E+01	@(P	2.590E+00	1.08E+01	4.61E+01 G
			1120.29	2.533E+01	+ P	6.695E+00	1.76E+01	1.51E+01 G
			1764.49	2.220E+01	+ P	7.660E+00	1.98E+01	1.54E+01 G
BI-210M	T	-8.2712E-01					1.10E+09	
			265.83	-8.271E-01	?(	2.711E+00	9.78E+01	5.00E+01 G
			304.90	0.000E+00	&	9.043E+00	1.00E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	2.1509E+01					2.10E+03	
			911.07	2.164E+01	(P	4.165E+00	1.25E+01	2.90E+01 G
			968.97	3.038E+01	+ P	5.452E+00	1.34E+01	1.75E+01 G
			338.32	2.119E+01	(	7.606E+00	1.78E+01	1.20E+01 G
			93.35	3.493E+01	+	1.561E+01	1.96E+01	5.56E+00 XA
TH-227	N	9.0174E+00					7.95E+03	
			50.14	7.011E+00	*(	2.657E+01	1.13E+02	8.00E+00 G
			256.24	1.131E+01	?(	1.204E+01	4.31E+01	7.00E+00 G
TH-229	N	6.2433E+00					2.68E+06	
			193.51	4.861E+00	&(	2.405E+01	1.92E+02	4.40E+00 G
			210.85	8.277E+00	?(	5.644E+01	2.02E+02	2.99E+00 G
TH-234	N	6.1480E+00					1.63E+12	
			63.29	6.148E+00	*(P	5.379E+01	2.61E+02	3.81E+00 G
			92.59	-6.066E+00	+ P	4.803E+01	1.44E+02	5.58E+00 G
PA-231	N	1.6617E+01					1.20E+07	
			302.65	1.547E+01	?(	8.427E+01	1.62E+02	2.88E+00 G
			300.07	1.796E+01	(	9.366E+01	1.55E+02	2.46E+00 G
PA-233	C	-1.5600E-01					7.82E+08	
			312.01	-1.411E+00	?(	7.523E+00	1.59E+02	3.60E+01 G
			300.18	7.129E+00	(	3.804E+01	1.59E+02	6.20E+00 G
PA-234	N	-4.0691E-02					1.63E+12	
			131.29	-2.381E+00	?(	1.271E+01	1.60E+02	1.80E+01 G
			946.02	5.599E-01	+ P	1.033E+01	7.54E+02	1.34E+01 G
			569.47	5.097E+00	?(	1.846E+01	1.06E+02	8.20E+00 G
			883.24	-1.093E+01	+	3.342E+01	9.13E+01	9.60E+00 G
			880.53	-1.742E+01	+	4.937E+01	8.47E+01	6.00E+00 GA
PA-234M	N	6.8687E+01					1.63E+12	
			1001.00	0.000E+00	?(	3.203E+02	1.00E+03	8.37E-01 G
			766.41	2.642E+02	?(	8.006E+02	9.02E+01	2.94E-01 G
U-235	N	9.4732E-01					2.57E+11	
			143.79	-1.374E-02	%(P	2.198E+01	3.36E+04	1.10E+01 G
			205.33	-4.333E+00	+	3.248E+01	2.22E+02	5.01E+00 G
			163.38	3.021E+00	?(	2.695E+01	2.64E+02	5.08E+00 G
AM-241	T	3.1097E+00					1.58E+05	
			59.54	3.110E+00	@(	3.804E+00	5.01E+01	3.59E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-237	F	3.2955E+00					2.14E+06	
			86.49	3.296E+00	&(	2.064E+01	1.88E+02	1.31E+01 G
Ir-192	F	5.4342E-03					7.40E+01	
			316.49	-6.182E-01	&(	3.078E+00	1.49E+02	8.70E+01 G
			468.06	1.054E+00	?(	3.436E+00	9.69E+01	5.18E+01 G
			308.44	-1.581E+00	+	8.624E+00	1.63E+02	3.18E+01 G
Cs-136	F	7.5544E-01					1.30E+01	
			818.50	6.365E-01	?(	2.077E+00	9.64E+01	1.00E+02 G
			1048.07	2.965E-02	%	2.573E+00	2.39E+03	8.00E+01 G
			340.57	1.009E+00	?(	5.561E+00	1.64E+02	4.69E+01 G
Np-239	T	1.5681E+00					2.36E+00	
			103.70	9.996E-01	?	6.679E+00	1.99E+02	2.40E+01 X
			106.13	1.568E+00	*(	6.596E+00	1.26E+02	2.27E+01 G
			99.50	2.515E+00		1.024E+01	1.22E+02	1.50E+01 X
Nd-147		2.8821E+00					1.11E+01	
			531.00	2.882E+00	?(	9.310E+00	1.33E+02	1.30E+01 G
			91.10	0.000E+00	-	9.457E+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
R - Coincidence Corrected
H - Halflife limit exceeded
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	297.	31.	0.017	80.19	2.092E+01	P
TH-227	50.14	303.	22.	0.012	113.32	7.011E+00	
TH-234	63.29	509.	12.	0.007	261.12	6.148E+00	P
BA-133	80.99	1390.	-35.	-0.019	92.92	-1.591E+00	P
EU-155	86.54	1660.	-31.	-0.017	184.92	-1.540E+00	
TH-234	92.59	1485.	-23.	-0.013	143.80	-6.066E+00	P
Np-239	99.50	494.	26.	0.015	121.99	2.515E+00	
Gd-153	103.20	520.	26.	0.015	124.69	1.726E+00	
Np-239	103.70	546.	17.	0.009	199.36	9.996E-01	
Np-239	106.13	477.	25.	0.014	125.95	1.568E+00	
EU-152	121.78	385.	-31.	-0.017	106.27	-1.575E+00	P
CO-57	122.06	416.	-31.	-0.017	94.85	-5.226E-01	
EU-154	123.10	350.	10.	0.006	268.28	3.523E-01	
HF-181	133.02	1045.	-29.	-0.016	157.77	-9.958E-01	
CE-144	133.54	1015.	-29.	-0.016	155.51	-3.895E+00	
HF-181	136.30	1024.	-29.	-0.016	155.76	-7.459E+00	
CO-57	136.47	1053.	-29.	-0.016	157.94	-4.087E+00	
Tc-99m	140.51	1082.	-25.	-0.014	189.08	-4.318E-01	
CE-141	145.44	231.	-21.	-0.012	137.15	-6.691E-01	
Ba-140	162.66	273.	24.	0.013	100.71	6.267E+00	
U-235	163.38	297.	9.	0.005	263.97	3.021E+00	
CE-139	165.85	255.	15.	0.009	149.38	3.143E-01	
Cf-251	176.60	143.	9.	0.005	250.80	9.077E-01	
TH-229	193.51	139.	12.	0.006	191.54	4.861E+00	
U-235	205.33	311.	-11.	-0.006	222.17	-4.333E+00	
TH-229	210.85	322.	13.	0.007	202.41	8.277E+00	
Cf-251	227.00	99.	10.	0.006	188.81	3.277E+00	
EU-152	244.69	810.	22.	0.012	186.01	6.276E+00	
TH-227	256.24	55.	35.	0.019	43.09	1.131E+01	
Cd-113m	263.70	68.	36.	0.020	36.78	1.368E+04	
BI-210M	265.83	142.	-18.	-0.010	97.76	-8.271E-01	
Hg-203	279.20	159.	17.	0.010	105.54	5.139E-01	
I-131	284.30	92.	-12.	-0.007	159.14	-4.786E+00	
PA-231	300.07	353.	17.	0.010	155.39	1.796E+01	
PA-233	300.18	370.	17.	0.010	159.04	7.129E+00	
PA-231	302.65	388.	17.	0.010	162.33	1.547E+01	
BA-133	302.85	405.	13.	0.007	220.02	1.829E+00	
Ir-192	308.44	482.	-19.	-0.011	162.85	-1.581E+00	
PA-233	312.01	463.	-19.	-0.011	159.23	-1.411E+00	
Ir-192	316.49	442.	-20.	-0.011	148.72	-6.182E-01	
CR-51	320.08	420.	-12.	-0.007	148.15	-3.169E+00	P
La-140	328.76	340.	15.	0.009	170.29	2.090E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cf-249	333.44	355.	17.	0.009	161.34	2.986E+00		
Cs-136	340.57	372.	17.	0.009	164.19	1.009E+00		
EU-152	344.29	390.	16.	0.009	172.54	1.752E+00		P
HF-181	345.83	434.	-18.	-0.010	152.78	-3.495E+00		P
BA-133	356.00	346.	-18.	-0.010	108.64	-8.665E-01		P
I-131	364.48	72.	-12.	-0.007	160.73	-4.540E-01		P
BA-133	383.84	145.	-9.	-0.005	192.13	-3.114E+00		
Cf-249	387.95	81.	13.	0.007	101.57	6.157E-01		
SN-113	391.69	136.	-6.	-0.003	326.18	-3.036E-01		P
AG-108M	433.94	80.	-20.	-0.011	90.29	-7.546E-01		
pm-146	453.88	39.	-4.	-0.002	322.59	-2.176E-01		
Ir-192	468.06	99.	15.	0.008	96.93	1.054E+00		
BE-7	477.60	86.	12.	0.007	109.26	4.353E+00		P
HF-181	482.00	143.	-17.	-0.009	104.56	-7.670E-01		
La-140	487.02	153.	-17.	-0.009	80.09	-1.399E+00		P
RU-103	497.05	26.	11.	0.006	95.91	4.775E-01		
RH-106	511.86	133.	28.	0.016	109.31	5.454E+00		
Nd-147	531.00	35.	9.	0.005	132.86	2.882E+00		
Ba-140	537.26	57.	-10.	-0.005	140.33	-1.619E+00		P
CS-134	563.24	39.	10.	0.006	131.34	5.045E+00		
CS-134	569.32	51.	-6.	-0.004	164.85	-1.750E+00		
BI-207	569.70	32.	12.	0.007	72.66	5.182E-01		
SB-124	602.73	279.	11.	0.006	218.15	4.957E-01		
RH-106	621.92	17.	10.	0.006	90.56	4.609E+00		
I-131	636.97	62.	-12.	-0.007	93.58	-8.129E+00		
AG-110M	657.76	62.	6.	0.004	175.07	3.289E-01		
CS-137	661.66	79.	-8.	-0.004	202.23	-4.571E-01		P
PM-144	696.54	33.	14.	0.008	91.99	6.993E-01		
SB-124	722.79	94.	7.	0.004	211.19	3.173E+00		P
ZR-95	724.20	117.	-12.	-0.007	114.78	-1.436E+00		P
pm-146	735.72	14.	7.	0.004	119.95	1.632E+00		P
pm-146	747.16	19.	6.	0.004	150.38	9.910E-01		P
ZR-95	756.73	19.	9.	0.005	104.91	9.119E-01		P
AG-110M	763.94	84.	-20.	-0.011	68.04	-4.912E+00		
NB-95	765.79	106.	-11.	-0.006	134.01	-6.090E-01		
PA-234M	766.41	76.	14.	0.008	90.16	2.642E+02		
EU-152	778.92	28.	4.	0.002	285.04	1.706E+00		
CS-134	795.87	53.	4.	0.002	262.20	2.628E-01		
CS-134	801.95	30.	10.	0.005	87.72	6.185E+00		
CO-58	810.78	50.	-5.	-0.003	204.94	-2.870E-01		
La-140	815.77	54.	-7.	-0.004	153.20	-1.725E+00		
Cs-136	818.50	51.	11.	0.006	96.41	6.365E-01		
MN-54	834.85	14.	8.	0.004	105.33	4.682E-01		
Co-56	846.77	33.	-8.	-0.004	162.22	-4.544E-01		
NB-94	871.10	43.	-9.	-0.005	106.61	-5.568E-01		
EU-154	873.23	68.	-13.	-0.007	91.45	-6.607E+00		
AG-110M	884.68	88.	14.	0.008	98.81	1.181E+00		
Sc-46	889.28	107.	-11.	-0.006	130.80	-7.086E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
y-88	898.04	20.	-2.	-0.001	496.66	-1.329E-01		
AG-110M	937.49	55.	-19.	-0.011	87.32	-3.637E+00		
EU-152	964.11	110.	10.	0.006	148.78	4.629E+00		
EU-154	996.33	52.	-10.	-0.005	109.97	-6.210E+00		
EU-154	1004.77	52.	10.	0.006	107.08	3.809E+00		
Co-56	1037.84	5.	19.	0.011	34.84	9.438E+00		P
RH-106	1050.36	36.	-8.	-0.004	85.09	-3.592E+01		P
BI-207	1063.66	26.	1.	0.001	794.59	1.353E-01		P
Ga-68	1077.40	35.	-4.	-0.002	328.98	-1.040E+01		
FE-59	1099.25	22.	-2.	-0.001	577.12	-2.544E-01		P
EU-152	1112.07	96.	-13.	-0.007	114.30	-6.864E+00		
ZN-65	1115.55	83.	-8.	-0.005	158.76	-1.237E+00		
Ta-182	1121.30	88.	-11.	-0.006	126.06	-2.342E+00		
CO-60	1173.24	27.	-1.	-0.001	813.26	-8.705E-02		P
Ta-182	1189.05	27.	8.	0.005	145.05	4.086E+00		
Ta-182	1221.41	49.	-17.	-0.009	54.74	-4.998E+00		P
Co-56	1238.28	16.	26.	0.014	40.09	3.240E+00		
FE-59	1291.60	21.	8.	0.004	141.62	1.516E+00		
CO-60	1332.50	11.	1.	0.001	563.47	1.171E-01		
AG-110M	1384.30	23.	-13.	-0.007	70.24	-4.862E+00		P
La-140	1596.21	6.	5.	0.003	115.37	5.677E-01		P
SB-124	1690.98	24.	-15.	-0.008	83.47	-3.393E+00		
Co-56	1771.35	44.	-6.	-0.004	148.76	-4.762E+00		
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	4.3531E+00	4.3532E+00	1.093E+02%	1.61E+01
NA-22	#A	4.2248E-01	4.2248E-01	1.217E+02%	1.80E+00
K-40		2.8372E+02	2.8372E+02	6.016E+00%	1.52E+01
Sc-46	#A	-7.0862E-01	-7.0863E-01	1.308E+02%	3.14E+00
CR-51	#A	-3.1694E+00	-3.1695E+00	1.482E+02%	2.65E+01
MN-54	#A	4.6824E-01	4.6824E-01	1.053E+02%	1.18E+00
FE-59	#A	5.1288E-01	5.1288E-01	1.416E+02%	3.22E+00
Co-56	#A	1.6765E+00	1.6765E+00	3.484E+01%	1.74E+00
CO-57	#A	-5.2259E-01	-5.2259E-01	9.485E+01%	1.65E+00
CO-58	#A	-2.8696E-01	-2.8696E-01	2.049E+02%	2.05E+00
CO-60	#A	1.1714E-01	1.1714E-01	5.635E+02%	1.58E+00
ZN-65	#A	-1.2371E+00	-1.2371E+00	1.588E+02%	6.72E+00
NB-94	#A	1.7227E-02	1.7227E-02	4.351E+03%	1.79E+00
ZR-95	#A	9.1191E-01	9.1192E-01	1.049E+02%	2.26E+00
NB-95	#A	-6.0896E-01	-6.0897E-01	1.340E+02%	2.77E+00
RU-103	#A	4.7749E-01	4.7750E-01	9.591E+01%	1.11E+00

RH-106 #A	4.6094E+00	4.6094E+00	9.056E+01%	1.02E+01
AG-108M#A	-7.5456E-01	-7.5456E-01	9.029E+01%	1.67E+00
AG-110M#A	1.1809E+00	1.1809E+00	9.881E+01%	3.93E+00
SN-113 #A	-3.0359E-01	-3.0359E-01	3.262E+02%	2.80E+00
SB-124 #A	7.6105E-01	7.6106E-01	1.518E+02%	3.65E+00
SB-125 #	2.8382E+00	2.8382E+00	5.314E+01%	2.50E+00
I-131 #A	-4.5393E-01	-4.5396E-01	1.607E+02%	1.54E+00
Gd-153 #A	7.2626E-01	7.2626E-01	1.247E+02%	8.75E+00
Ga-68 #A	-1.0260E+01	-1.0395E+01	3.290E+02%	7.87E+01
Tc-99m #A	-4.3075E-01	-4.3181E-01	1.891E+02%	2.72E+00
BA-133 #A	-2.5190E-01	-2.5190E-01	1.086E+02%	4.20E+00
CS-134 #A	5.9119E-01	5.9119E-01	8.772E+01%	3.75E+00
CS-137 #A	-4.5709E-01	-4.5709E-01	2.022E+02%	2.49E+00
CE-139 #A	3.1433E-01	3.1433E-01	1.494E+02%	1.58E+00
Ba-140 #A	-1.6348E-02	-1.6349E-02	8.637E+01%	6.28E+00
La-140 #A	8.3480E-01	8.3484E-01	1.028E+02%	1.50E+00
CE-141 #A	-6.6905E-01	-6.6906E-01	1.371E+02%	2.34E+00
CE-144 #A	-3.8950E+00	-3.8950E+00	1.555E+02%	2.02E+01
PM-144 #A	6.9931E-01	6.9931E-01	9.199E+01%	1.49E+00
EU-152 #A	2.9805E+00	2.9805E+00	1.024E+02%	1.01E+01
EU-154 #A	-6.6072E+00	-6.6072E+00	9.145E+01%	2.03E+01
EU-155 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.66E+00
HF-181 #A	-7.6702E-01	-7.6703E-01	1.046E+02%	2.69E+00
Ta-182 #A	-3.0431E-01	-3.0431E-01	9.609E+01%	1.00E+01
Hg-203 #A	5.1385E-01	5.1386E-01	1.055E+02%	1.82E+00
TL-208 #	8.5106E+00	8.5106E+00	9.453E+00%	1.15E+00
pm-146 #A	1.2463E+00	1.2463E+00	9.618E+01%	3.58E+00
y-88 #A	-1.1712E-02	-1.1712E-02	4.256E+02%	1.57E+00
Cd-113m#A	1.3679E+04	1.3679E+04	3.678E+01%	1.58E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.47E+01
Cf-251 #A	9.0767E-01	9.0767E-01	2.508E+02%	5.89E+00
Cf-249 #A	1.0667E+00	1.0667E+00	9.532E+01%	2.11E+00
Sn-126 A	1.9405E+00	1.9405E+00	3.393E+02%	2.21E+01
PB-210 #A	2.0918E+01	2.0918E+01	8.019E+01%	5.55E+01
PB-212	2.7016E+01	2.7016E+01	4.758E+00%	1.98E+00
PB-214	1.5850E+01	1.5850E+01	8.905E+00%	2.36E+00
BI-207 #A	5.1821E-01	5.1821E-01	7.266E+01%	1.26E+00
BI-212 #	4.7180E+01	4.7180E+01	1.414E+01%	8.76E+00
BI-214	1.4704E+01	1.4704E+01	1.080E+01%	2.59E+00
BI-210M#A	-8.2712E-01	-8.2712E-01	9.776E+01%	2.71E+00
AC-228	2.1509E+01	2.1509E+01	1.088E+01%	4.17E+00
TH-227 #A	9.0174E+00	9.0174E+00	4.309E+01%	2.66E+01
TH-229 #A	6.2433E+00	6.2433E+00	1.393E+02%	2.41E+01
TH-234 #A	6.1480E+00	6.1480E+00	2.611E+02%	5.38E+01
PA-231 #A	1.6617E+01	1.6617E+01	1.124E+02%	8.43E+01
PA-233 #A	-1.5600E-01	-1.5600E-01	1.125E+02%	7.52E+00
PA-234 #A	-4.0691E-02	-4.0691E-02	9.615E+01%	1.27E+01
PA-234M#A	6.8687E+01	6.8687E+01	9.016E+01%	3.20E+02
U-235 #A	9.4732E-01	9.4732E-01	2.640E+02%	2.20E+01

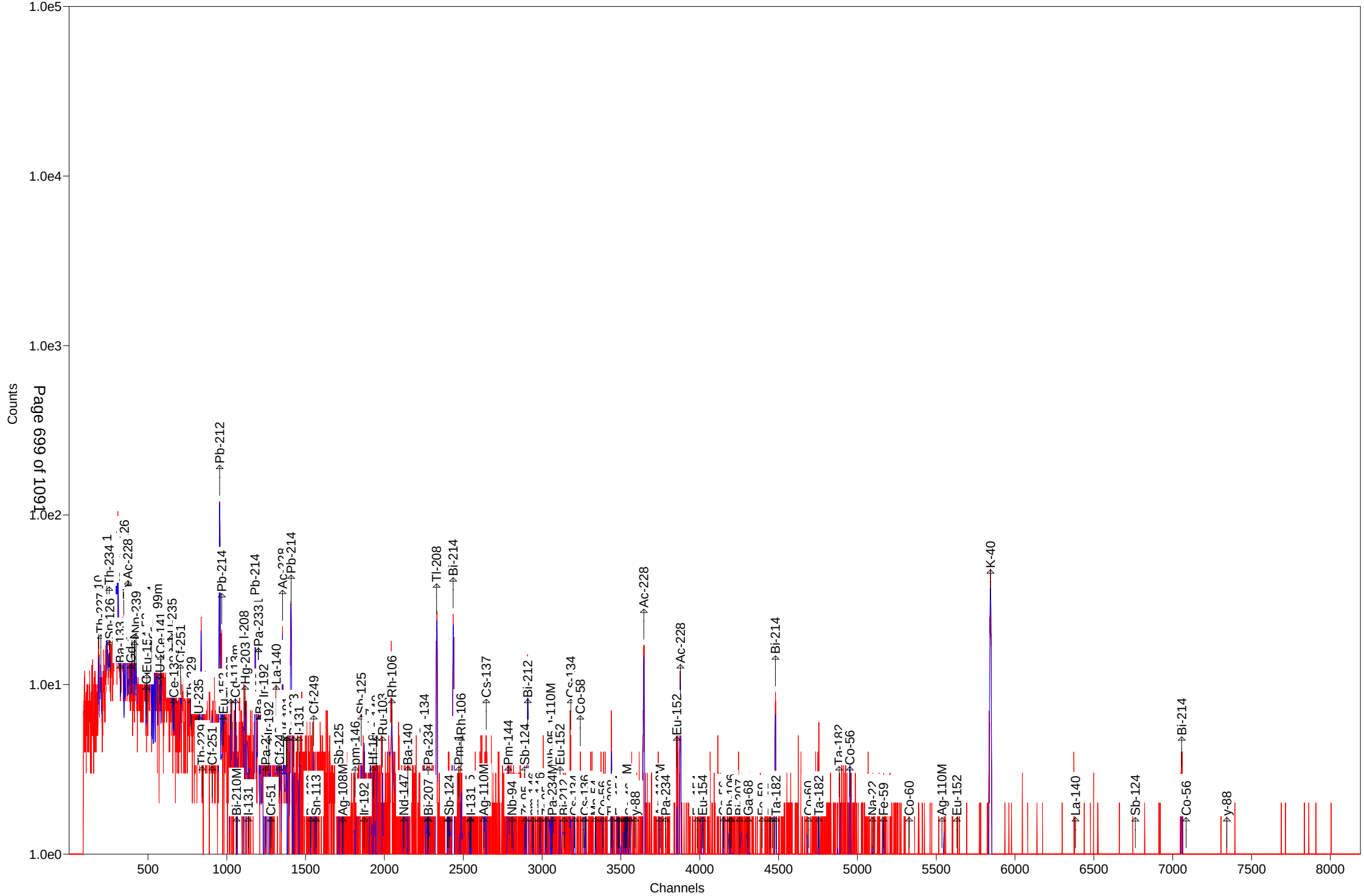
AM-241 #A	3.1097E+00	3.1097E+00	5.009E+01%	3.80E+00
Np-237 #A	3.2955E+00	3.2955E+00	1.881E+02%	2.06E+01
Ir-192 #A	5.4342E-03	5.4342E-03	8.876E+01%	3.08E+00
Cs-136 #A	7.5541E-01	7.5544E-01	9.520E+01%	2.08E+00
Np-239 #A	1.5677E+00	1.5681E+00	1.259E+02%	6.60E+00
Nd-147 #A	2.8820E+00	2.8821E+00	1.329E+02%	9.31E+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) 4.216E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.2159915E+02 Bq/Sample

264540_Gamma_160-18553-A-12-B. 15_Gamma_20161069.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20162254

Sample Description: 264540_Gamma_160-18553-A-13-B
Detector: Detector #14
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-13-B

Decay to Time: 9/1/2016 16:06 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:07:09 Real Time: 1807 sec
Analysis Time: 9/1/2016 16:38 Dead Time: 0.40 %
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	1.963E+00	172.7	3.391E+00	3.392E+00	1.171E+01
NA-22	2.647E-01	185.6	4.914E-01	4.916E-01	1.749E+00
K-40	2.445E+02	5.7	1.382E+01	1.864E+01	9.895E+00
Sc-46	7.165E-02	835.2	5.984E-01	5.984E-01	2.107E+00
CR-51	-3.912E+00	106.7	4.173E+00	4.179E+00	1.403E+01
MN-54	-2.297E-01	237.0	5.444E-01	5.445E-01	1.292E+00
FE-59	8.368E-01	90.3	7.557E-01	7.569E-01	1.496E+00
Co-56	1.388E+00	32.9	4.572E-01	4.627E-01	9.043E-01
CO-57	-2.592E-03	14440.8	3.743E-01	3.743E-01	1.209E+00
CO-58	-5.099E-01	104.5	5.329E-01	5.335E-01	1.902E+00
CO-60	-4.012E-01	151.7	6.086E-01	6.090E-01	2.028E+00
ZN-65	-9.264E-01	208.2	1.928E+00	1.929E+00	6.599E+00
NB-94	-6.901E-01	92.4	6.379E-01	6.389E-01	1.650E+00
ZR-95	-6.059E-01	186.0	1.127E+00	1.127E+00	2.754E+00
NB-95	-9.851E-01	51.3	5.057E-01	5.082E-01	2.480E+00
RU-103	-1.852E-01	285.9	5.293E-01	5.294E-01	1.345E+00
RH-106	2.210E+00	79.3	1.753E+00	1.757E+00	1.231E+01
AG-108M	3.007E-01	124.0	3.727E-01	3.731E-01	9.848E-01
AG-110M	1.258E-01	184.4	2.320E-01	2.321E-01	2.849E+00
SN-113	6.632E-01	124.9	8.280E-01	8.287E-01	2.788E+00
SB-124	5.898E-01	37.8	2.229E-01	2.250E-01	3.225E+00
SB-125	1.620E+00	99.0	1.604E+00	1.606E+00	3.123E+00
I-131	9.379E-02	240.5	2.256E-01	2.257E-01	1.175E+00
Gd-153	6.184E-01	122.2	7.555E-01	7.565E-01	3.282E+00
Ga-68	-1.119E+01	263.9	2.954E+01	2.955E+01	6.778E+01
Tc-99m	1.275E-02	3182.0	4.059E-01	4.059E-01	1.378E+00
BA-133	5.540E-01	179.1	9.920E-01	9.924E-01	3.343E+00
CS-134	6.984E-01	90.6	6.328E-01	6.338E-01	3.214E+00
CS-137	4.965E-02	974.7	4.839E-01	4.839E-01	1.721E+00
CE-139	-2.424E-01	177.2	4.297E-01	4.303E-01	1.448E+00
Ba-140	1.405E+00	97.0	1.363E+00	1.365E+00	3.458E+00
La-140	-3.400E-01	148.5	5.050E-01	5.054E-01	2.019E+00
CE-141	1.211E-01	516.2	6.251E-01	6.251E-01	1.706E+00

CE-144	2.167E+00	156.4	3.390E+00	3.391E+00	1.136E+01
PM-144	-2.345E-01	266.6	6.250E-01	6.251E-01	1.421E+00
EU-152	2.486E+00	75.9	1.887E+00	1.892E+00	6.381E+00
EU-154	1.105E+00	88.7	9.805E-01	9.822E-01	1.539E+01
EU-155	6.284E-01	238.5	1.498E+00	1.499E+00	5.056E+00
HF-181	5.350E-02	112.6	6.026E-02	6.032E-02	1.918E+00
Ta-182	-3.336E+00	92.6	3.089E+00	3.093E+00	1.034E+01
Hg-203	1.927E-01	223.5	4.306E-01	4.307E-01	1.471E+00
TL-208	6.176E+00	10.6	6.539E-01	7.282E-01	9.778E-01
pm-146	1.171E+00	92.8	1.087E+00	1.088E+00	2.678E+00
y-88	2.981E-01	204.6	6.099E-01	6.101E-01	1.472E+00
Cd-113m	9.099E+02	542.6	4.937E+03	4.937E+03	1.709E+04
Cd-109	0.000E+00	1.#INF	1.334E+01	1.334E+01	4.489E+01
Cf-251	1.606E+00	108.5	1.743E+00	1.749E+00	4.696E+00
Cf-249	-6.369E-01	121.3	7.725E-01	7.732E-01	2.601E+00
Sn-126	3.624E+00	114.8	4.161E+00	4.166E+00	1.393E+01
PB-210	1.202E+01	75.9	9.118E+00	9.145E+00	2.705E+01
PB-212	1.786E+01	6.1	1.093E+00	1.590E+00	2.229E+00
PB-214	1.297E+01	9.4	1.217E+00	1.391E+00	2.293E+00
BI-207	5.860E-01	48.1	2.822E-01	2.838E-01	1.546E+00
BI-212	3.276E+01	19.4	6.358E+00	6.581E+00	1.132E+01
BI-214	1.361E+01	8.8	1.195E+00	1.388E+00	1.861E+00
BI-210M	-7.251E-01	142.2	1.031E+00	1.032E+00	2.251E+00
AC-228	1.927E+01	12.6	2.427E+00	2.619E+00	3.807E+00
TH-227	-5.488E+00	78.8	4.322E+00	4.333E+00	1.917E+01
TH-229	-3.248E+00	287.7	9.345E+00	9.348E+00	2.032E+01
TH-234	2.972E+00	382.4	1.137E+01	1.137E+01	3.274E+01
PA-231	-1.359E+01	146.2	1.987E+01	1.988E+01	6.671E+01
PA-233	0.000E+00	1.#INF	1.833E-01	1.833E-01	5.720E+00
PA-234	4.664E-01	471.1	2.197E+00	2.197E+00	7.409E+00
PA-234M	1.252E+02	55.5	6.951E+01	6.980E+01	1.539E+02
U-235	3.231E-01	441.1	1.426E+00	1.426E+00	1.103E+01
AM-241	1.026E+00	112.4	1.153E+00	1.155E+00	3.267E+00
Np-237	2.484E+00	159.6	3.966E+00	3.968E+00	1.324E+01
Ir-192	5.382E-01	72.9	3.924E-01	3.937E-01	1.328E+00
Cs-136	3.393E-01	92.0	3.122E-01	3.128E-01	1.411E+00
Np-239	-1.170E+00	123.9	1.450E+00	1.452E+00	4.854E+00
Nd-147	1.223E-01	111.2	1.360E-01	1.361E-01	9.175E+00
Total	1.430E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-13-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20162254.An1

Acquisition information
Start time: 9/1/2016 4:07:09 PM
Live time: 1800
Real time: 1807
Dead time: 0.40 %
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 4:06:00 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. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1870

***** 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
46.59	20.	75.88	0.55	2.171E-02	46.54	4.250	PBC<MDA	PB210
59.54	20.	112.39	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.29	7.	382.43	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
64.28	21.	114.83	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.90	189.	11.89	0.78	3.816E-02				
77.23	303.	8.20	0.78	3.900E-02				
86.15	24.	159.64	0.79	4.163E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.060E+00	EU155
87.24	109.	20.60	0.90	4.179E-02	86.54	30.700	4.752E+00	EU155
					86.94	9.040	1.610E+01	Sn126
					87.57	37.500	3.869E+00	Sn126
					88.04	3.790	3.819E+01	Cd109
91.10	26.	147.82	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
93.48	25.	145.14	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.50	6.	388.72	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
103.20	19.	122.18	0.81	4.392E-02	103.20	21.800	PBC<MDA	Gd153
103.70	19.	126.24	0.81	4.395E-02	103.70	24.000	PBC<MDA	Np239
105.31	11.	238.46	0.81	4.403E-02	105.31	21.200	PBC<MDA	EU155
109.80	22.	65.90	1.30	4.414E-02				
123.10	20.	109.25	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
128.93	39.	40.69	0.37	4.324E-02				
131.29	6.	471.06	0.84	4.301E-02	131.29	18.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
134.11	18.	156.43	0.84	4.277E-02	133.54	11.090	PBC<MDA	CE144
136.30	10.	316.21	0.84	4.245E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.185E+00	CO57
145.44	4.	516.25	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
176.60	18.	108.50	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
205.33	4.	441.15	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
227.00	18.	106.33	0.93	3.046E-02	227.00	6.300	PBC<MDA	Cf251
238.29	417.	5.94	0.94	2.935E-02	238.63	43.300	1.786E+01	PB212
241.24	68.	21.45	0.95	2.907E-02	242.00	7.430	1.758E+01	PB214
263.70	3.	542.56	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m
276.66	41.	35.24	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
279.20	7.	223.51	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
284.30	6.	286.41	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.79	127.	17.21	0.98	2.489E-02	295.09	19.300	1.430E+01	PB214
299.57	53.	20.93	1.30	2.455E-02	300.03	3.280	3.657E+01	PB212
					300.07	2.460	4.876E+01	PA231
					300.18	6.200	1.935E+01	PA233
316.49	14.	102.36	1.02	2.355E-02	316.49	87.040	PBC<MDA	Ir192
328.76	10.	165.56	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
337.92	105.	12.78	1.20	2.237E-02	338.32	12.010	2.176E+01	AC228
344.29	14.	140.94	1.05	2.205E-02	344.29	26.500	PBC<MDA	EU152
345.83	13.	155.32	1.05	2.197E-02	345.83	15.070	PBC<MDA	HF181
351.49	188.	9.60	1.32	2.169E-02	351.93	37.600	1.234E+01	PB214
356.00	13.	179.06	1.06	2.148E-02	356.00	62.050	PBC<MDA	BA133
391.69	15.	124.85	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	216.78	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
433.94	9.	123.98	1.13	1.838E-02	433.94	90.480	PBC<MDA	AG108M
463.37	12.	98.97	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	13.	103.88	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
477.60	6.	172.72	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
511.86	62.	29.16	2.46	1.612E-02	511.86	20.000	1.067E+01	RH106
537.26	10.	97.03	1.23	1.551E-02	537.26	24.390	PBC<MDA	Ba140
563.47	5.	218.73	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
583.11	137.	10.59	0.66	1.453E-02	583.02	84.500	6.176E+00	TL208
600.50	10.	234.25	1.29	1.419E-02	600.50	17.860	PBC<MDA	SB125
602.73	6.	418.95	1.29	1.415E-02	602.73	98.260	PBC<MDA	SB124
604.62	10.	234.73	1.29	1.412E-02	604.71	97.620	PBC<MDA	CS134
609.26	171.	8.49	1.07	1.403E-02	609.31	46.090	1.467E+01	BI214
					610.30	5.750	1.178E+02	RU103
636.97	2.	514.78	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
657.76	5.	184.39	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
661.66	1.	974.68	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
727.33	54.	19.40	0.54	1.217E-02	727.17	7.550	3.276E+01	BI212
747.16	9.	92.76	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
766.41	15.	95.46	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.423E+02	PA234M
778.92	3.	351.72	1.44	1.151E-02	778.92	12.940	PBC<MDA	EU152
785.70	8.	116.58	1.45	1.144E-02	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
796.36	9.	106.93	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
802.05	7.	130.32	1.46	1.124E-02	801.95	8.690	PBC<MDA	CS134
818.50	7.	112.30	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136
846.77	7.	106.83	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
860.66	23.	44.40	1.51	1.062E-02	860.56	12.420	9.828E+00	TL208
873.23	2.	505.29	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
889.28	1.	835.16	1.54	1.034E-02	889.28	99.984	PBC<MDA	Sc46
898.04	5.	204.59	1.54	1.026E-02	898.04	93.700	PBC<MDA	y88
911.07	102.	12.59	1.55	1.014E-02	911.07	29.000	1.927E+01	AC228
964.11	15.	75.90	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.84	15.	84.20	1.60	9.642E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	88.70	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1001.00	12.	56.71	1.63	9.389E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	4.	145.77	1.66	9.043E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	8.	79.34	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	17.	48.15	1.67	8.934E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	3.	180.15	1.70	8.697E-03	1099.25	56.500	PBC<MDA	FE59
1120.11	51.	17.85	0.96	8.562E-03	1120.29	15.100	2.170E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	3.	332.78	1.77	8.153E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	7.	151.54	1.79	7.975E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	28.	32.93	1.80	7.886E-03	1238.28	66.070	2.969E+00	Co56
1274.53	4.	185.64	1.83	7.700E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.518E-01	EU154
1291.60	9.	90.32	1.84	7.616E-03	1291.60	43.200	PBC<MDA	FE59
1460.84	323.	5.65	1.57	6.879E-03	1460.83	10.670	2.445E+02	K40
1690.98	7.	37.80	2.10	6.091E-03	1690.98	47.790	PBC<MDA	SB124
1764.77	31.	17.96	2.14	5.878E-03	1764.49	15.400	1.902E+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
298.99	74.90	157.	189.	4.954E+03	11.89	0.777	- D
308.30	77.22	158.	303.	7.777E+03	8.20	0.780	- D
438.54	109.80	68.	22.	4.908E+02	65.90	1.300	- sM
515.05	128.93	78.	39.	8.942E+02	40.69	0.372	- sM
962.53	241.17	131.	38.	1.304E+03	45.63	0.947	- sD
1350.84	337.92	24.	105.	4.701E+03	12.78	1.202	-

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	185.79	46.59	82.	20.	0.011	75.88	0.548s
TH-227	199.98	50.14	192.	-19.	-0.011	78.76	0.751s
AM-241	237.55	59.54	177.	20.	0.011	112.39	0.761s
TH-234	252.55	63.29	232.	7.	0.004	382.43	0.765s
Sn-126	256.52	64.28	283.	21.	0.012	114.83	0.766
BA-133	323.33	80.99	217.	-11.	-0.006	201.20	0.784s
Np-237	345.33	86.49	746.	24.	0.014	159.64	0.789
EU-155	345.54	86.54	493.	-28.	-0.016	113.76	0.790s
Sn-126	347.13	86.94	465.	-28.	-0.016	110.54	0.790
Sn-126	349.65	87.57	488.	33.	0.018	59.48	0.791D
Cd-109	351.53	88.04	729.	0.	0.000	1000.00	0.791A
Nd-147	363.77	91.10	703.	26.	0.014	147.82	0.794
AC-228	372.76	93.35	666.	25.	0.014	145.14	0.797
Gd-153	389.36	97.50	254.	6.	0.003	388.72	0.801s
Np-239	397.36	99.50	274.	-5.	-0.003	428.14	0.803s
Gd-153	412.15	103.20	272.	19.	0.011	122.18	0.807s
Np-239	414.15	103.70	291.	19.	0.011	126.24	0.807s
EU-155	420.60	105.31	311.	11.	0.006	238.46	0.809s
Np-239	423.87	106.13	330.	-21.	-0.012	123.89	0.810
EU-152	486.43	121.78	267.	-21.	-0.012	119.71	0.826s
EU-154	491.73	123.10	237.	20.	0.011	109.25	0.828s
PA-234	524.50	131.29	466.	6.	0.004	471.06	0.836
HF-181	531.42	133.02	438.	-10.	-0.005	307.75	0.838s
CE-144	533.47	133.54	410.	18.	0.010	156.43	0.838s
HF-181	544.52	136.30	462.	10.	0.005	316.21	0.841s
CO-57	545.21	136.47	472.	0.	0.000	1000.00	0.841s
CE-141	581.07	145.44	157.	4.	0.002	516.25	0.850
Ba-140	649.93	162.66	276.	-10.	-0.006	245.39	0.868s
CE-139	662.70	165.85	280.	-14.	-0.007	177.24	0.871
Cf-251	705.68	176.60	117.	18.	0.010	108.50	0.882
TH-229	773.30	193.51	128.	-9.	-0.005	287.70	0.899
U-235	820.58	205.33	97.	4.	0.002	441.15	0.912s
TH-229	842.65	210.85	193.	-24.	-0.013	103.92	0.917
Cf-251	907.23	227.00	110.	18.	0.010	106.33	0.933s
PB-212	953.75	238.63	107.	408.	0.227	6.12	0.945D
PB-214	967.21	242.00	798.	-21.	-0.012	188.24	0.948s
Cd-113m	1054.01	263.70	103.	3.	0.001	542.56	0.970s
BI-210M	1062.53	265.83	124.	-18.	-0.010	142.16	0.972
TL-208	1108.33	277.28	82.	41.	0.023	35.24	0.983
Hg-203	1115.99	279.20	131.	7.	0.004	223.51	0.985s
I-131	1136.39	284.30	73.	6.	0.003	286.41	0.990s
PB-214	1178.71	294.88	60.	123.	0.068	15.82	0.989
PB-212	1197.46	299.57	21.	53.	0.029	20.93	1.300s
PA-231	1199.46	300.07	341.	-17.	-0.010	154.39	1.006s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	1199.90	300.18	324.	-17.	-0.010	150.52	1.006s
PA-231	1209.78	302.65	307.	-17.	-0.010	146.24	1.008s
BA-133	1210.59	302.85	290.	-17.	-0.010	142.17	1.009s
Ba-140	1218.57	304.85	304.	-17.	-0.010	145.20	1.011
BI-210M	1218.76	304.90	321.	-16.	-0.009	158.49	1.011
Ir-192	1232.94	308.44	337.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	337.	0.	0.000	1000.00	1.018s
Ir-192	1265.13	316.49	99.	14.	0.008	102.36	1.022s
CR-51	1279.51	320.08	144.	-16.	-0.009	106.68	1.026s
La-140	1314.21	328.76	81.	10.	0.006	165.56	1.034s
Cf-249	1332.92	333.44	62.	-7.	-0.004	204.77	1.039s
AC-228	1352.44	338.32	251.	-16.	-0.009	143.92	1.043
Cs-136	1361.44	340.57	235.	-16.	-0.009	139.17	1.045
EU-152	1376.30	344.29	191.	14.	0.008	140.94	1.049s
HF-181	1382.47	345.83	202.	13.	0.007	155.32	1.050s
PB-214	1405.10	351.49	44.	181.	0.101	10.08	1.321s
BA-133	1423.15	356.00	276.	13.	0.007	179.06	1.060s
I-131	1457.08	364.48	52.	-4.	-0.002	416.80	1.069s
BA-133	1534.50	383.84	146.	-16.	-0.009	106.49	1.087s
Cf-249	1550.94	387.95	162.	-15.	-0.008	121.29	1.091s
SN-113	1565.90	391.69	173.	15.	0.008	124.85	1.095s
SB-125	1710.63	427.88	37.	5.	0.003	216.78	1.129s
AG-108M	1734.87	433.94	33.	9.	0.005	123.98	1.135s
SB-125	1852.59	463.37	66.	12.	0.007	98.97	1.163s
Ir-192	1871.36	468.06	82.	13.	0.007	103.88	1.167s
BE-7	1909.50	477.60	57.	6.	0.004	172.72	1.176s
HF-181	1927.10	482.00	90.	-12.	-0.007	112.64	1.180s
La-140	1947.19	487.02	44.	-3.	-0.002	436.74	1.185s
RU-103	1987.33	497.05	52.	-5.	-0.003	285.89	1.194
RH-106	2046.57	511.86	41.	62.	0.034	29.16	2.458s
Nd-147	2123.11	531.00	44.	-8.	-0.004	166.15	1.225s
Ba-140	2148.15	537.26	20.	10.	0.005	97.03	1.231s
CS-134	2252.06	563.24	29.	5.	0.003	218.73	1.255s
CS-134	2276.40	569.32	40.	-6.	-0.003	154.56	1.260s
PA-234	2276.99	569.47	56.	-7.	-0.004	155.84	1.261
TL-208	2331.56	583.11	16.	137.	0.076	10.59	0.659s
SB-125	2401.12	600.50	270.	10.	0.006	234.25	1.289s
SB-124	2410.04	602.73	280.	6.	0.003	418.95	1.291
CS-134	2417.96	604.71	273.	10.	0.006	234.73	1.292
BI-214	2436.36	609.31	17.	158.	0.088	8.77	1.296D
RU-103	2440.31	610.30	283.	3.	0.002	826.78	1.297s
AG-108M	2456.25	614.28	286.	0.	0.000	1000.00	1.301s
RH-106	2486.79	621.92	35.	-6.	-0.003	225.44	1.308s
SB-125	2542.69	635.89	50.	-7.	-0.004	147.77	1.320s
I-131	2547.03	636.97	52.	2.	0.001	514.78	1.321s
AG-110M	2630.18	657.76	40.	5.	0.003	184.39	1.339s
CS-137	2645.77	661.66	47.	1.	0.001	974.68	1.343s
PM-144	2785.32	696.54	39.	-5.	-0.003	266.56	1.374s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	2809.67	702.63	52.	-15.	-0.008	92.43	1.379s
SB-124	2890.31	722.79	122.	-14.	-0.008	117.14	1.396
AG-108M	2890.91	722.94	113.	-10.	-0.005	157.04	1.397s
EU-154	2892.59	723.36	103.	0.	0.000	1000.00	1.397
ZR-95	2895.96	724.20	103.	0.	0.000	1000.00	1.398s
BI-212	2908.47	727.33	12.	54.	0.030	19.40	0.541s
pm-146	2942.05	735.72	26.	-4.	-0.002	264.97	1.408s
pm-146	2987.81	747.16	13.	9.	0.005	92.76	1.417s
ZR-95	3026.09	756.73	39.	-7.	-0.004	185.99	1.426s
AG-110M	3054.96	763.94	94.	-21.	-0.011	70.18	1.432s
NB-95	3062.34	765.79	112.	-21.	-0.011	51.34	1.433s
PA-234M	3064.83	766.41	94.	15.	0.008	95.46	1.434s
EU-152	3114.87	778.92	26.	3.	0.002	351.72	1.444s
BI-212	3140.88	785.42	17.	8.	0.004	116.58	1.450s
CS-134	3182.67	795.87	22.	9.	0.005	106.93	1.459s
CS-134	3207.01	801.95	19.	7.	0.004	130.32	1.464s
CO-58	3242.31	810.77	57.	-10.	-0.006	104.51	1.471s
La-140	3262.30	815.77	67.	0.	0.000	1000.00	1.475s
Cs-136	3273.22	818.50	30.	7.	0.004	112.30	1.478s
MN-54	3338.63	834.85	24.	-5.	-0.003	236.96	1.492s
Co-56	3386.32	846.77	10.	7.	0.004	106.83	1.501s
TL-208	3441.51	860.56	19.	23.	0.013	44.40	1.513s
NB-94	3483.65	871.10	40.	-14.	-0.008	69.01	1.522s
EU-154	3492.19	873.23	50.	2.	0.001	505.29	1.523s
PA-234	3521.39	880.53	51.	-9.	-0.005	119.00	1.529
PA-234	3532.24	883.24	60.	0.	0.000	1000.00	1.531
AG-110M	3538.01	884.68	60.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	61.	1.	0.001	835.16	1.536s
y-88	3591.45	898.04	24.	5.	0.003	204.59	1.543s
AC-228	3643.58	911.07	14.	102.	0.057	12.59	1.554
AG-110M	3749.30	937.49	47.	-17.	-0.010	87.03	1.576s
PA-234	3783.42	946.02	33.	-10.	-0.005	129.48	1.582
EU-152	3855.80	964.11	55.	15.	0.008	75.90	1.597s
AC-228	3875.25	968.97	70.	15.	0.008	84.20	1.601
EU-154	3984.71	996.33	10.	6.	0.003	88.70	1.622s
PA-234M	4003.39	1001.00	17.	12.	0.007	56.71	1.626s
EU-154	4018.51	1004.77	102.	-16.	-0.009	92.76	1.629s
Co-56	4150.81	1037.84	35.	-11.	-0.006	59.62	1.655s
Cs-136	4191.74	1048.07	15.	4.	0.002	145.77	1.663s
RH-106	4200.91	1050.36	17.	8.	0.005	79.34	1.665s
BI-207	4254.12	1063.66	10.	17.	0.009	48.15	1.675s
Ga-68	4309.10	1077.40	35.	-5.	-0.003	263.94	1.685s
FE-59	4396.54	1099.25	5.	3.	0.002	180.15	1.702s
EU-152	4447.85	1112.07	126.	-16.	-0.009	103.89	1.712s
ZN-65	4461.74	1115.55	110.	-7.	-0.004	208.17	1.714s
BI-214	4480.02	1120.11	7.	51.	0.028	17.85	0.958s
Sc-46	4481.77	1120.55	103.	0.	0.000	1000.00	1.718s
Ta-182	4484.77	1121.30	129.	-18.	-0.010	92.58	1.719s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.60	1173.24	31.	-7.	-0.004	133.86	1.757s
Ta-182	4755.88	1189.05	20.	3.	0.002	332.78	1.769
Ta-182	4885.38	1221.41	22.	7.	0.004	151.54	1.792
Co-56	4952.89	1238.28	11.	28.	0.015	32.93	1.805
NA-22	5097.96	1274.53	21.	4.	0.002	185.64	1.831s
EU-154	5098.01	1274.54	25.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	11.	9.	0.005	90.32	1.843s
CO-60	5329.96	1332.50	27.	-5.	-0.003	151.72	1.871s
AG-110M	5537.26	1384.30	11.	-3.	-0.001	285.04	1.907s
K-40	5843.61	1460.84	5.	323.	0.179	5.65	1.571
La-140	6385.44	1596.21	17.	-7.	-0.004	246.64	2.044s
SB-124	6764.81	1690.98	0.	7.	0.004	37.80	2.102
BI-214	7059.07	1764.49	0.	31.	0.017	17.96	2.145
Co-56	7086.53	1771.35	31.	0.	0.000	1000.00	2.149s
y-88	7345.59	1836.06	0.	0.	0.000	1000.00	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	1.9632E+00				5.31E+01	
			477.60	1.963E+00	&(	1.171E+01 1.73E+02 1.05E+01	G
NA-22	C	2.6470E-01				9.50E+02	
			1274.53	2.647E-01	?(	1.749E+00 1.86E+02 9.99E+01	G
K-40	N	2.4453E+02				4.66E+11	
			1460.83	2.445E+02	(P	9.895E+00 5.65E+00 1.07E+01	G
Sc-46	F	7.1649E-02				8.38E+01	
			889.28	7.165E-02	&(	2.107E+00 8.35E+02 1.00E+02	G
			1120.55	0.000E+00	-	3.245E+00 1.00E+03 1.00E+02	G
CR-51	F	-3.9119E+00				2.77E+01	
			320.08	-3.912E+00	?(	1.403E+01 1.07E+02 9.94E+00	G
MN-54	C	-2.2974E-01				3.12E+02	
			834.85	-2.297E-01	?(P	1.292E+00 2.37E+02 1.00E+02	G
FE-59	F	8.3677E-01				4.45E+01	
			1099.25	3.285E-01	?(P	1.496E+00 1.80E+02 5.65E+01	G
			1291.60	1.502E+00	?(P	3.048E+00 9.03E+01 4.32E+01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Co-56    C   1.3883E+00                                     7.73E+01
                          846.77 3.430E-01 ?(P 9.043E-01 1.07E+02 9.99E+01 G
                         1238.28 2.969E+00 ?(P 1.948E+00 3.29E+01 6.61E+01 G
                         1037.84-4.939E+00 + P 1.314E+01 5.96E+01 1.41E+01 G
                         1771.35 0.000E+00 -   1.755E+01 1.00E+03 1.55E+01  A

CO-57    C  -2.5919E-03                                     2.72E+02
                          122.06-2.592E-03 %(P 1.209E+00 1.44E+04 8.56E+01 G
                          136.47 0.000E+00 +   1.274E+01 1.00E+03 1.07E+01 G

CO-58    C  -5.0987E-01                                     7.09E+01
                          810.78-5.099E-01 ?(P 1.902E+00 1.05E+02 9.95E+01 G

CO-60    F  -4.0116E-01                                     1.93E+03
                         1332.50-4.012E-01 ?(P 2.028E+00 1.52E+02 1.00E+02 G
                         1173.24-4.598E-01 + P 1.928E+00 1.34E+02 9.99E+01 G

ZN-65    F  -9.2638E-01                                     2.44E+02
                         1115.55-9.264E-01 ?(  6.599E+00 2.08E+02 5.06E+01 G

NB-94    I  -6.9012E-01                                     7.41E+06
                          702.63-6.901E-01 &(P 1.650E+00 9.24E+01 9.79E+01 G
                          871.10-7.404E-01 +   1.696E+00 6.90E+01 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 +   5.153E+00 1.00E+03 4.42E+01 G

NB-95    I  -9.8505E-01                                     6.40E+01
                          765.79-9.851E-01 &(P 2.480E+00 5.13E+01 9.98E+01 G

RU-103   I  -1.8515E-01                                     3.93E+01
                          497.05-1.852E-01 &(  1.345E+00 2.86E+02 9.09E+01 G
                          610.30 1.990E+00 ?   5.594E+01 8.27E+02 5.75E+00 GA

RH-106   I   2.2102E+00                                     3.74E+02
                          621.92-2.517E+00  (P 1.231E+01 2.25E+02 9.93E+00 G
                         1050.36 3.230E+01 ?(  8.649E+01 7.93E+01 1.56E+00 G
                          511.86 1.067E+01 ? P 5.597E+00 2.92E+01 2.00E+01 GA

AG-108M  C   3.0066E-01                                     1.53E+05
                          433.94 3.007E-01 ?(  9.848E-01 1.24E+02 9.05E+01 G
                          722.94-4.885E-01 &   2.610E+00 1.57E+02 9.08E+01 G
                          614.28 0.000E+00 &   3.616E+00 1.00E+03 8.98E+01 G
```

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	1.2582E-01					2.50E+02	
			884.68	0.000E+00	?(	2.849E+00	1.00E+03	7.27E+01 G
			657.76	2.224E-01	&(	1.432E+00	1.84E+02	9.46E+01 G
			937.49	-2.828E+00	+	5.639E+00	8.70E+01	3.44E+01 G
			1384.30	-8.480E-01	+	5.702E+00	2.85E+02	2.43E+01 G
			763.94	-4.376E+00	+	1.018E+01	7.02E+01	2.23E+01 G
SN-113	F	6.6316E-01					1.15E+02	
			391.69	6.632E-01	?(	2.788E+00	1.25E+02	6.40E+01 G
SB-124	F	5.8984E-01					6.02E+01	
			602.73	2.269E-01	(	3.225E+00	4.19E+02	9.83E+01 G
			1690.98	1.336E+00	(	1.407E+00	3.78E+01	4.78E+01 G
			722.79	-5.770E+00	+	2.281E+01	1.17E+02	1.08E+01 G
SB-125	I	1.6202E+00					1.01E+03	
			427.88	5.386E-01	&(	3.123E+00	2.17E+02	2.96E+01 G
			600.50	2.195E+00	?(	1.738E+01	2.34E+02	1.79E+01 G
			635.89	-2.536E+00	+	1.292E+01	1.48E+02	1.13E+01 G
			463.37	3.697E+00	&(P	1.235E+01	9.90E+01	1.05E+01 G
I-131	I	9.3792E-02					8.02E+00	
			364.48	-1.417E-01	?(P	1.175E+00	4.17E+02	8.17E+01 G
			284.30	2.000E+00	&(P	1.506E+01	2.86E+02	6.14E+00 G
			636.97	1.145E+00	?(	2.078E+01	5.15E+02	7.17E+00 G
Gd-153	F	6.1839E-01					2.42E+02	
			97.50	2.486E-01	?(	3.282E+00	3.89E+02	3.00E+01 G
			103.20	1.127E+00	&(	4.616E+00	1.22E+02	2.18E+01 G
Ga-68	C	-1.1193E+01					4.71E-02	
			1077.40	-1.119E+01	?(	6.778E+01	2.64E+02	3.30E+00 G
Tc-99m	I	1.2755E-02					2.51E-01	
			140.51	1.275E-02	%(	1.378E+00	3.18E+03	8.93E+01 G
BA-133	F	5.5399E-01					3.85E+03	
			356.00	5.540E-01	&(	3.343E+00	1.79E+02	6.20E+01 G
			302.85	-2.136E+00	+	1.020E+01	1.42E+02	1.83E+01 G
			383.84	-5.057E+00	&	1.809E+01	1.06E+02	8.94E+00 GA
			80.99	-4.549E-01	+ P	2.897E+00	2.01E+02	3.41E+01 GA
CS-134	I	6.9836E-01					7.54E+02	
			604.71	4.051E-01	?(	3.214E+00	2.35E+02	9.76E+01 G
			795.87	5.358E-01	?(	1.401E+00	1.07E+02	8.55E+01 G
			569.32	-1.463E+00	+	7.848E+00	1.55E+02	1.54E+01 G
			801.95	4.169E+00	?(	1.299E+01	1.30E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	2.180E+00	?(P	1.240E+01	2.19E+02	8.35E+00 G
CS-137	I	4.9648E-02					1.10E+04	
			661.66	4.965E-02	?(	1.721E+00	9.75E+02	8.52E+01 G
CE-139	F	-2.4242E-01					1.38E+02	
			165.85	-2.424E-01	(	1.448E+00	1.77E+02	7.99E+01 G
Ba-140	I	1.4052E+00					1.28E+01	
			537.26	1.405E+00	?(	3.458E+00	9.70E+01	2.44E+01 G
			162.66	-2.396E+00	+ P	1.859E+01	2.45E+02	6.22E+00 G
			304.85	-9.193E+00	+	4.482E+01	1.45E+02	4.29E+00 G
La-140	I	-3.4004E-01					1.28E+01	
			1596.21	-6.757E-01	?(P	2.019E+00	2.47E+02	9.54E+01 G
			487.02	-2.184E-01	+	2.447E+00	4.37E+02	4.55E+01 G
			328.76	1.237E+00	?(	5.335E+00	1.66E+02	2.03E+01 G
			815.77	0.000E+00	+	8.791E+00	1.00E+03	2.33E+01 G
CE-141	I	1.2109E-01					3.25E+01	
			145.44	1.211E-01	&(	1.706E+00	5.16E+02	4.82E+01 G
CE-144	I	2.1668E+00					2.85E+02	
			133.54	2.167E+00	&(	1.136E+01	1.56E+02	1.11E+01 G
PM-144	C	-2.3446E-01					3.63E+02	
			696.54	-2.345E-01	?(P	1.421E+00	2.67E+02	9.90E+01 G
			618.06	-1.141E-02	% P	3.296E+00	4.94E+03	9.91E+01 G
EU-152	F	2.4862E+00					4.94E+03	
			344.29	1.343E+00	?(	6.381E+00	1.41E+02	2.65E+01 G
			1112.07	-7.445E+00	&	2.601E+01	1.04E+02	1.36E+01 G
			121.78	-9.354E-01	+ P	3.500E+00	1.20E+02	2.86E+01 G
			778.92	1.119E+00	?(	9.871E+00	3.52E+02	1.29E+01 G
			964.11	5.773E+00	?(	1.462E+01	7.59E+01	1.46E+01 G
			244.69	-5.930E-01	%	3.379E+01	1.70E+03	7.58E+00 G
			1408.00	-2.486E-01	%	6.687E+00	1.12E+03	2.10E+01 GA
EU-154	I	1.1054E+00					3.14E+03	
			873.23	8.623E-01	?(	1.539E+01	5.05E+02	1.23E+01 G
			123.10	6.336E-01	?(	2.318E+00	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.333E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.124E+01	1.00E+03	2.02E+01 G
			1004.77	-5.281E+00	+	1.644E+01	9.28E+01	1.80E+01 G
			996.33	3.202E+00	?(	9.769E+00	8.87E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	6.2837E-01					1.81E+03	
			105.31	6.284E-01	(P	5.056E+00	2.38E+02	2.12E+01 G
			86.54	-1.216E+00	&	4.614E+00	1.14E+02	3.07E+01 G
HF-181	F	5.3498E-02					4.24E+01	
			482.00	-5.033E-01	?(	1.918E+00	1.13E+02	8.05E+01 G
			133.02	-2.896E-01	+	3.002E+00	3.08E+02	4.33E+01 G
			345.83	2.209E+00	?(	1.158E+01	1.55E+02	1.51E+01 G
			136.30	2.162E+00	?(	2.302E+01	3.16E+02	5.85E+00 G
Ta-182	F	-3.3363E+00					1.14E+02	
			1121.30	-3.336E+00	?(	1.034E+01	9.26E+01	3.49E+01 G
			1221.41	1.853E+00	+ P	6.315E+00	1.52E+02	2.70E+01 G
			1189.05	1.262E+00	+	9.905E+00	3.33E+02	1.62E+01 G
Hg-203	F	1.9265E-01					4.66E+01	
			279.20	1.927E-01	?(	1.471E+00	2.24E+02	8.15E+01 G
TL-208	N	6.1765E+00					6.98E+02	
			583.02	6.176E+00	(P	9.778E-01	1.06E+01	8.45E+01 G
			277.28	1.372E+01	&	1.518E+01	3.52E+01	6.31E+00 G
			860.56	9.828E+00	+	9.622E+00	4.44E+01	1.24E+01 G
pm-146	C	1.1714E+00					2.02E+03	
			747.16	1.171E+00	?(	2.678E+00	9.28E+01	3.40E+01 G
			735.72	-8.192E-01	-	5.421E+00	2.65E+02	2.25E+01 G
			453.88	4.563E-02	% P	1.569E+00	1.32E+03	6.50E+01 G
y-88	F	2.9809E-01					1.07E+02	
			898.04	2.981E-01	?(P	1.472E+00	2.05E+02	9.37E+01 G
			1836.06	0.000E+00	-	7.259E-01	1.00E+03	9.92E+01 G
Cd-113m		9.0992E+02					5.33E+03	
			263.70	9.099E+02	?(	1.709E+04	5.43E+02	6.00E-03 K
Cf-251	T	1.6062E+00					3.28E+05	
			176.60	1.606E+00	&(	4.696E+00	1.09E+02	1.70E+01 G
			227.00	5.211E+00		1.493E+01	1.06E+02	6.30E+00 GA
Cf-249	T	-6.3689E-01					1.28E+05	
			387.95	-6.369E-01	*(	2.601E+00	1.21E+02	6.60E+01 G
			333.44	-1.162E+00	+	6.258E+00	2.05E+02	1.55E+01 G
Sn-126		3.6240E+00					3.65E+07	
			87.57	1.159E+00	}	3.738E+00	5.95E+01	3.75E+01 GA
			64.28	3.624E+00	(	1.393E+01	1.15E+02	9.70E+00 G
			86.94	-4.123E+00	+	1.520E+01	1.11E+02	9.04E+00 GA

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-210   N   1.2017E+01                                      8.14E+03
                          46.54 1.202E+01  (P 2.705E+01 7.59E+01 4.25E+00 G

PB-212   N   1.7856E+01                                      6.98E+02
                         238.63 1.786E+01  (P 2.229E+00 6.12E+00 4.33E+01 G
                         300.03 3.657E+01 +   1.660E+01 2.09E+01 3.28E+00 GA

PB-214   N   1.2972E+01                                      5.84E+05
                         351.93 1.234E+01  (P 2.293E+00 1.01E+01 3.76E+01 G
                         295.09 1.421E+01  (P 4.501E+00 1.58E+01 1.93E+01 G
                         242.00-5.508E+00 -   3.464E+01 1.88E+02 7.43E+00 GA

BI-207   C   5.8600E-01                                      1.18E+04
                         569.70-3.839E-02 %(  1.546E+00 1.14E+03 9.77E+01 G
                        1063.66 1.405E+00 ?(P 1.466E+00 4.81E+01 7.45E+01 G

BI-212   N   3.2764E+01                                      6.98E+02
                         727.17 3.276E+01 @(P 1.132E+01 1.94E+01 7.55E+00 G
                         785.42 2.910E+01 ?   8.392E+01 1.17E+02 1.28E+00 GA

BI-214   N   1.3615E+01                                      5.84E+05
                         609.31 1.361E+01  (P 1.861E+00 8.77E+00 4.61E+01 G
                        1120.29 2.170E+01 + P 6.647E+00 1.79E+01 1.51E+01 G
                        1764.49 1.902E+01 +   4.523E+00 1.80E+01 1.54E+01 G

BI-210M  T  -7.2507E-01                                      1.10E+09
                         265.83-7.251E-01  (P 2.251E+00 1.42E+02 5.00E+01 G
                         304.90-1.324E+00 +   7.053E+00 1.58E+02 2.80E+01 G

AC-228   N   1.9273E+01                                      2.10E+03
                         911.07 1.927E+01  (  3.807E+00 1.26E+01 2.90E+01 G
                         968.97 4.860E+00 -   1.372E+01 8.42E+01 1.75E+01 G
                         338.32-3.271E+00 -   1.583E+01 1.44E+02 1.20E+01 G
                          93.35 5.908E+00 -   2.862E+01 1.45E+02 5.56E+00 XA

TH-227   N  -5.4879E+00                                      7.95E+03
                          50.14-5.488E+00 ?(P 1.917E+01 7.88E+01 8.00E+00 G
                         256.24-9.535E-02 %   1.365E+01 5.16E+03 7.00E+00 G

TH-229   N  -3.2482E+00                                      2.68E+06
                         193.51-3.248E+00 ?(P 2.032E+01 2.88E+02 4.40E+00 G
                         210.85-1.399E+01 &   3.890E+01 1.04E+02 2.99E+00 G

TH-234   N   2.9722E+00                                      1.63E+12
                          63.29 2.972E+00 *(P 3.274E+01 3.82E+02 3.81E+00 G
                          92.59 2.582E-01 % P 2.934E+01 3.38E+03 5.58E+00 G
```

