ANALYTICAL REPORT

Job Number: 160-18567-1

Job Description: EA and Cabrera - Hill AFB WR111

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

Attention: Pamela J Moss

Approved for release.
Jessica H DeHerrera
Project Manager I
9/9/2016 4:09 PM

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09/09/2016

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

The Lab Certification ID# is 4025.

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

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

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

CASE NARRATIVE

Client: EA Engineering, Science, and Technology

Project: EA and Cabrera - Hill AFB WR111

Report Number: 160-18567-1

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 08/10/2016; the samples arrived in good condition. The temperature of the coolers at receipt was 20.0 C. Thermal preservation is not required for the requested analyses; therefore, the laboratory will proceed with the requested analyses. Corrective action is deemed unnecessary.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)
Samples SU03-S-058-SS-P-00 (160-18567-1), SU03-S-059-SS-P-00 (160-18567-2), SU03-S-060-SS-P-00 (160-18567-3), SU03-S-061-SS-P-00 (160-18567-4), SU03-S-062-SS-P-00 (160-18567-5), SU03-S-063-SS-P-00 (160-18567-6), SU03-S-064-SS-P-00 (160-18567-7), SU03-S-065-SS-P-00 (160-18567-8), SU03-S-066-SS-P-00 (160-18567-9), SU03-S-067-SS-P-00 (160-18567-10), SU03-S-068-SS-P-00 (160-18567-11), SU03-S-069-SS-P-00 (160-18567-12), SU03-S-070-SS-P-00 (160-18567-13), SU03-S-071-SS-P-00 (160-18567-14), SU03-S-072-SS-P-00 (160-18567-15), SU03-S-073-SS-P-00 (160-18567-16), SU03-S-074-SS-P-00 (160-18567-17), SU03-S-075-SS-P-00 (160-18567-18), SU03-S-074-SS-DUP-00 (160-18567-19) and SU03-S-060-SS-DUP-00 (160-18567-20) were analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with EPA 901.1. The samples were leached on 08/10/2016, prepared on 08/17/2016 and analyzed on 09/07/2016.

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

ISOTOPIC THORIUM
Samples SU03-S-058-SS-P-00 (160-18567-1), SU03-S-059-SS-P-00 (160-18567-2), SU03-S-060-SS-P-00 (160-18567-3), SU03-S-061-SS-P-00 (160-18567-4), SU03-S-062-SS-P-00 (160-18567-5), SU03-S-063-SS-P-00 (160-18567-6), SU03-S-064-SS-P-00 (160-18567-7), SU03-S-065-SS-P-00 (160-18567-8), SU03-S-066-SS-P-00 (160-18567-9), SU03-S-067-SS-P-00 (160-18567-10), SU03-S-068-SS-P-00 (160-18567-11), SU03-S-069-SS-P-00 (160-18567-12), SU03-S-070-SS-P-00 (160-18567-13), SU03-S-071-SS-P-00 (160-18567-14), SU03-S-072-SS-P-00 (160-18567-15), SU03-S-073-SS-P-00 (160-18567-16), SU03-S-074-SS-P-00 (160-18567-17), SU03-S-075-SS-P-00 (160-18567-18), SU03-S-074-SS-DUP-00 (160-18567-19) and SU03-S-060-SS-DUP-00 (160-18567-20) were analyzed for D Isotopic Thorium accordance with A01R_Th. The samples were leached on 08/10/2016, prepared on 08/25/2016 and analyzed on 09/07/2016 and 09/08/2016.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: SU03-S-071-SS-P-00 (160-18567-14), SU03-S-072-SS-P-00 (160-18567-15), SU03-S-073-SS-P-00 (160-18567-16), SU03-S-074-SS-P-00 (160-18567-17), SU03-S-075-SS-P-00 (160-18567-18), SU03-S-074-SS-DUP-00 (160-18567-19), SU03-S-060-SS-DUP-00 (160-18567-20) and (160-18567-A-14-A DU). The samples contain rocks.

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: 160-18567-1

Client Sample ID: SU03-S-058-SS-P-00 — Lab Sample ID: 160-18567-1

No Detections.

Client Sample ID: SU03-S-059-SS-P-00 — Lab Sample ID: 160-18567-2

No Detections.

Client Sample ID: SU03-S-060-SS-P-00 — Lab Sample ID: 160-18567-3

No Detections.

Client Sample ID: SU03-S-061-SS-P-00 — Lab Sample ID: 160-18567-4

No Detections.

Client Sample ID: SU03-S-062-SS-P-00 — Lab Sample ID: 160-18567-5

No Detections.

Client Sample ID: SU03-S-063-SS-P-00 — Lab Sample ID: 160-18567-6

No Detections.

Client Sample ID: SU03-S-064-SS-P-00 — Lab Sample ID: 160-18567-7

No Detections.

Client Sample ID: SU03-S-065-SS-P-00 — Lab Sample ID: 160-18567-8

No Detections.

Client Sample ID: SU03-S-066-SS-P-00 — Lab Sample ID: 160-18567-9

No Detections.

Client Sample ID: SU03-S-067-SS-P-00 — Lab Sample ID: 160-18567-10

No Detections.

Client Sample ID: SU03-S-068-SS-P-00 — Lab Sample ID: 160-18567-11

No Detections.

Client Sample ID: SU03-S-069-SS-P-00 — Lab Sample ID: 160-18567-12

No Detections.

Client Sample ID: SU03-S-070-SS-P-00 — Lab Sample ID: 160-18567-13

No Detections.

Client Sample ID: SU03-S-071-SS-P-00 — Lab Sample ID: 160-18567-14

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: 160-18567-1

Client Sample ID: SU03-S-072-SS-P-00 — Lab Sample ID: 160-18567-15

No Detections.

Client Sample ID: SU03-S-073-SS-P-00 — Lab Sample ID: 160-18567-16

No Detections.

Client Sample ID: SU03-S-074-SS-P-00 — Lab Sample ID: 160-18567-17

No Detections.

Client Sample ID: SU03-S-075-SS-P-00 — Lab Sample ID: 160-18567-18

No Detections.

Client Sample ID: SU03-S-074-SS-DUP-00 — Lab Sample ID: 160-18567-19

No Detections.

Client Sample ID: SU03-S-060-SS-DUP-00 — Lab Sample ID: 160-18567-20

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SU03-S-058-SS-P-00 — Lab Sample ID: 160-18567-1

Date Collected: 08/09/16 09:45 — **Matrix: Solid**
Date Received: 08/10/16 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		0.215	0.241	0.500	0.167	pCi/g	08/17/16 10:53	09/07/16 15:22	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	0.621		0.117	0.128	0.100	0.0437	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.16		0.158	0.186	0.100	0.0299	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.6*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU03-S-059-SS-P-00 — Lab Sample ID: 160-18567-2

Date Collected: 08/09/16 10:00 — **Matrix: Solid**
Date Received: 08/10/16 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		0.207	0.243	0.500	0.156	pCi/g	08/17/16 10:53	09/07/16 16:27	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	0.767		0.122	0.138	0.100	0.0146	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.25		0.157	0.189	0.100	0.0391	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU03-S-060-SS-P-00 — Lab Sample ID: 160-18567-3

Date Collected: 08/09/16 09:31 — **Matrix: Solid**
Date Received: 08/10/16 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	1.12		0.259	0.284	0.500	0.204	pCi/g	08/17/16 10:53	09/07/16 16:29	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		0.176	0.215	0.100	0.0344	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.80		0.194	0.245	0.100	0.0288	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Client Sample ID: SU03-S-060-SS-P-00 — Lab Sample ID: 160-18567-3

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

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.2		30 - 110	08/25/16 15:54	09/07/16 14:38	1

Client Sample ID: SU03-S-061-SS-P-00 — Lab Sample ID: 160-18567-4

Date Collected: 08/09/16 09:36 — **Matrix: Solid**
Date Received: 08/10/16 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		0.208	0.236	0.500	0.138	pCi/g	08/17/16 10:53	09/07/16 16:30	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.11		0.152	0.178	0.100	0.0392	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.90		0.198	0.255	0.100	0.0379	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	89.6		30 - 110	08/25/16 15:54	09/07/16 14:38	1

Client Sample ID: SU03-S-062-SS-P-00 — Lab Sample ID: 160-18567-5

Date Collected: 08/09/16 09:40 — **Matrix: Solid**
Date Received: 08/10/16 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	1.34		0.255	0.291	0.500	0.209	pCi/g	08/17/16 10:53	09/07/16 17:48	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	0.806		0.125	0.142	0.100	0.0300	pCi/g	08/25/16 15:54	09/08/16 15:56	1
Thorium-232	1.45		0.166	0.206	0.100	0.0263	pCi/g	08/25/16 15:54	09/08/16 15:56	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.6		30 - 110	08/25/16 15:54	09/08/16 15:56	1

Client Sample ID: SU03-S-063-SS-P-00 — Lab Sample ID: 160-18567-6

Date Collected: 08/09/16 09:24 — **Matrix: Solid**
Date Received: 08/10/16 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	1.30		0.233	0.270	0.500	0.176	pCi/g	08/17/16 10:53	09/07/16 17:44	1

Client Sample ID: SU03-S-063-SS-P-00 — Lab Sample ID: 160-18567-6

Date Collected: 08/09/16 09:24 — **Matrix: Solid**
Date Received: 08/10/16 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	0.883		0.133	0.153	0.100	0.0256	pCi/g	08/25/16 15:54	09/08/16 15:56	1
Thorium-232	1.77		0.188	0.239	0.100	0.0150	pCi/g	08/25/16 15:54	09/08/16 15:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.8*		*30 - 110*	*08/25/16 15:54*	*09/08/16 15:56*	*1*

Client Sample ID: SU03-S-064-SS-P-00 — Lab Sample ID: 160-18567-7

Date Collected: 08/09/16 09:44 — **Matrix: Solid**
Date Received: 08/10/16 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	1.17		0.294	0.318	0.500	0.242	pCi/g	08/17/16 10:53	09/07/16 17:50	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	1.58		0.182	0.226	0.100	0.0290	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.81		0.195	0.247	0.100	0.0288	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.9*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU03-S-065-SS-P-00 — Lab Sample ID: 160-18567-8

Date Collected: 08/09/16 09:27 — **Matrix: Solid**
Date Received: 08/10/16 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	1.13		0.194	0.227	0.500	0.191	pCi/g	08/17/16 10:53	09/07/16 17:50	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	1.34		0.160	0.196	0.100	0.0265	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.42		0.165	0.204	0.100	0.0264	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU03-S-066-SS-P-00 — Lab Sample ID: 160-18567-9

Date Collected: 08/09/16 09:10 — **Matrix: Solid**
Date Received: 08/10/16 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		0.292	0.322	0.500	0.236	pCi/g	08/17/16 10:53	09/07/16 17:51	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.19		0.161	0.190	0.100	0.0300	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.89		0.203	0.258	0.100	0.0300	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.3*		*30 - 110*	*08/25/16 15:54*	*09/07/16 14:38*	*1*

Client Sample ID: SU03-S-067-SS-P-00 — Lab Sample ID: 160-18567-10

Date Collected: 08/09/16 08:30 — **Matrix: Solid**
Date Received: 08/10/16 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		0.206	0.248	0.500	0.101	pCi/g	08/17/16 10:53	09/07/16 17:52	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.910		0.138	0.157	0.100	0.0286	pCi/g	08/25/16 15:54	09/08/16 15:56	1
Thorium-232	2.07		0.207	0.270	0.100	0.0339	pCi/g	08/25/16 15:54	09/08/16 15:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*08/25/16 15:54*	*09/08/16 15:56*	*1*

Client Sample ID: SU03-S-068-SS-P-00 — Lab Sample ID: 160-18567-11

Date Collected: 08/09/16 08:40 — **Matrix: Solid**
Date Received: 08/10/16 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	1.71		0.304	0.352	0.500	0.188	pCi/g	08/17/16 10:53	09/07/16 17:53	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	0.852		0.128	0.146	0.100	0.0144	pCi/g	08/25/16 15:54	09/08/16 15:56	1
Thorium-232	1.83		0.187	0.242	0.100	0.0263	pCi/g	08/25/16 15:54	09/08/16 15:56	1

Client Sample ID: SU03-S-068-SS-P-00 — Lab Sample ID: 160-18567-11

Date Collected: 08/09/16 08:40 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.6		30 - 110	08/25/16 15:54	09/08/16 15:56	1

Client Sample ID: SU03-S-069-SS-P-00 — Lab Sample ID: 160-18567-12

Date Collected: 08/09/16 08:45 — **Matrix: Solid**
Date Received: 08/10/16 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		0.270	0.315	0.500	0.211	pCi/g	08/17/16 10:53	09/07/16 18:30	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	1.71		0.182	0.232	0.100	0.0145	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	1.63		0.177	0.224	0.100	0.0265	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	91.9		30 - 110	08/25/16 15:54	09/07/16 14:38	1

Client Sample ID: SU03-S-070-SS-P-00 — Lab Sample ID: 160-18567-13

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

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.61		0.304	0.347	0.500	0.228	pCi/g	08/17/16 10:53	09/07/16 18:30	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	2.20		0.211	0.281	0.100	0.0373	pCi/g	08/25/16 15:54	09/07/16 14:38	1
Thorium-232	2.40		0.221	0.299	0.100	0.0498	pCi/g	08/25/16 15:54	09/07/16 14:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.7		30 - 110	08/25/16 15:54	09/07/16 14:38	1

Client Sample ID: SU03-S-071-SS-P-00 — Lab Sample ID: 160-18567-14

Date Collected: 08/09/16 09:49 — **Matrix: Solid**
Date Received: 08/10/16 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	1.78		0.280	0.336	0.500	0.112	pCi/g	08/17/16 10:53	09/07/16 18:31	1

Client Sample ID: SU03-S-071-SS-P-00 — Lab Sample ID: 160-18567-14

Date Collected: 08/09/16 09:49 — **Matrix: Solid**
Date Received: 08/10/16 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	1.83		0.188	0.243	0.100	0.0144	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	1.38		0.162	0.199	0.100	0.0144	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.3*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Client Sample ID: SU03-S-072-SS-P-00 — Lab Sample ID: 160-18567-15

Date Collected: 08/09/16 10:12 — **Matrix: Solid**
Date Received: 08/10/16 09:20

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.68		0.334	0.376	0.500	0.237	pCi/g	08/17/16 10:53	09/07/16 18:32	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	8.49		0.417	0.826	0.100	0.0154	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	2.75		0.237	0.331	0.100	0.0335	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.6*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Client Sample ID: SU03-S-073-SS-P-00 — Lab Sample ID: 160-18567-16

Date Collected: 08/09/16 09:53 — **Matrix: Solid**
Date Received: 08/10/16 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	1.30		0.217	0.256	0.500	0.171	pCi/g	08/17/16 10:53	09/07/16 18:33	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	16.3		0.580	1.49	0.100	0.0415	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	3.86		0.281	0.429	0.100	0.0283	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.9*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Client Sample ID: SU03-S-074-SS-P-00 — Lab Sample ID: 160-18567-17

Date Collected: 08/09/16 08:55 — **Matrix: Solid**
Date Received: 08/10/16 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	1.16		0.291	0.315	0.500	0.237	pCi/g	08/17/16 10:53	09/07/16 18:33	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.52		0.178	0.219	0.100	0.0156	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	1.26		0.162	0.194	0.100	0.0417	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.7*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Client Sample ID: SU03-S-075-SS-P-00 — Lab Sample ID: 160-18567-18

Date Collected: 08/09/16 09:00 — **Matrix: Solid**
Date Received: 08/10/16 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	1.41		0.271	0.309	0.500	0.217	pCi/g	08/17/16 10:53	09/07/16 18:34	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	1.57		0.182	0.225	0.100	0.0344	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	1.28		0.164	0.196	0.100	0.0287	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.4*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Client Sample ID: SU03-S-074-SS-DUP-00 — Lab Sample ID: 160-18567-19

Date Collected: 08/09/16 08:55 — **Matrix: Solid**
Date Received: 08/10/16 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	1.39		0.242	0.281	0.500	0.181	pCi/g	08/17/16 10:53	09/07/16 18:35	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	1.51		0.172	0.214	0.100	0.0369	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	1.51		0.171	0.213	0.100	0.0357	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Client Sample ID: SU03-S-074-SS-DUP-00 — Lab Sample ID: 160-18567-19

Date Collected: 08/09/16 08:55 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.3*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Client Sample ID: SU03-S-060-SS-DUP-00 — Lab Sample ID: 160-18567-20

Date Collected: 08/09/16 09:31 — **Matrix: Solid**
Date Received: 08/10/16 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	**1.27**		0.231	0.266	0.500	0.224	pCi/g	08/17/16 10:53	09/07/16 19:11	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	**1.09**		0.151	0.177	0.100	0.0646	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	**1.23**		0.157	0.188	0.100	0.0278	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.1*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Tracer/Carrier Summary

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

TestAmerica Job ID: 160-18567-1

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)**							
160-18567-1	SU03-S-058-SS-P-00	80.6							
160-18567-2	SU03-S-059-SS-P-00	89.3							
160-18567-3	SU03-S-060-SS-P-00	87.2							
160-18567-4	SU03-S-061-SS-P-00	89.6							
160-18567-5	SU03-S-062-SS-P-00	88.6							
160-18567-6	SU03-S-063-SS-P-00	93.8							
160-18567-7	SU03-S-064-SS-P-00	82.9							
160-18567-8	SU03-S-065-SS-P-00	89.7							
160-18567-9	SU03-S-066-SS-P-00	87.3							
160-18567-10	SU03-S-067-SS-P-00	89.3							
160-18567-11	SU03-S-068-SS-P-00	88.6							
160-18567-12	SU03-S-069-SS-P-00	91.9							
160-18567-13	SU03-S-070-SS-P-00	86.7							
160-18567-14	SU03-S-071-SS-P-00	88.3							
160-18567-14 DU	SU03-S-071-SS-P-00	96.3							
160-18567-15	SU03-S-072-SS-P-00	86.6							
160-18567-16	SU03-S-073-SS-P-00	84.9							
160-18567-17	SU03-S-074-SS-P-00	83.7							
160-18567-18	SU03-S-075-SS-P-00	87.4							
160-18567-19	SU03-S-074-SS-DUP-00	95.3							
160-18567-20	SU03-S-060-SS-DUP-00	88.1							
LCS 160-266565/2-A	Lab Control Sample	97.0							
LCS 160-266566/2-A	Lab Control Sample	88.6							
MB 160-266565/1-A	Method Blank	96.5							
MB 160-266566/1-A	Method Blank	90.7							

Tracer/Carrier Legend

Th-229 = Thorium-229

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

Lab Sample ID: MB 160-265170/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268245 — **Prep Batch: 265170**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.05210	U	0.132	0.132	0.500	0.389	pCi/g	08/17/16 10:53	09/07/16 16:23	1

Lab Sample ID: LCS 160-265170/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268246 — **Prep Batch: 265170**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.1	96.96		10.2		1.12	pCi/g	100	87 - 116		
Cesium-137			29.5	29.30		3.12		0.236	pCi/g	99	87 - 120		
Cobalt-60			16.6	16.39		1.70		0.0748	pCi/g	99	87 - 115		

Lab Sample ID: 160-18567-1 DU — **Client Sample ID: SU03-S-058-SS-P-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268247 — **Prep Batch: 265170**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Radium-226	1.03			1.124		0.236	0.500	0.152	pCi/g			0.20	1

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

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

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

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

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

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

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

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

Lab Sample ID: MB 160-266566/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268671 — **Prep Batch: 266566**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.05109		0.0339	0.0341	0.100	0.0330	pCi/g	08/25/16 15:56	09/08/16 11:49	1
Thorium-232	0.01000	U	0.0141	0.0142	0.100	0.0150	pCi/g	08/25/16 15:56	09/08/16 11:49	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.7*		*30 - 110*	*08/25/16 15:56*	*09/08/16 11:49*	*1*

Lab Sample ID: LCS 160-266566/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268672 — **Prep Batch: 266566**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.59		2.37	0.100	0.0776	pCi/g	104	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*88.6*		*30 - 110*

Lab Sample ID: 160-18567-14 DU — **Client Sample ID: SU03-S-071-SS-P-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 268674 — **Prep Batch: 266566**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Thorium-230	1.83			2.112		0.269	0.100	0.0357	pCi/g			0.54	1
Thorium-232	1.38			1.524		0.214	0.100	0.0388	pCi/g			0.36	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*96.3*		*30 - 110*

QC Association Summary

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

TestAmerica Job ID: 160-18567-1

Rad

Leach Batch: 264321

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18567-1	SU03-S-058-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-2	SU03-S-059-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-3	SU03-S-060-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-4	SU03-S-061-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-5	SU03-S-062-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-6	SU03-S-063-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-7	SU03-S-064-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-8	SU03-S-065-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-9	SU03-S-066-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-10	SU03-S-067-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-11	SU03-S-068-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-12	SU03-S-069-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-13	SU03-S-070-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-14	SU03-S-071-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-15	SU03-S-072-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-16	SU03-S-073-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-17	SU03-S-074-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-18	SU03-S-075-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-19	SU03-S-074-SS-DUP-00	Total/NA	Solid	Dry and Grind	
160-18567-20	SU03-S-060-SS-DUP-00	Total/NA	Solid	Dry and Grind	
160-18567-1 DU	SU03-S-058-SS-P-00	Total/NA	Solid	Dry and Grind	
160-18567-14 DU	SU03-S-071-SS-P-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 265170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18567-1	SU03-S-058-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-2	SU03-S-059-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-3	SU03-S-060-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-4	SU03-S-061-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-5	SU03-S-062-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-6	SU03-S-063-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-7	SU03-S-064-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-8	SU03-S-065-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-9	SU03-S-066-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-10	SU03-S-067-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-11	SU03-S-068-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-12	SU03-S-069-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-13	SU03-S-070-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-14	SU03-S-071-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-15	SU03-S-072-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-16	SU03-S-073-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-17	SU03-S-074-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-18	SU03-S-075-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-19	SU03-S-074-SS-DUP-00	Total/NA	Solid	Fill_Geo-21	264321
160-18567-20	SU03-S-060-SS-DUP-00	Total/NA	Solid	Fill_Geo-21	264321
MB 160-265170/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-265170/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-18567-1 DU	SU03-S-058-SS-P-00	Total/NA	Solid	Fill_Geo-21	264321

Rad (Continued)

Prep Batch: 266565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18567-1	SU03-S-058-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-2	SU03-S-059-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-3	SU03-S-060-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-4	SU03-S-061-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-5	SU03-S-062-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-6	SU03-S-063-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-7	SU03-S-064-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-8	SU03-S-065-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-9	SU03-S-066-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-10	SU03-S-067-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-11	SU03-S-068-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-12	SU03-S-069-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-13	SU03-S-070-SS-P-00	Total/NA	Solid	ExtChrom	264321
MB 160-266565/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-266565/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 266566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18567-14	SU03-S-071-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-15	SU03-S-072-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-16	SU03-S-073-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-17	SU03-S-074-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-18	SU03-S-075-SS-P-00	Total/NA	Solid	ExtChrom	264321
160-18567-19	SU03-S-074-SS-DUP-00	Total/NA	Solid	ExtChrom	264321
160-18567-20	SU03-S-060-SS-DUP-00	Total/NA	Solid	ExtChrom	264321
MB 160-266566/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-266566/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-18567-14 DU	SU03-S-071-SS-P-00	Total/NA	Solid	ExtChrom	264321

Lab Chronicle

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

TestAmerica Job ID: 160-18567-1

Client Sample ID: SU03-S-058-SS-P-00 — Lab Sample ID: 160-18567-1

Date Collected: 08/09/16 09:45
Matrix: Solid
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268245	09/07/16 15:22	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268488	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-059-SS-P-00 — Lab Sample ID: 160-18567-2

Date Collected: 08/09/16 10:00
Matrix: Solid
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268241	09/07/16 16:27	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268489	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-060-SS-P-00 — Lab Sample ID: 160-18567-3

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268237	09/07/16 16:29	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268490	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-061-SS-P-00 — Lab Sample ID: 160-18567-4

Date Collected: 08/09/16 09:36
Matrix: Solid
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268239	09/07/16 16:30	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268491	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-062-SS-P-00 — Lab Sample ID: 160-18567-5

Date Collected: 08/09/16 09:40 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268247	09/07/16 17:48	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268650	09/08/16 15:56	ALD	TAL SL

Client Sample ID: SU03-S-063-SS-P-00 — Lab Sample ID: 160-18567-6

Date Collected: 08/09/16 09:24 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268246	09/07/16 17:44	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268651	09/08/16 15:56	ALD	TAL SL

Client Sample ID: SU03-S-064-SS-P-00 — Lab Sample ID: 160-18567-7

Date Collected: 08/09/16 09:44 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268245	09/07/16 17:50	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268494	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-065-SS-P-00 — Lab Sample ID: 160-18567-8

Date Collected: 08/09/16 09:27 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268241	09/07/16 17:50	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268495	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-066-SS-P-00 — Lab Sample ID: 160-18567-9

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268239	09/07/16 17:51	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268496	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-067-SS-P-00 — Lab Sample ID: 160-18567-10

Date Collected: 08/09/16 08:30 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268238	09/07/16 17:52	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268652	09/08/16 15:56	ALD	TAL SL

Client Sample ID: SU03-S-068-SS-P-00 — Lab Sample ID: 160-18567-11

Date Collected: 08/09/16 08:40 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268237	09/07/16 17:53	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268653	09/08/16 15:56	ALD	TAL SL

Client Sample ID: SU03-S-069-SS-P-00 — Lab Sample ID: 160-18567-12

Date Collected: 08/09/16 08:45 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268236	09/07/16 18:30	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268499	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-070-SS-P-00 — Lab Sample ID: 160-18567-13

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268237	09/07/16 18:30	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266565	08/25/16 15:54	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268500	09/07/16 14:38	ALD	TAL SL

Client Sample ID: SU03-S-071-SS-P-00 — Lab Sample ID: 160-18567-14

Date Collected: 08/09/16 09:49 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268238	09/07/16 18:31	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268673	09/08/16 11:49	ALD	TAL SL

Client Sample ID: SU03-S-072-SS-P-00 — Lab Sample ID: 160-18567-15

Date Collected: 08/09/16 10:12 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268239	09/07/16 18:32	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268675	09/08/16 11:49	ALD	TAL SL

Client Sample ID: SU03-S-073-SS-P-00 — Lab Sample ID: 160-18567-16

Date Collected: 08/09/16 09:53 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268241	09/07/16 18:33	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268676	09/08/16 11:49	ALD	TAL SL

Client Sample ID: SU03-S-074-SS-P-00 — Lab Sample ID: 160-18567-17

Date Collected: 08/09/16 08:55 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268245	09/07/16 18:33	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268677	09/08/16 11:49	ALD	TAL SL

Client Sample ID: SU03-S-075-SS-P-00 — Lab Sample ID: 160-18567-18

Date Collected: 08/09/16 09:00 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268246	09/07/16 18:34	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268678	09/08/16 11:49	ALD	TAL SL

Client Sample ID: SU03-S-074-SS-DUP-00 — Lab Sample ID: 160-18567-19

Date Collected: 08/09/16 08:55 — **Matrix: Solid**
Date Received: 08/10/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268247	09/07/16 18:35	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268679	09/08/16 11:49	ALD	TAL SL

Client Sample ID: SU03-S-060-SS-DUP-00 — Lab Sample ID: 160-18567-20

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			265170	08/17/16 10:53	R1S	TAL SL
Total/NA	Analysis	901.1		1	268236	09/07/16 19:11	ALS	TAL SL
Total/NA	Leach	Dry and Grind			264321	08/10/16 13:23	DRO	TAL SL
Total/NA	Prep	ExtChrom			266566	08/25/16 15:56	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	268680	09/08/16 11:49	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: 160-18567-1

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: 160-18567-1

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: 160-18567-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-18567-1	SU03-S-058-SS-P-00	Solid	08/09/16 09:45	08/10/16 09:20
160-18567-2	SU03-S-059-SS-P-00	Solid	08/09/16 10:00	08/10/16 09:20
160-18567-3	SU03-S-060-SS-P-00	Solid	08/09/16 09:31	08/10/16 09:20
160-18567-4	SU03-S-061-SS-P-00	Solid	08/09/16 09:36	08/10/16 09:20
160-18567-5	SU03-S-062-SS-P-00	Solid	08/09/16 09:40	08/10/16 09:20
160-18567-6	SU03-S-063-SS-P-00	Solid	08/09/16 09:24	08/10/16 09:20
160-18567-7	SU03-S-064-SS-P-00	Solid	08/09/16 09:44	08/10/16 09:20
160-18567-8	SU03-S-065-SS-P-00	Solid	08/09/16 09:27	08/10/16 09:20
160-18567-9	SU03-S-066-SS-P-00	Solid	08/09/16 09:10	08/10/16 09:20
160-18567-10	SU03-S-067-SS-P-00	Solid	08/09/16 08:30	08/10/16 09:20
160-18567-11	SU03-S-068-SS-P-00	Solid	08/09/16 08:40	08/10/16 09:20
160-18567-12	SU03-S-069-SS-P-00	Solid	08/09/16 08:45	08/10/16 09:20
160-18567-13	SU03-S-070-SS-P-00	Solid	08/09/16 10:10	08/10/16 09:20
160-18567-14	SU03-S-071-SS-P-00	Solid	08/09/16 09:49	08/10/16 09:20
160-18567-15	SU03-S-072-SS-P-00	Solid	08/09/16 10:12	08/10/16 09:20
160-18567-16	SU03-S-073-SS-P-00	Solid	08/09/16 09:53	08/10/16 09:20
160-18567-17	SU03-S-074-SS-P-00	Solid	08/09/16 08:55	08/10/16 09:20
160-18567-18	SU03-S-075-SS-P-00	Solid	08/09/16 09:00	08/10/16 09:20
160-18567-19	SU03-S-074-SS-DUP-00	Solid	08/09/16 08:55	08/10/16 09:20
160-18567-20	SU03-S-060-SS-DUP-00	Solid	08/09/16 09:31	08/10/16 09:20

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

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
							Pulser	
							Thorium-230	7.63 Bq
							U	
82233-334_00001	06/03/60	Eckert & Zigler, Lot 82233-334			(Purchased Reagent)		Americium-241	5.114 Bq
							Pu-239	6.064 Bq
							Pulser	
							Thorium-230	4.95 Bq
							U	
82234-334_00001	06/02/60	Eckert & Zigler, Lot 82234-334			(Purchased Reagent)		Americium-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60	Eckert & Ziegler, Lot 82235-334			(Purchased Reagent)		Americium-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60	Eckert & Ziegler, Lot 82236-334			(Purchased Reagent)		Americium-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60	Eckert & Ziegler, Lot 82237-334			(Purchased Reagent)		Americium-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60	Eckert & Ziegler, Lot 82240-334			(Purchased Reagent)		Americium-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60	Eckert & Ziegler, Lot 82241-334			(Purchased Reagent)		Americium-241	6.638 Bq
							Pu-239	6.797 Bq
							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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq
Marn Soil_00002	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	2870 Bq
							Cd-109	39231 Bq
							Ce-139	1302 Bq
							Cesium-137	1087 Bq
							Co-57	849 Bq
							Cobalt-60	1788 Bq
							Hg-203	2820 Bq
							Pb-210	35040 Bq
							Sn-113	2306 Bq
							Y-88	3762 Bq
MarnSolid_00002	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	2797 Bq
							Cd-109	39337 Bq
							Ce-139	1320 Bq
							Cesium-137	1122 Bq
							Co-57	870 Bq
							Hg-203	2814 Bq
							Pb-210	35883 Bq
							Sn-113	2322 Bq
							Y-88	3821 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

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 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
Th-229_00021	08/01/17	07/20/16	0.1M HNO3, Lot n/a	500 mL	Th-229_00017	15 mL	At-217	67.2296 dpm/mL
							Thorium-229	67.2296 dpm/mL
.Th-229_00017	08/01/17	08/20/14	0.1M HNO3, Lot n/a	100 mL	Th-229_00016	5.0464 g	At-217	2240.99 dpm/mL
							Thorium-229	2240.99 dpm/mL
..Th-229_00016	08/06/64	Analytics, Lot 97790			(Purchased Reagent)		At-217	740.127 Bq/g
							Thorium-229	740.127 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Radium-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g
Tuna Can LCS_00005	10/29/16	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

SDG No.:

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

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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

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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."