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	-1.3586E+01					1.20E+07	
			302.65	-1.359E+01	(	6.671E+01	1.46E+02	2.88E+00 G
			300.07	-1.576E+01	+	8.167E+01	1.54E+02	2.46E+00 G
PA-234	N	4.6644E-01					1.63E+12	
			131.29	4.664E-01	(	7.409E+00	4.71E+02	1.80E+01 G
			946.02	-4.076E+00	+	1.237E+01	1.29E+02	1.34E+01 G
			569.47	-3.202E+00	+	1.719E+01	1.56E+02	8.20E+00 G
			883.24	0.000E+00	-	2.154E+01	1.00E+03	9.60E+00 G
			880.53	-7.847E+00	+	3.192E+01	1.19E+02	6.00E+00 GA
PA-234M	N	1.2520E+02					1.63E+12	
			1001.00	8.407E+01	(P	1.539E+02	5.67E+01	8.37E-01 G
			766.41	2.423E+02	?(	7.776E+02	9.55E+01	2.94E-01 G
U-235	N	3.2315E-01					2.57E+11	
			143.79	-1.453E-01	%(P	1.103E+01	2.13E+03	1.10E+01 G
			205.33	1.348E+00	&(P	1.638E+01	4.41E+02	5.01E+00 G
			163.38	-2.195E-01	% P	2.136E+01	3.30E+03	5.08E+00 G
AM-241	T	1.0262E+00					1.58E+05	
			59.54	1.026E+00	?(	3.267E+00	1.12E+02	3.59E+01 G
Np-237	F	2.4843E+00					2.14E+06	
			86.49	2.484E+00	&(	1.324E+01	1.60E+02	1.31E+01 G
Ir-192	F	5.3818E-01					7.40E+01	
			316.49	3.851E-01	?(	1.328E+00	1.02E+02	8.70E+01 G
			468.06	7.956E-01	&(	2.791E+00	1.04E+02	5.18E+01 G
			308.44	0.000E+00	-	6.428E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.3932E-01					1.30E+01	
			818.50	3.650E-01	?(	1.411E+00	1.12E+02	1.00E+02 G
			1048.07	3.072E-01	&(	1.594E+00	1.46E+02	8.00E+01 G
			340.57	-8.438E-01	+	3.950E+00	1.39E+02	4.69E+01 G
Np-239	T	-1.1704E+00					2.36E+00	
			103.70	1.024E+00	&	4.334E+00	1.26E+02	2.40E+01 X
			106.13	-1.170E+00	?(	4.854E+00	1.24E+02	2.27E+01 G
			99.50	-4.668E-01	+	6.783E+00	4.28E+02	1.50E+01 X
Nd-147		1.2227E-01					1.11E+01	
			531.00	-2.183E+00	?(	9.175E+00	1.66E+02	1.30E+01 G
			91.10	1.181E+00	?(	5.828E+00	1.48E+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 Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	192.	-19.	-0.011	78.76	-5.488E+00	P
AM-241	59.54	177.	20.	0.011	112.39	1.026E+00	
TH-234	63.29	232.	7.	0.004	382.43	2.972E+00	P
BA-133	80.99	217.	-11.	-0.006	201.20	-4.549E-01	P
EU-155	86.54	493.	-28.	-0.016	113.76	-1.216E+00	
Nd-147	91.10	703.	26.	0.014	147.82	1.181E+00	
Gd-153	97.50	254.	6.	0.003	388.72	2.486E-01	
Np-239	99.50	274.	-5.	-0.003	428.14	-4.668E-01	
Gd-153	103.20	272.	19.	0.011	122.18	1.127E+00	
Np-239	103.70	291.	19.	0.011	126.24	1.024E+00	
EU-155	105.31	311.	11.	0.006	238.46	6.284E-01	P
Np-239	106.13	330.	-21.	-0.012	123.89	-1.170E+00	
EU-152	121.78	267.	-21.	-0.012	119.71	-9.354E-01	P
EU-154	123.10	237.	20.	0.011	109.25	6.336E-01	
HF-181	133.02	438.	-10.	-0.005	307.75	-2.896E-01	
HF-181	136.30	462.	10.	0.005	316.21	2.162E+00	
CE-141	145.44	157.	4.	0.002	516.25	1.211E-01	
Ba-140	162.66	276.	-10.	-0.006	245.39	-2.396E+00	P
CE-139	165.85	280.	-14.	-0.007	177.24	-2.424E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	176.60	117.	18.	0.010	108.50	1.606E+00	
TH-229	193.51	128.	-9.	-0.005	287.70	-3.248E+00	P
U-235	205.33	97.	4.	0.002	441.15	1.348E+00	P
TH-229	210.85	193.	-24.	-0.013	103.92	-1.399E+01	
Cf-251	227.00	110.	18.	0.010	106.33	5.211E+00	
Cd-113m	263.70	103.	3.	0.001	542.56	9.099E+02	
BI-210M	265.83	124.	-18.	-0.010	142.16	-7.251E-01	P
Hg-203	279.20	131.	7.	0.004	223.51	1.927E-01	
I-131	284.30	73.	6.	0.003	286.41	2.000E+00	P
PA-231	300.07	341.	-17.	-0.010	154.39	-1.576E+01	
PA-233	300.18	324.	-17.	-0.010	150.52	-6.255E+00	
PA-231	302.65	307.	-17.	-0.010	146.24	-1.359E+01	
BA-133	302.85	290.	-17.	-0.010	142.17	-2.136E+00	
Ba-140	304.85	304.	-17.	-0.010	145.20	-9.193E+00	
BI-210M	304.90	321.	-16.	-0.009	158.49	-1.324E+00	
Ir-192	316.49	99.	14.	0.008	102.36	3.851E-01	
CR-51	320.08	144.	-16.	-0.009	106.68	-3.912E+00	
La-140	328.76	81.	10.	0.006	165.56	1.237E+00	
Cf-249	333.44	62.	-7.	-0.004	204.77	-1.162E+00	
Cs-136	340.57	235.	-16.	-0.009	139.17	-8.438E-01	
EU-152	344.29	191.	14.	0.008	140.94	1.343E+00	
HF-181	345.83	202.	13.	0.007	155.32	2.209E+00	
BA-133	356.00	276.	13.	0.007	179.06	5.540E-01	
I-131	364.48	52.	-4.	-0.002	416.80	-1.417E-01	P
BA-133	383.84	146.	-16.	-0.009	106.49	-5.057E+00	
Cf-249	387.95	162.	-15.	-0.008	121.29	-6.369E-01	
SN-113	391.69	173.	15.	0.008	124.85	6.632E-01	
SB-125	427.88	37.	5.	0.003	216.78	5.386E-01	
AG-108M	433.94	33.	9.	0.005	123.98	3.007E-01	
SB-125	463.37	66.	12.	0.007	98.97	3.697E+00	P
Ir-192	468.06	82.	13.	0.007	103.88	7.956E-01	
BE-7	477.60	57.	6.	0.004	172.72	1.963E+00	
HF-181	482.00	90.	-12.	-0.007	112.64	-5.033E-01	
La-140	487.02	44.	-3.	-0.002	436.74	-2.184E-01	
RU-103	497.05	52.	-5.	-0.003	285.89	-1.852E-01	
RH-106	511.86	41.	62.	0.034	29.16	1.067E+01	P
Nd-147	531.00	44.	-8.	-0.004	166.15	-2.183E+00	
Ba-140	537.26	20.	10.	0.005	97.03	1.405E+00	
SB-125	600.50	270.	10.	0.006	234.25	2.195E+00	
RU-103	610.30	283.	3.	0.002	826.78	1.990E+00	
RH-106	621.92	35.	-6.	-0.003	225.44	-2.517E+00	P
SB-125	635.89	50.	-7.	-0.004	147.77	-2.536E+00	
I-131	636.97	52.	2.	0.001	514.78	1.145E+00	
AG-110M	657.76	40.	5.	0.003	184.39	2.224E-01	
CS-137	661.66	47.	1.	0.001	974.68	4.965E-02	
PM-144	696.54	39.	-5.	-0.003	266.56	-2.345E-01	P
NB-94	702.63	52.	-15.	-0.008	92.43	-6.901E-01	P
AG-108M	722.94	113.	-10.	-0.005	157.04	-4.885E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
pm-146	735.72	26.	-4.	-0.002	264.97	-8.192E-01		
pm-146	747.16	13.	9.	0.005	92.76	1.171E+00		
ZR-95	756.73	39.	-7.	-0.004	185.99	-6.059E-01		
AG-110M	763.94	94.	-21.	-0.011	70.18	-4.376E+00		
NB-95	765.79	112.	-21.	-0.011	51.34	-9.851E-01		P
PA-234M	766.41	94.	15.	0.008	95.46	2.423E+02		
EU-152	778.92	26.	3.	0.002	351.72	1.119E+00		
CO-58	810.77	57.	-10.	-0.006	104.51	-5.099E-01		P
Cs-136	818.50	30.	7.	0.004	112.30	3.650E-01		
MN-54	834.85	24.	-5.	-0.003	236.96	-2.297E-01		P
NB-94	871.10	40.	-14.	-0.008	69.01	-7.404E-01		
EU-154	873.23	50.	2.	0.001	505.29	8.623E-01		
Sc-46	889.28	61.	1.	0.001	835.16	7.165E-02		
y-88	898.04	24.	5.	0.003	204.59	2.981E-01		P
AG-110M	937.49	47.	-17.	-0.010	87.03	-2.828E+00		
EU-152	964.11	55.	15.	0.008	75.90	5.773E+00		
EU-154	996.33	10.	6.	0.003	88.70	3.202E+00		
PA-234M	1001.00	17.	12.	0.007	56.71	8.407E+01		P
EU-154	1004.77	102.	-16.	-0.009	92.76	-5.281E+00		
Cs-136	1048.07	15.	4.	0.002	145.77	3.072E-01		
RH-106	1050.36	17.	8.	0.005	79.34	3.230E+01		
BI-207	1063.66	10.	17.	0.009	48.15	1.405E+00		P
Ga-68	1077.40	35.	-5.	-0.003	263.94	-1.119E+01		
FE-59	1099.25	5.	3.	0.002	180.15	3.285E-01		P
EU-152	1112.07	126.	-16.	-0.009	103.89	-7.445E+00		
ZN-65	1115.55	110.	-7.	-0.004	208.17	-9.264E-01		
Ta-182	1121.30	129.	-18.	-0.010	92.58	-3.336E+00		
CO-60	1173.24	31.	-7.	-0.004	133.86	-4.598E-01		P
Ta-182	1189.05	20.	3.	0.002	332.78	1.262E+00		
Ta-182	1221.41	22.	7.	0.004	151.54	1.853E+00		P
NA-22	1274.53	21.	4.	0.002	185.64	2.647E-01		
FE-59	1291.60	11.	9.	0.005	90.32	1.502E+00		P
CO-60	1332.50	27.	-5.	-0.003	151.72	-4.012E-01		P
AG-110M	1384.30	11.	-3.	-0.001	285.04	-8.480E-01		
La-140	1596.21	17.	-7.	-0.004	246.64	-6.757E-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	1.9632E+00	1.9632E+00	1.727E+02%	1.17E+01
NA-22	#A	2.6470E-01	2.6470E-01	1.856E+02%	1.75E+00
K-40		2.4453E+02	2.4453E+02	5.652E+00%	9.89E+00
Sc-46	#A	7.1649E-02	7.1649E-02	8.352E+02%	2.11E+00
CR-51	#A	-3.9118E+00	-3.9119E+00	1.067E+02%	1.40E+01

MN-54	#A	-2.2974E-01	-2.2974E-01	2.370E+02%	1.29E+00
FE-59	#A	8.3676E-01	8.3677E-01	9.032E+01%	1.50E+00
Co-56	#C	1.3883E+00	1.3883E+00	3.293E+01%	9.04E-01
CO-57	#A	-2.5919E-03	-2.5919E-03	1.444E+04%	1.21E+00
CO-58	#A	-5.0987E-01	-5.0987E-01	1.045E+02%	1.90E+00
CO-60	#A	-4.0116E-01	-4.0116E-01	1.517E+02%	2.03E+00
ZN-65	#A	-9.2638E-01	-9.2638E-01	2.082E+02%	6.60E+00
NB-94	#A	-6.9012E-01	-6.9012E-01	9.243E+01%	1.65E+00
ZR-95	#A	-6.0590E-01	-6.0590E-01	1.860E+02%	2.75E+00
NB-95	#A	-9.8504E-01	-9.8505E-01	5.134E+01%	2.48E+00
RU-103	#A	-1.8515E-01	-1.8515E-01	2.859E+02%	1.34E+00
RH-106	#A	2.2101E+00	2.2102E+00	7.934E+01%	1.23E+01
AG-108M	#A	3.0066E-01	3.0066E-01	1.240E+02%	9.85E-01
AG-110M	#A	1.2582E-01	1.2582E-01	1.844E+02%	2.85E+00
SN-113	#A	6.6316E-01	6.6316E-01	1.249E+02%	2.79E+00
SB-124	A	5.8984E-01	5.8984E-01	3.780E+01%	3.23E+00
SB-125	#A	1.6202E+00	1.6202E+00	9.897E+01%	3.12E+00
I-131	#A	9.3785E-02	9.3792E-02	2.405E+02%	1.18E+00
Gd-153	#A	6.1839E-01	6.1839E-01	1.222E+02%	3.28E+00
Ga-68	#A	-1.1062E+01	-1.1193E+01	2.639E+02%	6.78E+01
Tc-99m	#A	1.2726E-02	1.2755E-02	3.182E+03%	1.38E+00
BA-133	#A	5.5399E-01	5.5399E-01	1.791E+02%	3.34E+00
CS-134	#A	6.9836E-01	6.9836E-01	9.061E+01%	3.21E+00
CS-137	#A	4.9648E-02	4.9648E-02	9.747E+02%	1.72E+00
CE-139	#A	-2.4242E-01	-2.4242E-01	1.772E+02%	1.45E+00
Ba-140	#A	1.4051E+00	1.4052E+00	9.703E+01%	3.46E+00
La-140	#A	-3.4003E-01	-3.4004E-01	1.485E+02%	2.02E+00
CE-141	#A	1.2109E-01	1.2109E-01	5.162E+02%	1.71E+00
CE-144	A	2.1668E+00	2.1668E+00	1.564E+02%	1.14E+01
PM-144	#A	-2.3446E-01	-2.3446E-01	2.666E+02%	1.42E+00
EU-152	#A	2.4862E+00	2.4862E+00	7.590E+01%	6.38E+00
EU-154	#A	1.1054E+00	1.1054E+00	8.870E+01%	1.54E+01
EU-155	#A	6.2837E-01	6.2837E-01	2.385E+02%	5.06E+00
HF-181	#A	5.3497E-02	5.3498E-02	1.126E+02%	1.92E+00
Ta-182	#A	-3.3362E+00	-3.3363E+00	9.258E+01%	1.03E+01
Hg-203	#A	1.9265E-01	1.9265E-01	2.235E+02%	1.47E+00
TL-208		6.1765E+00	6.1765E+00	1.059E+01%	9.78E-01
pm-146	#A	1.1714E+00	1.1714E+00	9.276E+01%	2.68E+00
y-88	#A	2.9809E-01	2.9809E-01	2.046E+02%	1.47E+00
Cd-113m	#A	9.0992E+02	9.0992E+02	5.426E+02%	1.71E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.49E+01
Cf-251	#A	1.6062E+00	1.6062E+00	1.085E+02%	4.70E+00
Cf-249	#A	-6.3689E-01	-6.3689E-01	1.213E+02%	2.60E+00
Sn-126	A	3.6240E+00	3.6240E+00	1.148E+02%	1.39E+01
PB-210	A	1.2017E+01	1.2017E+01	7.588E+01%	2.70E+01
PB-212		1.7856E+01	1.7856E+01	6.122E+00%	2.23E+00
PB-214		1.2972E+01	1.2972E+01	9.380E+00%	2.29E+00
BI-207	#A	5.8600E-01	5.8600E-01	4.815E+01%	1.55E+00
BI-212	#	3.2764E+01	3.2764E+01	1.940E+01%	1.13E+01

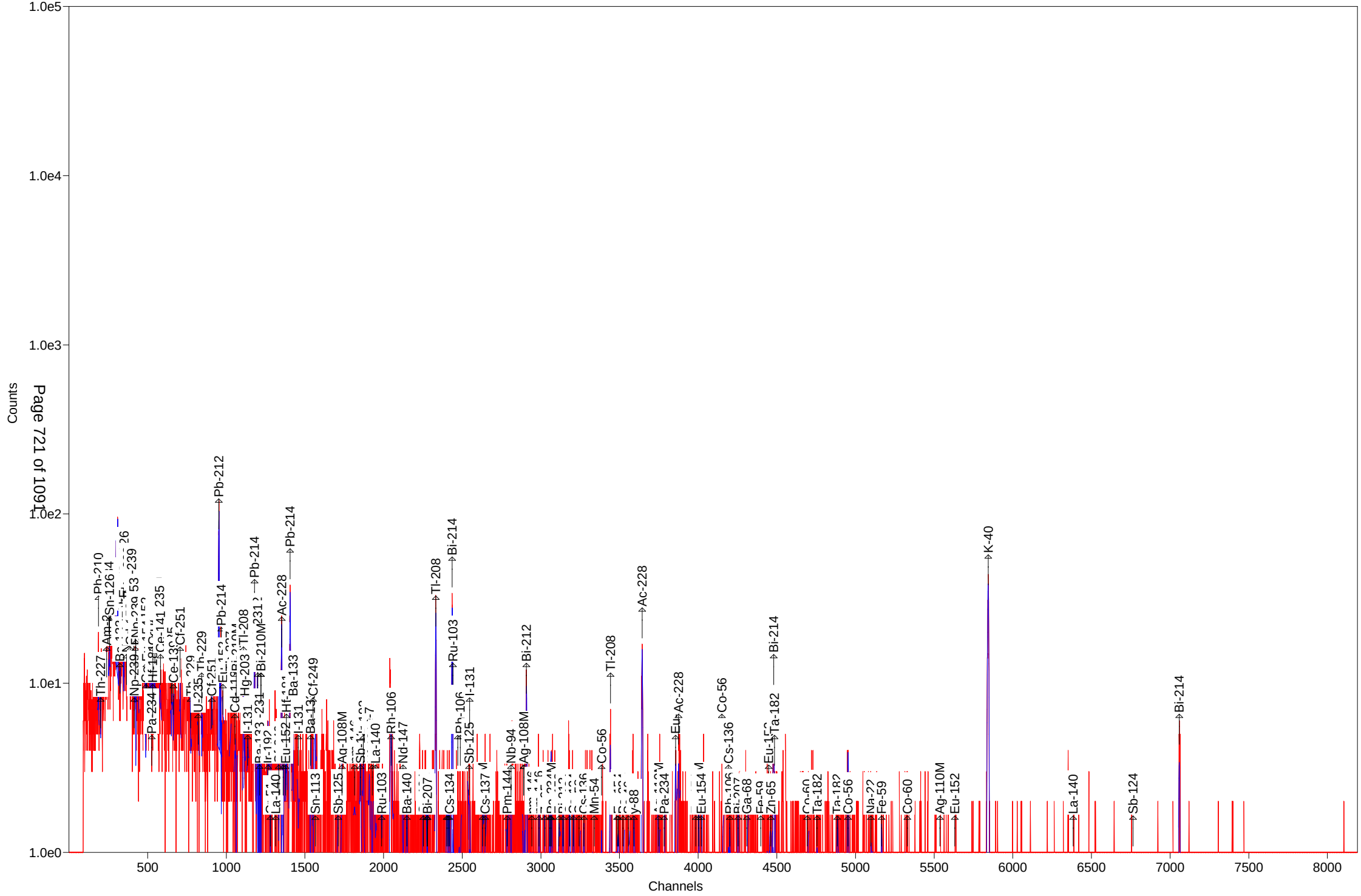
BI-214	1.3615E+01	1.3615E+01	8.775E+00%	1.86E+00
BI-210M#A	-7.2507E-01	-7.2507E-01	1.422E+02%	2.25E+00
AC-228 #	1.9273E+01	1.9273E+01	1.259E+01%	3.81E+00
TH-227 #A	-5.4879E+00	-5.4879E+00	7.876E+01%	1.92E+01
TH-229 #A	-3.2482E+00	-3.2482E+00	2.877E+02%	2.03E+01
TH-234 #A	2.9722E+00	2.9722E+00	3.824E+02%	3.27E+01
PA-231 #A	-1.3586E+01	-1.3586E+01	1.462E+02%	6.67E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.72E+00
PA-234 A	4.6644E-01	4.6644E-01	4.711E+02%	7.41E+00
PA-234M#A	1.2520E+02	1.2520E+02	5.552E+01%	1.54E+02
U-235 #A	3.2315E-01	3.2315E-01	4.411E+02%	1.10E+01
AM-241 #A	1.0262E+00	1.0262E+00	1.124E+02%	3.27E+00
Np-237 A	2.4843E+00	2.4843E+00	1.596E+02%	1.32E+01
Ir-192 #A	5.3817E-01	5.3818E-01	7.292E+01%	1.33E+00
Cs-136 #A	3.3931E-01	3.3932E-01	9.201E+01%	1.41E+00
Np-239 #A	-1.1701E+00	-1.1704E+00	1.239E+02%	4.85E+00
Nd-147 #A	1.2226E-01	1.2227E-01	1.112E+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) 3.279E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.2791162E+02 Bq/Sample

264540_Gamma_160-18553-A-13-B. 14_Gamma_20162254.spc.



Test America St. Louis Spectrum ID: 13_Gamma_20160736

Sample Description: 264540_Gamma_160-18553-A-14-B
Detector: Detector #13
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-14-B

Decay to Time: 9/1/2016 16:09 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:09:42 Real Time: 1805 sec
Analysis Time: 9/1/2016 16:40 Dead Time: 0.26 %
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	-2.483E+00	158.8	3.943E+00	3.945E+00	1.336E+01
NA-22	-9.875E-01	52.2	5.154E-01	5.177E-01	1.669E+00
K-40	2.358E+02	4.8	1.141E+01	1.661E+01	8.726E+00
Sc-46	6.128E-03	6992.8	4.285E-01	4.285E-01	1.511E+00
CR-51	2.903E+00	207.2	6.014E+00	6.016E+00	2.014E+01
MN-54	-4.203E-01	132.7	5.578E-01	5.582E-01	1.249E+00
FE-59	4.094E-01	224.3	9.183E-01	9.185E-01	2.055E+00
Co-56	8.902E-01	35.4	3.155E-01	3.188E-01	6.180E-01
CO-57	6.585E-02	333.3	2.195E-01	2.195E-01	9.150E-01
CO-58	6.885E-02	595.8	4.102E-01	4.102E-01	1.435E+00
CO-60	2.698E-02	1513.9	4.085E-01	4.085E-01	9.685E-01
ZN-65	-1.847E+00	85.1	1.571E+00	1.574E+00	5.242E+00
NB-94	-3.136E-02	1394.0	4.372E-01	4.372E-01	1.522E+00
ZR-95	-3.578E-01	274.8	9.833E-01	9.835E-01	2.223E+00
NB-95	-4.044E-01	131.2	5.307E-01	5.311E-01	1.796E+00
RU-103	-2.233E-01	139.0	3.104E-01	3.106E-01	9.855E-01
RH-106	4.634E+00	164.2	7.609E+00	7.612E+00	2.555E+01
AG-108M	2.767E-01	101.7	2.814E-01	2.818E-01	6.838E-01
AG-110M	0.000E+00	1.#INF	1.745E-01	1.745E-01	2.058E+00
SN-113	-7.138E-01	108.5	7.748E-01	7.756E-01	2.332E+00
SB-124	-4.919E-02	37.8	1.859E-02	1.877E-02	2.749E+00
SB-125	1.335E+00	69.6	9.291E-01	9.316E-01	2.895E+00
I-131	2.061E-01	137.3	2.830E-01	2.832E-01	9.644E-01
Gd-153	-1.314E+00	165.2	2.169E+00	2.171E+00	7.207E+00
Ga-68	-1.009E+00	1764.9	1.781E+01	1.781E+01	4.052E+01
Tc-99m	4.001E-02	1286.2	5.146E-01	5.146E-01	1.727E+00
BA-133	-6.808E-01	132.5	9.023E-01	9.030E-01	3.017E+00
CS-134	2.531E-01	90.7	2.297E-01	2.300E-01	2.715E+00
CS-137	2.399E-01	206.8	4.961E-01	4.963E-01	1.700E+00
CE-139	7.156E-02	468.9	3.355E-01	3.356E-01	1.138E+00
Ba-140	1.303E+00	59.0	7.683E-01	7.713E-01	3.576E+00
La-140	-2.705E-01	135.0	3.652E-01	3.655E-01	1.606E+00
CE-141	-6.683E-01	72.2	4.824E-01	4.836E-01	1.882E+00

CE-144	0.000E+00	1.#INF	1.405E+00	1.405E+00	1.325E+01
PM-144	-2.567E-01	163.2	4.190E-01	4.193E-01	1.433E+00
EU-152	1.590E+00	162.0	2.575E+00	2.576E+00	6.812E+00
EU-154	1.161E+00	86.6	1.006E+00	1.008E+00	1.031E+01
EU-155	0.000E+00	1.#INF	8.059E-01	8.059E-01	1.034E+01
HF-181	4.701E-01	97.9	4.605E-01	4.611E-01	1.546E+00
Ta-182	5.227E-01	41.1	2.147E-01	2.163E-01	6.978E+00
Hg-203	2.318E-01	142.3	3.299E-01	3.302E-01	1.117E+00
TL-208	5.067E+00	9.9	5.041E-01	5.685E-01	8.304E-01
pm-146	4.036E-01	133.4	5.383E-01	5.387E-01	2.888E+00
y-88	-5.724E-01	88.0	5.038E-01	5.046E-01	1.479E+00
Cd-113m	2.982E+03	209.4	6.245E+03	6.248E+03	2.106E+04
Cd-109	0.000E+00	1.#INF	1.775E+01	1.775E+01	5.897E+01
Cf-251	2.035E-01	906.2	1.844E+00	1.844E+00	4.565E+00
Cf-249	3.897E-01	158.6	6.180E-01	6.183E-01	1.885E+00
Sn-126	4.040E+00	111.5	4.503E+00	4.508E+00	1.501E+01
PB-210	1.197E+01	92.0	1.101E+01	1.104E+01	3.672E+01
PB-212	1.560E+01	5.6	8.795E-01	1.339E+00	1.784E+00
PB-214	1.253E+01	7.6	9.541E-01	1.155E+00	2.034E+00
BI-207	4.806E-01	37.5	1.801E-01	1.818E-01	1.028E+00
BI-212	3.186E+01	13.3	4.231E+00	4.543E+00	5.333E+00
BI-214	1.258E+01	9.4	1.178E+00	1.347E+00	1.854E+00
BI-210M	-7.623E-01	167.8	1.279E+00	1.280E+00	2.736E+00
AC-228	1.796E+01	7.6	1.368E+00	1.646E+00	2.453E+00
TH-227	-6.331E-01	932.1	5.901E+00	5.901E+00	2.002E+01
TH-229	4.178E+00	156.6	6.543E+00	6.551E+00	1.611E+01
TH-234	4.980E+00	96.1	4.786E+00	4.793E+00	3.785E+01
PA-231	2.767E+00	403.7	1.117E+01	1.117E+01	7.046E+01
PA-233	7.760E-01	208.6	1.619E+00	1.620E+00	5.425E+00
PA-234	4.972E-01	74.4	3.698E-01	3.707E-01	7.995E+00
PA-234M	7.355E-01	67.0	4.926E-01	4.940E-01	2.077E+02
U-235	2.493E+00	84.5	2.108E+00	2.112E+00	7.012E+00
AM-241	-5.144E-01	177.9	9.149E-01	9.153E-01	4.123E+00
Np-237	-2.752E+00	176.3	4.853E+00	4.855E+00	1.613E+01
Ir-192	4.483E-01	115.9	5.194E-01	5.201E-01	2.297E+00
Cs-136	2.354E-01	34.6	8.146E-02	8.257E-02	1.648E+00
Np-239	1.654E+00	168.5	2.788E+00	2.790E+00	9.263E+00
Nd-147	1.597E+00	148.3	2.368E+00	2.370E+00	5.776E+00
Total	3.368E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-14-B

Spectrum Filename: C:\User\SPC\Det13\13_Gamma_20160736.An1

Acquisition information
Start time: 9/1/2016 4:09:42 PM
Live time: 1800
Real time: 1805
Dead time: 0.26 %
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 4:09:00 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. 30 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1042

***** 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	25.	92.03	1.02	2.705E-02	46.54	4.250	PBC<MDA	PB210
63.64	17.	185.13	1.03	4.068E-02	63.29	3.810	PBC<MDA	TH234
64.28	29.	111.46	1.03	4.135E-02	64.28	9.700	PBC<MDA	Sn126
74.89	170.	15.41	1.04	4.736E-02				
77.10	327.	8.55	1.05	4.837E-02				
87.40	82.	28.30	1.06	5.213E-02	86.94	9.040	9.747E+00	Sn126
					87.57	37.500	2.342E+00	Sn126
89.99	68.	26.41	0.76	5.277E-02				
92.42	23.	96.11	1.06	5.337E-02	92.59	5.584	PBC<MDA	TH234
106.13	37.	168.54	1.07	5.524E-02	106.13	22.700	PBC<MDA	Np239
123.10	28.	86.64	1.09	5.523E-02	123.10	40.790	PBC<MDA	EU154
136.67	10.	413.27	1.10	5.395E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.006E+00	CO57
143.79	26.	84.55	1.11	5.293E-02	143.79	10.960	PBC<MDA	U235
165.85	5.	468.86	1.13	5.020E-02	165.85	79.900	PBC<MDA	CE139
176.60	3.	906.15	1.14	4.817E-02	176.60	17.000	PBC<MDA	Cf251
193.51	15.	156.58	1.16	4.533E-02	193.51	4.400	PBC<MDA	TH229
227.00	15.	165.06	1.19	4.071E-02	227.00	6.300	PBC<MDA	Cf251
238.61	430.	8.43	1.17	3.935E-02	238.63	43.300	1.401E+01	PB212
241.99	105.	16.98	1.20	3.897E-02	242.00	7.430	2.008E+01	PB214
244.69	24.	175.74	1.20	3.868E-02	244.69	7.580	PBC<MDA	EU152
263.70	12.	209.43	1.22	3.674E-02	263.70	0.006	PBC<MDA	Cd113m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
270.49	72.	22.57	1.44	3.610E-02				
277.40	35.	36.09	1.23	3.549E-02	277.28	6.310	PBC<MDA	TL208
279.32	12.	142.31	1.23	3.532E-02	279.20	81.460	PBC<MDA	Hg203
284.30	7.	270.93	1.24	3.488E-02	284.30	6.140	PBC<MDA	I131
295.32	170.	13.56	1.28	3.397E-02	295.09	19.300	1.439E+01	PB214
300.07	9.	403.66	1.25	3.359E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.007E+00	PA231
					300.18	6.200	2.384E+00	PA233
300.23	45.	26.91	1.25	3.360E-02	300.03	3.280	2.271E+01	PB212
					300.07	2.460	3.028E+01	PA231
					300.18	6.200	1.202E+01	PA233
305.05	15.	58.97	1.26	3.322E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	8.999E-01	BI210M
308.44	18.	192.63	1.26	3.295E-02	308.44	31.750	PBC<MDA	Ir192
312.01	16.	208.64	1.26	3.269E-02	312.01	36.000	PBC<MDA	PA233
316.49	18.	197.34	1.27	3.236E-02	316.49	87.040	PBC<MDA	Ir192
320.08	17.	207.16	1.27	3.211E-02	320.08	9.940	PBC<MDA	CR51
328.76	17.	164.13	1.28	3.151E-02	328.76	20.300	PBC<MDA	La140
333.44	18.	158.56	1.28	3.120E-02	333.44	15.510	PBC<MDA	Cf249
338.25	119.	14.58	0.95	3.088E-02	338.32	12.010	1.784E+01	AC228
340.57	18.	161.25	1.29	3.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	5.	579.44	1.29	3.050E-02	344.29	26.500	PBC<MDA	EU152
352.13	254.	9.75	1.25	3.002E-02	351.93	37.600	1.251E+01	PB214
383.84	11.	165.43	1.33	2.823E-02	383.84	8.940	PBC<MDA	BA133
427.88	3.	551.60	1.37	2.611E-02	427.88	29.600	PBC<MDA	SB125
433.94	12.	101.72	1.37	2.585E-02	433.94	90.480	PBC<MDA	AG108M
453.88	7.	195.69	1.39	2.502E-02	453.88	65.000	PBC<MDA	pm146
463.37	14.	113.84	1.40	2.465E-02	463.37	10.470	PBC<MDA	SB125
468.06	7.	211.55	1.40	2.447E-02	468.06	51.750	PBC<MDA	Ir192
482.00	16.	97.95	1.42	2.395E-02	482.00	80.500	PBC<MDA	HF181
511.86	153.	12.94	2.69	2.292E-02	511.86	20.000	1.855E+01	RH106
531.00	8.	148.32	1.46	2.230E-02	531.00	13.000	PBC<MDA	Nd147
536.95	5.	303.35	1.46	2.211E-02	537.26	24.390	PBC<MDA	Ba140
563.24	10.	122.72	1.49	2.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	310.91	1.49	2.118E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.596E-01	PA234
					569.70	97.740	8.053E-02	BI207
569.47	5.	176.56	1.49	2.118E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.706E+00	PA234
					569.70	97.740	1.432E-01	BI207
583.25	160.	9.95	1.36	2.081E-02	583.02	84.500	5.067E+00	TL208
609.26	210.	9.36	1.28	2.014E-02	609.31	46.090	1.258E+01	BI214
					610.30	5.750	1.010E+02	RU103
621.92	16.	164.19	1.54	1.983E-02	621.92	9.930	PBC<MDA	RH106
635.89	11.	69.59	1.55	1.951E-02	635.89	11.310	PBC<MDA	SB125
636.97	7.	137.33	1.55	1.948E-02	636.97	7.170	PBC<MDA	I131
661.66	7.	206.80	1.57	1.893E-02	661.66	85.210	PBC<MDA	CS137
727.39	76.	13.28	1.59	1.763E-02	727.17	7.550	3.186E+01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
747.16	7.	181.31	1.64	1.727E-02	747.16	34.000	PBC<MDA	pm146
766.41	14.	90.94	1.66	1.694E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.575E+02	PA234M
785.33	3.	432.25	1.67	1.663E-02	785.42	1.280	PBC<MDA	BI212
801.95	12.	90.72	1.69	1.636E-02	801.95	8.690	PBC<MDA	CS134
810.78	2.	595.82	1.69	1.623E-02	810.78	99.460	PBC<MDA	CO58
846.77	24.	35.44	1.72	1.569E-02	846.77	99.935	8.501E-01	Co56
860.60	14.	91.31	1.73	1.550E-02	860.56	12.420	PBC<MDA	TL208
880.53	14.	80.57	1.75	1.523E-02	880.53	6.000	PBC<MDA	PA234
911.21	142.	10.36	1.87	1.483E-02	911.07	29.000	1.831E+01	AC228
946.02	10.	96.14	1.80	1.441E-02	946.02	13.400	PBC<MDA	PA234
964.11	9.	161.95	1.82	1.419E-02	964.11	14.605	PBC<MDA	EU152
969.14	78.	14.22	2.21	1.414E-02	968.97	17.460	1.744E+01	AC228
1004.77	14.	87.94	1.85	1.374E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	4.	325.32	1.88	1.340E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	20.	34.61	1.88	1.330E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	24.	37.47	1.90	1.315E-02	1063.66	74.500	1.369E+00	BI207
1099.25	5.	224.30	1.92	1.281E-02	1099.25	56.500	PBC<MDA	FE59
1120.36	57.	18.95	1.57	1.262E-02	1120.29	15.100	1.660E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	22.	41.08	2.02	1.179E-02	1221.41	27.000	3.926E+00	Ta182
1238.28	6.	263.82	2.03	1.166E-02	1238.28	66.070	PBC<MDA	Co56
1408.00	1.	777.68	2.16	1.052E-02	1408.00	21.005	PBC<MDA	EU152
1460.89	462.	4.84	1.94	1.021E-02	1460.83	10.670	2.358E+02	K40
1690.98	7.	37.80	2.35	9.068E-03	1690.98	47.790	PBC<MDA	SB124
1764.70	42.	16.48	2.40	8.758E-03	1764.49	15.400	1.737E+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	
299.26	74.89	258.	170.	3.587E+03	15.41	1.045	-	sD
308.11	77.10	227.	327.	6.757E+03	8.55	1.047	-	sD
358.95	89.99	177.	73.	1.390E+03	28.20	1.059	-	sD
1081.39	270.49	48.	72.	1.994E+03	22.57	1.439	-	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	247.	25.	0.014	92.03	1.018s
TH-227	200.32	50.14	331.	-3.	-0.002	932.08	1.021s
AM-241	237.89	59.54	448.	-13.	-0.007	177.88	1.030s
TH-234	252.89	63.29	488.	17.	0.009	185.13	1.034s
Sn-126	256.85	64.28	514.	29.	0.016	111.46	1.035
BA-133	323.66	80.99	1217.	-25.	-0.014	126.58	1.051s
Np-237	345.65	86.49	1741.	-34.	-0.019	176.30	1.056
EU-155	345.86	86.54	2059.	-38.	-0.021	169.07	1.056s
Sn-126	347.45	86.94	2021.	-38.	-0.021	167.47	1.056
Sn-126	349.97	87.57	1839.	82.	0.046	28.30	1.057D
Cd-109	351.85	88.04	1983.	0.	0.000	165.71	1.057A
Nd-147	364.09	91.10	1877.	-38.	-0.021	160.84	1.060D
TH-234	370.04	92.59	225.	23.	0.013	96.11	1.061D
AC-228	373.08	93.35	1965.	-38.	-0.021	164.19	1.062s
Gd-153	389.67	97.50	2003.	-39.	-0.021	165.16	1.066s
Np-239	397.67	99.50	2041.	-39.	-0.021	166.43	1.068s
Gd-153	412.46	103.20	2080.	-39.	-0.021	167.47	1.071s
Np-239	414.46	103.70	2119.	-11.	-0.006	576.42	1.072s
EU-155	420.91	105.31	2130.	0.	0.000	1000.00	1.074s
Np-239	424.18	106.13	1961.	37.	0.021	168.54	1.074s
EU-152	486.74	121.78	246.	-30.	-0.016	77.31	1.089s
CO-57	487.88	122.06	261.	-4.	-0.002	523.08	1.089s
EU-154	492.03	123.10	277.	28.	0.015	86.64	1.090s
PA-234	524.80	131.29	884.	-33.	-0.018	96.81	1.098s
HF-181	531.71	133.02	884.	-30.	-0.017	142.66	1.100s
CE-144	533.77	133.54	914.	0.	0.000	1000.00	1.100s
HF-181	544.81	136.30	914.	0.	0.000	1000.00	1.103s
CO-57	545.50	136.47	924.	10.	0.006	413.27	1.103s
U-235	574.74	143.79	229.	26.	0.014	84.55	1.110s
CE-141	581.36	145.44	319.	-31.	-0.017	72.18	1.111s
Ba-140	650.21	162.66	325.	-5.	-0.003	511.86	1.127s
U-235	653.08	163.38	330.	0.	0.000	1000.00	1.128s
CE-139	662.98	165.85	291.	5.	0.003	468.86	1.130
Cf-251	705.95	176.60	192.	3.	0.002	906.15	1.140s
TH-229	773.56	193.51	140.	15.	0.008	156.58	1.156s
U-235	820.84	205.33	184.	-23.	-0.013	94.41	1.167s
TH-229	842.90	210.85	216.	-19.	-0.011	114.14	1.172s
Cf-251	907.48	227.00	156.	15.	0.008	165.06	1.186s
PB-212	953.99	238.63	125.	478.	0.266	5.64	1.197D
PB-214	967.44	242.00	105.	105.	0.058	16.98	1.200D
EU-152	978.22	244.69	870.	24.	0.013	175.74	1.203s
TH-227	1024.40	256.24	132.	-5.	-0.003	452.11	1.213
Cd-113m	1054.23	263.70	301.	12.	0.007	209.43	1.220s
BI-210M	1062.75	265.83	351.	-25.	-0.014	167.76	1.222s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.54	277.28	64.	35.	0.020	36.09	1.232D
Hg-203	1116.21	279.20	140.	12.	0.007	142.31	1.234s
I-131	1136.60	284.30	92.	7.	0.004	270.93	1.239s
PB-214	1179.75	295.09	75.	148.	0.082	11.71	1.249D
PB-212	1199.51	300.03	51.	45.	0.025	26.91	1.253D
PA-231	1199.67	300.07	646.	9.	0.005	403.66	1.253s
PA-233	1200.11	300.18	655.	0.	0.000	1000.00	1.253s
PA-231	1209.98	302.65	655.	0.	0.000	1000.00	1.255s
BA-133	1210.79	302.85	655.	0.	0.000	1000.00	1.256s
Ba-140	1218.78	304.85	32.	15.	0.008	58.97	1.257D
BI-210M	1218.97	304.90	655.	0.	0.000	1000.00	1.257s
Ir-192	1233.14	308.44	561.	18.	0.010	192.63	1.261s
PA-233	1247.42	312.01	580.	16.	0.009	208.64	1.264s
Ir-192	1265.33	316.49	596.	18.	0.010	197.34	1.268s
CR-51	1279.70	320.08	588.	17.	0.009	207.16	1.271s
La-140	1314.40	328.76	374.	17.	0.009	164.13	1.279
Cf-249	1333.11	333.44	391.	18.	0.010	158.56	1.283s
AC-228	1352.33	338.25	46.	119.	0.066	14.58	0.951s
Cs-136	1361.62	340.57	409.	18.	0.010	161.25	1.290s
EU-152	1376.48	344.29	428.	5.	0.003	579.44	1.293s
HF-181	1382.65	345.83	505.	-21.	-0.011	155.75	1.294s
PB-214	1407.84	352.13	69.	254.	0.141	9.75	1.255s
BA-133	1423.33	356.00	439.	-23.	-0.013	132.52	1.303s
I-131	1457.25	364.48	69.	-5.	-0.003	456.50	1.311s
BA-133	1534.67	383.84	155.	11.	0.006	165.43	1.328s
Cf-249	1551.10	387.95	166.	0.	0.000	1000.00	1.332s
SN-113	1566.06	391.69	239.	-23.	-0.013	108.55	1.335s
SB-125	1710.77	427.88	65.	3.	0.002	551.60	1.367s
AG-108M	1735.01	433.94	31.	12.	0.006	101.72	1.373s
pm-146	1814.77	453.88	48.	7.	0.004	195.69	1.390s
SB-125	1852.71	463.37	120.	14.	0.008	113.84	1.399s
Ir-192	1871.48	468.06	117.	7.	0.004	211.55	1.403s
BE-7	1909.62	477.60	156.	-11.	-0.006	158.82	1.411s
HF-181	1927.22	482.00	119.	16.	0.009	97.95	1.415s
La-140	1947.31	487.02	141.	-7.	-0.004	227.85	1.419s
RU-103	1987.44	497.05	57.	-9.	-0.005	139.01	1.428s
RH-106	2046.68	511.86	35.	153.	0.085	12.94	2.691s
Nd-147	2123.21	531.00	35.	8.	0.005	148.32	1.458s
Ba-140	2148.25	537.26	47.	5.	0.003	303.35	1.463s
CS-134	2252.15	563.24	33.	10.	0.006	122.72	1.486s
CS-134	2276.48	569.32	42.	3.	0.002	310.91	1.491s
PA-234	2277.07	569.47	42.	5.	0.003	176.56	1.491s
BI-207	2278.00	569.70	58.	-7.	-0.004	151.85	1.491s
TL-208	2332.18	583.25	26.	160.	0.089	9.95	1.362
SB-125	2401.19	600.50	443.	-18.	-0.010	164.48	1.518s
SB-124	2410.11	602.73	424.	-18.	-0.010	160.92	1.519s
CS-134	2418.03	604.71	406.	-15.	-0.008	190.58	1.521s
BI-214	2436.24	609.26	37.	210.	0.117	9.36	1.279

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.38	610.30	391.	0.	0.000	1000.00	1.526s
AG-108M	2456.31	614.28	391.	0.	0.000	1000.00	1.529s
PM-144	2471.43	618.06	391.	0.	0.000	1000.00	1.533
RH-106	2486.85	621.92	355.	16.	0.009	164.19	1.536s
SB-125	2542.74	635.89	23.	11.	0.006	69.59	1.548s
I-131	2547.08	636.97	37.	7.	0.004	137.33	1.549s
AG-110M	2630.23	657.76	95.	-20.	-0.011	136.92	1.566s
CS-137	2645.82	661.66	100.	7.	0.004	206.80	1.570s
PM-144	2785.35	696.54	88.	-8.	-0.005	163.22	1.599s
SB-124	2890.33	722.79	136.	-15.	-0.008	113.53	1.621
AG-108M	2890.93	722.94	121.	-5.	-0.003	319.12	1.621
EU-154	2892.61	723.36	116.	0.	0.000	1000.00	1.622s
BI-212	2908.74	727.39	5.	76.	0.042	13.28	1.588
pm-146	2942.07	735.72	46.	-6.	-0.003	483.58	1.632s
pm-146	2987.83	747.16	36.	7.	0.004	181.31	1.641
ZR-95	3026.11	756.73	55.	-6.	-0.003	274.79	1.649s
AG-110M	3054.97	763.94	99.	-23.	-0.013	64.48	1.655s
NB-95	3062.35	765.79	124.	-12.	-0.007	131.22	1.657s
PA-234M	3064.84	766.41	75.	14.	0.008	90.94	1.657s
EU-152	3114.88	778.92	123.	-18.	-0.010	88.67	1.668s
BI-212	3140.88	785.42	102.	3.	0.002	432.25	1.673s
CS-134	3207.01	801.95	21.	12.	0.007	90.72	1.687s
CO-58	3242.31	810.78	70.	2.	0.001	595.82	1.694s
La-140	3262.29	815.77	72.	0.	0.000	1000.00	1.698s
Cs-136	3273.21	818.50	94.	-18.	-0.010	80.68	1.700s
MN-54	3338.61	834.85	50.	-12.	-0.007	132.72	1.714s
Co-56	3386.31	846.77	10.	24.	0.013	35.44	1.723s
TL-208	3441.49	860.56	31.	14.	0.008	91.31	1.735s
NB-94	3483.63	871.10	34.	-3.	-0.002	254.56	1.743s
EU-154	3492.16	873.23	48.	-1.	-0.001	981.49	1.745s
PA-234	3521.37	880.53	53.	14.	0.008	80.57	1.751s
AG-110M	3537.98	884.68	67.	0.	0.000	1000.00	1.754s
y-88	3591.42	898.04	55.	-14.	-0.008	88.00	1.765s
AC-228	3644.10	911.21	12.	142.	0.079	10.36	1.875s
AG-110M	3749.25	937.49	75.	-23.	-0.013	86.53	1.797s
PA-234	3783.37	946.02	17.	10.	0.006	96.14	1.803s
EU-152	3855.75	964.11	94.	9.	0.005	161.95	1.818s
AC-228	3875.88	969.14	11.	78.	0.043	14.22	2.210s
EU-154	3984.66	996.33	49.	-8.	-0.004	128.70	1.844s
PA-234M	4003.33	1001.00	75.	-11.	-0.006	98.35	1.847s
EU-154	4018.45	1004.77	73.	14.	0.008	87.94	1.850
Co-56	4150.74	1037.84	32.	4.	0.002	325.32	1.876s
Cs-136	4191.67	1048.07	13.	20.	0.011	34.61	1.884s
RH-106	4200.83	1050.36	47.	-12.	-0.007	85.80	1.886s
BI-207	4254.05	1063.66	12.	24.	0.013	37.47	1.896s
FE-59	4396.46	1099.25	27.	5.	0.003	224.30	1.924s
EU-152	4447.77	1112.07	126.	-16.	-0.009	99.58	1.934s
ZN-65	4461.66	1115.55	154.	-21.	-0.012	85.08	1.937s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4480.90	1120.36	11.	57.	0.032	18.95	1.573
Sc-46	4481.68	1120.55	132.	-21.	-0.012	79.21	1.941
Ta-182	4484.68	1121.30	127.	-17.	-0.009	98.52	1.941
CO-60	4692.51	1173.24	40.	-8.	-0.004	196.01	1.981s
Ta-182	4885.27	1221.41	12.	22.	0.012	41.08	2.017
Co-56	4952.78	1238.28	46.	6.	0.003	263.82	2.030s
NA-22	5097.85	1274.53	46.	-20.	-0.011	52.19	2.057s
EU-154	5097.90	1274.54	66.	-5.	-0.003	229.07	2.057s
FE-59	5166.14	1291.60	40.	-3.	-0.001	557.27	2.070s
AG-110M	5537.14	1384.30	18.	-3.	-0.002	346.41	2.138s
EU-152	5632.00	1408.00	19.	1.	0.001	777.68	2.155s
K-40	5843.67	1460.89	10.	462.	0.257	4.84	1.945
La-140	6385.31	1596.21	25.	-10.	-0.006	214.43	2.288s
SB-124	6764.67	1690.98	0.	7.	0.004	37.80	2.353s
BI-214	7058.94	1764.49	3.	42.	0.023	16.48	2.402
Co-56	7086.40	1771.35	45.	0.	0.000	1000.00	2.407s
y-88	7345.46	1836.06	13.	-4.	-0.002	220.14	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	-2.4826E+00					5.31E+01	
			477.60	-2.483E+00	?(	1.336E+01	1.59E+02 1.05E+01	G
NA-22	C	-9.8747E-01					9.50E+02	
			1274.53	-9.875E-01	?(	1.669E+00	5.22E+01 9.99E+01	G
K-40	N	2.3578E+02					4.66E+11	
			1460.83	2.358E+02	(P	8.726E+00	4.84E+00 1.07E+01	G
Sc-46	F	6.1279E-03					8.38E+01	
			889.28	6.128E-03	%(	1.511E+00	6.99E+03 1.00E+02	G
			1120.55	-9.398E-01	+	2.479E+00	7.92E+01 1.00E+02	G
CR-51	F	2.9029E+00					2.77E+01	
			320.08	2.903E+00	&(P	2.014E+01	2.07E+02 9.94E+00	G
MN-54	C	-4.2027E-01					3.12E+02	
			834.85	-4.203E-01	(	1.249E+00	1.33E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	4.0940E-01					4.45E+01	
			1099.25	4.094E-01	?(	2.055E+00	2.24E+02	5.65E+01 G
			1291.60	-3.042E-01	+	3.657E+00	5.57E+02	4.32E+01 G
Co-56	C	8.9020E-01					7.73E+01	
			846.77	8.501E-01	?(	6.180E-01	3.54E+01	9.99E+01 G
			1238.28	4.381E-01	- P	2.473E+00	2.64E+02	6.61E+01 G
			1037.84	1.174E+00	?(	8.529E+00	3.25E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.396E+01	1.00E+03	1.55E+01 A
CO-57	C	6.5847E-02					2.72E+02	
			122.06	-5.145E-02	?(	9.150E-01	5.23E+02	8.56E+01 G
			136.47	1.006E+00	&(	1.392E+01	4.13E+02	1.07E+01 G
CO-58	C	6.8848E-02					7.09E+01	
			810.78	6.885E-02	&(	1.435E+00	5.96E+02	9.95E+01 G
CO-60	F	2.6984E-02					1.93E+03	
			1332.50	2.698E-02	%(P	9.685E-01	1.51E+03	1.00E+02 G
			1173.24	-3.504E-01	+	1.465E+00	1.96E+02	9.99E+01 G
ZN-65	F	-1.8469E+00					2.44E+02	
			1115.55	-1.847E+00	?(	5.242E+00	8.51E+01	5.06E+01 G
NB-94	I	-3.1361E-02					7.41E+06	
			702.63	-3.136E-02	%(	1.522E+00	1.39E+03	9.79E+01 G
			871.10	-1.207E-01	+	1.087E+00	2.55E+02	9.99E+01 G
ZR-95	I	-3.5785E-01					6.40E+01	
			756.73	-3.578E-01	?(	2.223E+00	2.75E+02	5.45E+01 G
			724.20	1.186E-02	%	3.746E+00	9.10E+03	4.42E+01 G
NB-95	I	-4.0440E-01					6.40E+01	
			765.79	-4.044E-01	?(	1.796E+00	1.31E+02	9.98E+01 G
RU-103	I	-2.2328E-01					3.93E+01	
			497.05	-2.233E-01	?(P	9.855E-01	1.39E+02	9.09E+01 G
			610.30	0.000E+00	+	4.556E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.6339E+00					3.74E+02	
			621.92	4.634E+00	?(P	2.555E+01	1.64E+02	9.93E+00 G
			1050.36	-3.219E+01	+	9.297E+01	8.58E+01	1.56E+00 G
			511.86	1.855E+01		3.670E+00	1.29E+01	2.00E+01 GA
AG-108M	C	2.7668E-01					1.53E+05	
			433.94	2.767E-01	?(P	6.838E-01	1.02E+02	9.05E+01 G
			722.94	-1.700E-01	-	1.863E+00	3.19E+02	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	0.000E+00	-	2.930E+00	1.00E+03	8.98E+01 G
SN-113	F	-7.1378E-01					1.15E+02	
			391.69	-7.138E-01	?(P	2.332E+00	1.09E+02	6.40E+01 G
SB-124	F	-4.9191E-02					6.02E+01	
			602.73	-5.096E-01	?(	2.749E+00	1.61E+02	9.83E+01 G
			1690.98	8.973E-01	?(	9.448E-01	3.78E+01	4.78E+01 G
			722.79	-4.327E+00	+	1.655E+01	1.14E+02	1.08E+01 G
SB-125	I	1.3350E+00					1.01E+03	
			427.88	2.156E-01	?(	2.895E+00	5.52E+02	2.96E+01 G
			600.50	-2.792E+00	+	1.539E+01	1.64E+02	1.79E+01 G
			635.89	2.710E+00	*(	6.269E+00	6.96E+01	1.13E+01 G
			463.37	3.014E+00	&(	1.157E+01	1.14E+02	1.05E+01 G
I-131	I	2.0608E-01					8.02E+00	
			364.48	-1.262E-01	(P	9.644E-01	4.56E+02	8.17E+01 G
			284.30	1.816E+00	&(	1.230E+01	2.71E+02	6.14E+00 G
			636.97	2.614E+00	?(	1.242E+01	1.37E+02	7.17E+00 G
Gd-153	F	-1.3136E+00					2.42E+02	
			97.50	-1.314E+00	?(	7.207E+00	1.65E+02	3.00E+01 G
			103.20	-1.793E+00	+	9.973E+00	1.67E+02	2.18E+01 G
Ga-68	C	-1.0090E+00					4.71E-02	
			1077.40	-1.009E+00	%(	4.052E+01	1.76E+03	3.30E+00 G
Tc-99m	I	4.0011E-02					2.51E-01	
			140.51	4.001E-02	%(	1.727E+00	1.29E+03	8.93E+01 G
BA-133	F	-6.8083E-01					3.85E+03	
			356.00	-6.808E-01	?(	3.017E+00	1.33E+02	6.20E+01 G
			302.85	0.000E+00	+	1.108E+01	1.00E+03	1.83E+01 G
			383.84	2.385E+00	?	1.337E+01	1.65E+02	8.94E+00 GA
			80.99	-8.134E-01	+ P	5.396E+00	1.27E+02	3.41E+01 GA
CS-134	I	2.5314E-01					7.54E+02	
			604.71	-4.241E-01	?(	2.715E+00	1.91E+02	9.76E+01 G
			795.87	3.947E-02	%	1.667E+00	1.20E+03	8.55E+01 G
			569.32	5.115E-01	?(	5.612E+00	3.11E+02	1.54E+01 G
			801.95	4.583E+00	?(	9.402E+00	9.07E+01	8.69E+00 G
			563.24	3.189E+00	?(P	9.156E+00	1.23E+02	8.35E+00 G
CS-137	I	2.3990E-01					1.10E+04	
			661.66	2.399E-01	?(	1.700E+00	2.07E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	7.1560E-02					1.38E+02	
			165.85	7.156E-02	&(	1.138E+00	4.69E+02	7.99E+01 G
Ba-140	I	1.3030E+00					1.28E+01	
			537.26	4.992E-01	?(P	3.576E+00	3.03E+02	2.44E+01 G
			162.66	-8.998E-01	&	1.561E+01	5.12E+02	6.22E+00 G
			304.85	5.873E+00	(	1.132E+01	5.90E+01	4.29E+00 G
La-140	I	-2.7051E-01					1.28E+01	
			1596.21	-6.397E-01	?(P	1.606E+00	2.14E+02	9.54E+01 G
			487.02	-3.843E-01	+	2.987E+00	2.28E+02	4.55E+01 G
			328.76	1.464E+00	&(P	8.065E+00	1.64E+02	2.03E+01 G
			815.77	0.000E+00	+	6.243E+00	1.00E+03	2.33E+01 G
CE-141	I	-6.6830E-01					3.25E+01	
			145.44	-6.683E-01	&(P	1.882E+00	7.22E+01	4.82E+01 G
PM-144	C	-2.5674E-01					3.63E+02	
			696.54	-2.567E-01	&(	1.433E+00	1.63E+02	9.90E+01 G
			618.06	0.000E+00	+	2.669E+00	1.00E+03	9.91E+01 G
EU-152	F	1.5899E+00					4.94E+03	
			344.29	3.482E-01	?(P	6.812E+00	5.79E+02	2.65E+01 G
			1112.07	-5.285E+00	+	1.767E+01	9.96E+01	1.36E+01 G
			121.78	-1.039E+00	&	2.666E+00	7.73E+01	2.86E+01 G
			778.92	-4.705E+00	+	1.396E+01	8.87E+01	1.29E+01 G
			964.11	2.317E+00	&(P	1.281E+01	1.62E+02	1.46E+01 G
			244.69	4.529E+00	&(P	2.656E+01	1.76E+02	7.58E+00 G
			1408.00	3.357E-01	? P	5.743E+00	7.78E+02	2.10E+01 GA
EU-154	I	1.1612E+00					3.14E+03	
			873.23	-2.954E-01	?(	1.031E+01	9.81E+02	1.23E+01 G
			123.10	6.866E-01	?(	1.979E+00	8.66E+01	4.08E+01 G
			1274.54	-7.061E-01	+	5.605E+00	2.29E+02	3.52E+01 G
			723.36	0.000E+00	-	8.211E+00	1.00E+03	2.02E+01 G
			1004.77	3.229E+00	(	9.534E+00	8.79E+01	1.80E+01 G
			996.33	-3.030E+00	+	1.338E+01	1.29E+02	1.06E+01 G
HF-181	F	4.7013E-01					4.24E+01	
			482.00	4.701E-01	?(	1.546E+00	9.79E+01	8.05E+01 G
			133.02	-7.016E-01	+	3.335E+00	1.43E+02	4.33E+01 G
			345.83	-2.500E+00	+	1.303E+01	1.56E+02	1.51E+01 G
			136.30	0.000E+00	&	2.527E+01	1.00E+03	5.85E+00 G
Ta-182	F	5.2268E-01					1.14E+02	
			1121.30	-2.110E+00	(	6.978E+00	9.85E+01	3.49E+01 G
			1221.41	3.926E+00	(P	3.234E+00	4.11E+01	2.70E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1189.05	1.317E-01	% P	7.863E+00	2.71E+03	1.62E+01 G
Hg-203	F	2.3185E-01					4.66E+01	
			279.20	2.318E-01	?(	1.117E+00	1.42E+02	8.15E+01 G
TL-208	N	5.0669E+00					6.98E+02	
			583.02	5.067E+00	(P	8.304E-01	9.95E+00	8.45E+01 G
			277.28	8.805E+00	+	9.943E+00	3.61E+01	6.31E+00 G
			860.56	4.009E+00	- P	8.255E+00	9.13E+01	1.24E+01 G
pm-146	C	4.0359E-01					2.02E+03	
			747.16	6.962E-01	&(P	2.888E+00	1.81E+02	3.40E+01 G
			735.72	-7.894E-01	+ P	4.829E+00	4.84E+02	2.25E+01 G
			453.88	2.505E-01	?(	1.192E+00	1.96E+02	6.50E+01 G
y-88	F	-5.7245E-01					1.07E+02	
			898.04	-5.724E-01	?(P	1.479E+00	8.80E+01	9.37E+01 G
			1836.06	-2.863E-01	+	1.303E+00	2.20E+02	9.92E+01 G
Cd-113m		2.9821E+03					5.33E+03	
			263.70	2.982E+03	(	2.106E+04	2.09E+02	6.00E-03 K
Cf-251	T	2.0354E-01					3.28E+05	
			176.60	2.035E-01	*(	4.565E+00	9.06E+02	1.70E+01 G
			227.00	3.249E+00	?	1.320E+01	1.65E+02	6.30E+00 GA
Cf-249	T	3.8972E-01					1.28E+05	
			387.95	0.000E+00	&(	1.885E+00	1.00E+03	6.60E+01 G
			333.44	2.048E+00	?(	1.089E+01	1.59E+02	1.55E+01 G
Sn-126		4.0403E+00					3.65E+07	
			87.57	2.342E+00	}	5.756E+00	2.83E+01	3.75E+01 GA
			64.28	4.040E+00	(	1.501E+01	1.11E+02	9.70E+00 G
			86.94	-4.512E+00	+	2.510E+01	1.67E+02	9.04E+00 GA
PB-210	N	1.1967E+01					8.14E+03	
			46.54	1.197E+01	*(	3.672E+01	9.20E+01	4.25E+00 G
PB-212	N	1.5602E+01					6.98E+02	
			238.63	1.560E+01	(	1.784E+00	5.64E+00	4.33E+01 G
			300.03	2.271E+01	+	1.814E+01	2.69E+01	3.28E+00 GA
PB-214	N	1.2527E+01					5.84E+05	
			351.93	1.251E+01	@(P	2.034E+00	9.75E+00	3.76E+01 G
			295.09	1.255E+01	(P	3.642E+00	1.17E+01	1.93E+01 G
			242.00	2.008E+01	+ P	9.697E+00	1.70E+01	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C 4.8059E-01					1.18E+04	
		569.70	-1.969E-01	?(	1.028E+00	1.52E+02	9.77E+01 G
		1063.66	1.369E+00	&(P	1.064E+00	3.75E+01	7.45E+01 G
BI-212	N 3.1859E+01					6.98E+02	
		727.17	3.186E+01	(	5.333E+00	1.33E+01	7.55E+00 G
		785.42	8.710E+00	-	1.301E+02	4.32E+02	1.28E+00 GA
BI-214	N 1.2581E+01					5.84E+05	
		609.31	1.258E+01	(P	1.854E+00	9.36E+00	4.61E+01 G
		1120.29	1.660E+01	+ P	5.312E+00	1.89E+01	1.51E+01 G
		1764.49	1.737E+01	+ P	4.347E+00	1.65E+01	1.54E+01 G
BI-210M	T -7.6235E-01					1.10E+09	
		265.83	-7.623E-01	?(P	2.736E+00	1.68E+02	5.00E+01 G
		304.90	0.000E+00	+	7.285E+00	1.00E+03	2.80E+01 G
AC-228	N 1.7957E+01					2.10E+03	
		911.07	1.831E+01	*(P	2.453E+00	1.04E+01	2.90E+01 G
		968.97	1.744E+01	(P	4.163E+00	1.42E+01	1.75E+01 G
		338.32	1.784E+01	(P	5.136E+00	1.46E+01	1.20E+01 G
		93.35	-7.159E+00	-	3.905E+01	1.64E+02	5.56E+00 XA
TH-227	N -6.3310E-01					7.95E+03	
		50.14	-6.331E-01	?(	2.002E+01	9.32E+02	8.00E+00 G
		256.24	-1.059E+00	+	1.191E+01	4.52E+02	7.00E+00 G
TH-229	N 4.1784E+00					2.68E+06	
		193.51	4.178E+00	?(	1.611E+01	1.57E+02	4.40E+00 G
		210.85	-8.418E+00	+ P	3.094E+01	1.14E+02	2.99E+00 G
TH-234	N 4.9796E+00					1.63E+12	
		63.29	6.101E+00	?(P	3.785E+01	1.85E+02	3.81E+00 G
		92.59	4.215E+00	(	1.353E+01	9.61E+01	5.58E+00 G
PA-231	N 2.7674E+00					1.20E+07	
		302.65	0.000E+00	?(	7.046E+01	1.00E+03	2.88E+00 G
		300.07	6.007E+00	(	8.145E+01	4.04E+02	2.46E+00 G
PA-233	C 7.7604E-01					7.82E+08	
		312.01	7.760E-01	&(P	5.425E+00	2.09E+02	3.60E+01 G
		300.18	0.000E+00	-	3.254E+01	1.00E+03	6.20E+00 G
PA-234	N 4.9722E-01					1.63E+12	
		131.29	-1.849E+00	?(P	7.995E+00	9.68E+01	1.80E+01 G
		946.02	2.910E+00	&(P	6.269E+00	9.61E+01	1.34E+01 G
		569.47	1.706E+00	?(	1.049E+01	1.77E+02	8.20E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          883.24 2.060E-02 %   1.556E+01 2.14E+04 9.60E+00 G
                          880.53 8.277E+00 ?   2.234E+01 8.06E+01 6.00E+00 GA

PA-234M  N   7.3552E-01                                     1.63E+12
                         1001.00-5.431E+01 ?(P 2.077E+02 9.83E+01 8.37E-01 G
                          766.41 1.575E+02 ?(  4.814E+02 9.09E+01 2.94E-01 G

U-235    N   2.4933E+00                                     2.57E+11
                          143.79 2.493E+00 ?(P 7.012E+00 8.45E+01 1.10E+01 G
                          205.33-5.955E+00 & P 1.680E+01 9.44E+01 5.01E+00 G
                          163.38 0.000E+00 &   1.930E+01 1.00E+03 5.08E+00 G

AM-241   T  -5.1435E-01                                     1.58E+05
                           59.54-5.144E-01 ?(P 4.123E+00 1.78E+02 3.59E+01 G

Np-237   F  -2.7525E+00                                     2.14E+06
                           86.49-2.752E+00 &(  1.613E+01 1.76E+02 1.31E+01 G

Ir-192   F   4.4830E-01                                     7.40E+01
                          316.49 3.476E-01 ?(  2.297E+00 1.97E+02 8.70E+01 G
                          468.06 3.218E-01 ?(  2.328E+00 2.12E+02 5.18E+01 G
                          308.44 9.305E-01 ?(  6.005E+00 1.93E+02 3.18E+01 G

Cs-136   F   2.3536E-01                                     1.30E+01
                          818.50-6.117E-01 ?(  1.648E+00 8.07E+01 1.00E+02 G
                         1048.07 1.027E+00 ?(  1.030E+00 3.46E+01 8.00E+01 G
                          340.57 6.910E-01 ?(  3.736E+00 1.61E+02 4.69E+01 G

Np-239   T   1.6541E+00                                     2.36E+00
                          103.70-4.756E-01 -   9.135E+00 5.76E+02 2.40E+01 X
                          106.13 1.654E+00  (  9.263E+00 1.69E+02 2.27E+01 G
                           99.50-2.618E+00 +   1.447E+01 1.66E+02 1.50E+01 X

Nd-147       1.5967E+00                                     1.11E+01
                          531.00 1.597E+00 ?(  5.776E+00 1.48E+02 1.30E+01 G
                           91.10-1.417E+00 +   7.573E+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	
PB-210	46.54	247.	25.	0.014	92.03	1.197E+01	
TH-227	50.14	331.	-3.	-0.002	932.08	-6.331E-01	
AM-241	59.54	448.	-13.	-0.007	177.88	-5.144E-01	P
BA-133	80.99	1217.	-25.	-0.014	126.58	-8.134E-01	P
Np-237	86.49	1741.	-34.	-0.019	176.30	-2.752E+00	
EU-155	86.54	2059.	-38.	-0.021	169.07	-1.331E+00	
Nd-147	91.10	1877.	-38.	-0.021	160.84	-1.417E+00	
Gd-153	97.50	2003.	-39.	-0.021	165.16	-1.314E+00	
Np-239	99.50	2041.	-39.	-0.021	166.43	-2.618E+00	
Gd-153	103.20	2080.	-39.	-0.021	167.47	-1.793E+00	
Np-239	103.70	2119.	-11.	-0.006	576.42	-4.756E-01	
Np-239	106.13	1961.	37.	0.021	168.54	1.654E+00	
EU-152	121.78	246.	-30.	-0.016	77.31	-1.039E+00	
PA-234	131.29	884.	-33.	-0.018	96.81	-1.849E+00	P
HF-181	133.02	884.	-30.	-0.017	142.66	-7.016E-01	
U-235	143.79	229.	26.	0.014	84.55	2.493E+00	P
CE-141	145.44	319.	-31.	-0.017	72.18	-6.683E-01	P
CE-139	165.85	291.	5.	0.003	468.86	7.156E-02	
Cf-251	176.60	192.	3.	0.002	906.15	2.035E-01	
TH-229	193.51	140.	15.	0.008	156.58	4.178E+00	
U-235	205.33	184.	-23.	-0.013	94.41	-5.955E+00	P
TH-229	210.85	216.	-19.	-0.011	114.14	-8.418E+00	P
Cf-251	227.00	156.	15.	0.008	165.06	3.249E+00	
EU-152	244.69	870.	24.	0.013	175.74	4.529E+00	P
TH-227	256.24	132.	-5.	-0.003	452.11	-1.059E+00	
Cd-113m	263.70	301.	12.	0.007	209.43	2.982E+03	
BI-210M	265.83	351.	-25.	-0.014	167.76	-7.623E-01	P
I-131	284.30	92.	7.	0.004	270.93	1.816E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	300.07	646.	9.	0.005	403.66	6.007E+00	
Ir-192	308.44	561.	18.	0.010	192.63	9.305E-01	
PA-233	312.01	580.	16.	0.009	208.64	7.760E-01	P
Ir-192	316.49	596.	18.	0.010	197.34	3.476E-01	
CR-51	320.08	588.	17.	0.009	207.16	2.903E+00	P
La-140	328.76	374.	17.	0.009	164.13	1.464E+00	P
Cf-249	333.44	391.	18.	0.010	158.56	2.048E+00	
Cs-136	340.57	409.	18.	0.010	161.25	6.910E-01	
EU-152	344.29	428.	5.	0.003	579.44	3.482E-01	P
HF-181	345.83	505.	-21.	-0.011	155.75	-2.500E+00	
BA-133	356.00	439.	-23.	-0.013	132.52	-6.808E-01	
I-131	364.48	69.	-5.	-0.003	456.50	-1.262E-01	P
BA-133	383.84	155.	11.	0.006	165.43	2.385E+00	
SN-113	391.69	239.	-23.	-0.013	108.55	-7.138E-01	P
SB-125	427.88	65.	3.	0.002	551.60	2.156E-01	
AG-108M	433.94	31.	12.	0.006	101.72	2.767E-01	P
pm-146	453.88	48.	7.	0.004	195.69	2.505E-01	
SB-125	463.37	120.	14.	0.008	113.84	3.014E+00	
Ir-192	468.06	117.	7.	0.004	211.55	3.218E-01	
BE-7	477.60	156.	-11.	-0.006	158.82	-2.483E+00	
HF-181	482.00	119.	16.	0.009	97.95	4.701E-01	
La-140	487.02	141.	-7.	-0.004	227.85	-3.843E-01	
RU-103	497.05	57.	-9.	-0.005	139.01	-2.233E-01	P
RH-106	511.86	35.	153.	0.085	12.94	1.855E+01	
Nd-147	531.00	35.	8.	0.005	148.32	1.597E+00	
CS-134	563.24	33.	10.	0.006	122.72	3.189E+00	P
CS-134	569.32	42.	3.	0.002	310.91	5.115E-01	
PA-234	569.47	42.	5.	0.003	176.56	1.706E+00	
BI-207	569.70	58.	-7.	-0.004	151.85	-1.969E-01	
SB-125	600.50	443.	-18.	-0.010	164.48	-2.792E+00	
SB-124	602.73	424.	-18.	-0.010	160.92	-5.096E-01	
CS-134	604.71	406.	-15.	-0.008	190.58	-4.241E-01	
RH-106	621.92	355.	16.	0.009	164.19	4.634E+00	P
SB-125	635.89	23.	11.	0.006	69.59	2.710E+00	
I-131	636.97	37.	7.	0.004	137.33	2.614E+00	
AG-110M	657.76	95.	-20.	-0.011	136.92	-6.084E-01	P
CS-137	661.66	100.	7.	0.004	206.80	2.399E-01	
PM-144	696.54	88.	-8.	-0.005	163.22	-2.567E-01	
SB-124	722.79	136.	-15.	-0.008	113.53	-4.327E+00	
AG-108M	722.94	121.	-5.	-0.003	319.12	-1.700E-01	
pm-146	735.72	46.	-6.	-0.003	483.58	-7.894E-01	P
pm-146	747.16	36.	7.	0.004	181.31	6.962E-01	P
ZR-95	756.73	55.	-6.	-0.003	274.79	-3.578E-01	
AG-110M	763.94	99.	-23.	-0.013	64.48	-3.380E+00	
NB-95	765.79	124.	-12.	-0.007	131.22	-4.044E-01	
PA-234M	766.41	75.	14.	0.008	90.94	1.575E+02	
EU-152	778.92	123.	-18.	-0.010	88.67	-4.705E+00	
CS-134	801.95	21.	12.	0.007	90.72	4.583E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.78	70.	2.	0.001	595.82	6.885E-02		
Cs-136	818.50	94.	-18.	-0.010	80.68	-6.117E-01		
MN-54	834.85	50.	-12.	-0.007	132.72	-4.203E-01		
NB-94	871.10	34.	-3.	-0.002	254.56	-1.207E-01		
PA-234	880.53	53.	14.	0.008	80.57	8.277E+00		
y-88	898.04	55.	-14.	-0.008	88.00	-5.724E-01		P
AG-110M	937.49	75.	-23.	-0.013	86.53	-2.605E+00		
PA-234	946.02	17.	10.	0.006	96.14	2.910E+00		P
EU-152	964.11	94.	9.	0.005	161.95	2.317E+00		P
PA-234M	1001.00	75.	-11.	-0.006	98.35	-5.431E+01		P
Cs-136	1048.07	13.	20.	0.011	34.61	1.027E+00		
RH-106	1050.36	47.	-12.	-0.007	85.80	-3.219E+01		
BI-207	1063.66	12.	24.	0.013	37.47	1.369E+00		P
FE-59	1099.25	27.	5.	0.003	224.30	4.094E-01		
EU-152	1112.07	126.	-16.	-0.009	99.58	-5.285E+00		
ZN-65	1115.55	154.	-21.	-0.012	85.08	-1.847E+00		
Sc-46	1120.55	132.	-21.	-0.012	79.21	-9.398E-01		
Ta-182	1121.30	127.	-17.	-0.009	98.52	-2.110E+00		
CO-60	1173.24	40.	-8.	-0.004	196.01	-3.504E-01		
Ta-182	1221.41	12.	22.	0.012	41.08	3.926E+00		P
NA-22	1274.53	46.	-20.	-0.011	52.19	-9.875E-01		
FE-59	1291.60	40.	-3.	-0.001	557.27	-3.042E-01		
AG-110M	1384.30	18.	-3.	-0.002	346.41	-6.434E-01		
EU-152	1408.00	19.	1.	0.001	777.68	3.357E-01		P
La-140	1596.21	25.	-10.	-0.006	214.43	-6.397E-01		P
SB-124	1690.98	0.	7.	0.004	37.80	8.973E-01		
y-88	1836.06	13.	-4.	-0.002	220.14	-2.863E-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	-2.4826E+00	-2.4826E+00	1.588E+02%	1.34E+01
NA-22	#A	-9.8747E-01	-9.8747E-01	5.219E+01%	1.67E+00
K-40		2.3578E+02	2.3578E+02	4.839E+00%	8.73E+00
Sc-46	#A	6.1279E-03	6.1279E-03	6.993E+03%	1.51E+00
CR-51	#A	2.9029E+00	2.9029E+00	2.072E+02%	2.01E+01
MN-54	#A	-4.2027E-01	-4.2027E-01	1.327E+02%	1.25E+00
FE-59	#A	4.0939E-01	4.0940E-01	2.243E+02%	2.06E+00
Co-56	#	8.9019E-01	8.9020E-01	3.544E+01%	6.18E-01
CO-57	#A	6.5846E-02	6.5847E-02	3.333E+02%	9.15E-01
CO-58	#A	6.8848E-02	6.8848E-02	5.958E+02%	1.44E+00
CO-60	#A	2.6984E-02	2.6984E-02	1.514E+03%	9.68E-01
ZN-65	#A	-1.8469E+00	-1.8469E+00	8.508E+01%	5.24E+00
NB-94	#A	-3.1361E-02	-3.1361E-02	1.394E+03%	1.52E+00

ZR-95	#A	-3.5784E-01	-3.5785E-01	2.748E+02%	2.22E+00
NB-95	#A	-4.0439E-01	-4.0440E-01	1.312E+02%	1.80E+00
RU-103	#A	-2.2327E-01	-2.2328E-01	1.390E+02%	9.85E-01
RH-106	#A	4.6339E+00	4.6339E+00	1.642E+02%	2.55E+01
AG-108M	#A	2.7668E-01	2.7668E-01	1.017E+02%	6.84E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.06E+00
SN-113	#A	-7.1378E-01	-7.1378E-01	1.085E+02%	2.33E+00
SB-124	#A	-4.9191E-02	-4.9191E-02	3.780E+01%	2.75E+00
SB-125	#A	1.3350E+00	1.3350E+00	6.959E+01%	2.90E+00
I-131	#A	2.0607E-01	2.0608E-01	1.373E+02%	9.64E-01
Gd-153	#A	-1.3136E+00	-1.3136E+00	1.652E+02%	7.21E+00
Ga-68	#A	-1.0018E+00	-1.0090E+00	1.765E+03%	4.05E+01
Tc-99m	#A	3.9957E-02	4.0011E-02	1.286E+03%	1.73E+00
BA-133	#A	-6.8083E-01	-6.8083E-01	1.325E+02%	3.02E+00
CS-134	#A	2.5314E-01	2.5314E-01	9.072E+01%	2.71E+00
CS-137	#A	2.3990E-01	2.3990E-01	2.068E+02%	1.70E+00
CE-139	#A	7.1560E-02	7.1560E-02	4.689E+02%	1.14E+00
Ba-140	A	1.3029E+00	1.3030E+00	5.897E+01%	3.58E+00
La-140	#A	-2.7050E-01	-2.7051E-01	1.350E+02%	1.61E+00
CE-141	#A	-6.6830E-01	-6.6830E-01	7.218E+01%	1.88E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+01
PM-144	#A	-2.5674E-01	-2.5674E-01	1.632E+02%	1.43E+00
EU-152	#A	1.5899E+00	1.5899E+00	1.620E+02%	6.81E+00
EU-154	A	1.1612E+00	1.1612E+00	8.664E+01%	1.03E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.03E+01
HF-181	#A	4.7013E-01	4.7013E-01	9.795E+01%	1.55E+00
Ta-182	#A	5.2268E-01	5.2268E-01	4.108E+01%	6.98E+00
Hg-203	#A	2.3185E-01	2.3185E-01	1.423E+02%	1.12E+00
TL-208		5.0669E+00	5.0669E+00	9.948E+00%	8.30E-01
pm-146	#A	4.0359E-01	4.0359E-01	1.334E+02%	2.89E+00
y-88	#A	-5.7245E-01	-5.7245E-01	8.800E+01%	1.48E+00
Cd-113m	#A	2.9821E+03	2.9821E+03	2.094E+02%	2.11E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.90E+01
Cf-251	#A	2.0354E-01	2.0354E-01	9.062E+02%	4.56E+00
Cf-249	#A	3.8972E-01	3.8972E-01	1.586E+02%	1.89E+00
Sn-126	A	4.0403E+00	4.0403E+00	1.115E+02%	1.50E+01
PB-210	#A	1.1967E+01	1.1967E+01	9.203E+01%	3.67E+01
PB-212		1.5602E+01	1.5602E+01	5.637E+00%	1.78E+00
PB-214	#	1.2527E+01	1.2527E+01	7.617E+00%	2.03E+00
BI-207	#A	4.8059E-01	4.8059E-01	3.747E+01%	1.03E+00
BI-212		3.1859E+01	3.1859E+01	1.328E+01%	5.33E+00
BI-214		1.2581E+01	1.2581E+01	9.361E+00%	1.85E+00
BI-210M	#A	-7.6235E-01	-7.6235E-01	1.678E+02%	2.74E+00
AC-228		1.7957E+01	1.7957E+01	7.617E+00%	2.45E+00
TH-227	#A	-6.3310E-01	-6.3310E-01	9.321E+02%	2.00E+01
TH-229	#A	4.1784E+00	4.1784E+00	1.566E+02%	1.61E+01
TH-234	#A	4.9796E+00	4.9796E+00	9.611E+01%	3.79E+01
PA-231	#A	2.7674E+00	2.7674E+00	4.037E+02%	7.05E+01
PA-233	#A	7.7604E-01	7.7604E-01	2.086E+02%	5.42E+00

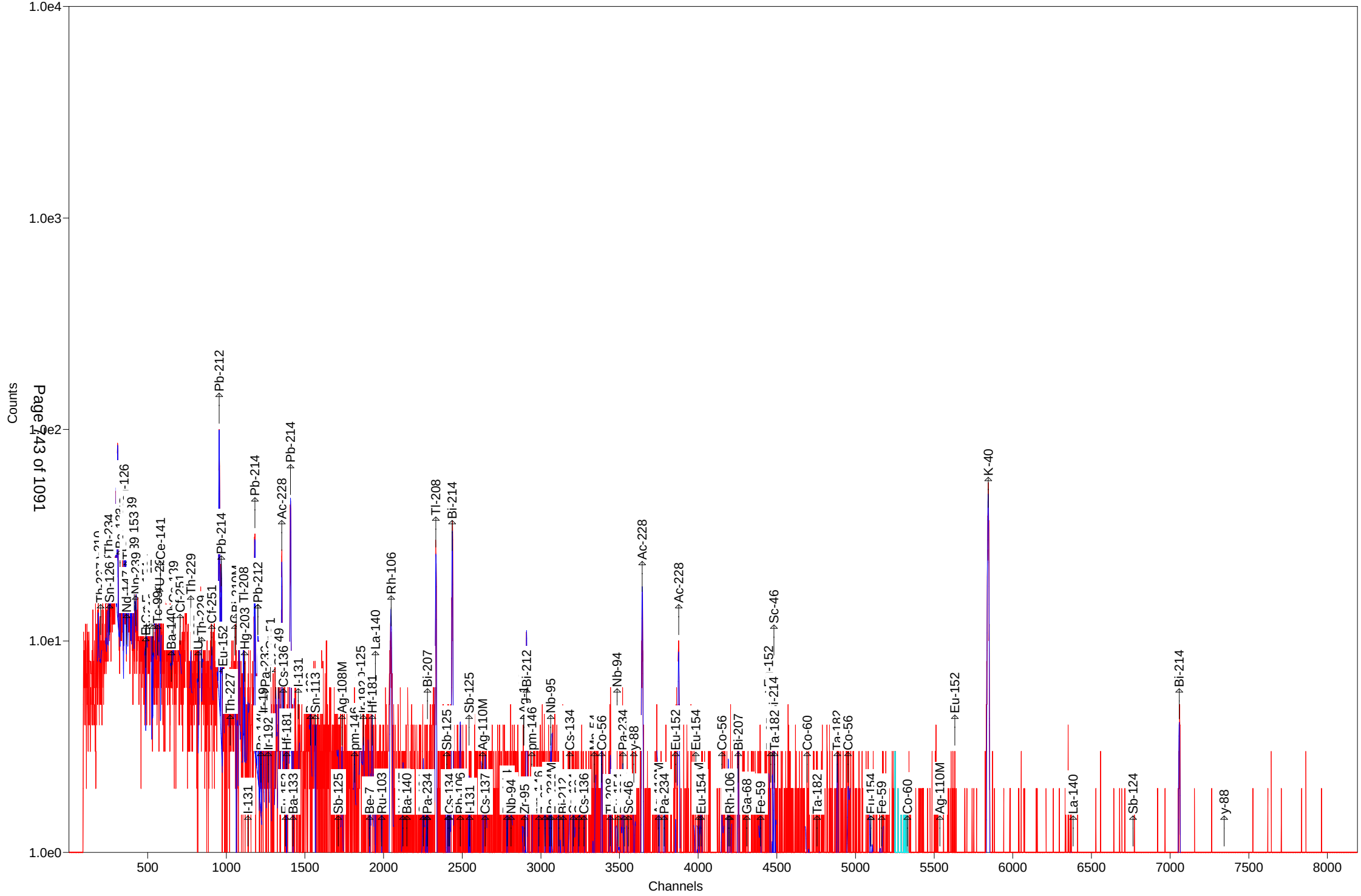
PA-234 #A	4.9722E-01	4.9722E-01	7.438E+01%	7.99E+00
PA-234M#A	7.3552E-01	7.3552E-01	6.697E+01%	2.08E+02
U-235 #A	2.4933E+00	2.4933E+00	8.455E+01%	7.01E+00
AM-241 #A	-5.1435E-01	-5.1435E-01	1.779E+02%	4.12E+00
Np-237 #A	-2.7525E+00	-2.7525E+00	1.763E+02%	1.61E+01
Ir-192 #A	4.4829E-01	4.4830E-01	1.159E+02%	2.30E+00
Cs-136 #A	2.3535E-01	2.3536E-01	3.461E+01%	1.65E+00
Np-239 #A	1.6538E+00	1.6541E+00	1.685E+02%	9.26E+00
Nd-147 #A	1.5967E+00	1.5967E+00	1.483E+02%	5.78E+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) 3.314E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.3137619E+02 Bq/Sample

264540_Gamma_160-18553-A-14-B. 13_Gamma_20160736.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161873

Sample Description: 264540_Gamma_160-18553-A-15-B
Detector: Detector #12
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-15-B

Decay to Time: 9/1/2016 16:06 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:06:22 Real Time: 1810 sec
Analysis Time: 9/1/2016 16:37 Dead Time: 0.58 %
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	3.361E+00	106.8	3.591E+00	3.595E+00	1.214E+01
NA-22	-1.165E-01	406.2	4.730E-01	4.731E-01	1.693E+00
K-40	2.794E+02	4.7	1.320E+01	1.946E+01	8.496E+00
Sc-46	-7.125E-01	86.1	6.136E-01	6.147E-01	2.055E+00
CR-51	0.000E+00	1.#INF	1.747E+00	1.747E+00	2.008E+01
MN-54	4.551E-01	90.3	4.111E-01	4.117E-01	9.673E-01
FE-59	-4.872E-01	189.3	9.222E-01	9.225E-01	2.681E+00
Co-56	6.899E-01	53.1	3.660E-01	3.677E-01	1.400E+00
CO-57	-3.433E-01	94.9	3.257E-01	3.262E-01	1.087E+00
CO-58	2.344E-01	178.5	4.184E-01	4.186E-01	1.452E+00
CO-60	5.381E-02	1089.9	5.865E-01	5.865E-01	1.325E+00
ZN-65	0.000E+00	1.#INF	2.074E-01	2.074E-01	5.137E+00
NB-94	6.772E-01	57.1	3.868E-01	3.884E-01	8.905E-01
ZR-95	3.786E-01	234.0	8.858E-01	8.860E-01	2.107E+00
NB-95	-6.056E-01	82.5	4.996E-01	5.006E-01	1.672E+00
RU-103	2.527E-01	163.2	4.124E-01	4.126E-01	1.005E+00
RH-106	2.596E-06	343798610.6	8.924E+00	8.924E+00	3.033E+01
AG-108M	3.539E-01	94.5	3.346E-01	3.350E-01	8.372E-01
AG-110M	4.055E-01	96.7	3.921E-01	3.926E-01	2.435E+00
SN-113	3.598E-01	167.3	6.018E-01	6.021E-01	2.048E+00
SB-124	-2.314E-01	131.0	3.032E-01	3.035E-01	3.091E+00
SB-125	1.024E+00	93.5	9.579E-01	9.593E-01	3.276E+00
I-131	4.744E-01	102.6	4.867E-01	4.873E-01	1.066E+00
Gd-153	-2.501E-01	545.2	1.363E+00	1.364E+00	4.593E+00
Ga-68	7.222E+00	325.3	2.349E+01	2.350E+01	5.249E+01
Tc-99m	-3.825E-01	151.9	5.810E-01	5.814E-01	1.938E+00
BA-133	-2.141E-01	119.9	2.568E-01	2.570E-01	3.661E+00
CS-134	2.706E-01	66.1	1.788E-01	1.794E-01	3.331E+00
CS-137	4.185E-01	99.7	4.171E-01	4.177E-01	1.416E+00
CE-139	3.033E-01	124.7	3.780E-01	3.791E-01	1.269E+00
Ba-140	1.965E-01	96.1	1.889E-01	1.891E-01	5.051E+00
La-140	2.669E-01	128.3	3.424E-01	3.427E-01	1.374E+00
CE-141	6.766E-01	155.6	1.053E+00	1.054E+00	3.514E+00

CE-144	0.000E+00	1.#INF	1.294E+00	1.294E+00	1.461E+01
PM-144	3.135E-02	1444.8	4.529E-01	4.529E-01	1.096E+00
EU-152	9.968E-01	96.9	9.660E-01	9.674E-01	6.604E+00
EU-154	2.810E+00	78.5	2.207E+00	2.212E+00	1.260E+01
EU-155	2.708E-01	673.3	1.823E+00	1.823E+00	6.151E+00
HF-181	-1.456E-01	334.2	4.866E-01	4.866E-01	1.681E+00
Ta-182	-1.585E+00	148.0	2.345E+00	2.347E+00	7.968E+00
Hg-203	-5.134E-01	86.2	4.425E-01	4.435E-01	1.476E+00
TL-208	6.650E+00	10.5	6.964E-01	7.772E-01	1.103E+00
pm-146	3.414E-01	378.6	1.293E+00	1.293E+00	3.115E+00
y-88	-6.652E-01	73.1	4.860E-01	4.872E-01	1.692E+00
Cd-113m	4.101E+03	121.6	4.985E+03	4.992E+03	1.684E+04
Cd-109	0.000E+00	1.#INF	1.429E+01	1.429E+01	4.800E+01
Cf-251	1.783E+00	104.0	1.854E+00	1.861E+00	4.744E+00
Cf-249	1.108E-01	442.4	4.900E-01	4.900E-01	2.059E+00
Sn-126	4.448E+00	120.7	5.368E+00	5.374E+00	1.792E+01
PB-210	1.600E+01	60.6	9.691E+00	9.736E+00	3.161E+01
PB-212	1.930E+01	5.1	9.881E-01	1.592E+00	1.602E+00
PB-214	1.438E+01	9.1	1.305E+00	1.504E+00	2.454E+00
BI-207	1.698E-01	211.9	3.597E-01	3.598E-01	1.189E+00
BI-212	3.734E+01	14.8	5.515E+00	5.846E+00	8.252E+00
BI-214	1.107E+01	11.5	1.269E+00	1.393E+00	2.145E+00
BI-210M	2.845E-01	199.7	5.681E-01	5.683E-01	1.942E+00
AC-228	2.212E+01	8.4	1.860E+00	2.176E+00	2.138E+00
TH-227	2.181E+00	338.9	7.393E+00	7.394E+00	2.498E+01
TH-229	5.576E+00	130.3	7.263E+00	7.277E+00	1.869E+01
TH-234	1.990E+01	41.2	8.197E+00	8.262E+00	2.626E+01
PA-231	1.260E+01	111.5	1.405E+01	1.407E+01	6.352E+01
PA-233	7.946E-01	157.8	1.254E+00	1.255E+00	5.406E+00
PA-234	1.290E+00	205.2	2.646E+00	2.647E+00	8.852E+00
PA-234M	8.588E+01	75.0	6.444E+01	6.459E+01	1.959E+02
U-235	-3.544E+00	75.5	2.676E+00	2.682E+00	1.576E+01
AM-241	-1.406E+00	126.8	1.783E+00	1.785E+00	5.946E+00
Np-237	-2.917E+00	155.5	4.537E+00	4.540E+00	1.511E+01
Ir-192	2.789E-01	96.8	2.698E-01	2.703E-01	2.258E+00
Cs-136	-3.281E-02	83.8	2.751E-02	2.757E-02	1.653E+00
Np-239	-7.218E-01	246.4	1.778E+00	1.779E+00	5.971E+00
Nd-147	2.393E+00	120.4	2.882E+00	2.885E+00	6.983E+00
Total	4.668E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-15-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161873.An1

Acquisition information
Start time: 9/1/2016 4:06:22 PM
Live time: 1800
Real time: 1810
Dead time: 0.58 %
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 4:06:00 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: 0.1019

***** 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
46.58	26.	72.13	1.19	2.232E-02	46.54	4.250	PBC<MDA	PB210
50.21	8.	338.88	0.89	2.496E-02	50.14	8.000	PBC<MDA	TH227
63.36	46.	41.18	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
64.35	26.	120.69	0.91	3.392E-02	64.28	9.700	PBC<MDA	Sn126
74.75	173.	14.03	0.92	3.876E-02				
77.20	283.	9.13	0.92	3.967E-02				
80.99	27.	173.10	0.92	4.091E-02	80.99	34.060	PBC<MDA	BA133
87.11	108.	18.70	0.93	4.255E-02	86.49	13.100	1.082E+01	Np237
					86.54	30.700	4.616E+00	EU155
					86.94	9.040	1.564E+01	Sn126
					87.57	37.500	3.758E+00	Sn126
					88.04	3.790	3.709E+01	Cd109
90.12	86.	20.09	0.93	4.321E-02				
92.48	12.	181.48	0.93	4.369E-02	92.59	5.584	PBC<MDA	TH234
93.24	31.	129.26	0.93	4.382E-02	93.35	5.561	PBC<MDA	AC228
105.31	5.	673.32	0.95	4.516E-02	105.31	21.200	PBC<MDA	EU155
121.78	24.	96.91	0.96	4.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.386E-01	CO57
123.10	8.	289.81	0.96	4.522E-02	123.10	40.790	PBC<MDA	EU154
131.29	19.	205.21	0.97	4.468E-02	131.29	18.000	PBC<MDA	PA234
145.44	25.	155.65	0.98	4.318E-02	145.44	48.200	PBC<MDA	CE141
162.66	22.	104.60	1.00	4.072E-02	162.66	6.220	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	18.	124.65	1.00	4.089E-02	165.85	79.900	PBC<MDA	CE139
176.60	21.	104.03	1.01	3.926E-02	176.60	17.000	PBC<MDA	Cf251
193.51	16.	130.26	1.03	3.699E-02	193.51	4.400	PBC<MDA	TH229
205.33	20.	105.87	1.04	3.557E-02	205.33	5.010	PBC<MDA	U235
227.00	3.	688.40	1.06	3.329E-02	227.00	6.300	PBC<MDA	Cf251
238.61	473.	5.80	1.06	3.220E-02	238.63	43.300	1.885E+01	PB212
241.96	66.	23.80	1.07	3.189E-02	242.00	7.430	1.542E+01	PB214
244.69	19.	206.96	1.08	3.166E-02	244.69	7.580	PBC<MDA	EU152
263.70	13.	121.55	1.09	3.010E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	8.	199.67	1.10	2.994E-02	265.83	50.000	PBC<MDA	BI210M
277.53	15.	86.51	1.64	2.910E-02	277.28	6.310	PBC<MDA	TL208
294.98	134.	15.48	0.96	2.790E-02	295.09	19.300	1.380E+01	PB214
300.07	17.	153.98	1.13	2.757E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.362E+01	PA231
					300.18	6.200	5.407E+00	PA233
300.10	16.	153.52	1.13	2.757E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.18	17.	157.80	1.13	2.756E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.363E+01	PA231
					300.18	6.200	5.408E+00	PA233
302.65	17.	161.24	1.13	2.741E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.844E+00	BA133
302.85	14.	190.26	1.13	2.740E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.596E+00	BA133
333.44	4.	442.43	1.16	2.564E-02	333.44	15.510	PBC<MDA	Cf249
338.21	109.	16.66	1.27	2.538E-02	338.32	12.010	1.992E+01	AC228
351.80	245.	9.45	1.08	2.471E-02	351.93	37.600	1.468E+01	PB214
364.48	15.	102.59	1.19	2.410E-02	364.48	81.700	PBC<MDA	I131
383.84	10.	168.59	1.20	2.325E-02	383.84	8.940	PBC<MDA	BA133
391.69	10.	167.27	1.21	2.292E-02	391.69	64.000	PBC<MDA	SN113
433.94	12.	94.54	1.25	2.132E-02	433.94	90.480	PBC<MDA	AG108M
463.37	14.	93.53	1.28	2.035E-02	463.37	10.470	PBC<MDA	SB125
468.06	14.	96.75	1.28	2.020E-02	468.06	51.750	PBC<MDA	Ir192
477.60	13.	106.84	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
487.02	11.	128.29	1.30	1.964E-02	487.02	45.500	PBC<MDA	La140
497.05	8.	163.22	1.31	1.935E-02	497.05	90.900	PBC<MDA	RU103
511.86	114.	20.47	2.57	1.895E-02	511.86	20.000	1.676E+01	RH106
531.00	10.	120.40	1.34	1.845E-02	531.00	13.000	PBC<MDA	Nd147
569.32	13.	78.68	1.37	1.754E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.893E+00	PA234
					569.70	97.740	4.106E-01	BI207
569.70	5.	218.14	1.37	1.753E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.867E+00	PA234
					569.70	97.740	1.567E-01	BI207
583.08	174.	10.47	1.10	1.724E-02	583.02	84.500	6.650E+00	TL208
609.45	148.	11.46	1.33	1.669E-02	609.31	46.090	1.072E+01	BI214
635.89	4.	218.75	1.43	1.618E-02	635.89	11.310	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
636.97	2.	382.53	1.43	1.616E-02	636.97	7.170	PBC<MDA	I131
661.88	10.	99.67	1.45	1.571E-02	661.66	85.210	PBC<MDA	CS137
702.63	18.	57.11	1.49	1.503E-02	702.63	97.900	PBC<MDA	NB94
727.26	74.	14.77	1.69	1.465E-02	727.17	7.550	3.734E+01	BI212
747.16	3.	378.59	1.52	1.436E-02	747.16	34.000	PBC<MDA	pm146
756.73	5.	234.00	1.53	1.422E-02	756.73	54.460	PBC<MDA	ZR95
766.41	16.	75.03	1.54	1.409E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.60	12.	50.84	2.08	1.383E-02	785.42	1.280	PBC<MDA	BI212
801.95	14.	102.25	1.57	1.362E-02	801.95	8.690	PBC<MDA	CS134
810.78	6.	178.52	1.58	1.351E-02	810.78	99.460	PBC<MDA	CO58
834.85	11.	90.32	1.60	1.321E-02	834.85	99.980	PBC<MDA	MN54
860.76	7.	169.37	1.62	1.291E-02	860.56	12.420	PBC<MDA	TL208
873.23	5.	189.71	1.63	1.277E-02	873.23	12.270	PBC<MDA	EU154
880.53	2.	565.69	1.63	1.269E-02	880.53	6.000	PBC<MDA	PA234
911.42	134.	9.77	1.48	1.237E-02	911.07	29.000	2.081E+01	AC228
969.05	96.	16.22	1.71	1.180E-02	968.97	17.460	2.581E+01	AC228
996.33	10.	82.26	1.73	1.155E-02	996.33	10.600	PBC<MDA	EU154
1001.00	7.	134.39	1.73	1.151E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	9.	112.90	1.74	1.148E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	15.	53.05	1.76	1.119E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	100.00	1.77	1.111E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	3.	363.24	1.78	1.099E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	4.	325.32	1.79	1.088E-02	1077.40	3.300	PBC<MDA	Ga68
1120.35	51.	20.12	2.69	1.055E-02	1120.29	15.100	1.786E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	7.731E+00	Ta182
1189.05	2.	646.79	1.88	1.008E-02	1189.05	16.200	PBC<MDA	Ta182
1384.30	6.	96.69	2.03	8.948E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	2.	488.62	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1461.04	460.	4.72	1.34	8.575E-03	1460.83	10.670	2.794E+02	K40
1596.21	1.	842.61	2.18	7.993E-03	1596.21	95.400	PBC<MDA	La140
1690.98	3.	205.48	2.25	7.633E-03	1690.98	47.790	PBC<MDA	SB124
1764.46	25.	22.59	2.30	7.376E-03	1764.49	15.400	1.214E+01	BI214
1836.06	5.	44.72	2.35	7.144E-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
298.55	74.78	207.	173.	4.461E+03	14.03	0.916	- D
308.32	77.23	191.	283.	7.126E+03	9.13	0.919	- D
359.27	90.06	133.	86.	1.990E+03	21.81	0.931	- 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	185.80	46.54	121.	27.	0.015	60.55	0.889D
TH-227	200.19	50.14	349.	8.	0.004	338.88	0.893s
AM-241	237.74	59.54	633.	-28.	-0.016	126.81	0.902s
TH-234	252.73	63.29	152.	46.	0.025	41.18	0.905D
Sn-126	256.70	64.28	492.	26.	0.015	120.69	0.906
BA-133	323.48	80.99	1069.	27.	0.015	173.10	0.922s
Np-237	345.47	86.49	1015.	-29.	-0.016	155.54	0.928s
EU-155	345.68	86.54	1003.	-31.	-0.017	146.81	0.928s
Sn-126	347.27	86.94	973.	-31.	-0.017	144.54	0.928D
Sn-126	349.78	87.57	850.	67.	0.037	31.26	0.929D
Cd-109	351.66	88.04	869.	0.	0.000	1000.00	0.929A
Nd-147	363.89	91.10	869.	0.	0.000	1000.00	0.932s
TH-234	369.85	92.59	249.	12.	0.007	181.48	0.933D
AC-228	372.88	93.35	785.	31.	0.017	129.26	0.934s
Gd-153	389.47	97.50	532.	-6.	-0.003	545.18	0.938
Np-239	397.47	99.50	538.	0.	0.000	1000.00	0.940
Gd-153	412.25	103.20	538.	0.	0.000	1000.00	0.944s
Np-239	414.25	103.70	538.	0.	0.000	1000.00	0.944s
EU-155	420.70	105.31	491.	5.	0.003	673.32	0.946s
Np-239	423.96	106.13	533.	-13.	-0.007	246.40	0.946s
EU-152	486.50	121.78	250.	24.	0.013	96.91	0.961s
CO-57	487.64	122.06	246.	-24.	-0.013	94.85	0.962s
EU-154	491.79	123.10	243.	8.	0.004	289.81	0.963s
PA-234	524.55	131.29	724.	19.	0.010	205.21	0.970s
HF-181	531.46	133.02	743.	0.	0.000	1000.00	0.972s
CE-144	533.51	133.54	743.	0.	0.000	1000.00	0.973s
HF-181	544.55	136.30	743.	0.	0.000	1000.00	0.975s
CO-57	545.24	136.47	786.	-26.	-0.014	153.58	0.975s
Tc-99m	561.38	140.51	774.	-26.	-0.015	151.90	0.979s
U-235	574.47	143.79	805.	-30.	-0.017	75.51	0.982s
CE-141	581.09	145.44	766.	25.	0.014	155.65	0.984s
Ba-140	649.91	162.66	260.	22.	0.012	104.60	1.000s
CE-139	662.68	165.85	238.	18.	0.010	124.65	1.003s
Cf-251	705.64	176.60	136.	21.	0.012	104.03	1.013s
TH-229	773.22	193.51	125.	16.	0.009	130.26	1.029s
U-235	820.49	205.33	126.	20.	0.011	105.87	1.040s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	842.54	210.85	187.	-6.	-0.003	428.34	1.046s
Cf-251	907.10	227.00	121.	3.	0.002	688.40	1.061s
PB-212	953.60	238.63	65.	484.	0.269	5.12	1.071D
PB-214	967.05	242.00	89.	66.	0.037	23.80	1.074D
EU-152	977.83	244.69	770.	19.	0.011	206.96	1.077s
TH-227	1023.99	256.24	165.	-25.	-0.014	96.84	1.088s
Cd-113m	1053.81	263.70	125.	13.	0.007	121.55	1.095s
BI-210M	1062.33	265.83	113.	8.	0.004	199.67	1.097s
TL-208	1109.08	277.53	48.	15.	0.008	86.51	1.638s
Hg-203	1115.78	279.20	166.	-22.	-0.012	86.20	1.109s
I-131	1136.16	284.30	115.	-23.	-0.013	58.62	1.114
PB-214	1178.85	294.98	68.	134.	0.074	15.48	0.955s
PB-212	1199.05	300.03	303.	16.	0.009	153.52	1.128
PA-231	1199.21	300.07	320.	17.	0.009	153.98	1.128
PA-233	1199.65	300.18	336.	17.	0.009	157.80	1.128
PA-231	1209.52	302.65	353.	17.	0.009	161.24	1.131s
BA-133	1210.33	302.85	370.	14.	0.008	190.26	1.131s
Ba-140	1218.32	304.85	384.	0.	0.000	1000.00	1.133s
BI-210M	1218.50	304.90	384.	0.	0.000	1000.00	1.133
Ir-192	1232.67	308.44	384.	0.	0.000	1000.00	1.136s
PA-233	1246.95	312.01	384.	0.	0.000	1000.00	1.139s
Ir-192	1264.85	316.49	384.	0.	0.000	1000.00	1.143s
CR-51	1279.22	320.08	390.	0.	0.000	1000.00	1.147s
La-140	1313.91	328.76	157.	-4.	-0.002	629.80	1.155s
Cf-249	1332.62	333.44	168.	4.	0.002	442.43	1.159s
AC-228	1351.69	338.21	48.	109.	0.061	16.66	1.271
Cs-136	1361.13	340.57	284.	-16.	-0.009	155.71	1.165s
EU-152	1375.98	344.29	268.	0.	0.000	1000.00	1.169s
HF-181	1382.15	345.83	300.	-18.	-0.010	135.71	1.170
PB-214	1406.04	351.80	68.	245.	0.136	9.45	1.082
BA-133	1422.81	356.00	438.	-20.	-0.011	146.03	1.180s
I-131	1456.73	364.48	57.	15.	0.008	102.59	1.187s
BA-133	1534.13	383.84	124.	10.	0.005	168.59	1.205s
Cf-249	1550.56	387.95	133.	0.	0.000	1000.00	1.209s
SN-113	1565.51	391.69	122.	10.	0.005	167.27	1.212
AG-108M	1734.43	433.94	32.	12.	0.007	94.54	1.250s
pm-146	1814.18	453.88	68.	-15.	-0.008	101.11	1.268s
SB-125	1852.11	463.37	75.	14.	0.008	93.53	1.277s
Ir-192	1870.88	468.06	86.	14.	0.008	96.75	1.281s
BE-7	1909.00	477.60	85.	13.	0.007	106.84	1.289s
HF-181	1926.61	482.00	95.	-4.	-0.002	334.18	1.293s
La-140	1946.69	487.02	91.	11.	0.006	128.29	1.298s
RU-103	1986.82	497.05	39.	8.	0.004	163.22	1.307s
RH-106	2046.04	511.86	67.	114.	0.064	20.47	2.570s
Nd-147	2122.56	531.00	35.	10.	0.006	120.40	1.337s
Ba-140	2147.60	537.26	66.	-8.	-0.004	161.26	1.342
CS-134	2251.48	563.24	56.	-1.	-0.001	870.96	1.365s
CS-134	2275.81	569.32	43.	13.	0.007	78.68	1.370s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	2276.41	569.47	56.	0.	0.000	1000.00	1.370s
BI-207	2277.34	569.70	53.	5.	0.003	218.14	1.371s
TL-208	2330.85	583.08	32.	174.	0.097	10.47	1.102
SB-125	2400.51	600.50	384.	-17.	-0.009	166.46	1.398s
SB-124	2409.43	602.73	367.	-17.	-0.009	162.65	1.399
CS-134	2417.34	604.71	420.	-19.	-0.011	150.54	1.401s
BI-214	2436.31	609.45	34.	148.	0.082	11.46	1.329
RU-103	2439.69	610.30	401.	-20.	-0.011	146.57	1.406s
AG-108M	2455.62	614.28	381.	-20.	-0.011	142.69	1.410s
PM-144	2470.74	618.06	362.	-18.	-0.010	153.92	1.413s
SB-125	2542.05	635.89	30.	4.	0.002	218.75	1.428s
I-131	2546.39	636.97	39.	2.	0.001	382.53	1.429s
AG-110M	2629.52	657.76	72.	-18.	-0.010	70.20	1.447s
CS-137	2645.12	661.66	45.	10.	0.006	99.67	1.451s
NB-94	2808.99	702.63	20.	18.	0.010	57.11	1.486s
SB-124	2889.61	722.79	145.	-16.	-0.009	111.48	1.503s
AG-108M	2890.22	722.94	129.	-16.	-0.009	105.60	1.503s
EU-154	2891.89	723.36	113.	-3.	-0.002	435.73	1.503s
ZR-95	2895.26	724.20	116.	-8.	-0.005	189.89	1.504s
BI-212	2907.52	727.26	9.	74.	0.041	14.77	1.695s
pm-146	2941.34	735.72	61.	-19.	-0.010	91.49	1.514s
pm-146	2987.11	747.16	28.	3.	0.002	378.59	1.524s
ZR-95	3025.38	756.73	33.	5.	0.003	234.00	1.532
NB-95	3061.63	765.79	72.	-15.	-0.009	82.49	1.539s
PA-234M	3064.12	766.41	61.	16.	0.009	75.03	1.540s
EU-152	3114.15	778.92	37.	-4.	-0.002	302.94	1.550s
BI-212	3140.85	785.60	8.	12.	0.007	50.84	2.077s
CS-134	3181.95	795.87	95.	-18.	-0.010	80.08	1.565s
CS-134	3206.28	801.95	96.	14.	0.008	102.25	1.570s
CO-58	3241.58	810.78	48.	6.	0.003	178.52	1.577s
La-140	3261.56	815.77	54.	0.	0.000	1000.00	1.581s
Cs-136	3272.49	818.50	64.	-9.	-0.005	134.56	1.583s
MN-54	3337.89	834.85	19.	11.	0.006	90.32	1.597s
TL-208	3440.76	860.56	28.	7.	0.004	169.37	1.619s
NB-94	3482.90	871.10	45.	-5.	-0.003	194.94	1.627
EU-154	3491.44	873.23	50.	5.	0.003	189.71	1.629s
PA-234	3520.64	880.53	63.	2.	0.001	565.69	1.635s
PA-234	3531.48	883.24	65.	0.	0.000	1000.00	1.637s
AG-110M	3537.26	884.68	65.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	89.	-16.	-0.009	86.12	1.642s
y-88	3590.70	898.04	50.	-14.	-0.008	73.07	1.649s
AC-228	3644.21	911.42	6.	134.	0.075	9.77	1.477
AG-110M	3748.54	937.49	50.	-19.	-0.010	55.25	1.682s
PA-234	3782.66	946.02	45.	-11.	-0.006	137.42	1.688s
EU-152	3855.05	964.11	195.	-32.	-0.018	64.40	1.703s
AC-228	3874.49	968.97	73.	96.	0.053	16.22	1.707s
EU-154	3983.96	996.33	32.	10.	0.006	82.26	1.729s
PA-234M	4002.64	1001.00	45.	7.	0.004	134.39	1.733s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4017.76	1004.77	42.	9.	0.005	112.90	1.736s
Co-56	4150.07	1037.84	10.	15.	0.008	53.05	1.762s
Cs-136	4191.00	1048.07	15.	6.	0.003	100.00	1.771s
BI-207	4253.39	1063.66	20.	3.	0.002	363.24	1.783s
Ga-68	4308.37	1077.40	32.	4.	0.002	325.32	1.794s
FE-59	4395.81	1099.25	32.	-5.	-0.003	189.28	1.811s
EU-152	4447.13	1112.07	111.	-10.	-0.006	149.98	1.821s
ZN-65	4461.03	1115.55	101.	0.	0.000	1000.00	1.824s
BI-214	4480.25	1120.35	13.	51.	0.028	20.12	2.693s
Sc-46	4481.05	1120.55	111.	-10.	-0.006	149.98	1.828s
Ta-182	4484.05	1121.30	116.	-10.	-0.006	148.00	1.828s
CO-60	4691.91	1173.24	38.	-5.	-0.003	226.90	1.869s
Ta-182	4755.20	1189.05	32.	2.	0.001	646.79	1.881
Ta-182	4884.72	1221.41	53.	-8.	-0.005	202.19	1.906
NA-22	5097.34	1274.53	32.	-2.	-0.001	406.20	1.946s
EU-154	5097.39	1274.54	34.	0.	0.000	1000.00	1.946s
AG-110M	5536.74	1384.30	6.	6.	0.004	96.69	2.029
EU-152	5631.64	1408.00	17.	2.	0.001	488.62	2.046s
K-40	5843.96	1461.04	6.	460.	0.256	4.72	1.344s
La-140	6385.21	1596.21	12.	1.	0.001	842.61	2.182s
SB-124	6764.73	1690.98	6.	3.	0.002	205.48	2.247s
BI-214	7059.14	1764.49	3.	25.	0.014	22.59	2.297s
Co-56	7086.61	1771.35	28.	0.	0.000	1000.00	2.302s
y-88	7345.80	1836.06	0.	5.	0.003	44.72	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	3.3611E+00				5.31E+01	
			477.60	3.361E+00	&(	1.214E+01 1.07E+02 1.05E+01	G
NA-22	C	-1.1645E-01				9.50E+02	
			1274.53	-1.165E-01	?(	1.693E+00 4.06E+02 9.99E+01	G
K-40	N	2.7937E+02				4.66E+11	
			1460.83	2.794E+02	(P	8.496E+00 4.72E+00 1.07E+01	G
Sc-46	F	-7.1250E-01				8.38E+01	
			889.28	-7.125E-01	?(	2.055E+00 8.61E+01 1.00E+02	G
			1120.55	-5.353E-01	+	2.730E+00 1.50E+02 1.00E+02	G

(Page 10 of 21)

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	4.5513E-01					3.12E+02	
			834.85	4.551E-01	&(P	9.673E-01	9.03E+01	1.00E+02 G
FE-59	F	-4.8719E-01					4.45E+01	
			1099.25	-4.872E-01	?(P	2.681E+00	1.89E+02	5.65E+01 G
			1291.60	9.074E-02	%	3.745E+00	1.88E+03	4.32E+01 G
Co-56	C	6.8986E-01					7.73E+01	
			846.77	4.253E-02	%(	1.400E+00	1.38E+03	9.99E+01 G
			1238.28	1.104E-01	% P	2.887E+00	1.17E+03	6.61E+01 G
			1037.84	5.268E+00	&(	6.127E+00	5.31E+01	1.41E+01 G
			1771.35	0.000E+00	-	1.336E+01	1.00E+03	1.55E+01 A
CO-57	C	-3.4333E-01					2.72E+02	
			122.06	-3.433E-01	&(	1.087E+00	9.49E+01	8.56E+01 G
			136.47	-3.063E+00	+	1.569E+01	1.54E+02	1.07E+01 G
CO-58	C	2.3437E-01					7.09E+01	
			810.78	2.344E-01	&(	1.452E+00	1.79E+02	9.95E+01 G
CO-60	F	5.3809E-02					1.93E+03	
			1332.50	5.381E-02	%(P	1.325E+00	1.09E+03	1.00E+02 G
			1173.24	-2.488E-01	+ P	1.708E+00	2.27E+02	9.99E+01 G
NB-94	I	6.7722E-01					7.41E+06	
			702.63	6.772E-01	?(P	8.905E-01	5.71E+01	9.79E+01 G
			871.10	-2.174E-01	&	1.477E+00	1.95E+02	9.99E+01 G
ZR-95	I	3.7856E-01					6.40E+01	
			756.73	3.786E-01	(P	2.107E+00	2.34E+02	5.45E+01 G
			724.20	-6.993E-01	+	4.533E+00	1.90E+02	4.42E+01 G
NB-95	I	-6.0561E-01					6.40E+01	
			765.79	-6.056E-01	?(	1.672E+00	8.25E+01	9.98E+01 G
RU-103	I	2.5268E-01					3.93E+01	
			497.05	2.527E-01	?(	1.005E+00	1.63E+02	9.09E+01 G
			610.30	-1.133E+01	+	5.563E+01	1.47E+02	5.75E+00 GA
RH-106	I	2.5957E-06					3.74E+02	
			621.92	2.596E-06	%(	3.033E+01	3.44E+08	9.93E+00 G
			1050.36	1.605E+00	%	8.425E+01	1.44E+03	1.56E+00 G
			511.86	1.676E+01	?	5.976E+00	2.05E+01	2.00E+01 GA
AG-108M	C	3.5387E-01					1.53E+05	
			433.94	3.539E-01	?(	8.372E-01	9.45E+01	9.05E+01 G
			722.94	-6.515E-01	+	2.314E+00	1.06E+02	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	-7.303E-01	+	3.491E+00	1.43E+02	8.98E+01 G
AG-110M	F	4.0552E-01					2.50E+02	
			884.68	0.000E+00	?(	2.435E+00	1.00E+03	7.27E+01 G
			657.76	-6.748E-01	+	1.572E+00	7.02E+01	9.46E+01 G
			937.49	-2.484E+00	+ P	4.769E+00	5.53E+01	3.44E+01 G
			1384.30	1.619E+00	?(	3.528E+00	9.67E+01	2.43E+01 G
			763.94	-5.475E-02	% P	7.129E+00	3.99E+03	2.23E+01 G
SN-113	F	3.5981E-01					1.15E+02	
			391.69	3.598E-01	?(	2.048E+00	1.67E+02	6.40E+01 G
SB-124	F	-2.3143E-01					6.02E+01	
			602.73	-5.662E-01	(	3.091E+00	1.63E+02	9.83E+01 G
			1690.98	4.569E-01	?(	2.151E+00	2.05E+02	4.78E+01 G
			722.79	-5.474E+00	+	2.053E+01	1.11E+02	1.08E+01 G
SB-125	I	1.0242E+00					1.01E+03	
			427.88	8.716E-02	%(	3.276E+00	1.47E+03	2.96E+01 G
			600.50	-3.103E+00	+	1.734E+01	1.66E+02	1.79E+01 G
			635.89	1.113E+00	&(	8.615E+00	2.19E+02	1.13E+01 G
			463.37	3.577E+00	(P	1.125E+01	9.35E+01	1.05E+01 G
I-131	I	4.7444E-01					8.02E+00	
			364.48	4.179E-01	?(P	1.066E+00	1.03E+02	8.17E+01 G
			284.30	-7.157E+00	& P	1.665E+01	5.86E+01	6.14E+00 G
			636.97	1.119E+00	?(	1.520E+01	3.83E+02	7.17E+00 G
Gd-153	F	-2.5009E-01					2.42E+02	
			97.50	-2.501E-01	?(	4.593E+00	5.45E+02	3.00E+01 G
			103.20	0.000E+00	+	6.273E+00	1.00E+03	2.18E+01 G
Ga-68	C	7.2218E+00					4.71E-02	
			1077.40	7.222E+00	?(	5.249E+01	3.25E+02	3.30E+00 G
Tc-99m	I	-3.8249E-01					2.51E-01	
			140.51	-3.825E-01	&(	1.938E+00	1.52E+02	8.93E+01 G
BA-133	F	-2.1414E-01					3.85E+03	
			356.00	-7.489E-01	?(	3.661E+00	1.46E+02	6.20E+01 G
			302.85	1.596E+00	?(	1.021E+01	1.90E+02	1.83E+01 G
			383.84	2.539E+00	?	1.457E+01	1.69E+02	8.94E+00 GA
			80.99	1.072E+00	& P	6.183E+00	1.73E+02	3.41E+01 GA
CS-134	I	2.7059E-01					7.54E+02	
			604.71	-6.605E-01	?(	3.331E+00	1.51E+02	9.76E+01 G
			795.87	-8.557E-01	+	2.287E+00	8.01E+01	8.55E+01 G
			569.32	2.608E+00	&(	6.875E+00	7.87E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	6.592E+00	?(	2.271E+01	1.02E+02	8.69E+00 G
			563.24	-5.595E-01	+ P	1.420E+01	8.71E+02	8.35E+00 G
CS-137	I	4.1848E-01					1.10E+04	
			661.66	4.185E-01	?(	1.416E+00	9.97E+01	8.52E+01 G
CE-139	F	3.0328E-01					1.38E+02	
			165.85	3.033E-01	(	1.269E+00	1.25E+02	7.99E+01 G
Ba-140	I	1.9651E-01					1.28E+01	
			537.26	-9.978E-01	?(P	5.051E+00	1.61E+02	2.44E+01 G
			162.66	4.880E+00	(	1.706E+01	1.05E+02	6.22E+00 G
			304.85	0.000E+00	&	4.465E+01	1.00E+03	4.29E+00 G
La-140	I	2.6687E-01					1.28E+01	
			1596.21	7.286E-02	?(	1.374E+00	8.43E+02	9.54E+01 G
			487.02	6.737E-01	?(	2.935E+00	1.28E+02	4.55E+01 G
			328.76	-4.198E-01	+ P	6.457E+00	6.30E+02	2.03E+01 G
			815.77	0.000E+00	-	6.560E+00	1.00E+03	2.33E+01 G
CE-141	I	6.7664E-01					3.25E+01	
			145.44	6.766E-01	*(	3.514E+00	1.56E+02	4.82E+01 G
PM-144	C	3.1346E-02					3.63E+02	
			696.54	3.135E-02	%(P	1.096E+00	1.44E+03	9.90E+01 G
			618.06	-6.002E-01	+	3.099E+00	1.54E+02	9.91E+01 G
EU-152	F	9.9676E-01					4.94E+03	
			344.29	0.000E+00	?(	6.604E+00	1.00E+03	2.65E+01 G
			1112.07	-3.900E+00	+	1.989E+01	1.50E+02	1.36E+01 G
			121.78	1.014E+00	?(	3.280E+00	9.69E+01	2.86E+01 G
			778.92	-1.337E+00	&	9.620E+00	3.03E+02	1.29E+01 G
			964.11	-1.024E+01	+	2.177E+01	6.44E+01	1.46E+01 G
			244.69	4.417E+00	(	3.057E+01	2.07E+02	7.58E+00 G
			1408.00	5.991E-01	?	6.568E+00	4.89E+02	2.10E+01 GA
EU-154	I	2.8105E+00					3.14E+03	
			873.23	1.912E+00	?(P	1.260E+01	1.90E+02	1.23E+01 G
			123.10	2.309E-01	-	2.270E+00	2.90E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.941E+00	1.00E+03	3.52E+01 G
			723.36	-6.508E-01	-	9.780E+00	4.36E+02	2.02E+01 G
			1004.77	2.295E+00	?(	8.864E+00	1.13E+02	1.80E+01 G
			996.33	4.726E+00	?(	1.310E+01	8.23E+01	1.06E+01 G
EU-155	I	2.7077E-01					1.81E+03	
			105.31	2.708E-01	(	6.151E+00	6.73E+02	2.12E+01 G
			86.54	-1.311E+00	&	6.411E+00	1.47E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	-1.4560E-01					4.24E+01	
			482.00	-1.456E-01	?(	1.681E+00	3.34E+02	8.05E+01 G
			133.02	0.000E+00	+	3.738E+00	1.00E+03	4.33E+01 G
			345.83	-2.703E+00	+	1.231E+01	1.36E+02	1.51E+01 G
			136.30	0.000E+00	+	2.786E+01	1.00E+03	5.85E+00 G
Ta-182	F	-1.5847E+00					1.14E+02	
			1121.30	-1.585E+00	&(	7.968E+00	1.48E+02	3.49E+01 G
			1221.41	-1.737E+00	+	7.660E+00	2.02E+02	2.70E+01 G
			1189.05	6.806E-01	+	9.892E+00	6.47E+02	1.62E+01 G
Hg-203	F	-5.1336E-01					4.66E+01	
			279.20	-5.134E-01	?(	1.476E+00	8.62E+01	8.15E+01 G
TL-208	N	6.6504E+00					6.98E+02	
			583.02	6.650E+00	(P	1.103E+00	1.05E+01	8.45E+01 G
			277.28	4.604E+00	- P	1.057E+01	8.65E+01	6.31E+00 G
			860.56	2.362E+00	- P	9.509E+00	1.69E+02	1.24E+01 G
pm-146	C	3.4143E-01					2.02E+03	
			747.16	3.414E-01	?(	3.115E+00	3.79E+02	3.40E+01 G
			735.72	-3.174E+00	+	6.632E+00	9.15E+01	2.25E+01 G
			453.88	-6.228E-01	+ P	1.703E+00	1.01E+02	6.50E+01 G
y-88	F	-6.6520E-01					1.07E+02	
			898.04	-6.652E-01	?(P	1.692E+00	7.31E+01	9.37E+01 G
			1836.06	3.920E-01	+	5.777E-01	4.47E+01	9.92E+01 G
Cd-113m		4.1011E+03					5.33E+03	
			263.70	4.101E+03	&(	1.684E+04	1.22E+02	6.00E-03 K
Cf-251	T	1.7825E+00					3.28E+05	
			176.60	1.783E+00	&(	4.744E+00	1.04E+02	1.70E+01 G
			227.00	7.948E-01	?	1.430E+01	6.88E+02	6.30E+00 GA
Cf-249	T	1.1076E-01					1.28E+05	
			387.95	0.000E+00	?(	2.059E+00	1.00E+03	6.60E+01 G
			333.44	5.821E-01	&(	8.812E+00	4.42E+02	1.55E+01 G
Sn-126		4.4483E+00					3.65E+07	
			87.57	2.317E+00	}	4.811E+00	3.13E+01	3.75E+01 GA
			64.28	4.448E+00	&(	1.792E+01	1.21E+02	9.70E+00 G
			86.94	-4.444E+00	+	2.139E+01	1.45E+02	9.04E+00 GA
PB-210	N	1.6004E+01					8.14E+03	
			46.54	1.600E+01	(P	3.161E+01	6.06E+01	4.25E+00 G

Nuclide	Ave activity		Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.9299E+01					6.98E+02	
			238.63	1.930E+01	(P	1.602E+00	5.12E+00	4.33E+01 G
			300.03	9.989E+00	- P	5.152E+01	1.54E+02	3.28E+00 GA
PB-214	N	1.4384E+01					5.84E+05	
			351.93	1.468E+01	(P	2.454E+00	9.45E+00	3.76E+01 G
			295.09	1.380E+01	(P	4.254E+00	1.55E+01	1.93E+01 G
			242.00	1.542E+01	P	1.095E+01	2.38E+01	7.43E+00 GA
BI-207	C	1.6977E-01					1.18E+04	
			569.70	1.567E-01	?(	1.189E+00	2.18E+02	9.77E+01 G
			1063.66	1.869E-01	?(P	1.607E+00	3.63E+02	7.45E+01 G
BI-212	N	3.7335E+01					6.98E+02	
			727.17	3.734E+01	*(	8.252E+00	1.48E+01	7.55E+00 G
			785.42	3.858E+01	P	4.909E+01	5.08E+01	1.28E+00 GA
BI-214	N	1.1074E+01					5.84E+05	
			609.31	1.072E+01	(P	2.145E+00	1.15E+01	4.61E+01 G
			1120.29	1.786E+01	+ P	6.751E+00	2.01E+01	1.51E+01 G
			1764.49	1.214E+01	?(P	5.391E+00	2.26E+01	1.54E+01 G
BI-210M	T	2.8452E-01					1.10E+09	
			265.83	2.845E-01	?(	1.942E+00	2.00E+02	5.00E+01 G
			304.90	0.000E+00	&	6.841E+00	1.00E+03	2.80E+01 G
AC-228	N	2.2122E+01					2.10E+03	
			911.07	2.081E+01	(	2.138E+00	9.77E+00	2.90E+01 G
			968.97	2.581E+01	?(	1.145E+01	1.62E+01	1.75E+01 G
			338.32	1.992E+01	(	6.357E+00	1.67E+01	1.20E+01 G
			93.35	7.059E+00	-	3.039E+01	1.29E+02	5.56E+00 XA
TH-227	N	2.1815E+00					7.95E+03	
			50.14	2.181E+00	&(	2.498E+01	3.39E+02	8.00E+00 G
			256.24	-6.556E+00	+	1.618E+01	9.68E+01	7.00E+00 G
TH-229	N	5.5757E+00					2.68E+06	
			193.51	5.576E+00	(	1.869E+01	1.30E+02	4.40E+00 G
			210.85	-3.189E+00	-	3.531E+01	4.28E+02	2.99E+00 G
TH-234	N	1.9902E+01					1.63E+12	
			63.29	1.990E+01	(P	2.626E+01	4.12E+01	3.81E+00 G
			92.59	2.845E+00	- P	1.735E+01	1.81E+02	5.58E+00 G
PA-231	N	1.2603E+01					1.20E+07	
			302.65	1.173E+01	?(	6.352E+01	1.61E+02	2.88E+00 G
			300.07	1.362E+01	?(	7.046E+01	1.54E+02	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	7.9455E-01					7.82E+08	
			312.01	0.000E+00	?(	5.406E+00	1.00E+03	3.60E+01 G
			300.18	5.408E+00	?(	2.866E+01	1.58E+02	6.20E+00 G
PA-234	N	1.2896E+00					1.63E+12	
			131.29	1.290E+00	&(	8.852E+00	2.05E+02	1.80E+01 G
			946.02	-3.795E+00	+	1.172E+01	1.37E+02	1.34E+01 G
			569.47	0.000E+00	&	1.452E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	1.841E+01	1.00E+03	9.60E+00 G
			880.53	1.459E+00	?	2.897E+01	5.66E+02	6.00E+00 GA
PA-234M	N	8.5884E+01					1.63E+12	
			1001.00	4.247E+01	?(P	1.959E+02	1.34E+02	8.37E-01 G
			766.41	2.095E+02	&(P	5.237E+02	7.50E+01	2.94E-01 G
U-235	N	-3.5438E+00					2.57E+11	
			143.79	-3.544E+00	?(P	1.576E+01	7.55E+01	1.10E+01 G
			205.33	6.305E+00	& P	1.712E+01	1.06E+02	5.01E+00 G
			163.38	-1.716E-01	& P	2.183E+01	3.73E+03	5.08E+00 G
AM-241	T	-1.4063E+00					1.58E+05	
			59.54	-1.406E+00	&(	5.946E+00	1.27E+02	3.59E+01 G
Np-237	F	-2.9170E+00					2.14E+06	
			86.49	-2.917E+00	&(	1.511E+01	1.56E+02	1.31E+01 G
Ir-192	F	2.7891E-01					7.40E+01	
			316.49	0.000E+00	?(	2.258E+00	1.00E+03	8.70E+01 G
			468.06	7.480E-01	?(	2.436E+00	9.68E+01	5.18E+01 G
			308.44	0.000E+00	-	6.081E+00	1.00E+03	3.18E+01 G
Cs-136	F	-3.2813E-02					1.30E+01	
			818.50	-3.591E-01	?(	1.653E+00	1.35E+02	1.00E+02 G
			1048.07	3.750E-01	?(	1.297E+00	1.00E+02	8.00E+01 G
			340.57	-7.266E-01	&	3.805E+00	1.56E+02	4.69E+01 G
Np-239	T	-7.2180E-01					2.36E+00	
			103.70	0.000E+00	+	5.693E+00	1.00E+03	2.40E+01 X
			106.13	-7.218E-01	(	5.971E+00	2.46E+02	2.27E+01 G
			99.50	0.000E+00	+	9.188E+00	1.00E+03	1.50E+01 X
Nd-147		2.3934E+00					1.11E+01	
			531.00	2.393E+00	?(	6.983E+00	1.20E+02	1.30E+01 G
			91.10	0.000E+00	-	6.334E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