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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
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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

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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."

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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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82237-334_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82240-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Marn Soil_00002

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office
Laboratory

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

Reagent

MarnSolid_00002

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

Reagent

Source C_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

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 H_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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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

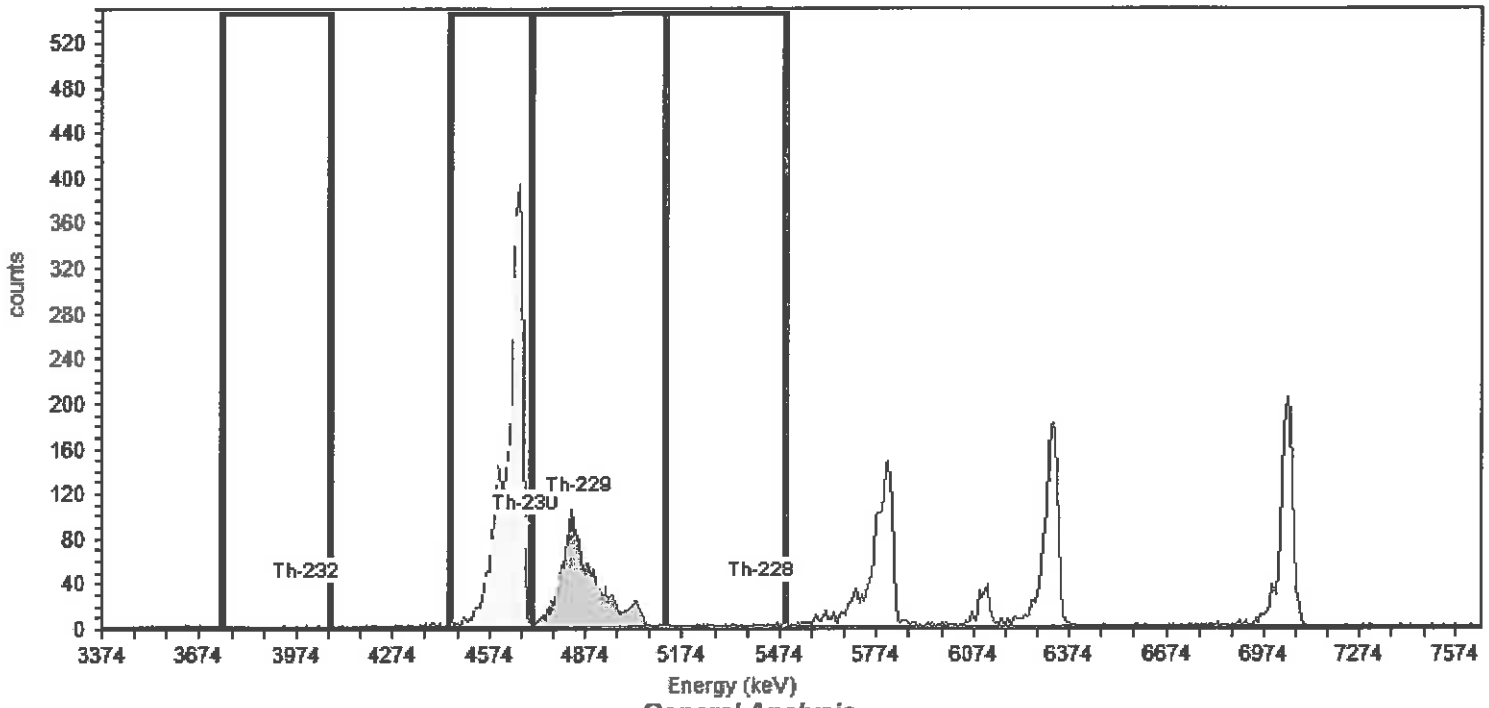
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

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

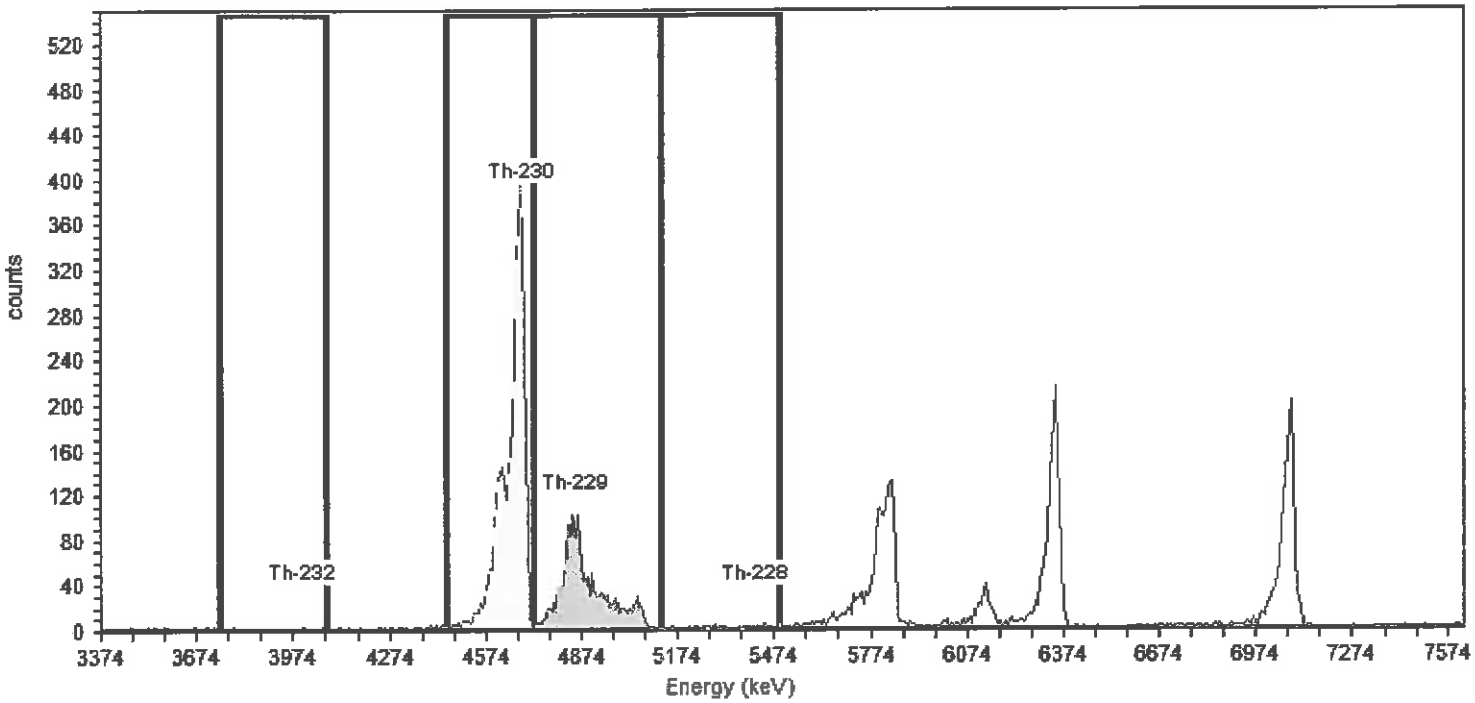
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

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

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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

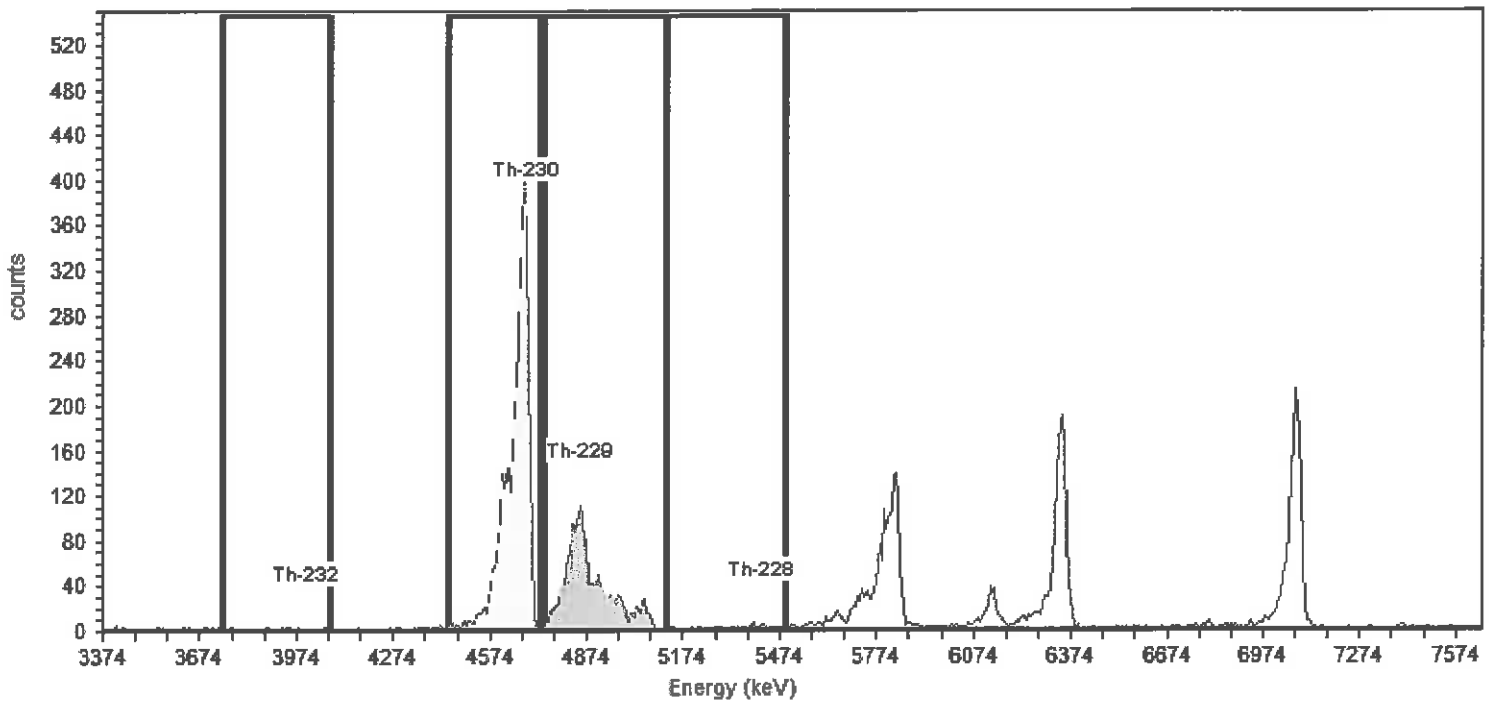
Tracer Name: Th-230_00029
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:19:32AM

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

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THE LEADER IN ENVIRONMENTAL TESTING

Th-229 Tracer (New) by Coppt.

Aliquot Only

Batch No. : _____

Balance ID : _____

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

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				

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

End of Certificate

Reagent

Tuna Can_00002

Rc'd 2/3/10

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81427-334

1.0 Liter Sand in 1 Liter HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

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

Source Prepared by: _____
W. Mao, Radiochemist

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

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

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

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office
Laboratory

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

ALPHA SPECTROSCOPY

Method A-01-R Th

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

Prep Batch: 266565

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: MB 160-266565/1-A
Client ID:
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV171
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.09373	0.0422	0.0430		pCi/g	0.100	0.0143	268478
Thorium-232	0.004736	0.00947	0.00948	U	pCi/g	0.100	0.0142	268478

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.922	0.232	0.338		pCi/g	0.0339	3.03	96.5	30 - 110

Lab ID: LCS 160-266565/2-A
Client ID:
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV172
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	25.18	0.982	2.33		pCi/g	0.100	0.0287	268479

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.865	0.467	0.679		pCi/g	0.0685	6.05	97.0	30 - 110

Lab ID: 160-18567-1
Client ID: SU03-S-058-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
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	0.621	0.117	0.128		pCi/g	0.100	0.0437	268488
Thorium-232	1.16	0.158	0.186		pCi/g	0.100	0.0299	268488

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.44	0.207	0.291		pCi/g	0.0323	3.03	80.6	30 - 110

Lab ID: 160-18567-2
Client ID: SU03-S-059-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV198
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	0.767	0.122	0.138		pCi/g	0.100	0.0146	268489
Thorium-232	1.25	0.157	0.189		pCi/g	0.100	0.0391	268489

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.70	0.217	0.314		pCi/g	0.0241	3.03	89.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: 160-18567-3 | Analyzed: 09/07/16 14:38 | Decay Corrected: No
Client ID: SU03-S-060-SS-P-00 | Detector: AV199 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.47	0.176	0.215		pCi/g	0.100	0.0344	268490
Thorium-232	1.80	0.194	0.245		pCi/g	0.100	0.0288	268490

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.64	0.220	0.312		pCi/g	0.0337	3.03	87.2	30 - 110

Lab ID: 160-18567-4 | Analyzed: 09/07/16 14:38 | Decay Corrected: No
Client ID: SU03-S-061-SS-P-00 | Detector: AV200 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.11	0.152	0.178		pCi/g	0.100	0.0392	268491
Thorium-232	1.90	0.198	0.255		pCi/g	0.100	0.0379	268491

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.71	0.224	0.320		pCi/g	0.0304	3.03	89.6	30 - 110

Lab ID: 160-18567-5 | Analyzed: 09/08/16 15:56 | Decay Corrected: No
Client ID: SU03-S-062-SS-P-00 | Detector: AV148 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.806	0.125	0.142		pCi/g	0.100	0.0300	268650
Thorium-232	1.45	0.166	0.206		pCi/g	0.100	0.0263	268650

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.68	0.214	0.311		pCi/g	0.0366	3.03	88.6	30 - 110

Lab ID: 160-18567-6 | Analyzed: 09/08/16 15:56 | Decay Corrected: No
Client ID: SU03-S-063-SS-P-00 | Detector: AV149 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.883	0.133	0.153		pCi/g	0.100	0.0256	268651
Thorium-232	1.77	0.188	0.239		pCi/g	0.100	0.0150	268651

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.85	0.232	0.333		pCi/g	0.0141	3.03	93.8	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: 160-18567-7
Client ID: SU03-S-064-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV203
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	1.58	0.182	0.226		pCi/g	0.100	0.0290	268494
Thorium-232	1.81	0.195	0.247		pCi/g	0.100	0.0288	268494

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.51	0.210	0.298		pCi/g	0.0459	3.03	82.9	30 - 110

Lab ID: 160-18567-8
Client ID: SU03-S-065-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV204
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	1.34	0.160	0.196		pCi/g	0.100	0.0265	268495
Thorium-232	1.42	0.165	0.204		pCi/g	0.100	0.0264	268495

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.72	0.216	0.314		pCi/g	0.0283	3.03	89.7	30 - 110

Lab ID: 160-18567-9
Client ID: SU03-S-066-SS-P-00
Sigma: 2

Analyzed: 09/07/16 14:38
Detector: AV205
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	1.19	0.161	0.190		pCi/g	0.100	0.0300	268496
Thorium-232	1.89	0.203	0.258		pCi/g	0.100	0.0300	268496

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.64	0.225	0.316		pCi/g	0.0381	3.02	87.3	30 - 110

Lab ID: 160-18567-10
Client ID: SU03-S-067-SS-P-00
Sigma: 2

Analyzed: 09/08/16 15:56
Detector: AV150
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	0.910	0.138	0.157		pCi/g	0.100	0.0286	268652
Thorium-232	2.07	0.207	0.270		pCi/g	0.100	0.0339	268652

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.71	0.224	0.319		pCi/g	0.0341	3.03	89.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Lab ID: 160-18567-11 | Analyzed: 09/08/16 15:56 | Decay Corrected: No
Client ID: SU03-S-068-SS-P-00 | Detector: AV153 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.852	0.128	0.146		pCi/g	0.100	0.0144	268653
Thorium-232	1.83	0.187	0.242		pCi/g	0.100	0.0263	268653

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.68	0.213	0.310		pCi/g	0.0279	3.02	88.6	30 - 110

Lab ID: 160-18567-12 | Analyzed: 09/07/16 14:38 | Decay Corrected: No
Client ID: SU03-S-069-SS-P-00 | Detector: AV208 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.71	0.182	0.232		pCi/g	0.100	0.0145	268499
Thorium-232	1.63	0.177	0.224		pCi/g	0.100	0.0265	268499

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.78	0.222	0.323		pCi/g	0.0294	3.03	91.9	30 - 110

Lab ID: 160-18567-13 | Analyzed: 09/07/16 14:38 | Decay Corrected: No
Client ID: SU03-S-070-SS-P-00 | Detector: AV209 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.20	0.211	0.281		pCi/g	0.100	0.0373	268500
Thorium-232	2.40	0.221	0.299		pCi/g	0.100	0.0498	268500

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.62	0.215	0.308		pCi/g	0.0465	3.02	86.7	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-266565/1-A	Thorium-230			0.09373		pCi/g							4.36243907
MB 160-266565/1-A	Thorium-232			0.004736	U	pCi/g							.99911917

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-266565/2-A	Thorium-230		24.5	25.18		pCi/g	103	81 - 118					.4226744371

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266565

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

SDG No.:

Batch Number: 266565 Batch Start Date: 08/25/16 15:54 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 08/31/16 11:14

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00021	TRM-2 00001	AnalysisComment		
MB 160-266565/1		ExtChrom, A-01-R		1.0 g	0.1 mL				
LCS 160-266565/2		ExtChrom, A-01-R		0.5006 g	0.1 mL	0.5006 g	TRM		
160-18567-A-1-A	SU03-S-058-SS-P-00	ExtChrom, A-01-R	T	0.9992 g	0.1 mL				
160-18567-A-2-A	SU03-S-059-SS-P-00	ExtChrom, A-01-R	T	1.0004 g	0.1 mL				
160-18567-A-3-A	SU03-S-060-SS-P-00	ExtChrom, A-01-R	T	1.0005 g	0.1 mL				
160-18567-A-4-A	SU03-S-061-SS-P-00	ExtChrom, A-01-R	T	0.9999 g	0.1 mL				
160-18567-A-5-A	SU03-S-062-SS-P-00	ExtChrom, A-01-R	T	0.9989 g	0.1 mL				
160-18567-A-6-A	SU03-S-063-SS-P-00	ExtChrom, A-01-R	T	0.9984 g	0.1 mL				
160-18567-A-7-A	SU03-S-064-SS-P-00	ExtChrom, A-01-R	T	1.0005 g	0.1 mL				
160-18567-A-8-A	SU03-S-065-SS-P-00	ExtChrom, A-01-R	T	1.0001 g	0.1 mL				
160-18567-A-9-A	SU03-S-066-SS-P-00	ExtChrom, A-01-R	T	1.0018 g	0.1 mL				
160-18567-A-10-A	SU03-S-067-SS-P-00	ExtChrom, A-01-R	T	0.9988 g	0.1 mL				
160-18567-A-11-A	SU03-S-068-SS-P-00	ExtChrom, A-01-R	T	1.0017 g	0.1 mL				
160-18567-A-12-A	SU03-S-069-SS-P-00	ExtChrom, A-01-R	T	0.9988 g	0.1 mL				
160-18567-A-13-A	SU03-S-070-SS-P-00	ExtChrom, A-01-R	T	1.0024 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.: 160-18567-1

SDG No.:

Batch Number: 266565 Batch Start Date: 08/25/16 15:54 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 08/31/16 11:14

Batch Notes	
Balance ID	0034150065
Analyst ID - Column	nmn per scb
Column Date	8/30/16
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	8/31/16
Pipette ID	rad104
Analyst ID - Reagent Drop Witness	rjs
Analyst ID - Reagent Drop	ats
SOP Number	st-rc-0003, st-rc-0004, st-rc-0100, st-rc-0242

Basis	Basis Description
T	Total/NA

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:27PM 9/7/2016

Sample

Sample Name: MB 160-266565/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-266565/1-A
Sample Collection Date: 8/31/2016 11:21:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176260
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

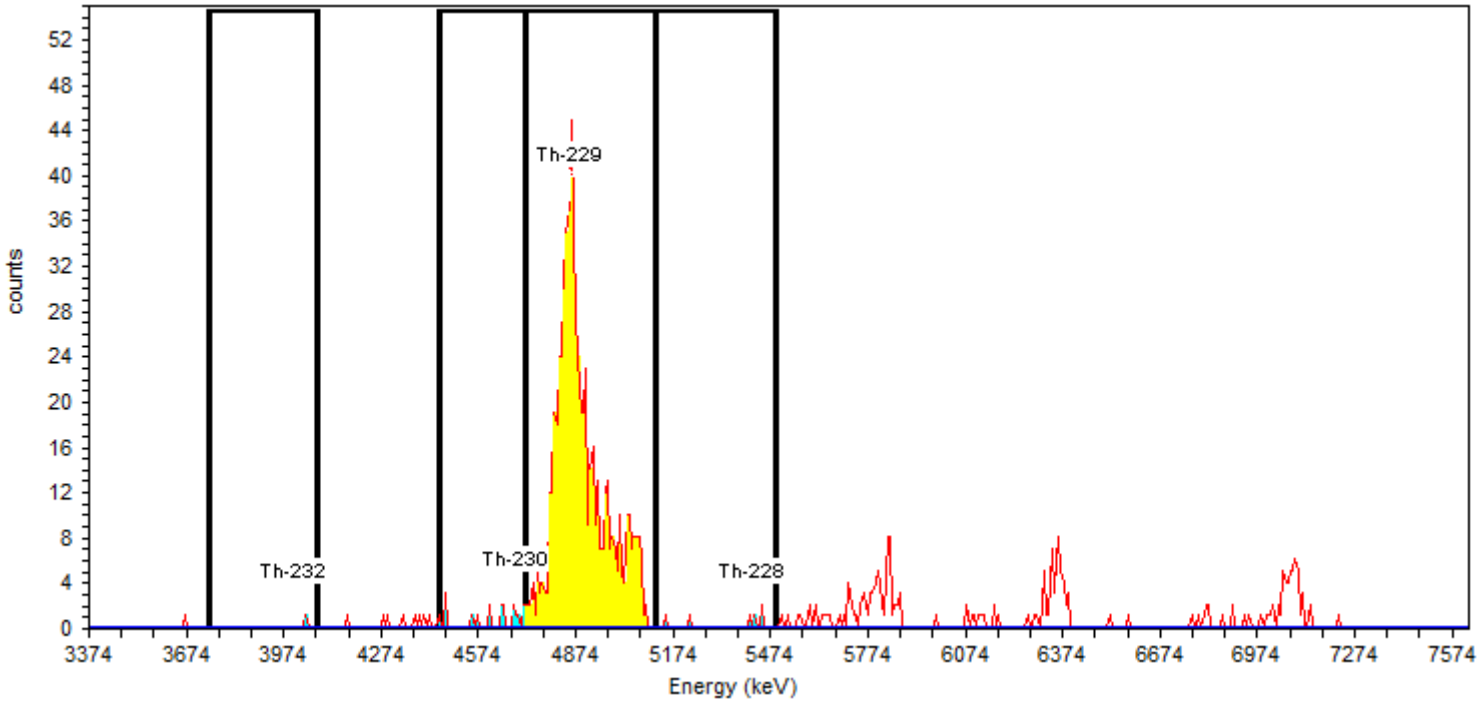
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.52%

Acquisition

Detector: AV171 SN: 50-112 Y2
Acquisition Start Date: 9/7/2016 2:38:43PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV171; Det: AV171; Spectrum #1; 9/1/2016 3:17:13 PM

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	9.8	100.2	1	0.0000	1.00	4.736E-003	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.3	99.7	20	0.0000	19.69	9.373E-002	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.6	99.6	637	1.2500	635.75	2.923E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	10.0	99.8	6	5.8333	0.17	7.929E-004	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:57PM 9/7/2016

Sample

Sample Name: LCS 160-266565/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-266565/2-A
Sample Collection Date: 8/31/2016 11:21:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176264
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

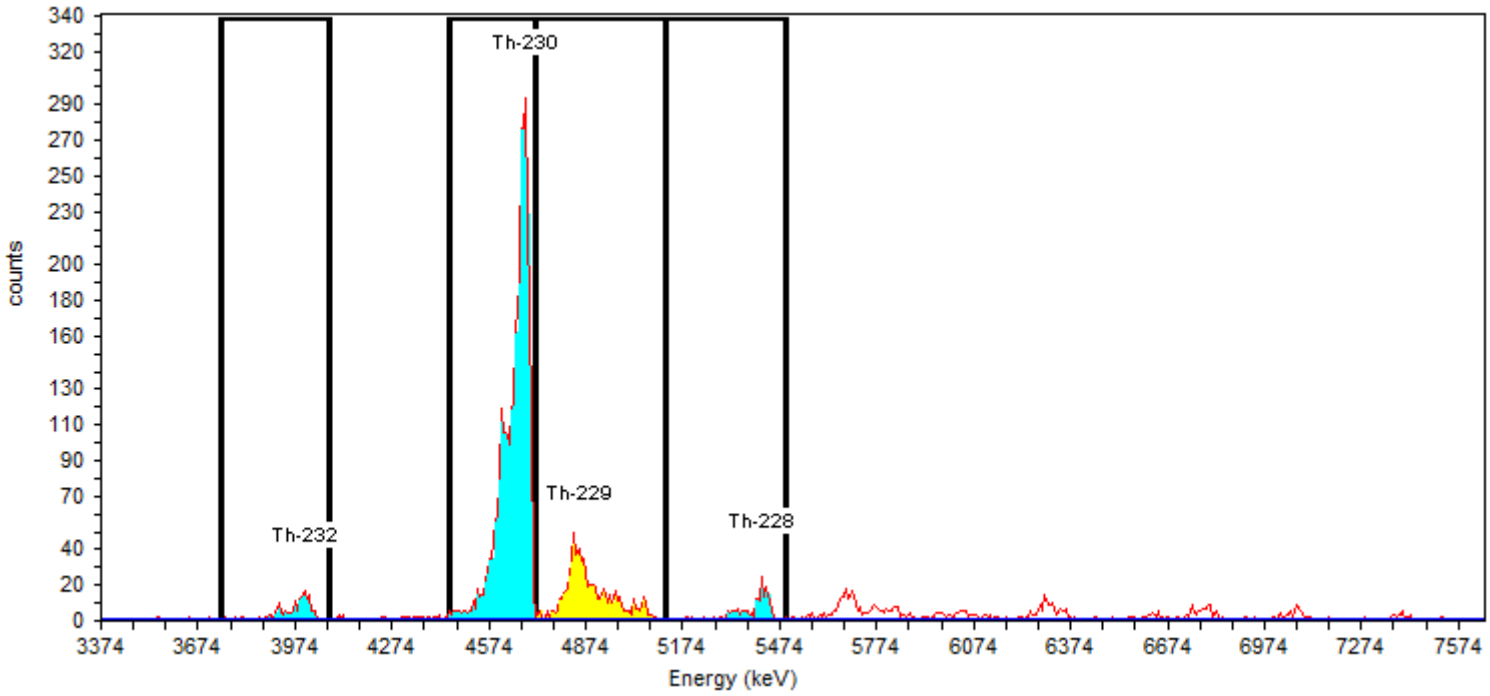
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.96%

Acquisition

Detector: AV172 SN: 50-112 Y3
Acquisition Start Date: 9/7/2016 2:38:44PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV172; Det: AV172; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-9884;AV172-20151016
Efficiency Calibration:IC-9884;AV172-20151016
Calibration Date: 10/17/2015 2:36:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	65.5	100.2	133	0.4167	132.58	1.262E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.2	99.7	2632	0.0000	2632.14	2.518E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.6	99.6	633	1.2500	631.81	5.866E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	145	5.0000	139.91	1.338E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:53PM 9/7/2016

Sample

Sample Name: 160-18567-A-1-D Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-1-D
Sample Collection Date: 8/9/2016 9:45:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176255
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

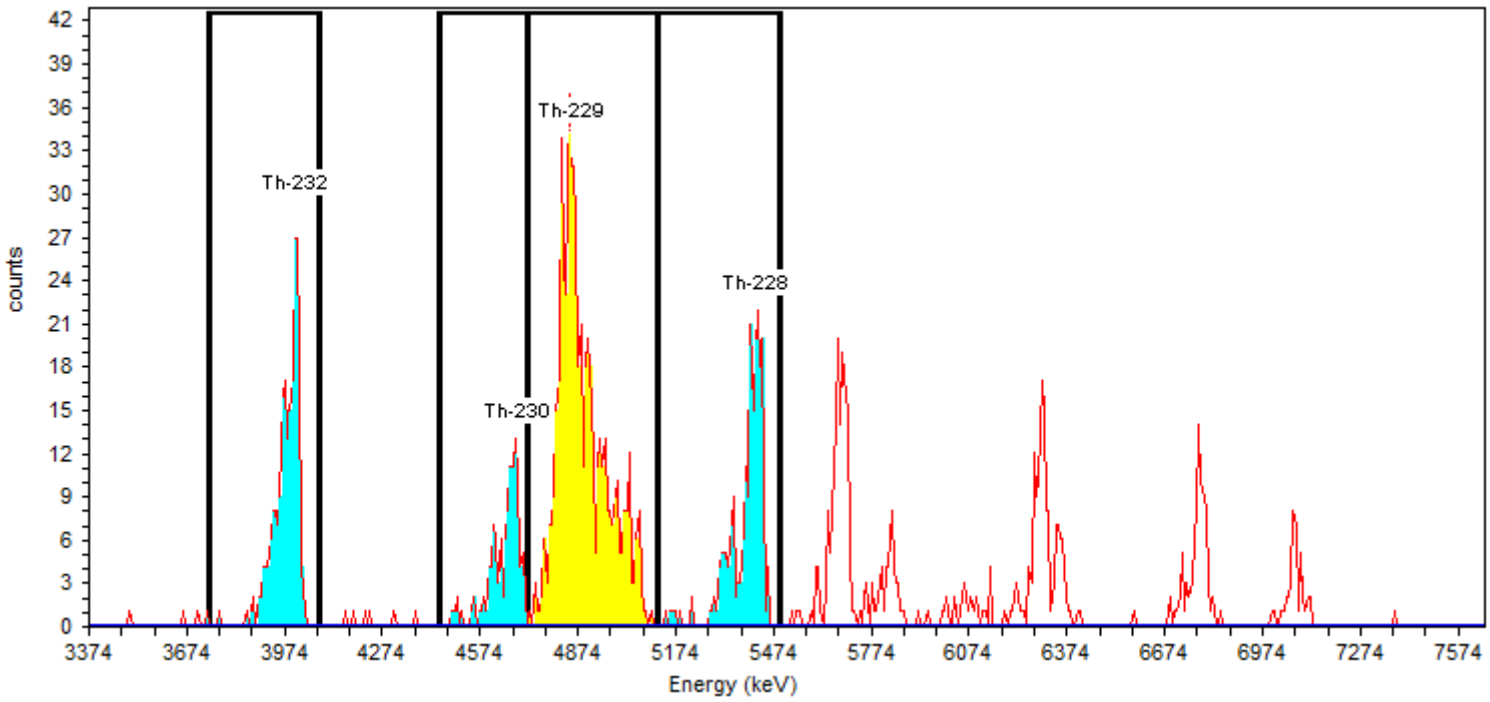
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.55%