********** 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	
AM-241	59.54	633.	-28.	-0.016	126.81	-1.406E+00	
BA-133	80.99	1069.	27.	0.015	173.10	1.072E+00	P
Np-237	86.49	1015.	-29.	-0.016	155.54	-2.917E+00	
EU-155	86.54	1003.	-31.	-0.017	146.81	-1.311E+00	
Gd-153	97.50	532.	-6.	-0.003	545.18	-2.501E-01	
EU-155	105.31	491.	5.	0.003	673.32	2.708E-01	
Np-239	106.13	533.	-13.	-0.007	246.40	-7.218E-01	
EU-152	121.78	250.	24.	0.013	96.91	1.014E+00	
CO-57	122.06	246.	-24.	-0.013	94.85	-3.433E-01	
EU-154	123.10	243.	8.	0.004	289.81	2.309E-01	
PA-234	131.29	724.	19.	0.010	205.21	1.290E+00	
CO-57	136.47	786.	-26.	-0.014	153.58	-3.063E+00	
Tc-99m	140.51	774.	-26.	-0.015	151.90	-3.825E-01	
U-235	143.79	805.	-30.	-0.017	75.51	-3.544E+00	P
CE-141	145.44	766.	25.	0.014	155.65	6.766E-01	
Ba-140	162.66	260.	22.	0.012	104.60	4.880E+00	
CE-139	165.85	238.	18.	0.010	124.65	3.033E-01	
Cf-251	176.60	136.	21.	0.012	104.03	1.783E+00	
TH-229	193.51	125.	16.	0.009	130.26	5.576E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	205.33	126.	20.	0.011	105.87	6.305E+00	P
TH-229	210.85	187.	-6.	-0.003	428.34	-3.189E+00	
Cf-251	227.00	121.	3.	0.002	688.40	7.948E-01	
EU-152	244.69	770.	19.	0.011	206.96	4.417E+00	
Cd-113m	263.70	125.	13.	0.007	121.55	4.101E+03	
BI-210M	265.83	113.	8.	0.004	199.67	2.845E-01	
Hg-203	279.20	166.	-22.	-0.012	86.20	-5.134E-01	
I-131	284.30	115.	-23.	-0.013	58.62	-7.157E+00	P
PA-231	300.07	320.	17.	0.009	153.98	1.362E+01	
PA-233	300.18	336.	17.	0.009	157.80	5.408E+00	
PA-231	302.65	353.	17.	0.009	161.24	1.173E+01	
BA-133	302.85	370.	14.	0.008	190.26	1.596E+00	
La-140	328.76	157.	-4.	-0.002	629.80	-4.198E-01	P
Cf-249	333.44	168.	4.	0.002	442.43	5.821E-01	
Cs-136	340.57	284.	-16.	-0.009	155.71	-7.266E-01	
HF-181	345.83	300.	-18.	-0.010	135.71	-2.703E+00	
BA-133	356.00	438.	-20.	-0.011	146.03	-7.489E-01	
I-131	364.48	57.	15.	0.008	102.59	4.179E-01	P
BA-133	383.84	124.	10.	0.005	168.59	2.539E+00	
SN-113	391.69	122.	10.	0.005	167.27	3.598E-01	
AG-108M	433.94	32.	12.	0.007	94.54	3.539E-01	
pm-146	453.88	68.	-15.	-0.008	101.11	-6.228E-01	P
SB-125	463.37	75.	14.	0.008	93.53	3.577E+00	P
Ir-192	468.06	86.	14.	0.008	96.75	7.480E-01	
BE-7	477.60	85.	13.	0.007	106.84	3.361E+00	
HF-181	482.00	95.	-4.	-0.002	334.18	-1.456E-01	
La-140	487.02	91.	11.	0.006	128.29	6.737E-01	
RU-103	497.05	39.	8.	0.004	163.22	2.527E-01	
RH-106	511.86	67.	114.	0.064	20.47	1.676E+01	
Nd-147	531.00	35.	10.	0.006	120.40	2.393E+00	
Ba-140	537.26	66.	-8.	-0.004	161.26	-9.978E-01	P
CS-134	563.24	56.	-1.	-0.001	870.96	-5.595E-01	P
CS-134	569.32	43.	13.	0.007	78.68	2.608E+00	
BI-207	569.70	53.	5.	0.003	218.14	1.567E-01	
SB-125	600.50	384.	-17.	-0.009	166.46	-3.103E+00	
SB-124	602.73	367.	-17.	-0.009	162.65	-5.662E-01	
CS-134	604.71	420.	-19.	-0.011	150.54	-6.605E-01	
RU-103	610.30	401.	-20.	-0.011	146.57	-1.133E+01	
AG-108M	614.28	381.	-20.	-0.011	142.69	-7.303E-01	
PM-144	618.06	362.	-18.	-0.010	153.92	-6.002E-01	
SB-125	635.89	30.	4.	0.002	218.75	1.113E+00	
I-131	636.97	39.	2.	0.001	382.53	1.119E+00	
AG-110M	657.76	72.	-18.	-0.010	70.20	-6.748E-01	
NB-94	702.63	20.	18.	0.010	57.11	6.772E-01	P
SB-124	722.79	145.	-16.	-0.009	111.48	-5.474E+00	
AG-108M	722.94	129.	-16.	-0.009	105.60	-6.515E-01	
EU-154	723.36	113.	-3.	-0.002	435.73	-6.508E-01	
ZR-95	724.20	116.	-8.	-0.005	189.89	-6.993E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
pm-146	735.72	61.	-19.	-0.010	91.49	-3.174E+00		
pm-146	747.16	28.	3.	0.002	378.59	3.414E-01		
ZR-95	756.73	33.	5.	0.003	234.00	3.786E-01		P
NB-95	765.79	72.	-15.	-0.009	82.49	-6.056E-01		
PA-234M	766.41	61.	16.	0.009	75.03	2.095E+02		P
EU-152	778.92	37.	-4.	-0.002	302.94	-1.337E+00		
CS-134	795.87	95.	-18.	-0.010	80.08	-8.557E-01		
CS-134	801.95	96.	14.	0.008	102.25	6.592E+00		
CO-58	810.78	48.	6.	0.003	178.52	2.344E-01		
Cs-136	818.50	64.	-9.	-0.005	134.56	-3.591E-01		
MN-54	834.85	19.	11.	0.006	90.32	4.551E-01		P
NB-94	871.10	45.	-5.	-0.003	194.94	-2.174E-01		
EU-154	873.23	50.	5.	0.003	189.71	1.912E+00		P
PA-234	880.53	63.	2.	0.001	565.69	1.459E+00		
Sc-46	889.28	89.	-16.	-0.009	86.12	-7.125E-01		
y-88	898.04	50.	-14.	-0.008	73.07	-6.652E-01		P
AG-110M	937.49	50.	-19.	-0.010	55.25	-2.484E+00		P
PA-234	946.02	45.	-11.	-0.006	137.42	-3.795E+00		
EU-152	964.11	195.	-32.	-0.018	64.40	-1.024E+01		
EU-154	996.33	32.	10.	0.006	82.26	4.726E+00		
PA-234M	1001.00	45.	7.	0.004	134.39	4.247E+01		P
EU-154	1004.77	42.	9.	0.005	112.90	2.295E+00		
Co-56	1037.84	10.	15.	0.008	53.05	5.268E+00		
Cs-136	1048.07	15.	6.	0.003	100.00	3.750E-01		
BI-207	1063.66	20.	3.	0.002	363.24	1.869E-01		P
Ga-68	1077.40	32.	4.	0.002	325.32	7.222E+00		
FE-59	1099.25	32.	-5.	-0.003	189.28	-4.872E-01		P
EU-152	1112.07	111.	-10.	-0.006	149.98	-3.900E+00		
Sc-46	1120.55	111.	-10.	-0.006	149.98	-5.353E-01		
Ta-182	1121.30	116.	-10.	-0.006	148.00	-1.585E+00		
CO-60	1173.24	38.	-5.	-0.003	226.90	-2.488E-01		P
Ta-182	1189.05	32.	2.	0.001	646.79	6.806E-01		
Ta-182	1221.41	53.	-8.	-0.005	202.19	-1.737E+00		
NA-22	1274.53	32.	-2.	-0.001	406.20	-1.165E-01		
AG-110M	1384.30	6.	6.	0.004	96.69	1.619E+00		
EU-152	1408.00	17.	2.	0.001	488.62	5.991E-01		
La-140	1596.21	12.	1.	0.001	842.61	7.286E-02		
SB-124	1690.98	6.	3.	0.002	205.48	4.569E-01		
y-88	1836.06	0.	5.	0.003	44.72	3.920E-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	3.3611E+00	3.3611E+00	1.068E+02%	1.21E+01
NA-22	#A	-1.1645E-01	-1.1645E-01	4.062E+02%	1.69E+00
K-40		2.7937E+02	2.7937E+02	4.724E+00%	8.50E+00
Sc-46	#A	-7.1250E-01	-7.1250E-01	8.612E+01%	2.06E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.01E+01
MN-54	#A	4.5513E-01	4.5513E-01	9.032E+01%	9.67E-01
FE-59	#A	-4.8719E-01	-4.8719E-01	1.893E+02%	2.68E+00
Co-56	#A	6.8986E-01	6.8986E-01	5.305E+01%	1.40E+00
CO-57	#A	-3.4333E-01	-3.4333E-01	9.485E+01%	1.09E+00
CO-58	#A	2.3437E-01	2.3437E-01	1.785E+02%	1.45E+00
CO-60	#A	5.3809E-02	5.3809E-02	1.090E+03%	1.32E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.14E+00
NB-94	#A	6.7722E-01	6.7722E-01	5.711E+01%	8.91E-01
ZR-95	#A	3.7856E-01	3.7856E-01	2.340E+02%	2.11E+00
NB-95	#A	-6.0561E-01	-6.0561E-01	8.249E+01%	1.67E+00
RU-103	#A	2.5268E-01	2.5268E-01	1.632E+02%	1.00E+00
RH-106	#A	2.5957E-06	2.5957E-06	3.438E+08%	3.03E+01
AG-108M	#A	3.5387E-01	3.5387E-01	9.454E+01%	8.37E-01
AG-110M	#A	4.0552E-01	4.0552E-01	9.669E+01%	2.43E+00
SN-113	#A	3.5981E-01	3.5981E-01	1.673E+02%	2.05E+00
SB-124	#A	-2.3143E-01	-2.3143E-01	1.310E+02%	3.09E+00
SB-125	#A	1.0242E+00	1.0242E+00	9.353E+01%	3.28E+00
I-131	#A	4.7443E-01	4.7444E-01	1.026E+02%	1.07E+00
Gd-153	#A	-2.5009E-01	-2.5009E-01	5.452E+02%	4.59E+00
Ga-68	#A	7.1948E+00	7.2218E+00	3.253E+02%	5.25E+01
Tc-99m	#A	-3.8222E-01	-3.8249E-01	1.519E+02%	1.94E+00
BA-133	#A	-2.1414E-01	-2.1414E-01	1.199E+02%	3.66E+00
CS-134	#A	2.7059E-01	2.7059E-01	6.609E+01%	3.33E+00
CS-137	#A	4.1848E-01	4.1848E-01	9.967E+01%	1.42E+00
CE-139	#A	3.0328E-01	3.0328E-01	1.247E+02%	1.27E+00
Ba-140	#A	1.9651E-01	1.9651E-01	9.611E+01%	5.05E+00
La-140	#A	2.6687E-01	2.6687E-01	1.283E+02%	1.37E+00
CE-141	#A	6.7664E-01	6.7664E-01	1.556E+02%	3.51E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.46E+01
PM-144	#A	3.1346E-02	3.1346E-02	1.445E+03%	1.10E+00
EU-152	#A	9.9676E-01	9.9676E-01	9.691E+01%	6.60E+00
EU-154	#A	2.8105E+00	2.8105E+00	7.853E+01%	1.26E+01
EU-155	#A	2.7077E-01	2.7077E-01	6.733E+02%	6.15E+00
HF-181	#A	-1.4560E-01	-1.4560E-01	3.342E+02%	1.68E+00
Ta-182	#A	-1.5847E+00	-1.5847E+00	1.480E+02%	7.97E+00
Hg-203	#A	-5.1336E-01	-5.1336E-01	8.620E+01%	1.48E+00
TL-208		6.6504E+00	6.6504E+00	1.047E+01%	1.10E+00
pm-146	#A	3.4143E-01	3.4143E-01	3.786E+02%	3.11E+00

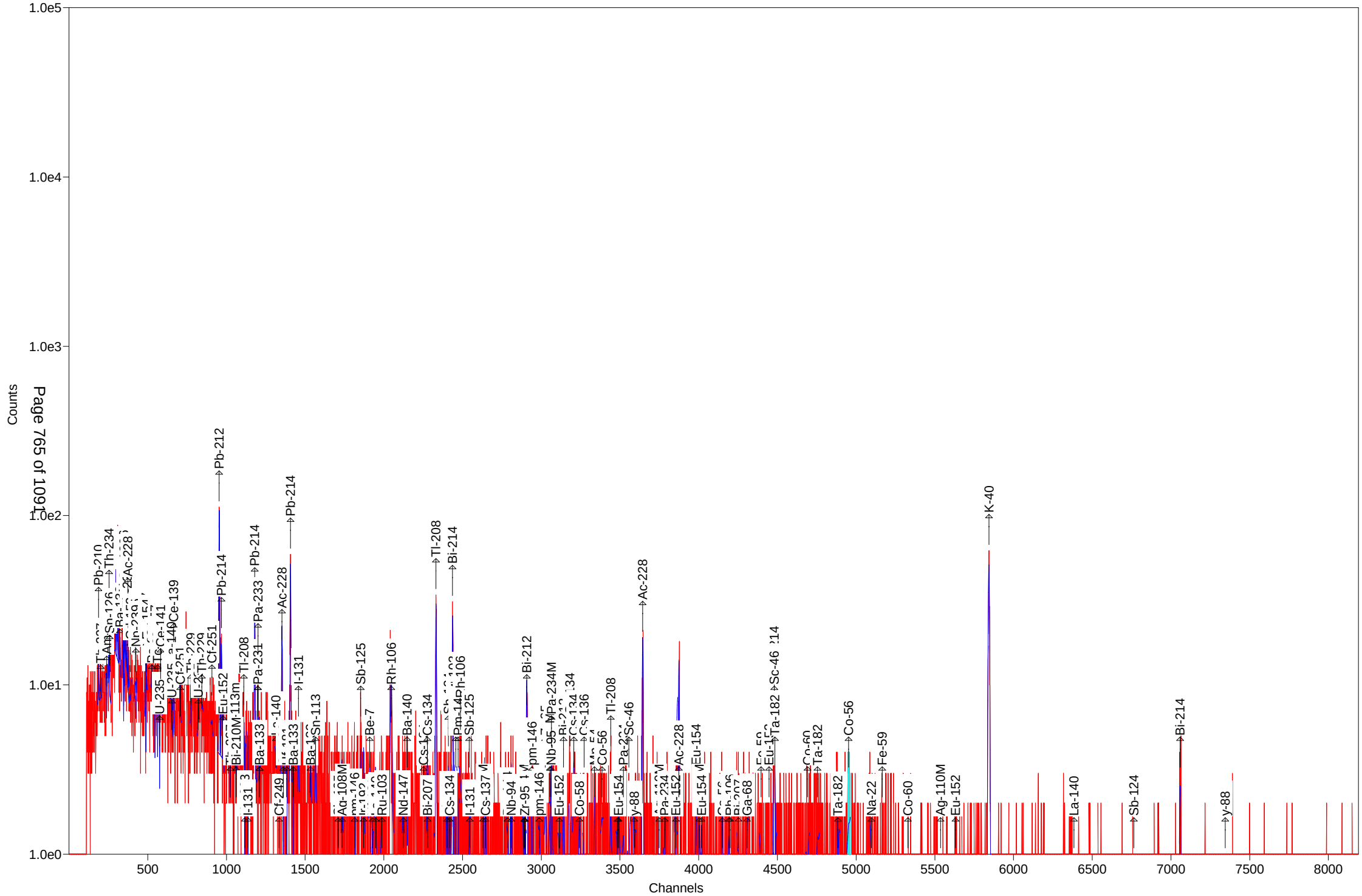
y-88	#A	-6.6520E-01	-6.6520E-01	7.307E+01%	1.69E+00
Cd-113m	#A	4.1011E+03	4.1011E+03	1.216E+02%	1.68E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.80E+01
Cf-251	#A	1.7825E+00	1.7825E+00	1.040E+02%	4.74E+00
Cf-249	#A	1.1076E-01	1.1076E-01	4.424E+02%	2.06E+00
Sn-126	A	4.4483E+00	4.4483E+00	1.207E+02%	1.79E+01
PB-210	A	1.6004E+01	1.6004E+01	6.055E+01%	3.16E+01
PB-212		1.9299E+01	1.9299E+01	5.120E+00%	1.60E+00
PB-214		1.4384E+01	1.4384E+01	9.071E+00%	2.45E+00
BI-207	#A	1.6977E-01	1.6977E-01	2.119E+02%	1.19E+00
BI-212		3.7335E+01	3.7335E+01	1.477E+01%	8.25E+00
BI-214		1.1074E+01	1.1074E+01	1.146E+01%	2.15E+00
BI-210M	#A	2.8452E-01	2.8452E-01	1.997E+02%	1.94E+00
AC-228		2.2122E+01	2.2122E+01	8.407E+00%	2.14E+00
TH-227	#A	2.1815E+00	2.1815E+00	3.389E+02%	2.50E+01
TH-229	#A	5.5757E+00	5.5757E+00	1.303E+02%	1.87E+01
TH-234	A	1.9902E+01	1.9902E+01	4.118E+01%	2.63E+01
PA-231	#A	1.2603E+01	1.2603E+01	1.115E+02%	6.35E+01
PA-233	#A	7.9455E-01	7.9455E-01	1.578E+02%	5.41E+00
PA-234	#A	1.2896E+00	1.2896E+00	2.052E+02%	8.85E+00
PA-234M	#A	8.5884E+01	8.5884E+01	7.503E+01%	1.96E+02
U-235	#A	-3.5438E+00	-3.5438E+00	7.551E+01%	1.58E+01
AM-241	#A	-1.4063E+00	-1.4063E+00	1.268E+02%	5.95E+00
Np-237	#A	-2.9170E+00	-2.9170E+00	1.555E+02%	1.51E+01
Ir-192	#A	2.7890E-01	2.7891E-01	9.675E+01%	2.26E+00
Cs-136	#A	-3.2812E-02	-3.2813E-02	8.382E+01%	1.65E+00
Np-239	#A	-7.2174E-01	-7.2180E-01	2.464E+02%	5.97E+00
Nd-147	#A	2.3934E+00	2.3934E+00	1.204E+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) 4.261E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 4.2614453E+02 Bq/Sample

264540_Gamma_160-18553-A-15-B. 12_Gamma_20161873.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161673

Sample Description: 264540_Gamma_160-18553-A-16-B
Detector: Detector # 5
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-16-B

Decay to Time: 9/1/2016 16:01 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:02:00 Real Time: 1809 sec
Analysis Time: 9/1/2016 16:32 Dead Time: 0.48 %
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	-6.079E+00	90.2	5.483E+00	5.492E+00	1.841E+01
NA-22	7.121E-01	73.0	5.199E-01	5.211E-01	1.741E+00
K-40	3.165E+02	5.8	1.820E+01	2.436E+01	1.207E+01
Sc-46	1.111E+00	64.2	7.129E-01	7.152E-01	2.461E+00
CR-51	3.916E+00	109.5	4.286E+00	4.291E+00	1.448E+01
MN-54	1.224E+00	50.0	6.122E-01	6.155E-01	1.370E+00
FE-59	-1.423E-01	101.1	1.438E-01	1.440E-01	3.945E+00
Co-56	1.972E+00	32.6	6.434E-01	6.513E-01	1.396E+00
CO-57	-6.637E-02	69.8	4.632E-02	4.645E-02	1.602E+00
CO-58	-9.769E-01	84.6	8.262E-01	8.277E-01	2.770E+00
CO-60	2.578E-01	222.7	5.743E-01	5.744E-01	1.828E+00
ZN-65	-2.898E+00	90.5	2.623E+00	2.627E+00	8.790E+00
NB-94	1.953E-01	76.5	1.495E-01	1.498E-01	2.007E+00
ZR-95	0.000E+00	1.#INF	3.253E-01	3.253E-01	3.045E+00
NB-95	-1.198E+00	72.5	8.690E-01	8.712E-01	2.888E+00
RU-103	-5.897E-02	994.1	5.862E-01	5.862E-01	1.414E+00
RH-106	-8.491E+00	100.6	8.541E+00	8.552E+00	4.508E+01
AG-108M	4.656E-01	101.5	4.729E-01	4.735E-01	1.191E+00
AG-110M	3.113E-01	84.5	2.631E-01	2.636E-01	4.099E+00
SN-113	-9.173E-01	140.1	1.286E+00	1.286E+00	3.507E+00
SB-124	-1.619E-01	85.7	1.388E-01	1.391E-01	4.657E+00
SB-125	4.077E+00	27.1	1.105E+00	1.124E+00	5.102E+00
I-131	3.777E-01	102.5	3.872E-01	3.877E-01	1.608E+00
Gd-153	-8.455E-01	156.9	1.327E+00	1.328E+00	4.458E+00
Ga-68	2.997E+00	857.3	2.569E+01	2.570E+01	6.221E+01
Tc-99m	2.320E-01	215.4	4.996E-01	4.998E-01	1.683E+00
BA-133	-6.187E-01	233.4	1.444E+00	1.444E+00	4.866E+00
CS-134	-2.083E-01	146.3	3.047E-01	3.049E-01	4.599E+00
CS-137	1.266E-02	5458.0	6.910E-01	6.910E-01	2.444E+00
CE-139	2.515E-01	202.9	5.103E-01	5.108E-01	1.723E+00
Ba-140	1.312E-02	18327.1	2.404E+00	2.404E+00	6.273E+00
La-140	8.077E-01	58.2	4.700E-01	4.719E-01	2.262E+00
CE-141	0.000E+00	1.#INF	5.898E-01	5.898E-01	3.130E+00

CE-144	-2.125E+00	161.8	3.438E+00	3.440E+00	1.480E+01
PM-144	1.968E-02	3609.7	7.102E-01	7.102E-01	1.780E+00
EU-152	3.353E+00	115.7	3.879E+00	3.883E+00	8.295E+00
EU-154	4.420E+00	72.3	3.194E+00	3.202E+00	1.209E+01
EU-155	1.532E+00	156.8	2.402E+00	2.404E+00	8.035E+00
HF-181	9.114E-01	101.9	9.288E-01	9.300E-01	2.438E+00
Ta-182	2.991E+00	84.2	2.518E+00	2.523E+00	8.471E+00
Hg-203	3.909E-03	17196.8	6.722E-01	6.722E-01	2.305E+00
TL-208	9.370E+00	9.7	9.057E-01	1.028E+00	1.365E+00
pm-146	1.102E+00	162.8	1.795E+00	1.796E+00	4.474E+00
y-88	1.286E+00	46.0	5.910E-01	5.947E-01	1.308E+00
Cd-113m	1.807E+03	339.3	6.131E+03	6.132E+03	2.116E+04
Cd-109	1.109E+01	159.4	1.768E+01	1.769E+01	5.896E+01
Cf-251	1.981E+00	104.6	2.072E+00	2.080E+00	5.585E+00
Cf-249	4.276E-01	225.4	9.639E-01	9.642E-01	3.116E+00
Sn-126	-5.559E+00	101.5	5.642E+00	5.650E+00	1.881E+01
PB-210	2.650E+00	581.4	1.541E+01	1.541E+01	4.497E+01
PB-212	2.484E+01	5.7	1.411E+00	2.138E+00	2.729E+00
PB-214	2.056E+01	8.8	1.805E+00	2.097E+00	3.556E+00
BI-207	0.000E+00	1.#INF	1.238E-01	1.238E-01	1.846E+00
BI-212	2.568E+01	25.8	6.617E+00	6.750E+00	1.339E+01
BI-214	1.807E+01	9.8	1.779E+00	2.012E+00	2.748E+00
BI-210M	7.767E-01	97.5	7.577E-01	7.591E-01	2.549E+00
AC-228	2.888E+01	8.1	2.328E+00	2.755E+00	3.086E+00
TH-227	6.341E+00	109.0	6.912E+00	6.920E+00	1.963E+01
TH-229	-7.629E-01	1250.6	9.541E+00	9.541E+00	2.618E+01
TH-234	1.568E+00	783.7	1.229E+01	1.229E+01	4.178E+01
PA-231	0.000E+00	1.#INF	7.443E+00	7.443E+00	7.944E+01
PA-233	1.174E+00	156.6	1.839E+00	1.840E+00	6.198E+00
PA-234	-2.131E+00	130.6	2.784E+00	2.786E+00	9.299E+00
PA-234M	1.457E+02	65.7	9.578E+01	9.606E+01	2.605E+02
U-235	0.000E+00	1.#INF	1.084E+00	1.084E+00	1.368E+01
AM-241	5.320E-02	2893.4	1.539E+00	1.539E+00	4.437E+00
Np-237	0.000E+00	1.#INF	5.458E+00	5.458E+00	1.820E+01
Ir-192	-5.840E-01	101.4	5.921E-01	5.931E-01	1.988E+00
Cs-136	7.807E-01	104.0	8.121E-01	8.133E-01	2.993E+00
Np-239	-5.635E-01	397.5	2.239E+00	2.240E+00	7.535E+00
Nd-147	-6.432E+00	93.0	5.981E+00	5.992E+00	1.474E+01
Total	2.458E+03				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-16-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161673.An1

Acquisition information
Start time: 9/1/2016 4:02:00 PM
Live time: 1800
Real time: 1809
Dead time: 0.48 %
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 4:01:00 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. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2198

***** 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	4.	581.41	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	18.	109.00	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.29	3.	783.66	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
74.81	169.	14.93	0.81	3.152E-02				
77.07	294.	8.75	0.81	3.219E-02				
86.81	26.	83.59	0.83	3.443E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	4.668E+00	Sn126
87.44	26.	157.09	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
88.04	26.	159.40	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
90.07	65.	33.88	0.66	3.493E-02				
91.10	26.	161.18	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-18.	233.85	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.22	75.	25.76	0.83	3.536E-02	93.35	5.561	2.113E+01	AC228
99.50	22.	110.02	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
105.31	21.	156.82	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
123.10	14.	166.00	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
126.89	14.	81.77	0.55	3.547E-02				
136.73	19.	86.40	1.33	3.457E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.910E+00	CO57
140.51	12.	215.39	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	11.	202.88	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
176.60	18.	104.62	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
186.20	84.	28.91	1.21	2.848E-02				
238.83	449.	5.68	0.98	2.318E-02	238.63	43.300	2.484E+01	PB212
242.07	94.	15.84	0.98	2.292E-02	242.00	7.430	3.056E+01	PB214
244.69	16.	239.30	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
263.70	4.	339.27	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
266.05	15.	97.55	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
295.36	138.	14.65	1.30	1.945E-02	295.09	19.300	2.043E+01	PB214
300.49	60.	28.52	1.38	1.918E-02	300.03	3.280	5.297E+01	PB212
					300.07	2.460	7.064E+01	PA231
					300.18	6.200	PBC<MDA	PA233
312.01	14.	156.60	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
320.08	13.	109.46	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	26.	58.19	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
333.44	4.	369.27	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.52	127.	14.57	1.43	1.736E-02	338.32	12.010	3.395E+01	AC228
340.57	9.	212.49	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
344.29	9.	216.90	1.08	1.711E-02	344.29	26.500	PBC<MDA	EU152
345.83	9.	221.52	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.11	234.	9.68	1.64	1.679E-02	351.93	37.600	2.062E+01	PB214
383.84	14.	115.30	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
387.95	6.	258.59	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
433.94	11.	101.55	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
463.37	47.	27.09	1.19	1.336E-02	463.37	10.470	1.871E+01	SB125
482.00	13.	101.92	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	7.	183.31	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
511.86	76.	28.40	2.48	1.230E-02	511.86	20.000	1.717E+01	RH106
583.64	166.	9.83	1.10	1.102E-02	583.02	84.500	9.847E+00	TL208
609.43	162.	9.84	1.74	1.063E-02	609.31	46.090	1.833E+01	BI214
635.89	10.	70.20	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
636.97	8.	102.53	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	9.	84.53	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
727.56	32.	25.77	1.84	9.170E-03	727.17	7.550	2.568E+01	BI212
747.16	6.	162.83	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
766.41	16.	85.25	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.440E+02	PA234M
795.87	6.	232.56	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
818.50	13.	104.02	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
835.64	18.	50.00	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
846.77	9.	95.12	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
858.08	13.	93.54	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	9.	76.52	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	5.	112.47	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
889.28	11.	94.01	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
898.04	17.	45.96	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.45	105.	10.46	1.74	7.591E-03	911.07	29.000	2.645E+01	AC228
964.11	12.	127.08	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.29	67.	16.22	1.85	7.209E-03	968.97	17.460	2.943E+01	AC228
996.33	8.	90.73	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1001.13	8.	100.05	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1077.40	1.	857.32	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1120.29	16.	98.06	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	17.	87.40	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.448E+00	Sc46
					1121.30	34.900	4.151E+00	Ta182
1121.31	12.	84.20	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.991E+00	Ta182
1173.24	5.	222.75	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	28.	32.63	1.80	5.866E-03	1238.28	66.070	4.022E+00	Co56
1274.53	7.	73.01	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.022E+00	EU154
1291.60	5.	121.64	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	1.	726.62	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	6.	101.72	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.38	310.	5.75	2.14	5.103E-03	1460.83	10.670	3.165E+02	K40
1596.21	2.	480.00	2.02	4.736E-03	1596.21	95.400	PBC<MDA	La140
1690.98	4.	137.50	2.08	4.511E-03	1690.98	47.790	PBC<MDA	SB124
1765.26	21.	24.08	2.11	4.351E-03	1764.49	15.400	1.731E+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
298.87	74.85	232.	169.	5.349E+03	14.93	0.813	- sD
307.90	77.11	185.	294.	9.147E+03	8.75	0.815	- sD
359.45	90.07	125.	76.	2.179E+03	23.72	0.828	- D
507.37	126.89	51.	14.	3.853E+02	81.77	0.550	- c
744.76	186.20	120.	84.	2.938E+03	28.91	1.208	- 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	185.69	46.54	159.	4.	0.002	581.41	0.783s
TH-227	200.11	50.14	135.	18.	0.010	109.00	0.787s
TH-234	252.74	63.29	259.	3.	0.002	783.66	0.801s
Sn-126	256.71	64.28	355.	-27.	-0.015	101.48	0.802s
Np-237	345.63	86.49	964.	0.	0.000	169.10	0.825A
EU-155	345.84	86.54	938.	-24.	-0.013	181.25	0.825s
Sn-126	347.43	86.94	874.	26.	0.015	83.59	0.825D
Sn-126	349.95	87.57	832.	26.	0.015	157.09	0.826
Cd-109	351.83	88.04	859.	26.	0.015	159.40	0.826s
Nd-147	364.08	91.10	885.	26.	0.015	161.18	0.829s
TH-234	370.05	92.59	849.	-18.	-0.010	233.85	0.831s
AC-228	373.09	93.35	148.	75.	0.042	25.76	0.832D
Gd-153	389.70	97.50	320.	-16.	-0.009	156.93	0.836s
Np-239	397.71	99.50	282.	22.	0.012	110.02	0.838s
Gd-153	412.52	103.20	368.	-14.	-0.007	202.66	0.842s
Np-239	414.52	103.70	381.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	539.	21.	0.012	156.82	0.844s
Np-239	424.25	106.13	544.	-8.	-0.005	397.45	0.845s
EU-152	486.88	121.78	332.	-24.	-0.013	108.66	0.861s
CO-57	488.03	122.06	338.	-24.	-0.013	109.59	0.861s
EU-154	492.18	123.10	278.	14.	0.008	166.00	0.862s
PA-234	524.99	131.29	489.	-24.	-0.013	130.61	0.871
HF-181	531.91	133.02	474.	-24.	-0.013	128.46	0.872s
CE-144	533.97	133.54	463.	-15.	-0.008	161.76	0.873s
HF-181	545.02	136.30	477.	0.	0.000	1000.00	0.876s
CO-57	546.74	136.73	92.	19.	0.011	86.40	1.326s
Tc-99m	561.88	140.51	347.	12.	0.007	215.39	0.880s
U-235	574.99	143.79	359.	0.	0.000	1000.00	0.883s
CE-141	581.61	145.44	359.	0.	0.000	1000.00	0.885s
Ba-140	650.54	162.66	252.	-4.	-0.002	563.47	0.902s
U-235	653.42	163.38	234.	-20.	-0.011	110.45	0.903s
CE-139	663.32	165.85	259.	11.	0.006	202.88	0.905s
Cf-251	706.34	176.60	107.	18.	0.010	104.62	0.916s
U-235	821.35	205.33	124.	-11.	-0.006	213.40	0.945s
PB-212	954.64	238.63	100.	449.	0.249	5.68	0.978D
PB-214	968.10	242.00	65.	92.	0.051	16.16	0.981D
EU-152	978.89	244.69	751.	16.	0.009	239.30	0.984s
TH-227	1025.11	256.24	111.	-20.	-0.011	196.17	0.995s
Cd-113m	1054.97	263.70	98.	4.	0.002	339.27	1.002s
BI-210M	1063.50	265.83	97.	15.	0.008	97.55	1.005s
TL-208	1109.33	277.28	191.	-21.	-0.012	94.82	1.016s
I-131	1137.41	284.30	77.	0.	0.000	1000.00	1.022
PB-214	1181.68	295.36	65.	138.	0.077	14.65	1.302s
PB-212	1202.21	300.49	54.	60.	0.033	28.52	1.382s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	1200.97	300.18	264.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	264.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	264.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	264.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	264.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	238.	14.	0.008	156.60	1.049s
Ir-192	1266.25	316.49	136.	-17.	-0.009	101.39	1.053
CR-51	1280.63	320.08	91.	13.	0.007	109.46	1.057
La-140	1315.35	328.76	60.	26.	0.015	58.19	1.065s
Cf-249	1334.08	333.44	51.	4.	0.002	369.27	1.070s
AC-228	1354.42	338.52	43.	127.	0.071	14.57	1.434s
Cs-136	1362.62	340.57	185.	9.	0.005	212.49	1.077s
EU-152	1377.49	344.29	195.	9.	0.005	216.90	1.080s
HF-181	1383.66	345.83	204.	9.	0.005	221.52	1.082s
PB-214	1408.81	352.11	66.	234.	0.130	9.68	1.644s
BA-133	1424.36	356.00	354.	-12.	-0.006	233.41	1.091
BA-133	1535.78	383.84	124.	14.	0.008	115.30	1.117
Cf-249	1552.22	387.95	138.	6.	0.004	258.59	1.121s
SN-113	1567.19	391.69	162.	-16.	-0.009	140.14	1.125s
SB-125	1711.99	427.88	60.	-11.	-0.006	206.11	1.158s
AG-108M	1736.25	433.94	28.	11.	0.006	101.55	1.164s
pm-146	1816.05	453.88	89.	-20.	-0.011	53.90	1.182
SB-125	1854.01	463.37	58.	47.	0.026	27.09	1.191s
Ir-192	1872.79	468.06	105.	0.	0.000	1000.00	1.195s
BE-7	1910.94	477.59	84.	-15.	-0.008	90.18	1.204s
HF-181	1928.56	482.00	85.	13.	0.007	101.92	1.208s
La-140	1948.65	487.02	36.	7.	0.004	183.31	1.212s
RU-103	1988.80	497.05	32.	-1.	-0.001	994.15	1.221s
RH-106	2048.06	511.86	60.	76.	0.042	28.40	2.485s
Nd-147	2124.62	531.00	68.	-18.	-0.010	92.99	1.252s
CS-134	2277.94	569.32	44.	-6.	-0.003	161.59	1.286s
BI-207	2279.47	569.70	53.	0.	0.000	1000.00	1.286s
TL-208	2334.78	583.53	19.	157.	0.087	9.67	1.101s
SB-125	2402.69	600.50	352.	-14.	-0.008	185.64	1.313s
SB-124	2411.61	602.73	338.	-15.	-0.008	102.41	1.315s
CS-134	2419.53	604.71	323.	-14.	-0.008	177.52	1.317s
BI-214	2438.40	609.43	21.	162.	0.090	9.84	1.736s
RU-103	2441.89	610.30	309.	-15.	-0.008	172.97	1.322s
AG-108M	2457.82	614.28	294.	-7.	-0.004	344.13	1.325s
PM-144	2472.94	618.06	287.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	306.	-16.	-0.009	100.59	1.332s
SB-125	2544.26	635.89	22.	10.	0.006	70.20	1.344
I-131	2548.61	636.97	26.	8.	0.004	102.53	1.345s
AG-110M	2631.76	657.76	27.	9.	0.005	84.53	1.362s
NB-94	2811.25	702.63	43.	-4.	-0.002	313.79	1.400s
SB-124	2891.88	722.79	70.	-2.	-0.001	790.22	1.417s
AG-108M	2892.48	722.94	68.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	68.	0.	0.000	1000.00	1.418

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	2897.53	724.20	82.	-13.	-0.007	101.89	1.418
BI-212	2910.97	727.56	9.	32.	0.018	25.77	1.837s
pm-146	2943.61	735.72	35.	-10.	-0.005	128.42	1.428s
pm-146	2989.37	747.16	22.	6.	0.003	162.83	1.437s
ZR-95	3027.65	756.73	26.	0.	0.000	1000.00	1.445s
AG-110M	3056.50	763.94	46.	-8.	-0.004	133.67	1.451
NB-95	3063.89	765.79	84.	-19.	-0.010	72.55	1.453s
PA-234M	3066.38	766.41	85.	16.	0.009	85.25	1.453
EU-152	3116.41	778.92	51.	-17.	-0.009	93.32	1.463s
BI-212	3142.41	785.42	65.	-19.	-0.011	92.64	1.468s
CS-134	3184.19	795.87	37.	6.	0.003	232.56	1.477s
CS-134	3208.53	801.95	38.	-11.	-0.006	92.65	1.482s
CO-58	3243.82	810.78	69.	-15.	-0.008	84.57	1.489s
La-140	3263.80	815.77	84.	-8.	-0.004	172.29	1.493s
Cs-136	3274.72	818.50	81.	13.	0.007	104.02	1.495s
MN-54	3340.10	834.85	14.	18.	0.010	50.00	1.508s
Co-56	3387.78	846.77	14.	9.	0.005	95.12	1.518s
TL-208	3442.95	860.56	28.	13.	0.007	93.54	1.529s
NB-94	3485.08	871.10	20.	9.	0.005	76.52	1.537s
EU-154	3493.61	873.23	15.	5.	0.003	112.47	1.539s
PA-234	3522.80	880.53	66.	-4.	-0.002	291.55	1.544
PA-234	3533.64	883.24	70.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	46.	11.	0.006	94.01	1.551s
y-88	3592.83	898.04	9.	17.	0.009	45.96	1.558s
AC-228	3646.44	911.45	4.	105.	0.058	10.46	1.742
AG-110M	3750.60	937.49	47.	-14.	-0.008	109.43	1.589s
EU-152	3857.05	964.11	114.	12.	0.007	127.08	1.609s
AC-228	3877.76	969.29	9.	67.	0.037	16.22	1.849
EU-154	3985.88	996.33	22.	8.	0.004	90.73	1.633s
PA-234M	4004.55	1001.00	28.	8.	0.004	100.05	1.636s
EU-154	4019.65	1004.77	48.	-3.	-0.002	324.54	1.639s
Co-56	4151.87	1037.84	30.	-8.	-0.005	130.17	1.664s
Cs-136	4192.77	1048.07	18.	-1.	-0.001	608.28	1.671s
Ga-68	4310.04	1077.40	15.	1.	0.001	857.32	1.692s
FE-59	4397.41	1099.25	25.	-7.	-0.004	161.52	1.708s
EU-152	4448.68	1112.07	125.	-17.	-0.009	96.96	1.717s
ZN-65	4462.56	1115.55	109.	-17.	-0.009	90.52	1.720s
BI-214	4481.51	1120.29	115.	16.	0.009	98.06	1.723s
Sc-46	4482.57	1120.55	97.	17.	0.009	87.40	1.723s
Ta-182	4485.56	1121.30	45.	12.	0.007	84.20	1.724s
CO-60	4693.21	1173.24	20.	5.	0.003	222.75	1.760s
Ta-182	4756.42	1189.05	40.	-12.	-0.007	14.66	1.771s
Ta-182	4885.79	1221.41	43.	-7.	-0.004	37.27	1.793s
Co-56	4953.23	1238.28	11.	28.	0.016	32.63	1.804s
NA-22	5098.13	1274.53	11.	7.	0.004	73.01	1.828s
EU-154	5098.19	1274.54	18.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	5.	0.003	121.64	1.840s
CO-60	5329.85	1332.50	11.	1.	0.001	726.62	1.866s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	5536.88	1384.30	11.	-1.	0.000	999.06	1.899s
EU-152	5631.62	1408.00	5.	6.	0.003	101.72	1.914s
K-40	5844.94	1461.38	4.	310.	0.172	5.75	2.145
La-140	6383.73	1596.21	11.	2.	0.001	480.00	2.024s
SB-124	6762.39	1690.98	6.	4.	0.002	137.50	2.076s
BI-214	7056.06	1764.49	2.	21.	0.012	24.08	2.114s
Co-56	7083.46	1771.35	23.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	18.	-11.	-0.006	97.91	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	-6.0794E+00						5.31E+01	
			477.60	-6.079E+00	?(	1.841E+01	9.02E+01	1.05E+01	G
NA-22	C	7.1208E-01						9.50E+02	
			1274.53	7.121E-01	?(	1.741E+00	7.30E+01	9.99E+01	G
K-40	N	3.1646E+02						4.66E+11	
			1460.83	3.165E+02	(P	1.207E+01	5.75E+00	1.07E+01	G
Sc-46	F	1.1108E+00						8.38E+01	
			889.28	7.735E-01	&(	2.461E+00	9.40E+01	1.00E+02	G
			1120.55	1.448E+00	?(	4.239E+00	8.74E+01	1.00E+02	G
CR-51	F	3.9155E+00						2.77E+01	
			320.08	3.916E+00	?(	1.448E+01	1.09E+02	9.94E+00	G
MN-54	C	1.2245E+00						3.12E+02	
			834.85	1.224E+00	&(	1.370E+00	5.00E+01	1.00E+02	G
FE-59	F	-1.4226E-01						4.45E+01	
			1099.25	-1.062E+00	?(	3.945E+00	1.62E+02	5.65E+01	G
			1291.60	1.060E+00	?(	3.060E+00	1.22E+02	4.32E+01	G
Co-56	C	1.9717E+00						7.73E+01	
			846.77	6.162E-01	?(P	1.396E+00	9.51E+01	9.99E+01	G
			1238.28	4.022E+00	?(P	2.598E+00	3.26E+01	6.61E+01	G
			1037.84	-4.816E+00	+ P	1.640E+01	1.30E+02	1.41E+01	G
			1771.35	0.000E+00	-	2.073E+01	1.00E+03	1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	-6.6373E-02					2.72E+02	
			122.06	-4.377E-01	?(	1.602E+00	1.10E+02	8.56E+01 G
			136.47	2.910E+00	(	7.122E+00	8.64E+01	1.07E+01 G
CO-58	C	-9.7694E-01					7.09E+01	
			810.78	-9.769E-01	?(	2.770E+00	8.46E+01	9.95E+01 G
CO-60	F	2.5783E-01					1.93E+03	
			1332.50	1.045E-01	?(P	1.828E+00	7.27E+02	1.00E+02 G
			1173.24	4.112E-01	?(P	2.155E+00	2.23E+02	9.99E+01 G
ZN-65	F	-2.8979E+00					2.44E+02	
			1115.55	-2.898E+00	?(	8.790E+00	9.05E+01	5.06E+01 G
NB-94	I	1.9534E-01					7.41E+06	
			702.63	-2.606E-01	?(	2.007E+00	3.14E+02	9.79E+01 G
			871.10	6.422E-01	?(P	1.649E+00	7.65E+01	9.99E+01 G
NB-95	I	-1.1979E+00					6.40E+01	
			765.79	-1.198E+00	?(	2.888E+00	7.25E+01	9.98E+01 G
RU-103	I	-5.8968E-02					3.93E+01	
			497.05	-5.897E-02	?(P	1.414E+00	9.94E+02	9.09E+01 G
			610.30	-1.322E+01	+	7.696E+01	1.73E+02	5.75E+00 GA
RH-106	I	-8.4912E+00					3.74E+02	
			621.92	-8.491E+00	?(P	4.508E+01	1.01E+02	9.93E+00 G
			1050.36	-4.208E+00	% P	1.267E+02	1.37E+03	1.56E+00 G
			511.86	1.717E+01	?	8.765E+00	2.84E+01	2.00E+01 GA
AG-108M	C	4.6564E-01					1.53E+05	
			433.94	4.656E-01	?(P	1.191E+00	1.02E+02	9.05E+01 G
			722.94	0.000E+00	-	2.730E+00	1.00E+03	9.08E+01 G
			614.28	-4.151E-01	-	4.838E+00	3.44E+02	8.98E+01 G
AG-110M	F	3.1126E-01					2.50E+02	
			884.68	-9.519E-03	%(P	4.099E+00	7.21E+03	7.27E+01 G
			657.76	5.576E-01	?(	1.593E+00	8.45E+01	9.46E+01 G
			937.49	-2.982E+00	+	7.536E+00	1.09E+02	3.44E+01 G
			1384.30	-3.239E-01	+ P	7.707E+00	9.99E+02	2.43E+01 G
			763.94	-2.125E+00	+	9.773E+00	1.34E+02	2.23E+01 G
SN-113	F	-9.1732E-01					1.15E+02	
			391.69	-9.173E-01	?(P	3.507E+00	1.40E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	-1.6195E-01					6.02E+01	
			602.73	-7.839E-01	(P	4.657E+00	1.02E+02	9.83E+01 G
			1690.98	1.117E+00	?(	3.557E+00	1.37E+02	4.78E+01 G
			722.79	-8.364E-01	+	2.317E+01	7.90E+02	1.08E+01 G
SB-125	I	4.0771E+00					1.01E+03	
			427.88	-1.452E+00	?(P	5.102E+00	2.06E+02	2.96E+01 G
			600.50	-4.173E+00	+	2.605E+01	1.86E+02	1.79E+01 G
			635.89	5.001E+00	?(	1.168E+01	7.02E+01	1.13E+01 G
			463.37	1.871E+01	(P	1.515E+01	2.71E+01	1.05E+01 G
I-131	I	3.7767E-01					8.02E+00	
			364.48	-9.319E-02	%(P	1.608E+00	1.02E+03	8.17E+01 G
			284.30	0.000E+00	&	1.967E+01	1.00E+03	6.14E+00 G
			636.97	5.743E+00	?(P	2.018E+01	1.03E+02	7.17E+00 G
Gd-153	F	-8.4552E-01					2.42E+02	
			97.50	-8.455E-01	&(	4.458E+00	1.57E+02	3.00E+01 G
			103.20	-9.526E-01	+	6.495E+00	2.03E+02	2.18E+01 G
Ga-68	C	2.9971E+00					4.71E-02	
			1077.40	2.997E+00	*(	6.221E+01	8.57E+02	3.30E+00 G
Tc-99m	I	2.3196E-01					2.51E-01	
			140.51	2.320E-01	?(	1.683E+00	2.15E+02	8.93E+01 G
BA-133	F	-6.1871E-01					3.85E+03	
			356.00	-6.187E-01	&(	4.866E+00	2.33E+02	6.20E+01 G
			302.85	0.000E+00	+	1.249E+01	1.00E+03	1.83E+01 G
			383.84	5.570E+00		2.167E+01	1.15E+02	8.94E+00 GA
			80.99	2.193E-02	% P	3.807E+00	6.40E+03	3.41E+01 GA
CS-134	I	-2.0831E-01					7.54E+02	
			604.71	-7.701E-01	?(	4.599E+00	1.78E+02	9.76E+01 G
			795.87	4.329E-01	(	2.382E+00	2.33E+02	8.55E+01 G
			569.32	-1.926E+00	+	1.079E+01	1.62E+02	1.54E+01 G
			801.95	-8.083E+00	+ P	2.370E+01	9.26E+01	8.69E+00 G
			563.24	5.860E-01	%	1.886E+01	1.24E+03	8.35E+00 G
CS-137	I	1.2660E-02					1.10E+04	
			661.66	1.266E-02	%(P	2.444E+00	5.46E+03	8.52E+01 G
CE-139	F	2.5152E-01					1.38E+02	
			165.85	2.515E-01	&(	1.723E+00	2.03E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	1.3118E-02					1.28E+01	
			537.26	1.312E-02	%(P	6.273E+00	1.83E+04	2.44E+01 G
			162.66	-1.148E+00	+	2.200E+01	5.63E+02	6.22E+00 G
			304.85	0.000E+00	-	5.365E+01	1.00E+03	4.29E+00 G
La-140	I	8.0768E-01					1.28E+01	
			1596.21	2.050E-01	?(	2.262E+00	4.80E+02	9.54E+01 G
			487.02	6.268E-01	&(P	2.937E+00	1.83E+02	4.55E+01 G
			328.76	4.046E+00	(P	5.960E+00	5.82E+01	2.03E+01 G
			815.77	-2.204E+00	+	1.301E+01	1.72E+02	2.33E+01 G
CE-144	I	-2.1254E+00					2.85E+02	
			133.54	-2.125E+00	?(P	1.480E+01	1.62E+02	1.11E+01 G
PM-144	C	1.9676E-02					3.63E+02	
			696.54	1.968E-02	%(	1.780E+00	3.61E+03	9.90E+01 G
			618.06	0.000E+00	-	4.357E+00	1.00E+03	9.91E+01 G
EU-152	F	3.3525E+00					4.94E+03	
			344.29	1.127E+00	&(	8.295E+00	2.17E+02	2.65E+01 G
			1112.07	-1.070E+01	+	3.482E+01	9.70E+01	1.36E+01 G
			121.78	-1.310E+00	+	4.754E+00	1.09E+02	2.86E+01 G
			778.92	-8.366E+00	+	1.790E+01	9.33E+01	1.29E+01 G
			964.11	6.404E+00	?(P	2.755E+01	1.27E+02	1.46E+01 G
			244.69	5.253E+00	?(P	4.207E+01	2.39E+02	7.58E+00 G
			1408.00	2.847E+00	?	6.769E+00	1.02E+02	2.10E+01 GA
EU-154	I	4.4203E+00					3.14E+03	
			873.23	3.079E+00	&(	1.209E+01	1.12E+02	1.23E+01 G
			123.10	5.484E-01	- P	3.064E+00	1.66E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.200E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.227E+01	1.00E+03	2.02E+01 G
			1004.77	-1.354E+00	-	1.545E+01	3.25E+02	1.80E+01 G
			996.33	5.973E+00	?(	1.847E+01	9.07E+01	1.06E+01 G
EU-155	I	1.5318E+00					1.81E+03	
			105.31	1.532E+00	(	8.035E+00	1.57E+02	2.12E+01 G
			86.54	-1.267E+00	+	7.660E+00	1.81E+02	3.07E+01 G
HF-181	F	9.1137E-01					4.24E+01	
			482.00	7.090E-01	?(	2.438E+00	1.02E+02	8.05E+01 G
			133.02	-8.920E-01	+	3.828E+00	1.28E+02	4.33E+01 G
			345.83	1.993E+00	?(	1.497E+01	2.22E+02	1.51E+01 G
			136.30	0.000E+00	-	2.868E+01	1.00E+03	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	2.9908E+00					1.14E+02	
			1121.30	2.991E+00	?(	8.471E+00	8.42E+01	3.49E+01 G
			1221.41	-2.473E+00	- P	1.155E+01	3.73E+01	2.70E+01 G
			1189.05	-6.854E+00	+ P	1.821E+01	1.47E+01	1.62E+01 G
Hg-203	F	3.9090E-03					4.66E+01	
			279.20	3.909E-03	&(P	2.305E+00	1.72E+04	8.15E+01 G
TL-208	N	9.3702E+00					6.98E+02	
			583.02	9.370E+00	*(P	1.365E+00	9.67E+00	8.45E+01 G
			277.28	-9.112E+00	&	2.888E+01	9.48E+01	6.31E+00 G
			860.56	7.092E+00	& P	1.547E+01	9.35E+01	1.24E+01 G
pm-146	C	1.1025E+00					2.02E+03	
			747.16	1.102E+00	?(P	4.474E+00	1.63E+02	3.40E+01 G
			735.72	-2.628E+00	+	8.197E+00	1.28E+02	2.25E+01 G
			453.88	-1.281E+00	+ P	2.936E+00	5.39E+01	6.50E+01 G
y-88	F	1.2861E+00					1.07E+02	
			898.04	1.286E+00	(	1.308E+00	4.60E+01	9.37E+01 G
			1836.06	-1.464E+00	-	2.992E+00	9.79E+01	9.92E+01 G
Cd-113m		1.8070E+03					5.33E+03	
			263.70	1.807E+03	?(	2.116E+04	3.39E+02	6.00E-03 K
Cd-109	F	1.1091E+01					4.53E+02	
			88.04	1.109E+01	?(	5.896E+01	1.59E+02	3.79E+00 G
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	3.648E-01	%	1.882E+01	1.87E+03	6.30E+00 GA
Cf-249	T	4.2765E-01					1.28E+05	
			387.95	3.525E-01	&(	3.116E+00	2.59E+02	6.60E+01 G
			333.44	7.474E-01	&(	7.358E+00	3.69E+02	1.55E+01 G
Sn-126		-5.5595E+00					3.65E+07	
			87.57	1.123E+00	+	5.883E+00	1.57E+02	3.75E+01 GA
			64.28	-5.559E+00	?(	1.881E+01	1.01E+02	9.70E+00 G
			86.94	4.668E+00	}	2.507E+01	8.36E+01	9.04E+00 GA
PB-210	N	2.6504E+00					8.14E+03	
			46.54	2.650E+00	(P	4.497E+01	5.81E+02	4.25E+00 G
PB-212	N	2.4836E+01					6.98E+02	
			238.63	2.484E+01	(P	2.729E+00	5.68E+00	4.33E+01 G
			300.03	5.297E+01	+ P	3.263E+01	2.85E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	2.0555E+01					5.84E+05	
			351.93	2.062E+01	*(P	3.556E+00	9.68E+00	3.76E+01 G
			295.09	2.043E+01	*(P	5.960E+00	1.47E+01	1.93E+01 G
			242.00	3.007E+01	+	1.312E+01	1.62E+01	7.43E+00 GA
BI-212	N	2.5677E+01					6.98E+02	
			727.17	2.568E+01	(	1.339E+01	2.58E+01	7.55E+00 G
			785.42	-9.643E+01	-	2.038E+02	9.26E+01	1.28E+00 GA
BI-214	N	1.8071E+01					5.84E+05	
			609.31	1.833E+01	(P	2.748E+00	9.84E+00	4.61E+01 G
			1120.29	9.230E+00	- P	3.040E+01	9.81E+01	1.51E+01 G
			1764.49	1.731E+01	?(P	7.878E+00	2.41E+01	1.54E+01 G
BI-210M	T	7.7674E-01					1.10E+09	
			265.83	7.767E-01	?(	2.549E+00	9.75E+01	5.00E+01 G
			304.90	5.241E-02	%	8.213E+00	4.59E+03	2.80E+01 G
AC-228	N	2.8883E+01					2.10E+03	
			911.07	2.645E+01	(P	3.086E+00	1.05E+01	2.90E+01 G
			968.97	2.943E+01	(P	7.477E+00	1.62E+01	1.75E+01 G
			338.32	3.395E+01	(P	8.823E+00	1.46E+01	1.20E+01 G
			93.35	2.113E+01	-	1.679E+01	2.58E+01	5.56E+00 XA
TH-227	N	6.3412E+00					7.95E+03	
			50.14	6.341E+00	(	1.963E+01	1.09E+02	8.00E+00 G
			256.24	-7.214E+00	+ P	1.880E+01	1.96E+02	7.00E+00 G
TH-229	N	-7.6291E-01					2.68E+06	
			193.51	-7.629E-01	%(	2.618E+01	1.25E+03	4.40E+00 G
			210.85	7.231E-01	%	4.038E+01	2.03E+03	2.99E+00 G
TH-234	N	1.5680E+00					1.63E+12	
			63.29	1.568E+00	?(P	4.178E+01	7.84E+02	3.81E+00 G
			92.59	-4.946E+00	+ P	3.905E+01	2.34E+02	5.58E+00 G
PA-233	C	1.1745E+00					7.82E+08	
			312.01	1.174E+00	&(	6.198E+00	1.57E+02	3.60E+01 G
			300.18	0.000E+00	-	3.665E+01	1.00E+03	6.20E+00 G
PA-234	N	-2.1312E+00					1.63E+12	
			131.29	-2.131E+00	&(	9.299E+00	1.31E+02	1.80E+01 G
			946.02	3.758E-01	%	1.422E+01	1.54E+03	1.34E+01 G
			569.47	-5.018E-01	%	2.184E+01	1.23E+03	8.20E+00 G
			883.24	0.000E+00	+	3.097E+01	1.00E+03	9.60E+00 G
			880.53	-4.741E+00	+	4.809E+01	2.92E+02	6.00E+00 GA

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   1.4574E+02                                      1.63E+12
                         1001.00 7.611E+01 ?(  2.605E+02 1.00E+02 8.37E-01 G
                          766.41 3.440E+02  (  9.820E+02 8.52E+01 2.94E-01 G

AM-241   T   5.3196E-02                                      1.58E+05
                           59.54 5.320E-02 %(P 4.437E+00 2.89E+03 3.59E+01 G

Ir-192   F  -5.8401E-01                                      7.40E+01
                          316.49-5.840E-01 ?(  1.988E+00 1.01E+02 8.70E+01 G
                          468.06 0.000E+00 &   4.088E+00 1.00E+03 5.18E+01 G
                          308.44 0.000E+00 +   7.320E+00 1.00E+03 3.18E+01 G

Cs-136   F   7.8073E-01                                      1.30E+01
                          818.50 8.518E-01 &(  2.993E+00 1.04E+02 1.00E+02 G
                         1048.07-1.029E-01 -   2.313E+00 6.08E+02 8.00E+01 G
                          340.57 6.293E-01 ?(  4.538E+00 2.12E+02 4.69E+01 G

Np-239   T  -5.6346E-01                                      2.36E+00
                          103.70 0.000E+00 +   6.002E+00 1.00E+03 2.40E+01 X
                          106.13-5.635E-01 ?(  7.535E+00 3.97E+02 2.27E+01 G
                           99.50 2.270E+00 ?   8.354E+00 1.10E+02 1.50E+01 X

Nd-147      -6.4318E+00                                      1.11E+01
                          531.00-6.432E+00 ?(  1.474E+01 9.30E+01 1.30E+01 G
                           91.10 1.471E+00 +   7.909E+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:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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	
PB-210	46.54	159.	4.	0.002	581.41	2.650E+00	P
TH-227	50.14	135.	18.	0.010	109.00	6.341E+00	
TH-234	63.29	259.	3.	0.002	783.66	1.568E+00	P
EU-155	86.54	938.	-24.	-0.013	181.25	-1.267E+00	
Cd-109	88.04	859.	26.	0.015	159.40	1.109E+01	
Nd-147	91.10	885.	26.	0.015	161.18	1.471E+00	
TH-234	92.59	849.	-18.	-0.010	233.85	-4.946E+00	P
Gd-153	97.50	320.	-16.	-0.009	156.93	-8.455E-01	
Np-239	99.50	282.	22.	0.012	110.02	2.270E+00	
Gd-153	103.20	368.	-14.	-0.007	202.66	-9.526E-01	
EU-155	105.31	539.	21.	0.012	156.82	1.532E+00	
Np-239	106.13	544.	-8.	-0.005	397.45	-5.635E-01	
EU-152	121.78	332.	-24.	-0.013	108.66	-1.310E+00	
EU-154	123.10	278.	14.	0.008	166.00	5.484E-01	P
PA-234	131.29	489.	-24.	-0.013	130.61	-2.131E+00	
HF-181	133.02	474.	-24.	-0.013	128.46	-8.920E-01	
CE-144	133.54	463.	-15.	-0.008	161.76	-2.125E+00	P
Tc-99m	140.51	347.	12.	0.007	215.39	2.320E-01	
Ba-140	162.66	252.	-4.	-0.002	563.47	-1.148E+00	
U-235	163.38	234.	-20.	-0.011	110.45	-7.050E+00	
CE-139	165.85	259.	11.	0.006	202.88	2.515E-01	
Cf-251	176.60	107.	18.	0.010	104.62	1.981E+00	
U-235	205.33	124.	-11.	-0.006	213.40	-4.744E+00	P
EU-152	244.69	751.	16.	0.009	239.30	5.253E+00	P
TH-227	256.24	111.	-20.	-0.011	196.17	-7.214E+00	P
Cd-113m	263.70	98.	4.	0.002	339.27	1.807E+03	
PA-233	312.01	238.	14.	0.008	156.60	1.174E+00	
Ir-192	316.49	136.	-17.	-0.009	101.39	-5.840E-01	
CR-51	320.08	91.	13.	0.007	109.46	3.916E+00	
La-140	328.76	60.	26.	0.015	58.19	4.046E+00	P
Cf-249	333.44	51.	4.	0.002	369.27	7.474E-01	
Cs-136	340.57	185.	9.	0.005	212.49	6.293E-01	
EU-152	344.29	195.	9.	0.005	216.90	1.127E+00	
HF-181	345.83	204.	9.	0.005	221.52	1.993E+00	
BA-133	356.00	354.	-12.	-0.006	233.41	-6.187E-01	
BA-133	383.84	124.	14.	0.008	115.30	5.570E+00	
Cf-249	387.95	138.	6.	0.004	258.59	3.525E-01	
SN-113	391.69	162.	-16.	-0.009	140.14	-9.173E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	427.88	60.	-11.	-0.006	206.11	-1.452E+00	P
AG-108M	433.94	28.	11.	0.006	101.55	4.656E-01	P
pm-146	453.88	89.	-20.	-0.011	53.90	-1.281E+00	P
SB-125	463.37	58.	47.	0.026	27.09	1.871E+01	P
BE-7	477.59	84.	-15.	-0.008	90.18	-6.079E+00	
HF-181	482.00	85.	13.	0.007	101.92	7.090E-01	
La-140	487.02	36.	7.	0.004	183.31	6.268E-01	P
RU-103	497.05	32.	-1.	-0.001	994.15	-5.897E-02	P
RH-106	511.86	60.	76.	0.042	28.40	1.717E+01	
Nd-147	531.00	68.	-18.	-0.010	92.99	-6.432E+00	
CS-134	569.32	44.	-6.	-0.003	161.59	-1.926E+00	
SB-125	600.50	352.	-14.	-0.008	185.64	-4.173E+00	
SB-124	602.73	338.	-15.	-0.008	102.41	-7.839E-01	P
CS-134	604.71	323.	-14.	-0.008	177.52	-7.701E-01	
RU-103	610.30	309.	-15.	-0.008	172.97	-1.322E+01	
AG-108M	614.28	294.	-7.	-0.004	344.13	-4.151E-01	
RH-106	621.92	306.	-16.	-0.009	100.59	-8.491E+00	P
SB-125	635.89	22.	10.	0.006	70.20	5.001E+00	
I-131	636.97	26.	8.	0.004	102.53	5.743E+00	P
AG-110M	657.76	27.	9.	0.005	84.53	5.576E-01	
NB-94	702.63	43.	-4.	-0.002	313.79	-2.606E-01	
SB-124	722.79	70.	-2.	-0.001	790.22	-8.364E-01	
ZR-95	724.20	82.	-13.	-0.007	101.89	-1.784E+00	
pm-146	735.72	35.	-10.	-0.005	128.42	-2.628E+00	
pm-146	747.16	22.	6.	0.003	162.83	1.102E+00	P
AG-110M	763.94	46.	-8.	-0.004	133.67	-2.125E+00	
NB-95	765.79	84.	-19.	-0.010	72.55	-1.198E+00	
EU-152	778.92	51.	-17.	-0.009	93.32	-8.366E+00	
CS-134	795.87	37.	6.	0.003	232.56	4.329E-01	
CS-134	801.95	38.	-11.	-0.006	92.65	-8.083E+00	P
CO-58	810.78	69.	-15.	-0.008	84.57	-9.769E-01	
La-140	815.77	84.	-8.	-0.004	172.29	-2.204E+00	
Cs-136	818.50	81.	13.	0.007	104.02	8.518E-01	
NB-94	871.10	20.	9.	0.005	76.52	6.422E-01	P
EU-154	873.23	15.	5.	0.003	112.47	3.079E+00	
PA-234	880.53	66.	-4.	-0.002	291.55	-4.741E+00	
Sc-46	889.28	46.	11.	0.006	94.01	7.735E-01	
y-88	898.04	9.	17.	0.009	45.96	1.286E+00	
AG-110M	937.49	47.	-14.	-0.008	109.43	-2.982E+00	
EU-152	964.11	114.	12.	0.007	127.08	6.404E+00	P
EU-154	996.33	22.	8.	0.004	90.73	5.973E+00	
EU-154	1004.77	48.	-3.	-0.002	324.54	-1.354E+00	
Cs-136	1048.07	18.	-1.	-0.001	608.28	-1.029E-01	
Ga-68	1077.40	15.	1.	0.001	857.32	2.997E+00	
FE-59	1099.25	25.	-7.	-0.004	161.52	-1.062E+00	
EU-152	1112.07	125.	-17.	-0.009	96.96	-1.070E+01	
ZN-65	1115.55	109.	-17.	-0.009	90.52	-2.898E+00	
Sc-46	1120.55	97.	17.	0.009	87.40	1.448E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	1173.24	20.	5.	0.003	222.75	4.112E-01	P
NA-22	1274.53	11.	7.	0.004	73.01	7.121E-01	
FE-59	1291.60	5.	5.	0.003	121.64	1.060E+00	
CO-60	1332.50	11.	1.	0.001	726.62	1.045E-01	P
AG-110M	1384.30	11.	-1.	0.000	999.06	-3.239E-01	P
EU-152	1408.00	5.	6.	0.003	101.72	2.847E+00	
La-140	1596.21	11.	2.	0.001	480.00	2.050E-01	
SB-124	1690.98	6.	4.	0.002	137.50	1.117E+00	
y-88	1836.06	18.	-11.	-0.006	97.91	-1.464E+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 *****

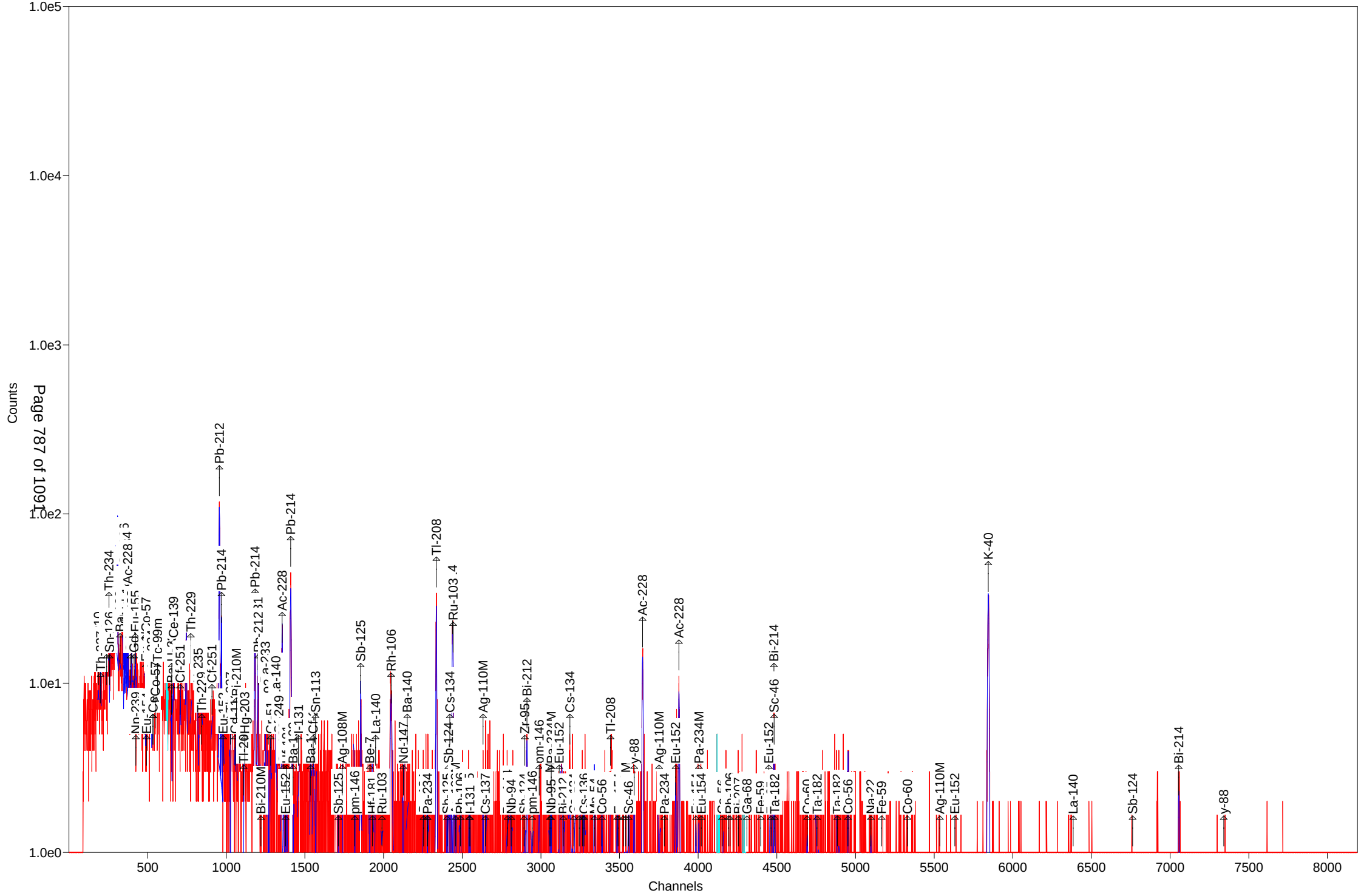
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-6.0793E+00	-6.0794E+00	9.018E+01%	1.84E+01
NA-22	#A	7.1208E-01	7.1208E-01	7.301E+01%	1.74E+00
K-40		3.1646E+02	3.1646E+02	5.751E+00%	1.21E+01
Sc-46	#A	1.1108E+00	1.1108E+00	6.418E+01%	2.46E+00
CR-51	#A	3.9154E+00	3.9155E+00	1.095E+02%	1.45E+01
MN-54	#A	1.2245E+00	1.2245E+00	5.000E+01%	1.37E+00
FE-59	#A	-1.4226E-01	-1.4226E-01	1.011E+02%	3.94E+00
Co-56	#	1.9717E+00	1.9717E+00	3.263E+01%	1.40E+00
CO-57	A	-6.6373E-02	-6.6373E-02	6.978E+01%	1.60E+00
CO-58	#A	-9.7693E-01	-9.7694E-01	8.457E+01%	2.77E+00
CO-60	#A	2.5783E-01	2.5783E-01	2.227E+02%	1.83E+00
ZN-65	#A	-2.8979E+00	-2.8979E+00	9.052E+01%	8.79E+00
NB-94	#A	1.9534E-01	1.9534E-01	7.652E+01%	2.01E+00
ZR-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.04E+00
NB-95	#A	-1.1979E+00	-1.1979E+00	7.255E+01%	2.89E+00
RU-103	#A	-5.8967E-02	-5.8968E-02	9.941E+02%	1.41E+00
RH-106	#A	-8.4911E+00	-8.4912E+00	1.006E+02%	4.51E+01
AG-108M	#A	4.6564E-01	4.6564E-01	1.015E+02%	1.19E+00
AG-110M	#A	3.1126E-01	3.1126E-01	8.453E+01%	4.10E+00
SN-113	#A	-9.1732E-01	-9.1732E-01	1.401E+02%	3.51E+00
SB-124	#A	-1.6195E-01	-1.6195E-01	8.572E+01%	4.66E+00
SB-125	#A	4.0771E+00	4.0771E+00	2.709E+01%	5.10E+00
I-131	#A	3.7764E-01	3.7767E-01	1.025E+02%	1.61E+00
Gd-153	#A	-8.4552E-01	-8.4552E-01	1.569E+02%	4.46E+00
Ga-68	#A	2.9666E+00	2.9971E+00	8.573E+02%	6.22E+01
Tc-99m	#A	2.3151E-01	2.3196E-01	2.154E+02%	1.68E+00
BA-133	#A	-6.1871E-01	-6.1871E-01	2.334E+02%	4.87E+00
CS-134	#A	-2.0831E-01	-2.0831E-01	1.463E+02%	4.60E+00
CS-137	#A	1.2660E-02	1.2660E-02	5.458E+03%	2.44E+00
CE-139	#A	2.5152E-01	2.5152E-01	2.029E+02%	1.72E+00
Ba-140	#A	1.3118E-02	1.3118E-02	1.833E+04%	6.27E+00