Acquisition

Detector: AV195 SN: 50-117AA2
Acquisition Start Date: 9/7/2016 2:38:46PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV195; Det: AV195; Spectrum #1; 9/1/2016 3:17:13 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:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.6	100.2	215	0.4167	214.58	1.159E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.0	99.7	116	1.6667	114.36	6.212E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.7	99.6	559	1.2500	557.78	2.441E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.6	99.8	206	5.3445	200.66	2.417E+007	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:06PM 9/7/2016

Sample

Sample Name: 160-18567-A-2-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-2-C
Sample Collection Date: 8/9/2016 10:00:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176257
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

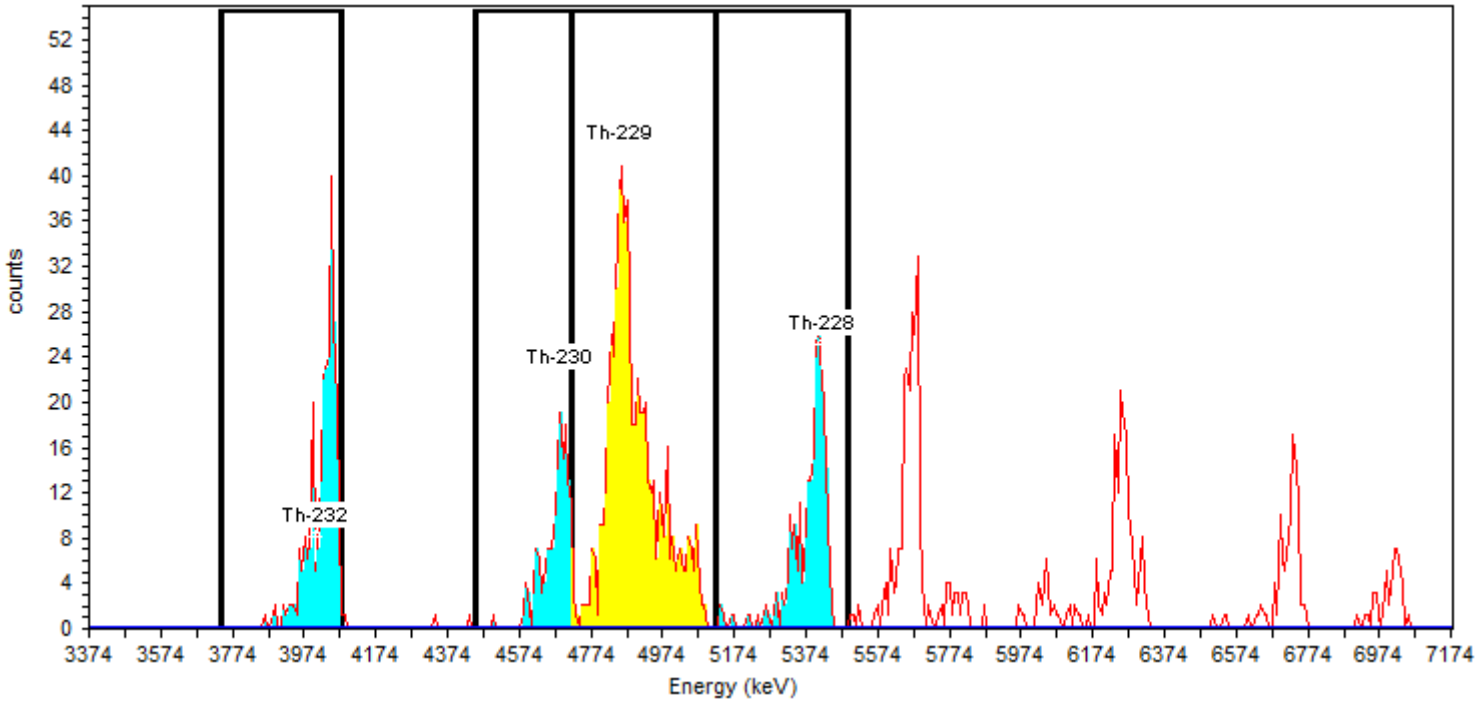
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.98%

Acquisition

Detector: AV198 SN: 50-117AA7
Acquisition Start Date: 9/7/2016 2:38:46PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 9/2/2016 10:55:26AM
Bkgd Info: Sample: ICB;AV198; Det: AV198; Spectrum #1; 9/2/2016 10:55:26 AM

Energy Calibration: CCV-9795;AV198-20151122
Efficiency Calibration:CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.90% +/- 0.46% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	35.7	100.2	253	1.4896	251.64	1.200E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	60.8	99.7	153	0.0000	152.75	7.322E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.4	99.6	632	0.4167	631.34	2.754E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.6	99.8	234	7.9167	226.17	2.404E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:05:31AM 9/8/2016

Sample

Sample Name: 160-18567-A-2-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-2-C
Sample Collection Date: 8/9/2016 10:00:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176277
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

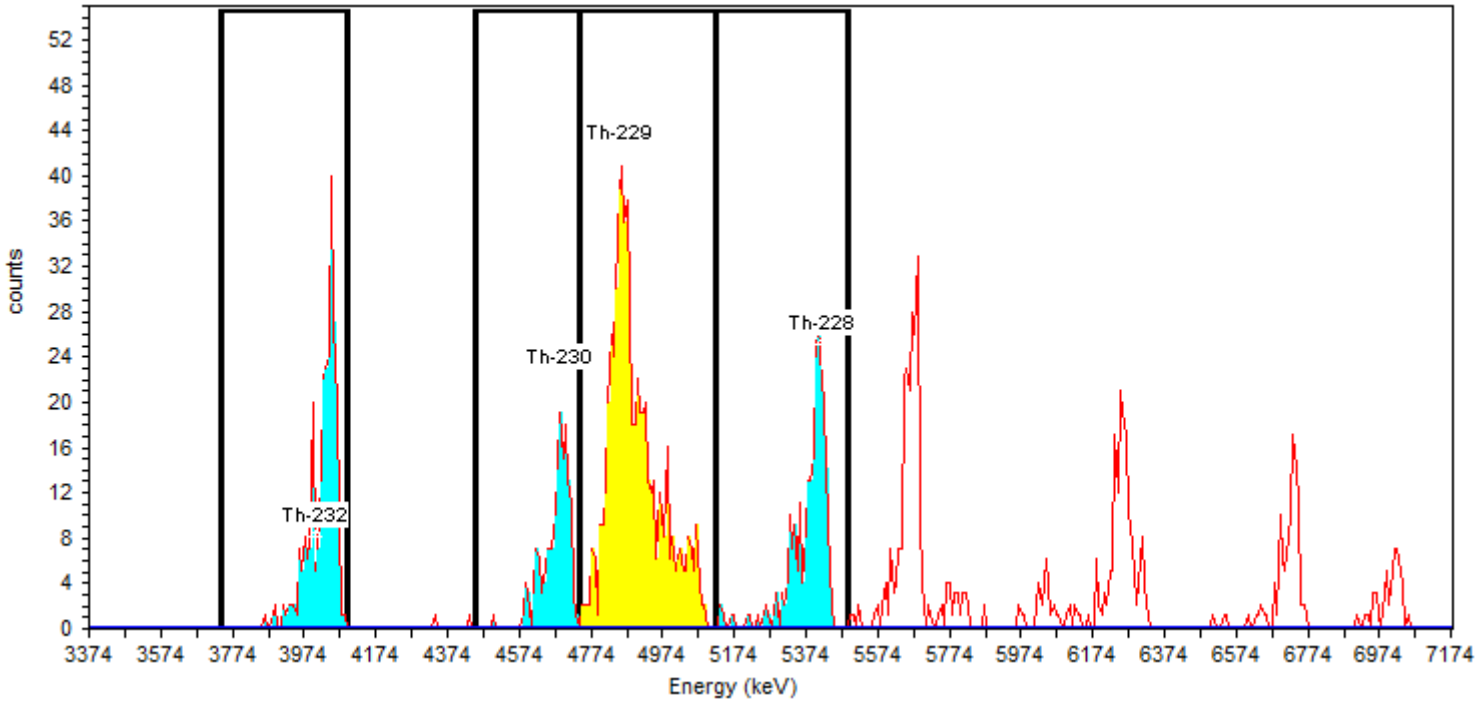
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.29%

Acquisition

Detector: AV198 SN: 50-117AA7
Acquisition Start Date: 9/7/2016 2:38:46PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 9/2/2016 10:55:26AM
Bkgd Info: Sample: ICB;AV198; Det: AV198; Spectrum #1; 9/2/2016 10:55:26 AM

Energy Calibration: CCV-9795;AV198-20151122
Efficiency Calibration:CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.90% +/- 0.46% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/08/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	24.4	99.7	157	0.0000	157.00	7.668E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	84.4	99.6	620	0.4167	619.58	2.703E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.6	99.8	234	7.9167	226.17	2.450E+007	pCi/g
Th-232	3999.0	4,010.0	-11.0	3739.8	4090.3	32.7	100.2	260	1.6667	258.33	1.255E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:14PM 9/7/2016

Sample

Sample Name: 160-18567-A-3-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-3-C
Sample Collection Date: 8/9/2016 9:31:00AM
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: 266565
AnalysisResultsID: 176258
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

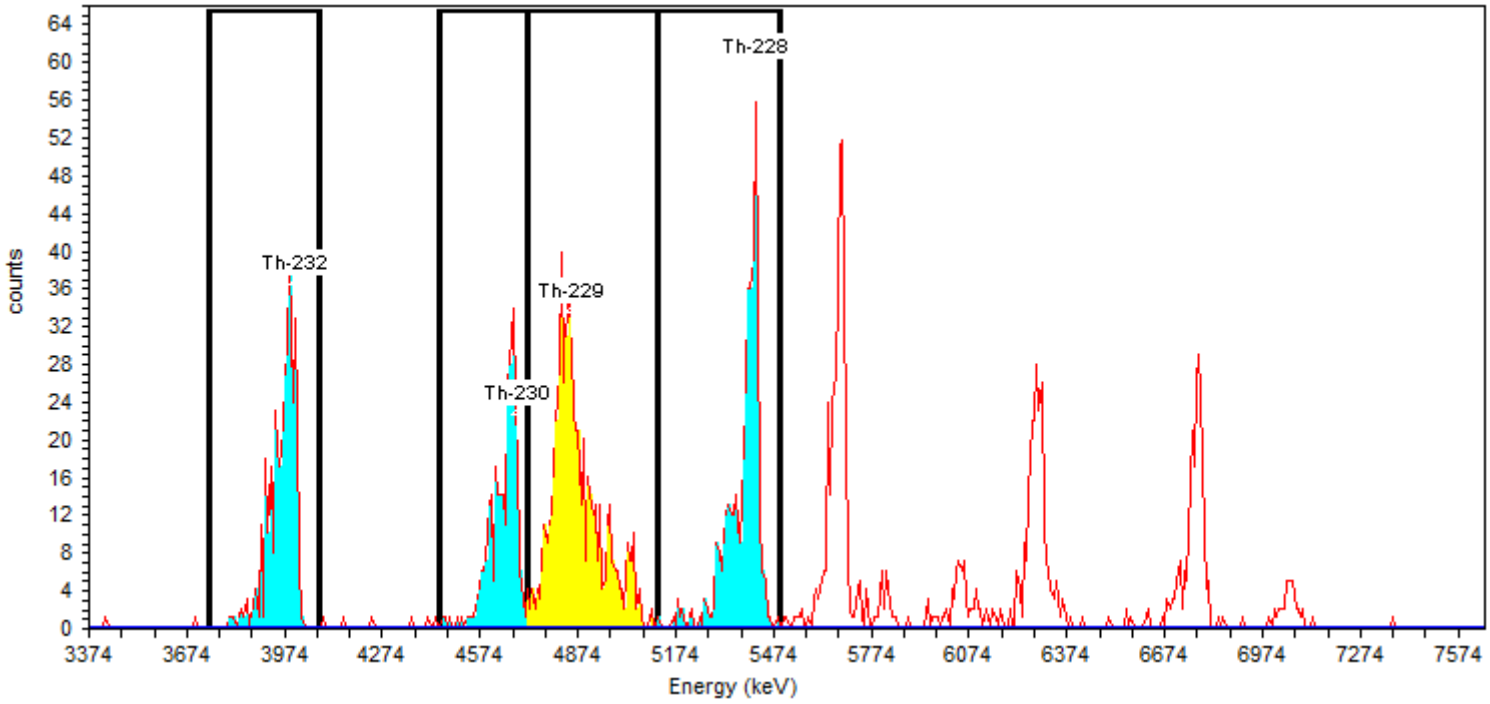
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.25%

Acquisition

Detector: AV199 SN: 50-117Z3
Acquisition Start Date: 9/7/2016 2:38:46PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 9/1/2016 3:17:14PM
Bkgd Info: Sample: ICB;AV199; Det: AV199; Spectrum #1; 9/1/2016 3:17:14 PM

Energy Calibration: IC-9817;AV199-20151017
Efficiency Calibration:IC-9817;AV199-20151017
Calibration Date: 10/18/2015 3:55:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.71% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	75.9	100.2	345	0.4167	344.58	1.795E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	23.5	99.7	282	0.8333	281.10	1.473E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.1	99.6	579	1.2500	577.62	2.641E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.1	99.8	408	5.8333	402.10	4.672E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:18:55PM 9/7/2016

Sample

Sample Name: 160-18567-A-4-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-4-C
Sample Collection Date: 8/9/2016 9:36:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176244
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

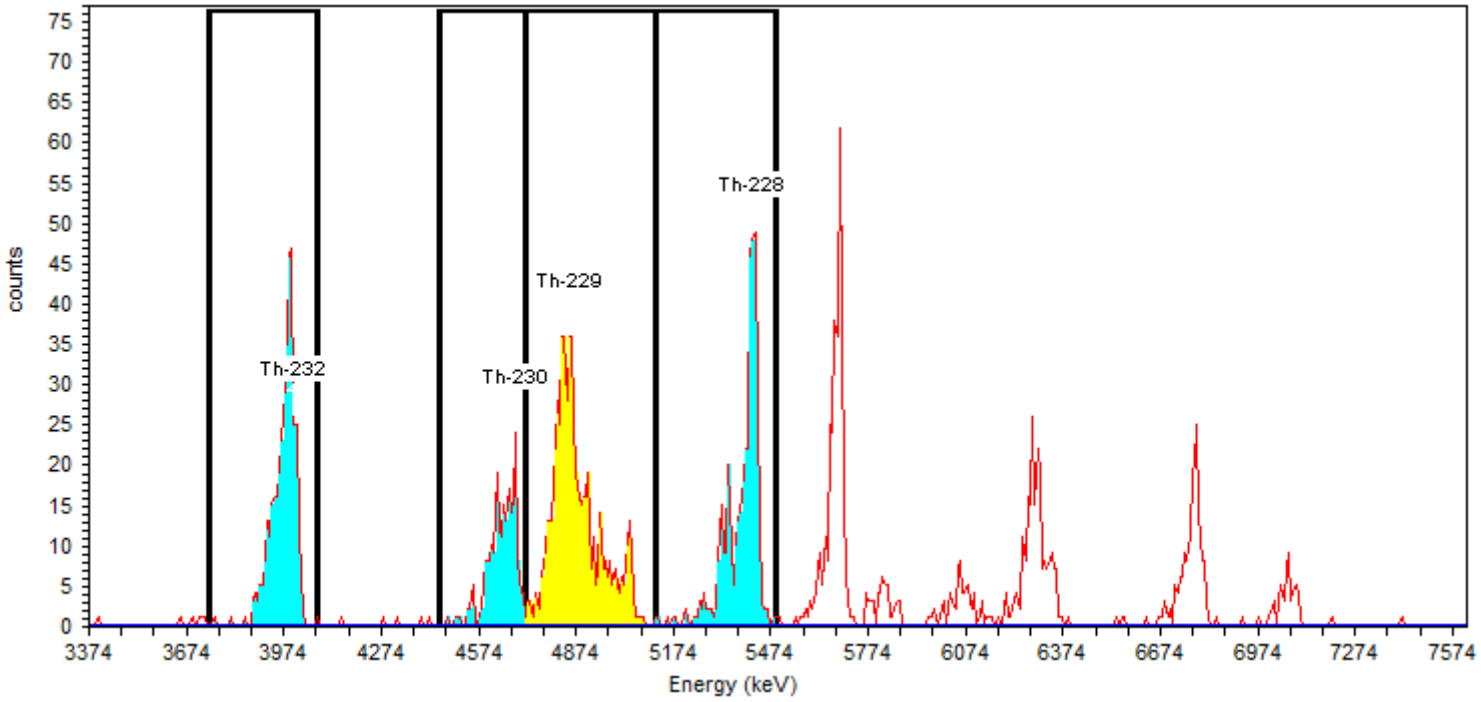
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.64%

Acquisition

Detector: AV200 SN: 50-117J6
Acquisition Start Date: 9/7/2016 2:38:47PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:26AM
Bkgd Info: Sample: ICB;AV200; Det: AV200; Spectrum #1; 9/2/2016 10:55:26 AM

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:
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	372	1.2500	370.29	1.902E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.8	99.7	216	1.3784	214.68	1.109E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.5	99.6	587	0.8333	586.16	2.715E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.2	99.8	395	7.5000	387.44	4.439E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:36:59PM 9/8/2016

Sample

Sample Name: 160-18567-A-5-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-5-C
Sample Collection Date: 8/9/2016 9:40:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176424
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

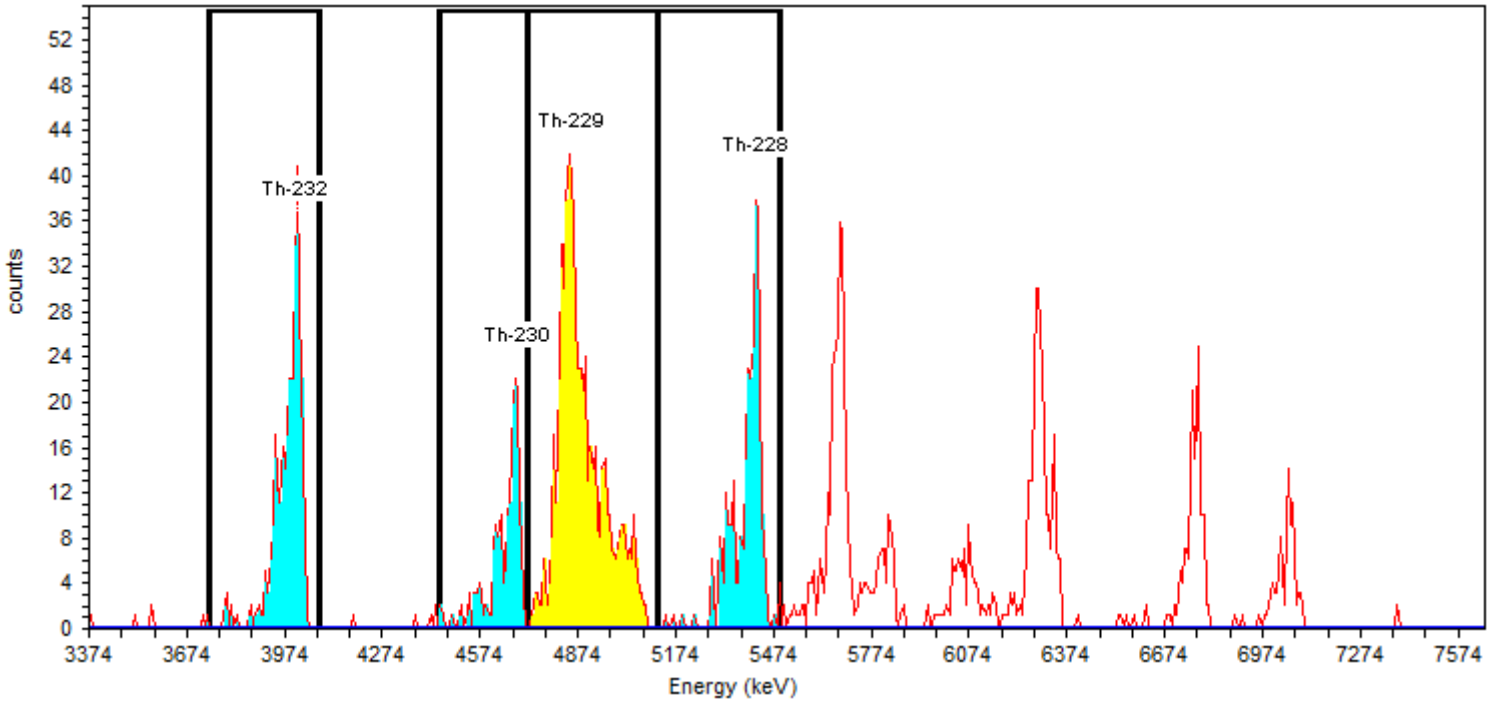
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.56%

Acquisition

Detector: AV148 SN: 50-05/R2
Acquisition Start Date: 9/8/2016 3:56:56PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:27PM
Bkgd Info: Sample: ICB;AV148; Det: AV148; Spectrum #1; 9/1/2016 3:17:27 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:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	62.4	100.2	306	0.4167	305.58	1.453E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.0	99.7	169	0.7050	168.68	8.061E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.7	99.6	636	2.0833	633.92	2.685E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.0	99.8	302	7.0833	294.57	1.408E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:37:21PM 9/8/2016

Sample

Sample Name: 160-18567-A-6-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-6-C
Sample Collection Date: 8/9/2016 9:24:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176428
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

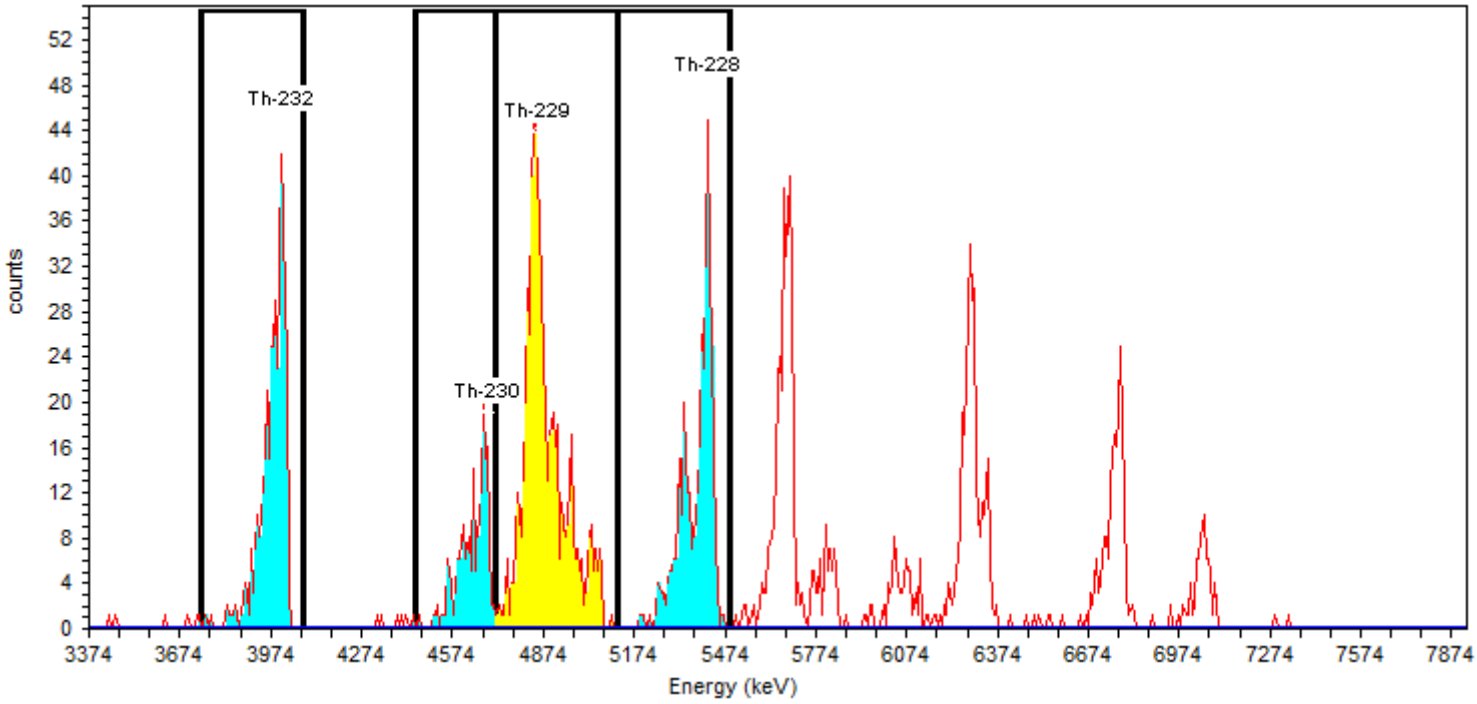
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 93.82%

Acquisition

Detector: AV149 SN: 50-05/R3
Acquisition Start Date: 9/8/2016 3:56:56PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:27PM
Bkgd Info: Sample: ICB;AV149; Det: AV149; Spectrum #1; 9/1/2016 3:17:27 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:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	75.3	100.2	354	0.0000	354.00	1.768E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.8	99.7	176	0.2883	176.05	8.834E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.7	99.6	604	0.0000	604.03	2.846E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.9	99.8	365	6.2861	358.71	1.801E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:10PM 9/7/2016

Sample

Sample Name: 160-18567-A-7-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-7-C
Sample Collection Date: 8/9/2016 9:44:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176247
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

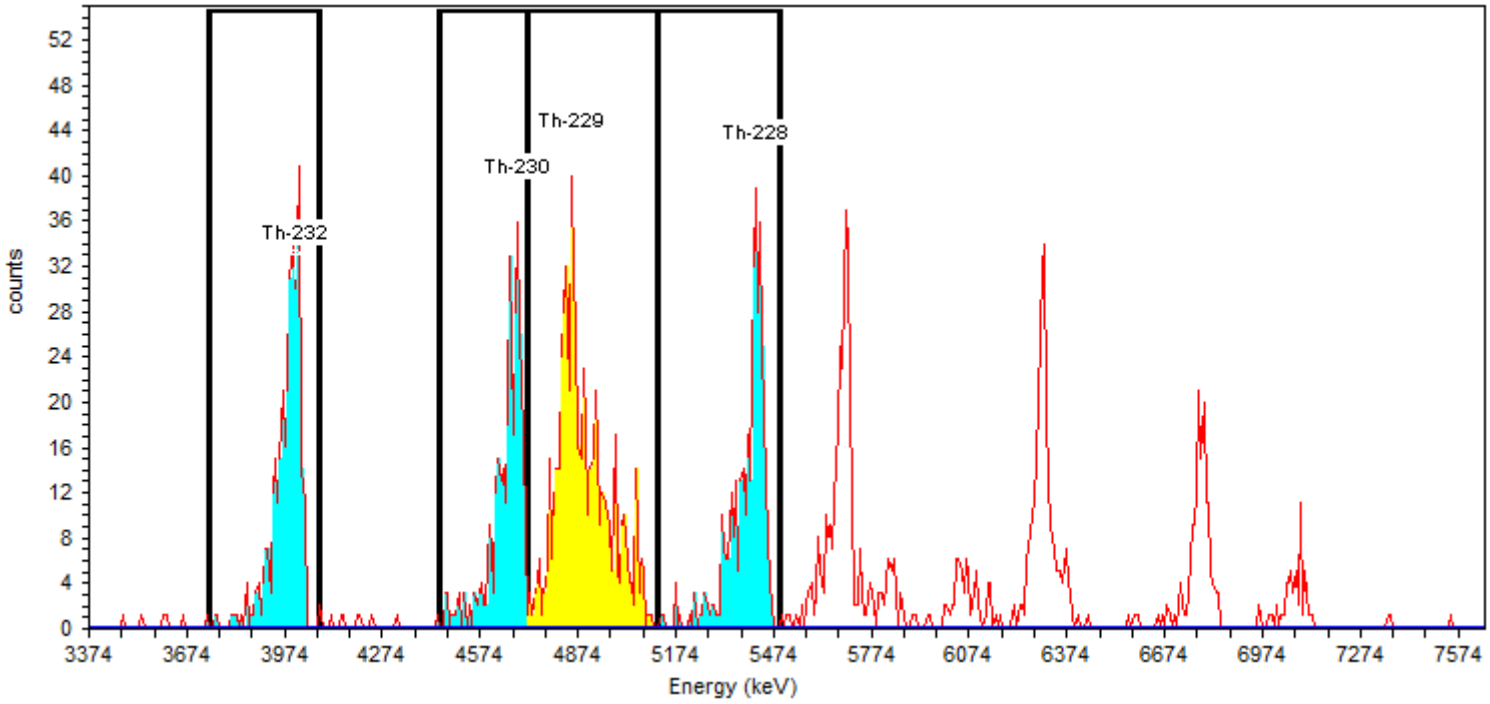
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.94%

Acquisition

Detector: AV203 SN: 50-117J4
Acquisition Start Date: 9/7/2016 2:38:47PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 9/1/2016 3:17:15PM
Bkgd Info: Sample: ICB;AV203; Det: AV203; Spectrum #1; 9/1/2016 3:17:15 PM

Energy Calibration: IC-7107;AV203-20151018a
Efficiency Calibration:IC-7107;AV203-20151018a
Calibration Date: 10/18/2015 6:42:12PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.98% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	74.2	100.2	348	0.4167	347.67	1.812E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.8	99.7	302	0.4167	301.95	1.583E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.3	99.6	581	3.7234	577.34	2.511E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	64.1	99.8	346	7.8900	338.20	3.931E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:21:05PM 9/7/2016

Sample

Sample Name: 160-18567-A-8-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-8-C
Sample Collection Date: 8/9/2016 9:27:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176265
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

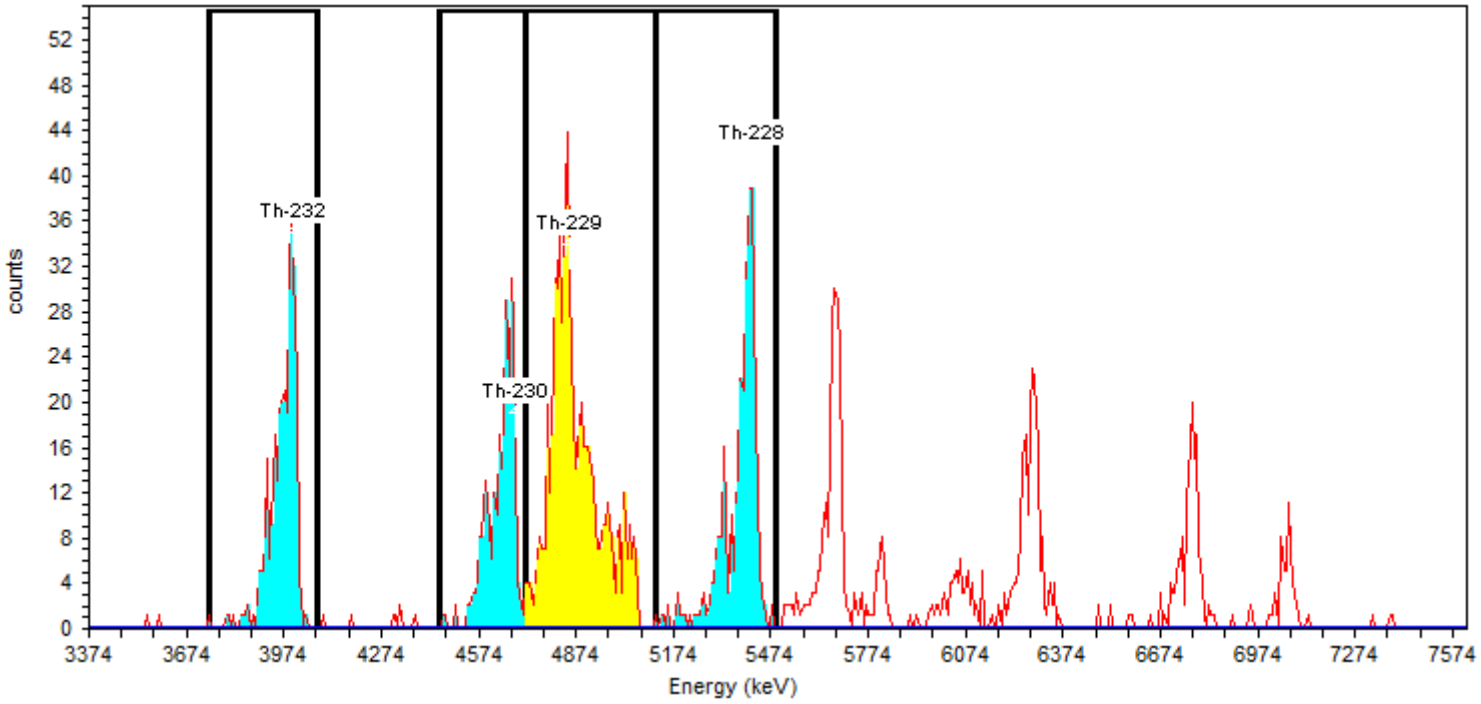
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.68%