La-140 #A	8.0765E-01	8.0768E-01	5.819E+01%	2.26E+00
CE-141 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.13E+00
CE-144 #A	-2.1254E+00	-2.1254E+00	1.618E+02%	1.48E+01
PM-144 #A	1.9676E-02	1.9676E-02	3.610E+03%	1.78E+00
EU-152 #A	3.3525E+00	3.3525E+00	1.157E+02%	8.29E+00
EU-154 #A	4.4203E+00	4.4203E+00	7.225E+01%	1.21E+01
EU-155 #A	1.5318E+00	1.5318E+00	1.568E+02%	8.03E+00
HF-181 #A	9.1136E-01	9.1137E-01	1.019E+02%	2.44E+00
Ta-182 #A	2.9908E+00	2.9908E+00	8.420E+01%	8.47E+00
Hg-203 #A	3.9090E-03	3.9090E-03	1.720E+04%	2.31E+00
TL-208 #	9.3702E+00	9.3702E+00	9.666E+00%	1.36E+00
pm-146 #A	1.1025E+00	1.1025E+00	1.628E+02%	4.47E+00
y-88 #A	1.2861E+00	1.2861E+00	4.596E+01%	1.31E+00
Cd-113m#A	1.8070E+03	1.8070E+03	3.393E+02%	2.12E+04
Cd-109 #A	1.1091E+01	1.1091E+01	1.594E+02%	5.90E+01
Cf-251 #A	1.9807E+00	1.9807E+00	1.046E+02%	5.58E+00
Cf-249 #A	4.2765E-01	4.2765E-01	2.254E+02%	3.12E+00
Sn-126 #A	-5.5595E+00	-5.5595E+00	1.015E+02%	1.88E+01
PB-210 #A	2.6504E+00	2.6504E+00	5.814E+02%	4.50E+01
PB-212	2.4836E+01	2.4836E+01	5.679E+00%	2.73E+00
PB-214 #	2.0555E+01	2.0555E+01	8.782E+00%	3.56E+00
BI-207 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.85E+00
BI-212	2.5677E+01	2.5677E+01	2.577E+01%	1.34E+01
BI-214	1.8071E+01	1.8071E+01	9.845E+00%	2.75E+00
BI-210M#A	7.7674E-01	7.7674E-01	9.755E+01%	2.55E+00
AC-228	2.8883E+01	2.8883E+01	8.059E+00%	3.09E+00
TH-227 #A	6.3412E+00	6.3412E+00	1.090E+02%	1.96E+01
TH-229 #A	-7.6291E-01	-7.6291E-01	1.251E+03%	2.62E+01
TH-234 #A	1.5680E+00	1.5680E+00	7.837E+02%	4.18E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.94E+01
PA-233 #A	1.1745E+00	1.1745E+00	1.566E+02%	6.20E+00
PA-234 #A	-2.1312E+00	-2.1312E+00	1.306E+02%	9.30E+00
PA-234M A	1.4574E+02	1.4574E+02	6.572E+01%	2.60E+02
U-235 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.37E+01
AM-241 #A	5.3196E-02	5.3196E-02	2.893E+03%	4.44E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.82E+01
Ir-192 #A	-5.8401E-01	-5.8401E-01	1.014E+02%	1.99E+00
Cs-136 #A	7.8070E-01	7.8073E-01	1.040E+02%	2.99E+00
Np-239 #A	-5.6334E-01	-5.6346E-01	3.975E+02%	7.53E+00
Nd-147 #A	-6.4315E+00	-6.4318E+00	9.299E+01%	1.47E+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)     4.451E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 4.4507248E+02  Bq/Sample
```

264540_Gamma_160-18553-A-16-B. 5_Gamma_20161673.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161135

Sample Description: 264540_Gamma_160-18553-A-17-B
Detector: Detector #17
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-17-B

Decay to Time: 9/1/2016 16:46 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:46:32 Real Time: 1834 sec
Analysis Time: 9/1/2016 17:18 Dead Time: 1.83 %
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	2.595E+00	129.1	3.350E+00	3.352E+00	1.145E+01
NA-22	-8.865E-01	63.1	5.592E-01	5.610E-01	1.841E+00
K-40	2.348E+02	5.4	1.273E+01	1.751E+01	1.049E+01
Sc-46	2.314E-01	222.2	5.141E-01	5.142E-01	1.788E+00
CR-51	-4.654E+00	57.7	2.688E+00	2.699E+00	1.573E+01
MN-54	6.720E-01	51.3	3.449E-01	3.466E-01	7.764E-01
FE-59	6.861E-01	96.3	6.606E-01	6.615E-01	2.362E+00
Co-56	-2.625E-01	218.0	5.724E-01	5.726E-01	1.360E+00
CO-57	2.406E-01	131.8	3.170E-01	3.173E-01	1.067E+00
CO-58	3.964E-01	91.5	3.627E-01	3.633E-01	1.233E+00
CO-60	-8.954E-01	90.0	8.063E-01	8.076E-01	1.754E+00
ZN-65	-1.504E+00	117.4	1.765E+00	1.767E+00	5.962E+00
NB-94	5.989E-02	75.4	4.517E-02	4.527E-02	1.436E+00
ZR-95	9.075E-01	94.6	8.589E-01	8.602E-01	2.082E+00
NB-95	-2.279E-02	2576.1	5.870E-01	5.870E-01	2.048E+00
RU-103	-5.163E-01	75.8	3.912E-01	3.921E-01	1.291E+00
RH-106	7.408E+00	106.9	7.922E+00	7.931E+00	3.218E+01
AG-108M	-3.337E-01	137.8	4.597E-01	4.601E-01	1.201E+00
AG-110M	-9.865E-01	90.0	8.874E-01	8.889E-01	2.979E+00
SN-113	-3.557E-01	154.8	5.505E-01	5.508E-01	2.391E+00
SB-124	-6.197E-01	32.8	2.032E-01	2.058E-01	3.498E+00
SB-125	1.032E+00	105.1	1.084E+00	1.085E+00	2.928E+00
I-131	4.891E-01	113.2	5.537E-01	5.543E-01	1.081E+00
Gd-153	9.790E-01	82.7	8.095E-01	8.117E-01	3.345E+00
Ga-68	0.000E+00	1.#INF	1.972E+00	1.972E+00	4.094E+01
Tc-99m	-2.595E-03	15903.7	4.126E-01	4.126E-01	1.402E+00
BA-133	-5.847E-01	180.1	1.053E+00	1.053E+00	3.540E+00
CS-134	8.308E-01	19.4	1.610E-01	1.667E-01	3.456E+00
CS-137	-4.519E-02	1274.1	5.758E-01	5.758E-01	2.014E+00
CE-139	0.000E+00	1.#INF	2.196E-01	2.197E-01	1.326E+00
Ba-140	3.280E-01	491.6	1.613E+00	1.613E+00	4.185E+00
La-140	6.546E-01	45.1	2.954E-01	2.974E-01	1.752E+00
CE-141	4.449E-01	128.1	5.701E-01	5.705E-01	1.919E+00

CE-144	0.000E+00	1.#INF	8.617E-01	8.617E-01	1.148E+01
PM-144	-4.041E-01	150.6	6.084E-01	6.087E-01	1.467E+00
EU-152	7.733E-01	96.0	7.423E-01	7.434E-01	7.351E+00
EU-154	7.631E-01	87.7	6.695E-01	6.706E-01	1.124E+01
EU-155	8.154E-01	180.4	1.471E+00	1.472E+00	4.957E+00
HF-181	3.642E-01	167.9	6.114E-01	6.117E-01	1.603E+00
Ta-182	1.700E+00	122.5	2.082E+00	2.084E+00	7.082E+00
Hg-203	1.441E-01	281.4	4.057E-01	4.057E-01	1.391E+00
TL-208	7.721E+00	8.3	6.370E-01	7.525E-01	6.928E-01
pm-146	-2.588E-01	745.3	1.929E+00	1.929E+00	3.948E+00
y-88	8.609E-02	619.7	5.335E-01	5.335E-01	1.303E+00
Cd-113m	-2.987E+03	166.7	4.979E+03	4.982E+03	1.697E+04
Cd-109	8.044E+00	199.4	1.604E+01	1.605E+01	5.354E+01
Cf-251	-2.041E+00	106.3	2.170E+00	2.177E+00	5.812E+00
Cf-249	4.319E-01	149.2	6.444E-01	6.448E-01	2.187E+00
Sn-126	-1.381E+00	315.6	4.360E+00	4.360E+00	1.475E+01
PB-210	2.267E+01	47.8	1.083E+01	1.092E+01	3.033E+01
PB-212	2.024E+01	5.1	1.041E+00	1.673E+00	1.633E+00
PB-214	1.473E+01	8.4	1.236E+00	1.454E+00	1.924E+00
BI-207	2.527E-01	91.5	2.312E-01	2.316E-01	1.155E+00
BI-212	2.243E+01	19.7	4.411E+00	4.562E+00	7.728E+00
BI-214	1.403E+01	8.7	1.215E+00	1.417E+00	1.750E+00
BI-210M	5.621E-01	101.3	5.693E-01	5.703E-01	1.918E+00
AC-228	1.662E+01	10.9	1.804E+00	1.993E+00	1.928E+00
TH-227	3.831E+00	141.0	5.401E+00	5.406E+00	1.546E+01
TH-229	2.769E+00	249.9	6.920E+00	6.923E+00	1.892E+01
TH-234	1.694E+01	47.4	8.033E+00	8.081E+00	2.588E+01
PA-231	-1.443E+01	143.9	2.077E+01	2.079E+01	6.964E+01
PA-233	-9.188E-01	196.0	1.801E+00	1.802E+00	6.051E+00
PA-234	1.133E+00	198.5	2.249E+00	2.250E+00	6.915E+00
PA-234M	3.004E+01	172.7	5.187E+01	5.189E+01	1.812E+02
U-235	1.244E+00	115.2	1.433E+00	1.434E+00	1.128E+01
AM-241	-8.374E-01	156.6	1.312E+00	1.312E+00	3.726E+00
Np-237	0.000E+00	1.#INF	5.036E+00	5.036E+00	1.680E+01
Ir-192	-5.510E-02	92.7	5.109E-02	5.119E-02	1.690E+00
Cs-136	8.150E-02	72.3	5.896E-02	5.915E-02	1.703E+00
Np-239	-1.086E+00	131.4	1.427E+00	1.428E+00	4.784E+00
Nd-147	5.714E-01	201.0	1.148E+00	1.149E+00	7.326E+00
Total	4.417E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-17-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161135.An1

Acquisition information
Start time: 9/1/2016 4:46:32 PM
Live time: 1800
Real time: 1834
Dead time: 1.83 %
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 4:46:00 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. 22 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1512

***** 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
46.70	36.	47.79	1.17	2.100E-02	46.54	4.250	PBC<MDA	PB210
50.14	13.	141.00	0.78	2.357E-02	50.14	8.000	PBC<MDA	TH227
63.43	54.	39.37	0.86	3.172E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	9.617E+00	Sn126
74.88	171.	12.20	0.80	3.682E-02				
77.16	284.	8.43	0.80	3.763E-02				
81.36	35.	38.10	0.81	3.896E-02	80.99	34.060	PBC<MDA	BA133
84.29	51.	31.46	0.81	3.975E-02				
87.20	126.	14.71	0.81	4.043E-02	86.49	13.100	1.332E+01	Np237
					86.54	30.700	5.681E+00	EU155
					86.94	9.040	1.925E+01	Sn126
					87.57	37.500	4.625E+00	Sn126
					88.04	3.790	4.565E+01	Cd109
90.06	69.	23.60	0.82	4.101E-02				
91.10	22.	200.96	0.82	4.119E-02	91.10	28.300	PBC<MDA	Nd147
92.98	118.	15.52	0.82	4.151E-02	92.59	5.584	1.781E+01	TH234
					93.35	5.561	2.825E+01	AC228
97.50	20.	114.64	0.82	4.213E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	768.11	0.82	4.234E-02	99.50	15.000	PBC<MDA	Np239
103.20	19.	119.21	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
103.70	19.	123.50	0.83	4.269E-02	103.70	24.000	PBC<MDA	Np239
105.31	13.	180.45	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
121.78	19.	106.48	0.85	4.277E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.856E-01	CO57
122.06	16.	131.76	0.85	4.276E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.406E-01	CO57
123.10	13.	160.12	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
131.29	14.	200.51	0.85	4.212E-02	131.29	18.000	PBC<MDA	PA234
143.79	-6.	408.99	0.87	4.080E-02	143.79	10.960	PBC<MDA	U235
145.44	16.	128.14	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
186.02	81.	23.01	1.04	3.541E-02				
193.51	8.	249.92	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229
205.33	17.	115.15	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
227.00	12.	143.61	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.48	478.	5.92	1.00	2.990E-02	238.63	43.300	2.054E+01	PB212
241.89	69.	21.79	0.96	2.960E-02	242.00	7.430	1.746E+01	PB214
244.69	12.	294.14	0.96	2.938E-02	244.69	7.580	PBC<MDA	EU152
265.83	14.	101.28	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
276.55	4.	388.24	0.99	2.694E-02	277.28	6.310	PBC<MDA	TL208
279.20	6.	281.43	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
284.30	11.	152.26	1.00	2.648E-02	284.30	6.140	PBC<MDA	I131
295.13	135.	15.25	0.87	2.579E-02	295.09	19.300	1.507E+01	PB214
299.97	17.	69.51	1.57	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
308.44	17.	155.45	1.02	2.501E-02	308.44	31.750	PBC<MDA	Ir192
328.76	32.	45.12	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
338.06	116.	15.49	1.02	2.345E-02	338.32	12.010	2.280E+01	AC228
340.57	3.	673.94	1.05	2.333E-02	340.57	46.900	PBC<MDA	Cs136
345.83	13.	167.86	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.80	225.	8.39	0.89	2.280E-02	351.93	37.600	1.455E+01	PB214
364.48	8.	167.60	1.07	2.223E-02	364.48	81.700	PBC<MDA	I131
383.84	13.	118.64	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	149.20	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
427.88	4.	265.80	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
463.37	11.	105.06	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
468.06	3.	400.02	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
477.60	9.	129.10	1.17	1.832E-02	477.60	10.520	PBC<MDA	BE7
487.02	6.	200.00	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
511.86	77.	29.50	2.45	1.742E-02	511.86	20.000	1.221E+01	RH106
537.26	2.	491.56	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
563.24	28.	19.38	1.25	1.624E-02	563.24	8.350	1.129E+01	CS134
569.47	4.	271.80	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.472E+00	PA234
					569.70	97.740	1.235E-01	BI207
583.31	186.	8.25	0.87	1.583E-02	583.02	84.500	7.721E+00	TL208
609.35	178.	8.67	1.61	1.533E-02	609.31	46.090	1.403E+01	BI214
					610.30	5.750	1.126E+02	RU103
621.92	15.	172.53	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
635.89	2.	289.62	1.31	1.486E-02	635.89	11.310	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
727.41	41.	19.66	0.45	1.345E-02	727.17	7.550	2.243E+01	BI212
756.73	12.	94.64	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
785.94	27.	24.39	0.31	1.270E-02	785.42	1.280	9.344E+01	BI212
795.87	13.	88.72	1.45	1.257E-02	795.87	85.530	PBC<MDA	CS134
801.95	16.	25.00	1.45	1.250E-02	801.95	8.690	8.183E+00	CS134
810.78	9.	91.49	1.46	1.240E-02	810.78	99.460	PBC<MDA	CO58
834.85	15.	51.33	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
859.98	42.	22.98	2.86	1.185E-02	860.56	12.420	1.588E+01	TL208
871.10	7.	75.42	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
880.53	11.	91.36	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
883.24	2.	490.60	1.52	1.162E-02	883.24	9.600	PBC<MDA	PA234
889.28	5.	222.16	1.53	1.156E-02	889.28	99.984	PBC<MDA	Sc46
898.04	2.	619.68	1.53	1.148E-02	898.04	93.700	PBC<MDA	y88
911.25	98.	10.85	1.54	1.135E-02	911.07	29.000	1.662E+01	AC228
964.11	10.	159.19	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.25	86.	11.78	1.25	1.083E-02	968.97	17.460	2.535E+01	AC228
996.33	8.	87.73	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1001.00	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
1048.07	8.	72.35	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	126.37	1.66	1.019E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	91.49	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1099.25	7.	149.28	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1120.32	68.	16.22	2.05	9.697E-03	1120.29	15.100	2.569E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.112E+01	Ta182
1120.68	10.	122.49	1.72	9.691E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.930E-01	Sc46
					1121.30	34.900	1.700E+00	Ta182
1173.24	9.	100.31	1.76	9.359E-03	1173.24	99.900	PBC<MDA	CO60
1291.60	5.	121.64	1.85	8.689E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	12.	28.87	1.94	8.125E-03	1408.00	21.005	3.906E+00	EU152
1460.88	356.	5.42	2.07	7.894E-03	1460.83	10.670	2.348E+02	K40
1596.21	2.	619.01	2.09	7.364E-03	1596.21	95.400	PBC<MDA	La140
1764.80	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.95	74.87	132.	171.	4.658E+03	12.20	0.802	- sD
308.05	77.14	144.	284.	7.546E+03	8.43	0.804	- D
324.93	81.42	70.	34.	8.794E+02	38.47	0.808	- sD
336.64	84.35	102.	51.	1.282E+03	31.35	0.811	- sD
359.71	90.12	97.	68.	1.666E+03	23.68	0.816	- D
743.30	186.02	76.	81.	2.290E+03	23.01	1.039	-

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	186.25	46.70	98.	36.	0.020	47.79	1.165s
TH-227	200.03	50.14	114.	13.	0.007	141.00	0.778
AM-241	237.59	59.54	216.	-16.	-0.009	156.62	0.787s
TH-234	252.59	63.29	132.	37.	0.020	47.43	0.791D
Sn-126	256.56	64.28	296.	-8.	-0.004	315.60	0.792
BA-133	323.36	80.99	1153.	-22.	-0.012	109.83	0.807s
Np-237	345.35	86.49	1132.	0.	0.000	218.58	0.813A
EU-155	345.56	86.54	1122.	-22.	-0.012	214.11	0.813s
Sn-126	347.15	86.94	1023.	12.	0.007	176.61	0.813D
Sn-126	349.67	87.57	966.	22.	0.012	95.25	0.814D
Cd-109	351.55	88.04	976.	22.	0.012	199.42	0.814A
Nd-147	363.79	91.10	998.	22.	0.012	200.96	0.817s
TH-234	369.74	92.59	218.	26.	0.015	81.50	0.818D
AC-228	372.78	93.35	927.	22.	0.012	196.40	0.819s
Gd-153	389.37	97.50	248.	20.	0.011	114.64	0.823s
Np-239	397.37	99.50	239.	3.	0.002	768.11	0.825s
Gd-153	412.16	103.20	244.	19.	0.010	119.21	0.828s
Np-239	414.16	103.70	263.	19.	0.010	123.50	0.829s
EU-155	420.61	105.31	282.	13.	0.007	180.45	0.830s
Np-239	423.88	106.13	302.	-19.	-0.011	131.37	0.831
EU-152	486.43	121.78	191.	19.	0.010	106.48	0.846s
CO-57	487.57	122.06	210.	16.	0.009	131.76	0.846s
EU-154	491.73	123.10	199.	13.	0.007	160.12	0.847s
PA-234	524.49	131.29	387.	14.	0.008	200.51	0.855s
HF-181	531.41	133.02	401.	0.	0.000	1000.00	0.856
CE-144	533.46	133.54	401.	0.	0.000	1000.00	0.857s
HF-181	544.50	136.30	401.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	465.	-24.	-0.013	127.31	0.859s
U-235	574.43	143.79	357.	-6.	-0.003	408.99	0.866s
CE-141	581.05	145.44	194.	16.	0.009	128.14	0.868s
Ba-140	649.90	162.66	214.	-12.	-0.007	168.10	0.884s
U-235	652.78	163.38	231.	-4.	-0.002	575.23	0.885
CE-139	662.67	165.85	227.	0.	0.000	1000.00	0.887s
Cf-251	705.64	176.60	180.	-23.	-0.013	106.29	0.897s
TH-229	773.25	193.51	110.	8.	0.004	249.92	0.913s
U-235	820.52	205.33	112.	17.	0.009	115.15	0.924s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	842.58	210.85	187.	-24.	-0.013	102.68	0.929
Cf-251	907.16	227.00	90.	12.	0.007	143.61	0.944s
PB-212	953.67	238.63	57.	472.	0.262	5.14	0.954D
PB-214	967.13	242.00	79.	69.	0.038	21.79	0.957D
EU-152	977.91	244.69	668.	12.	0.007	294.14	0.960
TH-227	1024.08	256.24	90.	-13.	-0.007	183.19	0.971s
Cd-113m	1053.91	263.70	108.	-9.	-0.005	166.67	0.978s
BI-210M	1062.44	265.83	94.	14.	0.008	101.28	0.979s
TL-208	1108.23	277.28	117.	4.	0.002	388.24	0.990s
Hg-203	1115.89	279.20	124.	6.	0.003	281.43	0.992
I-131	1136.28	284.30	77.	11.	0.006	152.26	0.996s
PB-214	1179.59	295.13	72.	135.	0.075	15.25	0.870
PB-212	1198.96	299.97	39.	17.	0.009	69.51	1.573s
PA-231	1199.35	300.07	361.	-19.	-0.011	143.91	1.011s
PA-233	1199.79	300.18	344.	-19.	-0.011	140.53	1.011s
PA-231	1209.66	302.65	363.	-19.	-0.011	143.92	1.013s
BA-133	1210.47	302.85	382.	-19.	-0.011	147.53	1.013s
Ba-140	1218.46	304.85	401.	-19.	-0.011	59.76	1.015s
BI-210M	1218.64	304.90	420.	-13.	-0.007	86.72	1.015s
Ir-192	1232.82	308.44	325.	17.	0.009	155.45	1.019s
PA-233	1247.10	312.01	412.	-15.	-0.008	196.04	1.022s
Ir-192	1265.01	316.49	179.	-19.	-0.011	101.11	1.026s
CR-51	1279.38	320.08	200.	-20.	-0.011	57.75	1.029s
La-140	1314.07	328.76	52.	32.	0.018	45.12	1.037s
Cf-249	1332.79	333.44	73.	-15.	-0.009	107.56	1.041s
AC-228	1351.23	338.05	46.	127.	0.071	15.00	1.031
Cs-136	1361.30	340.57	251.	3.	0.002	673.94	1.048
EU-152	1376.16	344.29	284.	-16.	-0.009	155.71	1.051s
HF-181	1382.33	345.83	238.	13.	0.007	167.86	1.053s
PB-214	1406.21	351.80	33.	225.	0.125	8.39	0.892
BA-133	1423.00	356.00	346.	-15.	-0.008	180.09	1.062s
I-131	1456.93	364.48	49.	8.	0.004	167.60	1.070s
BA-133	1534.34	383.84	114.	13.	0.007	118.64	1.087
Cf-249	1550.77	387.95	127.	11.	0.006	149.20	1.091s
SN-113	1565.73	391.69	142.	-9.	-0.005	154.77	1.094s
SB-125	1710.44	427.88	37.	4.	0.002	265.80	1.127s
AG-108M	1734.69	433.94	59.	-11.	-0.006	137.78	1.132s
SB-125	1852.38	463.37	59.	11.	0.006	105.06	1.158
Ir-192	1871.15	468.06	76.	3.	0.002	400.02	1.163s
BE-7	1909.29	477.59	63.	9.	0.005	129.10	1.171s
La-140	1946.98	487.02	36.	6.	0.003	200.00	1.180s
RU-103	1987.11	497.05	56.	-15.	-0.008	75.78	1.188s
RH-106	2046.35	511.86	67.	77.	0.043	29.50	2.452s
Nd-147	2122.88	531.00	32.	-2.	-0.001	558.27	1.219s
Ba-140	2147.92	537.26	37.	2.	0.001	491.56	1.224s
CS-134	2251.82	563.24	0.	28.	0.015	19.38	1.247s
CS-134	2276.15	569.32	40.	-6.	-0.003	154.56	1.252s
PA-234	2276.75	569.47	44.	4.	0.002	271.80	1.253s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	2332.09	583.31	9.	186.	0.103	8.25	0.868s
SB-125	2400.86	600.50	380.	-15.	-0.008	188.68	1.280s
SB-124	2409.78	602.73	398.	-17.	-0.009	32.80	1.282s
CS-134	2417.70	604.71	381.	-16.	-0.009	173.32	1.284s
BI-214	2436.28	609.35	18.	178.	0.099	8.67	1.608s
RU-103	2440.05	610.30	365.	-13.	-0.007	216.31	1.288s
AG-108M	2455.98	614.28	352.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	352.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	326.	15.	0.008	172.53	1.299s
SB-125	2542.41	635.89	22.	2.	0.001	289.62	1.311s
I-131	2546.75	636.97	29.	-2.	-0.001	988.65	1.312s
AG-110M	2629.90	657.76	68.	-12.	-0.007	98.97	1.330s
PM-144	2785.03	696.54	52.	-10.	-0.006	150.55	1.363s
NB-94	2809.38	702.63	48.	-6.	-0.003	267.92	1.368s
SB-124	2890.01	722.79	86.	-10.	-0.006	134.91	1.386s
AG-108M	2890.61	722.94	76.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	76.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	76.	0.	0.000	1000.00	1.387s
BI-212	2908.50	727.41	6.	41.	0.023	19.66	0.454s
pm-146	2941.74	735.72	22.	-2.	-0.001	794.10	1.397s
pm-146	2987.51	747.16	39.	-2.	-0.001	745.30	1.407
ZR-95	3025.79	756.73	26.	12.	0.006	94.64	1.415s
AG-110M	3054.64	763.94	82.	-19.	-0.011	70.91	1.421s
PA-234M	3064.52	766.41	110.	-10.	-0.006	110.38	1.423s
EU-152	3114.56	778.92	26.	-4.	-0.002	264.97	1.434s
BI-212	3142.63	785.94	4.	27.	0.015	24.39	0.309s
CS-134	3182.35	795.87	30.	13.	0.007	88.72	1.448s
CS-134	3206.69	801.95	0.	16.	0.009	25.00	1.454s
CO-58	3241.99	810.78	28.	9.	0.005	91.49	1.461s
La-140	3261.97	815.77	41.	-1.	-0.001	627.10	1.465s
Cs-136	3272.90	818.50	56.	-8.	-0.004	146.36	1.467s
MN-54	3338.30	834.85	9.	15.	0.008	51.33	1.481s
Co-56	3385.99	846.77	33.	-6.	-0.003	218.04	1.491s
TL-208	3438.86	859.98	10.	42.	0.023	22.98	2.861s
NB-94	3483.32	871.10	12.	7.	0.004	75.42	1.512s
EU-154	3491.85	873.23	32.	-5.	-0.003	163.20	1.514s
PA-234	3521.06	880.53	41.	11.	0.006	91.36	1.520s
PA-234	3531.90	883.24	52.	2.	0.001	490.60	1.522s
AG-110M	3537.67	884.68	83.	-15.	-0.008	89.96	1.523s
Sc-46	3556.06	889.28	55.	5.	0.003	222.16	1.527s
y-88	3591.11	898.04	23.	2.	0.001	619.68	1.534s
AC-228	3643.97	911.25	4.	98.	0.055	10.85	1.542s
AG-110M	3748.95	937.49	47.	-11.	-0.006	139.26	1.567s
PA-234	3783.07	946.02	33.	-2.	-0.001	731.57	1.574s
EU-152	3855.45	964.11	111.	10.	0.005	159.19	1.589s
AC-228	3876.01	969.25	4.	86.	0.048	11.78	1.248
EU-154	3984.36	996.33	20.	8.	0.004	87.73	1.616s
PA-234M	4003.04	1001.00	31.	5.	0.003	172.67	1.620s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4018.15	1004.77	47.	2.	0.001	619.10	1.623s
Co-56	4150.45	1037.84	45.	-17.	-0.010	47.95	1.650s
Cs-136	4191.39	1048.07	13.	8.	0.005	72.35	1.658s
RH-106	4200.55	1050.36	21.	6.	0.003	126.37	1.661s
BI-207	4253.77	1063.66	10.	8.	0.005	91.49	1.671
Ga-68	4308.74	1077.40	15.	0.	0.000	1000.00	1.683s
FE-59	4396.18	1099.25	20.	7.	0.004	149.28	1.700s
EU-152	4447.49	1112.07	129.	-13.	-0.007	123.83	1.711s
ZN-65	4461.38	1115.55	116.	-13.	-0.007	117.41	1.713s
BI-214	4480.48	1120.32	9.	68.	0.038	16.22	2.050s
Sc-46	4481.41	1120.55	102.	-2.	-0.001	606.09	1.717s
Ta-182	4484.41	1121.30	75.	10.	0.006	122.49	1.718s
CO-60	4692.24	1173.24	15.	9.	0.005	100.31	1.760s
NA-22	5097.60	1274.53	32.	-14.	-0.008	63.08	1.840s
EU-154	5097.66	1274.54	46.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	5.	5.	0.003	121.64	1.854s
CO-60	5329.61	1332.50	27.	-14.	-0.008	90.05	1.886s
AG-110M	5536.92	1384.30	11.	-6.	-0.003	254.11	1.926s
EU-152	5631.79	1408.00	0.	12.	0.007	28.87	1.944s
K-40	5843.45	1460.88	8.	356.	0.198	5.42	2.066
La-140	6385.15	1596.21	17.	2.	0.001	619.01	2.087s
BI-214	7058.84	1764.49	12.	5.	0.003	107.29	2.211s
Co-56	7086.31	1771.35	8.	0.	0.000	1000.00	2.216s
y-88	7345.39	1836.06	12.	-7.	-0.004	125.36	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	2.5948E+00				5.31E+01	
			477.60	2.595E+00	&(	1.145E+01 1.29E+02 1.05E+01	G
NA-22	C	-8.8651E-01				9.50E+02	
			1274.53	-8.865E-01	?(	1.841E+00 6.31E+01 9.99E+01	G
K-40	N	2.3479E+02				4.66E+11	
			1460.83	2.348E+02	(P	1.049E+01 5.42E+00 1.07E+01	G
Sc-46	F	2.3138E-01				8.38E+01	
			889.28	2.314E-01	?(	1.788E+00 2.22E+02 1.00E+02	G
			1120.55	-1.361E-01	+	2.857E+00 6.06E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-4.6544E+00					2.77E+01	
			320.08	-4.654E+00	?(P	1.573E+01	5.77E+01	9.94E+00 G
MN-54	C	6.7199E-01					3.12E+02	
			834.85	6.720E-01	?(	7.764E-01	5.13E+01	1.00E+02 G
FE-59	F	6.8606E-01					4.45E+01	
			1099.25	6.825E-01	?(P	2.362E+00	1.49E+02	5.65E+01 G
			1291.60	6.907E-01	?(	1.994E+00	1.22E+02	4.32E+01 G
Co-56	C	-2.6254E-01					7.73E+01	
			846.77	-2.625E-01	?(	1.360E+00	2.18E+02	9.99E+01 G
			1238.28	6.745E-02	% P	3.125E+00	2.07E+03	6.61E+01 G
			1037.84	-6.597E+00	+ P	1.299E+01	4.80E+01	1.41E+01 G
			1771.35	0.000E+00	+	8.272E+00	1.00E+03	1.55E+01 A
CO-57	C	2.4059E-01					2.72E+02	
			122.06	2.406E-01	*(	1.067E+00	1.32E+02	8.56E+01 G
			136.47	-3.032E+00	+	1.290E+01	1.27E+02	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	-8.9544E-01					1.93E+03	
			1332.50	-8.954E-01	?(	1.754E+00	9.00E+01	1.00E+02 G
			1173.24	5.348E-01	+	1.233E+00	1.00E+02	9.99E+01 G
ZN-65	F	-1.5036E+00					2.44E+02	
			1115.55	-1.504E+00	&(	5.962E+00	1.17E+02	5.06E+01 G
NB-94	I	5.9888E-02					7.41E+06	
			702.63	-2.382E-01	&(P	1.436E+00	2.68E+02	9.79E+01 G
			871.10	3.520E-01	?(	8.927E-01	7.54E+01	9.99E+01 G
ZR-95	I	9.0754E-01					6.40E+01	
			756.73	9.075E-01	?(P	2.082E+00	9.46E+01	5.45E+01 G
			724.20	0.000E+00	&	4.042E+00	1.00E+03	4.42E+01 G
NB-95	I	-2.2786E-02					6.40E+01	
			765.79	-2.279E-02	%(	2.048E+00	2.58E+03	9.98E+01 G
RU-103	I	-5.1629E-01					3.93E+01	
			497.05	-5.163E-01	?(P	1.291E+00	7.58E+01	9.09E+01 G
			610.30	-7.943E+00	+	5.785E+01	2.16E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	7.4082E+00					3.74E+02	
			621.92	5.546E+00	?(	3.218E+01	1.73E+02	9.93E+00 G
			1050.36	1.926E+01	?(	8.498E+01	1.26E+02	1.56E+00 G
			511.86	1.221E+01	?	6.500E+00	2.95E+01	2.00E+01 GA
AG-108M	C	-3.3367E-01					1.53E+05	
			433.94	-3.337E-01	?(	1.201E+00	1.38E+02	9.05E+01 G
			722.94	0.000E+00	+	1.962E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	&	3.657E+00	1.00E+03	8.98E+01 G
AG-110M	F	-9.8649E-01					2.50E+02	
			884.68	-9.865E-01	?(	2.979E+00	9.00E+01	7.27E+01 G
			657.76	-4.996E-01	+	1.670E+00	9.90E+01	9.46E+01 G
			937.49	-1.552E+00	+	5.027E+00	1.39E+02	3.44E+01 G
			1384.30	-1.633E+00	+ P	5.023E+00	2.54E+02	2.43E+01 G
			763.94	-3.681E+00	+	8.663E+00	7.09E+01	2.23E+01 G
SN-113	F	-3.5567E-01					1.15E+02	
			391.69	-3.557E-01	&(P	2.391E+00	1.55E+02	6.40E+01 G
SB-124	F	-6.1965E-01					6.02E+01	
			602.73	-6.197E-01	?(P	3.498E+00	3.28E+01	9.83E+01 G
			1690.98	-6.197E-02	% P	2.391E+00	2.62E+03	4.78E+01 G
			722.79	-3.804E+00	-	1.747E+01	1.35E+02	1.08E+01 G
SB-125	I	1.0315E+00					1.01E+03	
			427.88	4.102E-01	?(	2.928E+00	2.66E+02	2.96E+01 G
			600.50	-2.962E+00	+	1.878E+01	1.89E+02	1.79E+01 G
			635.89	7.714E-01	?(	8.067E+00	2.90E+02	1.13E+01 G
			463.37	3.069E+00	?(P	1.093E+01	1.05E+02	1.05E+01 G
I-131	I	4.8908E-01					8.02E+00	
			364.48	2.433E-01	&(P	1.081E+00	1.68E+02	8.17E+01 G
			284.30	3.759E+00	(	1.490E+01	1.52E+02	6.14E+00 G
			636.97	-8.185E-01	+ P	1.442E+01	9.89E+02	7.17E+00 G
Gd-153	F	9.7896E-01					2.42E+02	
			97.50	8.709E-01	(	3.345E+00	1.15E+02	3.00E+01 G
			103.20	1.128E+00	?(	4.508E+00	1.19E+02	2.18E+01 G
Tc-99m	I	-2.5946E-03					2.51E-01	
			140.51	-2.595E-03	&(	1.402E+00	1.59E+04	8.93E+01 G
BA-133	F	-5.8466E-01					3.85E+03	
			356.00	-5.847E-01	&(	3.540E+00	1.80E+02	6.20E+01 G
			302.85	-2.269E+00	+	1.122E+01	1.48E+02	1.83E+01 G
			383.84	3.795E+00	?	1.521E+01	1.19E+02	8.94E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			80.99	-9.163E-01	+ P	6.761E+00	1.10E+02	3.41E+01 GA
CS-134	I	8.3080E-01					7.54E+02	
			604.71	-5.938E-01	?(	3.456E+00	1.73E+02	9.76E+01 G
			795.87	6.883E-01	(	1.466E+00	8.87E+01	8.55E+01 G
			569.32	-1.345E+00	+	7.213E+00	1.55E+02	1.54E+01 G
			801.95	8.183E+00	?(	3.769E+00	2.50E+01	8.69E+00 G
			563.24	1.129E+01	*(P	3.019E+00	1.94E+01	8.35E+00 G
CS-137	I	-4.5191E-02					1.10E+04	
			661.66	-4.519E-02	%(	2.014E+00	1.27E+03	8.52E+01 G
Ba-140	I	3.2804E-01					1.28E+01	
			537.26	3.280E-01	?(P	4.185E+00	4.92E+02	2.44E+01 G
			162.66	-2.928E+00	+	1.662E+01	1.68E+02	6.22E+00 G
			304.85	-9.983E+00	+ P	4.934E+01	5.98E+01	4.29E+00 G
La-140	I	6.5460E-01					1.28E+01	
			1596.21	1.252E-01	?(P	1.752E+00	6.19E+02	9.54E+01 G
			487.02	4.057E-01	?(	2.074E+00	2.00E+02	4.55E+01 G
			328.76	3.701E+00	&(P	4.143E+00	4.51E+01	2.03E+01 G
			815.77	-2.833E-01	+	6.327E+00	6.27E+02	2.33E+01 G
CE-141	I	4.4490E-01					3.25E+01	
			145.44	4.449E-01	(	1.919E+00	1.28E+02	4.82E+01 G
PM-144	C	-4.0407E-01					3.63E+02	
			696.54	-4.041E-01	&(	1.467E+00	1.51E+02	9.90E+01 G
			618.06	0.000E+00	&	3.330E+00	1.00E+03	9.91E+01 G
EU-152	F	7.7330E-01					4.94E+03	
			344.29	-1.404E+00	*(	7.351E+00	1.56E+02	2.65E+01 G
			1112.07	-5.554E+00	+	2.323E+01	1.24E+02	1.36E+01 G
			121.78	8.552E-01	*(	3.053E+00	1.06E+02	2.86E+01 G
			778.92	-1.344E+00	&	8.895E+00	2.65E+02	1.29E+01 G
			964.11	3.348E+00	?(	1.814E+01	1.59E+02	1.46E+01 G
			244.69	3.115E+00	?(	3.072E+01	2.94E+02	7.58E+00 G
			1408.00	3.906E+00	?	2.399E+00	2.89E+01	2.10E+01 GA
EU-154	I	7.6307E-01					3.14E+03	
			873.23	-1.970E+00	(	1.124E+01	1.63E+02	1.23E+01 G
			123.10	4.040E-01	+	2.185E+00	1.60E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.171E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.818E+00	1.00E+03	2.02E+01 G
			1004.77	4.642E-01	+	1.018E+01	6.19E+02	1.80E+01 G
			996.33	3.927E+00	?(	1.172E+01	8.77E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	8.1538E-01				1.81E+03		
			105.31	8.154E-01	&(P	4.957E+00	1.80E+02	2.12E+01 G
			86.54	-9.993E-01	+	7.138E+00	2.14E+02	3.07E+01 G
HF-181	F	3.6422E-01				4.24E+01		
			482.00	3.793E-02	%(	1.603E+00	1.20E+03	8.05E+01 G
			133.02	0.000E+00	-	2.936E+00	1.00E+03	4.33E+01 G
			345.83	2.107E+00	&(	1.193E+01	1.68E+02	1.51E+01 G
			136.30	0.000E+00	-	2.190E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.6999E+00				1.14E+02		
			1121.30	1.700E+00	@(	7.082E+00	1.22E+02	3.49E+01 G
			1221.41	-4.319E-02	% P	6.125E+00	6.18E+03	2.70E+01 G
			1189.05	3.060E-01	% P	1.124E+01	1.58E+03	1.62E+01 G
Hg-203	F	1.4414E-01				4.66E+01		
			279.20	1.441E-01	&(	1.391E+00	2.81E+02	8.15E+01 G
TL-208	N	7.7210E+00				6.98E+02		
			583.02	7.721E+00	@(	6.928E-01	8.25E+00	8.45E+01 G
			277.28	1.299E+00	& P	1.736E+01	3.88E+02	6.31E+00 G
			860.56	1.588E+01	+ P	6.561E+00	2.30E+01	1.24E+01 G
pm-146	C	-2.5879E-01				2.02E+03		
			747.16	-2.588E-01	?(P	3.948E+00	7.45E+02	3.40E+01 G
			735.72	-3.625E-01	+ P	4.546E+00	7.94E+02	2.25E+01 G
			453.88	4.498E-02	&	1.633E+00	1.42E+03	6.50E+01 G
y-88	F	8.6093E-02				1.07E+02		
			898.04	8.609E-02	&(	1.303E+00	6.20E+02	9.37E+01 G
			1836.06	-5.946E-01	+	1.601E+00	1.25E+02	9.92E+01 G
Cd-113m		-2.9872E+03				5.33E+03		
			263.70	-2.987E+03	?(	1.697E+04	1.67E+02	6.00E-03 K
Cd-109	F	8.0437E+00				4.53E+02		
						Derived Ave Activity		
			88.04	8.044E+00	}(	5.354E+01	1.99E+02	3.79E+00 G
Cf-251	T	-2.0413E+00				3.28E+05		
			176.60	-2.041E+00	?(	5.812E+00	1.06E+02	1.70E+01 G
			227.00	3.421E+00	&	1.338E+01	1.44E+02	6.30E+00 GA
Cf-249	T	4.3192E-01				1.28E+05		
			387.95	4.319E-01	&(	2.187E+00	1.49E+02	6.60E+01 G
			333.44	-2.320E+00	+	6.447E+00	1.08E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-1.3814E+00					3.65E+07	
			87.57	8.145E-01	}	5.396E+00	9.53E+01	3.75E+01 GA
			64.28	-1.381E+00	?(	1.475E+01	3.16E+02	9.70E+00 G
			86.94	1.845E+00	}	2.311E+01	1.77E+02	9.04E+00 GA
PB-210	N	2.2670E+01					8.14E+03	
			46.54	2.267E+01	*(P	3.033E+01	4.78E+01	4.25E+00 G
PB-212	N	2.0243E+01					6.98E+02	
			238.63	2.024E+01	(P	1.633E+00	5.14E+00	4.33E+01 G
			300.03	1.105E+01	- P	2.122E+01	6.95E+01	3.28E+00 GA
PB-214	N	1.4731E+01					5.84E+05	
			351.93	1.455E+01	(P	1.924E+00	8.39E+00	3.76E+01 G
			295.09	1.507E+01	(P	4.711E+00	1.52E+01	1.93E+01 G
			242.00	1.746E+01		1.114E+01	2.18E+01	7.43E+00 GA
BI-207	C	2.5273E-01					1.18E+04	
			569.70	-1.764E-02	%(	1.155E+00	1.83E+03	9.77E+01 G
			1063.66	6.074E-01	&(	1.289E+00	9.15E+01	7.45E+01 G
BI-212	N	2.2431E+01					6.98E+02	
			727.17	2.243E+01	(	7.728E+00	1.97E+01	7.55E+00 G
			785.42	9.344E+01	+	3.977E+01	2.44E+01	1.28E+00 GA
BI-214	N	1.4025E+01					5.84E+05	
			609.31	1.403E+01	@(P	1.750E+00	8.67E+00	4.61E+01 G
			1120.29	2.569E+01	+ P	6.415E+00	1.62E+01	1.51E+01 G
			1764.49	2.713E+00	- P	1.014E+01	1.07E+02	1.54E+01 G
BI-210M	T	5.6210E-01					1.10E+09	
			265.83	5.621E-01	&(	1.918E+00	1.01E+02	5.00E+01 G
			304.90	-1.056E+00	+ P	7.728E+00	8.67E+01	2.80E+01 G
AC-228	N	1.6620E+01					2.10E+03	
			911.07	1.662E+01	@(	1.928E+00	1.09E+01	2.90E+01 G
			968.97	2.535E+01	+	3.416E+00	1.18E+01	1.75E+01 G
			338.32	2.510E+01	+	6.762E+00	1.50E+01	1.20E+01 G
			93.35	5.299E+00	-	3.475E+01	1.96E+02	5.56E+00 XA
TH-227	N	3.8308E+00					7.95E+03	
			50.14	3.831E+00	(	1.546E+01	1.41E+02	8.00E+00 G
			256.24	-3.695E+00	+ P	1.310E+01	1.83E+02	7.00E+00 G
TH-229	N	2.7688E+00					2.68E+06	
			193.51	2.769E+00	?(P	1.892E+01	2.50E+02	4.40E+00 G
			210.85	-1.380E+01	+	3.791E+01	1.03E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.6937E+01					1.63E+12	
			63.29	1.694E+01	(P	2.588E+01	4.74E+01	3.81E+00 G
			92.59	6.359E+00	- P	1.716E+01	8.15E+01	5.58E+00 G
PA-231	N	-1.4435E+01					1.20E+07	
			302.65	-1.443E+01	?(	6.964E+01	1.44E+02	2.88E+00 G
			300.07	-1.676E+01	+	8.084E+01	1.44E+02	2.46E+00 G
PA-233	C	-9.1880E-01					7.82E+08	
			312.01	-9.188E-01	?(	6.051E+00	1.96E+02	3.60E+01 G
			300.18	-6.652E+00	+	3.134E+01	1.41E+02	6.20E+00 G
PA-234	N	1.1329E+00					1.63E+12	
			131.29	1.026E+00	*(	6.915E+00	2.01E+02	1.80E+01 G
			946.02	-6.262E-01	+	1.103E+01	7.32E+02	1.34E+01 G
			569.47	1.472E+00	?(	1.406E+01	2.72E+02	8.20E+00 G
			883.24	1.044E+00	?(	1.806E+01	4.91E+02	9.60E+00 G
			880.53	8.400E+00	?	2.596E+01	9.14E+01	6.00E+00 GA
PA-234M	N	3.0037E+01					1.63E+12	
			1001.00	3.004E+01	?(P	1.812E+02	1.73E+02	8.37E-01 G
			766.41	-1.465E+02	+ P	7.549E+02	1.10E+02	2.94E-01 G
U-235	N	1.2441E+00					2.57E+11	
			143.79	-7.398E-01	?(P	1.128E+01	4.09E+02	1.10E+01 G
			205.33	5.584E+00	?(P	1.740E+01	1.15E+02	5.01E+00 G
			163.38	-1.230E+00	& P	2.116E+01	5.75E+02	5.08E+00 G
AM-241	T	-8.3736E-01					1.58E+05	
			59.54	-8.374E-01	?(	3.726E+00	1.57E+02	3.59E+01 G
Ir-192	F	-5.5099E-02					7.40E+01	
			316.49	-4.990E-01	?(	1.690E+00	1.01E+02	8.70E+01 G
			468.06	1.797E-01	+	2.501E+00	4.00E+02	5.18E+01 G
			308.44	1.162E+00	?(	6.066E+00	1.55E+02	3.18E+01 G
Cs-136	F	8.1498E-02					1.30E+01	
			818.50	-3.385E-01	?(	1.703E+00	1.46E+02	1.00E+02 G
			1048.07	5.550E-01	?(	1.342E+00	7.23E+01	8.00E+01 G
			340.57	1.693E-01	?(	3.884E+00	6.74E+02	4.69E+01 G
Np-239	T	-1.0860E+00					2.36E+00	
			103.70	1.024E+00	?	4.242E+00	1.24E+02	2.40E+01 X
			106.13	-1.086E+00	?(	4.784E+00	1.31E+02	2.27E+01 G
			99.50	2.498E-01	&	6.541E+00	7.68E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	5.7144E-01					1.11E+01	
		531.00	-5.040E-01	&(	7.326E+00	5.58E+02	1.30E+01 G
		91.10	1.065E+00	?(	7.145E+00	2.01E+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	114.	13.	0.007	141.00	3.831E+00	
AM-241	59.54	216.	-16.	-0.009	156.62	-8.374E-01	
BA-133	80.99	1153.	-22.	-0.012	109.83	-9.163E-01	P
EU-155	86.54	1122.	-22.	-0.012	214.11	-9.993E-01	
Nd-147	91.10	998.	22.	0.012	200.96	1.065E+00	
Gd-153	97.50	248.	20.	0.011	114.64	8.709E-01	
Np-239	99.50	239.	3.	0.002	768.11	2.498E-01	
Gd-153	103.20	244.	19.	0.010	119.21	1.128E+00	
Np-239	103.70	263.	19.	0.010	123.50	1.024E+00	
EU-155	105.31	282.	13.	0.007	180.45	8.154E-01	P
Np-239	106.13	302.	-19.	-0.011	131.37	-1.086E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	121.78	191.	19.	0.010	106.48	8.552E-01	
CO-57	122.06	210.	16.	0.009	131.76	2.406E-01	
EU-154	123.10	199.	13.	0.007	160.12	4.040E-01	
PA-234	131.29	387.	14.	0.008	200.51	1.026E+00	
CO-57	136.47	465.	-24.	-0.013	127.31	-3.032E+00	
U-235	143.79	357.	-6.	-0.003	408.99	-7.398E-01	P
CE-141	145.44	194.	16.	0.009	128.14	4.449E-01	
Ba-140	162.66	214.	-12.	-0.007	168.10	-2.928E+00	
U-235	163.38	231.	-4.	-0.002	575.23	-1.230E+00	P
Cf-251	176.60	180.	-23.	-0.013	106.29	-2.041E+00	
TH-229	193.51	110.	8.	0.004	249.92	2.769E+00	P
U-235	205.33	112.	17.	0.009	115.15	5.584E+00	P
TH-229	210.85	187.	-24.	-0.013	102.68	-1.380E+01	
Cf-251	227.00	90.	12.	0.007	143.61	3.421E+00	
EU-152	244.69	668.	12.	0.007	294.14	3.115E+00	
TH-227	256.24	90.	-13.	-0.007	183.19	-3.695E+00	P
Cd-113m	263.70	108.	-9.	-0.005	166.67	-2.987E+03	
BI-210M	265.83	94.	14.	0.008	101.28	5.621E-01	
Hg-203	279.20	124.	6.	0.003	281.43	1.441E-01	
I-131	284.30	77.	11.	0.006	152.26	3.759E+00	
PA-231	300.07	361.	-19.	-0.011	143.91	-1.676E+01	
PA-233	300.18	344.	-19.	-0.011	140.53	-6.652E+00	
PA-231	302.65	363.	-19.	-0.011	143.92	-1.443E+01	
BA-133	302.85	382.	-19.	-0.011	147.53	-2.269E+00	
Ba-140	304.85	401.	-19.	-0.011	59.76	-9.983E+00	P
BI-210M	304.90	420.	-13.	-0.007	86.72	-1.056E+00	P
Ir-192	308.44	325.	17.	0.009	155.45	1.162E+00	
PA-233	312.01	412.	-15.	-0.008	196.04	-9.188E-01	
Ir-192	316.49	179.	-19.	-0.011	101.11	-4.990E-01	
CR-51	320.08	200.	-20.	-0.011	57.75	-4.654E+00	P
La-140	328.76	52.	32.	0.018	45.12	3.701E+00	P
Cf-249	333.44	73.	-15.	-0.009	107.56	-2.320E+00	
Cs-136	340.57	251.	3.	0.002	673.94	1.693E-01	
EU-152	344.29	284.	-16.	-0.009	155.71	-1.404E+00	
HF-181	345.83	238.	13.	0.007	167.86	2.107E+00	
BA-133	356.00	346.	-15.	-0.008	180.09	-5.847E-01	
I-131	364.48	49.	8.	0.004	167.60	2.433E-01	P
BA-133	383.84	114.	13.	0.007	118.64	3.795E+00	
Cf-249	387.95	127.	11.	0.006	149.20	4.319E-01	
SN-113	391.69	142.	-9.	-0.005	154.77	-3.557E-01	P
SB-125	427.88	37.	4.	0.002	265.80	4.102E-01	
AG-108M	433.94	59.	-11.	-0.006	137.78	-3.337E-01	
SB-125	463.37	59.	11.	0.006	105.06	3.069E+00	P
Ir-192	468.06	76.	3.	0.002	400.02	1.797E-01	
BE-7	477.59	63.	9.	0.005	129.10	2.595E+00	
La-140	487.02	36.	6.	0.003	200.00	4.057E-01	
RU-103	497.05	56.	-15.	-0.008	75.78	-5.163E-01	P
RH-106	511.86	67.	77.	0.043	29.50	1.221E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	531.00	32.	-2.	-0.001	558.27	-5.040E-01	
Ba-140	537.26	37.	2.	0.001	491.56	3.280E-01	P
CS-134	563.24	0.	28.	0.015	19.38	1.129E+01	P
CS-134	569.32	40.	-6.	-0.003	154.56	-1.345E+00	
PA-234	569.47	44.	4.	0.002	271.80	1.472E+00	
SB-125	600.50	380.	-15.	-0.008	188.68	-2.962E+00	
SB-124	602.73	398.	-17.	-0.009	32.80	-6.197E-01	P
CS-134	604.71	381.	-16.	-0.009	173.32	-5.938E-01	
RU-103	610.30	365.	-13.	-0.007	216.31	-7.943E+00	
RH-106	621.92	326.	15.	0.008	172.53	5.546E+00	
SB-125	635.89	22.	2.	0.001	289.62	7.714E-01	
I-131	636.97	29.	-2.	-0.001	988.65	-8.185E-01	P
AG-110M	657.76	68.	-12.	-0.007	98.97	-4.996E-01	
PM-144	696.54	52.	-10.	-0.006	150.55	-4.041E-01	
NB-94	702.63	48.	-6.	-0.003	267.92	-2.382E-01	P
SB-124	722.79	86.	-10.	-0.006	134.91	-3.804E+00	
pm-146	735.72	22.	-2.	-0.001	794.10	-3.625E-01	P
pm-146	747.16	39.	-2.	-0.001	745.30	-2.588E-01	P
ZR-95	756.73	26.	12.	0.006	94.64	9.075E-01	P
AG-110M	763.94	82.	-19.	-0.011	70.91	-3.681E+00	
PA-234M	766.41	110.	-10.	-0.006	110.38	-1.465E+02	P
EU-152	778.92	26.	-4.	-0.002	264.97	-1.344E+00	
CS-134	795.87	30.	13.	0.007	88.72	6.883E-01	
CS-134	801.95	0.	16.	0.009	25.00	8.183E+00	
CO-58	810.78	28.	9.	0.005	91.49	3.964E-01	
La-140	815.77	41.	-1.	-0.001	627.10	-2.833E-01	
Cs-136	818.50	56.	-8.	-0.004	146.36	-3.385E-01	
MN-54	834.85	9.	15.	0.008	51.33	6.720E-01	
Co-56	846.77	33.	-6.	-0.003	218.04	-2.625E-01	
NB-94	871.10	12.	7.	0.004	75.42	3.520E-01	
EU-154	873.23	32.	-5.	-0.003	163.20	-1.970E+00	
PA-234	880.53	41.	11.	0.006	91.36	8.400E+00	
PA-234	883.24	52.	2.	0.001	490.60	1.044E+00	
AG-110M	884.68	83.	-15.	-0.008	89.96	-9.865E-01	
Sc-46	889.28	55.	5.	0.003	222.16	2.314E-01	
y-88	898.04	23.	2.	0.001	619.68	8.609E-02	
AG-110M	937.49	47.	-11.	-0.006	139.26	-1.552E+00	
PA-234	946.02	33.	-2.	-0.001	731.57	-6.262E-01	
EU-152	964.11	111.	10.	0.005	159.19	3.348E+00	
EU-154	996.33	20.	8.	0.004	87.73	3.927E+00	
PA-234M	1001.00	31.	5.	0.003	172.67	3.004E+01	P
EU-154	1004.77	47.	2.	0.001	619.10	4.642E-01	
Co-56	1037.84	45.	-17.	-0.010	47.95	-6.597E+00	P
Cs-136	1048.07	13.	8.	0.005	72.35	5.550E-01	
RH-106	1050.36	21.	6.	0.003	126.37	1.926E+01	
BI-207	1063.66	10.	8.	0.005	91.49	6.074E-01	
FE-59	1099.25	20.	7.	0.004	149.28	6.825E-01	P
EU-152	1112.07	129.	-13.	-0.007	123.83	-5.554E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZN-65	1115.55	116.	-13.	-0.007	117.41	-1.504E+00		
Sc-46	1120.55	102.	-2.	-0.001	606.09	-1.361E-01		
Ta-182	1121.30	75.	10.	0.006	122.49	1.700E+00		
CO-60	1173.24	15.	9.	0.005	100.31	5.348E-01		
NA-22	1274.53	32.	-14.	-0.008	63.08	-8.865E-01		
FE-59	1291.60	5.	5.	0.003	121.64	6.907E-01		
CO-60	1332.50	27.	-14.	-0.008	90.05	-8.954E-01		
AG-110M	1384.30	11.	-6.	-0.003	254.11	-1.633E+00	P	
EU-152	1408.00	0.	12.	0.007	28.87	3.906E+00		
La-140	1596.21	17.	2.	0.001	619.01	1.252E-01	P	
y-88	1836.06	12.	-7.	-0.004	125.36	-5.946E-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	2.5948E+00	2.5948E+00	1.291E+02%	1.14E+01
NA-22	#A	-8.8651E-01	-8.8651E-01	6.308E+01%	1.84E+00
K-40		2.3479E+02	2.3479E+02	5.423E+00%	1.05E+01
Sc-46	#A	2.3138E-01	2.3138E-01	2.222E+02%	1.79E+00
CR-51	#A	-4.6544E+00	-4.6544E+00	5.775E+01%	1.57E+01
MN-54	#A	6.7199E-01	6.7199E-01	5.133E+01%	7.76E-01
FE-59	#A	6.8606E-01	6.8606E-01	9.628E+01%	2.36E+00
Co-56	#A	-2.6254E-01	-2.6254E-01	2.180E+02%	1.36E+00
CO-57	#A	2.4059E-01	2.4059E-01	1.318E+02%	1.07E+00
CO-58	#A	3.9640E-01	3.9640E-01	9.149E+01%	1.23E+00
CO-60	#A	-8.9544E-01	-8.9544E-01	9.005E+01%	1.75E+00
ZN-65	#A	-1.5036E+00	-1.5036E+00	1.174E+02%	5.96E+00
NB-94	#A	5.9888E-02	5.9888E-02	7.542E+01%	1.44E+00
ZR-95	#A	9.0754E-01	9.0754E-01	9.464E+01%	2.08E+00
NB-95	#A	-2.2786E-02	-2.2786E-02	2.576E+03%	2.05E+00
RU-103	#A	-5.1629E-01	-5.1629E-01	7.578E+01%	1.29E+00
RH-106	#A	7.4082E+00	7.4082E+00	1.069E+02%	3.22E+01
AG-108M	#A	-3.3367E-01	-3.3367E-01	1.378E+02%	1.20E+00
AG-110M	#A	-9.8649E-01	-9.8649E-01	8.996E+01%	2.98E+00
SN-113	#A	-3.5566E-01	-3.5567E-01	1.548E+02%	2.39E+00
SB-124	#A	-6.1965E-01	-6.1965E-01	3.280E+01%	3.50E+00
SB-125	#A	1.0315E+00	1.0315E+00	1.051E+02%	2.93E+00
I-131	#A	4.8907E-01	4.8908E-01	1.132E+02%	1.08E+00
Gd-153	#A	9.7896E-01	9.7896E-01	8.269E+01%	3.35E+00
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.09E+01
Tc-99m	#A	-2.5919E-03	-2.5946E-03	1.590E+04%	1.40E+00
BA-133	#A	-5.8466E-01	-5.8466E-01	1.801E+02%	3.54E+00
CS-134	#A	8.3080E-01	8.3080E-01	1.938E+01%	3.46E+00
CS-137	#A	-4.5191E-02	-4.5191E-02	1.274E+03%	2.01E+00

CE-139 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.33E+00
Ba-140 #A	3.2803E-01	3.2804E-01	4.916E+02%	4.19E+00
La-140 #A	6.5458E-01	6.5460E-01	4.512E+01%	1.75E+00
CE-141 #A	4.4490E-01	4.4490E-01	1.281E+02%	1.92E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.15E+01
PM-144 #A	-4.0407E-01	-4.0407E-01	1.506E+02%	1.47E+00
EU-152 #A	7.7330E-01	7.7330E-01	9.600E+01%	7.35E+00
EU-154 #A	7.6307E-01	7.6307E-01	8.773E+01%	1.12E+01
EU-155 #A	8.1538E-01	8.1538E-01	1.804E+02%	4.96E+00
HF-181 #A	3.6422E-01	3.6422E-01	1.679E+02%	1.60E+00
Ta-182 #A	1.6999E+00	1.6999E+00	1.225E+02%	7.08E+00
Hg-203 #A	1.4414E-01	1.4414E-01	2.814E+02%	1.39E+00
TL-208 #	7.7210E+00	7.7210E+00	8.251E+00%	6.93E-01
pm-146 #A	-2.5879E-01	-2.5879E-01	7.453E+02%	3.95E+00
y-88 #A	8.6093E-02	8.6093E-02	6.197E+02%	1.30E+00
Cd-113m#A	-2.9872E+03	-2.9872E+03	1.667E+02%	1.70E+04
Cd-109 #A	8.0437E+00	8.0437E+00	1.994E+02%	5.35E+01
Cf-251 #A	-2.0413E+00	-2.0413E+00	1.063E+02%	5.81E+00
Cf-249 #A	4.3192E-01	4.3192E-01	1.492E+02%	2.19E+00
Sn-126 #A	-1.3814E+00	-1.3814E+00	3.156E+02%	1.48E+01
PB-210 #A	2.2670E+01	2.2670E+01	4.779E+01%	3.03E+01
PB-212	2.0243E+01	2.0243E+01	5.142E+00%	1.63E+00
PB-214	1.4731E+01	1.4731E+01	8.394E+00%	1.92E+00
BI-207 #A	2.5273E-01	2.5273E-01	9.149E+01%	1.15E+00
BI-212	2.2431E+01	2.2431E+01	1.966E+01%	7.73E+00
BI-214 #	1.4025E+01	1.4025E+01	8.665E+00%	1.75E+00
BI-210M#A	5.6210E-01	5.6210E-01	1.013E+02%	1.92E+00
AC-228	1.6620E+01	1.6620E+01	1.085E+01%	1.93E+00
TH-227 #A	3.8308E+00	3.8308E+00	1.410E+02%	1.55E+01
TH-229 #A	2.7688E+00	2.7688E+00	2.499E+02%	1.89E+01
TH-234 #A	1.6937E+01	1.6937E+01	4.743E+01%	2.59E+01
PA-231 #A	-1.4435E+01	-1.4435E+01	1.439E+02%	6.96E+01
PA-233 #A	-9.1880E-01	-9.1880E-01	1.960E+02%	6.05E+00
PA-234 #A	1.1329E+00	1.1329E+00	1.985E+02%	6.92E+00
PA-234M#A	3.0037E+01	3.0037E+01	1.727E+02%	1.81E+02
U-235 #A	1.2441E+00	1.2441E+00	1.152E+02%	1.13E+01
AM-241 #A	-8.3736E-01	-8.3736E-01	1.566E+02%	3.73E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.68E+01
Ir-192 #A	-5.5099E-02	-5.5099E-02	9.272E+01%	1.69E+00
Cs-136 #A	8.1497E-02	8.1498E-02	7.235E+01%	1.70E+00
Np-239 #A	-1.0859E+00	-1.0860E+00	1.314E+02%	4.78E+00
Nd-147 #A	5.7142E-01	5.7144E-01	2.010E+02%	7.33E+00

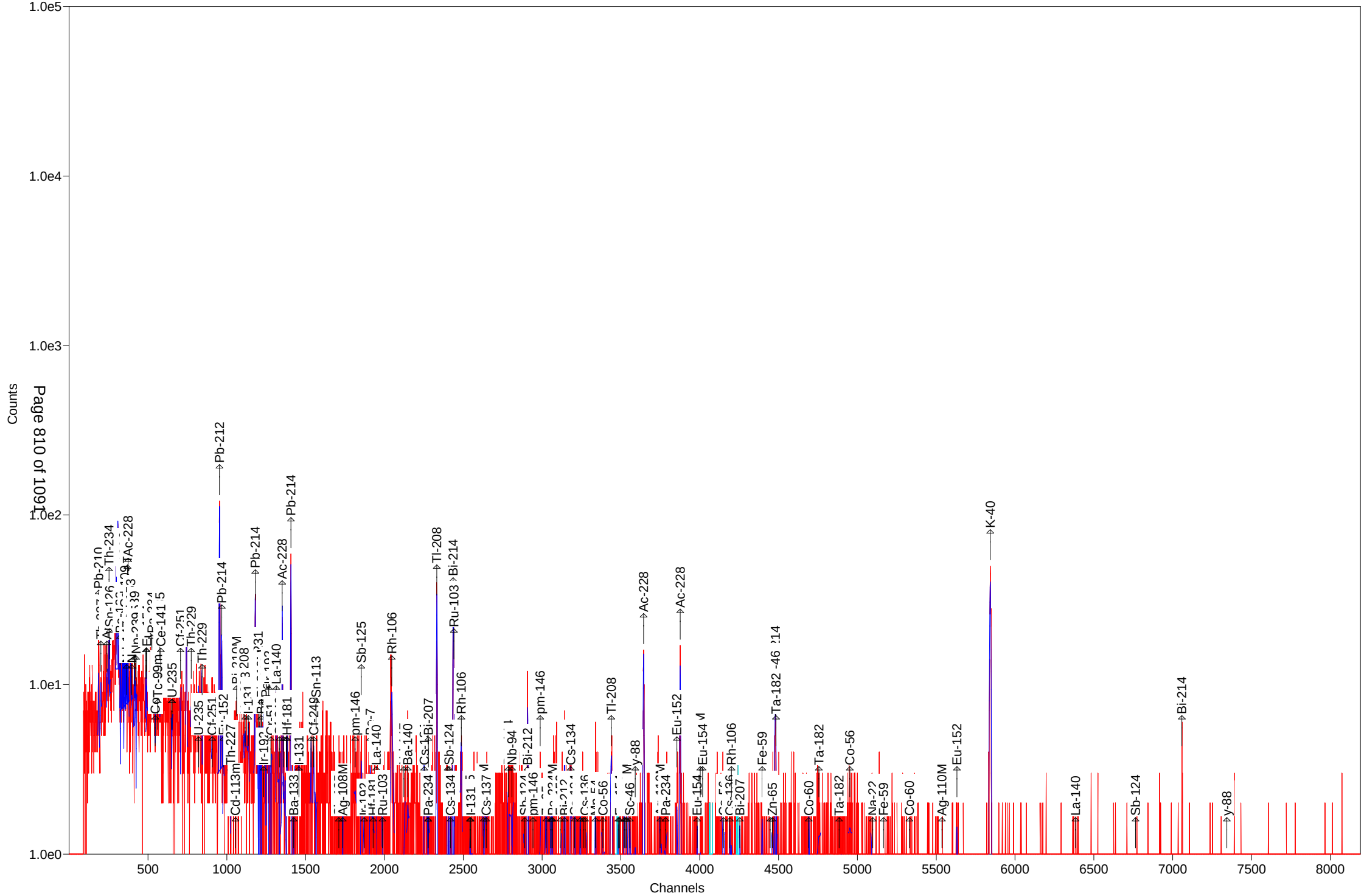
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - 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) 3.702E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.7016367E+02 Bq/Sample

264540_Gamma_160-18553-A-17-B. 17_Gamma_20161135.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162112

Sample Description: 264540_Gamma_160-18553-A-18-B
Detector: Detector #16
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-18-B

Decay to Time: 9/1/2016 16:47 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:47:17 Real Time: 1816 sec
Analysis Time: 9/1/2016 17:18 Dead Time: 0.87 %
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	3.149E-01	1450.6	4.568E+00	4.568E+00	1.574E+01
NA-22	5.910E-01	57.1	3.377E-01	3.390E-01	1.087E+00
K-40	2.987E+02	4.6	1.384E+01	2.062E+01	1.085E+01
Sc-46	-1.246E-01	457.7	5.703E-01	5.703E-01	1.985E+00
CR-51	-4.935E+00	162.6	8.024E+00	8.028E+00	2.680E+01
MN-54	-7.734E-01	97.5	7.541E-01	7.552E-01	1.667E+00
FE-59	1.874E+00	42.3	7.934E-01	7.989E-01	2.018E+00
Co-56	4.827E-01	89.5	4.320E-01	4.327E-01	1.549E+00
CO-57	3.436E-01	97.7	3.356E-01	3.360E-01	1.119E+00
CO-58	-8.362E-01	81.5	6.812E-01	6.825E-01	2.272E+00
CO-60	2.914E-01	120.2	3.503E-01	3.506E-01	1.681E+00
ZN-65	-1.846E+00	91.7	1.694E+00	1.696E+00	5.674E+00
NB-94	-8.572E-01	85.9	7.366E-01	7.380E-01	2.457E+00
ZR-95	5.218E-01	105.7	5.514E-01	5.521E-01	2.152E+00
NB-95	-2.216E-01	270.1	5.986E-01	5.987E-01	2.057E+00
RU-103	-5.214E-01	104.6	5.454E-01	5.461E-01	1.172E+00
RH-106	-2.764E+00	171.5	4.741E+00	4.743E+00	1.623E+01
AG-108M	4.304E-01	81.7	3.514E-01	3.521E-01	1.065E+00
AG-110M	4.041E-01	115.1	4.650E-01	4.655E-01	1.464E+00
SN-113	-5.748E-01	156.4	8.991E-01	8.996E-01	2.261E+00
SB-124	-1.008E-01	148.9	1.502E-01	1.502E-01	3.388E+00
SB-125	5.136E-01	60.1	3.088E-01	3.100E-01	3.897E+00
I-131	-6.522E-01	102.3	6.670E-01	6.678E-01	1.442E+00
Gd-153	0.000E+00	1.#INF	4.977E-01	4.977E-01	9.963E+00
Ga-68	-2.328E+01	120.5	2.806E+01	2.809E+01	6.092E+01
Tc-99m	-4.920E-01	146.0	7.183E-01	7.188E-01	2.389E+00
BA-133	-7.330E-01	153.3	1.123E+00	1.124E+00	3.762E+00
CS-134	0.000E+00	1.#INF	8.488E-02	8.488E-02	3.376E+00
CS-137	-9.022E-01	39.8	3.595E-01	3.626E-01	2.587E+00
CE-139	4.653E-01	98.4	4.577E-01	4.598E-01	1.525E+00
Ba-140	2.516E-01	686.2	1.726E+00	1.726E+00	4.276E+00
La-140	5.916E-01	83.1	4.915E-01	4.925E-01	1.061E+00
CE-141	-8.737E-01	143.7	1.256E+00	1.257E+00	4.179E+00

CE-144	0.000E+00	1.#INF	7.205E-01	7.205E-01	1.571E+01
PM-144	-7.884E-01	81.3	6.412E-01	6.425E-01	2.137E+00
EU-152	1.379E+00	93.5	1.290E+00	1.292E+00	8.832E+00
EU-154	-2.972E+00	114.0	3.387E+00	3.390E+00	1.207E+01
EU-155	-1.966E+00	217.3	4.272E+00	4.273E+00	1.418E+01
HF-181	2.679E-01	155.1	4.155E-01	4.157E-01	2.080E+00
Ta-182	1.437E+00	117.7	1.691E+00	1.693E+00	7.339E+00
Hg-203	3.320E-01	125.8	4.175E-01	4.179E-01	1.408E+00
TL-208	7.129E+00	9.5	6.748E-01	7.695E-01	1.051E+00
pm-146	3.416E-01	117.8	4.023E-01	4.026E-01	3.829E+00
y-88	-3.573E-01	127.8	4.566E-01	4.569E-01	1.473E+00
Cd-113m	1.659E+04	32.8	5.445E+03	5.549E+03	1.715E+04
Cd-109	0.000E+00	1.#INF	2.523E+01	2.523E+01	8.377E+01
Cf-251	1.068E+00	180.7	1.931E+00	1.933E+00	4.975E+00
Cf-249	0.000E+00	1.#INF	4.259E-01	4.259E-01	2.511E+00
Sn-126	-5.740E-01	1024.2	5.879E+00	5.879E+00	1.978E+01
PB-210	-3.195E+01	43.7	1.396E+01	1.409E+01	5.365E+01
PB-212	1.966E+01	5.3	1.044E+00	1.646E+00	1.911E+00
PB-214	1.718E+01	7.8	1.333E+00	1.604E+00	2.427E+00
BI-207	3.006E-01	146.4	4.400E-01	4.403E-01	1.300E+00
BI-212	-3.678E+00	126.0	4.636E+00	4.640E+00	2.522E+01
BI-214	1.738E+01	7.5	1.309E+00	1.590E+00	2.086E+00
BI-210M	-2.054E-01	131.5	2.700E-01	2.703E-01	2.504E+00
AC-228	2.294E+01	7.7	1.771E+00	2.123E+00	1.165E+00
TH-227	1.050E+00	730.6	7.675E+00	7.675E+00	2.594E+01
TH-229	7.335E+00	108.0	7.924E+00	7.945E+00	2.026E+01
TH-234	-2.407E+01	63.7	1.534E+01	1.539E+01	5.191E+01
PA-231	-1.641E+01	146.9	2.411E+01	2.413E+01	8.059E+01
PA-233	-1.359E+00	50.6	6.870E-01	6.909E-01	7.272E+00
PA-234	1.791E+00	150.8	2.701E+00	2.702E+00	9.338E+00
PA-234M	4.714E+01	80.4	3.790E+01	3.797E+01	2.418E+02
U-235	-4.071E+00	66.6	2.712E+00	2.719E+00	1.865E+01
AM-241	-2.421E-01	704.9	1.707E+00	1.707E+00	5.755E+00
Np-237	0.000E+00	1.#INF	7.549E+00	7.549E+00	2.507E+01
Ir-192	5.385E-01	156.7	8.437E-01	8.443E-01	2.820E+00
Cs-136	-8.753E-01	92.3	8.079E-01	8.095E-01	2.700E+00
Np-239	-1.845E+00	217.6	4.014E+00	4.015E+00	1.333E+01
Nd-147	2.365E-01	1278.7	3.024E+00	3.024E+00	7.524E+00
Total	1.704E+04				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-18-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162112.An1

Acquisition information
Start time: 9/1/2016 4:47:17 PM
Live time: 1800
Real time: 1816
Dead time: 0.87 %
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 4:47:00 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. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1984

***** 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	4.	730.58	0.96	2.644E-02	50.14	8.000	PBC<MDA	TH227
59.54	-5.	704.87	0.97	3.327E-02	59.54	35.900	PBC<MDA	AM241
74.88	220.	11.61	0.99	4.140E-02				
77.23	335.	8.39	0.99	4.232E-02				
84.09	65.	40.56	0.38	4.453E-02				
93.18	143.	18.06	1.42	4.651E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.065E+01	AC228
121.78	25.	93.51	1.03	4.731E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.435E-01	CO57
122.06	25.	97.67	1.03	4.729E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.436E-01	CO57
123.10	13.	188.69	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154
131.29	28.	150.76	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	28.	155.09	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.995E+00	CE144
165.85	28.	98.36	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
176.60	13.	180.73	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
193.51	22.	108.03	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
227.00	9.	266.84	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.57	483.	5.92	1.24	3.217E-02	238.63	43.300	1.925E+01	PB212
241.95	110.	16.89	1.14	3.185E-02	242.00	7.430	2.572E+01	PB214
244.69	21.	193.48	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
263.70	54.	32.83	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
277.16	30.	44.95	0.64	2.891E-02	277.28	6.310	9.240E+00	TL208
279.20	14.	125.76	1.17	2.876E-02	279.20	81.460	PBC<MDA	Hg203
295.35	163.	13.20	1.07	2.763E-02	295.09	19.300	1.697E+01	PB214
300.31	34.	34.14	0.62	2.732E-02	300.03	3.280	2.133E+01	PB212
					300.07	2.460	2.845E+01	PA231
					300.18	6.200	PBC<MDA	PA233
304.90	6.	582.86	1.20	2.701E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.381E-01	BI210M
316.49	22.	156.68	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
338.26	124.	15.36	0.82	2.507E-02	338.32	12.010	2.279E+01	AC228
351.82	285.	8.16	1.49	2.437E-02	351.93	37.600	1.728E+01	PB214
433.82	10.	150.55	1.31	2.093E-02	433.94	90.480	PBC<MDA	AG108M
453.88	12.	117.76	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
463.37	13.	112.36	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
487.02	9.	142.20	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
511.86	116.	24.16	2.63	1.856E-02	511.86	20.000	1.736E+01	RH106
537.26	2.	686.18	1.40	1.791E-02	537.26	24.390	PBC<MDA	Ba140
569.47	4.	284.48	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.645E+00	PA234
					569.70	97.740	1.380E-01	BI207
569.70	4.	250.92	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.776E+00	PA234
					569.70	97.740	1.491E-01	BI207
583.30	183.	9.47	1.47	1.687E-02	583.02	84.500	7.129E+00	TL208
609.67	240.	7.52	1.40	1.632E-02	609.31	46.090	1.701E+01	BI214
					610.30	5.750	1.420E+02	RU103
618.06	7.	279.69	1.47	1.616E-02	618.06	99.100	PBC<MDA	PM144
635.89	11.	73.73	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
722.74	13.	81.65	1.57	1.439E-02	722.79	10.810	4.763E+00	SB124
					722.94	90.840	5.669E-01	AG108M
					723.36	20.220	2.548E+00	EU154
722.79	7.	148.92	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.834E-01	AG108M
					723.36	20.220	1.274E+00	EU154
723.36	11.	96.66	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.630E-01	AG108M
					723.36	20.220	2.081E+00	EU154
724.20	11.	105.68	1.57	1.437E-02	724.20	44.150	PBC<MDA	ZR95
756.73	2.	523.72	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
766.41	18.	80.39	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	13.	89.16	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
861.09	46.	20.05	2.20	1.264E-02	860.56	12.420	1.628E+01	TL208
871.10	3.	225.83	1.69	1.253E-02	871.10	99.890	PBC<MDA	NB94
884.68	6.	115.06	1.71	1.238E-02	884.68	72.680	PBC<MDA	AG110M
911.44	137.	8.54	1.72	1.211E-02	911.07	29.000	2.166E+01	AC228
964.11	9.	159.13	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
969.52	91.	15.10	1.78	1.157E-02	968.97	17.460	2.515E+01	AC228
1063.66	7.	150.76	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1099.18	25.	42.34	1.89	1.052E-02	1099.25	56.500	2.297E+00	FE59
1120.29	33.	29.07	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.59	12.	32.00	1.12	1.037E-02	1120.29	15.100	1.928E+01	BI214
					1120.55	99.987	3.081E+00	Sc46
1121.30	8.	166.13	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.293E+00	Ta182
1173.24	10.	120.19	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1221.41	8.	166.78	1.99	9.717E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	18.	89.50	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	10.	57.14	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.679E+00	EU154
1274.54	2.	400.35	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.791E-01	EU154
1291.52	10.	88.89	2.05	9.314E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	2.	304.14	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	89.75	2.14	8.723E-03	1408.00	21.005	PBC<MDA	EU152
1461.10	487.	4.63	2.44	8.482E-03	1460.83	10.670	2.987E+02	K40
1596.21	8.	85.93	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1764.63	40.	17.04	2.43	7.342E-03	1764.49	15.400	1.963E+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	
299.16	74.87	215.	220.	5.315E+03	11.61	0.986	-	D
308.56	77.22	227.	335.	7.920E+03	8.39	0.988	-	D
335.96	84.09	150.	60.	1.337E+03	31.88	0.994	-	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	405.	-57.	-0.032	43.71	0.959s
TH-227	200.26	50.14	425.	4.	0.002	730.58	0.963s
AM-241	237.83	59.54	674.	-5.	-0.003	704.87	0.971s
TH-234	252.82	63.29	709.	-59.	-0.033	63.73	0.975s
BA-133	323.60	80.99	3246.	-34.	-0.019	240.60	0.991s
Np-237	345.59	86.49	3212.	0.	0.000	238.14	0.996A
EU-155	345.80	86.54	3178.	-34.	-0.019	236.89	0.996s
Sn-126	347.39	86.94	3083.	-34.	-0.019	233.26	0.997
Sn-126	349.91	87.57	2939.	-34.	-0.019	227.64	0.997s
Cd-109	351.79	88.04	3049.	0.	0.000	231.72	0.998A
Nd-147	364.02	91.10	2905.	-15.	-0.009	494.05	1.001s
TH-234	369.98	92.59	2931.	-41.	-0.023	72.91	1.002s
AC-228	372.32	93.18	156.	143.	0.079	18.06	1.416s
Gd-153	389.61	97.50	2890.	0.	0.000	1000.00	1.007s
Np-239	397.61	99.50	2890.	0.	0.000	1000.00	1.008s
Gd-153	412.40	103.20	2890.	0.	0.000	1000.00	1.012s
Np-239	414.40	103.70	2890.	0.	0.000	1000.00	1.012s
EU-155	420.85	105.31	3000.	-36.	-0.020	217.33	1.014s
Np-239	424.11	106.13	3040.	-36.	-0.020	217.56	1.014s
EU-152	486.67	121.78	261.	25.	0.014	93.51	1.029s
CO-57	487.81	122.06	286.	25.	0.014	97.67	1.029s
EU-154	491.96	123.10	276.	13.	0.007	188.69	1.030
PA-234	524.73	131.29	872.	28.	0.016	150.76	1.038
HF-181	531.64	133.02	900.	28.	0.015	155.09	1.039s
CE-144	533.70	133.54	928.	0.	0.000	1000.00	1.040s
HF-181	544.74	136.30	928.	0.	0.000	1000.00	1.042
CO-57	545.43	136.47	1301.	-35.	-0.019	148.64	1.042
Tc-99m	561.57	140.51	1264.	-35.	-0.019	146.00	1.046s
U-235	574.67	143.79	1203.	-36.	-0.020	66.61	1.049
CE-141	581.29	145.44	1153.	-34.	-0.019	143.74	1.050s
Ba-140	650.14	162.66	396.	-29.	-0.016	99.06	1.066s
U-235	653.01	163.38	425.	-5.	-0.003	641.51	1.067
CE-139	662.90	165.85	360.	28.	0.015	98.36	1.069s
Cf-251	705.88	176.60	154.	13.	0.007	180.73	1.079s
TH-229	773.49	193.51	150.	22.	0.012	108.03	1.094s
U-235	820.76	205.33	205.	-15.	-0.009	176.69	1.105s
TH-229	842.82	210.85	181.	-7.	-0.004	357.33	1.110s
Cf-251	907.40	227.00	150.	9.	0.005	266.84	1.125
PB-212	953.91	238.63	94.	493.	0.274	5.31	1.136D
PB-214	967.37	242.00	116.	110.	0.061	16.89	1.139D
EU-152	978.14	244.69	843.	21.	0.012	193.48	1.141
TH-227	1024.32	256.24	148.	-22.	-0.012	116.56	1.152s
Cd-113m	1054.15	263.70	128.	54.	0.030	32.83	1.158s
BI-210M	1062.67	265.83	191.	-15.	-0.008	131.46	1.160s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.46	277.28	140.	-4.	-0.002	421.31	1.171s
Hg-203	1116.13	279.20	148.	14.	0.008	125.76	1.173s
PB-214	1180.71	295.35	60.	163.	0.091	13.20	1.075
PB-212	1200.54	300.31	33.	34.	0.019	34.14	0.617s
PA-231	1199.58	300.07	587.	-23.	-0.013	150.09	1.192s
PA-233	1200.02	300.18	564.	-23.	-0.013	147.18	1.192s
PA-231	1209.90	302.65	564.	-23.	-0.013	146.92	1.194s
BA-133	1210.70	302.85	588.	-23.	-0.013	149.81	1.194s
Ba-140	1218.69	304.85	611.	-23.	-0.013	152.44	1.196s
BI-210M	1218.88	304.90	601.	6.	0.003	582.86	1.196s
Ir-192	1233.05	308.44	713.	-23.	-0.013	166.76	1.199s
PA-233	1247.34	312.01	691.	-23.	-0.013	50.55	1.202s
Ir-192	1265.24	316.49	593.	22.	0.012	156.68	1.206s
CR-51	1279.62	320.08	689.	-23.	-0.013	162.60	1.210s
Cf-249	1333.02	333.44	474.	0.	0.000	1000.00	1.222s
AC-228	1352.30	338.26	52.	124.	0.069	15.36	0.823s
Cs-136	1361.54	340.57	474.	0.	0.000	1000.00	1.228s
HF-181	1382.56	345.83	80.	-8.	-0.005	141.81	1.233
PB-214	1406.53	351.82	64.	285.	0.158	8.16	1.491s
BA-133	1423.24	356.00	450.	-20.	-0.011	153.27	1.242s
I-131	1457.16	364.48	105.	-23.	-0.013	102.26	1.250s
Cf-249	1551.01	387.95	195.	0.	0.000	1000.00	1.271s
SN-113	1565.96	391.69	145.	-15.	-0.008	156.43	1.274s
SB-125	1710.67	427.88	78.	-19.	-0.011	120.34	1.307s
AG-108M	1734.91	433.94	52.	10.	0.006	150.55	1.312s
pm-146	1814.67	453.88	48.	12.	0.007	117.76	1.330s
SB-125	1852.61	463.37	108.	13.	0.007	112.36	1.338
Ir-192	1871.38	468.06	146.	-20.	-0.011	89.11	1.342s
HF-181	1927.12	482.00	143.	0.	0.000	1000.00	1.355
La-140	1947.21	487.02	87.	9.	0.005	142.20	1.359s
RU-103	1987.33	497.05	52.	-16.	-0.009	104.61	1.368s
RH-106	2046.57	511.86	98.	116.	0.064	24.16	2.631s
Ba-140	2148.14	537.26	44.	2.	0.001	686.18	1.404s
CS-134	2252.03	563.24	69.	-13.	-0.007	101.28	1.427s
CS-134	2276.36	569.32	61.	-10.	-0.005	118.40	1.432s
PA-234	2276.96	569.47	68.	4.	0.002	284.48	1.432s
BI-207	2277.89	569.70	62.	4.	0.002	250.92	1.432s
TL-208	2332.26	583.30	27.	183.	0.102	9.47	1.466
SB-125	2401.07	600.50	441.	-17.	-0.009	178.10	1.460s
SB-124	2409.99	602.73	424.	-11.	-0.006	269.16	1.462s
CS-134	2417.91	604.71	413.	0.	0.000	1000.00	1.463s
BI-214	2436.31	609.31	30.	225.	0.125	7.53	1.468D
RU-103	2440.26	610.30	413.	0.	0.000	1000.00	1.468s
PM-144	2471.31	618.06	206.	7.	0.004	279.69	1.475s
RH-106	2486.73	621.92	89.	-8.	-0.004	171.52	1.479s
SB-125	2542.62	635.89	29.	11.	0.006	73.73	1.491s
I-131	2546.96	636.97	50.	-1.	-0.001	978.40	1.492s
AG-110M	2630.10	657.76	119.	-24.	-0.013	67.30	1.510s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.69	661.66	156.	-21.	-0.012	39.85	1.513s
PM-144	2785.22	696.54	132.	-21.	-0.012	81.33	1.544s
NB-94	2809.57	702.63	171.	-22.	-0.012	85.93	1.549s
SB-124	2890.19	722.79	46.	7.	0.004	148.92	1.567s
AG-108M	2890.80	722.94	53.	13.	0.007	81.65	1.567s
EU-154	2892.47	723.36	50.	11.	0.006	96.66	1.567s
ZR-95	2895.84	724.20	61.	11.	0.006	105.68	1.568s
BI-212	2907.73	727.17	99.	-7.	-0.004	126.04	1.570s
pm-146	2941.93	735.72	47.	-13.	-0.007	117.81	1.578s
pm-146	2987.69	747.16	42.	0.	0.000	1000.00	1.588s
ZR-95	3025.97	756.73	33.	2.	0.001	523.72	1.596s
AG-110M	3054.82	763.94	86.	-21.	-0.012	66.74	1.602s
NB-95	3062.21	765.79	107.	-5.	-0.003	270.11	1.604s
PA-234M	3064.70	766.41	96.	18.	0.010	80.39	1.605s
EU-152	3114.73	778.92	33.	-6.	-0.003	218.04	1.615s
BI-212	3140.74	785.42	29.	13.	0.007	89.16	1.621
CO-58	3242.16	810.78	120.	-20.	-0.011	81.46	1.643s
La-140	3262.14	815.77	140.	-20.	-0.011	87.23	1.647s
Cs-136	3273.06	818.50	172.	-21.	-0.011	92.30	1.649s
MN-54	3338.46	834.85	60.	-18.	-0.010	97.50	1.663s
Co-56	3386.15	846.77	50.	-6.	-0.003	262.29	1.674s
TL-208	3443.45	861.09	7.	46.	0.026	20.05	2.198s
NB-94	3483.47	871.10	27.	3.	0.002	225.83	1.695s
EU-154	3492.00	873.23	43.	-8.	-0.005	113.97	1.696s
PA-234	3521.21	880.53	78.	-3.	-0.002	420.32	1.703s
PA-234	3532.05	883.24	75.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	20.	6.	0.003	115.06	1.706s
Sc-46	3556.21	889.28	79.	-3.	-0.002	457.71	1.710s
y-88	3591.26	898.04	35.	-7.	-0.004	127.78	1.718s
AC-228	3644.88	911.44	0.	137.	0.076	8.54	1.719
AG-110M	3749.09	937.49	65.	-17.	-0.009	107.05	1.751s
PA-234	3783.21	946.02	60.	-20.	-0.011	47.10	1.759s
EU-152	3855.58	964.11	92.	9.	0.005	159.13	1.774s
AC-228	3875.02	968.97	50.	91.	0.051	15.10	1.778
EU-154	3984.48	996.33	64.	0.	0.000	1000.00	1.801s
PA-234M	4003.15	1001.00	68.	-4.	-0.002	251.94	1.805s
Co-56	4150.56	1037.84	38.	-3.	-0.002	310.16	1.836s
Cs-136	4191.49	1048.07	39.	-4.	-0.002	226.38	1.845s
RH-106	4200.65	1050.36	74.	-20.	-0.011	63.87	1.847s
BI-207	4253.86	1063.66	22.	7.	0.004	150.76	1.858s
Ga-68	4308.84	1077.40	43.	-13.	-0.007	120.54	1.870s
FE-59	4396.27	1099.25	16.	25.	0.014	42.34	1.888s
EU-152	4447.58	1112.07	138.	-17.	-0.010	97.90	1.899s
ZN-65	4461.46	1115.55	120.	-17.	-0.010	91.74	1.901s
BI-214	4480.43	1120.29	64.	33.	0.018	29.07	1.906D
Sc-46	4481.49	1120.55	4.	12.	0.007	32.00	1.124A
Ta-182	4484.49	1121.30	94.	8.	0.005	166.13	1.906
CO-60	4692.30	1173.24	24.	10.	0.005	120.19	1.950s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4755.57	1189.05	45.	-13.	-0.007	121.55	1.963
Ta-182	4885.06	1221.41	28.	8.	0.004	166.78	1.990
Co-56	4952.57	1238.28	47.	18.	0.010	89.50	2.004
NA-22	5097.62	1274.53	11.	10.	0.006	57.14	2.034s
EU-154	5097.68	1274.54	21.	2.	0.001	400.35	2.034s
FE-59	5165.91	1291.60	11.	10.	0.005	88.89	2.048s
AG-110M	5536.89	1384.30	6.	2.	0.001	304.14	2.124s
EU-152	5631.75	1408.00	6.	7.	0.004	89.75	2.143s
K-40	5844.25	1461.10	10.	487.	0.270	4.63	2.440
La-140	6385.02	1596.21	6.	8.	0.004	85.93	2.294s
BI-214	7058.61	1764.49	3.	40.	0.022	17.04	2.427s
Co-56	7086.08	1771.35	54.	-7.	-0.004	156.59	2.433s

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	3.1493E-01				5.31E+01	
			477.60	3.149E-01	%(P	1.574E+01 1.45E+03 1.05E+01 G	
NA-22	C	5.9103E-01				9.50E+02	
			1274.53	5.910E-01	?(	1.087E+00 5.71E+01 9.99E+01 G	
K-40	N	2.9875E+02				4.66E+11	
			1460.83	2.987E+02	(P	1.085E+01 4.63E+00 1.07E+01 G	
Sc-46	F	-1.2459E-01				8.38E+01	
			889.28	-1.246E-01	?(	1.985E+00 4.58E+02 1.00E+02 G	
			1120.55	6.306E-01	}	6.123E-01 3.20E+01 1.00E+02 G	
CR-51	F	-4.9346E+00				2.77E+01	
			320.08	-4.935E+00	?(	2.680E+01 1.63E+02 9.94E+00 G	
MN-54	C	-7.7345E-01				3.12E+02	
			834.85	-7.734E-01	&(	1.667E+00 9.75E+01 1.00E+02 G	
FE-59	F	1.8738E+00				4.45E+01	
			1099.25	2.297E+00	?(P	2.018E+00 4.23E+01 5.65E+01 G	
			1291.60	1.320E+00	?(P	2.550E+00 8.89E+01 4.32E+01 G	
Co-56	C	4.8274E-01				7.73E+01	
			846.77	-2.607E-01	?(	1.549E+00 2.62E+02 9.99E+01 G	
			1238.28	1.607E+00	?(P	3.020E+00 8.95E+01 6.61E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1037.84	-1.168E+00	& P	1.129E+01	3.10E+02	1.41E+01 G
			1771.35	-3.350E+00	+	1.809E+01	1.57E+02	1.55E+01 A
CO-57	C	3.4357E-01					2.72E+02	
			122.06	3.436E-01	*(	1.119E+00	9.77E+01	8.56E+01 G
			136.47	-3.930E+00	+	1.943E+01	1.49E+02	1.07E+01 G
CO-58	C	-8.3616E-01					7.09E+01	
			810.78	-8.362E-01	?(	2.272E+00	8.15E+01	9.95E+01 G
CO-60	F	2.9143E-01					1.93E+03	
			1332.50	4.072E-02	&(	1.681E+00	1.88E+03	1.00E+02 G
			1173.24	5.423E-01	?(P	1.424E+00	1.20E+02	9.99E+01 G
ZN-65	F	-1.8461E+00					2.44E+02	
			1115.55	-1.846E+00	?(	5.674E+00	9.17E+01	5.06E+01 G
NB-94	I	-8.5722E-01					7.41E+06	
			702.63	-8.572E-01	?(	2.457E+00	8.59E+01	9.79E+01 G
			871.10	1.480E-01	+	1.189E+00	2.26E+02	9.99E+01 G
ZR-95	I	5.2177E-01					6.40E+01	
			756.73	1.711E-01	?(	2.152E+00	5.24E+02	5.45E+01 G
			724.20	9.543E-01	?(	3.421E+00	1.06E+02	4.42E+01 G
NB-95	I	-2.2161E-01					6.40E+01	
			765.79	-2.216E-01	?(	2.057E+00	2.70E+02	9.98E+01 G
RU-103	I	-5.2137E-01					3.93E+01	
			497.05	-5.214E-01	?(P	1.172E+00	1.05E+02	9.09E+01 G
			610.30	0.000E+00	+	5.770E+01	1.00E+03	5.75E+00 GA
RH-106	I	-2.7643E+00					3.74E+02	
			621.92	-2.764E+00	?(	1.623E+01	1.72E+02	9.93E+00 G
			1050.36	-6.643E+01	+	1.400E+02	6.39E+01	1.56E+00 G
			511.86	1.736E+01	?	7.310E+00	2.42E+01	2.00E+01 GA
AG-108M	C	4.3039E-01					1.53E+05	
			433.94	2.933E-01	?(	1.065E+00	1.51E+02	9.05E+01 G
			722.94	5.669E-01	?(	1.552E+00	8.17E+01	9.08E+01 G
			614.28	3.638E-02	%	3.706E+00	3.01E+03	8.98E+01 G
AG-110M	F	4.0413E-01					2.50E+02	
			884.68	3.662E-01	?(	1.464E+00	1.15E+02	7.27E+01 G
			657.76	-9.148E-01	+	2.036E+00	6.73E+01	9.46E+01 G
			937.49	-2.318E+00	+	5.492E+00	1.07E+02	3.44E+01 G
			1384.30	5.176E-01	?(	3.656E+00	3.04E+02	2.43E+01 G
			763.94	-3.762E+00	+	8.304E+00	6.67E+01	2.23E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F -5.7477E-01					1.15E+02	
		391.69	-5.748E-01	&(P	2.261E+00	1.56E+02	6.40E+01 G
SB-124	F -1.0083E-01					6.02E+01	
		602.73	-3.739E-01	?(	3.388E+00	2.69E+02	9.83E+01 G
		1690.98	-5.109E-02	%	2.213E+00	1.88E+03	4.78E+01 G
		722.79	2.381E+00	?(	1.225E+01	1.49E+02	1.08E+01 G
SB-125	I 5.1361E-01					1.01E+03	
		427.88	-1.724E+00	?(P	3.897E+00	1.20E+02	2.96E+01 G
		600.50	-3.171E+00	+	1.895E+01	1.78E+02	1.79E+01 G
		635.89	3.531E+00	?(P	8.673E+00	7.37E+01	1.13E+01 G
		463.37	3.581E+00	?(P	1.357E+01	1.12E+02	1.05E+01 G
I-131	I -6.5224E-01					8.02E+00	
		364.48	-6.522E-01	?(P	1.442E+00	1.02E+02	8.17E+01 G
		284.30	5.195E-01	% P	1.514E+01	1.16E+03	6.14E+00 G
		636.97	-5.038E-01	&	1.749E+01	9.78E+02	7.17E+00 G
Ga-68	C -2.3277E+01					4.71E-02	
		1077.40	-2.328E+01	?(	6.092E+01	1.21E+02	3.30E+00 G
Tc-99m	I -4.9200E-01					2.51E-01	
		140.51	-4.920E-01	&(	2.389E+00	1.46E+02	8.93E+01 G
BA-133	F -7.3301E-01					3.85E+03	
		356.00	-7.330E-01	?(	3.762E+00	1.53E+02	6.20E+01 G
		302.85	-2.581E+00	&	1.292E+01	1.50E+02	1.83E+01 G
		383.84	-3.663E-01	% P	1.833E+01	1.73E+03	8.94E+00 GA
		80.99	-1.256E+00	+	1.003E+01	2.41E+02	3.41E+01 GA
CS-137	I -9.0225E-01					1.10E+04	
		661.66	-9.022E-01	?(P	2.587E+00	3.98E+01	8.52E+01 G
CE-139	F 4.6526E-01					1.38E+02	
		165.85	4.653E-01	?(	1.525E+00	9.84E+01	7.99E+01 G
Ba-140	I 2.5160E-01					1.28E+01	
		537.26	2.516E-01	?(P	4.276E+00	6.86E+02	2.44E+01 G
		162.66	-6.250E+00	+	2.062E+01	9.91E+01	6.22E+00 G
		304.85	-1.109E+01	&	5.651E+01	1.52E+02	4.29E+00 G
La-140	I 5.9160E-01					1.28E+01	
		1596.21	5.863E-01	?(	1.061E+00	8.59E+01	9.54E+01 G
		487.02	6.027E-01	(	2.921E+00	1.42E+02	4.55E+01 G
		328.76	2.318E-01	%	1.112E+01	1.42E+03	2.03E+01 G
		815.77	-3.598E+00	+	1.049E+01	8.72E+01	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-8.7372E-01					3.25E+01	
			145.44	-8.737E-01	&(	4.179E+00	1.44E+02	4.82E+01 G
PM-144	C	-7.8837E-01					3.63E+02	
			696.54	-7.884E-01	?(	2.137E+00	8.13E+01	9.90E+01 G
			618.06	2.542E-01	+	2.416E+00	2.80E+02	9.91E+01 G
EU-152	F	1.3793E+00					4.94E+03	
			344.29	-7.964E-02	%(P	8.832E+00	1.27E+03	2.65E+01 G
			1112.07	-6.821E+00	+	2.239E+01	9.79E+01	1.36E+01 G
			121.78	1.028E+00	*(	3.207E+00	9.35E+01	2.86E+01 G
			778.92	-1.787E+00	+	9.252E+00	2.18E+02	1.29E+01 G
			964.11	2.858E+00	&(	1.553E+01	1.59E+02	1.46E+01 G
			244.69	4.954E+00	(	3.202E+01	1.93E+02	7.58E+00 G
			1408.00	2.212E+00	? P	4.328E+00	8.97E+01	2.10E+01 GA
EU-154	I	-2.9718E+00					3.14E+03	
			873.23	-2.972E+00	&(P	1.207E+01	1.14E+02	1.23E+01 G
			123.10	3.639E-01	& P	2.313E+00	1.89E+02	4.08E+01 G
			1274.54	2.791E-01	+	4.067E+00	4.00E+02	3.52E+01 G
			723.36	2.081E+00	+	6.812E+00	9.67E+01	2.02E+01 G
			1004.77	2.654E-08	&	1.112E+01	1.19E+10	1.80E+01 G
			996.33	0.000E+00	&	1.850E+01	1.00E+03	1.06E+01 G
EU-155	I	-1.9657E+00					1.81E+03	
			105.31	-1.966E+00	(	1.418E+01	2.17E+02	2.12E+01 G
			86.54	-1.352E+00	&	1.064E+01	2.37E+02	3.07E+01 G
HF-181	F	2.6790E-01					4.24E+01	
			482.00	0.000E+00	&(	2.080E+00	1.00E+03	8.05E+01 G
			133.02	7.660E-01	?(	3.960E+00	1.55E+02	4.33E+01 G
			345.83	-1.266E+00	+ P	6.652E+00	1.42E+02	1.51E+01 G
			136.30	0.000E+00	-	3.002E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.4370E+00					1.14E+02	
			1121.30	1.293E+00	(	7.339E+00	1.66E+02	3.49E+01 G
			1221.41	1.623E+00	(	5.826E+00	1.67E+02	2.70E+01 G
			1189.05	-4.611E+00	+	1.179E+01	1.22E+02	1.62E+01 G
Hg-203	F	3.3196E-01					4.66E+01	
			279.20	3.320E-01	?(	1.408E+00	1.26E+02	8.15E+01 G
TL-208	N	7.1287E+00					6.98E+02	
			583.02	7.129E+00	(P	1.051E+00	9.47E+00	8.45E+01 G
			277.28	-1.218E+00	-	1.762E+01	4.21E+02	6.31E+00 G
			860.56	1.628E+01	+ P	5.316E+00	2.00E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	3.4158E-01					2.02E+03	
			747.16	0.000E+00	?(	3.829E+00	1.00E+03	3.40E+01 G
			735.72	-2.202E+00	+	6.004E+00	1.18E+02	2.25E+01 G
			453.88	5.203E-01	&(	1.471E+00	1.18E+02	6.50E+01 G
y-88	F	-3.5732E-01					1.07E+02	
			898.04	-3.573E-01	&(P	1.473E+00	1.28E+02	9.37E+01 G
			1836.06	2.621E-02	%	1.159E+00	1.98E+03	9.92E+01 G
Cd-113m		1.6587E+04					5.33E+03	
			263.70	1.659E+04	*(	1.715E+04	3.28E+01	6.00E-03 K
Cf-251	T	1.0682E+00					3.28E+05	
			176.60	1.068E+00	?(	4.975E+00	1.81E+02	1.70E+01 G
			227.00	2.293E+00	?	1.584E+01	2.67E+02	6.30E+00 GA
Sn-126		-5.7404E-01					3.65E+07	
			87.57	-1.102E+00	}	8.333E+00	2.28E+02	3.75E+01 GA
			64.28	-5.740E-01	&(	1.978E+01	1.02E+03	9.70E+00 G
			86.94	-4.584E+00	}	3.551E+01	2.33E+02	9.04E+00 GA
PB-210	N	-3.1947E+01					8.14E+03	
			46.54	-3.195E+01	(P	5.365E+01	4.37E+01	4.25E+00 G
PB-212	N	1.9665E+01					6.98E+02	
			238.63	1.966E+01	(P	1.911E+00	5.31E+00	4.33E+01 G
			300.03	2.133E+01	P	1.817E+01	3.41E+01	3.28E+00 GA
PB-214	N	1.7176E+01					5.84E+05	
			351.93	1.728E+01	(P	2.427E+00	8.16E+00	3.76E+01 G
			295.09	1.697E+01	(	4.040E+00	1.32E+01	1.93E+01 G
			242.00	2.572E+01	+	1.244E+01	1.69E+01	7.43E+00 GA
BI-207	C	3.0060E-01					1.18E+04	
			569.70	1.491E-01	?(	1.300E+00	2.51E+02	9.77E+01 G
			1063.66	4.994E-01	?(P	1.691E+00	1.51E+02	7.45E+01 G
BI-212	N	-3.6781E+00					6.98E+02	
			727.17	-3.678E+00	&(P	2.522E+01	1.26E+02	7.55E+00 G
			785.42	4.265E+01	& P	8.849E+01	8.92E+01	1.28E+00 GA
BI-214	N	1.7379E+01					5.84E+05	
			609.31	1.663E+01	(P	2.086E+00	7.53E+00	4.61E+01 G
			1120.29	1.154E+01	} P	1.420E+01	2.91E+01	1.51E+01 G
			1764.49	1.963E+01	?(P	5.325E+00	1.70E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T	-2.0540E-01					1.10E+09	
			265.83	-5.657E-01	?(	2.504E+00	1.31E+02	5.00E+01 G
			304.90	4.381E-01	&(	8.592E+00	5.83E+02	2.80E+01 G
AC-228	N	2.2937E+01					2.10E+03	
			911.07	2.166E+01	(	1.165E+00	8.54E+00	2.90E+01 G
			968.97	2.515E+01	?(	9.768E+00	1.51E+01	1.75E+01 G
			338.32	2.279E+01	*(	6.732E+00	1.54E+01	1.20E+01 G
			93.35	3.065E+01	+	1.310E+01	1.81E+01	5.56E+00 XA
TH-227	N	1.0505E+00					7.95E+03	
			50.14	1.050E+00	&(	2.594E+01	7.31E+02	8.00E+00 G
			256.24	-5.837E+00	+ P	1.544E+01	1.17E+02	7.00E+00 G
TH-229	N	7.3349E+00					2.68E+06	
			193.51	7.335E+00	&(	2.026E+01	1.08E+02	4.40E+00 G
			210.85	-3.549E+00	- P	3.459E+01	3.57E+02	2.99E+00 G
TH-234	N	-2.4070E+01					1.63E+12	
			63.29	-2.407E+01	&(P	5.191E+01	6.37E+01	3.81E+00 G
			92.59	-8.803E+00	& P	5.469E+01	7.29E+01	5.58E+00 G
PA-231	N	-1.6413E+01					1.20E+07	
			302.65	-1.641E+01	&(	8.059E+01	1.47E+02	2.88E+00 G
			300.07	-1.906E+01	+	9.560E+01	1.50E+02	2.46E+00 G
PA-233	C	-1.3590E+00					7.82E+08	
			312.01	-1.359E+00	&(P	7.272E+00	5.06E+01	3.60E+01 G
			300.18	-7.565E+00	+	3.721E+01	1.47E+02	6.20E+00 G
PA-234	N	1.7913E+00					1.63E+12	
			131.29	1.858E+00	&(	9.338E+00	1.51E+02	1.80E+01 G
			946.02	-7.082E+00	+ P	1.367E+01	4.71E+01	1.34E+01 G
			569.47	1.645E+00	?(	1.626E+01	2.84E+02	8.20E+00 G
			883.24	0.000E+00	-	2.010E+01	1.00E+03	9.60E+00 G
			880.53	-2.235E+00	+	3.268E+01	4.20E+02	6.00E+00 GA
PA-234M	N	4.7144E+01					1.63E+12	
			1001.00	-2.335E+01	?(P	2.418E+02	2.52E+02	8.37E-01 G
			766.41	2.478E+02	?(P	6.646E+02	8.04E+01	2.94E-01 G
U-235	N	-4.0709E+00					2.57E+11	
			143.79	-4.071E+00	?(P	1.865E+01	6.66E+01	1.10E+01 G
			205.33	-4.753E+00	+	2.154E+01	1.77E+02	5.01E+00 G
			163.38	-1.209E+00	+	2.622E+01	6.42E+02	5.08E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -2.4212E-01                                      1.58E+05
                           59.54-2.421E-01  (P 5.755E+00 7.05E+02 3.59E+01 G

Ir-192   F   5.3851E-01                                      7.40E+01
                          316.49 5.385E-01 ?(  2.820E+00 1.57E+02 8.70E+01 G
                          468.06-1.073E+00 +   3.194E+00 8.91E+01 5.18E+01 G
                          308.44-1.491E+00 +   8.306E+00 1.67E+02 3.18E+01 G

Cs-136   F  -8.7530E-01                                      1.30E+01
                          818.50-8.753E-01 ?(  2.700E+00 9.23E+01 1.00E+02 G
                         1048.07-2.547E-01 +   2.026E+00 2.26E+02 8.00E+01 G
                          340.57 0.000E+00 +   4.947E+00 1.00E+03 4.69E+01 G

Np-239   T  -1.8450E+00                                      2.36E+00
                          103.70 0.000E+00 +   1.232E+01 1.00E+03 2.40E+01 X
                          106.13-1.845E+00 &(  1.333E+01 2.18E+02 2.27E+01 G
                           99.50 0.000E+00 +   1.984E+01 1.00E+03 1.50E+01 X

Nd-147       2.3653E-01                                      1.11E+01
                          531.00 2.365E-01 %(  7.524E+00 1.28E+03 1.30E+01 G
                           91.10-6.576E-01 +   1.081E+01 4.94E+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
R - Coincidence Corrected
H - Halflife limit exceeded
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	405.	-57.	-0.032	43.71	-3.195E+01	P
TH-227	50.14	425.	4.	0.002	730.58	1.050E+00	
AM-241	59.54	674.	-5.	-0.003	704.87	-2.421E-01	P
TH-234	63.29	709.	-59.	-0.033	63.73	-2.407E+01	P
BA-133	80.99	3246.	-34.	-0.019	240.60	-1.256E+00	
EU-155	86.54	3178.	-34.	-0.019	236.89	-1.352E+00	
Sn-126	86.94	3083.	-34.	-0.019	233.26	-4.584E+00	
Sn-126	87.57	2939.	-34.	-0.019	227.64	-1.102E+00	
Nd-147	91.10	2905.	-15.	-0.009	494.05	-6.576E-01	
TH-234	92.59	2931.	-41.	-0.023	72.91	-8.803E+00	P
EU-155	105.31	3000.	-36.	-0.020	217.33	-1.966E+00	
Np-239	106.13	3040.	-36.	-0.020	217.56	-1.845E+00	
EU-152	121.78	261.	25.	0.014	93.51	1.028E+00	
CO-57	122.06	286.	25.	0.014	97.67	3.436E-01	
EU-154	123.10	276.	13.	0.007	188.69	3.639E-01	P
PA-234	131.29	872.	28.	0.016	150.76	1.858E+00	
HF-181	133.02	900.	28.	0.015	155.09	7.660E-01	
CO-57	136.47	1301.	-35.	-0.019	148.64	-3.930E+00	
Tc-99m	140.51	1264.	-35.	-0.019	146.00	-4.920E-01	
U-235	143.79	1203.	-36.	-0.020	66.61	-4.071E+00	P
CE-141	145.44	1153.	-34.	-0.019	143.74	-8.737E-01	
Ba-140	162.66	396.	-29.	-0.016	99.06	-6.250E+00	
U-235	163.38	425.	-5.	-0.003	641.51	-1.209E+00	
CE-139	165.85	360.	28.	0.015	98.36	4.653E-01	
Cf-251	176.60	154.	13.	0.007	180.73	1.068E+00	
TH-229	193.51	150.	22.	0.012	108.03	7.335E+00	
U-235	205.33	205.	-15.	-0.009	176.69	-4.753E+00	
TH-229	210.85	181.	-7.	-0.004	357.33	-3.549E+00	P
Cf-251	227.00	150.	9.	0.005	266.84	2.293E+00	
EU-152	244.69	843.	21.	0.012	193.48	4.954E+00	
TH-227	256.24	148.	-22.	-0.012	116.56	-5.837E+00	P
Cd-113m	263.70	128.	54.	0.030	32.83	1.659E+04	
BI-210M	265.83	191.	-15.	-0.008	131.46	-5.657E-01	
Hg-203	279.20	148.	14.	0.008	125.76	3.320E-01	
PA-231	300.07	587.	-23.	-0.013	150.09	-1.906E+01	
PA-233	300.18	564.	-23.	-0.013	147.18	-7.565E+00	
PA-231	302.65	564.	-23.	-0.013	146.92	-1.641E+01	
BA-133	302.85	588.	-23.	-0.013	149.81	-2.581E+00	
Ba-140	304.85	611.	-23.	-0.013	152.44	-1.109E+01	
BI-210M	304.90	601.	6.	0.003	582.86	4.381E-01	
Ir-192	308.44	713.	-23.	-0.013	166.76	-1.491E+00	
PA-233	312.01	691.	-23.	-0.013	50.55	-1.359E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	316.49	593.	22.	0.012	156.68	5.385E-01	
CR-51	320.08	689.	-23.	-0.013	162.60	-4.935E+00	
HF-181	345.83	80.	-8.	-0.005	141.81	-1.266E+00	P
BA-133	356.00	450.	-20.	-0.011	153.27	-7.330E-01	
I-131	364.48	105.	-23.	-0.013	102.26	-6.522E-01	P
SN-113	391.69	145.	-15.	-0.008	156.43	-5.748E-01	P
SB-125	427.88	78.	-19.	-0.011	120.34	-1.724E+00	P
pm-146	453.88	48.	12.	0.007	117.76	5.203E-01	
SB-125	463.37	108.	13.	0.007	112.36	3.581E+00	P
Ir-192	468.06	146.	-20.	-0.011	89.11	-1.073E+00	
La-140	487.02	87.	9.	0.005	142.20	6.027E-01	
RU-103	497.05	52.	-16.	-0.009	104.61	-5.214E-01	P
RH-106	511.86	98.	116.	0.064	24.16	1.736E+01	
Ba-140	537.26	44.	2.	0.001	686.18	2.516E-01	P
CS-134	563.24	69.	-13.	-0.007	101.28	-5.168E+00	P
CS-134	569.32	61.	-10.	-0.005	118.40	-2.034E+00	
PA-234	569.47	68.	4.	0.002	284.48	1.645E+00	
BI-207	569.70	62.	4.	0.002	250.92	1.491E-01	
SB-125	600.50	441.	-17.	-0.009	178.10	-3.171E+00	
SB-124	602.73	424.	-11.	-0.006	269.16	-3.739E-01	
PM-144	618.06	206.	7.	0.004	279.69	2.542E-01	
RH-106	621.92	89.	-8.	-0.004	171.52	-2.764E+00	
SB-125	635.89	29.	11.	0.006	73.73	3.531E+00	P
I-131	636.97	50.	-1.	-0.001	978.40	-5.038E-01	
AG-110M	657.76	119.	-24.	-0.013	67.30	-9.148E-01	
CS-137	661.66	156.	-21.	-0.012	39.85	-9.022E-01	P
PM-144	696.54	132.	-21.	-0.012	81.33	-7.884E-01	
NB-94	702.63	171.	-22.	-0.012	85.93	-8.572E-01	
SB-124	722.79	46.	7.	0.004	148.92	2.381E+00	
EU-154	723.36	50.	11.	0.006	96.66	2.081E+00	
ZR-95	724.20	61.	11.	0.006	105.68	9.543E-01	
BI-212	727.17	99.	-7.	-0.004	126.04	-3.678E+00	P
pm-146	735.72	47.	-13.	-0.007	117.81	-2.202E+00	
ZR-95	756.73	33.	2.	0.001	523.72	1.711E-01	
AG-110M	763.94	86.	-21.	-0.012	66.74	-3.762E+00	
NB-95	765.79	107.	-5.	-0.003	270.11	-2.216E-01	
PA-234M	766.41	96.	18.	0.010	80.39	2.478E+02	P
EU-152	778.92	33.	-6.	-0.003	218.04	-1.787E+00	
BI-212	785.42	29.	13.	0.007	89.16	4.265E+01	P
CO-58	810.78	120.	-20.	-0.011	81.46	-8.362E-01	
La-140	815.77	140.	-20.	-0.011	87.23	-3.598E+00	
Cs-136	818.50	172.	-21.	-0.011	92.30	-8.753E-01	
MN-54	834.85	60.	-18.	-0.010	97.50	-7.734E-01	
Co-56	846.77	50.	-6.	-0.003	262.29	-2.607E-01	
NB-94	871.10	27.	3.	0.002	225.83	1.480E-01	
EU-154	873.23	43.	-8.	-0.005	113.97	-2.972E+00	P
PA-234	880.53	78.	-3.	-0.002	420.32	-2.235E+00	
AG-110M	884.68	20.	6.	0.003	115.06	3.662E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
y-88	898.04	35.	-7.	-0.004	127.78	-3.573E-01	P
AG-110M	937.49	65.	-17.	-0.009	107.05	-2.318E+00	
PA-234	946.02	60.	-20.	-0.011	47.10	-7.082E+00	P
EU-152	964.11	92.	9.	0.005	159.13	2.858E+00	
PA-234M	1001.00	68.	-4.	-0.002	251.94	-2.335E+01	P
Co-56	1037.84	38.	-3.	-0.002	310.16	-1.168E+00	P
Cs-136	1048.07	39.	-4.	-0.002	226.38	-2.547E-01	
RH-106	1050.36	74.	-20.	-0.011	63.87	-6.643E+01	
BI-207	1063.66	22.	7.	0.004	150.76	4.994E-01	P
Ga-68	1077.40	43.	-13.	-0.007	120.54	-2.328E+01	
EU-152	1112.07	138.	-17.	-0.010	97.90	-6.821E+00	
ZN-65	1115.55	120.	-17.	-0.010	91.74	-1.846E+00	
Ta-182	1121.30	94.	8.	0.005	166.13	1.293E+00	
CO-60	1173.24	24.	10.	0.005	120.19	5.423E-01	P
Ta-182	1189.05	45.	-13.	-0.007	121.55	-4.611E+00	
Ta-182	1221.41	28.	8.	0.004	166.78	1.623E+00	
Co-56	1238.28	47.	18.	0.010	89.50	1.607E+00	P
NA-22	1274.53	11.	10.	0.006	57.14	5.910E-01	
EU-154	1274.54	21.	2.	0.001	400.35	2.791E-01	
AG-110M	1384.30	6.	2.	0.001	304.14	5.176E-01	
EU-152	1408.00	6.	7.	0.004	89.75	2.212E+00	P
La-140	1596.21	6.	8.	0.004	85.93	5.863E-01	
Co-56	1771.35	54.	-7.	-0.004	156.59	-3.350E+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	3.1492E-01	3.1493E-01	1.451E+03%	1.57E+01
NA-22	#A	5.9103E-01	5.9103E-01	5.714E+01%	1.09E+00
K-40		2.9875E+02	2.9875E+02	4.633E+00%	1.08E+01
Sc-46	A	-1.2459E-01	-1.2459E-01	4.577E+02%	1.98E+00
CR-51	#A	-4.9345E+00	-4.9346E+00	1.626E+02%	2.68E+01
MN-54	#A	-7.7345E-01	-7.7345E-01	9.750E+01%	1.67E+00
FE-59	#A	1.8738E+00	1.8738E+00	4.234E+01%	2.02E+00
Co-56	#A	4.8274E-01	4.8274E-01	8.950E+01%	1.55E+00
CO-57	#A	3.4357E-01	3.4357E-01	9.767E+01%	1.12E+00
CO-58	#A	-8.3616E-01	-8.3616E-01	8.146E+01%	2.27E+00
CO-60	#A	2.9143E-01	2.9143E-01	1.202E+02%	1.68E+00
ZN-65	#A	-1.8461E+00	-1.8461E+00	9.174E+01%	5.67E+00
NB-94	#A	-8.5722E-01	-8.5722E-01	8.593E+01%	2.46E+00
ZR-95	#A	5.2177E-01	5.2177E-01	1.057E+02%	2.15E+00
NB-95	#A	-2.2161E-01	-2.2161E-01	2.701E+02%	2.06E+00
RU-103	#A	-5.2137E-01	-5.2137E-01	1.046E+02%	1.17E+00
RH-106	#A	-2.7643E+00	-2.7643E+00	1.715E+02%	1.62E+01

AG-108M#A	4.3039E-01	4.3039E-01	8.165E+01%	1.07E+00
AG-110M#A	4.0413E-01	4.0413E-01	1.151E+02%	1.46E+00
SN-113 #A	-5.7477E-01	-5.7477E-01	1.564E+02%	2.26E+00
SB-124 #A	-1.0083E-01	-1.0083E-01	1.489E+02%	3.39E+00
SB-125 #A	5.1361E-01	5.1361E-01	6.013E+01%	3.90E+00
I-131 #A	-6.5223E-01	-6.5224E-01	1.023E+02%	1.44E+00
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	9.96E+00
Ga-68 #A	-2.3210E+01	-2.3277E+01	1.205E+02%	6.09E+01
Tc-99m #A	-4.9173E-01	-4.9200E-01	1.460E+02%	2.39E+00
BA-133 #A	-7.3301E-01	-7.3301E-01	1.533E+02%	3.76E+00
CS-134 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.38E+00
CS-137 #A	-9.0225E-01	-9.0225E-01	3.985E+01%	2.59E+00
CE-139 #A	4.6526E-01	4.6526E-01	9.836E+01%	1.53E+00
Ba-140 #A	2.5160E-01	2.5160E-01	6.862E+02%	4.28E+00
La-140 #A	5.9159E-01	5.9160E-01	8.307E+01%	1.06E+00
CE-141 #A	-8.7372E-01	-8.7372E-01	1.437E+02%	4.18E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.57E+01
PM-144 #A	-7.8837E-01	-7.8837E-01	8.133E+01%	2.14E+00
EU-152 #A	1.3793E+00	1.3793E+00	9.351E+01%	8.83E+00
EU-154 #A	-2.9718E+00	-2.9718E+00	1.140E+02%	1.21E+01
EU-155 #A	-1.9657E+00	-1.9657E+00	2.173E+02%	1.42E+01
HF-181 #A	2.6790E-01	2.6790E-01	1.551E+02%	2.08E+00
Ta-182 #A	1.4370E+00	1.4370E+00	1.177E+02%	7.34E+00
Hg-203 #A	3.3196E-01	3.3196E-01	1.258E+02%	1.41E+00
TL-208	7.1287E+00	7.1287E+00	9.466E+00%	1.05E+00
pm-146 #A	3.4158E-01	3.4158E-01	1.178E+02%	3.83E+00
y-88 #A	-3.5732E-01	-3.5732E-01	1.278E+02%	1.47E+00
Cd-113m#A	1.6587E+04	1.6587E+04	3.283E+01%	1.72E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	8.38E+01
Cf-251 #A	1.0682E+00	1.0682E+00	1.807E+02%	4.97E+00
Cf-249 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.51E+00
Sn-126 #A	-5.7404E-01	-5.7404E-01	1.024E+03%	1.98E+01
PB-210 #A	-3.1947E+01	-3.1947E+01	4.371E+01%	5.37E+01
PB-212	1.9665E+01	1.9665E+01	5.309E+00%	1.91E+00
PB-214	1.7176E+01	1.7176E+01	7.760E+00%	2.43E+00
BI-207 #A	3.0060E-01	3.0060E-01	1.464E+02%	1.30E+00
BI-212 #A	-3.6781E+00	-3.6781E+00	1.260E+02%	2.52E+01
BI-214	1.7379E+01	1.7379E+01	7.530E+00%	2.09E+00
BI-210M#A	-2.0540E-01	-2.0540E-01	1.315E+02%	2.50E+00
AC-228	2.2937E+01	2.2937E+01	7.723E+00%	1.17E+00
TH-227 #A	1.0505E+00	1.0505E+00	7.306E+02%	2.59E+01
TH-229 #A	7.3349E+00	7.3349E+00	1.080E+02%	2.03E+01
TH-234 #A	-2.4070E+01	-2.4070E+01	6.373E+01%	5.19E+01
PA-231 #A	-1.6413E+01	-1.6413E+01	1.469E+02%	8.06E+01
PA-233 #A	-1.3590E+00	-1.3590E+00	5.055E+01%	7.27E+00
PA-234 #A	1.7913E+00	1.7913E+00	1.508E+02%	9.34E+00
PA-234M#A	4.7144E+01	4.7144E+01	8.039E+01%	2.42E+02
U-235 #A	-4.0709E+00	-4.0709E+00	6.661E+01%	1.86E+01
AM-241 #A	-2.4212E-01	-2.4212E-01	7.049E+02%	5.75E+00

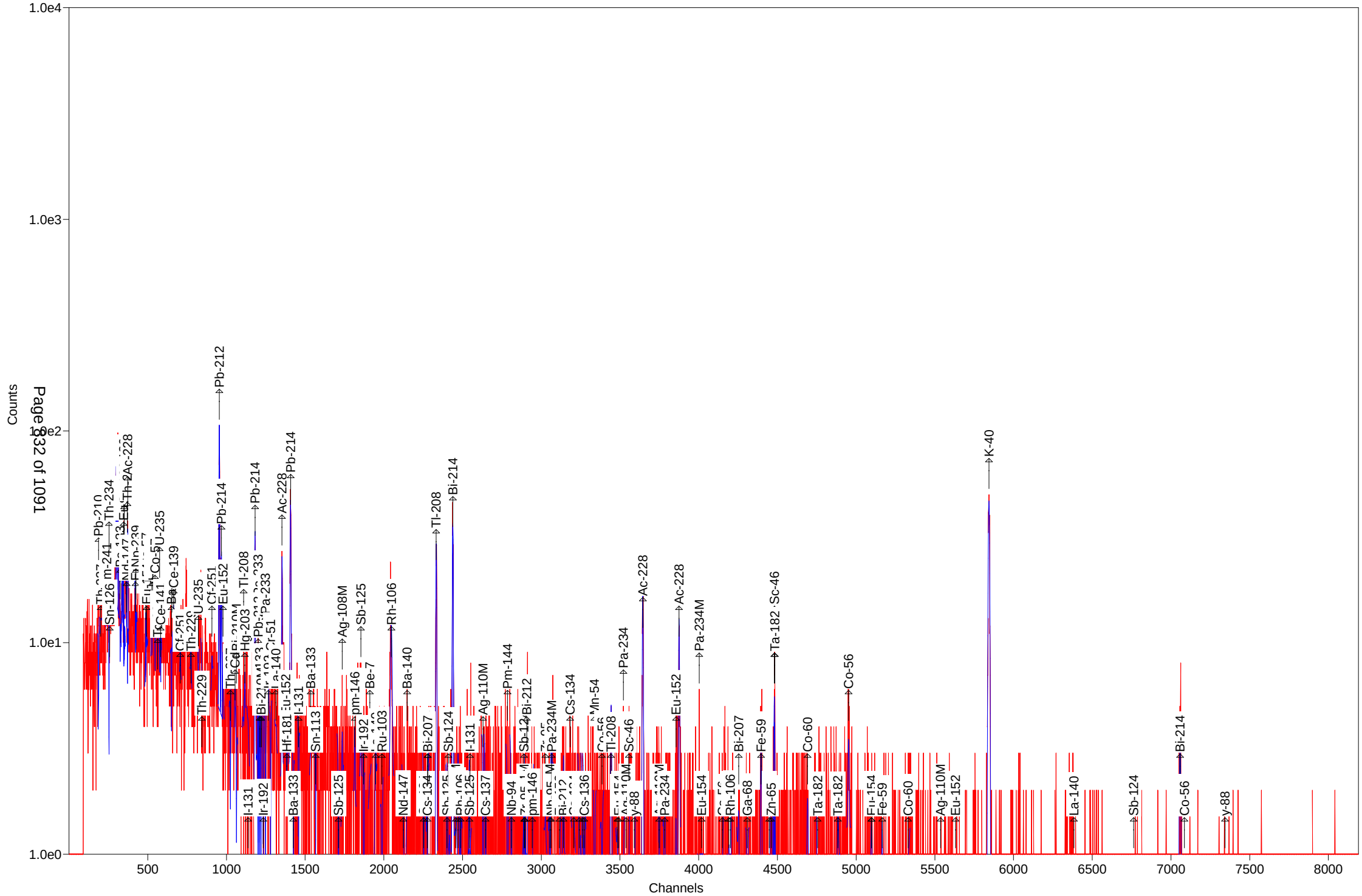
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.51E+01
Ir-192 #A	5.3851E-01	5.3851E-01	1.567E+02%		2.82E+00
Cs-136 #A	-8.7529E-01	-8.7530E-01	9.230E+01%		2.70E+00
Np-239 #A	-1.8449E+00	-1.8450E+00	2.176E+02%		1.33E+01
Nd-147 #A	2.3653E-01	2.3653E-01	1.279E+03%		7.52E+00

- 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) 3.849E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 3.8490701E+02 Bq/Sample

264540_Gamma_160-18553-A-18-B. 16_Gamma_20162112.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161070

Sample Description: 264540_Gamma_160-18553-A-19-B
Detector: Detector #15
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-19-B

Decay to Time: 9/1/2016 16:48 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:48:45 Real Time: 1803 sec
Analysis Time: 9/1/2016 17:19 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	4.353E+00	109.3	4.756E+00	4.761E+00	1.607E+01
NA-22	-2.253E-01	280.6	6.323E-01	6.324E-01	2.262E+00
K-40	2.830E+02	6.0	1.700E+01	2.233E+01	1.510E+01
Sc-46	7.888E-01	109.6	8.642E-01	8.652E-01	2.921E+00
CR-51	-5.859E+00	78.6	4.605E+00	4.615E+00	2.966E+01
MN-54	2.926E-01	228.9	6.699E-01	6.701E-01	1.602E+00
FE-59	-1.873E+00	54.0	1.011E+00	1.015E+00	4.379E+00
Co-56	7.044E-01	113.2	7.974E-01	7.982E-01	1.194E+00
CO-57	0.000E+00	1.#INF	2.603E-01	2.603E-01	1.466E+00
CO-58	-1.000E+00	84.6	8.463E-01	8.478E-01	2.830E+00
CO-60	-6.443E-01	147.8	9.525E-01	9.531E-01	2.129E+00
ZN-65	0.000E+00	1.#INF	2.969E-01	2.969E-01	6.590E+00
NB-94	9.991E-01	52.6	5.253E-01	5.279E-01	1.181E+00
ZR-95	-2.087E-01	645.1	1.346E+00	1.346E+00	3.258E+00
NB-95	8.315E-01	75.1	6.244E-01	6.259E-01	2.082E+00
RU-103	1.953E-01	291.6	5.696E-01	5.697E-01	1.397E+00
RH-106	6.416E+00	95.6	6.133E+00	6.142E+00	1.123E+01
AG-108M	-3.951E-02	220.3	8.703E-02	8.705E-02	1.267E+00
AG-110M	1.476E-01	133.6	1.972E-01	1.973E-01	4.503E+00
SN-113	-7.313E-02	963.3	7.045E-01	7.045E-01	2.717E+00
SB-124	8.439E-02	82.0	6.921E-02	6.935E-02	3.944E+00
SB-125	-4.784E-03	61.0	2.920E-03	2.930E-03	4.458E+00
I-131	5.280E-01	100.1	5.284E-01	5.291E-01	1.326E+00
Gd-153	-4.802E-01	596.8	2.866E+00	2.866E+00	9.560E+00
Ga-68	3.906E+01	25.7	1.005E+01	1.028E+01	1.905E+01
Tc-99m	-5.415E-01	148.1	8.019E-01	8.025E-01	2.670E+00
BA-133	5.788E-01	196.0	1.134E+00	1.135E+00	3.824E+00
CS-134	4.130E-01	83.3	3.441E-01	3.447E-01	3.892E+00
CS-137	-8.694E-01	92.1	8.007E-01	8.020E-01	2.265E+00
CE-139	-5.043E-01	97.6	4.921E-01	4.944E-01	1.642E+00
Ba-140	4.858E-01	168.8	8.202E-01	8.206E-01	4.744E+00
La-140	-1.560E+00	132.0	2.060E+00	2.061E+00	2.981E+00
CE-141	-9.807E-01	151.1	1.482E+00	1.483E+00	4.934E+00

CE-144	0.000E+00	1.#INF	1.952E+00	1.952E+00	1.876E+01
PM-144	0.000E+00	1.#INF	2.380E-01	2.380E-01	1.670E+00
EU-152	3.679E-01	613.8	2.259E+00	2.259E+00	1.012E+01
EU-154	1.141E+00	82.2	9.377E-01	9.395E-01	1.592E+01
EU-155	1.759E+00	105.6	1.858E+00	1.860E+00	6.198E+00
HF-181	6.017E-01	111.0	6.676E-01	6.683E-01	2.255E+00
Ta-182	2.349E+00	89.3	2.096E+00	2.100E+00	7.082E+00
Hg-203	-6.072E-01	89.3	5.423E-01	5.434E-01	1.812E+00
TL-208	6.631E+00	10.5	6.965E-01	7.768E-01	1.008E+00
pm-146	-9.414E-01	226.2	2.130E+00	2.130E+00	5.157E+00
y-88	1.667E-01	46.7	7.784E-02	7.831E-02	1.877E+00
Cd-113m	-2.569E+02	2121.3	5.449E+03	5.449E+03	1.897E+04
Cd-109	-1.312E+01	171.3	2.247E+01	2.248E+01	7.473E+01
Cf-251	-1.345E+00	186.2	2.504E+00	2.507E+00	6.443E+00
Cf-249	0.000E+00	1.#INF	1.495E-01	1.495E-01	2.601E+00
Sn-126	5.160E+00	119.1	6.143E+00	6.149E+00	2.050E+01
PB-210	4.208E+01	32.3	1.360E+01	1.382E+01	3.215E+01
PB-212	2.035E+01	5.5	1.127E+00	1.733E+00	1.824E+00
PB-214	1.627E+01	8.8	1.429E+00	1.660E+00	2.978E+00
BI-207	9.522E-02	79.6	7.580E-02	7.596E-02	1.872E+00
BI-212	9.559E+00	97.9	9.359E+00	9.372E+00	3.151E+01
BI-214	1.652E+01	8.3	1.373E+00	1.619E+00	1.667E+00
BI-210M	4.962E-01	159.4	7.912E-01	7.917E-01	1.974E+00
AC-228	2.539E+01	9.0	2.273E+00	2.616E+00	3.027E+00
TH-227	-7.681E+00	134.3	1.032E+01	1.033E+01	3.446E+01
TH-229	6.048E+00	108.7	6.577E+00	6.595E+00	2.435E+01
TH-234	2.638E+01	43.3	1.142E+01	1.150E+01	3.011E+01
PA-231	-1.823E+01	148.9	2.714E+01	2.716E+01	9.087E+01
PA-233	0.000E+00	1.#INF	2.531E-01	2.531E-01	7.797E+00
PA-234	-1.591E-02	118.3	1.883E-02	1.884E-02	1.113E+01
PA-234M	8.471E+01	93.0	7.881E+01	7.892E+01	2.669E+02
U-235	-4.355E+00	67.1	2.924E+00	2.932E+00	2.165E+01
AM-241	4.806E-01	352.1	1.692E+00	1.692E+00	5.702E+00
Np-237	-3.501E+00	181.6	6.356E+00	6.359E+00	2.115E+01
Ir-192	0.000E+00	1.#INF	2.287E-01	2.287E-01	3.261E+00
Cs-136	-1.154E-01	96.3	1.111E-01	1.113E-01	3.251E+00
Np-239	1.672E+00	105.6	1.765E+00	1.768E+00	5.888E+00
Nd-147	3.884E+00	93.7	3.640E+00	3.647E+00	8.762E+00
Total	6.110E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-19-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161070.An1

Acquisition information
Start time: 9/1/2016 4:48:45 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 4:48:00 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. 22 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1721

***** 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
46.56	63.	32.31	1.70	1.957E-02	46.54	4.250	4.208E+01	PB210
53.58	24.	46.89	0.34	2.404E-02				
59.54	8.	352.06	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.36	53.	43.28	1.73	2.924E-02	63.29	3.810	PBC<MDA	TH234
64.28	27.	119.05	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.88	172.	12.63	0.97	3.383E-02				
77.21	300.	8.32	0.97	3.455E-02				
92.71	38.	54.90	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
105.31	26.	105.62	1.00	3.876E-02	105.31	21.200	PBC<MDA	EU155
106.13	26.	105.56	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
123.10	19.	126.86	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
162.66	13.	168.82	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
210.85	21.	108.74	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	192.43	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.74	399.	6.16	1.17	2.591E-02	238.63	43.300	1.975E+01	PB212
242.09	65.	24.92	1.12	2.565E-02	242.00	7.430	1.884E+01	PB214
265.83	11.	159.44	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
276.50	18.	87.34	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
284.30	17.	100.09	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.27	122.	13.98	0.96	2.204E-02	295.09	19.300	1.591E+01	PB214
300.35	26.	57.95	1.96	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.663E+01	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.18	6.200	1.057E+01	PA233
338.23	141.	13.06	0.73	1.984E-02	338.32	12.010	3.289E+01	AC228
351.93	214.	10.64	1.18	1.923E-02	351.93	37.600	1.646E+01	PB214
356.00	12.	195.96	1.22	1.906E-02	356.00	62.050	PBC<MDA	BA133
364.48	2.	939.91	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
383.84	14.	110.19	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
391.69	-1.	963.32	1.25	1.767E-02	391.69	64.000	PBC<MDA	SN113
453.88	2.	607.52	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	15.	82.73	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
477.60	12.	109.26	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
482.00	13.	110.95	1.33	1.497E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	135.47	1.33	1.485E-02	487.02	45.500	PBC<MDA	La140
497.05	5.	291.64	1.34	1.460E-02	497.05	90.900	PBC<MDA	RU103
511.86	58.	44.95	2.60	1.426E-02	511.86	20.000	1.130E+01	RH106
531.00	13.	93.72	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
563.24	4.	371.37	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
583.23	129.	10.50	0.94	1.282E-02	583.02	84.500	6.605E+00	TL208
609.31	169.	8.31	0.80	1.236E-02	609.31	46.090	1.652E+01	BI214
					610.30	5.750	1.326E+02	RU103
621.92	7.	134.72	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
657.76	6.	133.56	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
702.63	19.	52.58	1.50	1.098E-02	702.63	97.900	PBC<MDA	NB94
722.79	15.	82.01	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	3.	492.02	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.464E-01	AG108M
					723.36	20.220	6.580E-01	EU154
727.09	14.	97.91	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
765.79	15.	75.10	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.824E+02	PA234M
795.87	12.	83.31	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
834.85	5.	228.91	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
846.77	4.	204.63	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
861.09	31.	23.57	1.62	9.252E-03	860.56	12.420	1.493E+01	TL208
889.28	13.	109.57	1.64	8.996E-03	889.28	99.984	PBC<MDA	Sc46
911.49	117.	10.22	1.28	8.811E-03	911.07	29.000	2.548E+01	AC228
946.02	6.	184.51	1.68	8.531E-03	946.02	13.400	PBC<MDA	PA234
964.11	2.	613.84	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
969.31	66.	14.70	0.85	8.357E-03	968.97	17.460	2.524E+01	AC228
996.33	10.	82.19	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1001.00	10.	93.03	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	5.	228.93	1.75	7.875E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	125.99	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	135.65	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	94.08	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	15.	25.72	1.77	7.623E-03	1077.40	3.300	3.906E+01	Ga68
1121.10	11.	89.25	1.80	7.362E-03	1120.55	99.987	PBC<MDA	Sc46

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					1121.30	34.900	2.349E+00	Ta182
1173.24	2.	626.70	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1221.22	2.	540.07	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	8.	145.05	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1384.30	3.	244.23	1.97	6.114E-03	1384.30	24.290	PBC<MDA	AG110M
1461.04	317.	6.01	1.64	5.827E-03	1460.83	10.670	2.830E+02	K40
1764.93	5.	114.29	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	87.05	2.18	4.898E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	5.	46.69	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
214.00	53.58	44.	24.	9.984E+02	46.89	0.340	- s
299.10	74.89	150.	172.	5.083E+03	12.63	0.972	- D
308.43	77.22	162.	300.	8.690E+03	8.32	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	185.94	46.56	95.	63.	0.035	32.31	1.697s
TH-227	200.23	50.14	518.	-24.	-0.013	134.33	0.950
AM-241	237.79	59.54	444.	8.	0.005	352.06	0.958s
TH-234	253.09	63.36	153.	53.	0.029	43.28	1.731s
Sn-126	256.75	64.28	494.	27.	0.015	119.05	0.963
BA-133	323.54	80.99	1230.	-35.	-0.019	65.84	0.978
Np-237	345.53	86.49	1504.	-30.	-0.017	181.55	0.983s
EU-155	345.74	86.54	1687.	-33.	-0.018	176.23	0.983s
Sn-126	347.33	86.94	1654.	-33.	-0.018	174.47	0.984
Sn-126	349.84	87.57	1621.	-33.	-0.018	172.61	0.984
Cd-109	351.72	88.04	1597.	-33.	-0.018	171.28	0.985s
Nd-147	363.95	91.10	1630.	-33.	-0.018	172.55	0.987s
TH-234	369.91	92.59	197.	38.	0.021	54.90	0.989D
AC-228	372.95	93.35	1717.	-33.	-0.019	176.69	0.990s
Gd-153	389.54	97.50	1751.	-10.	-0.006	596.76	0.993s
Gd-153	412.32	103.20	1560.	-38.	-0.021	149.76	0.998s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	414.32	103.70	1598.	-38.	-0.021	151.46	0.999s
EU-155	420.77	105.31	364.	26.	0.014	105.62	1.001s
Np-239	424.03	106.13	378.	26.	0.015	105.56	1.001s
EU-152	486.57	121.78	315.	-11.	-0.006	186.90	1.016s
CO-57	487.72	122.06	326.	0.	0.000	1000.00	1.016s
EU-154	491.87	123.10	281.	19.	0.011	126.86	1.017s
PA-234	524.63	131.29	820.	-28.	-0.015	148.15	1.024s
HF-181	531.54	133.02	848.	-27.	-0.015	151.28	1.026
CE-144	533.60	133.54	875.	0.	0.000	1000.00	1.026s
HF-181	544.63	136.30	875.	0.	0.000	1000.00	1.029s
CO-57	545.33	136.47	875.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	1042.	-31.	-0.017	148.08	1.032s
U-235	574.56	143.79	1074.	-31.	-0.017	67.14	1.036s
CE-141	581.17	145.44	1066.	-31.	-0.017	151.10	1.037s
Ba-140	650.01	162.66	247.	13.	0.007	168.82	1.053s
U-235	652.88	163.38	260.	0.	0.000	1000.00	1.053s
CE-139	662.77	165.85	276.	-25.	-0.014	97.58	1.055s
Cf-251	705.73	176.60	172.	-13.	-0.007	186.22	1.065
U-235	820.60	205.33	132.	-6.	-0.003	360.56	1.091s
TH-229	842.65	210.85	143.	21.	0.012	108.74	1.096s
Cf-251	907.22	227.00	117.	11.	0.006	192.43	1.110s
PB-212	953.72	238.63	54.	411.	0.228	5.54	1.120D
PB-214	967.17	242.00	97.	65.	0.036	24.92	1.123D
EU-152	977.95	244.69	768.	-24.	-0.014	161.75	1.126s
TH-227	1024.12	256.24	110.	-22.	-0.012	93.29	1.136s
BI-210M	1062.46	265.83	73.	11.	0.006	159.44	1.144
TL-208	1108.25	277.28	119.	18.	0.010	87.34	1.154s
Hg-203	1115.91	279.20	157.	-20.	-0.011	89.31	1.156s
I-131	1136.30	284.30	72.	17.	0.010	100.09	1.160s
PB-214	1180.15	295.27	46.	122.	0.068	13.98	0.961
PB-212	1200.45	300.35	53.	26.	0.014	57.95	1.962s
PA-231	1199.35	300.07	463.	-20.	-0.011	150.85	1.174s
PA-233	1199.79	300.18	443.	-20.	-0.011	147.54	1.174s
PA-231	1209.66	302.65	453.	-20.	-0.011	148.86	1.176s
BA-133	1210.47	302.85	473.	-20.	-0.011	152.11	1.176s
Ba-140	1218.46	304.85	494.	-4.	-0.002	701.17	1.178
BI-210M	1218.64	304.90	498.	0.	0.000	1000.00	1.178
Ir-192	1232.81	308.44	498.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	498.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	498.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	529.	-22.	-0.012	78.59	1.191s
La-140	1314.06	328.76	427.	-19.	-0.010	90.95	1.199s
Cf-249	1332.77	333.44	408.	-18.	-0.010	162.88	1.203s
AC-228	1351.91	338.23	36.	141.	0.078	13.06	0.729s
Cs-136	1361.28	340.57	391.	-4.	-0.002	780.18	1.209
HF-181	1382.30	345.83	61.	-4.	-0.002	775.83	1.213s
PB-214	1406.69	351.93	60.	214.	0.119	10.64	1.179s
BA-133	1422.97	356.00	285.	12.	0.007	195.96	1.222s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1456.89	364.48	52.	2.	0.001	939.91	1.229s
BA-133	1534.29	383.84	112.	14.	0.008	110.19	1.246s
Cf-249	1550.72	387.95	126.	0.	0.000	1000.00	1.249s
SN-113	1565.67	391.69	127.	-1.	-0.001	963.32	1.253s
SB-125	1710.36	427.88	61.	-16.	-0.009	89.75	1.283
AG-108M	1734.60	433.94	44.	-6.	-0.003	220.27	1.288s
pm-146	1814.35	453.88	48.	2.	0.001	607.52	1.304
SB-125	1852.29	463.37	70.	15.	0.008	82.73	1.312
Ir-192	1871.05	468.06	128.	-10.	-0.005	169.05	1.316s
BE-7	1909.18	477.60	86.	12.	0.007	109.26	1.324s
HF-181	1926.79	482.00	98.	13.	0.007	110.95	1.328s
La-140	1946.87	487.02	69.	9.	0.005	135.47	1.332s
RU-103	1987.00	497.05	43.	5.	0.003	291.64	1.340s
RH-106	2046.22	511.86	91.	58.	0.032	44.95	2.602s
Nd-147	2122.75	531.00	30.	13.	0.007	93.72	1.368s
Ba-140	2147.78	537.26	31.	-2.	-0.001	699.72	1.373s
CS-134	2251.67	563.24	52.	4.	0.002	371.37	1.394s
CS-134	2276.00	569.32	48.	-9.	-0.005	117.67	1.399s
BI-207	2277.52	569.70	75.	-10.	-0.005	128.43	1.399s
TL-208	2331.61	583.23	13.	129.	0.072	10.50	0.941s
SB-125	2400.69	600.50	342.	-15.	-0.008	90.60	1.424s
SB-124	2409.62	602.73	327.	-15.	-0.008	174.08	1.425s
BI-214	2435.91	609.31	10.	169.	0.094	8.31	0.796s
RU-103	2439.88	610.30	265.	-9.	-0.005	252.25	1.431s
AG-108M	2455.81	614.28	256.	0.	0.000	1000.00	1.435
RH-106	2486.35	621.92	22.	7.	0.004	134.72	1.440s
SB-125	2542.23	635.89	36.	-9.	-0.005	98.48	1.451s
I-131	2546.57	636.97	50.	-4.	-0.002	246.12	1.452s
AG-110M	2629.71	657.76	31.	6.	0.003	133.56	1.469s
CS-137	2645.30	661.66	64.	-15.	-0.009	92.10	1.472
PM-144	2784.82	696.54	42.	0.	0.000	1000.00	1.499s
NB-94	2809.17	702.63	19.	19.	0.011	52.58	1.503s
SB-124	2889.79	722.79	64.	15.	0.008	82.01	1.519s
AG-108M	2890.40	722.94	78.	3.	0.001	492.02	1.519s
EU-154	2892.07	723.36	81.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	176.	-28.	-0.015	43.02	1.520s
BI-212	2907.33	727.17	85.	14.	0.008	97.91	1.522s
pm-146	2941.53	735.72	33.	-3.	-0.001	506.13	1.529s
pm-146	2987.29	747.16	42.	-6.	-0.003	226.22	1.537s
ZR-95	3025.56	756.73	42.	-2.	-0.001	645.09	1.544s
AG-110M	3054.42	763.94	42.	-10.	-0.006	96.95	1.550s
NB-95	3061.80	765.79	58.	15.	0.008	75.10	1.551s
PA-234M	3064.30	766.41	69.	-9.	-0.005	140.58	1.552s
EU-152	3114.33	778.92	47.	-3.	-0.001	546.87	1.561
BI-212	3140.33	785.42	37.	-6.	-0.004	208.48	1.566s
CS-134	3182.12	795.87	46.	12.	0.007	83.31	1.574
CO-58	3241.75	810.78	100.	-17.	-0.010	84.62	1.585s
La-140	3261.74	815.77	117.	-17.	-0.010	90.94	1.589s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	3272.66	818.50	133.	-11.	-0.006	145.71	1.591s
MN-54	3338.05	834.85	28.	5.	0.003	228.91	1.603s
Co-56	3385.75	846.77	14.	4.	0.002	204.63	1.612s
TL-208	3440.93	860.56	5.	31.	0.017	23.57	1.622s
NB-94	3483.06	871.10	31.	-1.	0.000	948.68	1.629s
EU-154	3491.60	873.23	40.	-4.	-0.002	219.75	1.631s
PA-234	3520.80	880.53	85.	-16.	-0.009	84.93	1.636s
PA-234	3531.64	883.24	101.	-16.	-0.009	91.85	1.638s
AG-110M	3537.42	884.68	118.	-5.	-0.003	301.92	1.639s
Sc-46	3555.81	889.28	92.	13.	0.007	109.57	1.642s
y-88	3590.85	898.04	30.	-4.	-0.002	305.16	1.649s
AC-228	3644.65	911.49	6.	117.	0.065	10.22	1.278s
AG-110M	3748.69	937.49	40.	-16.	-0.009	87.83	1.677s
PA-234	3782.81	946.02	26.	6.	0.003	184.51	1.683s
EU-152	3855.18	964.11	116.	2.	0.001	613.84	1.696s
AC-228	3875.98	969.31	6.	66.	0.037	14.70	0.851s
EU-154	3984.09	996.33	31.	10.	0.006	82.19	1.718s
PA-234M	4002.77	1001.00	41.	10.	0.006	93.03	1.722s
EU-154	4017.88	1004.77	63.	-9.	-0.005	124.32	1.724s
Co-56	4150.18	1037.84	25.	5.	0.003	228.93	1.747s
Cs-136	4191.11	1048.07	29.	6.	0.004	125.99	1.754s
RH-106	4200.27	1050.36	26.	6.	0.003	135.65	1.755s
BI-207	4253.49	1063.66	11.	8.	0.004	94.08	1.765s
Ga-68	4308.47	1077.40	0.	15.	0.008	25.72	1.774s
FE-59	4395.90	1099.25	43.	-14.	-0.008	53.95	1.789s
EU-152	4447.22	1112.07	87.	-7.	-0.004	190.33	1.797s
ZN-65	4461.11	1115.55	80.	0.	0.000	1000.00	1.800s
Ta-182	4484.13	1121.30	42.	11.	0.006	89.25	1.803s
CO-60	4691.97	1173.24	27.	2.	0.001	626.70	1.838s
Ta-182	4755.25	1189.05	53.	-19.	-0.011	88.82	1.848s
Ta-182	4884.75	1221.41	33.	2.	0.001	540.07	1.869s
Co-56	4952.26	1238.28	27.	8.	0.005	145.05	1.879s
NA-22	5097.34	1274.53	27.	-3.	-0.001	280.62	1.902s
EU-154	5097.40	1274.54	29.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	16.	-4.	-0.002	232.74	1.913s
CO-60	5329.36	1332.50	21.	-7.	-0.004	147.85	1.938s
AG-110M	5536.68	1384.30	12.	3.	0.002	244.23	1.970s
EU-152	5631.56	1408.00	23.	-9.	-0.005	133.23	1.984s
K-40	5843.85	1461.04	9.	317.	0.176	6.01	1.638
La-140	6384.98	1596.21	28.	-14.	-0.008	132.01	2.092s
SB-124	6764.43	1690.98	6.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	13.	5.	0.003	114.29	2.181s
Co-56	7086.23	1771.35	18.	8.	0.004	87.05	2.184s
y-88	7345.35	1836.06	0.	5.	0.003	46.69	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	4.3532E+00				5.31E+01	
			477.60	4.353E+00	&(P	1.607E+01	1.09E+02 1.05E+01 G
NA-22	C	-2.2532E-01				9.50E+02	
			1274.53	-2.253E-01	?(	2.262E+00	2.81E+02 9.99E+01 G
K-40	N	2.8298E+02				4.66E+11	
			1460.83	2.830E+02	(P	1.510E+01	6.01E+00 1.07E+01 G
Sc-46	F	7.8875E-01				8.38E+01	
			889.28	7.888E-01	?(	2.921E+00	1.10E+02 1.00E+02 G
			1120.55	-3.300E-02	% P	3.357E+00	1.80E+03 1.00E+02 G
CR-51	F	-5.8592E+00				2.77E+01	
			320.08	-5.859E+00	&(P	2.966E+01	7.86E+01 9.94E+00 G
MN-54	C	2.9265E-01				3.12E+02	
			834.85	2.926E-01	?(	1.602E+00	2.29E+02 1.00E+02 G
FE-59	F	-1.8733E+00				4.45E+01	
			1099.25	-1.873E+00	?(P	4.379E+00	5.40E+01 5.65E+01 G
			1291.60	-7.912E-01	+	4.223E+00	2.33E+02 4.32E+01 G
Co-56	C	7.0443E-01				7.73E+01	
			846.77	2.371E-01	&(	1.194E+00	2.05E+02 9.99E+01 G
			1238.28	1.038E+00	?(	3.336E+00	1.45E+02 6.61E+01 G
			1037.84	2.449E+00	?(P	1.301E+01	2.29E+02 1.41E+01 G
			1771.35	5.568E+00	?	1.651E+01	8.71E+01 1.55E+01 A
CO-58	C	-1.0001E+00				7.09E+01	
			810.78	-1.000E+00	?(	2.830E+00	8.46E+01 9.95E+01 G
CO-60	F	-6.4426E-01				1.93E+03	
			1332.50	-6.443E-01	?(	2.129E+00	1.48E+02 1.00E+02 G
			1173.24	1.487E-01	+ P	2.120E+00	6.27E+02 9.99E+01 G
NB-94	I	9.9914E-01				7.41E+06	
			702.63	9.991E-01	&(	1.181E+00	5.26E+01 9.79E+01 G
			871.10	-5.062E-02	-	1.736E+00	9.49E+02 9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	-2.0866E-01					6.40E+01	
			756.73	-2.087E-01	?(P	3.258E+00	6.45E+02	5.45E+01 G
			724.20	-3.274E+00	+ P	7.590E+00	4.30E+01	4.42E+01 G
NB-95	I	8.3147E-01					6.40E+01	
			765.79	8.315E-01	&(	2.082E+00	7.51E+01	9.98E+01 G
RU-103	I	1.9531E-01					3.93E+01	
			497.05	1.953E-01	(	1.397E+00	2.92E+02	9.09E+01 G
			610.30	-7.207E+00	+	6.151E+01	2.52E+02	5.75E+00 GA
RH-106	I	6.4157E+00					3.74E+02	
			621.92	3.376E+00	?(	1.123E+01	1.35E+02	9.93E+00 G
			1050.36	2.577E+01	?(P	1.217E+02	1.36E+02	1.56E+00 G
			511.86	1.130E+01	?	9.188E+00	4.50E+01	2.00E+01 GA
AG-108M	C	-3.9511E-02					1.53E+05	
			433.94	-2.261E-01	?(	1.267E+00	2.20E+02	9.05E+01 G
			722.94	1.464E-01	?(	2.509E+00	4.92E+02	9.08E+01 G
			614.28	0.000E+00	+	3.891E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.4762E-01					2.50E+02	
			884.68	-4.342E-01	?(	4.503E+00	3.02E+02	7.27E+01 G
			657.76	3.120E-01	&(	1.446E+00	1.34E+02	9.46E+01 G
			937.49	-3.102E+00	+	6.052E+00	8.78E+01	3.44E+01 G
			1384.30	1.248E+00	?(P	6.967E+00	2.44E+02	2.43E+01 G
			763.94	-2.436E+00	+	8.018E+00	9.70E+01	2.23E+01 G
SN-113	F	-7.3128E-02					1.15E+02	
			391.69	-7.313E-02	?(P	2.717E+00	9.63E+02	6.40E+01 G
SB-124	F	8.4391E-02					6.02E+01	
			602.73	-6.737E-01	?(	3.944E+00	1.74E+02	9.83E+01 G
			1690.98	0.000E+00	+	3.214E+00	1.00E+03	4.78E+01 G
			722.79	6.976E+00	?(P	1.915E+01	8.20E+01	1.08E+01 G
SB-125	I	-4.7837E-03					1.01E+03	
			427.88	-1.833E+00	?(P	4.458E+00	8.98E+01	2.96E+01 G
			600.50	-3.721E+00	+ P	2.211E+01	9.06E+01	1.79E+01 G
			635.89	-3.773E+00	+	1.265E+01	9.85E+01	1.13E+01 G
			463.37	5.164E+00	(P	1.429E+01	8.27E+01	1.05E+01 G
I-131	I	5.2799E-01					8.02E+00	
			364.48	5.497E-02	?(P	1.326E+00	9.40E+02	8.17E+01 G
			284.30	6.822E+00	(	1.685E+01	1.00E+02	6.14E+00 G
			636.97	-2.709E+00	+	2.330E+01	2.46E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-4.8019E-01					2.42E+02	
			97.50	-4.802E-01	?(	9.560E+00	5.97E+02	3.00E+01 G
			103.20	-2.472E+00	+	1.231E+01	1.50E+02	2.18E+01 G
Ga-68	C	3.9056E+01					4.71E-02	
			1077.40	3.906E+01	?(	1.905E+01	2.57E+01	3.30E+00 G
Tc-99m	I	-5.4151E-01					2.51E-01	
			140.51	-5.415E-01	?(	2.670E+00	1.48E+02	8.93E+01 G
BA-133	F	5.7878E-01					3.85E+03	
			356.00	5.788E-01	?(P	3.824E+00	1.96E+02	6.20E+01 G
			302.85	-2.866E+00	+	1.459E+01	1.52E+02	1.83E+01 G
			383.84	4.844E+00	?	1.800E+01	1.10E+02	8.94E+00 GA
			80.99	-1.598E+00	+ P	7.619E+00	6.58E+01	3.41E+01 GA
CS-134	I	4.1300E-01					7.54E+02	
			604.71	-6.669E-02	&(	3.892E+00	1.72E+03	9.76E+01 G
			795.87	8.038E-01	?(	2.251E+00	8.33E+01	8.55E+01 G
			569.32	-2.395E+00	+	9.639E+00	1.18E+02	1.54E+01 G
			801.95	6.391E-02	%	2.766E+01	1.23E+04	8.69E+00 G
			563.24	2.018E+00	(	1.832E+01	3.71E+02	8.35E+00 G
CS-137	I	-8.6943E-01					1.10E+04	
			661.66	-8.694E-01	?(P	2.265E+00	9.21E+01	8.52E+01 G
CE-139	F	-5.0429E-01					1.38E+02	
			165.85	-5.043E-01	(	1.642E+00	9.76E+01	7.99E+01 G
Ba-140	I	4.8583E-01					1.28E+01	
			537.26	-2.895E-01	?(P	4.744E+00	7.00E+02	2.44E+01 G
			162.66	3.526E+00	?(	2.007E+01	1.69E+02	6.22E+00 G
			304.85	-2.705E+00	+	6.398E+01	7.01E+02	4.29E+00 G
La-140	I	-1.5603E+00					1.28E+01	
			1596.21	-1.560E+00	?(P	2.981E+00	1.32E+02	9.54E+01 G
			487.02	7.367E-01	+ P	3.407E+00	1.35E+02	4.55E+01 G
			328.76	-2.544E+00	+ P	1.336E+01	9.09E+01	2.03E+01 G
			815.77	-4.305E+00	+	1.311E+01	9.09E+01	2.33E+01 G
CE-141	I	-9.8070E-01					3.25E+01	
			145.44	-9.807E-01	&(	4.934E+00	1.51E+02	4.82E+01 G
EU-152	F	3.6794E-01					4.94E+03	
			344.29	-5.374E-02	%(P	1.012E+01	5.55E+03	2.65E+01 G
			1112.07	-3.884E+00	+	2.536E+01	1.90E+02	1.36E+01 G
			121.78	-5.664E-01	& P	4.317E+00	1.87E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	-1.137E+00	+	1.473E+01	5.47E+02	1.29E+01 G
			964.11	1.133E+00	?(	2.402E+01	6.14E+02	1.46E+01 G
			244.69	-7.039E+00	+	3.800E+01	1.62E+02	7.58E+00 G
			1408.00	-3.806E+00	+	1.093E+01	1.33E+02	2.10E+01 GA
EU-154	I	1.1410E+00					3.14E+03	
			873.23	-2.065E+00	?(	1.592E+01	2.20E+02	1.23E+01 G
			123.10	6.740E-01	?(	2.867E+00	1.27E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.707E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.145E+01	1.00E+03	2.02E+01 G
			1004.77	-3.575E+00	+	1.516E+01	1.24E+02	1.80E+01 G
			996.33	6.649E+00	?(	1.841E+01	8.22E+01	1.06E+01 G
EU-155	I	1.7589E+00					1.81E+03	
			105.31	1.759E+00	?(	6.198E+00	1.06E+02	2.12E+01 G
			86.54	-1.629E+00	&	9.548E+00	1.76E+02	3.07E+01 G
HF-181	F	6.0171E-01					4.24E+01	
			482.00	6.017E-01	(	2.255E+00	1.11E+02	8.05E+01 G
			133.02	-9.365E-01	&	4.723E+00	1.51E+02	4.33E+01 G
			345.83	-6.792E-01	& P	7.372E+00	7.76E+02	1.51E+01 G
			136.30	0.000E+00	-	3.583E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.3488E+00					1.14E+02	
			1121.30	2.349E+00	?(	7.082E+00	8.93E+01	3.49E+01 G
			1221.41	7.252E-01	- P	8.831E+00	5.40E+02	2.70E+01 G
			1189.05	-9.480E+00	+	1.802E+01	8.88E+01	1.62E+01 G
Hg-203	F	-6.0717E-01					4.66E+01	
			279.20	-6.072E-01	?(	1.812E+00	8.93E+01	8.15E+01 G
TL-208	N	6.6309E+00					6.98E+02	
			583.02	6.605E+00	(P	1.008E+00	1.05E+01	8.45E+01 G
			277.28	6.983E+00	&(P	2.039E+01	8.73E+01	6.31E+00 G
			860.56	1.493E+01	+ P	6.413E+00	2.36E+01	1.24E+01 G
pm-146	C	-9.4144E-01					2.02E+03	
			747.16	-9.414E-01	?(P	5.157E+00	2.26E+02	3.40E+01 G
			735.72	-6.272E-01	+ P	6.860E+00	5.06E+02	2.25E+01 G
			453.88	1.269E-01	+	1.897E+00	6.08E+02	6.50E+01 G
y-88	F	1.6671E-01					1.07E+02	
			898.04	-2.659E-01	?(	1.877E+00	3.05E+02	9.37E+01 G
			1836.06	5.753E-01	?(P	8.706E-01	4.67E+01	9.92E+01 G
Cd-113m		-2.5688E+02					5.33E+03	
			263.70	-2.569E+02	%(	1.897E+04	2.12E+03	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-109	F	-1.3118E+01					4.53E+02	
			88.04	-1.312E+01	?(	7.473E+01	1.71E+02	3.79E+00 G
Cf-251	T	-1.3447E+00					3.28E+05	
			176.60	-1.345E+00	?(	6.443E+00	1.86E+02	1.70E+01 G
			227.00	3.495E+00	?	1.743E+01	1.92E+02	6.30E+00 GA
Sn-126		5.1602E+00					3.65E+07	
			87.57	-1.328E+00	-	7.624E+00	1.73E+02	3.75E+01 GA
			64.28	5.160E+00	(	2.050E+01	1.19E+02	9.70E+00 G
			86.94	-5.523E+00	+	3.204E+01	1.74E+02	9.04E+00 GA
PB-210	N	4.2085E+01					8.14E+03	
			46.54	4.208E+01	*(P	3.215E+01	3.23E+01	4.25E+00 G
PB-212	N	2.0355E+01					6.98E+02	
			238.63	2.035E+01	(	1.824E+00	5.54E+00	4.33E+01 G
			300.03	1.997E+01		2.859E+01	5.79E+01	3.28E+00 GA
PB-214	N	1.6271E+01					5.84E+05	
			351.93	1.646E+01	@(P	2.978E+00	1.06E+01	3.76E+01 G
			295.09	1.591E+01	(P	4.487E+00	1.40E+01	1.93E+01 G
			242.00	1.884E+01		1.420E+01	2.49E+01	7.43E+00 GA
BI-207	C	9.5218E-02					1.18E+04	
			569.70	-4.278E-01	(	1.872E+00	1.28E+02	9.77E+01 G
			1063.66	7.814E-01	?(P	1.730E+00	9.41E+01	7.45E+01 G
BI-212	N	9.5588E+00					6.98E+02	
			727.17	9.559E+00	?(P	3.151E+01	9.79E+01	7.55E+00 G
			785.42	-2.749E+01	+	1.354E+02	2.08E+02	1.28E+00 GA
BI-214	N	1.6524E+01					5.84E+05	
			609.31	1.652E+01	(P	1.667E+00	8.31E+00	4.61E+01 G
			1120.29	-2.185E-01	% P	2.222E+01	1.78E+03	1.51E+01 G
			1764.49	3.551E+00	- P	1.420E+01	1.14E+02	1.54E+01 G
BI-210M	T	4.9623E-01					1.10E+09	
			265.83	4.962E-01	&(	1.974E+00	1.59E+02	5.00E+01 G
			304.90	0.000E+00	-	9.847E+00	1.00E+03	2.80E+01 G
AC-228	N	2.5392E+01					2.10E+03	
			911.07	2.548E+01	@(P	3.027E+00	1.02E+01	2.90E+01 G
			968.97	2.524E+01	(P	5.271E+00	1.47E+01	1.75E+01 G
			338.32	3.289E+01	+	7.154E+00	1.31E+01	1.20E+01 G
			93.35	-8.796E+00	-	5.168E+01	1.77E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-7.6806E+00					7.95E+03	
			50.14	-7.681E+00	&(	3.446E+01	1.34E+02	8.00E+00 G
			256.24	-6.985E+00	+	1.667E+01	9.33E+01	7.00E+00 G
TH-229	N	6.0481E+00					2.68E+06	
			193.51	8.334E-01	&(	2.435E+01	1.12E+03	4.40E+00 G
			210.85	1.372E+01	?(	3.818E+01	1.09E+02	2.99E+00 G
TH-234	N	2.6379E+01					1.63E+12	
			63.29	2.638E+01	(P	3.011E+01	4.33E+01	3.81E+00 G
			92.59	1.004E+01	- P	1.795E+01	5.49E+01	5.58E+00 G
PA-231	N	-1.8234E+01					1.20E+07	
			302.65	-1.823E+01	?(	9.087E+01	1.49E+02	2.88E+00 G
			300.07	-2.116E+01	&	1.069E+02	1.51E+02	2.46E+00 G
PA-234	N	-1.5911E-02					1.63E+12	
			131.29	-2.253E+00	(	1.113E+01	1.48E+02	1.80E+01 G
			946.02	2.990E+00	?(P	1.283E+01	1.85E+02	1.34E+01 G
			569.47	-4.320E-01	%	1.983E+01	1.30E+03	8.20E+00 G
			883.24	-1.030E+01	+	3.175E+01	9.19E+01	9.60E+00 G
			880.53	-1.642E+01	+	4.670E+01	8.49E+01	6.00E+00 GA
PA-234M	N	8.4706E+01					1.63E+12	
			1001.00	8.471E+01	?(	2.669E+02	9.30E+01	8.37E-01 G
			766.41	-1.590E+02	&	7.646E+02	1.41E+02	2.94E-01 G
U-235	N	-4.3547E+00					2.57E+11	
			143.79	-4.355E+00	&(P	2.165E+01	6.71E+01	1.10E+01 G
			205.33	-2.294E+00	+	2.151E+01	3.61E+02	5.01E+00 G
			163.38	0.000E+00	+	2.529E+01	1.00E+03	5.08E+00 G
AM-241	T	4.8059E-01					1.58E+05	
			59.54	4.806E-01	&(	5.702E+00	3.52E+02	3.59E+01 G
Np-237	F	-3.5010E+00					2.14E+06	
			86.49	-3.501E+00	&(	2.115E+01	1.82E+02	1.31E+01 G
Cs-136	F	-1.1539E-01					1.30E+01	
			818.50	-6.583E-01	?(	3.251E+00	1.46E+02	1.00E+02 G
			1048.07	5.633E-01	?(	2.460E+00	1.26E+02	8.00E+01 G
			340.57	-2.156E-01	+	5.693E+00	7.80E+02	4.69E+01 G
Np-239	T	1.6721E+00					2.36E+00	
			103.70	-2.246E+00	+	1.131E+01	1.51E+02	2.40E+01 X
			106.13	1.672E+00	&(	5.888E+00	1.06E+02	2.27E+01 G
			99.50	1.470E-06	%	1.910E+01	3.89E+08	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	3.8842E+00					1.11E+01	
		531.00	3.884E+00	?(	8.762E+00	9.37E+01	1.30E+01 G
		91.10	-1.739E+00	-	9.978E+00	1.73E+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	518.	-24.	-0.013	134.33	-7.681E+00	
AM-241	59.54	444.	8.	0.005	352.06	4.806E-01	
BA-133	80.99	1230.	-35.	-0.019	65.84	-1.598E+00	P
Np-237	86.49	1504.	-30.	-0.017	181.55	-3.501E+00	
EU-155	86.54	1687.	-33.	-0.018	176.23	-1.629E+00	
Cd-109	88.04	1597.	-33.	-0.018	171.28	-1.312E+01	
Nd-147	91.10	1630.	-33.	-0.018	172.55	-1.739E+00	
Gd-153	97.50	1751.	-10.	-0.006	596.76	-4.802E-01	
Gd-153	103.20	1560.	-38.	-0.021	149.76	-2.472E+00	
Np-239	103.70	1598.	-38.	-0.021	151.46	-2.246E+00	
EU-155	105.31	364.	26.	0.014	105.62	1.759E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	106.13	378.	26.	0.015	105.56	1.672E+00	
EU-152	121.78	315.	-11.	-0.006	186.90	-5.664E-01	P
EU-154	123.10	281.	19.	0.011	126.86	6.740E-01	
PA-234	131.29	820.	-28.	-0.015	148.15	-2.253E+00	
HF-181	133.02	848.	-27.	-0.015	151.28	-9.365E-01	
Tc-99m	140.51	1042.	-31.	-0.017	148.08	-5.415E-01	
U-235	143.79	1074.	-31.	-0.017	67.14	-4.355E+00	P
CE-141	145.44	1066.	-31.	-0.017	151.10	-9.807E-01	
Ba-140	162.66	247.	13.	0.007	168.82	3.526E+00	
CE-139	165.85	276.	-25.	-0.014	97.58	-5.043E-01	
Cf-251	176.60	172.	-13.	-0.007	186.22	-1.345E+00	
U-235	205.33	132.	-6.	-0.003	360.56	-2.294E+00	
TH-229	210.85	143.	21.	0.012	108.74	1.372E+01	
Cf-251	227.00	117.	11.	0.006	192.43	3.495E+00	
EU-152	244.69	768.	-24.	-0.014	161.75	-7.039E+00	
TH-227	256.24	110.	-22.	-0.012	93.29	-6.985E+00	
BI-210M	265.83	73.	11.	0.006	159.44	4.962E-01	
Hg-203	279.20	157.	-20.	-0.011	89.31	-6.072E-01	
I-131	284.30	72.	17.	0.010	100.09	6.822E+00	
PA-231	300.07	463.	-20.	-0.011	150.85	-2.116E+01	
PA-233	300.18	443.	-20.	-0.011	147.54	-8.401E+00	
PA-231	302.65	453.	-20.	-0.011	148.86	-1.823E+01	
BA-133	302.85	473.	-20.	-0.011	152.11	-2.866E+00	
Ba-140	304.85	494.	-4.	-0.002	701.17	-2.705E+00	
CR-51	320.08	529.	-22.	-0.012	78.59	-5.859E+00	P
La-140	328.76	427.	-19.	-0.010	90.95	-2.544E+00	P
Cf-249	333.44	408.	-18.	-0.010	162.88	-3.167E+00	
Cs-136	340.57	391.	-4.	-0.002	780.18	-2.156E-01	
HF-181	345.83	61.	-4.	-0.002	775.83	-6.792E-01	P
BA-133	356.00	285.	12.	0.007	195.96	5.788E-01	P
I-131	364.48	52.	2.	0.001	939.91	5.497E-02	P
BA-133	383.84	112.	14.	0.008	110.19	4.844E+00	
SN-113	391.69	127.	-1.	-0.001	963.32	-7.313E-02	P
SB-125	427.88	61.	-16.	-0.009	89.75	-1.833E+00	P
AG-108M	433.94	44.	-6.	-0.003	220.27	-2.261E-01	
pm-146	453.88	48.	2.	0.001	607.52	1.269E-01	
SB-125	463.37	70.	15.	0.008	82.73	5.164E+00	P
Ir-192	468.06	128.	-10.	-0.005	169.05	-6.742E-01	
BE-7	477.60	86.	12.	0.007	109.26	4.353E+00	P
HF-181	482.00	98.	13.	0.007	110.95	6.017E-01	
La-140	487.02	69.	9.	0.005	135.47	7.367E-01	P
RU-103	497.05	43.	5.	0.003	291.64	1.953E-01	
RH-106	511.86	91.	58.	0.032	44.95	1.130E+01	
Nd-147	531.00	30.	13.	0.007	93.72	3.884E+00	
Ba-140	537.26	31.	-2.	-0.001	699.72	-2.895E-01	P
CS-134	563.24	52.	4.	0.002	371.37	2.018E+00	
CS-134	569.32	48.	-9.	-0.005	117.67	-2.395E+00	
BI-207	569.70	75.	-10.	-0.005	128.43	-4.278E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	600.50	342.	-15.	-0.008	90.60	-3.721E+00	P
SB-124	602.73	327.	-15.	-0.008	174.08	-6.737E-01	
RU-103	610.30	265.	-9.	-0.005	252.25	-7.207E+00	
RH-106	621.92	22.	7.	0.004	134.72	3.376E+00	
SB-125	635.89	36.	-9.	-0.005	98.48	-3.773E+00	
I-131	636.97	50.	-4.	-0.002	246.12	-2.709E+00	
AG-110M	657.76	31.	6.	0.003	133.56	3.120E-01	
CS-137	661.66	64.	-15.	-0.009	92.10	-8.694E-01	P
NB-94	702.63	19.	19.	0.011	52.58	9.991E-01	
SB-124	722.79	64.	15.	0.008	82.01	6.976E+00	P
AG-108M	722.94	78.	3.	0.001	492.02	1.464E-01	
ZR-95	724.20	176.	-28.	-0.015	43.02	-3.274E+00	P
pm-146	735.72	33.	-3.	-0.001	506.13	-6.272E-01	P
pm-146	747.16	42.	-6.	-0.003	226.22	-9.414E-01	P
ZR-95	756.73	42.	-2.	-0.001	645.09	-2.087E-01	P
AG-110M	763.94	42.	-10.	-0.006	96.95	-2.436E+00	
NB-95	765.79	58.	15.	0.008	75.10	8.315E-01	
PA-234M	766.41	69.	-9.	-0.005	140.58	-1.590E+02	
EU-152	778.92	47.	-3.	-0.001	546.87	-1.137E+00	
CS-134	795.87	46.	12.	0.007	83.31	8.038E-01	
CO-58	810.78	100.	-17.	-0.010	84.62	-1.000E+00	
La-140	815.77	117.	-17.	-0.010	90.94	-4.305E+00	
Cs-136	818.50	133.	-11.	-0.006	145.71	-6.583E-01	
MN-54	834.85	28.	5.	0.003	228.91	2.926E-01	
Co-56	846.77	14.	4.	0.002	204.63	2.371E-01	
NB-94	871.10	31.	-1.	0.000	948.68	-5.062E-02	
EU-154	873.23	40.	-4.	-0.002	219.75	-2.065E+00	
PA-234	880.53	85.	-16.	-0.009	84.93	-1.642E+01	
PA-234	883.24	101.	-16.	-0.009	91.85	-1.030E+01	
AG-110M	884.68	118.	-5.	-0.003	301.92	-4.342E-01	
Sc-46	889.28	92.	13.	0.007	109.57	7.888E-01	
y-88	898.04	30.	-4.	-0.002	305.16	-2.659E-01	
AG-110M	937.49	40.	-16.	-0.009	87.83	-3.102E+00	
PA-234	946.02	26.	6.	0.003	184.51	2.990E+00	P
EU-152	964.11	116.	2.	0.001	613.84	1.133E+00	
EU-154	996.33	31.	10.	0.006	82.19	6.649E+00	
PA-234M	1001.00	41.	10.	0.006	93.03	8.471E+01	
EU-154	1004.77	63.	-9.	-0.005	124.32	-3.575E+00	
Co-56	1037.84	25.	5.	0.003	228.93	2.449E+00	P
Cs-136	1048.07	29.	6.	0.004	125.99	5.633E-01	
RH-106	1050.36	26.	6.	0.003	135.65	2.577E+01	P
BI-207	1063.66	11.	8.	0.004	94.08	7.814E-01	P
FE-59	1099.25	43.	-14.	-0.008	53.95	-1.873E+00	P
EU-152	1112.07	87.	-7.	-0.004	190.33	-3.884E+00	
CO-60	1173.24	27.	2.	0.001	626.70	1.487E-01	P
Co-56	1238.28	27.	8.	0.005	145.05	1.038E+00	
NA-22	1274.53	27.	-3.	-0.001	280.62	-2.253E-01	
FE-59	1291.60	16.	-4.	-0.002	232.74	-7.912E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-60	1332.50	21.	-7.	-0.004	147.85	-6.443E-01		
AG-110M	1384.30	12.	3.	0.002	244.23	1.248E+00		P
EU-152	1408.00	23.	-9.	-0.005	133.23	-3.806E+00		
La-140	1596.21	28.	-14.	-0.008	132.01	-1.560E+00		P
Co-56	1771.35	18.	8.	0.004	87.05	5.568E+00		
y-88	1836.06	0.	5.	0.003	46.69	5.753E-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 *****

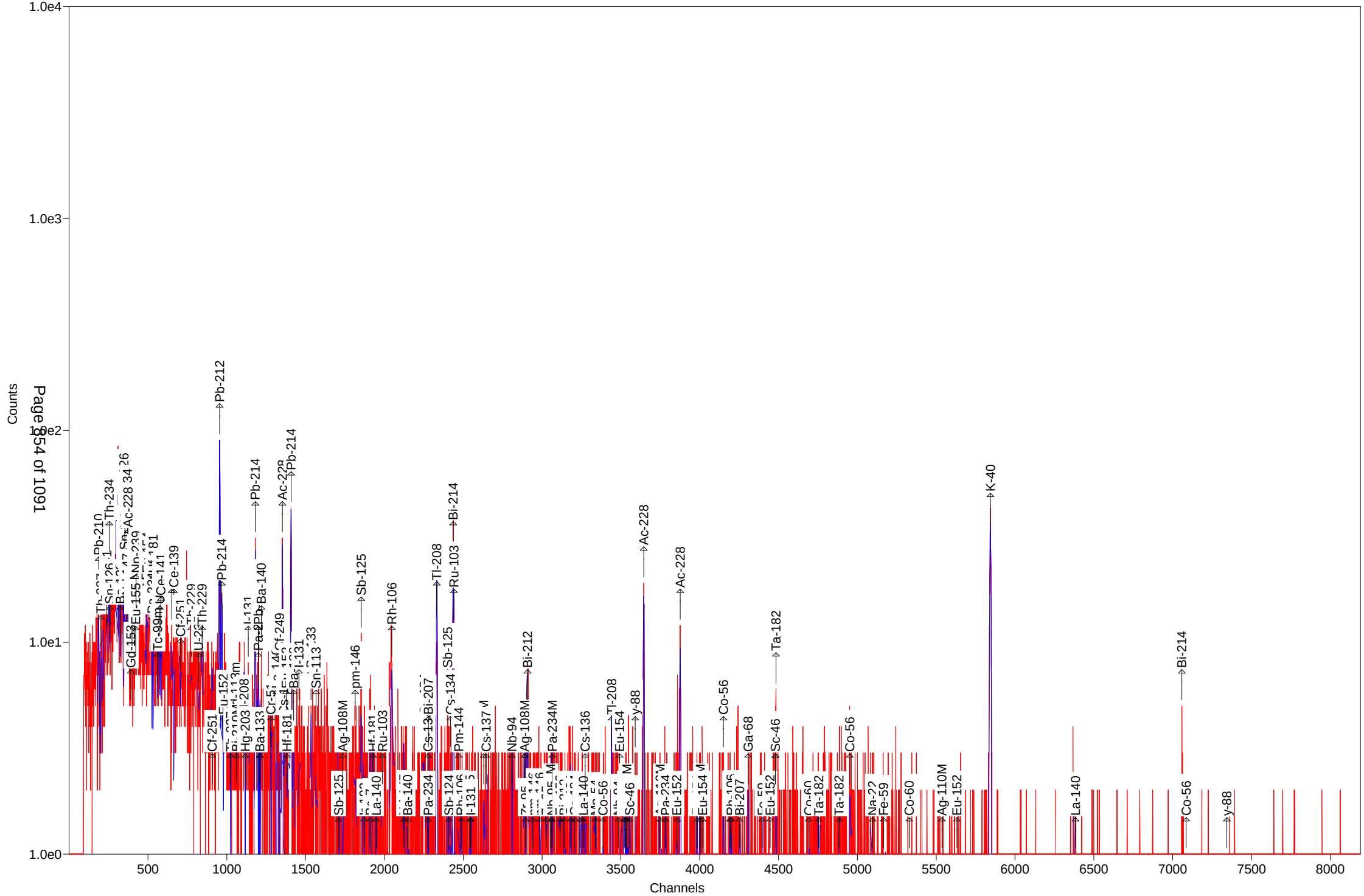
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	4.3531E+00	4.3532E+00	1.093E+02%	1.61E+01
NA-22	#A	-2.2532E-01	-2.2532E-01	2.806E+02%	2.26E+00
K-40		2.8298E+02	2.8298E+02	6.008E+00%	1.51E+01
Sc-46	#A	7.8875E-01	7.8875E-01	1.096E+02%	2.92E+00
CR-51	#A	-5.8592E+00	-5.8592E+00	7.859E+01%	2.97E+01
MN-54	#A	2.9265E-01	2.9265E-01	2.289E+02%	1.60E+00
FE-59	#A	-1.8733E+00	-1.8733E+00	5.395E+01%	4.38E+00
Co-56	#A	7.0443E-01	7.0443E-01	1.132E+02%	1.19E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.47E+00
CO-58	#A	-1.0001E+00	-1.0001E+00	8.462E+01%	2.83E+00
CO-60	#A	-6.4426E-01	-6.4426E-01	1.478E+02%	2.13E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.59E+00
NB-94	#A	9.9914E-01	9.9914E-01	5.258E+01%	1.18E+00
ZR-95	#A	-2.0866E-01	-2.0866E-01	6.451E+02%	3.26E+00
NB-95	#A	8.3146E-01	8.3147E-01	7.510E+01%	2.08E+00
RU-103	#A	1.9531E-01	1.9531E-01	2.916E+02%	1.40E+00
RH-106	#A	6.4157E+00	6.4157E+00	9.559E+01%	1.12E+01
AG-108M	#A	-3.9511E-02	-3.9511E-02	2.203E+02%	1.27E+00
AG-110M	#A	1.4762E-01	1.4762E-01	1.336E+02%	4.50E+00
SN-113	#A	-7.3128E-02	-7.3128E-02	9.633E+02%	2.72E+00
SB-124	#A	8.4391E-02	8.4391E-02	8.201E+01%	3.94E+00
SB-125	#A	-4.7837E-03	-4.7837E-03	6.103E+01%	4.46E+00
I-131	#A	5.2796E-01	5.2799E-01	1.001E+02%	1.33E+00
Gd-153	#A	-4.8019E-01	-4.8019E-01	5.968E+02%	9.56E+00
Ga-68	#	3.8758E+01	3.9056E+01	2.572E+01%	1.90E+01
Tc-99m	#A	-5.4073E-01	-5.4151E-01	1.481E+02%	2.67E+00
BA-133	#A	5.7878E-01	5.7878E-01	1.960E+02%	3.82E+00
CS-134	#A	4.1300E-01	4.1300E-01	8.331E+01%	3.89E+00
CS-137	#A	-8.6943E-01	-8.6943E-01	9.210E+01%	2.27E+00
CE-139	#A	-5.0429E-01	-5.0429E-01	9.758E+01%	1.64E+00
Ba-140	#A	4.8582E-01	4.8583E-01	1.688E+02%	4.74E+00
La-140	#A	-1.5602E+00	-1.5603E+00	1.320E+02%	2.98E+00
CE-141	#A	-9.8069E-01	-9.8070E-01	1.511E+02%	4.93E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.88E+01

PM-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.67E+00
EU-152 #A	3.6794E-01	3.6794E-01	6.138E+02%	1.01E+01
EU-154 #A	1.1410E+00	1.1410E+00	8.219E+01%	1.59E+01
EU-155 #A	1.7589E+00	1.7589E+00	1.056E+02%	6.20E+00
HF-181 #A	6.0170E-01	6.0171E-01	1.110E+02%	2.26E+00
Ta-182 #A	2.3488E+00	2.3488E+00	8.925E+01%	7.08E+00
Hg-203 #A	-6.0716E-01	-6.0717E-01	8.931E+01%	1.81E+00
TL-208	6.6309E+00	6.6309E+00	1.050E+01%	1.01E+00
pm-146 #A	-9.4144E-01	-9.4144E-01	2.262E+02%	5.16E+00
y-88 #A	1.6671E-01	1.6671E-01	4.669E+01%	1.88E+00
Cd-113m#B	-2.5687E+02	-2.5688E+02	2.121E+03%	1.90E+04
Cd-109 #A	-1.3118E+01	-1.3118E+01	1.713E+02%	7.47E+01
Cf-251 #A	-1.3447E+00	-1.3447E+00	1.862E+02%	6.44E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.60E+00
Sn-126 A	5.1602E+00	5.1602E+00	1.191E+02%	2.05E+01
PB-210 #	4.2085E+01	4.2085E+01	3.231E+01%	3.22E+01
PB-212	2.0355E+01	2.0355E+01	5.538E+00%	1.82E+00
PB-214	1.6271E+01	1.6271E+01	8.783E+00%	2.98E+00
BI-207 #A	9.5218E-02	9.5218E-02	7.960E+01%	1.87E+00
BI-212 #A	9.5588E+00	9.5588E+00	9.791E+01%	3.15E+01
BI-214	1.6524E+01	1.6524E+01	8.307E+00%	1.67E+00
BI-210M#A	4.9623E-01	4.9623E-01	1.594E+02%	1.97E+00
AC-228	2.5392E+01	2.5392E+01	8.952E+00%	3.03E+00
TH-227 #A	-7.6806E+00	-7.6806E+00	1.343E+02%	3.45E+01
TH-229 #A	6.0481E+00	6.0481E+00	1.087E+02%	2.43E+01
TH-234 A	2.6379E+01	2.6379E+01	4.328E+01%	3.01E+01
PA-231 #A	-1.8234E+01	-1.8234E+01	1.489E+02%	9.09E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.80E+00
PA-234 #A	-1.5911E-02	-1.5911E-02	1.183E+02%	1.11E+01
PA-234M#A	8.4706E+01	8.4706E+01	9.303E+01%	2.67E+02
U-235 #A	-4.3547E+00	-4.3547E+00	6.714E+01%	2.16E+01
AM-241 #A	4.8059E-01	4.8059E-01	3.521E+02%	5.70E+00
Np-237 #A	-3.5010E+00	-3.5010E+00	1.816E+02%	2.12E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%	3.26E+00
Cs-136 #A	-1.1539E-01	-1.1539E-01	9.631E+01%	3.25E+00
Np-239 #A	1.6719E+00	1.6721E+00	1.056E+02%	5.89E+00
Nd-147 #A	3.8841E+00	3.8842E+00	9.372E+01%	8.76E+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)     4.366E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.5 keV) 4.3661179E+02  Bq/Sample
```

264540_Gamma_160-18553-A-19-B. 15_Gamma_20161070.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20162255

Sample Description: 264540_Gamma_160-18553-A-20-B
Detector: Detector #14
Batch ID: 264540
Work Order Number: Gamma
Lot Number: 160-18553-A-20-B

Decay to Time: 9/1/2016 16:49 Live Time: 1800 sec
Acquisition Time: 9/1/2016 16:51:04 Real Time: 1807 sec
Analysis Time: 9/1/2016 17:21 Dead Time: 0.39 %
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	-2.687E+00	144.1	3.872E+00	3.874E+00	1.324E+01
NA-22	2.166E-01	197.2	4.271E-01	4.272E-01	1.541E+00
K-40	3.323E+02	4.8	1.605E+01	2.338E+01	9.895E+00
Sc-46	-8.613E-01	99.4	8.557E-01	8.568E-01	2.875E+00
CR-51	-5.188E-01	718.7	3.729E+00	3.729E+00	1.288E+01
MN-54	-4.850E-01	126.4	6.131E-01	6.136E-01	1.846E+00
FE-59	3.501E-01	145.1	5.078E-01	5.081E-01	2.668E+00
Co-56	1.516E-01	118.6	1.797E-01	1.799E-01	1.431E+00
CO-57	9.573E-02	373.5	3.575E-01	3.576E-01	1.211E+00
CO-58	-8.591E-01	69.9	6.005E-01	6.021E-01	2.525E+00
CO-60	4.355E-01	101.5	4.420E-01	4.426E-01	1.059E+00
ZN-65	0.000E+00	1.#INF	4.427E-01	4.427E-01	6.089E+00
NB-94	-1.761E-01	299.7	5.279E-01	5.280E-01	1.371E+00
ZR-95	-6.925E-01	163.2	1.130E+00	1.131E+00	2.754E+00
NB-95	2.519E-01	226.4	5.702E-01	5.703E-01	1.972E+00
RU-103	1.852E-01	239.2	4.428E-01	4.429E-01	1.136E+00
RH-106	3.910E+00	111.6	4.363E+00	4.367E+00	1.298E+01
AG-108M	2.680E-01	121.7	3.263E-01	3.265E-01	9.337E-01
AG-110M	1.181E+00	27.7	3.277E-01	3.332E-01	3.673E+00
SN-113	-8.278E-02	914.1	7.567E-01	7.567E-01	2.604E+00
SB-124	-5.378E-01	186.9	1.005E+00	1.006E+00	3.386E+00
SB-125	1.197E+00	100.4	1.201E+00	1.203E+00	3.395E+00
I-131	3.380E-01	141.1	4.771E-01	4.774E-01	1.213E+00
Gd-153	-5.541E-01	193.5	1.072E+00	1.073E+00	3.613E+00
Ga-68	6.779E+00	332.8	2.256E+01	2.256E+01	5.321E+01
Tc-99m	3.248E-01	130.7	4.245E-01	4.249E-01	1.421E+00
BA-133	-6.146E-01	171.5	1.054E+00	1.054E+00	3.545E+00
CS-134	2.879E-01	103.9	2.992E-01	2.996E-01	3.336E+00
CS-137	1.489E-01	384.4	5.726E-01	5.726E-01	2.000E+00
CE-139	-4.248E-01	116.7	4.959E-01	4.975E-01	1.657E+00
Ba-140	2.937E-01	623.2	1.830E+00	1.830E+00	4.725E+00
La-140	3.607E-01	54.9	1.979E-01	1.989E-01	1.703E+00
CE-141	-6.290E-01	130.8	8.226E-01	8.232E-01	2.751E+00