Acquisition

Detector: AV204 SN: 50-117I4
Acquisition Start Date: 9/7/2016 2:38:47PM
Live Time: 400.00 min.
Real Time: 400.09 min.
Background Date: 9/2/2016 10:55:27AM
Bkgd Info: Sample: ICB;AV204; Det: AV204; Spectrum #1; 9/2/2016 10:55:27 AM

Energy Calibration: IC-8874;AV204-20151018a
Efficiency Calibration:IC-8874;AV204-20151018a
Calibration Date: 10/18/2015 6:42:20PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.27% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	67.0	100.2	299	0.4167	298.16	1.422E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.6	99.7	279	0.4167	278.58	1.336E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.2	99.6	632	0.8333	631.10	2.716E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.0	99.8	351	4.5833	346.35	3.685E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:27PM 9/7/2016

Sample

Sample Name: 160-18567-A-9-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-9-C
Sample Collection Date: 8/9/2016 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: 266565
AnalysisResultsID: 176250
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

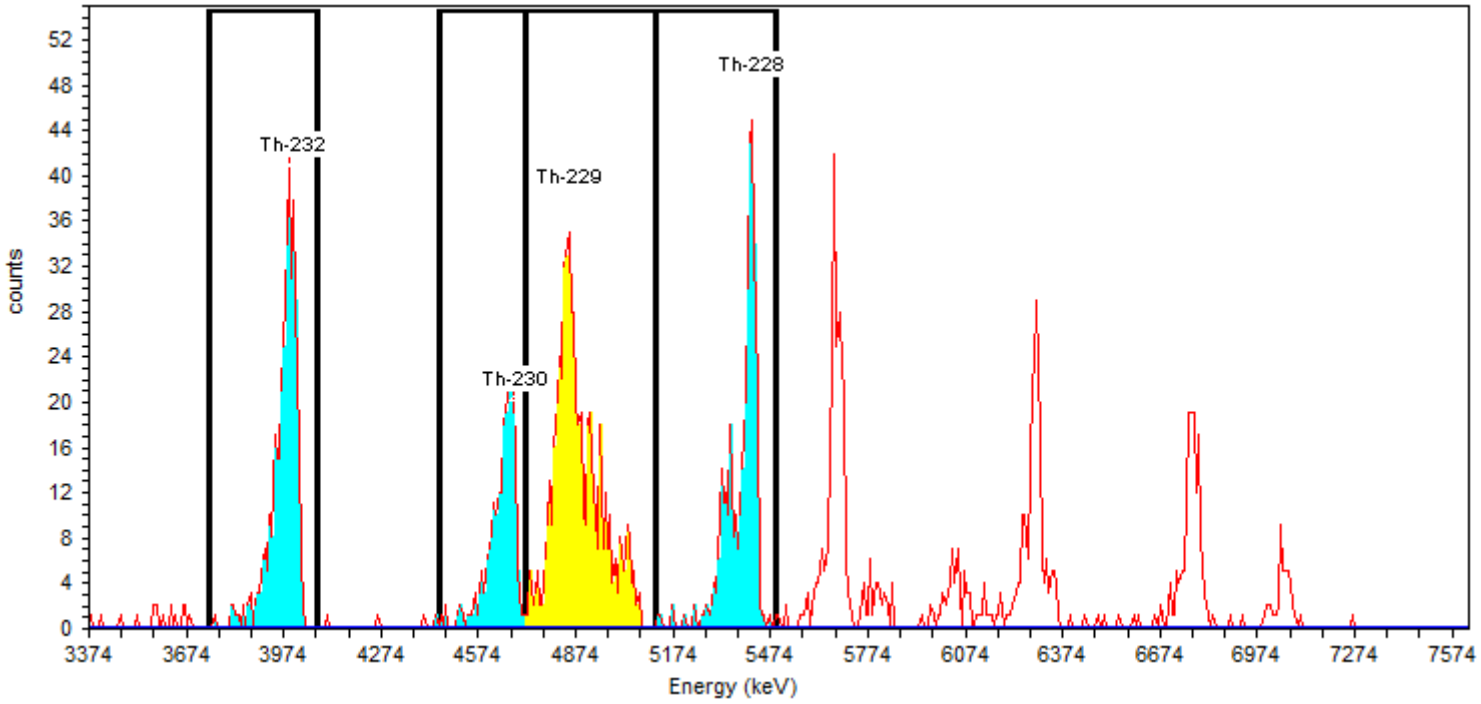
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.26%

Acquisition

Detector: AV205 SN: 49-155dd3
Acquisition Start Date: 9/7/2016 2:38:48PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:16PM
Bkgd Info: Sample: ICB;AV205; Det: AV205; Spectrum #1; 9/1/2016 3:17:16 PM

Energy Calibration: IC-8875;AV205-20151018a
Efficiency Calibration:IC-8875;AV205-20151018a
Calibration Date: 10/18/2015 6:42:32PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.67% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.4	100.2	349	0.4167	348.58	1.893E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.8	99.7	218	0.4038	217.90	1.190E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.0	99.6	555	1.6271	553.37	2.638E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.6	99.8	340	0.8067	339.19	4.108E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:37:05PM 9/8/2016

Sample

Sample Name: 160-18567-A-10-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-10-C
Sample Collection Date: 8/9/2016 8:30:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176425
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

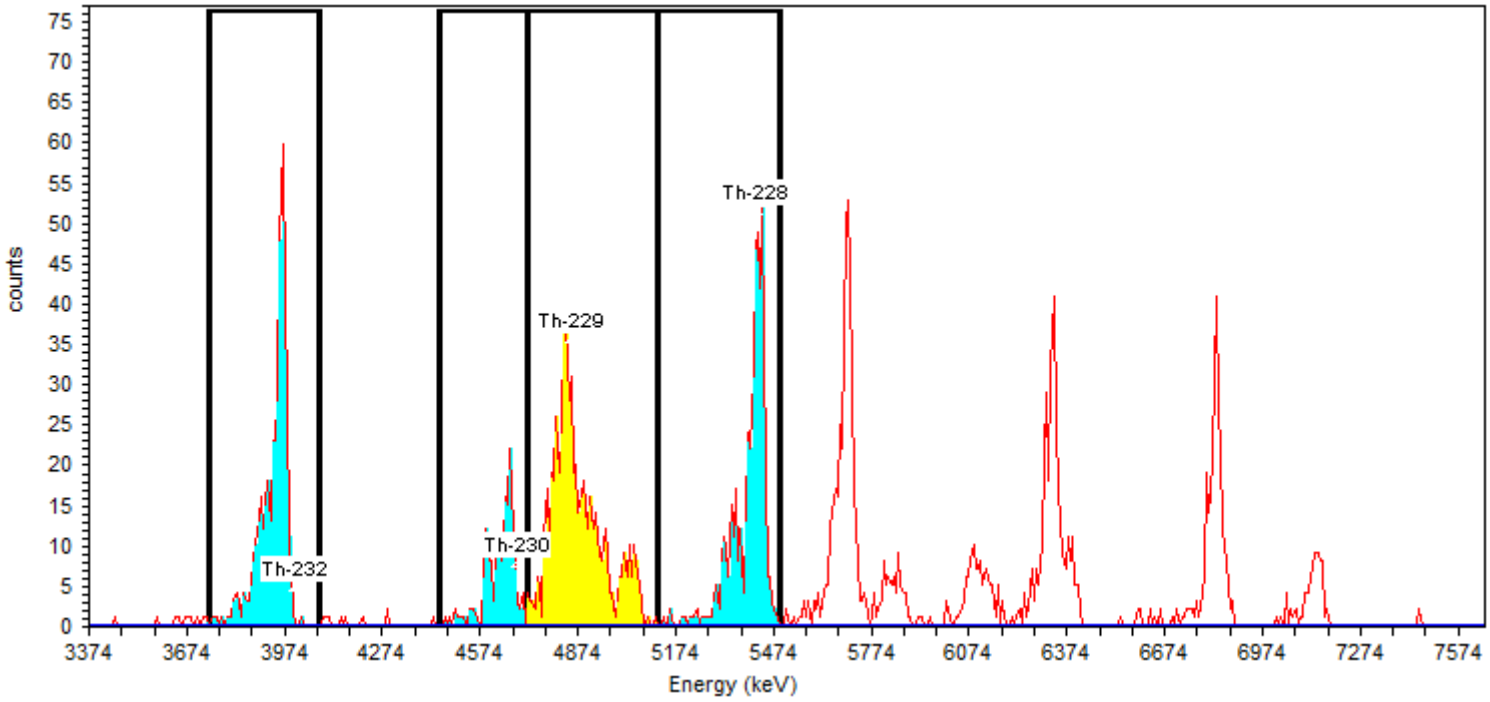
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.26%

Acquisition

Detector: AV150 SN: 50-05/R4
Acquisition Start Date: 9/8/2016 3:56:57PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:27PM
Bkgd Info: Sample: ICB;AV150; Det: AV150; Spectrum #1; 9/1/2016 3:17:27 PM

Energy Calibration: IC-8876;AV150-20151016
Efficiency Calibration:IC-8876;AV150-20151016
Calibration Date: 10/16/2015 6:46:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.45% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	52.3	100.2	402	0.8333	401.59	2.070E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	40.5	99.7	176	0.4167	175.55	9.095E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	92.7	99.6	586	1.2500	584.78	2.706E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.4	99.8	444	6.2500	437.81	2.269E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:37:10PM 9/8/2016

Sample

Sample Name: 160-18567-A-11-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-11-C
Sample Collection Date: 8/9/2016 8:40:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176426
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

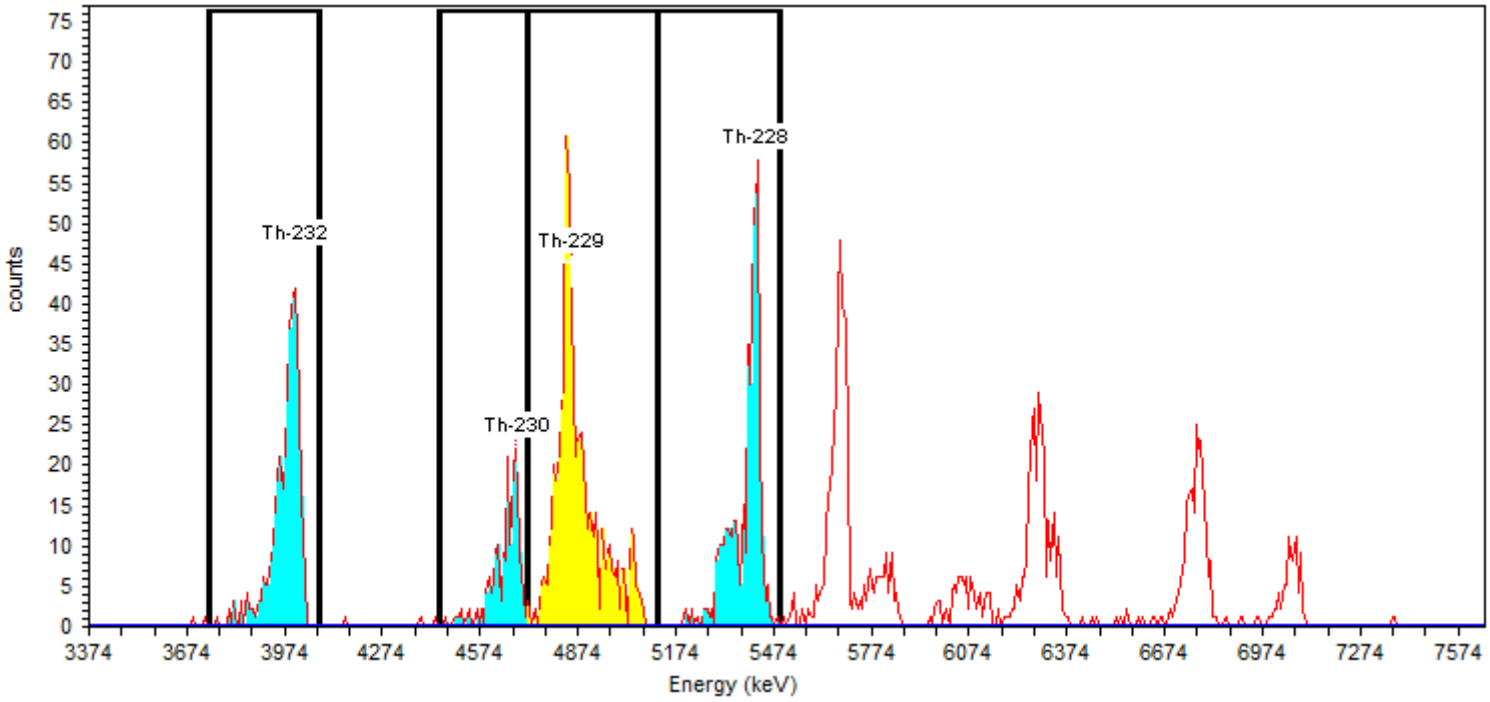
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.56%

Acquisition

Detector: AV153 SN: 54-011 Y6
Acquisition Start Date: 9/8/2016 3:56:57PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:07PM
Bkgd Info: Sample: ICB;AV153; Det: AV153; Spectrum #1; 9/1/2016 3:17:07 PM

Energy Calibration: IC-9792;AV153-20151016
Efficiency Calibration:IC-9792;AV153-20151016
Calibration Date: 10/16/2015 6:46:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.60% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/7/2016 2:29:56PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	62.2	100.2	385	0.4167	384.58	1.832E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.3	99.7	178	0.0000	177.97	8.519E-001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.1	99.6	632	0.8333	631.14	2.677E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.7	99.8	425	4.5833	420.42	2.013E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:37PM 9/7/2016

Sample

Sample Name: 160-18567-A-12-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-12-C
Sample Collection Date: 8/9/2016 8:45:00AM
Comment:

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

Batch

Batch Name: 266565
AnalysisResultsID: 176252
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

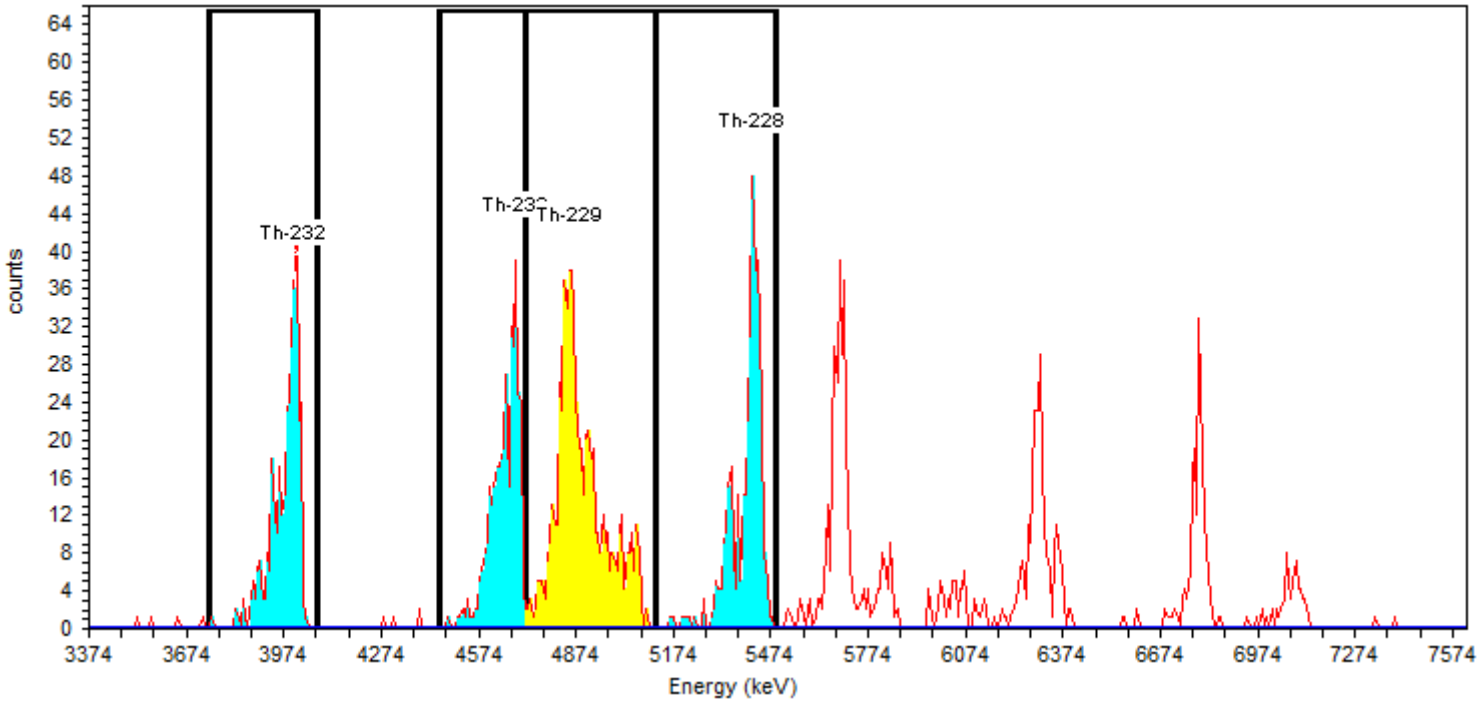
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 91.87%

Acquisition

Detector: AV208 SN: 50-112Z6
Acquisition Start Date: 9/7/2016 2:38:48PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:28AM
Bkgd Info: Sample: ICB;AV208; Det: AV208; Spectrum #1; 9/2/2016 10:55:28 AM

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:
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.8	100.2	340	0.4167	340.01	1.632E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.1	99.7	355	0.0000	355.00	1.713E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.0	99.6	629	0.8600	628.14	2.786E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.4	99.8	384	7.5266	376.47	4.029E+007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:40PM 9/7/2016

Sample

Sample Name: 160-18567-A-13-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-13-C
Sample Collection Date: 8/9/2016 10:10:00AM
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: 266565
AnalysisResultsID: 176253
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

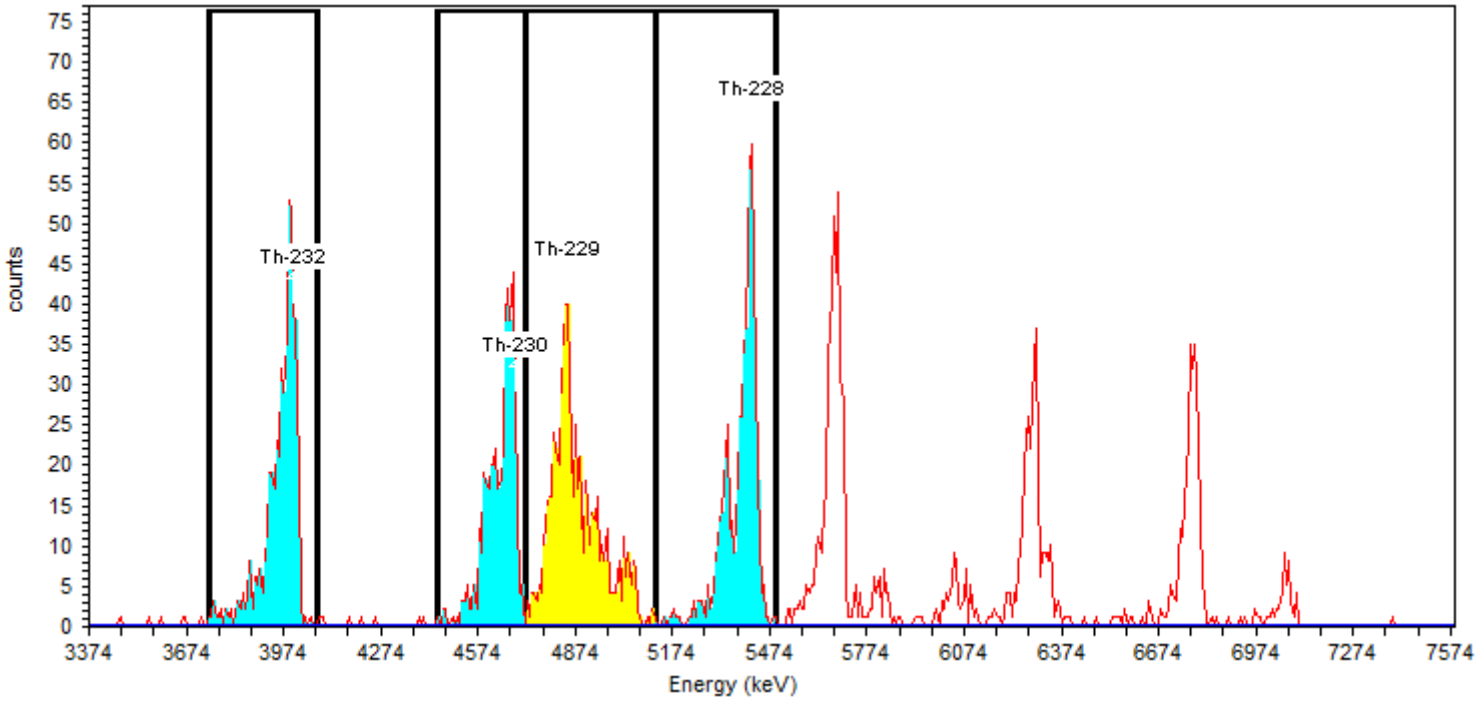
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.71%

Acquisition

Detector: AV209 SN: 50-117H7
Acquisition Start Date: 9/7/2016 2:38:48PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:16PM
Bkgd Info: Sample: ICB;AV209; Det: AV209; Spectrum #1; 9/1/2016 3:17:16 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:
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	62.2	100.2	480	3.0938	476.91	2.402E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.6	99.7	436	1.2500	434.53	2.200E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	90.6	99.6	600	3.7500	596.41	2.620E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.3	99.8	524	6.7388	517.24	5.809E+007	pCi/g

Prep Batch: 266566

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266566

Lab ID: MB 160-266566/1-A
Client ID:
Sigma: 2

Analyzed: 09/08/16 11:49
Detector: AV188
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	0.05109	0.0339	0.0341		pCi/g	0.100	0.0330	268671
Thorium-232	0.01000	0.0141	0.0142	U	pCi/g	0.100	0.0150	268671

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.748	0.224	0.322		pCi/g	0.0300	3.03	90.7	30 - 110

Lab ID: LCS 160-266566/2-A
Client ID:
Sigma: 2

Analyzed: 09/08/16 11:49
Detector: AV189
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	25.59	0.994	2.37		pCi/g	0.100	0.0776	268672

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.347	0.427	0.620		pCi/g	0.0311	6.04	88.6	30 - 110

Lab ID: 160-18567-14
Client ID: SU03-S-071-SS-P-00
Sigma: 2

Analyzed: 09/08/16 11:49
Detector: AV190
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.83	0.188	0.243		pCi/g	0.100	0.0144	268673
Thorium-232	1.38	0.162	0.199		pCi/g	0.100	0.0144	268673

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.67	0.214	0.310		pCi/g	0.0368	3.02	88.3	30 - 110

Lab ID: 160-18567-14 DU
Client ID: SU03-S-071-SS-P-00
Sigma: 2

Analyzed: 09/08/16 11:49
Detector: AV191
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	2.112	0.203	0.269		pCi/g	0.100	0.0357	268674
Thorium-232	1.524	0.172	0.214		pCi/g	0.100	0.0388	268674

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.915	0.233	0.338		pCi/g	0.0307	3.03	96.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266566

Lab ID: 160-18567-15 | Analyzed: 09/08/16 11:49 | Decay Corrected: No
Client ID: SU03-S-072-SS-P-00 | Detector: AV193 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	8.49	0.417	0.826		pCi/g	0.100	0.0154	268675
Thorium-232	2.75	0.237	0.331		pCi/g	0.100	0.0335	268675

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.62	0.216	0.309		pCi/g	0.0292	3.03	86.6	30 - 110

Lab ID: 160-18567-16 | Analyzed: 09/08/16 11:49 | Decay Corrected: No
Client ID: SU03-S-073-SS-P-00 | Detector: AV195 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	16.3	0.580	1.49		pCi/g	0.100	0.0415	268676
Thorium-232	3.86	0.281	0.429		pCi/g	0.100	0.0283	268676

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.57	0.212	0.303		pCi/g	0.0323	3.03	84.9	30 - 110

Lab ID: 160-18567-17 | Analyzed: 09/08/16 11:49 | Decay Corrected: No
Client ID: SU03-S-074-SS-P-00 | Detector: AV198 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.52	0.178	0.219		pCi/g	0.100	0.0156	268677
Thorium-232	1.26	0.162	0.194		pCi/g	0.100	0.0417	268677

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.53	0.210	0.299		pCi/g	0.0241	3.03	83.7	30 - 110

Lab ID: 160-18567-18 | Analyzed: 09/08/16 11:49 | Decay Corrected: No
Client ID: SU03-S-075-SS-P-00 | Detector: AV199 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.57	0.182	0.225		pCi/g	0.100	0.0344	268678
Thorium-232	1.28	0.164	0.196		pCi/g	0.100	0.0287	268678

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.65	0.220	0.313		pCi/g	0.0337	3.03	87.4	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 266566

Lab ID: 160-18567-19
Client ID: SU03-S-074-SS-DUP-00
Sigma: 2

Analyzed: 09/08/16 11:49
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	1.51	0.172	0.214		pCi/g	0.100	0.0369	268679
Thorium-232	1.51	0.171	0.213		pCi/g	0.100	0.0357	268679

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.89	0.232	0.335		pCi/g	0.0305	3.03	95.3	30 - 110

Lab ID: 160-18567-20
Client ID: SU03-S-060-SS-DUP-00
Sigma: 2

Analyzed: 09/08/16 11:49
Detector: AV201
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	1.09	0.151	0.177		pCi/g	0.100	0.0646	268680
Thorium-232	1.23	0.157	0.188		pCi/g	0.100	0.0278	268680

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.67	0.219	0.313		pCi/g	0.0489	3.02	88.1	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 160-266566/1-A	Thorium-230			0.05109		pCi/g							2.99414194
MB 160-266566/1-A	Thorium-232			0.01000	U	pCi/g							1.41172547

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-266566/2-A	Thorium-230		24.5	25.59		pCi/g	104	81 - 118					.6653575112

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-18567-14	Thorium-230	1.83		2.112		pCi/g			14	0.54	1.53	1	
160-18567-14	Thorium-232	1.38		1.524		pCi/g			10	0.36	1.01	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

SDG No.:

Batch Number: 266566 Batch Start Date: 08/25/16 15:56 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 09/01/16 15:04

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00021	TRM-2 00001	AnalysisComment		
MB 160-266566/1		ExtChrom, A-01-R		1.0 g	0.1 mL				
LCS 160-266566/2		ExtChrom, A-01-R		0.5016 g	0.1 mL	0.5016 g	TRM		
160-18567-A-14-A	SU03-S-071-SS-P-00	ExtChrom, A-01-R	T	1.0018 g	0.1 mL				
160-18567-A-14-A DU	SU03-S-071-SS-P-00	ExtChrom, A-01-R	T	1.0008 g	0.1 mL				
160-18567-A-15-A	SU03-S-072-SS-P-00	ExtChrom, A-01-R	T	1.0002 g	0.1 mL				
160-18567-A-16-A	SU03-S-073-SS-P-00	ExtChrom, A-01-R	T	0.9998 g	0.1 mL				
160-18567-A-17-A	SU03-S-074-SS-P-00	ExtChrom, A-01-R	T	1.0009 g	0.1 mL				
160-18567-A-18-A	SU03-S-075-SS-P-00	ExtChrom, A-01-R	T	1.0003 g	0.1 mL				
160-18567-A-19-A	SU03-S-074-SS-DUP-00	ExtChrom, A-01-R	T	0.9992 g	0.1 mL				
160-18567-A-20-A	SU03-S-060-SS-DUP-00	ExtChrom, A-01-R	T	1.0014 g	0.1 mL				

Batch Notes	
Balance ID	0034150065
Analyst ID - Column	ats per scb
Column Date	9/1/16
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	9/1/16
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
6:29:33PM 9/8/2016

Sample

Sample Name: MB 160-266566/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-266566/1-A
Sample Collection Date: 9/1/2016 3:11:00PM
Comment:

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

Batch

Batch Name: 266566
AnalysisResultsID: 176405
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

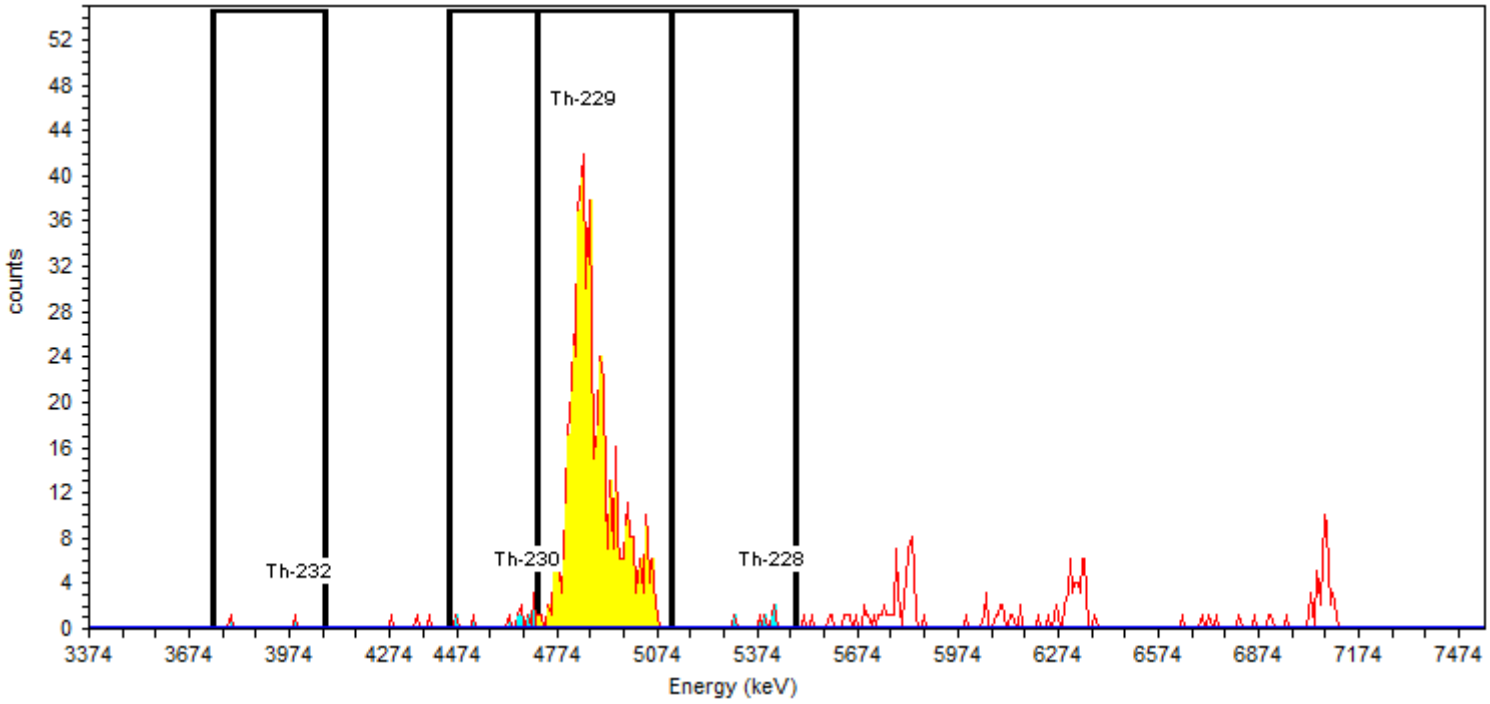
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.74%