CE-144	-1.152E+00	300.2	3.458E+00	3.458E+00	1.165E+01
PM-144	3.297E-01	156.7	5.167E-01	5.169E-01	1.269E+00
EU-152	1.566E+00	133.2	2.086E+00	2.088E+00	7.050E+00
EU-154	4.334E+00	77.6	3.364E+00	3.371E+00	1.440E+01
EU-155	-3.420E-02	3762.5	1.287E+00	1.287E+00	5.382E+00
HF-181	-4.944E-01	97.5	4.823E-01	4.830E-01	2.259E+00
Ta-182	1.608E+00	147.8	2.376E+00	2.378E+00	8.419E+00
Hg-203	-5.009E-01	105.0	5.259E-01	5.267E-01	1.762E+00
TL-208	7.669E+00	9.5	7.289E-01	8.304E-01	1.028E+00
pm-146	-1.951E-01	261.7	5.104E-01	5.105E-01	4.137E+00
y-88	-9.735E-01	72.1	7.017E-01	7.034E-01	2.096E+00
Cd-113m	-3.242E+03	178.8	5.796E+03	5.799E+03	1.971E+04
Cd-109	8.592E+00	161.5	1.388E+01	1.389E+01	4.633E+01
Cf-251	-1.995E+00	108.0	2.155E+00	2.162E+00	5.774E+00
Cf-249	7.476E-01	93.6	6.997E-01	7.007E-01	2.264E+00
Sn-126	-4.643E+00	109.0	5.060E+00	5.066E+00	1.688E+01
PB-210	2.125E+01	57.8	1.228E+01	1.234E+01	3.468E+01
PB-212	1.932E+01	5.7	1.106E+00	1.669E+00	2.133E+00
PB-214	1.398E+01	7.6	1.067E+00	1.291E+00	2.069E+00
BI-207	-1.024E-01	347.8	3.560E-01	3.561E-01	1.259E+00
BI-212	3.186E+01	20.2	6.441E+00	6.650E+00	1.152E+01
BI-214	1.291E+01	9.1	1.170E+00	1.348E+00	1.604E+00
BI-210M	6.388E-01	103.7	6.626E-01	6.637E-01	2.227E+00
AC-228	2.260E+01	8.3	1.867E+00	2.194E+00	2.345E+00
TH-227	1.061E+00	561.7	5.959E+00	5.960E+00	1.720E+01
TH-229	6.346E+00	114.1	7.239E+00	7.257E+00	1.955E+01
TH-234	1.955E+01	39.5	7.728E+00	7.795E+00	2.458E+01
PA-231	-1.467E+01	140.9	2.068E+01	2.069E+01	6.935E+01
PA-233	1.146E+00	148.7	1.704E+00	1.706E+00	5.720E+00
PA-234	1.188E+00	84.2	1.001E+00	1.003E+00	7.651E+00
PA-234M	2.738E+01	152.3	4.170E+01	4.172E+01	2.540E+02
U-235	2.567E+00	129.9	3.334E+00	3.337E+00	1.165E+01
AM-241	-1.349E+00	111.9	1.509E+00	1.511E+00	4.252E+00
Np-237	4.108E+00	91.6	3.763E+00	3.770E+00	1.249E+01
Ir-192	7.835E-02	253.1	1.983E-01	1.983E-01	1.337E+00
Cs-136	3.864E-01	206.0	7.960E-01	7.963E-01	2.718E+00
Np-239	8.335E-01	163.1	1.359E+00	1.360E+00	4.573E+00
Nd-147	-2.729E+00	139.3	3.801E+00	3.805E+00	9.551E+00
Total	5.612E+02				

Analyst: Mike Aldridge

Sample description
264540_Gamma_160-18553-A-20-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20162255.An1

Acquisition information
Start time: 9/1/2016 4:51:04 PM
Live time: 1800
Real time: 1807
Dead time: 0.39 %
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 4:49:00 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. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1715

***** 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	35.	57.78	0.75	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	4.	561.73	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
63.46	65.	29.70	0.63	3.290E-02	63.29	3.810	PBC<MDA	TH234
74.88	176.	13.51	0.78	3.815E-02				
77.29	308.	8.50	0.78	3.901E-02				
87.26	103.	21.72	0.72	4.180E-02	86.49	13.100	1.046E+01	Np237
					86.54	30.700	4.462E+00	EU155
					86.94	9.040	1.512E+01	Sn126
					87.57	37.500	3.633E+00	Sn126
88.06	25.	161.55	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
91.10	25.	160.48	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.51	16.	136.01	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.27	24.	157.74	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
99.50	19.	96.76	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
106.13	15.	163.07	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
122.06	6.	373.46	0.83	4.378E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
129.05	35.	41.16	0.49	4.323E-02				
136.30	10.	312.81	0.84	4.245E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.205E+00	CO57
140.31	21.	130.68	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	13.	218.79	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	17.	114.07	0.90	3.443E-02	193.51	4.400	PBC<MDA	TH229
205.33	14.	140.09	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
238.29	457.	5.87	0.98	2.935E-02	238.63	43.300	1.960E+01	PB212
241.69	18.	208.73	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	17.	212.60	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
265.83	16.	103.73	0.97	2.697E-02	265.83	50.000	PBC<MDA	BI210M
277.46	41.	31.19	0.94	2.610E-02	277.28	6.310	1.383E+01	TL208
284.30	11.	141.14	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.71	141.	11.58	0.92	2.489E-02	295.09	19.300	1.587E+01	PB214
299.81	38.	26.92	1.41	2.455E-02	300.03	3.280	2.622E+01	PB212
					300.07	2.460	3.496E+01	PA231
					300.18	6.200	1.388E+01	PA233
312.01	18.	148.72	1.02	2.381E-02	312.01	36.000	PBC<MDA	PA233
328.76	27.	54.87	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	10.	142.30	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
337.89	88.	17.55	0.93	2.237E-02	338.32	12.010	1.828E+01	AC228
351.49	198.	9.00	1.25	2.169E-02	351.93	37.600	1.301E+01	PB214
364.48	2.	723.34	1.07	2.109E-02	364.48	81.700	PBC<MDA	I131
383.84	13.	115.60	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	13.	121.61	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
427.88	2.	624.50	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
433.94	9.	121.75	1.13	1.838E-02	433.94	90.480	PBC<MDA	AG108M
463.37	13.	100.36	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	253.08	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
497.05	5.	239.17	1.19	1.650E-02	497.05	90.900	PBC<MDA	RU103
510.15	105.	16.37	1.51	1.617E-02	511.86	20.000	1.789E+01	RH106
537.26	2.	623.16	1.23	1.551E-02	537.26	24.390	PBC<MDA	Ba140
563.24	11.	103.93	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.47	5.	185.99	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.135E+00	PA234
					569.70	97.740	1.792E-01	BI207
583.01	170.	9.50	1.41	1.453E-02	583.02	84.500	7.669E+00	TL208
609.11	150.	9.06	1.01	1.403E-02	609.31	46.090	1.291E+01	BI214
					610.30	5.750	1.036E+02	RU103
614.28	6.	403.72	1.30	1.394E-02	614.28	89.850	PBC<MDA	AG108M
657.76	9.	109.43	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
661.66	3.	384.42	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
696.54	7.	156.72	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
727.17	53.	20.22	1.38	1.217E-02	727.17	7.550	3.186E+01	BI212
735.72	2.	519.22	1.41	1.206E-02	735.72	22.500	PBC<MDA	pm146
765.79	5.	226.39	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.554E+01	PA234M
766.41	8.	152.32	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.215E+02	PA234M
778.92	7.	133.23	1.44	1.151E-02	778.92	12.940	PBC<MDA	EU152
785.70	24.	33.80	1.23	1.144E-02	785.42	1.280	8.919E+01	BI212
795.87	3.	507.60	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
818.50	8.	206.00	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.60	11.	92.40	1.51	1.062E-02	860.56	12.420	PBC<MDA	TL208
873.23	8.	116.96	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
884.68	14.	104.99	1.53	1.038E-02	884.68	72.680	PBC<MDA	AG110M
910.88	111.	10.45	1.68	1.014E-02	911.07	29.000	2.091E+01	AC228
937.49	9.	89.72	1.58	9.905E-03	937.49	34.360	PBC<MDA	AG110M
946.02	10.	93.99	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
968.84	77.	12.79	1.73	9.642E-03	968.97	17.460	2.541E+01	AC228
996.33	9.	102.02	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1050.36	7.	111.57	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	3.	332.78	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	4.	299.38	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152
1120.38	56.	16.30	1.65	8.562E-03	1120.29	15.100	2.392E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.26	8.	156.55	1.72	8.556E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.573E+00	Ta182
1189.05	4.	250.83	1.77	8.153E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	9.	155.37	1.80	7.886E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	3.	197.20	1.83	7.700E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	6.151E-01	EU154
1291.60	7.	145.07	1.84	7.616E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	6.	101.50	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	13.	27.74	1.91	7.192E-03	1384.30	24.290	4.134E+00	AG110M
1408.00	5.	121.64	1.92	7.092E-03	1408.00	21.005	PBC<MDA	EU152
1460.85	439.	4.83	1.28	6.879E-03	1460.83	10.670	3.323E+02	K40
1764.47	38.	16.22	2.14	5.878E-03	1764.49	15.400	2.332E+01	BI214
1836.06	2.	304.14	2.19	5.686E-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
298.92	74.87	195.	176.	4.624E+03	13.51	0.777	- sD
308.54	77.27	189.	308.	7.895E+03	8.50	0.780	- D
515.54	129.05	69.	35.	8.096E+02	41.16	0.495	- s
2039.73	510.15	28.	105.	6.474E+03	16.37	1.507	- 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	185.58	46.54	139.	35.	0.020	57.78	0.750s
TH-227	199.98	50.14	153.	4.	0.002	561.73	0.751s
AM-241	237.55	59.54	306.	-27.	-0.015	111.87	0.761s
TH-234	252.55	63.29	127.	44.	0.024	39.52	0.765D
Sn-126	256.52	64.28	420.	-27.	-0.015	108.98	0.766s
BA-133	323.33	80.99	259.	-26.	-0.015	90.31	0.784s
Np-237	345.33	86.49	662.	40.	0.022	91.60	0.789
EU-155	345.54	86.54	523.	-28.	-0.016	116.02	0.790s
Sn-126	347.13	86.94	174.	59.	0.033	34.27	0.790D
Sn-126	349.65	87.57	546.	-31.	-0.017	109.52	0.791s
Cd-109	351.53	88.04	777.	25.	0.014	161.55	0.791A
Nd-147	363.77	91.10	783.	25.	0.014	160.48	0.794s
TH-234	369.72	92.59	222.	16.	0.009	136.01	0.796D
AC-228	372.76	93.35	713.	24.	0.013	157.74	0.797s
Gd-153	389.36	97.50	310.	-13.	-0.007	193.53	0.801s
Np-239	397.36	99.50	156.	19.	0.010	96.76	0.803
Np-239	414.15	103.70	354.	0.	0.000	1000.00	0.807
Np-239	423.87	106.13	292.	15.	0.008	163.07	0.810s
EU-152	486.43	121.78	300.	-24.	-0.013	90.20	0.826s
CO-57	487.58	122.06	287.	6.	0.004	373.46	0.826s
EU-154	491.73	123.10	281.	0.	0.000	1000.00	0.828s
PA-234	524.50	131.29	497.	-22.	-0.012	142.86	0.836s
HF-181	531.42	133.02	475.	-9.	-0.005	349.96	0.838s
CE-144	533.47	133.54	431.	-10.	-0.005	300.22	0.838s
HF-181	544.52	136.30	468.	10.	0.005	312.81	0.841s
Tc-99m	561.35	140.51	373.	21.	0.012	130.68	0.845s
U-235	574.45	143.79	395.	13.	0.007	218.79	0.849
CE-141	581.07	145.44	422.	-23.	-0.013	130.76	0.850s
Ba-140	649.93	162.66	294.	-11.	-0.006	250.38	0.868s
U-235	652.81	163.38	321.	-24.	-0.013	119.60	0.869s
CE-139	662.70	165.85	369.	-24.	-0.013	116.74	0.871s
Cf-251	705.68	176.60	180.	-23.	-0.013	108.01	0.882s
TH-229	773.30	193.51	118.	17.	0.010	114.07	0.899s
U-235	820.58	205.33	117.	14.	0.008	140.09	0.912s
TH-229	842.65	210.85	193.	-24.	-0.013	103.92	0.917s
Cf-251	907.23	227.00	137.	-10.	-0.005	217.60	0.933s
PB-212	953.75	238.63	98.	441.	0.245	5.72	0.945D
PB-214	967.21	242.00	677.	18.	0.010	208.73	0.948s
EU-152	977.99	244.69	683.	17.	0.010	212.60	0.951s
TH-227	1024.17	256.24	77.	-2.	-0.001	938.08	0.962
Cd-113m	1054.01	263.70	140.	-10.	-0.005	178.79	0.970s
BI-210M	1062.53	265.83	121.	16.	0.009	103.73	0.972s
TL-208	1109.03	277.46	35.	41.	0.023	31.19	0.936s
Hg-203	1115.99	279.20	191.	-19.	-0.011	104.98	0.985s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.39	284.30	70.	11.	0.006	141.14	0.990s
PB-214	1178.01	294.71	41.	137.	0.076	12.00	0.921s
PB-212	1198.41	299.81	25.	38.	0.021	26.92	1.405s
PA-231	1199.46	300.07	369.	-18.	-0.010	148.75	1.006s
PA-233	1199.90	300.18	351.	-19.	-0.010	145.03	1.006s
PA-231	1209.78	302.65	332.	-19.	-0.010	140.92	1.008s
BA-133	1210.59	302.85	349.	-19.	-0.010	144.26	1.009s
Ba-140	1218.57	304.85	367.	-9.	-0.005	295.55	1.011s
BI-210M	1218.76	304.90	377.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	377.	0.	0.000	1000.00	1.014
PA-233	1247.22	312.01	337.	18.	0.010	148.72	1.018s
Ir-192	1265.13	316.49	100.	-3.	-0.002	474.93	1.022s
CR-51	1279.51	320.08	120.	-2.	-0.001	718.73	1.026s
La-140	1314.21	328.76	55.	27.	0.015	54.87	1.034
Cf-249	1332.92	333.44	55.	10.	0.006	142.30	1.039
AC-228	1350.73	337.89	40.	88.	0.049	17.55	0.927
Cs-136	1361.44	340.57	250.	-15.	-0.009	148.15	1.045s
EU-152	1376.30	344.29	235.	0.	0.000	1000.00	1.049s
HF-181	1382.47	345.83	235.	0.	0.000	1000.00	1.050s
PB-214	1405.10	351.49	35.	191.	0.106	9.44	1.251s
BA-133	1423.15	356.00	312.	-15.	-0.008	171.46	1.060s
I-131	1457.08	364.48	56.	2.	0.001	723.34	1.069
BA-133	1534.50	383.84	108.	13.	0.007	115.60	1.087
Cf-249	1550.94	387.95	121.	13.	0.007	121.61	1.091s
SN-113	1565.90	391.69	150.	-2.	-0.001	914.07	1.095s
SB-125	1710.63	427.88	44.	2.	0.001	624.50	1.129s
AG-108M	1734.87	433.94	29.	9.	0.005	121.75	1.135
pm-146	1814.64	453.88	65.	-11.	-0.006	127.72	1.154s
SB-125	1852.59	463.37	81.	13.	0.007	100.36	1.163s
Ir-192	1871.36	468.06	97.	6.	0.003	253.08	1.167s
BE-7	1909.50	477.60	74.	-9.	-0.005	144.12	1.176s
HF-181	1927.10	482.00	128.	-17.	-0.009	97.55	1.180s
La-140	1947.19	487.02	60.	-9.	-0.005	171.77	1.185s
RU-103	1987.33	497.05	36.	5.	0.003	239.17	1.194s
Nd-147	2123.11	531.00	48.	-10.	-0.006	139.28	1.225
Ba-140	2148.15	537.26	40.	2.	0.001	623.16	1.231s
CS-134	2252.06	563.24	33.	11.	0.006	103.93	1.255s
CS-134	2276.40	569.32	36.	-2.	-0.001	430.12	1.260
PA-234	2276.99	569.47	35.	5.	0.003	185.99	1.261
BI-207	2277.92	569.70	42.	-3.	-0.001	347.76	1.261
TL-208	2331.14	583.01	18.	170.	0.094	9.50	1.407
SB-125	2401.12	600.50	323.	-13.	-0.007	191.17	1.289s
SB-124	2410.04	602.73	310.	-13.	-0.007	186.95	1.291s
BI-214	2435.55	609.11	12.	150.	0.083	9.06	1.015
RU-103	2440.31	610.30	237.	11.	0.006	199.51	1.297s
AG-108M	2456.25	614.28	248.	6.	0.003	403.72	1.301s
SB-125	2542.69	635.89	43.	-4.	-0.002	220.14	1.320s
I-131	2547.03	636.97	64.	-7.	-0.004	174.50	1.321s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	2630.18	657.76	44.	9.	0.005	109.43	1.339s
CS-137	2645.77	661.66	65.	3.	0.002	384.42	1.343s
PM-144	2785.32	696.54	31.	7.	0.004	156.72	1.374s
NB-94	2809.67	702.63	35.	-4.	-0.002	299.72	1.379s
SB-124	2890.31	722.79	107.	-12.	-0.006	128.57	1.396s
AG-108M	2890.91	722.94	95.	0.	0.000	1000.00	1.397s
EU-154	2892.59	723.36	95.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	95.	0.	0.000	1000.00	1.398s
BI-212	2907.83	727.17	12.	53.	0.029	20.22	1.383s
pm-146	2942.05	735.72	35.	2.	0.001	519.22	1.408s
pm-146	2987.81	747.16	35.	-5.	-0.003	261.67	1.417s
ZR-95	3026.09	756.73	39.	-8.	-0.004	163.22	1.426s
AG-110M	3054.96	763.94	50.	-8.	-0.004	137.60	1.432s
NB-95	3062.34	765.79	69.	5.	0.003	226.39	1.433
PA-234M	3064.83	766.41	62.	8.	0.004	152.32	1.434
EU-152	3114.87	778.92	17.	7.	0.004	133.23	1.444s
BI-212	3141.98	785.70	10.	24.	0.013	33.80	1.230
CS-134	3182.67	795.87	43.	3.	0.001	507.60	1.459s
CS-134	3207.01	801.95	61.	-18.	-0.010	93.00	1.464
CO-58	3242.31	810.77	105.	-17.	-0.010	69.90	1.471
La-140	3262.30	815.77	110.	-16.	-0.009	94.85	1.475s
Cs-136	3273.22	818.50	122.	8.	0.004	206.00	1.478s
MN-54	3338.63	834.85	52.	-10.	-0.005	126.41	1.492s
Co-56	3386.32	846.77	29.	-7.	-0.004	179.17	1.501s
TL-208	3441.51	860.56	19.	11.	0.006	92.40	1.513s
NB-94	3483.65	871.10	37.	-7.	-0.004	123.48	1.522s
EU-154	3492.19	873.23	43.	8.	0.005	116.96	1.523s
PA-234	3521.39	880.53	132.	-19.	-0.011	87.82	1.529s
PA-234	3532.24	883.24	151.	-19.	-0.011	93.44	1.531s
AG-110M	3538.01	884.68	103.	14.	0.008	104.99	1.533s
Sc-46	3556.40	889.28	119.	-16.	-0.009	99.36	1.536s
y-88	3591.45	898.04	52.	-17.	-0.009	72.07	1.543s
AC-228	3642.83	910.88	4.	111.	0.061	10.45	1.680s
AG-110M	3749.30	937.49	14.	9.	0.005	89.72	1.576s
PA-234	3783.42	946.02	19.	10.	0.006	93.99	1.582
EU-152	3855.80	964.11	126.	-3.	-0.002	532.29	1.597s
AC-228	3874.74	968.84	4.	77.	0.043	12.79	1.727
EU-154	3984.71	996.33	41.	9.	0.005	102.02	1.622s
EU-154	4018.51	1004.77	40.	-13.	-0.007	110.49	1.629s
Co-56	4150.81	1037.84	45.	-11.	-0.006	107.09	1.655s
Cs-136	4191.74	1048.07	35.	-1.	-0.001	842.61	1.663s
RH-106	4200.91	1050.36	27.	7.	0.004	111.57	1.665
BI-207	4254.12	1063.66	35.	-11.	-0.006	110.10	1.675
Ga-68	4309.10	1077.40	20.	3.	0.002	332.78	1.685s
FE-59	4396.54	1099.25	20.	-3.	-0.002	397.81	1.702s
EU-152	4447.85	1112.07	88.	4.	0.002	299.38	1.712s
ZN-65	4461.74	1115.55	93.	0.	0.000	1000.00	1.714
BI-214	4481.07	1120.38	5.	56.	0.031	16.30	1.646

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	4481.77	1120.55	93.	0.	0.000	1000.00	1.718
Ta-182	4484.77	1121.30	83.	8.	0.005	156.55	1.719
CO-60	4692.60	1173.24	51.	-20.	-0.011	45.57	1.757s
Ta-182	4755.88	1189.05	20.	4.	0.002	250.83	1.769
Ta-182	4885.38	1221.41	38.	-10.	-0.005	94.15	1.792
Co-56	4952.89	1238.28	32.	9.	0.005	155.37	1.805s
NA-22	5097.96	1274.53	16.	3.	0.002	197.20	1.831s
EU-154	5098.01	1274.54	19.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	22.	7.	0.004	145.07	1.843s
CO-60	5329.96	1332.50	6.	6.	0.003	101.50	1.871s
AG-110M	5537.26	1384.30	0.	13.	0.007	27.74	1.907s
EU-152	5632.13	1408.00	5.	5.	0.003	121.64	1.923s
K-40	5843.64	1460.85	5.	439.	0.244	4.83	1.284s
La-140	6385.44	1596.21	12.	-3.	-0.002	772.40	2.044s
SB-124	6764.81	1690.98	0.	0.	0.000	1000.00	2.102s
BI-214	7059.07	1764.49	0.	38.	0.021	16.22	2.145s
Co-56	7086.53	1771.35	38.	0.	0.000	1000.00	2.149s
y-88	7345.59	1836.06	6.	2.	0.001	304.14	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	-2.6865E+00				5.31E+01	
			477.60	-2.687E+00	(	1.324E+01 1.44E+02 1.05E+01	G
NA-22	C	2.1657E-01				9.50E+02	
			1274.53	2.166E-01	?(	1.541E+00 1.97E+02 9.99E+01	G
K-40	N	3.3233E+02				4.66E+11	
			1460.83	3.323E+02	(P	9.895E+00 4.83E+00 1.07E+01	G
Sc-46	F	-8.6126E-01				8.38E+01	
			889.28	-8.613E-01	&(	2.875E+00 9.94E+01 1.00E+02	G
			1120.55	0.000E+00	+	3.093E+00 1.00E+03 1.00E+02	G
CR-51	F	-5.1882E-01				2.77E+01	
			320.08	-5.188E-01	?(	1.288E+01 7.19E+02 9.94E+00	G
MN-54	C	-4.8500E-01				3.12E+02	
			834.85	-4.850E-01	?(P	1.846E+00 1.26E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	3.5007E-01					4.45E+01	
			1099.25	-3.499E-01	?(P	2.668E+00	3.98E+02	5.65E+01 G
			1291.60	1.266E+00	?(P	4.107E+00	1.45E+02	4.32E+01 G
Co-56	C	1.5156E-01					7.73E+01	
			846.77	-3.485E-01	?(P	1.431E+00	1.79E+02	9.99E+01 G
			1238.28	9.079E-01	?(P	3.121E+00	1.55E+02	6.61E+01 G
			1037.84	-4.939E+00	+ P	1.472E+01	1.07E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.925E+01	1.00E+03	1.55E+01 A
CO-57	C	9.5730E-02					2.72E+02	
			122.06	9.573E-02	?(P	1.211E+00	3.73E+02	8.56E+01 G
			136.47	8.768E-08	%	1.266E+01	4.27E+09	1.07E+01 G
CO-58	C	-8.5907E-01					7.09E+01	
			810.78	-8.591E-01	&(P	2.525E+00	6.99E+01	9.95E+01 G
CO-60	F	4.3548E-01					1.93E+03	
			1332.50	4.355E-01	?(P	1.059E+00	1.02E+02	1.00E+02 G
			1173.24	-1.359E+00	+ P	2.424E+00	4.56E+01	9.99E+01 G
NB-94	I	-1.7613E-01					7.41E+06	
			702.63	-1.761E-01	?(P	1.371E+00	3.00E+02	9.79E+01 G
			871.10	-3.879E-01	&	1.649E+00	1.23E+02	9.99E+01 G
ZR-95	I	-6.9246E-01					6.40E+01	
			756.73	-6.925E-01	?(	2.754E+00	1.63E+02	5.45E+01 G
			724.20	0.000E+00	&	4.960E+00	1.00E+03	4.42E+01 G
NB-95	I	2.5186E-01					6.40E+01	
			765.79	2.519E-01	?(P	1.972E+00	2.26E+02	9.98E+01 G
RU-103	I	1.8515E-01					3.93E+01	
			497.05	1.852E-01	(	1.136E+00	2.39E+02	9.09E+01 G
			610.30	7.618E+00	?	5.138E+01	2.00E+02	5.75E+00 GA
RH-106	I	3.9101E+00					3.74E+02	
			621.92	1.859E-01	%(P	1.298E+01	2.80E+03	9.93E+00 G
			1050.36	2.762E+01	?(	1.062E+02	1.12E+02	1.56E+00 G
			511.86	-1.716E-01	% P	1.078E+01	1.36E+03	2.00E+01 GA
AG-108M	C	2.6798E-01					1.53E+05	
			433.94	2.895E-01	&(	9.337E-01	1.22E+02	9.05E+01 G
			722.94	0.000E+00	-	2.407E+00	1.00E+03	9.08E+01 G
			614.28	2.463E-01	?(	3.378E+00	4.04E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	1.1815E+00					2.50E+02	
			884.68	1.038E+00	?(	3.673E+00	1.05E+02	7.27E+01 G
			657.76	4.004E-01	?(	1.496E+00	1.09E+02	9.46E+01 G
			937.49	1.549E+00	?(	3.289E+00	8.97E+01	3.44E+01 G
			1384.30	4.134E+00	?(	2.344E+00	2.77E+01	2.43E+01 G
			763.94	-1.599E+00	+	7.568E+00	1.38E+02	2.23E+01 G
SN-113	F	-8.2783E-02					1.15E+02	
			391.69	-8.278E-02	?(	2.604E+00	9.14E+02	6.40E+01 G
SB-124	F	-5.3776E-01					6.02E+01	
			602.73	-5.378E-01	?(	3.386E+00	1.87E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.407E+00	1.00E+03	4.78E+01 G
			722.79	-4.902E+00	+	2.136E+01	1.29E+02	1.08E+01 G
SB-125	I	1.1970E+00					1.01E+03	
			427.88	2.020E-01	?(	3.395E+00	6.24E+02	2.96E+01 G
			600.50	-2.945E+00	+	1.896E+01	1.91E+02	1.79E+01 G
			635.89	-1.570E+00	+	1.210E+01	2.20E+02	1.13E+01 G
			463.37	4.010E+00	&(P	1.357E+01	1.00E+02	1.05E+01 G
I-131	I	3.3803E-01					8.02E+00	
			364.48	6.255E-02	&(P	1.213E+00	7.23E+02	8.17E+01 G
			284.30	4.004E+00	?(P	1.471E+01	1.41E+02	6.14E+00 G
			636.97	-3.816E+00	+	2.294E+01	1.74E+02	7.17E+00 G
Gd-153	F	-5.5411E-01					2.42E+02	
			97.50	-5.541E-01	&(	3.613E+00	1.94E+02	3.00E+01 G
			103.20	-1.354E-01	&	5.225E+00	1.14E+03	2.18E+01 G
Ga-68	C	6.7789E+00					4.71E-02	
			1077.40	6.779E+00	?(	5.321E+01	3.33E+02	3.30E+00 G
Tc-99m	I	3.2483E-01					2.51E-01	
			140.51	3.248E-01	?(	1.421E+00	1.31E+02	8.93E+01 G
BA-133	F	-6.1459E-01					3.85E+03	
			356.00	-6.146E-01	?(	3.545E+00	1.71E+02	6.20E+01 G
			302.85	-2.307E+00	+	1.116E+01	1.44E+02	1.83E+01 G
			383.84	4.019E+00	?	1.570E+01	1.16E+02	8.94E+00 GA
			80.99	-1.074E+00	+ P	3.154E+00	9.03E+01	3.41E+01 GA
CS-134	I	2.8790E-01					7.54E+02	
			604.71	2.688E-03	%(	3.336E+00	3.64E+04	9.76E+01 G
			795.87	1.531E-01	?(	1.917E+00	5.08E+02	8.55E+01 G
			569.32	-4.877E-01	+	7.479E+00	4.30E+02	1.54E+01 G
			801.95	-1.043E+01	+	2.218E+01	9.30E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	5.003E+00	?(P	1.315E+01	1.04E+02	8.35E+00 G
CS-137	I	1.4894E-01					1.10E+04	
			661.66	1.489E-01	?(	2.000E+00	3.84E+02	8.52E+01 G
CE-139	F	-4.2479E-01					1.38E+02	
			165.85	-4.248E-01	?(	1.657E+00	1.17E+02	7.99E+01 G
Ba-140	I	2.9366E-01					1.28E+01	
			537.26	2.937E-01	?(	4.725E+00	6.23E+02	2.44E+01 G
			162.66	-2.628E+00	+ P	1.916E+01	2.50E+02	6.22E+00 G
			304.85	-4.930E+00	&	4.916E+01	2.96E+02	4.29E+00 G
La-140	I	3.6073E-01					1.28E+01	
			1596.21	-2.504E-01	?(P	1.703E+00	7.72E+02	9.54E+01 G
			487.02	-6.552E-01	+	2.825E+00	1.72E+02	4.55E+01 G
			328.76	3.233E+00	&(	4.462E+00	5.49E+01	2.03E+01 G
			815.77	-3.491E+00	+	1.112E+01	9.49E+01	2.33E+01 G
CE-141	I	-6.2905E-01					3.25E+01	
			145.44	-6.290E-01	?(	2.751E+00	1.31E+02	4.82E+01 G
CE-144	I	-1.1517E+00					2.85E+02	
			133.54	-1.152E+00	(	1.165E+01	3.00E+02	1.11E+01 G
PM-144	C	3.2966E-01					3.63E+02	
			696.54	3.297E-01	(P	1.269E+00	1.57E+02	9.90E+01 G
			618.06	-1.141E-02	% P	3.113E+00	4.84E+03	9.91E+01 G
EU-152	F	1.5658E+00					4.94E+03	
			344.29	0.000E+00	?(	7.050E+00	1.00E+03	2.65E+01 G
			1112.07	2.127E+00	?(	2.200E+01	2.99E+02	1.36E+01 G
			121.78	-1.067E+00	+ P	3.701E+00	9.02E+01	2.86E+01 G
			778.92	2.486E+00	?(	8.245E+00	1.33E+02	1.29E+01 G
			964.11	-1.179E+00	+	2.162E+01	5.32E+02	1.46E+01 G
			244.69	4.459E+00	?(	3.173E+01	2.13E+02	7.58E+00 G
			1408.00	1.740E+00	?	5.024E+00	1.22E+02	2.10E+01 GA
EU-154	I	4.3345E+00					3.14E+03	
			873.23	3.595E+00	?(	1.440E+01	1.17E+02	1.23E+01 G
			123.10	0.000E+00	&	2.517E+00	1.00E+03	4.08E+01 G
			1274.54	0.000E+00	-	4.720E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.082E+01	1.00E+03	2.02E+01 G
			1004.77	-4.284E+00	+	1.061E+01	1.10E+02	1.80E+01 G
			996.33	5.190E+00	?(	1.803E+01	1.02E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-3.4203E-02					1.81E+03	
			105.31	-3.420E-02	%(P	5.382E+00	3.76E+03	2.12E+01 G
			86.54	-1.228E+00	+	4.750E+00	1.16E+02	3.07E+01 G
HF-181	F	-4.9442E-01					4.24E+01	
			482.00	-6.902E-01	&(	2.259E+00	9.75E+01	8.05E+01 G
			133.02	-2.650E-01	+	3.123E+00	3.50E+02	4.33E+01 G
			345.83	0.000E+00	+	1.244E+01	1.00E+03	1.51E+01 G
			136.30	2.200E+00	?(	2.316E+01	3.13E+02	5.85E+00 G
Ta-182	F	1.6075E+00					1.14E+02	
			1121.30	1.573E+00	(	8.419E+00	1.57E+02	3.49E+01 G
			1221.41	-2.533E+00	+ P	8.093E+00	9.41E+01	2.70E+01 G
			1189.05	1.682E+00	(	9.905E+00	2.51E+02	1.62E+01 G
Hg-203	F	-5.0094E-01					4.66E+01	
			279.20	-5.009E-01	?(	1.762E+00	1.05E+02	8.15E+01 G
TL-208	N	7.6693E+00					6.98E+02	
			583.02	7.669E+00	(P	1.028E+00	9.50E+00	8.45E+01 G
			277.28	1.383E+01	+	1.021E+01	3.12E+01	6.31E+00 G
			860.56	4.432E+00	&	9.622E+00	9.24E+01	1.24E+01 G
pm-146	C	-1.9507E-01					2.02E+03	
			747.16	-6.404E-01	?(	4.137E+00	2.62E+02	3.40E+01 G
			735.72	4.779E-01	?(	6.174E+00	5.19E+02	2.25E+01 G
			453.88	-5.326E-01	+ P	1.942E+00	1.28E+02	6.50E+01 G
y-88	F	-9.7351E-01					1.07E+02	
			898.04	-9.735E-01	?(P	2.096E+00	7.21E+01	9.37E+01 G
			1836.06	1.970E-01	+	1.391E+00	3.04E+02	9.92E+01 G
Cd-113m		-3.2416E+03					5.33E+03	
			263.70	-3.242E+03	?(	1.971E+04	1.79E+02	6.00E-03 K
Cd-109	F	8.5918E+00					4.53E+02	
							Derived Ave Activity	
			88.04	8.592E+00	}(	4.633E+01	1.62E+02	3.79E+00 G
Cf-251	T	-1.9951E+00					3.28E+05	
			176.60	-1.995E+00	&(	5.774E+00	1.08E+02	1.70E+01 G
			227.00	-2.798E+00	+	1.655E+01	2.18E+02	6.30E+00 GA
Cf-249	T	7.4755E-01					1.28E+05	
			387.95	5.509E-01	(	2.264E+00	1.22E+02	6.60E+01 G
			333.44	1.584E+00	?(	5.905E+00	1.42E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-4.6433E+00					3.65E+07	
			87.57	-1.083E+00	}	3.950E+00	1.10E+02	3.75E+01 GA
			64.28	-4.643E+00	?(	1.688E+01	1.09E+02	9.70E+00 G
			86.94	8.671E+00		9.456E+00	3.43E+01	9.04E+00 GA
PB-210	N	2.1249E+01					8.14E+03	
			46.54	2.125E+01	*(P	3.468E+01	5.78E+01	4.25E+00 G
PB-212	N	1.9322E+01					6.98E+02	
			238.63	1.932E+01	(P	2.133E+00	5.72E+00	4.33E+01 G
			300.03	2.622E+01	+	1.795E+01	2.69E+01	3.28E+00 GA
PB-214	N	1.3977E+01					5.84E+05	
			351.93	1.301E+01	*(P	2.069E+00	9.44E+00	3.76E+01 G
			295.09	1.587E+01	(P	3.765E+00	1.20E+01	1.93E+01 G
			242.00	4.577E+00	&	3.197E+01	2.09E+02	7.43E+00 GA
BI-207	C	-1.0238E-01					1.18E+04	
			569.70	-1.024E-01	(	1.259E+00	3.48E+02	9.77E+01 G
			1063.66	-9.319E-01	+ P	2.533E+00	1.10E+02	7.45E+01 G
BI-212	N	3.1857E+01					6.98E+02	
			727.17	3.186E+01	(P	1.152E+01	2.02E+01	7.55E+00 G
			785.42	8.919E+01	+	6.480E+01	3.38E+01	1.28E+00 GA
BI-214	N	1.2910E+01					5.84E+05	
			609.31	1.291E+01	(P	1.604E+00	9.06E+00	4.61E+01 G
			1120.29	2.392E+01	+ P	5.788E+00	1.63E+01	1.51E+01 G
			1764.49	2.332E+01	+	4.523E+00	1.62E+01	1.54E+01 G
BI-210M	T	6.3877E-01					1.10E+09	
			265.83	6.388E-01	?(P	2.227E+00	1.04E+02	5.00E+01 G
			304.90	0.000E+00	&	7.624E+00	1.00E+03	2.80E+01 G
AC-228	N	2.2602E+01					2.10E+03	
			911.07	2.091E+01	*(	2.345E+00	1.05E+01	2.90E+01 G
			968.97	2.541E+01	(	3.970E+00	1.28E+01	1.75E+01 G
			338.32	1.828E+01	-	6.635E+00	1.76E+01	1.20E+01 G
			93.35	5.620E+00	-	2.960E+01	1.58E+02	5.56E+00 XA
TH-227	N	1.0609E+00					7.95E+03	
			50.14	1.061E+00	&(P	1.720E+01	5.62E+02	8.00E+00 G
			256.24	-4.768E-01	+	1.245E+01	9.38E+02	7.00E+00 G
TH-229	N	6.3458E+00					2.68E+06	
			193.51	6.346E+00	?(P	1.955E+01	1.14E+02	4.40E+00 G
			210.85	-1.399E+01	&	3.890E+01	1.04E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.9554E+01					1.63E+12	
			63.29	1.955E+01	(P	2.458E+01	3.95E+01	3.81E+00 G
			92.59	3.689E+00	- P	1.677E+01	1.36E+02	5.58E+00 G
PA-231	N	-1.4674E+01					1.20E+07	
			302.65	-1.467E+01	&(	6.935E+01	1.41E+02	2.88E+00 G
			300.07	-1.702E+01	+	8.489E+01	1.49E+02	2.46E+00 G
PA-233	C	1.1461E+00					7.82E+08	
			312.01	1.146E+00	?(	5.720E+00	1.49E+02	3.60E+01 G
			300.18	-6.757E+00	+	3.286E+01	1.45E+02	6.20E+00 G
PA-234	N	1.1884E+00					1.63E+12	
			131.29	-1.602E+00	(	7.651E+00	1.43E+02	1.80E+01 G
			946.02	4.357E+00	&(	9.632E+00	9.40E+01	1.34E+01 G
			569.47	2.135E+00	(	1.391E+01	1.86E+02	8.20E+00 G
			883.24	-1.069E+01	+	3.342E+01	9.34E+01	9.60E+00 G
			880.53	-1.703E+01	+	5.000E+01	8.78E+01	6.00E+00 GA
PA-234M	N	2.7377E+01					1.63E+12	
			1001.00	-5.683E+00	%(P	2.540E+02	1.52E+03	8.37E-01 G
			766.41	1.215E+02	?(	6.359E+02	1.52E+02	2.94E-01 G
U-235	N	2.5668E+00					2.57E+11	
			143.79	1.583E+00	?(P	1.165E+01	2.19E+02	1.10E+01 G
			205.33	4.718E+00	&(P	1.790E+01	1.40E+02	5.01E+00 G
			163.38	-6.768E+00	+ P	2.455E+01	1.20E+02	5.08E+00 G
AM-241	T	-1.3492E+00					1.58E+05	
			59.54	-1.349E+00	?(	4.252E+00	1.12E+02	3.59E+01 G
Np-237	F	4.1080E+00					2.14E+06	
			86.49	4.108E+00	(	1.249E+01	9.16E+01	1.31E+01 G
Ir-192	F	7.8347E-02					7.40E+01	
			316.49	-8.132E-02	(	1.337E+00	4.75E+02	8.70E+01 G
			468.06	3.469E-01	?(	3.020E+00	2.53E+02	5.18E+01 G
			308.44	0.000E+00	-	6.784E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.8639E-01					1.30E+01	
			818.50	3.864E-01	(	2.718E+00	2.06E+02	1.00E+02 G
			1048.07	-7.680E-02	-	2.325E+00	8.43E+02	8.00E+01 G
			340.57	-8.169E-01	&	4.072E+00	1.48E+02	4.69E+01 G
Np-239	T	8.3354E-01					2.36E+00	
			103.70	0.000E+00	-	4.760E+00	1.00E+03	2.40E+01 X
			106.13	8.335E-01	(	4.573E+00	1.63E+02	2.27E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                            99.50 1.596E+00 &   5.171E+00 9.68E+01 1.50E+01 X

Nd-147      -2.7292E+00                                        1.11E+01
                           531.00-2.729E+00 ?(  9.551E+00 1.39E+02 1.30E+01 G
                            91.10 1.147E+00 +   6.140E+00 1.60E+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 Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	139.	35.	0.020	57.78	2.125E+01	P
TH-227	50.14	153.	4.	0.002	561.73	1.061E+00	P
AM-241	59.54	306.	-27.	-0.015	111.87	-1.349E+00	
BA-133	80.99	259.	-26.	-0.015	90.31	-1.074E+00	P
EU-155	86.54	523.	-28.	-0.016	116.02	-1.228E+00	
Nd-147	91.10	783.	25.	0.014	160.48	1.147E+00	
Gd-153	97.50	310.	-13.	-0.007	193.53	-5.541E-01	
Np-239	99.50	156.	19.	0.010	96.76	1.596E+00	
Np-239	106.13	292.	15.	0.008	163.07	8.335E-01	
EU-152	121.78	300.	-24.	-0.013	90.20	-1.067E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	122.06	287.	6.	0.004	373.46	9.573E-02	P
PA-234	131.29	497.	-22.	-0.012	142.86	-1.602E+00	
HF-181	133.02	475.	-9.	-0.005	349.96	-2.650E-01	
CE-144	133.54	431.	-10.	-0.005	300.22	-1.152E+00	
HF-181	136.30	468.	10.	0.005	312.81	2.200E+00	
U-235	143.79	395.	13.	0.007	218.79	1.583E+00	P
CE-141	145.44	422.	-23.	-0.013	130.76	-6.290E-01	
Ba-140	162.66	294.	-11.	-0.006	250.38	-2.628E+00	P
U-235	163.38	321.	-24.	-0.013	119.60	-6.768E+00	P
CE-139	165.85	369.	-24.	-0.013	116.74	-4.248E-01	
Cf-251	176.60	180.	-23.	-0.013	108.01	-1.995E+00	
TH-229	193.51	118.	17.	0.010	114.07	6.346E+00	P
U-235	205.33	117.	14.	0.008	140.09	4.718E+00	P
TH-229	210.85	193.	-24.	-0.013	103.92	-1.399E+01	
Cf-251	227.00	137.	-10.	-0.005	217.60	-2.798E+00	
EU-152	244.69	683.	17.	0.010	212.60	4.459E+00	
TH-227	256.24	77.	-2.	-0.001	938.08	-4.768E-01	
Cd-113m	263.70	140.	-10.	-0.005	178.79	-3.242E+03	
BI-210M	265.83	121.	16.	0.009	103.73	6.388E-01	P
Hg-203	279.20	191.	-19.	-0.011	104.98	-5.009E-01	
I-131	284.30	70.	11.	0.006	141.14	4.004E+00	P
PA-231	300.07	369.	-18.	-0.010	148.75	-1.702E+01	
PA-233	300.18	351.	-19.	-0.010	145.03	-6.757E+00	
PA-231	302.65	332.	-19.	-0.010	140.92	-1.467E+01	
BA-133	302.85	349.	-19.	-0.010	144.26	-2.307E+00	
Ba-140	304.85	367.	-9.	-0.005	295.55	-4.930E+00	
PA-233	312.01	337.	18.	0.010	148.72	1.146E+00	
Ir-192	316.49	100.	-3.	-0.002	474.93	-8.132E-02	
CR-51	320.08	120.	-2.	-0.001	718.73	-5.188E-01	
La-140	328.76	55.	27.	0.015	54.87	3.233E+00	
Cf-249	333.44	55.	10.	0.006	142.30	1.584E+00	
Cs-136	340.57	250.	-15.	-0.009	148.15	-8.169E-01	
BA-133	356.00	312.	-15.	-0.008	171.46	-6.146E-01	
I-131	364.48	56.	2.	0.001	723.34	6.255E-02	P
BA-133	383.84	108.	13.	0.007	115.60	4.019E+00	
Cf-249	387.95	121.	13.	0.007	121.61	5.509E-01	
SN-113	391.69	150.	-2.	-0.001	914.07	-8.278E-02	
SB-125	427.88	44.	2.	0.001	624.50	2.020E-01	
AG-108M	433.94	29.	9.	0.005	121.75	2.895E-01	
pm-146	453.88	65.	-11.	-0.006	127.72	-5.326E-01	P
SB-125	463.37	81.	13.	0.007	100.36	4.010E+00	P
Ir-192	468.06	97.	6.	0.003	253.08	3.469E-01	
BE-7	477.60	74.	-9.	-0.005	144.12	-2.687E+00	
HF-181	482.00	128.	-17.	-0.009	97.55	-6.902E-01	
La-140	487.02	60.	-9.	-0.005	171.77	-6.552E-01	
RU-103	497.05	36.	5.	0.003	239.17	1.852E-01	
Nd-147	531.00	48.	-10.	-0.006	139.28	-2.729E+00	
Ba-140	537.26	40.	2.	0.001	623.16	2.937E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	33.	11.	0.006	103.93	5.003E+00	P
CS-134	569.32	36.	-2.	-0.001	430.12	-4.877E-01	
PA-234	569.47	35.	5.	0.003	185.99	2.135E+00	
BI-207	569.70	42.	-3.	-0.001	347.76	-1.024E-01	
SB-125	600.50	323.	-13.	-0.007	191.17	-2.945E+00	
SB-124	602.73	310.	-13.	-0.007	186.95	-5.378E-01	
RU-103	610.30	237.	11.	0.006	199.51	7.618E+00	
AG-108M	614.28	248.	6.	0.003	403.72	2.463E-01	
SB-125	635.89	43.	-4.	-0.002	220.14	-1.570E+00	
I-131	636.97	64.	-7.	-0.004	174.50	-3.816E+00	
AG-110M	657.76	44.	9.	0.005	109.43	4.004E-01	
CS-137	661.66	65.	3.	0.002	384.42	1.489E-01	
PM-144	696.54	31.	7.	0.004	156.72	3.297E-01	P
NB-94	702.63	35.	-4.	-0.002	299.72	-1.761E-01	P
SB-124	722.79	107.	-12.	-0.006	128.57	-4.902E+00	
pm-146	735.72	35.	2.	0.001	519.22	4.779E-01	
pm-146	747.16	35.	-5.	-0.003	261.67	-6.404E-01	
ZR-95	756.73	39.	-8.	-0.004	163.22	-6.925E-01	
AG-110M	763.94	50.	-8.	-0.004	137.60	-1.599E+00	
NB-95	765.79	69.	5.	0.003	226.39	2.519E-01	P
PA-234M	766.41	62.	8.	0.004	152.32	1.215E+02	
EU-152	778.92	17.	7.	0.004	133.23	2.486E+00	
CS-134	795.87	43.	3.	0.001	507.60	1.531E-01	
CS-134	801.95	61.	-18.	-0.010	93.00	-1.043E+01	
CO-58	810.77	105.	-17.	-0.010	69.90	-8.591E-01	P
La-140	815.77	110.	-16.	-0.009	94.85	-3.491E+00	
Cs-136	818.50	122.	8.	0.004	206.00	3.864E-01	
MN-54	834.85	52.	-10.	-0.005	126.41	-4.850E-01	P
Co-56	846.77	29.	-7.	-0.004	179.17	-3.485E-01	P
NB-94	871.10	37.	-7.	-0.004	123.48	-3.879E-01	
EU-154	873.23	43.	8.	0.005	116.96	3.595E+00	
PA-234	880.53	132.	-19.	-0.011	87.82	-1.703E+01	
PA-234	883.24	151.	-19.	-0.011	93.44	-1.069E+01	
AG-110M	884.68	103.	14.	0.008	104.99	1.038E+00	
Sc-46	889.28	119.	-16.	-0.009	99.36	-8.613E-01	
y-88	898.04	52.	-17.	-0.009	72.07	-9.735E-01	P
AG-110M	937.49	14.	9.	0.005	89.72	1.549E+00	
PA-234	946.02	19.	10.	0.006	93.99	4.357E+00	
EU-152	964.11	126.	-3.	-0.002	532.29	-1.179E+00	
EU-154	996.33	41.	9.	0.005	102.02	5.190E+00	
EU-154	1004.77	40.	-13.	-0.007	110.49	-4.284E+00	
Co-56	1037.84	45.	-11.	-0.006	107.09	-4.939E+00	P
Cs-136	1048.07	35.	-1.	-0.001	842.61	-7.680E-02	
RH-106	1050.36	27.	7.	0.004	111.57	2.762E+01	
BI-207	1063.66	35.	-11.	-0.006	110.10	-9.319E-01	P
Ga-68	1077.40	20.	3.	0.002	332.78	6.779E+00	
FE-59	1099.25	20.	-3.	-0.002	397.81	-3.499E-01	P
EU-152	1112.07	88.	4.	0.002	299.38	2.127E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1121.30	83.	8.	0.005	156.55	1.573E+00		
CO-60	1173.24	51.	-20.	-0.011	45.57	-1.359E+00		P
Ta-182	1189.05	20.	4.	0.002	250.83	1.682E+00		
Ta-182	1221.41	38.	-10.	-0.005	94.15	-2.533E+00		P
Co-56	1238.28	32.	9.	0.005	155.37	9.079E-01		P
NA-22	1274.53	16.	3.	0.002	197.20	2.166E-01		
FE-59	1291.60	22.	7.	0.004	145.07	1.266E+00		P
CO-60	1332.50	6.	6.	0.003	101.50	4.355E-01		P
AG-110M	1384.30	0.	13.	0.007	27.74	4.134E+00		
EU-152	1408.00	5.	5.	0.003	121.64	1.740E+00		
La-140	1596.21	12.	-3.	-0.002	772.40	-2.504E-01		P
y-88	1836.06	6.	2.	0.001	304.14	1.970E-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	-2.6865E+00	-2.6865E+00	1.441E+02%	1.32E+01
NA-22	#A	2.1657E-01	2.1657E-01	1.972E+02%	1.54E+00
K-40		3.3233E+02	3.3233E+02	4.828E+00%	9.89E+00
Sc-46	#A	-8.6125E-01	-8.6126E-01	9.936E+01%	2.87E+00
CR-51	#A	-5.1880E-01	-5.1882E-01	7.187E+02%	1.29E+01
MN-54	#A	-4.8499E-01	-4.8500E-01	1.264E+02%	1.85E+00
FE-59	#A	3.5006E-01	3.5007E-01	1.451E+02%	2.67E+00
Co-56	#A	1.5156E-01	1.5156E-01	1.186E+02%	1.43E+00
CO-57	#A	9.5730E-02	9.5730E-02	3.735E+02%	1.21E+00
CO-58	#A	-8.5906E-01	-8.5907E-01	6.990E+01%	2.53E+00
CO-60	#A	4.3548E-01	4.3548E-01	1.015E+02%	1.06E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.09E+00
NB-94	#A	-1.7613E-01	-1.7613E-01	2.997E+02%	1.37E+00
ZR-95	#A	-6.9245E-01	-6.9246E-01	1.632E+02%	2.75E+00
NB-95	#A	2.5185E-01	2.5186E-01	2.264E+02%	1.97E+00
RU-103	#A	1.8515E-01	1.8515E-01	2.392E+02%	1.14E+00
RH-106	#A	3.9101E+00	3.9101E+00	1.116E+02%	1.30E+01
AG-108M	#A	2.6798E-01	2.6798E-01	1.217E+02%	9.34E-01
AG-110M	#A	1.1815E+00	1.1815E+00	2.774E+01%	3.67E+00
SN-113	#A	-8.2782E-02	-8.2783E-02	9.141E+02%	2.60E+00
SB-124	#A	-5.3775E-01	-5.3776E-01	1.869E+02%	3.39E+00
SB-125	#A	1.1970E+00	1.1970E+00	1.004E+02%	3.40E+00
I-131	#A	3.3799E-01	3.3803E-01	1.411E+02%	1.21E+00
Gd-153	#A	-5.5411E-01	-5.5411E-01	1.935E+02%	3.61E+00
Ga-68	#A	6.6372E+00	6.7789E+00	3.328E+02%	5.32E+01
Tc-99m	#A	3.2355E-01	3.2483E-01	1.307E+02%	1.42E+00
BA-133	#A	-6.1459E-01	-6.1459E-01	1.715E+02%	3.55E+00
CS-134	#A	2.8790E-01	2.8790E-01	1.039E+02%	3.34E+00

CS-137 #A	1.4894E-01	1.4894E-01	3.844E+02%	2.00E+00
CE-139 #A	-4.2479E-01	-4.2479E-01	1.167E+02%	1.66E+00
Ba-140 #A	2.9364E-01	2.9366E-01	6.232E+02%	4.73E+00
La-140 #A	3.6070E-01	3.6073E-01	5.487E+01%	1.70E+00
CE-141 #A	-6.2903E-01	-6.2905E-01	1.308E+02%	2.75E+00
CE-144 #A	-1.1517E+00	-1.1517E+00	3.002E+02%	1.16E+01
PM-144 #A	3.2966E-01	3.2966E-01	1.567E+02%	1.27E+00
EU-152 #A	1.5658E+00	1.5658E+00	1.332E+02%	7.05E+00
EU-154 #A	4.3345E+00	4.3345E+00	7.760E+01%	1.44E+01
EU-155 #A	-3.4203E-02	-3.4203E-02	3.763E+03%	5.38E+00
HF-181 #A	-4.9441E-01	-4.9442E-01	9.755E+01%	2.26E+00
Ta-182 #A	1.6075E+00	1.6075E+00	1.478E+02%	8.42E+00
Hg-203 #A	-5.0093E-01	-5.0094E-01	1.050E+02%	1.76E+00
TL-208	7.6693E+00	7.6693E+00	9.504E+00%	1.03E+00
pm-146 #A	-1.9507E-01	-1.9507E-01	2.617E+02%	4.14E+00
y-88 #A	-9.7350E-01	-9.7351E-01	7.207E+01%	2.10E+00
Cd-113m#A	-3.2416E+03	-3.2416E+03	1.788E+02%	1.97E+04
Cd-109 #A	8.5918E+00	8.5918E+00	1.615E+02%	4.63E+01
Cf-251 #A	-1.9951E+00	-1.9951E+00	1.080E+02%	5.77E+00
Cf-249 #A	7.4755E-01	7.4755E-01	9.359E+01%	2.26E+00
Sn-126 #A	-4.6433E+00	-4.6433E+00	1.090E+02%	1.69E+01
PB-210 #A	2.1249E+01	2.1249E+01	5.778E+01%	3.47E+01
PB-212	1.9322E+01	1.9322E+01	5.723E+00%	2.13E+00
PB-214 #	1.3977E+01	1.3977E+01	7.633E+00%	2.07E+00
BI-207 #A	-1.0238E-01	-1.0238E-01	3.478E+02%	1.26E+00
BI-212	3.1857E+01	3.1857E+01	2.022E+01%	1.15E+01
BI-214	1.2910E+01	1.2910E+01	9.060E+00%	1.60E+00
BI-210M#A	6.3877E-01	6.3877E-01	1.037E+02%	2.23E+00
AC-228	2.2602E+01	2.2602E+01	8.259E+00%	2.35E+00
TH-227 #A	1.0609E+00	1.0609E+00	5.617E+02%	1.72E+01
TH-229 #A	6.3458E+00	6.3458E+00	1.141E+02%	1.95E+01
TH-234 A	1.9554E+01	1.9554E+01	3.952E+01%	2.46E+01
PA-231 #A	-1.4674E+01	-1.4674E+01	1.409E+02%	6.94E+01
PA-233 #A	1.1461E+00	1.1461E+00	1.487E+02%	5.72E+00
PA-234 #A	1.1884E+00	1.1884E+00	8.422E+01%	7.65E+00
PA-234M#A	2.7377E+01	2.7377E+01	1.523E+02%	2.54E+02
U-235 #A	2.5668E+00	2.5668E+00	1.299E+02%	1.16E+01
AM-241 #A	-1.3492E+00	-1.3492E+00	1.119E+02%	4.25E+00
Np-237 A	4.1080E+00	4.1080E+00	9.160E+01%	1.25E+01
Ir-192 #A	7.8346E-02	7.8347E-02	2.531E+02%	1.34E+00
Cs-136 #A	3.8636E-01	3.8639E-01	2.060E+02%	2.72E+00
Np-239 #A	8.3319E-01	8.3354E-01	1.631E+02%	4.57E+00
Nd-147 #A	-2.7290E+00	-2.7292E+00	1.393E+02%	9.55E+00

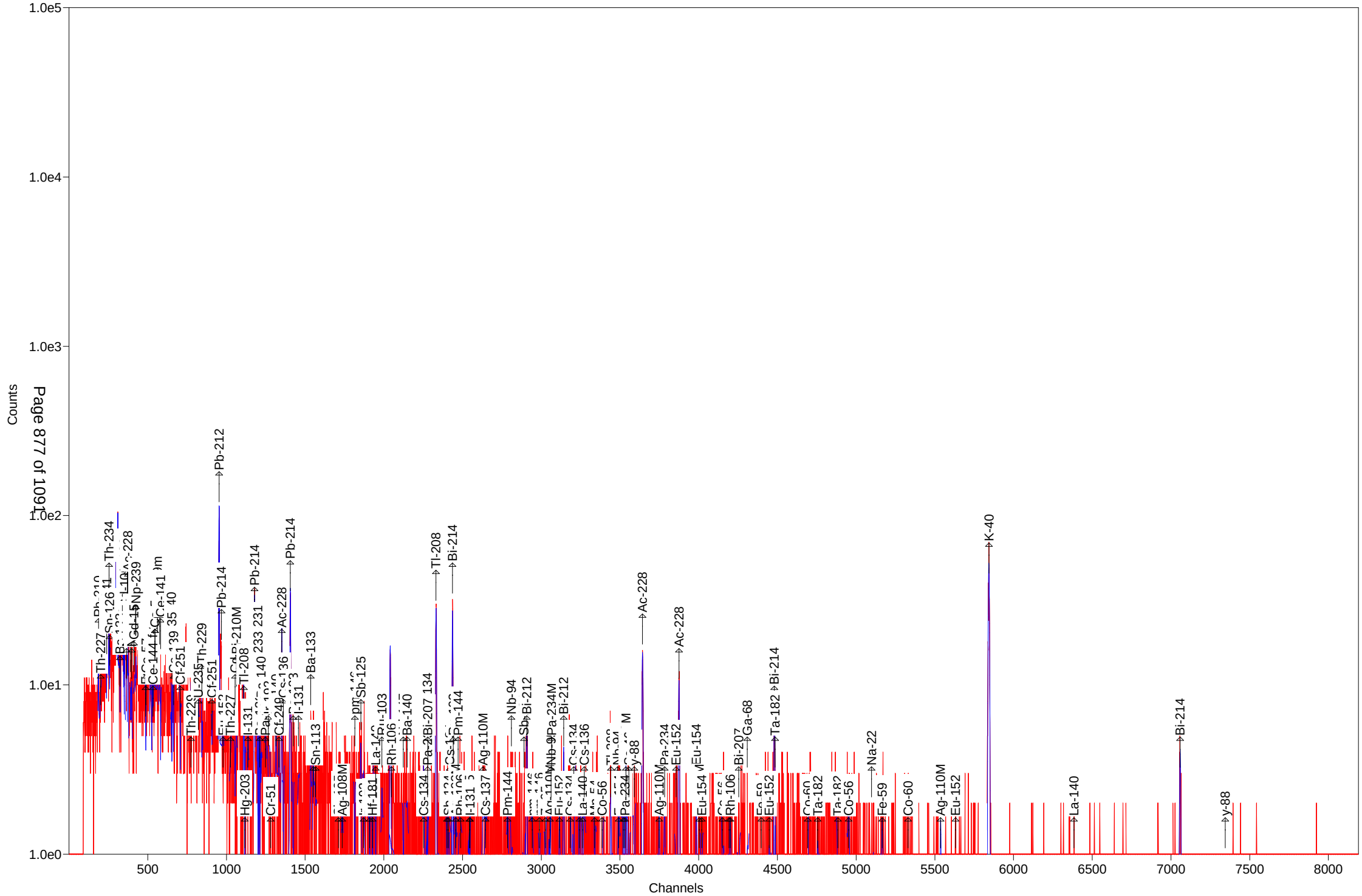
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - 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) 4.602E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.6022299E+02 Bq/Sample

264540_Gamma_160-18553-A-20-B. 14_Gamma_20162255.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
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 Centroid Channel	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:	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 Centroid Channel	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	Peak 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
```



```
   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

```
     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	Peak 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
```



```
   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

```
     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
```

```
       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	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

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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** 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	-

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

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
```

```
       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

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
```



```
   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:	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

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
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

14_TunaCan2nd_20120390

```
     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	-	

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.

***** 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
```

15_TunaCan2nd_20120288

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 Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

Page 2

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

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 6
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 #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
THE LEADER IN ENVIRONMENTAL TESTING

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
THE LEADER IN ENVIRONMENTAL TESTING

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	

TestAmerica, Inc. Spectrum name: 14_20160125003_EffVerif.An1

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       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   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 Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   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	

TestAmerica, Inc. Spectrum name: 17_20160127003_EffVerif.An1

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: 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

(Page 1 of 8)

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 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	<	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
```

(Page 8 of 8)

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	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 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	< 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

(Page 3 of 7)

********** 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  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction
```

(Page 5 of 7)

***** 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

(Page 6 of 7)

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 Counting 1 Sigma	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

(Page 1 of 8)

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

(Page 4 of 8)

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

(Page 1 of 8)

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

(Page 2 of 8)

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	ZZZZZ		267754			
09/01/16 12:42	30	ZZZZZ		267754			
09/01/16 13:24	30	ZZZZZ		267754			
09/01/16 14:36	30	ZZZZZ		267754			
09/01/16 15:16	30	ZZZZZ		267754			
09/01/16 16:02	30	160-18553-16	SU01-EXB-036-SS-P-00	267754	264540	901.1	RTM
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: 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	ZZZZZ		267757			
09/01/16 13:09	30	ZZZZZ		267757			
09/01/16 14:40	30	160-18553-4	SU01-EXB-025-SS-P-00	267757	264540	901.1	RTM
09/01/16 15:14	30	160-18553-9	SU01-EXB-030-SS-P-00	267757	264540	901.1	RTM
09/01/16 16:06	30	160-18553-15	SU01-EXB-035-SS-P-00	267757	264540	901.1	RTM
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

Gamma Spectroscopy Run Log

Detector: GV13 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/06/16 17:44		ICB 160-263714/1		263714			ALS
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	ZZZZZ		267758			
09/01/16 13:10	30	ZZZZZ		267758			
09/01/16 14:42	30	160-18553-3	SU01-EXB-024-SS-P-00	267758	264540	901.1	RTM
09/01/16 15:15	30	160-18553-8	SU01-EXB-029-SS-P-00	267758	264540	901.1	RTM
09/01/16 16:09	30	160-18553-14	SU01-EXB-034-SS-DUP-(0	267758	264540	901.1	RTM
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	ZZZZZ		267760			
09/01/16 13:11	30	ZZZZZ		267760			
09/01/16 14:35	30	160-18553-2	SU01-EXB-023-SS-P-00	267760	264540	901.1	RTM
09/01/16 15:10	30	160-18553-7	SU01-EXB-028-SS-P-00	267760	264540	901.1	RTM
09/01/16 16:07	30	160-18553-13	SU01-EXB-034-SS-P-00	267760	264540	901.1	RTM
09/01/16 16:51	30	160-18553-20	SU01-EXB-039-SS-DUP-(0	267760	264540	901.1	RTM
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

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 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
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	ZZZZZ		267761			
09/01/16 13:12	30	ZZZZZ		267761			
09/01/16 14:33	30	160-18553-1	SU01-EXB-022-SS-P-00	267761	264540	901.1	RTM
09/01/16 15:08	30	160-18553-6	SU01-EXB-027-SS-P-00	267761	264540	901.1	RTM
09/01/16 16:08	30	160-18553-12	SU01-EXB-033-SS-P-00	267761	264540	901.1	RTM
09/01/16 16:48	30	160-18553-19	SU01-EXB-039-SS-P-00	267761	264540	901.1	RTM
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	ZZZZZ		267762			
09/01/16 12:35	30	ZZZZZ		267762			
09/01/16 13:13	30	ZZZZZ		267762			
09/01/16 14:32	30	LCS 160-264540/2-A		267762	264540	901.1	RTM
09/01/16 15:06	30	160-18553-5	SU01-EXB-026-SS-P-00	267762	264540	901.1	RTM
09/01/16 16:09	30	160-18553-11	SU01-EXB-032-SS-P-00	267762	264540	901.1	RTM
09/01/16 16:47	30	160-18553-18	SU01-EXB-038-SS-P-00	267762	264540	901.1	RTM
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			

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 11:51	30	ZZZZZ		267763			
09/01/16 12:36	30	ZZZZZ		267763			
09/01/16 13:14	30	ZZZZZ		267763			
09/01/16 14:31	30	MB 160-264540/1-A		267763	264540	901.1	RTM
09/01/16 15:05	30	160-18553-1 DU	SU01-EXB-022-SS-P-00 DU	267763	264540	901.1	RTM
09/01/16 16:11	30	160-18553-10	SU01-EXB-031-SS-P-00	267763	264540	901.1	RTM
09/01/16 16:46	30	160-18553-17	SU01-EXB-037-SS-P-00	267763	264540	901.1	RTM
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

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

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:
SU01-EXB-022-SS-P-00	8/8/2016	1037		S	1			X	X	
SU01-EXB-023-SS-P-00	8/8/2016	1021		S	1			X	X	
SU01-EXB-024-SS-P-00	8/8/2016	1026		S	1			X	X	
SU01-EXB-025-SS-P-00	8/8/2016	1031		S	1			X	X	
SU01-EXB-026-SS-P-00	8/8/2016	1012		S	1			X	X	
SU01-EXB-027-SS-P-00	8/8/2016	1017		S	1			X	X	
SU01-EXB-028-SS-P-00	8/8/2016	1002		S	1			X	X	
SU01-EXB-029-SS-P-00	8/8/2016	1007		S	1			X	X	
SU01-EXB-030-SS-P-00	8/8/2016	0957		S	1			X	X	
SU01-EXB-031-SS-P-00	8/8/2016	0951		S	1			X	X	
SU01-EXB-032-SS-P-00	8/8/2016	0947		S	1			X	X	
SU01-EXB-033-SS-P-00	8/8/2016	0917		S	1			X	X	

160-18553 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

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

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:
SU01-EXB-034-SS-P-00	8/8/2016	0922		S	1			X	X	
SU01-EXB-034-SS-DUP-00	8/8/2016	0922		S	1			X	X	
SU01-EXB-035-SS-P-00	8/8/2016	0929		S	1			X	X	
SU01-EXB-036-SS-P-00	8/8/2016	0935		S	1			X	X	
SU01-EXB-037-SS-P-00	8/8/2016	0941		S	1			X	X	
SU01-EXB-038-SS-P-00	8/8/2016	0901		S	1			X	X	
SU01-EXB-039-SS-P-00	8/8/2016	0910		S	1			X	X	
SU01-EXB-039-SS-DUP-00	8/8/2016	0910		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	B	T4	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: 160-18553-1

Login Number: 18553
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?	False	
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	