Acquisition

Detector: AV188 SN: 50-110X4
Acquisition Start Date: 9/8/2016 11:49:32AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV188; Det: AV188; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-9886;AV188-20151017
Efficiency Calibration:IC-9886;AV188-20151017
Calibration Date: 10/17/2015 6:02:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.77% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:12AM
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	2	0.0000	2.00	1.000E-002	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	10.1	99.7	11	0.8333	10.17	5.109E-002	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.8	99.6	603	0.8333	602.17	2.748E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.5	99.8	6	5.8333	0.17	8.371E-004	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:29:43PM 9/8/2016

Sample

Sample Name: LCS 160-266566/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-266566/2-A
Sample Collection Date: 9/1/2016 3:11:00PM
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: 266566
AnalysisResultsID: 176406
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

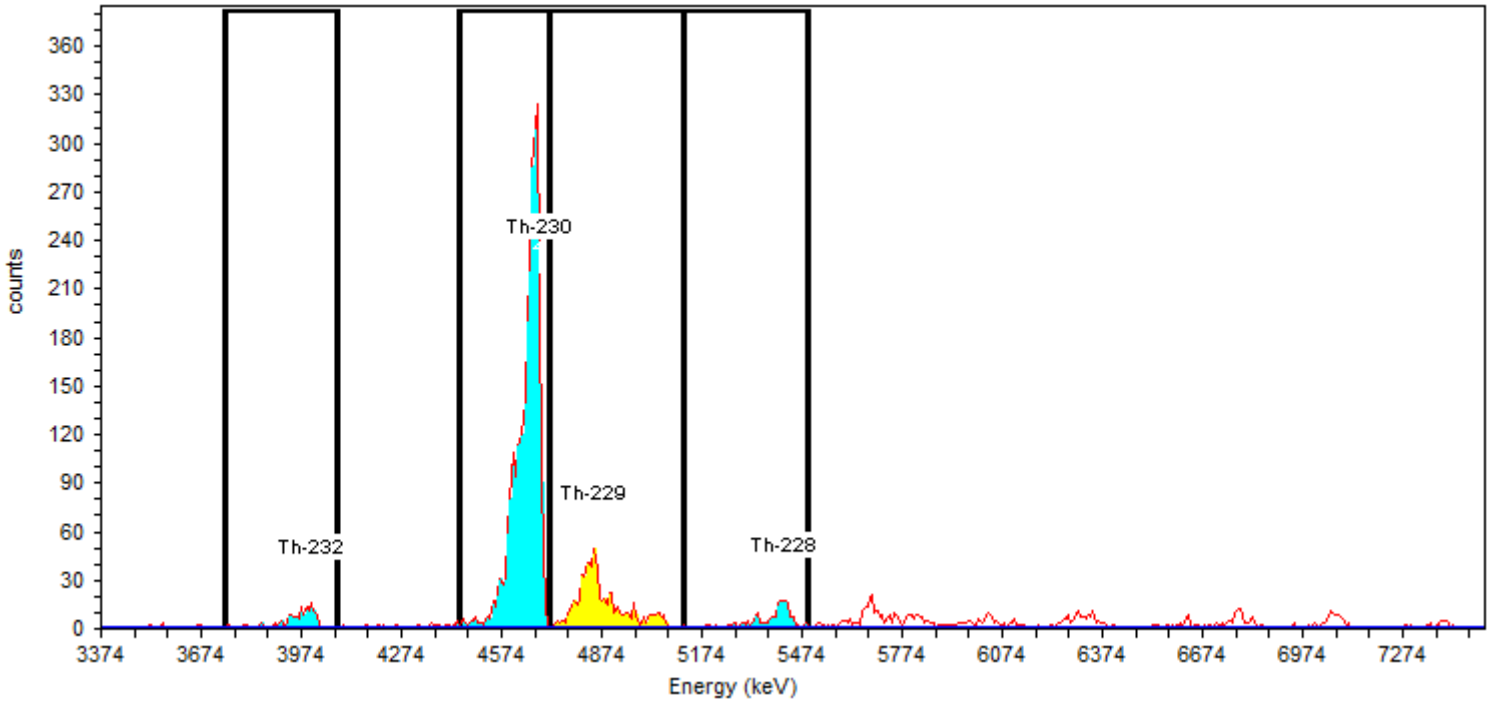
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.59%

Acquisition

Detector: AV189 SN: 50-112A3
Acquisition Start Date: 9/8/2016 11:49:32AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV189; Det: AV189; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-7107;AV189-20151017a
Efficiency Calibration:IC-7107;AV189-20151017a
Calibration Date: 10/18/2015 3:55:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.37% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	72.6	100.2	128	1.2500	127.18	1.220E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.9	99.7	2656	1.6667	2654.57	2.559E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.3	99.6	626	0.0266	625.91	5.348E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.5	99.8	159	6.6933	152.16	1.466E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:29:52PM 9/8/2016

Sample

Sample Name: 160-18567-A-14-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-14-C
Sample Collection Date: 8/9/2016 9:49:00AM
Comment:

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

Batch

Batch Name: 266566
AnalysisResultsID: 176408
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

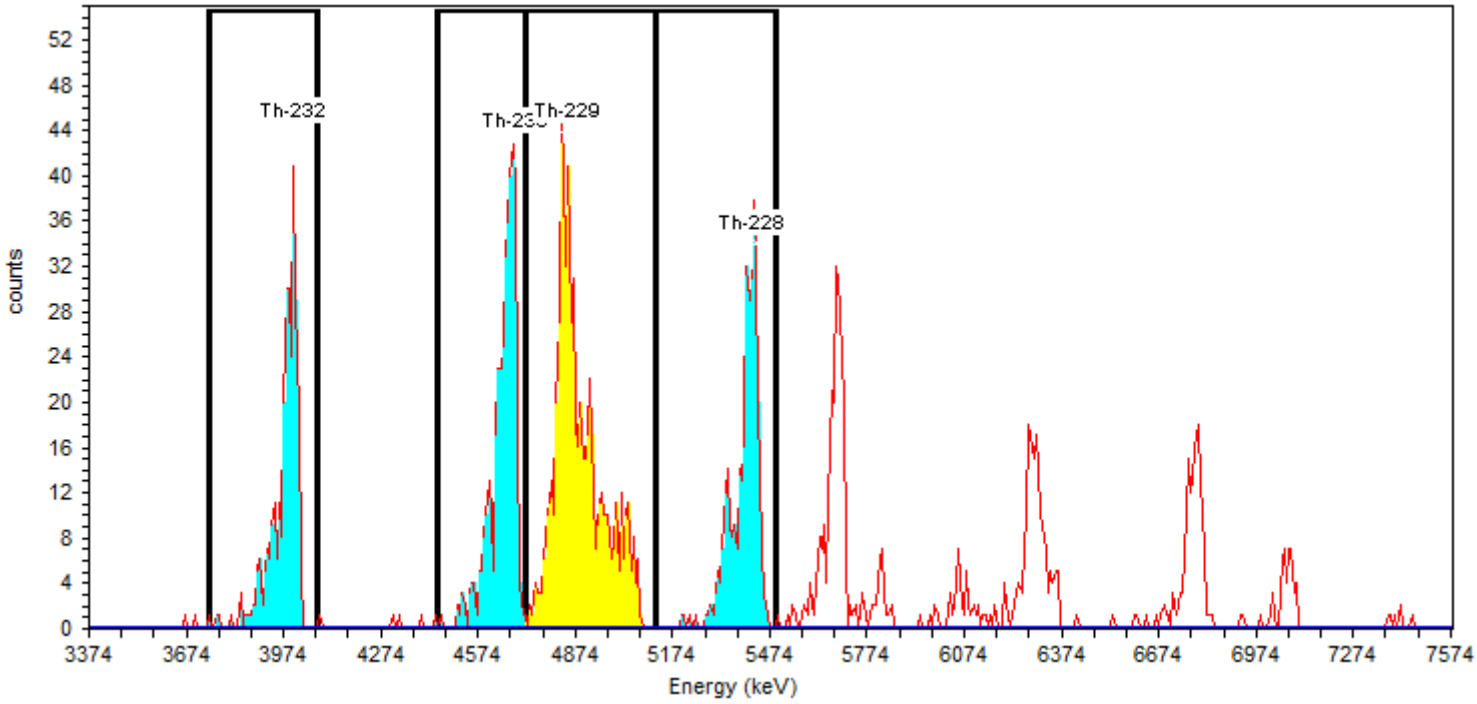
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.31%

Acquisition

Detector: AV190 SN: 50-119I7
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:12PM
Bkgd Info: Sample: ICB;AV190; Det: AV190; Spectrum #1; 9/1/2016 3:17:12 PM

Energy Calibration: IC-8874;AV190-20151017
Efficiency Calibration:IC-8874;AV190-20151017
Calibration Date: 10/18/2015 3:54:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
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	51.8	100.2	288	0.0000	287.57	1.377E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.6	99.7	381	0.0000	381.28	1.834E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.1	99.6	630	2.0833	627.89	2.670E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	61.9	99.8	325	6.6667	318.42	1.531E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:29:47PM 9/8/2016

Sample

Sample Name: 160-18567-A-14-D DU Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-14-D DU
Sample Collection Date: 8/9/2016 9:49:00AM
Comment:

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

Batch

Batch Name: 266566
AnalysisResultsID: 176407
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

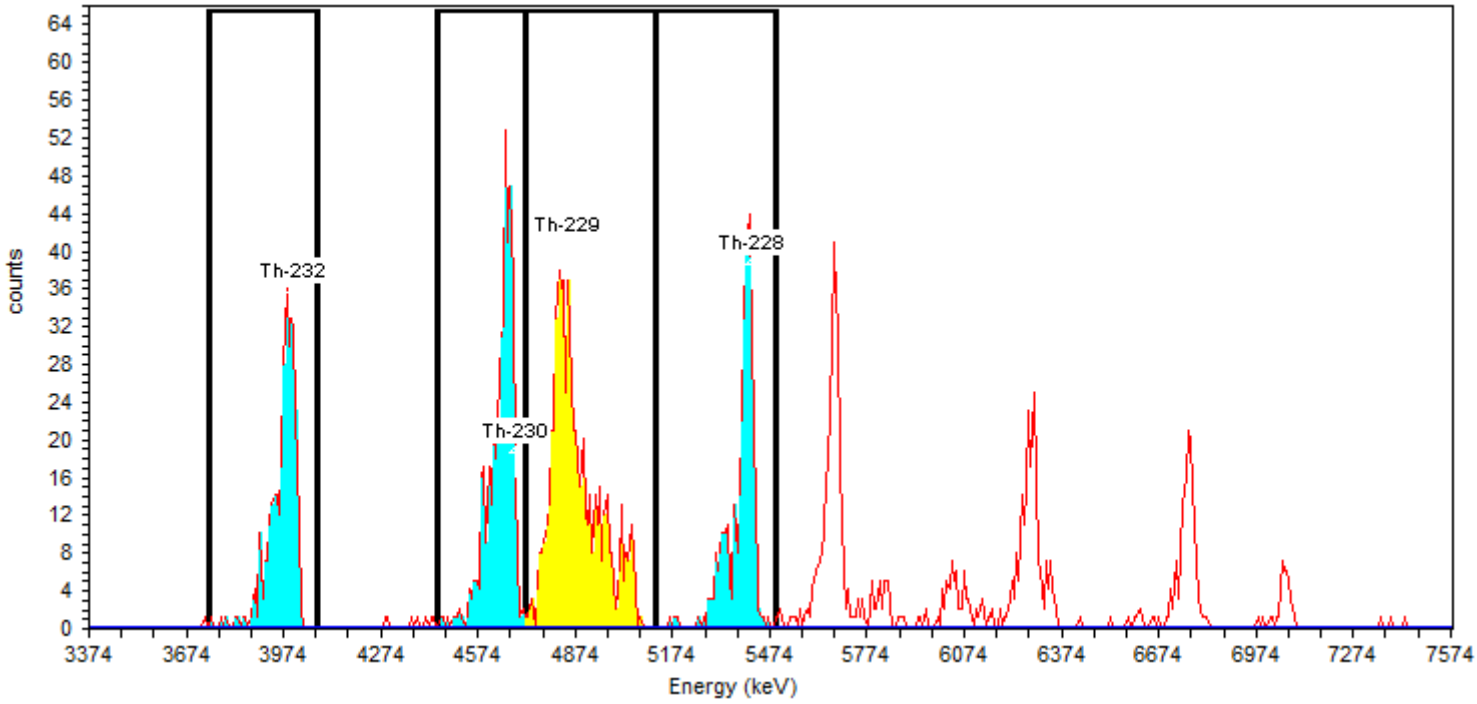
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 97.26%

Acquisition

Detector: AV191 SN: 50-112A2
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV191; Det: AV191; Spectrum #1; 9/1/2016 3:17:13 PM

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
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	59.5	100.2	318	1.6667	316.76	1.510E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	19.8	99.7	432	1.2500	430.75	2.064E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.5	99.6	632	0.8333	631.17	2.943E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.1	99.8	324	7.9167	316.08	1.513E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:40AM 9/9/2016

Sample

Sample Name: 160-18567-A-14-D DU Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-14-D DU
Sample Collection Date: 8/9/2016 9:49:00AM
Comment:

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

Batch

Batch Name: 266566
AnalysisResultsID: 176497
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

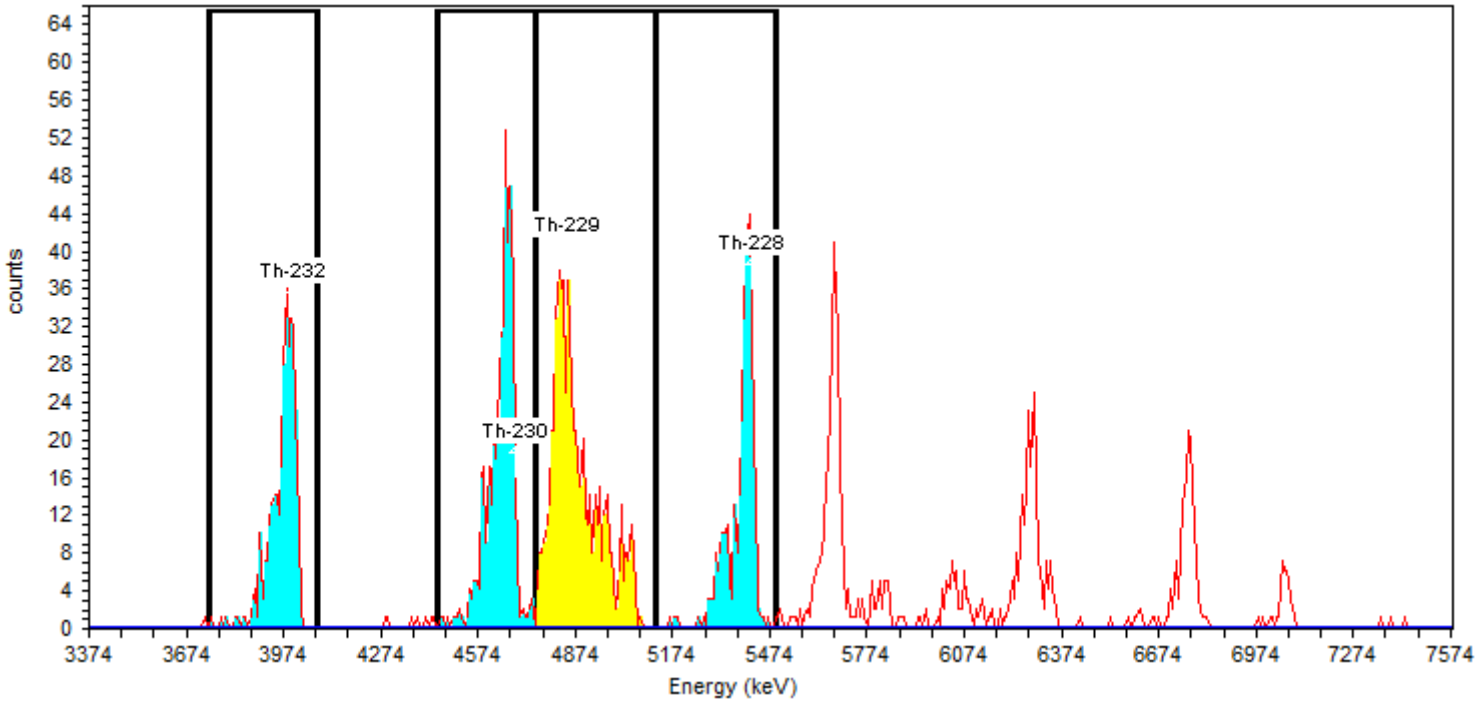
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.34%

Acquisition

Detector: AV191 SN: 50-112A2
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV191; Det: AV191; Spectrum #1; 9/1/2016 3:17:13 PM

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



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:9/8/2016 11:48:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/09/2016 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	59.5	100.2	318	1.6667	316.76	1.524E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	59.1	99.7	438	1.2500	436.75	2.112E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	88.5	99.6	626	0.8333	625.17	2.915E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.1	99.8	324	7.9167	316.08	1.528E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:29:56PM 9/8/2016

Sample

Sample Name: 160-18567-A-15-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-15-C
Sample Collection Date: 8/9/2016 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: 266566
AnalysisResultsID: 176409
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

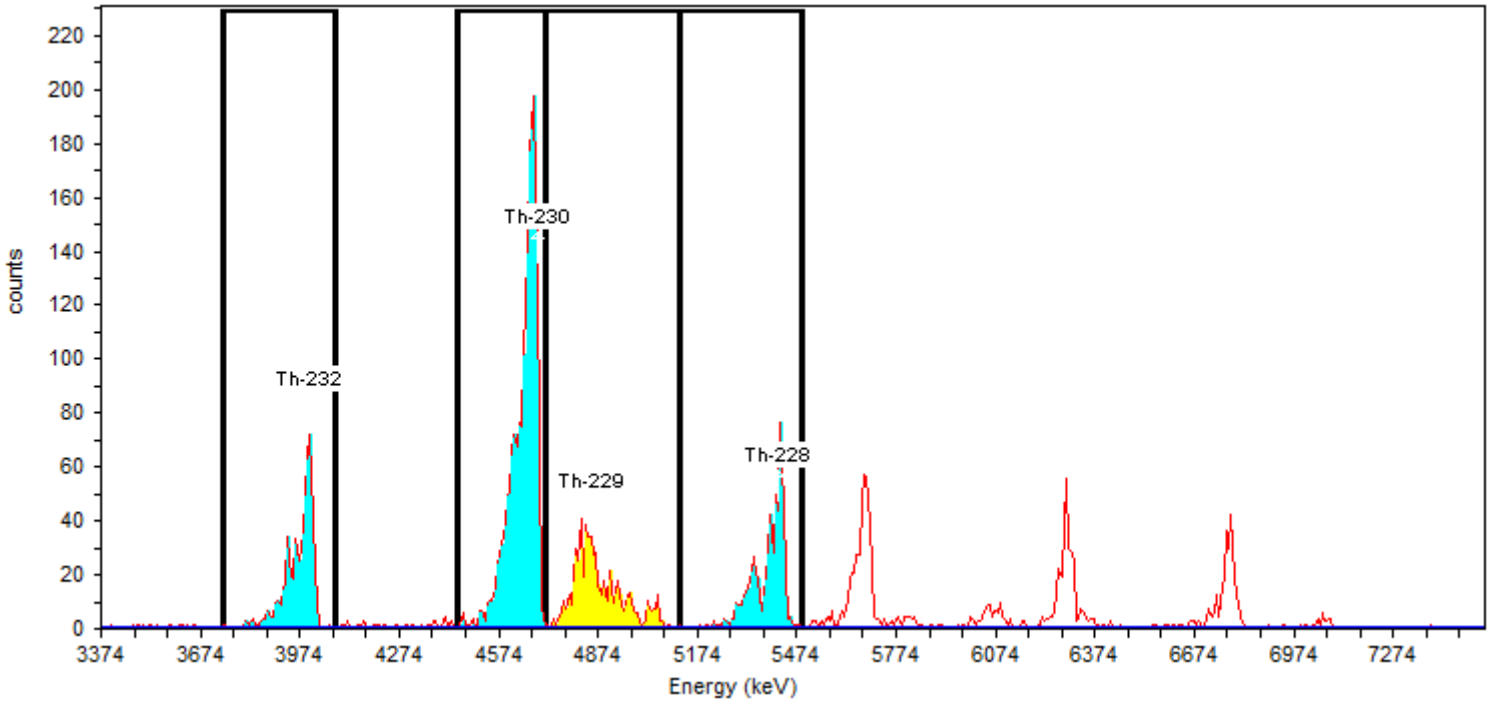
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.63%

Acquisition

Detector: AV193 SN: 50-119I5
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV193; Det: AV193; Spectrum #1; 9/1/2016 3:17:13 PM

Energy Calibration: IC-8877;AV193-20151017
Efficiency Calibration:IC-8877;AV193-20151017
Calibration Date: 10/18/2015 3:55:11PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.42% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
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	58.3	100.2	541	0.8333	539.74	2.754E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.6	99.7	1655	0.0000	1654.97	8.486E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.4	99.6	591	0.8333	590.07	2.623E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.1	99.8	544	5.8333	538.10	2.757E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:30:01PM 9/8/2016

Sample

Sample Name: 160-18567-A-16-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-16-C
Sample Collection Date: 8/9/2016 9:53:00AM
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: 266566
AnalysisResultsID: 176410
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

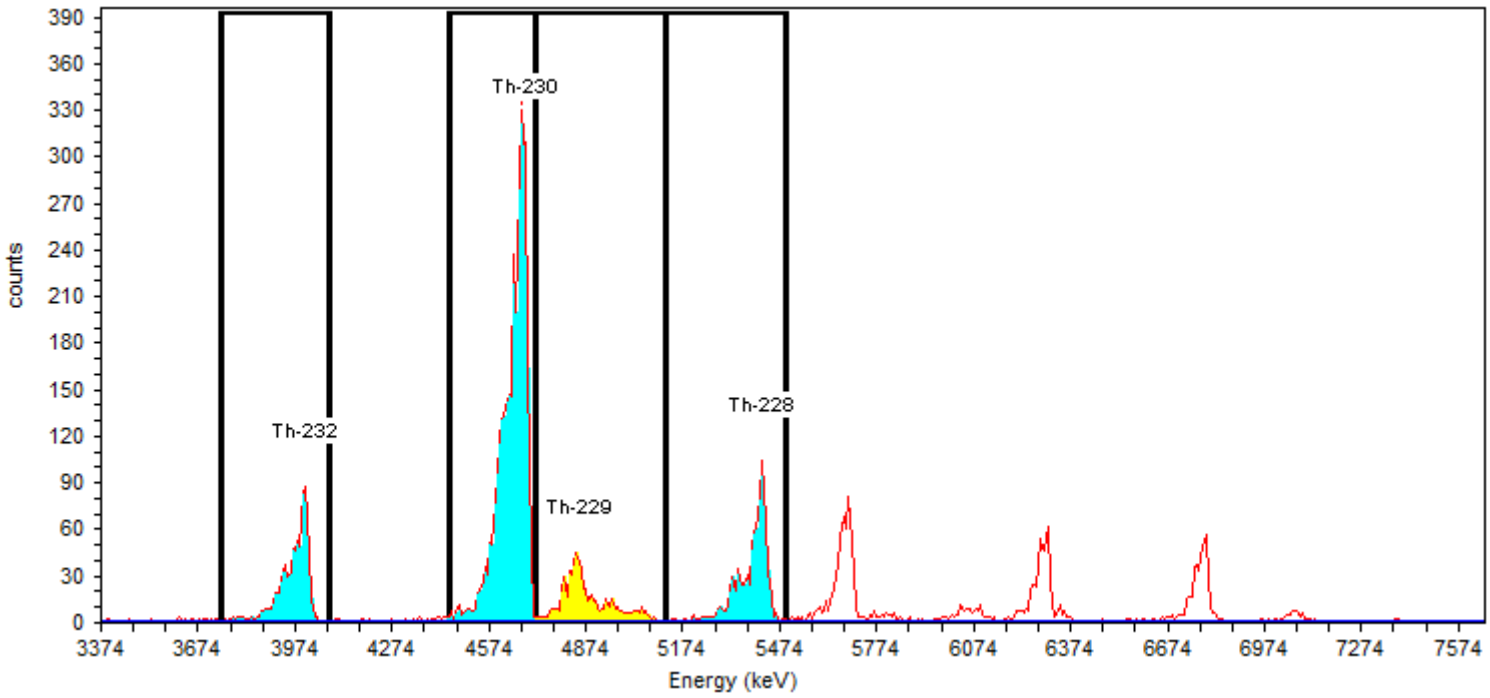
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.88%

Acquisition

Detector: AV195 SN: 50-117AA2
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:13PM
Bkgd Info: Sample: ICB;AV195; Det: AV195; Spectrum #1; 9/1/2016 3:17:13 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:9/8/2016 11:48:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	72.0	100.2	753	0.4167	752.58	3.856E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.1	99.7	3174	1.6667	3172.36	1.634E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	589	1.2500	587.78	2.571E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.6	99.8	850	5.3445	844.57	4.346E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:30:21PM 9/8/2016

Sample

Sample Name: 160-18567-A-17-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-17-C
Sample Collection Date: 8/9/2016 8:55:00AM
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: 266566
AnalysisResultsID: 176414
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

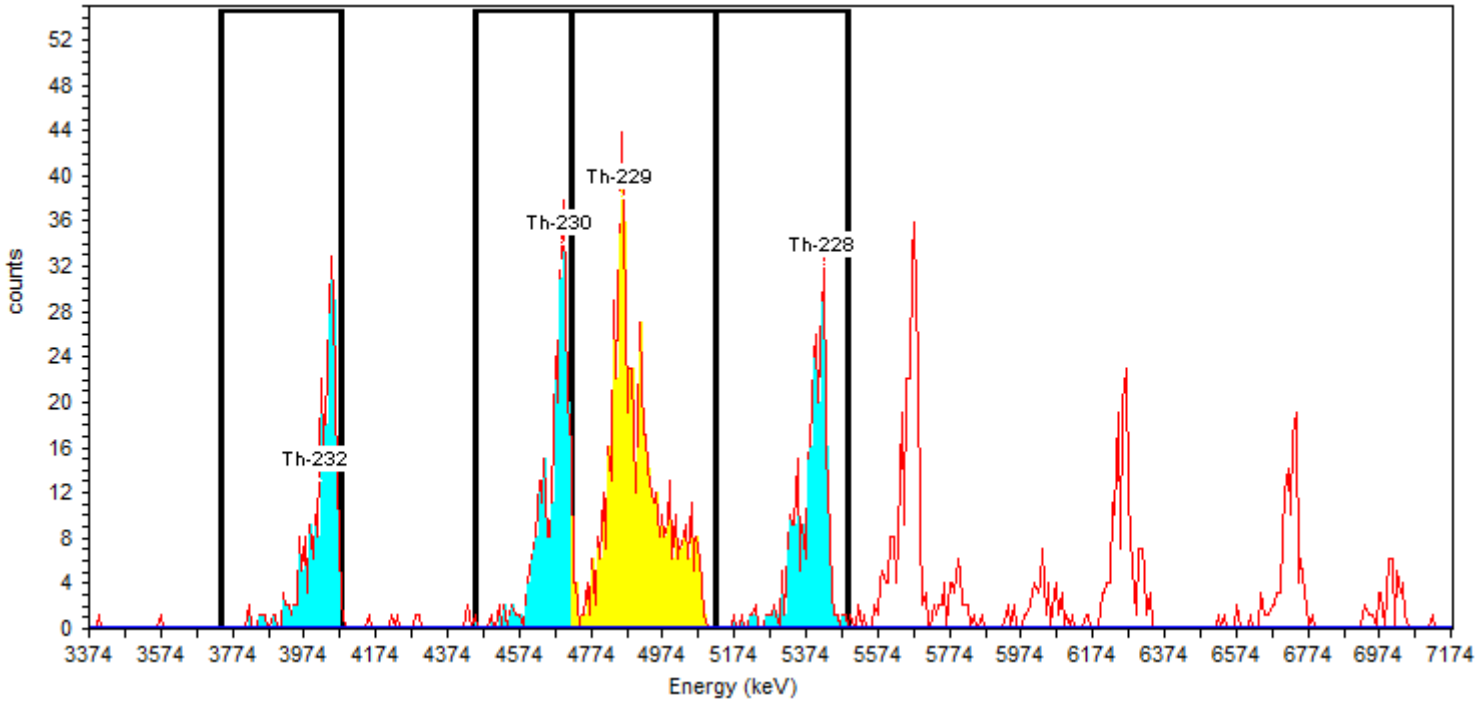
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.49%

Acquisition

Detector: AV198 SN: 50-117AA7
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.02 min.
Background Date: 9/2/2016 10:55:26AM
Bkgd Info: Sample: ICB;AV198; Det: AV198; Spectrum #1; 9/2/2016 10:55:26 AM

Energy Calibration: CCV-9795;AV198-20151122
Efficiency Calibration:CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.90% +/- 0.46% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
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	33.7	100.2	240	1.4896	238.26	1.194E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	40.9	99.7	282	0.0000	282.32	1.422E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	96.0	99.6	601	0.4167	600.21	2.617E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.6	99.8	284	7.9167	276.17	1.390E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:48AM 9/9/2016

Sample

Sample Name: 160-18567-A-17-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-17-C
Sample Collection Date: 8/9/2016 8:55:00AM
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: 266566
AnalysisResultsID: 176496
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

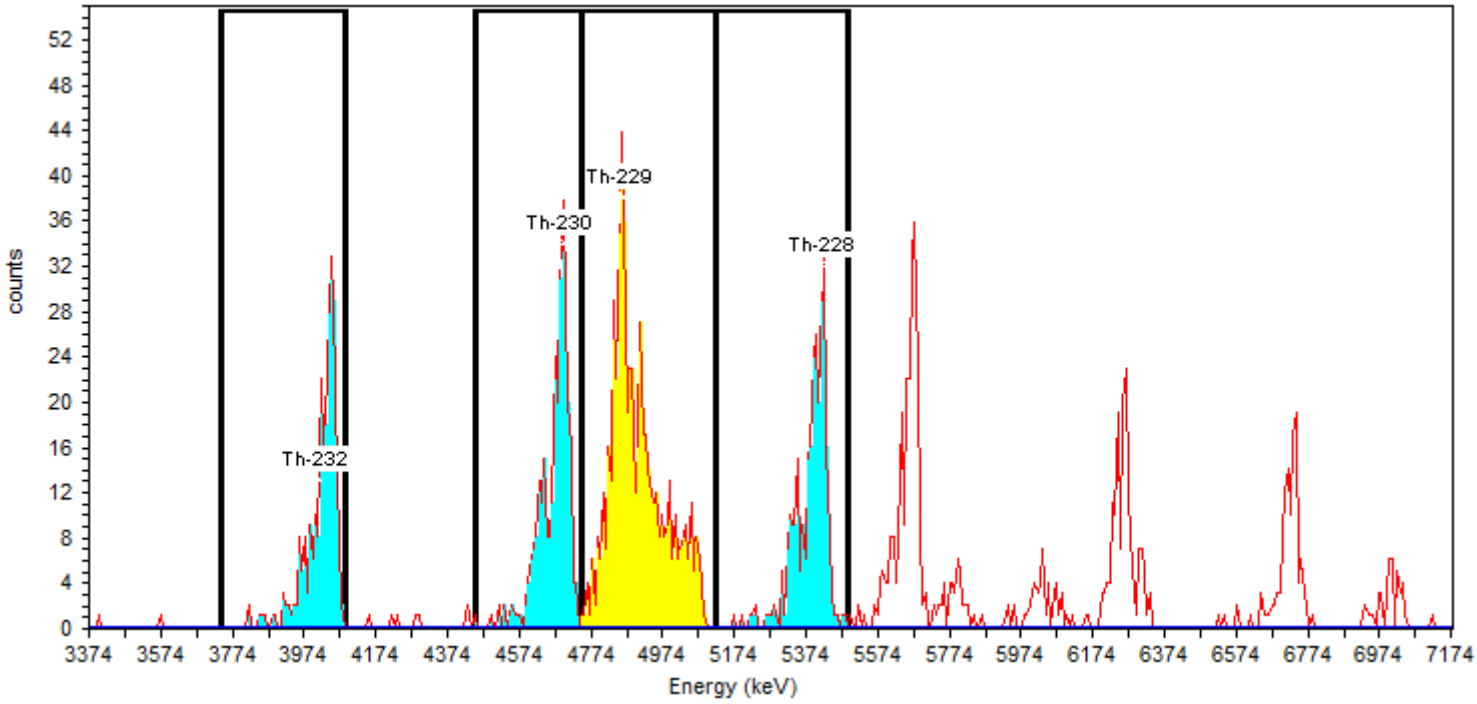
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.67%

Acquisition

Detector: AV198 SN: 50-117AA7
Acquisition Start Date: 9/8/2016 11:49:33AM
Live Time: 400.00 min.
Real Time: 400.02 min.
Background Date: 9/2/2016 10:55:26AM
Bkgd Info: Sample: ICB;AV198; Det: AV198; Spectrum #1; 9/2/2016 10:55:26 AM

Energy Calibration: CCV-9795;AV198-20151122
Efficiency Calibration:CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.90% +/- 0.46% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:9/8/2016 11:48:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 09/09/2016 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	3739.8	4082.9	21.0	100.2	245	1.6667	243.33	1.261E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	47.2	99.7	292	0.0000	292.00	1.521E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	96.0	99.6	581	0.4167	580.58	2.531E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.6	99.8	284	7.9167	276.17	1.437E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:30:16PM 9/8/2016

Sample

Sample Name: 160-18567-A-18-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-18-C
Sample Collection Date: 8/9/2016 9:00:00AM
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: 266566
AnalysisResultsID: 176413
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

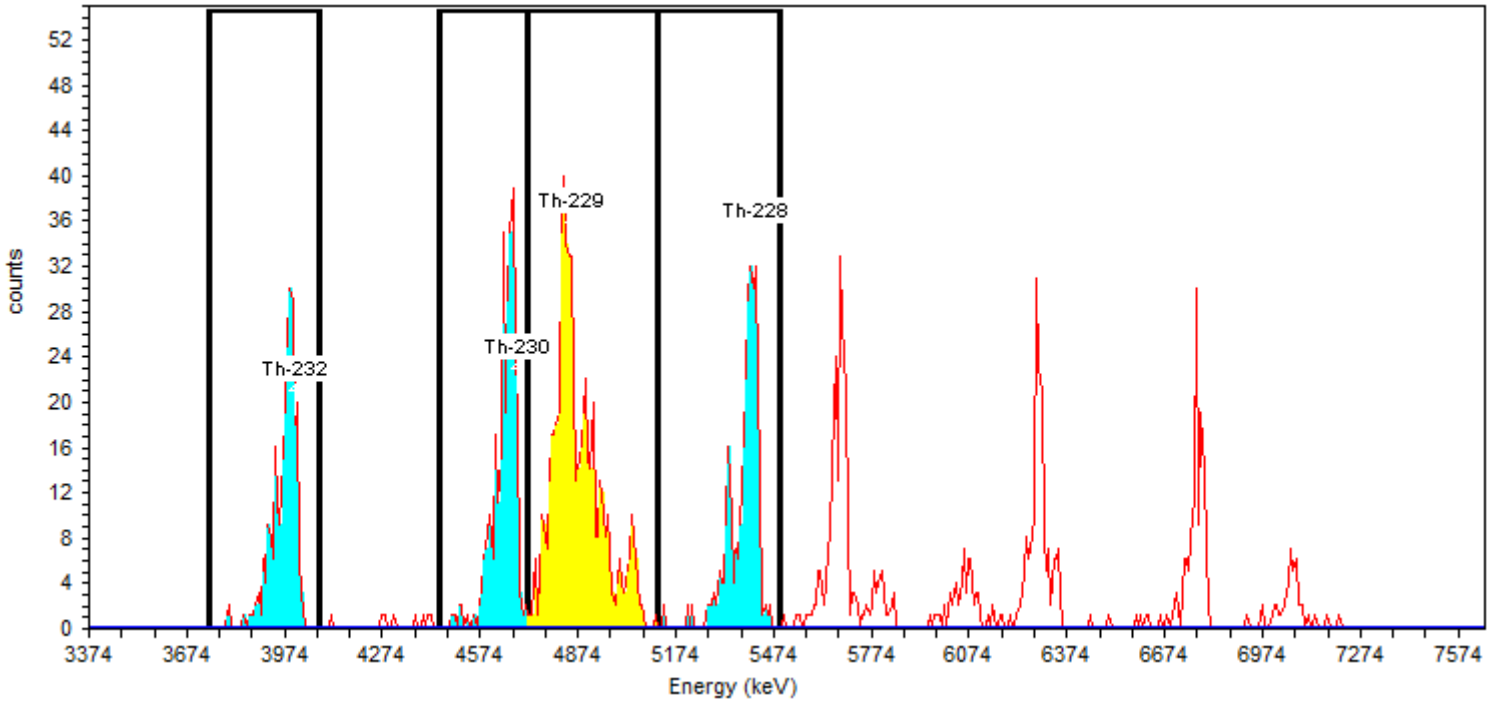
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.43%

Acquisition

Detector: AV199 SN: 50-117Z3
Acquisition Start Date: 9/8/2016 11:49:34AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/1/2016 3:17:14PM
Bkgd Info: Sample: ICB;AV199; Det: AV199; Spectrum #1; 9/1/2016 3:17:14 PM

Energy Calibration: IC-9817;AV199-20151017
Efficiency Calibration:IC-9817;AV199-20151017
Calibration Date: 10/18/2015 3:55:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.71% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
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	57.7	100.2	247	0.4167	246.58	1.282E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.8	99.7	302	0.8333	301.17	1.574E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.0	99.6	580	1.2500	578.81	2.647E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.7	99.8	293	5.8333	287.23	1.500E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:30:11PM 9/8/2016

Sample

Sample Name: 160-18567-A-19-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-19-C
Sample Collection Date: 8/9/2016 8:55:00AM
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: 266566
AnalysisResultsID: 176412
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

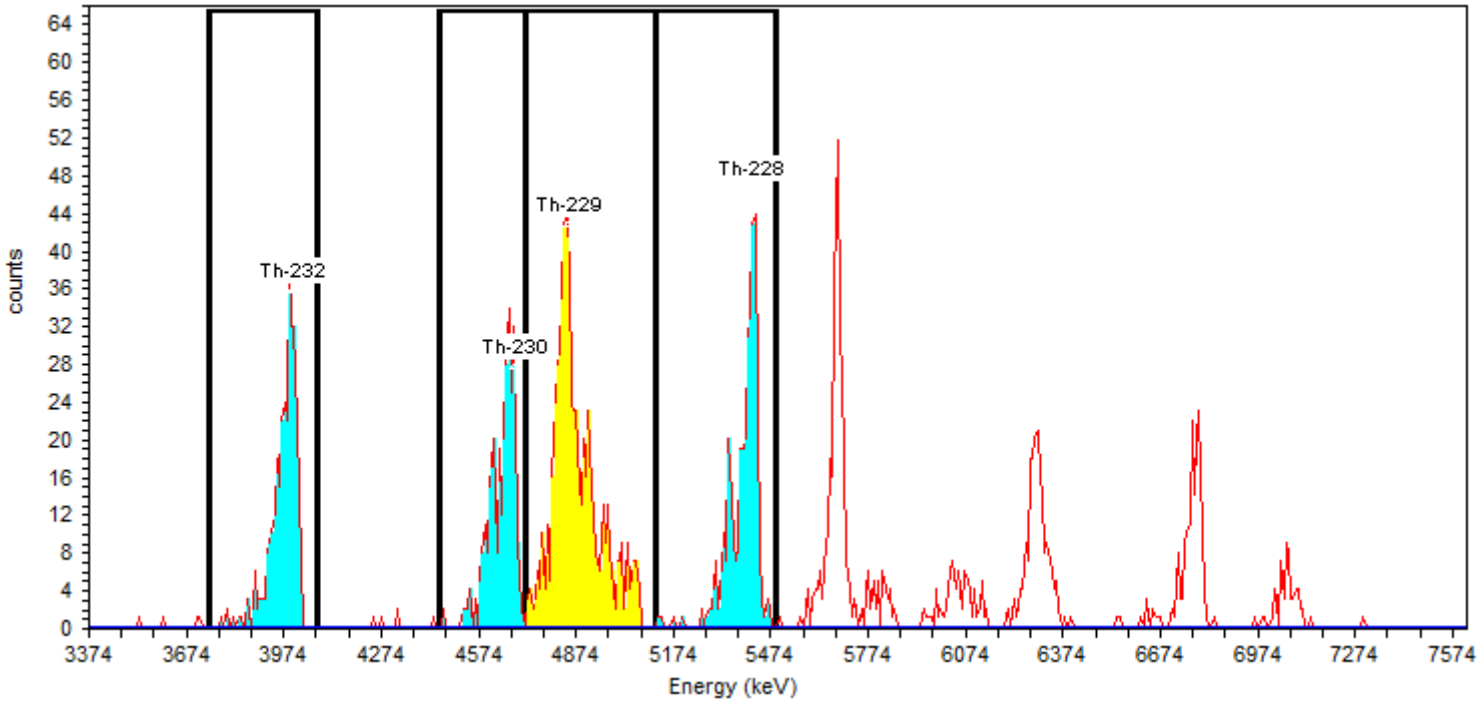
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.32%

Acquisition

Detector: AV200 SN: 50-117J6
Acquisition Start Date: 9/8/2016 11:49:34AM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 9/2/2016 10:55:26AM
Bkgd Info: Sample: ICB;AV200; Det: AV200; Spectrum #1; 9/2/2016 10:55:26 AM

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:9/8/2016 11:48:10AM
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	64.8	100.2	314	1.2500	312.75	1.512E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.8	99.7	313	1.3784	311.71	1.515E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.9	99.6	624	0.8333	623.26	2.889E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.5	99.8	354	7.5000	346.59	1.683E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:30:06PM 9/8/2016

Sample

Sample Name: 160-18567-A-20-C Type: Sample
Spectrum #1 Analysis #1
: 160-18567-A-20-C
Sample Collection Date: 8/9/2016 9:31:00AM
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: 266566
AnalysisResultsID: 176411
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

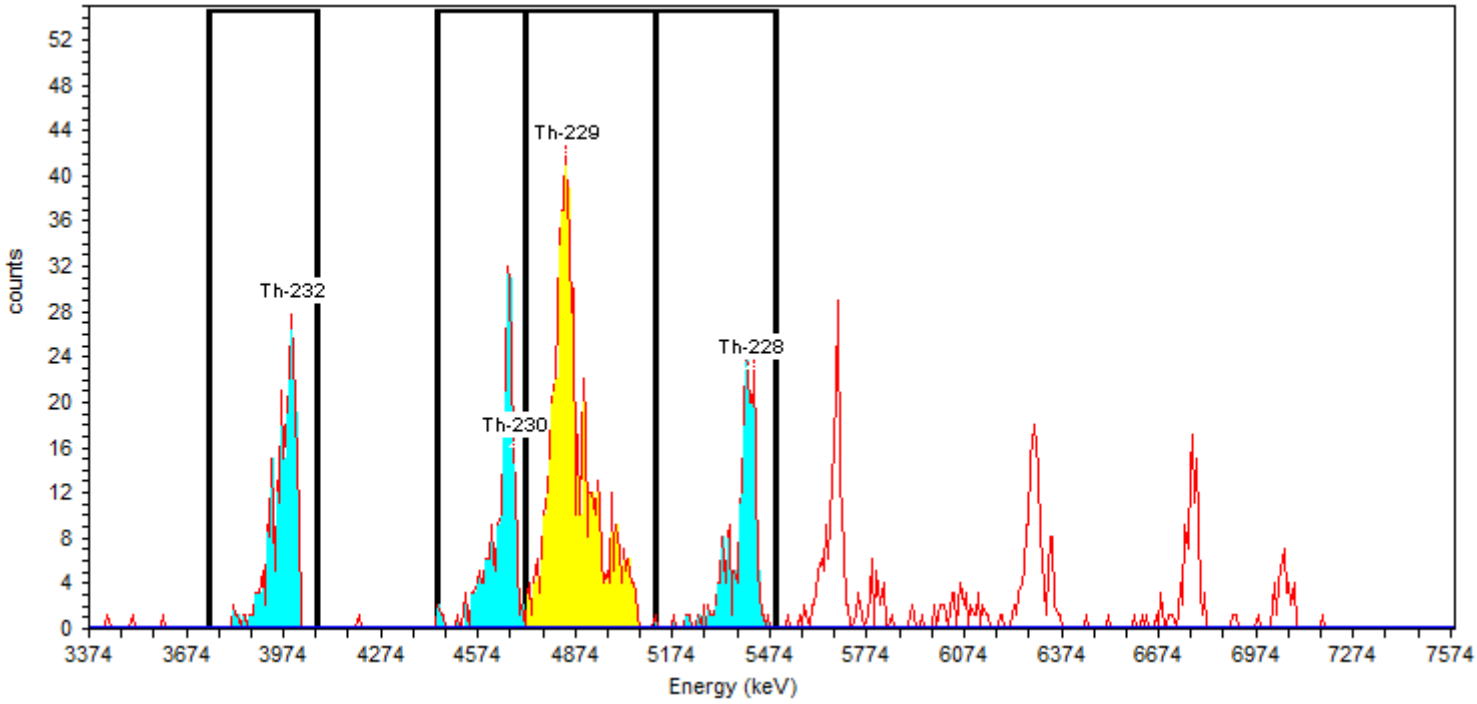
Tracer Name: Th-229_00021
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/16/2014 2:33:14PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.15%

Acquisition

Detector: AV201 SN: 50-117i5
Acquisition Start Date: 9/8/2016 11:49:34AM
Live Time: 400.00 min.
Real Time: 400.03 min.
Background Date: 9/1/2016 3:17:15PM
Bkgd Info: Sample: ICB;AV201; Det: AV201; Spectrum #1; 9/1/2016 3:17:15 PM

Energy Calibration: IC-9885;AV201-20151017b
Efficiency Calibration:IC-9885;AV201-20151017b
Calibration Date: 10/18/2015 3:55:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.32% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:9/8/2016 11:48:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.3	100.2	244	0.4167	243.58	1.225E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.4	99.7	221	6.2371	215.24	1.088E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.9	99.6	602	4.1538	597.88	2.666E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.5	99.8	213	5.0000	207.94	1.050E+000	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 09/07/16

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV171	09/07/16 12:23	6021	5540.8 - 6124.1	Pass	14.1	10 - 20	Pass	222.9	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV172	09/07/16 12:23	6021	5722.6 - 6324.9	Pass	14.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.0 - 5070.0	Pass
AV175	09/07/16 12:23	6011	5634.8 - 6228.0	Pass	14.3	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.4 - 5055.4	Pass
AV195	09/07/16 12:23	5815	5665.0 - 6261.3	Pass	12.9	10 - 20	Pass	224.0	219.1 - 229.1	Pass	5038	4998.0 - 5078.0	Pass
AV198	09/07/16 12:23	5994	5708.4 - 6309.3	Pass	16.7	10 - 20	Pass	224.0	219.2 - 229.2	Pass	5037	4998.7 - 5078.7	Pass
AV199	09/07/16 12:23	6004	5584.5 - 6172.3	Pass	15.7	10 - 20	Pass	219.1	214.0 - 224.0	Pass	5001	4959.9 - 5039.9	Pass
AV200	09/07/16 12:23	6012	5688.6 - 6287.4	Pass	15.0	10 - 20	Pass	222.1	216.9 - 226.9	Pass	5023	4981.7 - 5061.7	Pass
AV203	09/07/16 12:23	6029	5646.6 - 6240.9	Pass	14.2	10 - 20	Pass	208.0	204.0 - 214.0	Pass	4918	4885.5 - 4965.5	Pass
AV204	09/07/16 12:23	5980	5563.7 - 6149.3	Pass	15.3	10 - 20	Pass	222.1	217.0 - 227.0	Pass	5023	4982.8 - 5062.8	Pass
AV205	09/07/16 12:23	6011	5716.1 - 6317.8	Pass	14.6	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.3 - 5062.3	Pass
AV208	09/07/16 12:23	5862	5698.3 - 6298.1	Pass	13.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.1 - 5077.1	Pass
AV209	09/07/16 12:23	6006	5544.5 - 6128.1	Pass	15.0	10 - 20	Pass	221.1	216.5 - 226.5	Pass	5015	4979.1 - 5059.1	Pass

Analysis Date: 09/08/16

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV148	09/08/16 10:49	6013	5686.2 - 6284.7	Pass	14.6	10 - 20	Pass	222.0	218.0 - 228.0	Pass	5022	4990.0 - 5070.0	Pass
AV149	09/08/16 10:49	5879	5704.3 - 6304.8	Pass	13.2	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.4 - 5069.4	Pass
AV150	09/08/16 10:49	5978	5623.0 - 6214.9	Pass	16.0	10 - 20	Pass	224.2	219.0 - 229.0	Pass	5039	4997.7 - 5077.7	Pass
AV153	09/08/16 10:49	5989	5694.3 - 6293.7	Pass	16.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV188	09/08/16 10:49	6023	5548.7 - 6132.8	Pass	14.4	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5015	4974.8 - 5054.8	Pass
AV189	09/08/16 10:49	6030	5679.0 - 6276.8	Pass	13.7	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.2 - 5077.2	Pass
AV190	09/08/16 10:49	6014	5670.8 - 6267.7	Pass	14.2	10 - 20	Pass	222.8	218.3 - 228.3	Pass	5029	4992.2 - 5072.2	Pass
AV191	09/08/16 10:49	6005	5518.8 - 6099.7	Pass	14.9	10 - 20	Pass	220.8	217.0 - 227.0	Pass	5014	4982.9 - 5062.9	Pass
AV193	09/08/16 10:49	6012	5571.4 - 6157.9	Pass	15.0	10 - 20	Pass	222.0	217.1 - 227.1	Pass	5022	4983.4 - 5063.4	Pass
AV195	09/08/16 10:49	5925	5665.0 - 6261.3	Pass	13.2	10 - 20	Pass	224.0	219.1 - 229.1	Pass	5037	4998.0 - 5078.0	Pass
AV198	09/08/16 10:49	5989	5708.4 - 6309.3	Pass	15.5	10 - 20	Pass	223.8	219.2 - 229.2	Pass	5036	4998.7 - 5078.7	Pass
AV199	09/08/16 10:49	6017	5584.5 - 6172.3	Pass	13.8	10 - 20	Pass	219.0	214.0 - 224.0	Pass	5000	4959.9 - 5039.9	Pass
AV200	09/08/16 10:49	6016	5688.6 - 6287.4	Pass	14.0	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5023	4981.7 - 5061.7	Pass
AV201	09/08/16 10:49	6019	5698.0 - 6297.8	Pass	14.6	10 - 20	Pass	222.9	218.2 - 228.2	Pass	5029	4991.1 - 5071.1	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:41:17AM 9/9/2016

Sample

Sample Name: Pulser;AV148
Comment:

Spectrum #2 Analysis #1

Batch

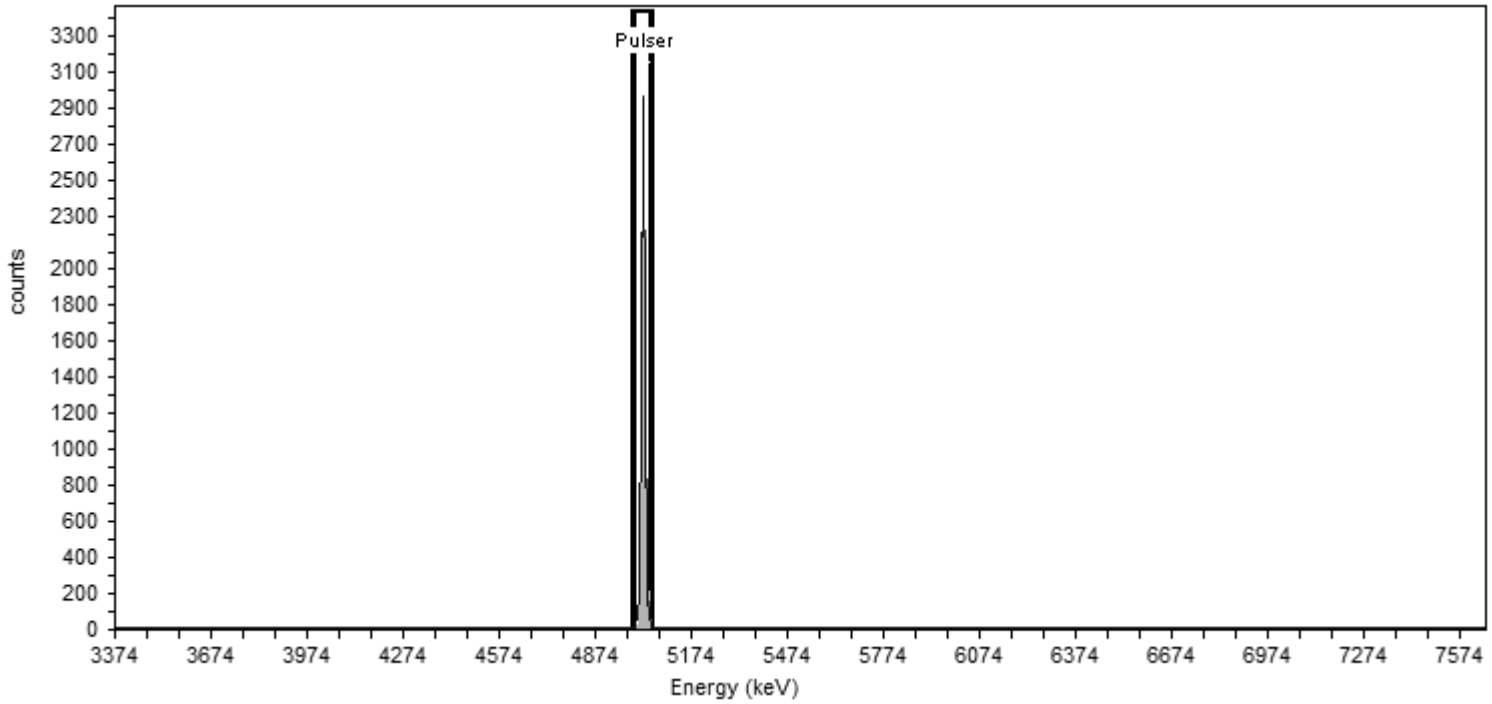
Batch Name: August2016a
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 9/8/2016 10:49:41AM
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	5022.465	4997.695	5047.234	14.55	6,172.38	6,012.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:41:22AM 9/9/2016

Sample

Sample Name: Pulser;AV149
Comment:

Spectrum #2 Analysis #1

Batch

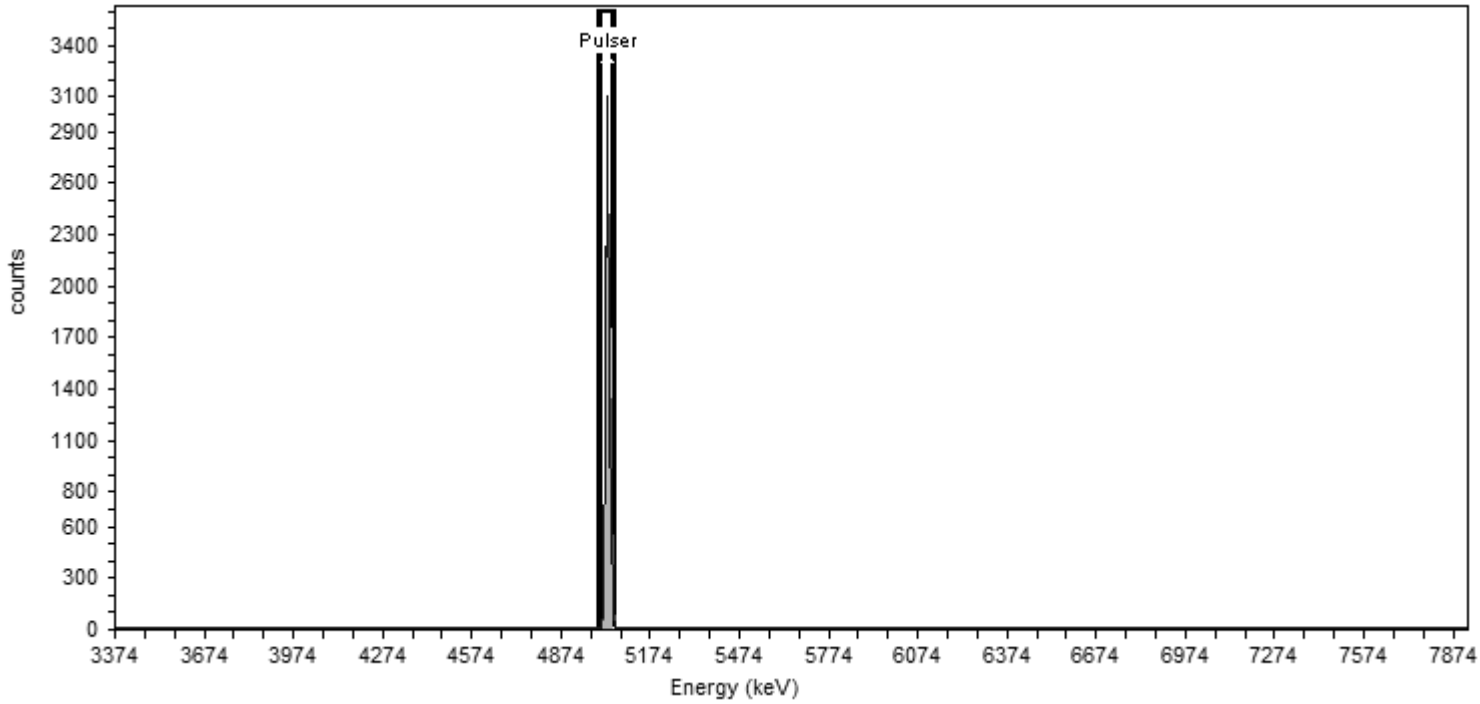
Batch Name: August2016a
Description:

Acquisition

Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 9/8/2016 10:49:41AM
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	5029.771	5007.387	5052.155	13.15	5,863.82	5,879.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:41:30AM 9/9/2016

Sample

Sample Name: Pulser;AV150
Comment:

Spectrum #2 Analysis #1

Batch

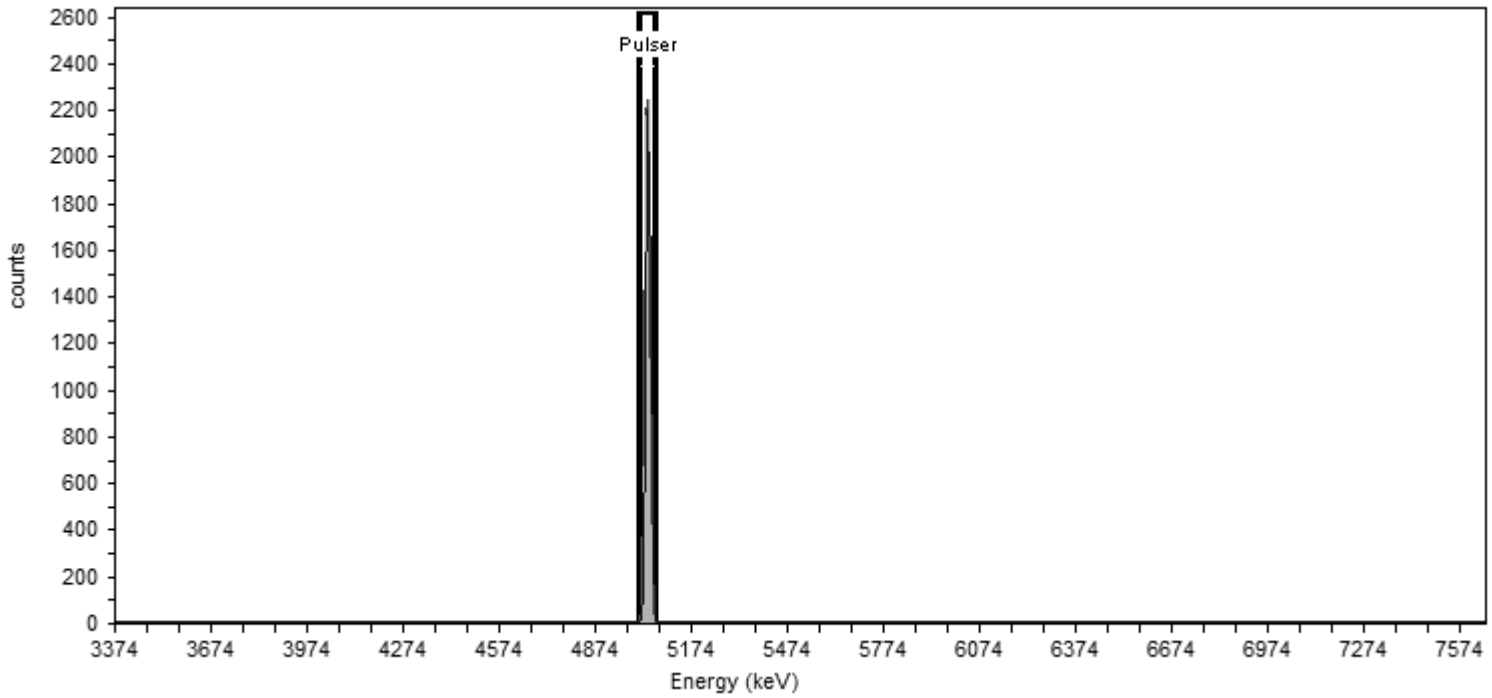
Batch Name: August2016a
Description:

Acquisition

Detector: AV150 , SN: 50-05/R4
Acquisition Start Date: 9/8/2016 10:49:41AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV150-20151016
Calibration Date: 10/16/2015 6:46:46PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.741	5011.519	5065.963	15.99	5,139.14	5,978.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:41:34AM 9/9/2016

Sample

Sample Name: Pulser;AV153
Comment:

Spectrum #2 Analysis #1

Batch

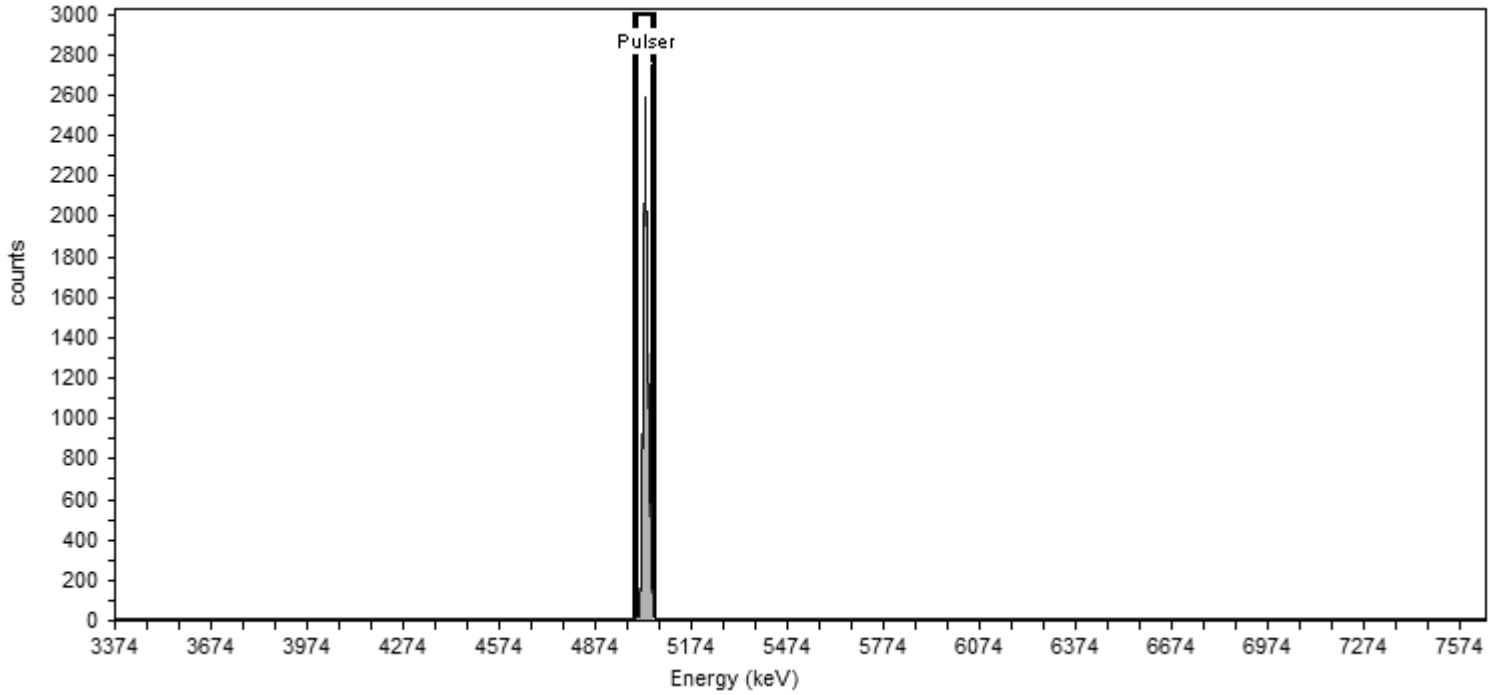
Batch Name: August2016a
Description:

Acquisition

Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 9/8/2016 10:49:41AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV153-20151016
Calibration Date: 10/16/2015 6:46:57PM

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	5030.079	5002.230	5057.927	16.36	6,066.87	5,988.56

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:35PM 9/7/2016

Sample

Sample Name: Pulser;AV171
Comment:

Spectrum #1 Analysis #1

Batch

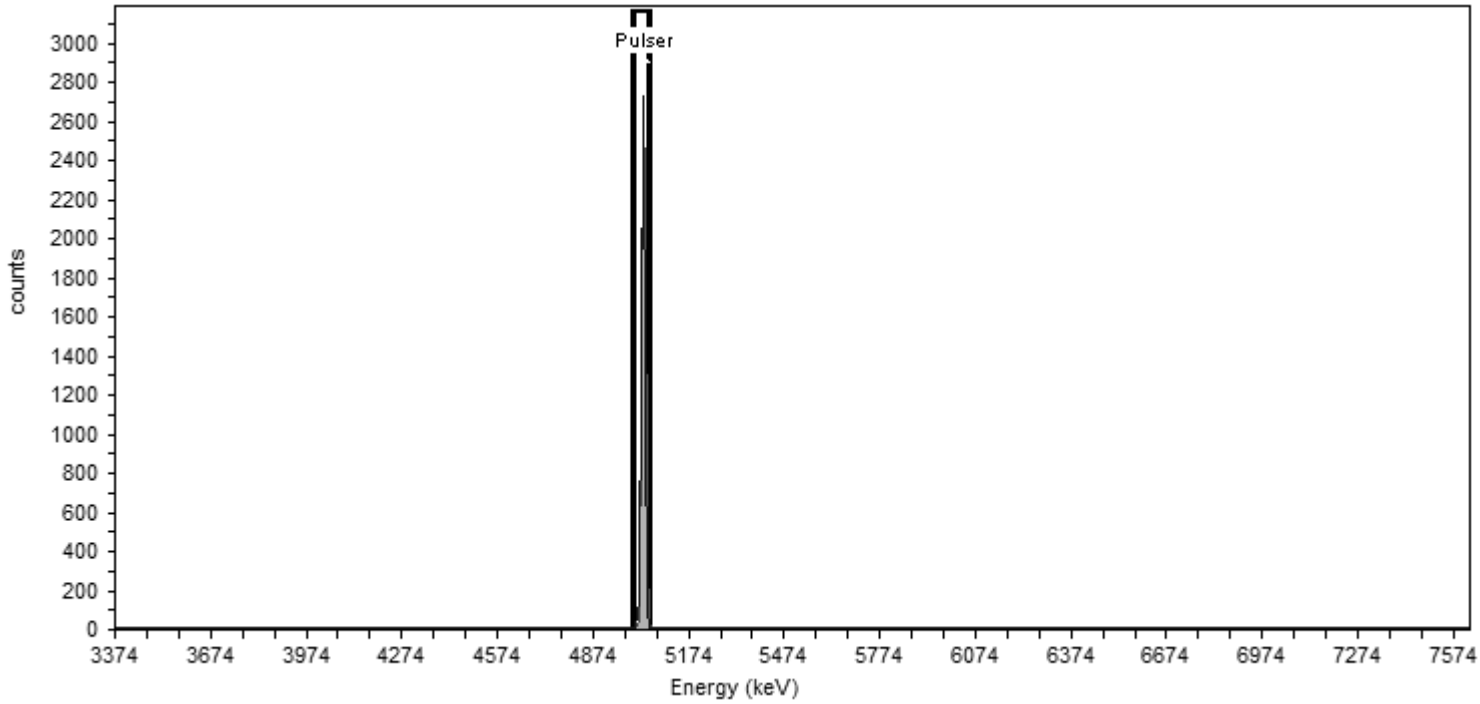
Batch Name: August2016a
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 9/7/2016 12:23:11PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV171-20151016
Calibration Date: 10/17/2015 2:36:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.579	5005.617	5053.541	14.08	5,516.13	6,020.72

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:36PM 9/7/2016

Sample

Sample Name: Pulser;AV172
Comment:

Spectrum #1 Analysis #1

Batch

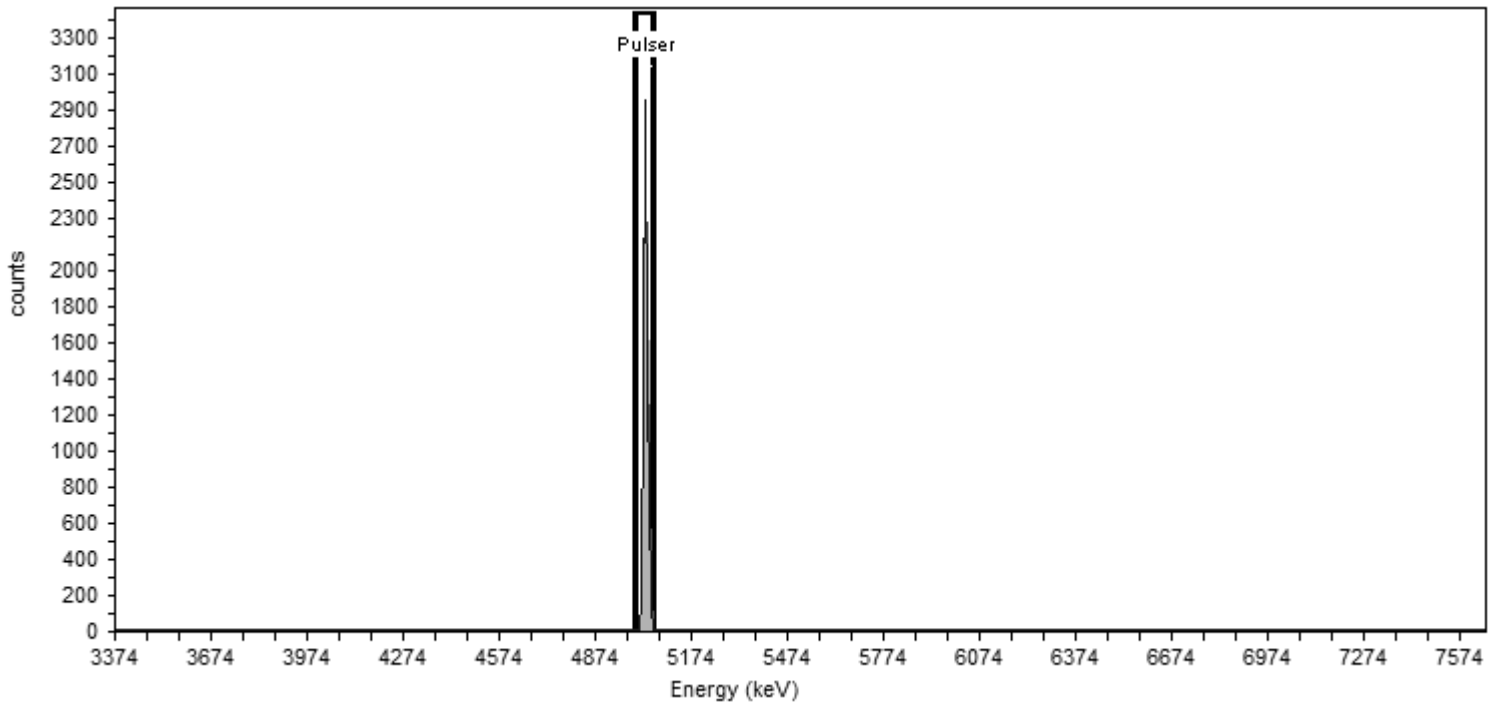
Batch Name: August2016a
Description:

Acquisition

Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 9/7/2016 12:23:11PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV172-20151016
Calibration Date: 10/17/2015 2:36:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.860	5005.553	5054.168	14.28	6,040.91	6,021.17

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:40PM 9/7/2016

Sample

Sample Name: Pulser;AV175
Comment:

Spectrum #1 Analysis #1

Batch

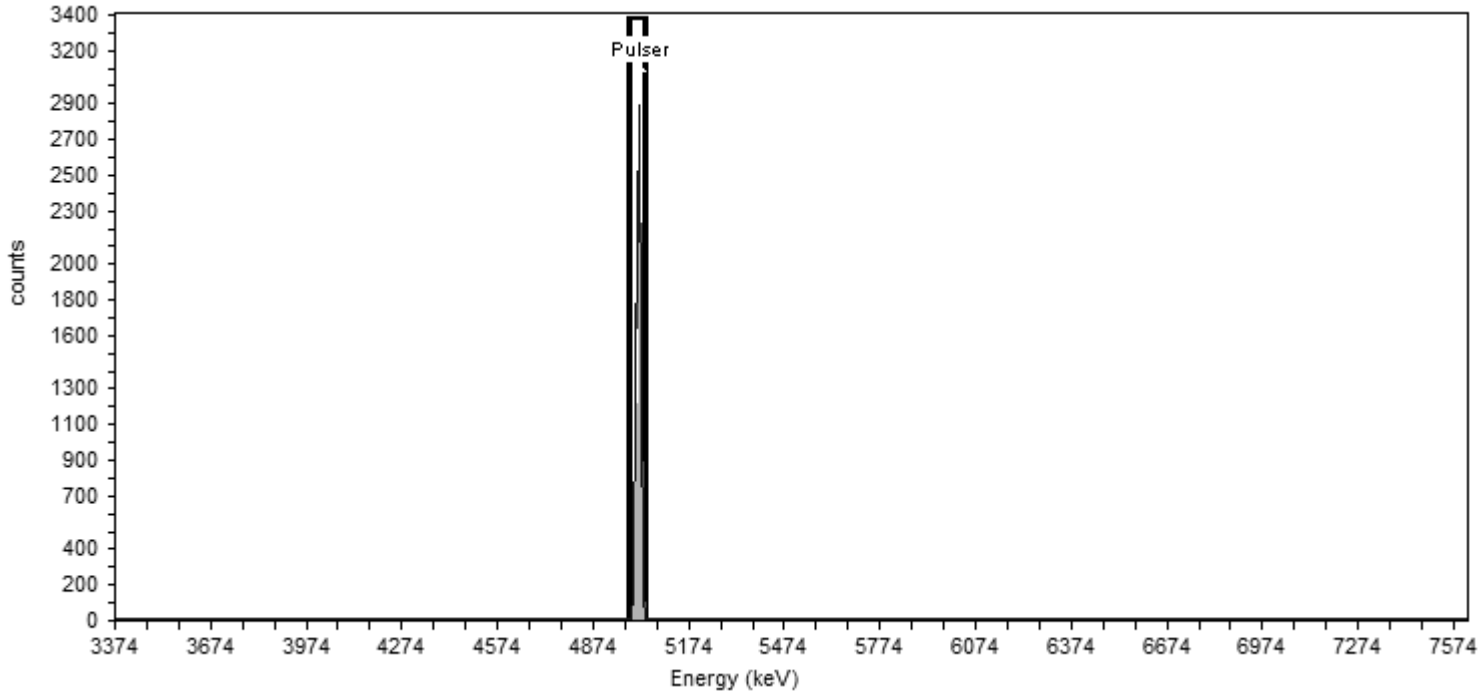
Batch Name: August2016a
Description:

Acquisition

Detector: AV175 , SN: 50-117H1
Acquisition Start Date: 9/7/2016 12:23:12PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV175-20151017
Calibration Date: 10/17/2015 6:01:46PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.979	4990.556	5039.401	14.35	5,958.79	6,011.25

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:51AM 9/9/2016

Sample

Sample Name: Pulser;AV188
Comment:

Spectrum #2 Analysis #1

Batch

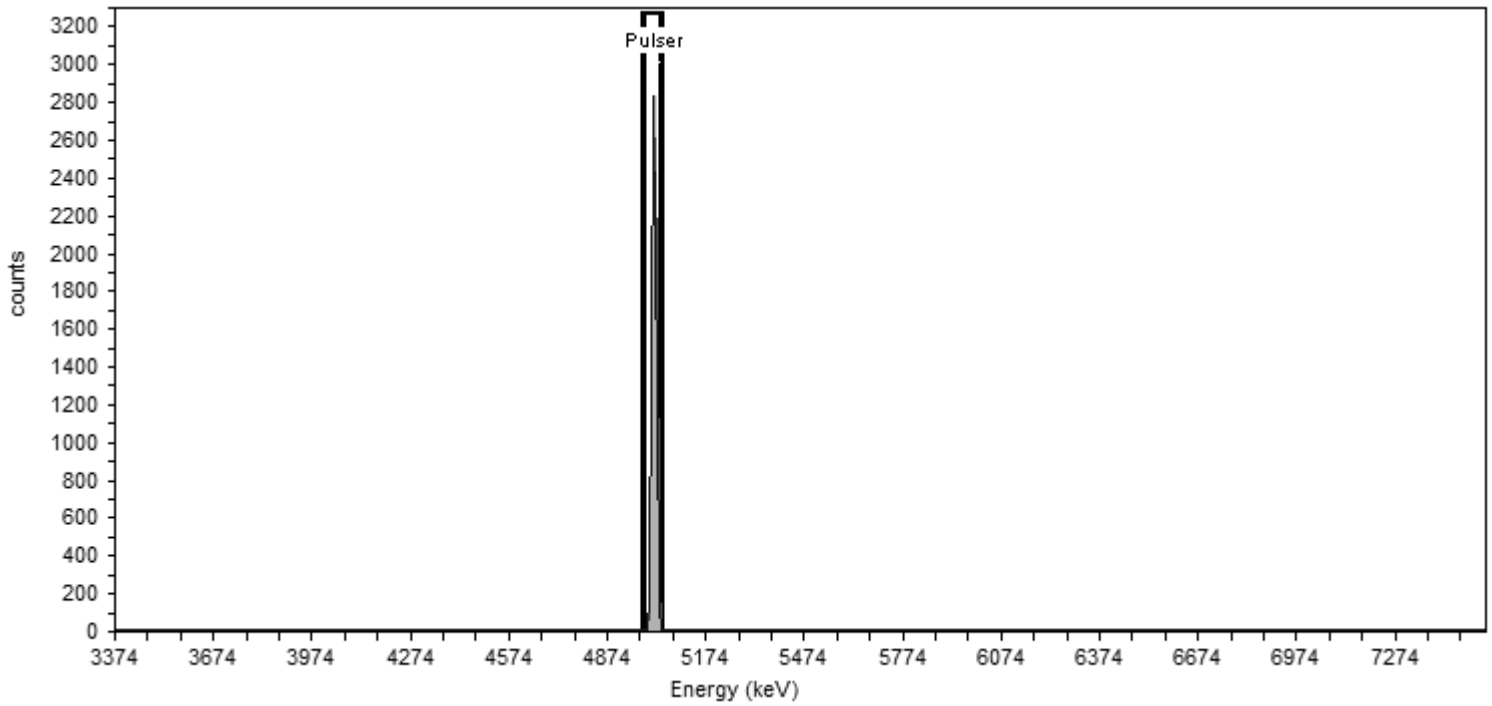
Batch Name: August2016b
Description:

Acquisition

Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 9/8/2016 10:49:51AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV188-20151017
Calibration Date: 10/17/2015 6:02:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.677	4990.177	5039.177	14.39	5,858.34	6,023.10

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:46AM 9/9/2016

Sample

Sample Name: Pulser;AV189
Comment:

Spectrum #2 Analysis #1

Batch

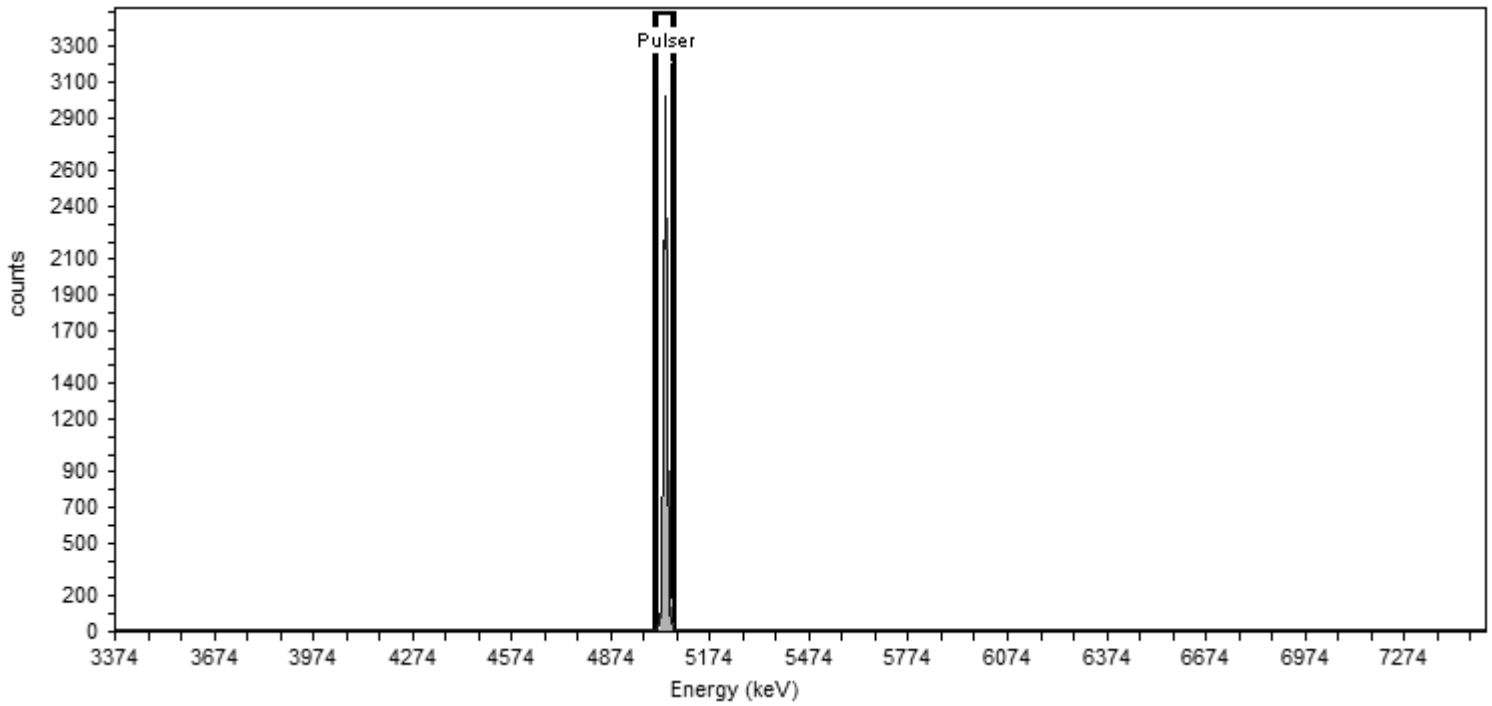
Batch Name: August2016b
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 9/8/2016 10:49:51AM
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	5037.288	5013.937	5060.638	13.72	5,946.35	6,029.85

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:39AM 9/9/2016

Sample

Sample Name: Pulser;AV190
Comment:

Spectrum #2 Analysis #1

Batch

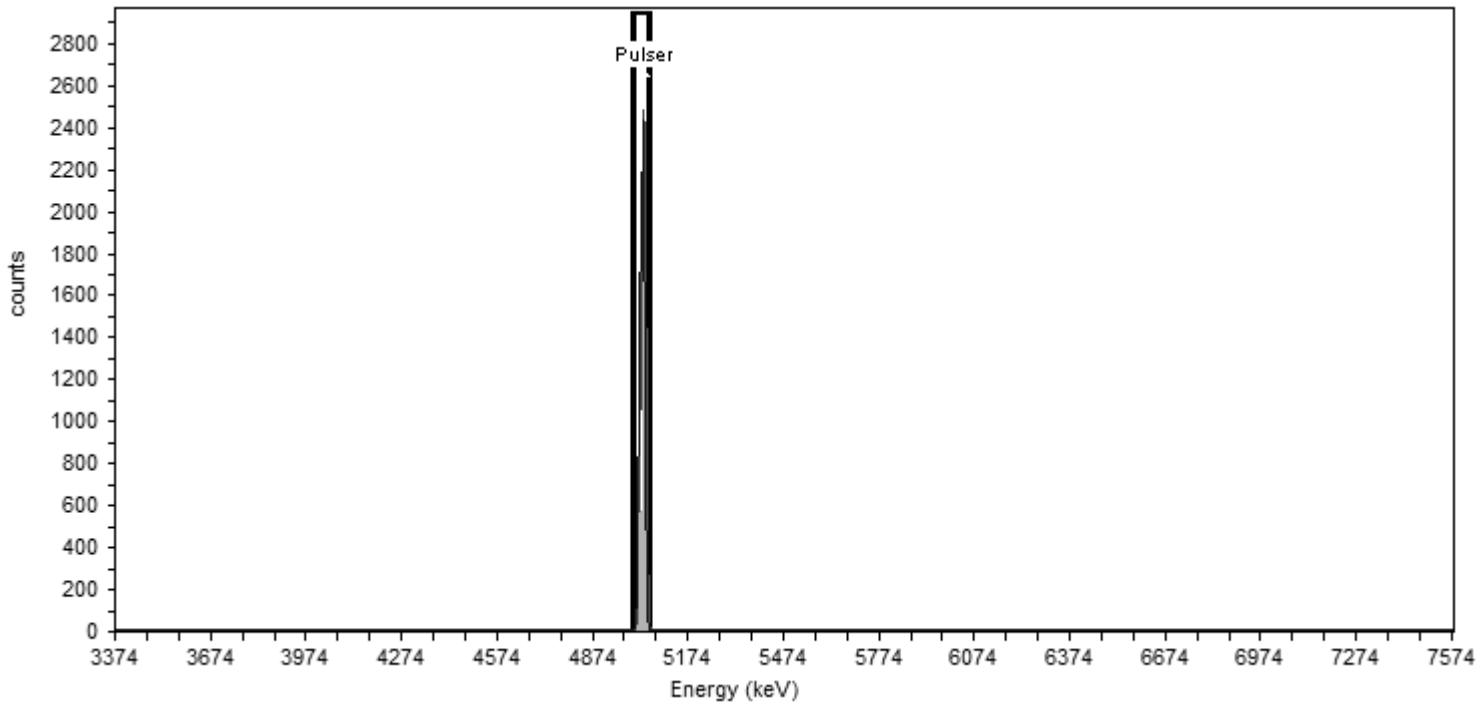
Batch Name: August2016b
Description:

Acquisition

Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 9/8/2016 10:49:51AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV190-20151017
Calibration Date: 10/18/2015 3:54:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5028.743	5004.489	5052.998	14.25	5,074.03	6,014.43

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:34AM 9/9/2016

Sample

Sample Name: Pulser;AV191
Comment:

Spectrum #2 Analysis #1

Batch

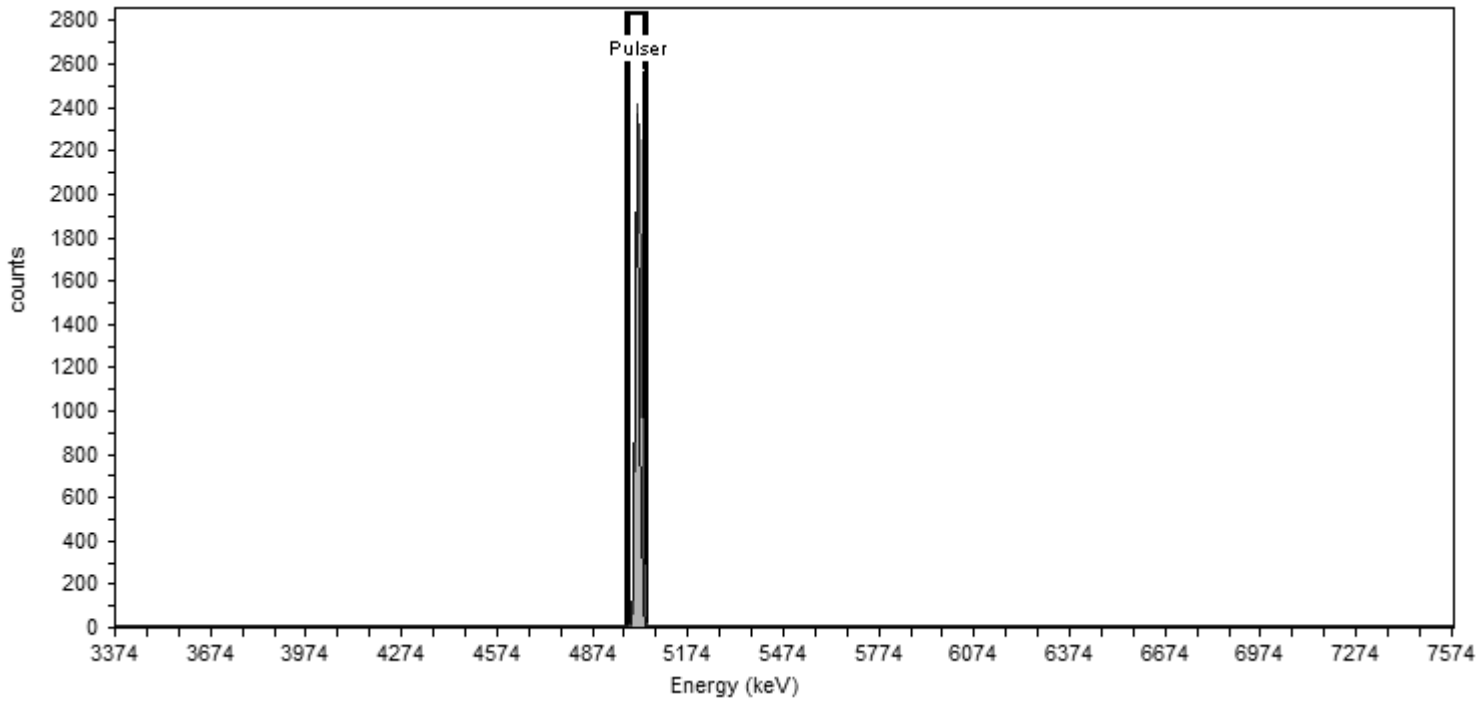
Batch Name: August2016b
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 9/8/2016 10:49:51AM
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	5013.914	4988.595	5039.231	14.87	5,143.44	6,005.40

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:27AM 9/9/2016

Sample

Sample Name: Pulser;AV193
Comment:

Spectrum #2 Analysis #1

Batch

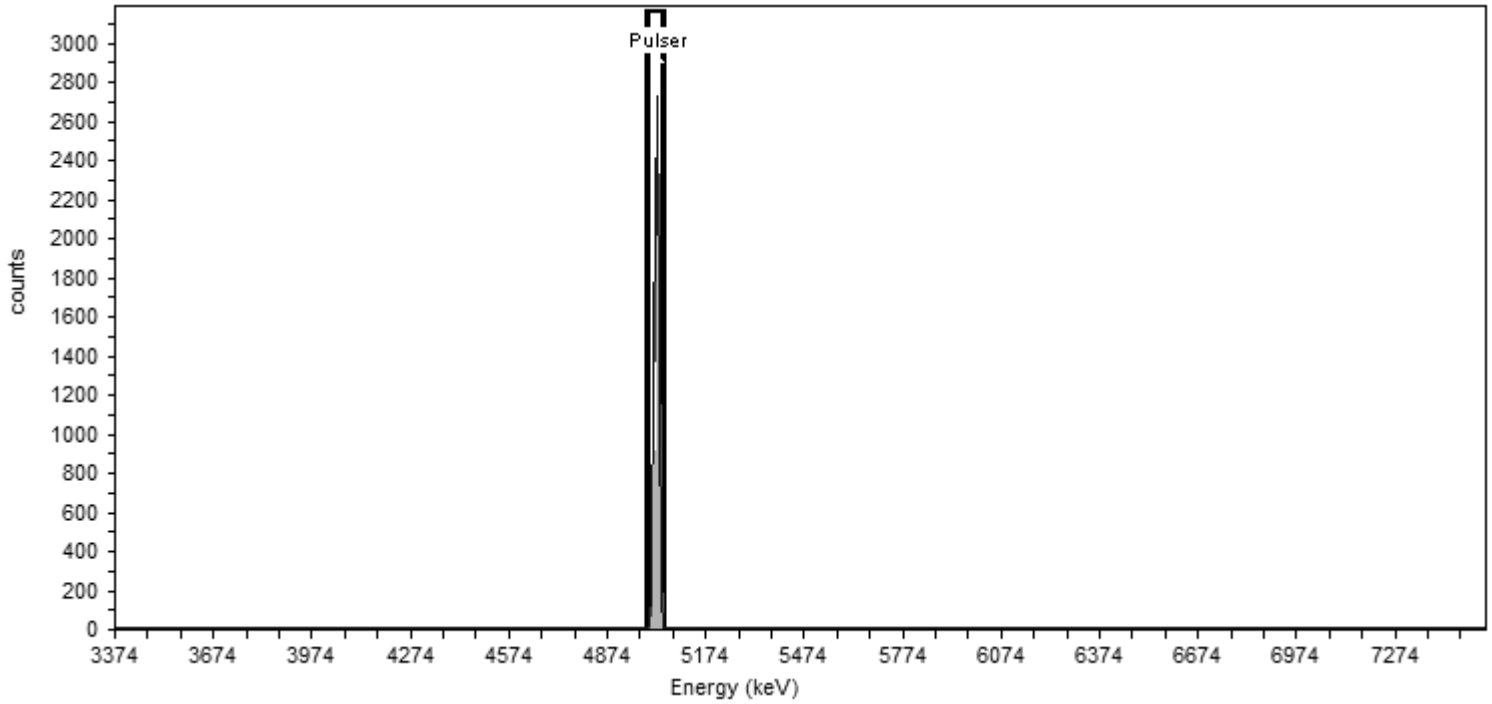
Batch Name: August2016b
Description:

Acquisition

Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 9/8/2016 10:49:52AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV193-20151017
Calibration Date: 10/18/2015 3:55:11PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.210	4996.635	5047.786	15.03	5,876.88	6,011.89

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:41PM 9/7/2016

Sample

Sample Name: Pulser;AV195
Comment:

Spectrum #1 Analysis #1

Batch

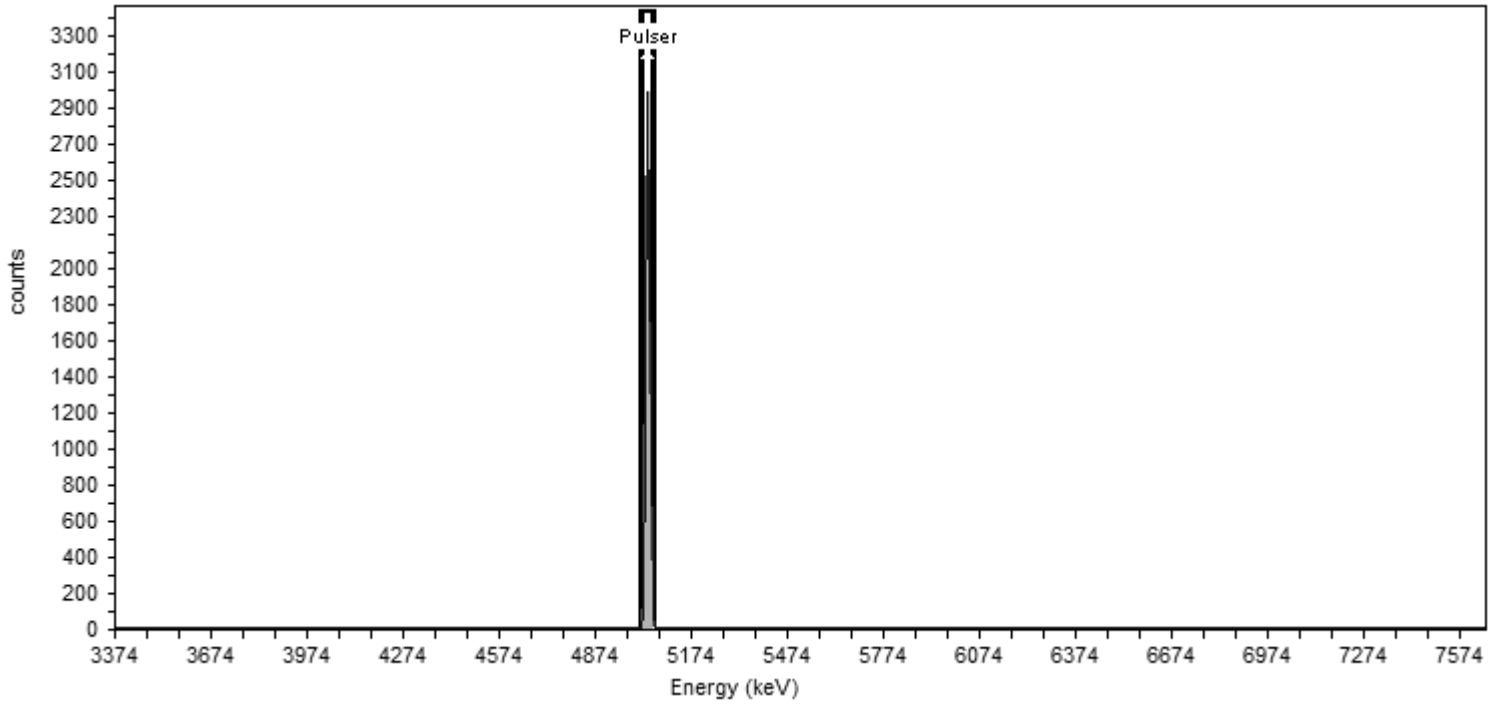
Batch Name: August2016b
Description:

Acquisition

Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 9/7/2016 12:23:19PM
Live Time: 1.00 min.
Real Time: 1.01 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	5037.741	5015.786	5059.696	12.90	5,531.90	5,815.24

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:22AM 9/9/2016

Sample

Sample Name: Pulser;AV195
Comment:

Spectrum #2 Analysis #1

Batch

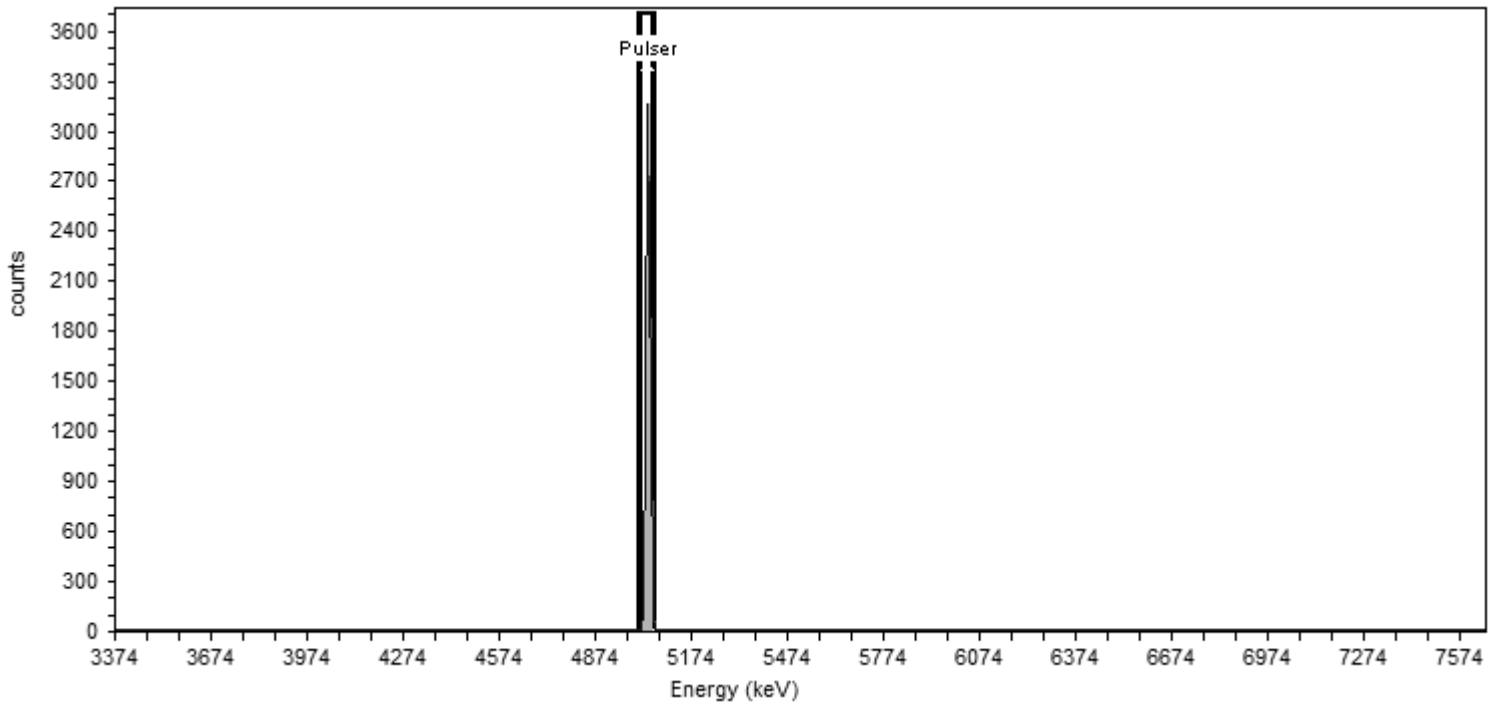
Batch Name: August2016b
Description:

Acquisition

Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 9/8/2016 10:49:52AM
Live Time: 1.00 min.
Real Time: 1.01 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	5037.381	5014.968	5059.795	13.17	5,976.94	5,925.28

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:44PM 9/7/2016

Sample

Sample Name: Pulser;AV198
Comment:

Spectrum #1 Analysis #1

Batch

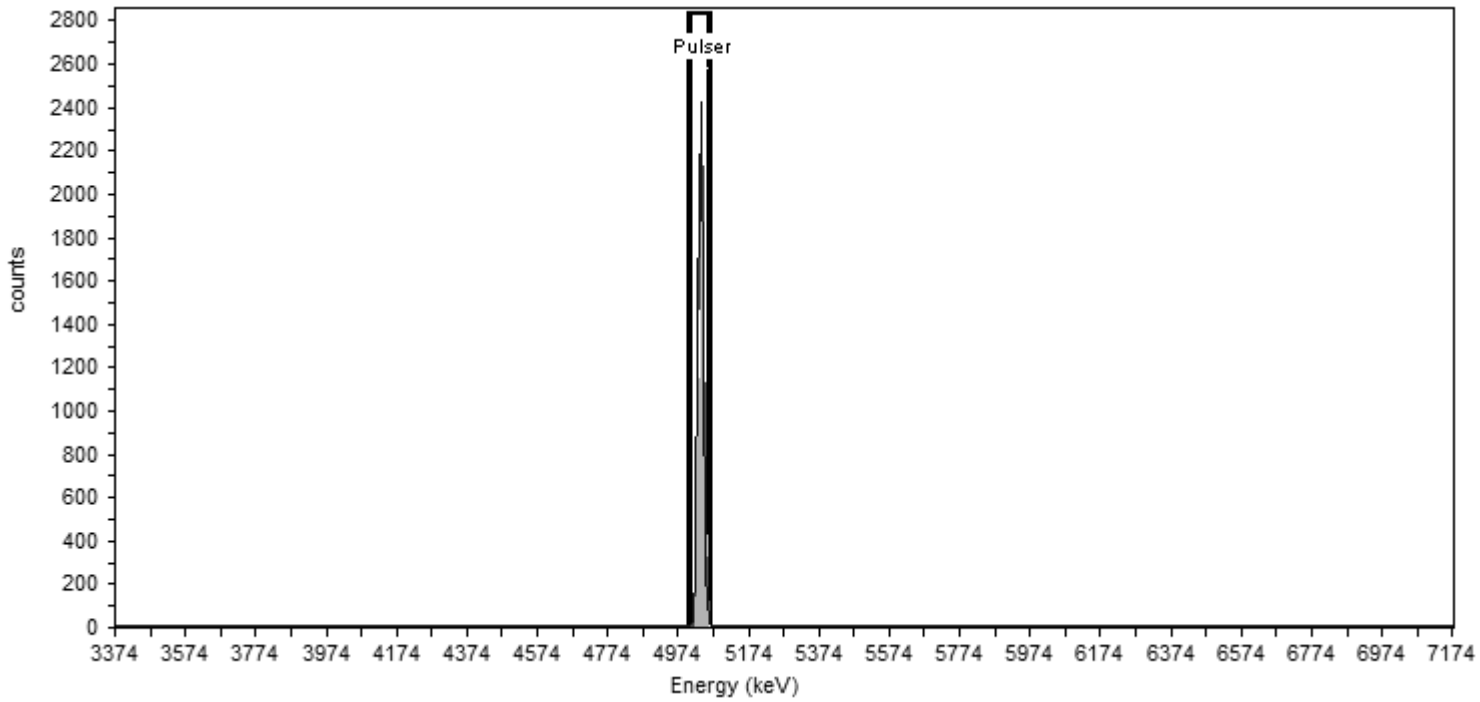
Batch Name: August2016b
Description:

Acquisition

Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 9/7/2016 12:23:19PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM

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	5037.138	5008.773	5065.502	16.66	5,793.29	5,994.27

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:15AM 9/9/2016

Sample

Sample Name: Pulser;AV198
Comment:

Spectrum #2 Analysis #1

Batch

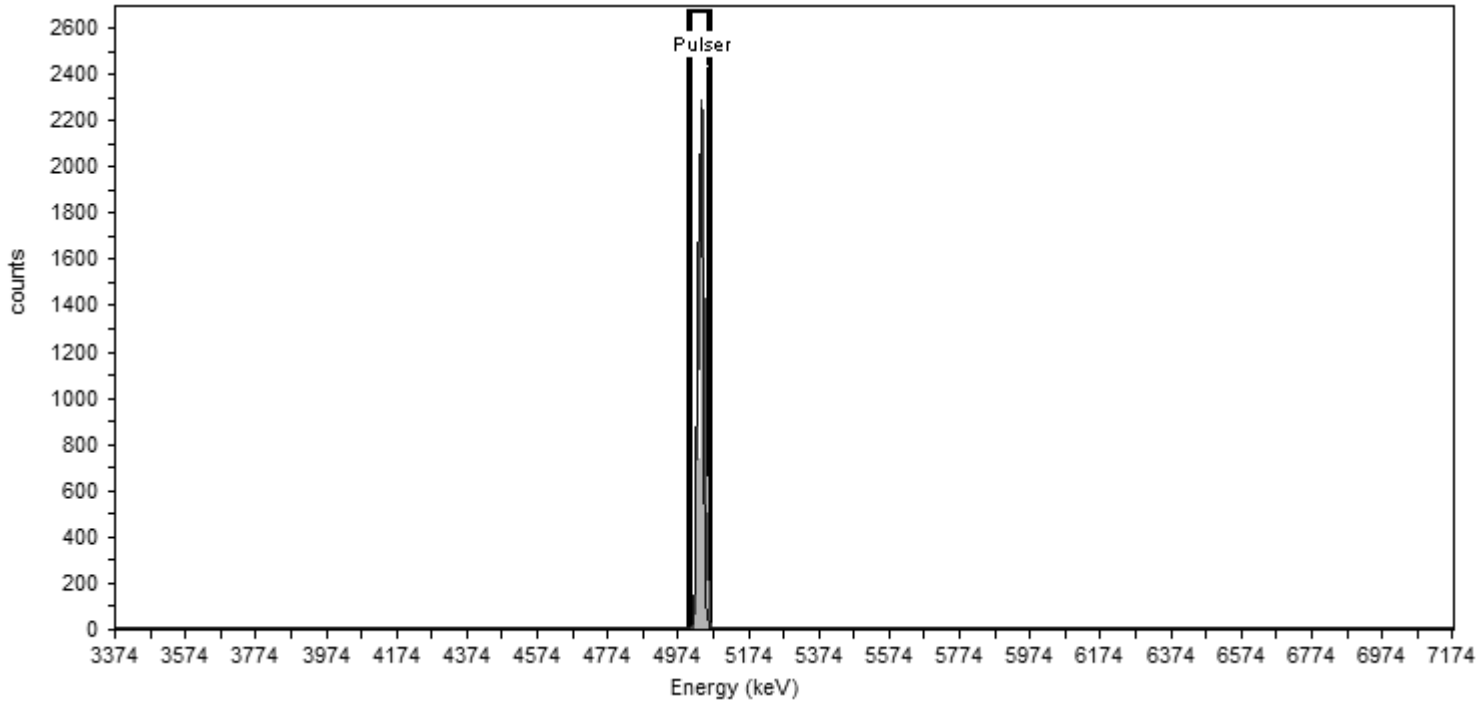
Batch Name: August2016b
Description:

Acquisition

Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 9/8/2016 10:49:52AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM

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	5036.177	5009.749	5062.606	15.53	5,100.43	5,989.08

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:48PM 9/7/2016

Sample

Sample Name: Pulser;AV199
Comment:

Spectrum #1 Analysis #1

Batch

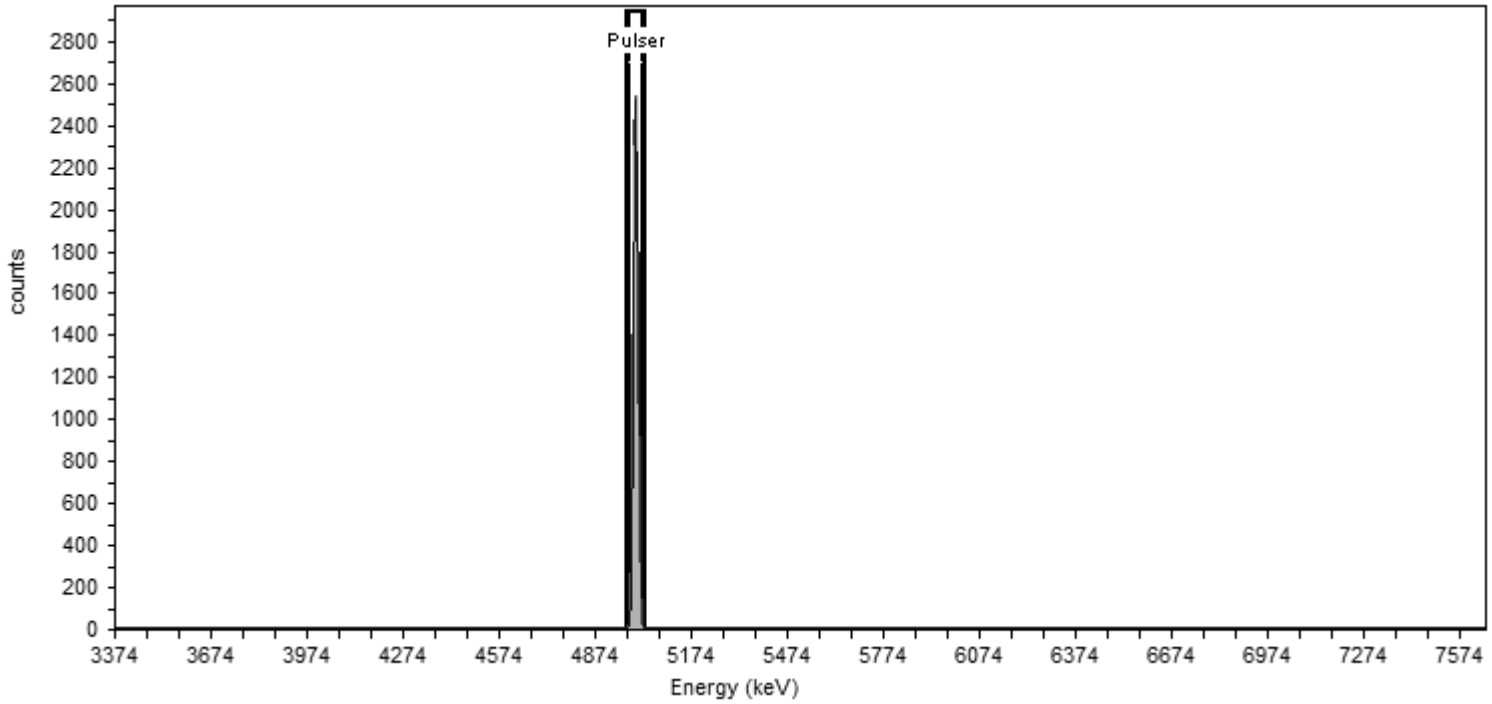
Batch Name: August2016b
Description:

Acquisition

Detector: AV199 , SN: 50-117Z3
Acquisition Start Date: 9/7/2016 12:23:19PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV199-20151017
Calibration Date: 10/18/2015 3:55:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5001.014	4974.316	5027.710	15.68	5,717.42	6,003.77

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:10AM 9/9/2016

Sample

Sample Name: Pulser;AV199
Comment:

Spectrum #2 Analysis #1

Batch

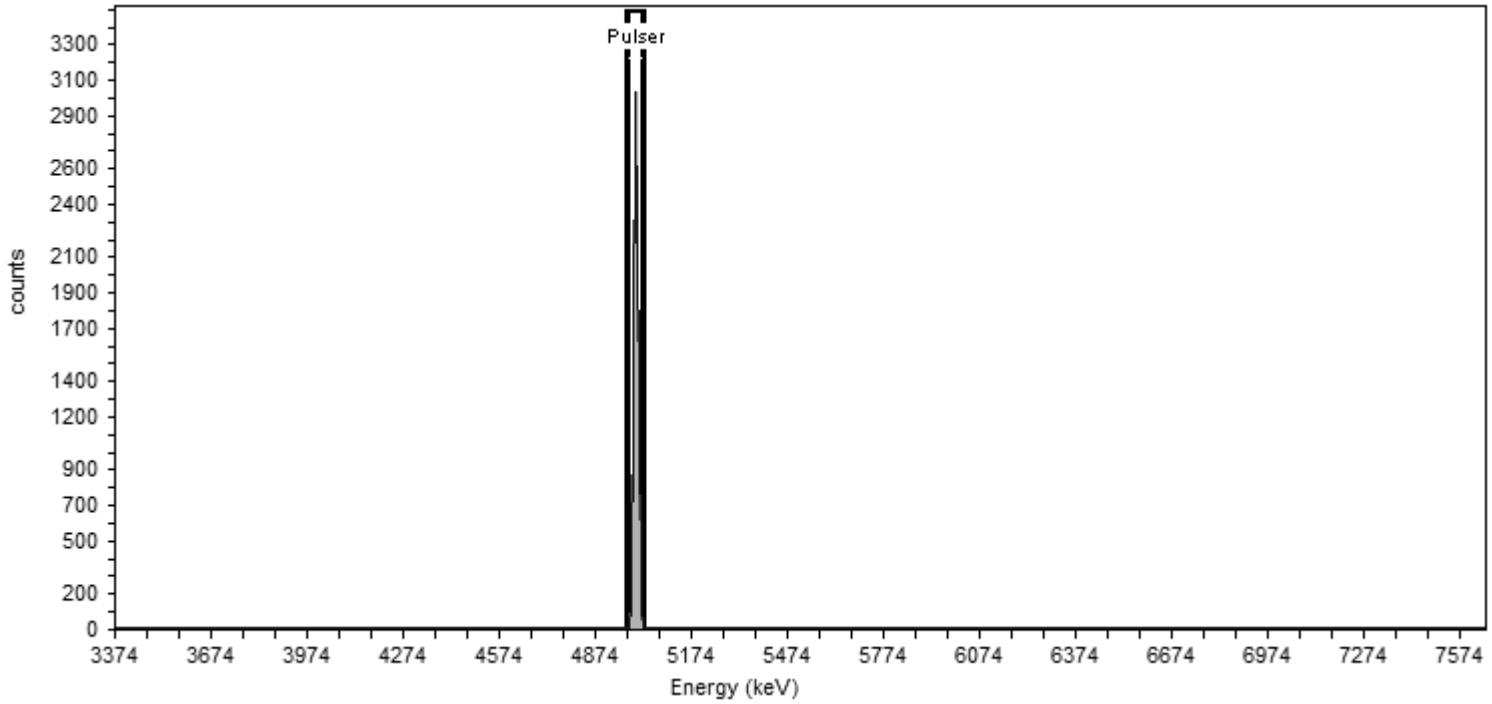
Batch Name: August2016b
Description:

Acquisition

Detector: AV199 , SN: 50-117Z3
Acquisition Start Date: 9/8/2016 10:49:52AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV199-20151017
Calibration Date: 10/18/2015 3:55:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5000.281	4976.849	5023.712	13.77	5,982.73	6,017.47

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:47PM 9/7/2016

Sample

Sample Name: Pulser;AV200
Comment:

Spectrum #1 Analysis #1

Batch

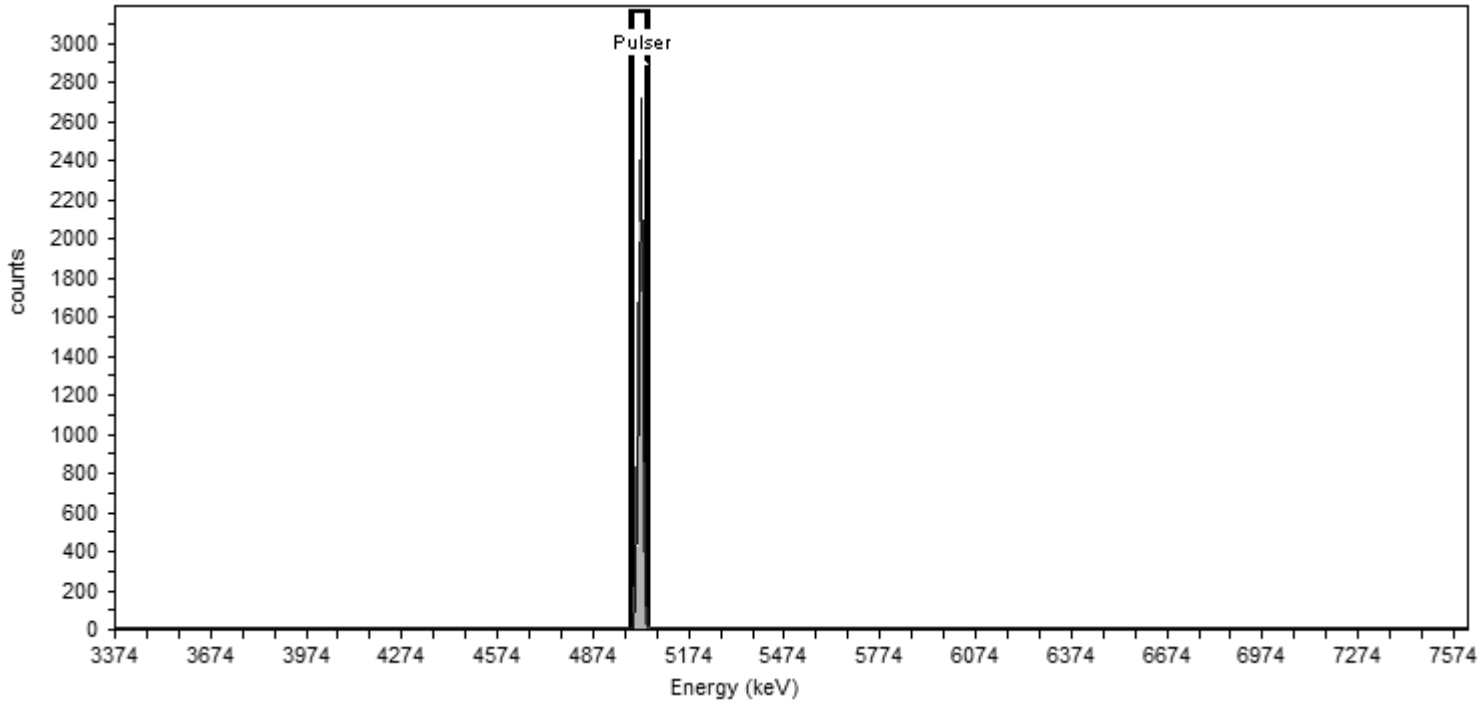
Batch Name: August2016b
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 9/7/2016 12:23:19PM
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	5022.985	4997.440	5048.529	15.01	5,850.43	6,012.27

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:02AM 9/9/2016

Sample

Sample Name: Pulser;AV200
Comment:

Spectrum #2 Analysis #1

Batch

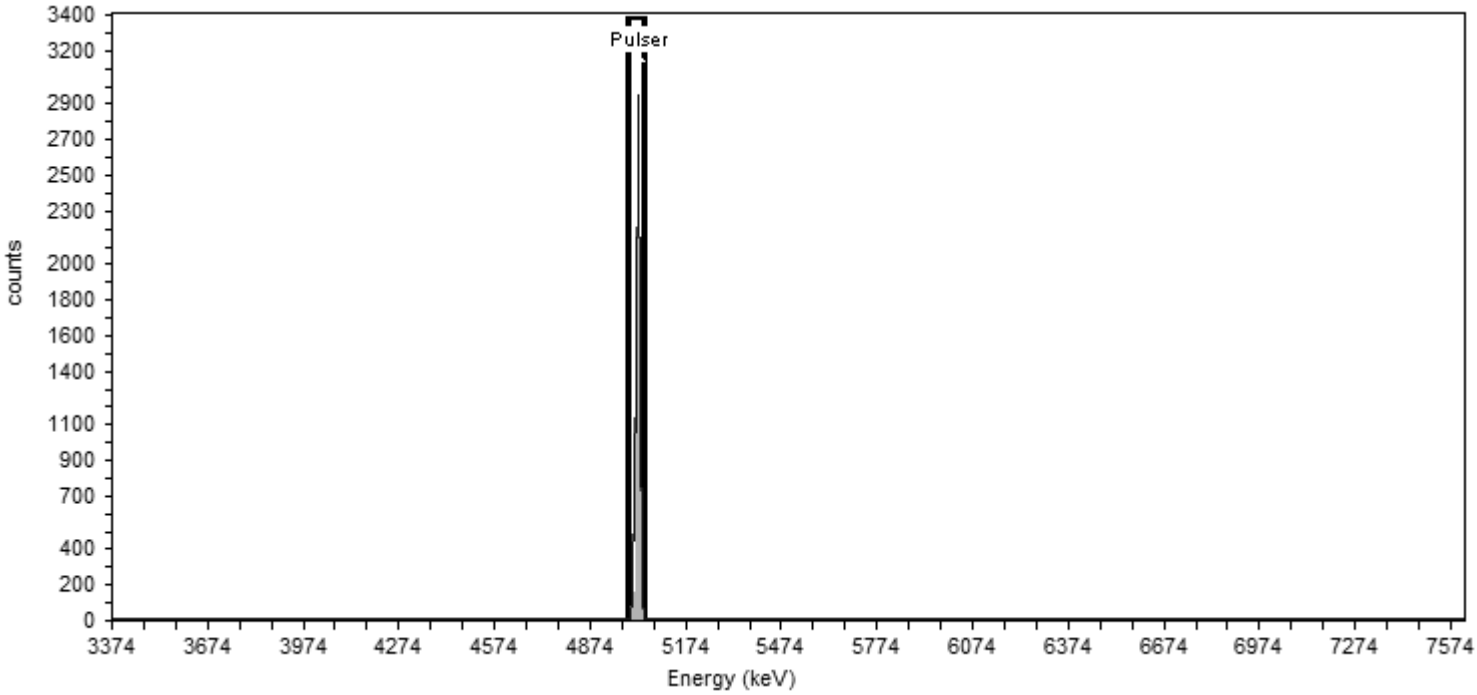
Batch Name: August2016b
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 9/8/2016 10:49:53AM
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	5022.551	4998.710	5046.393	14.01	5,916.98	6,016.22

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:57AM 9/9/2016

Sample

Sample Name: Pulser;AV201
Comment:

Spectrum #2 Analysis #1

Batch

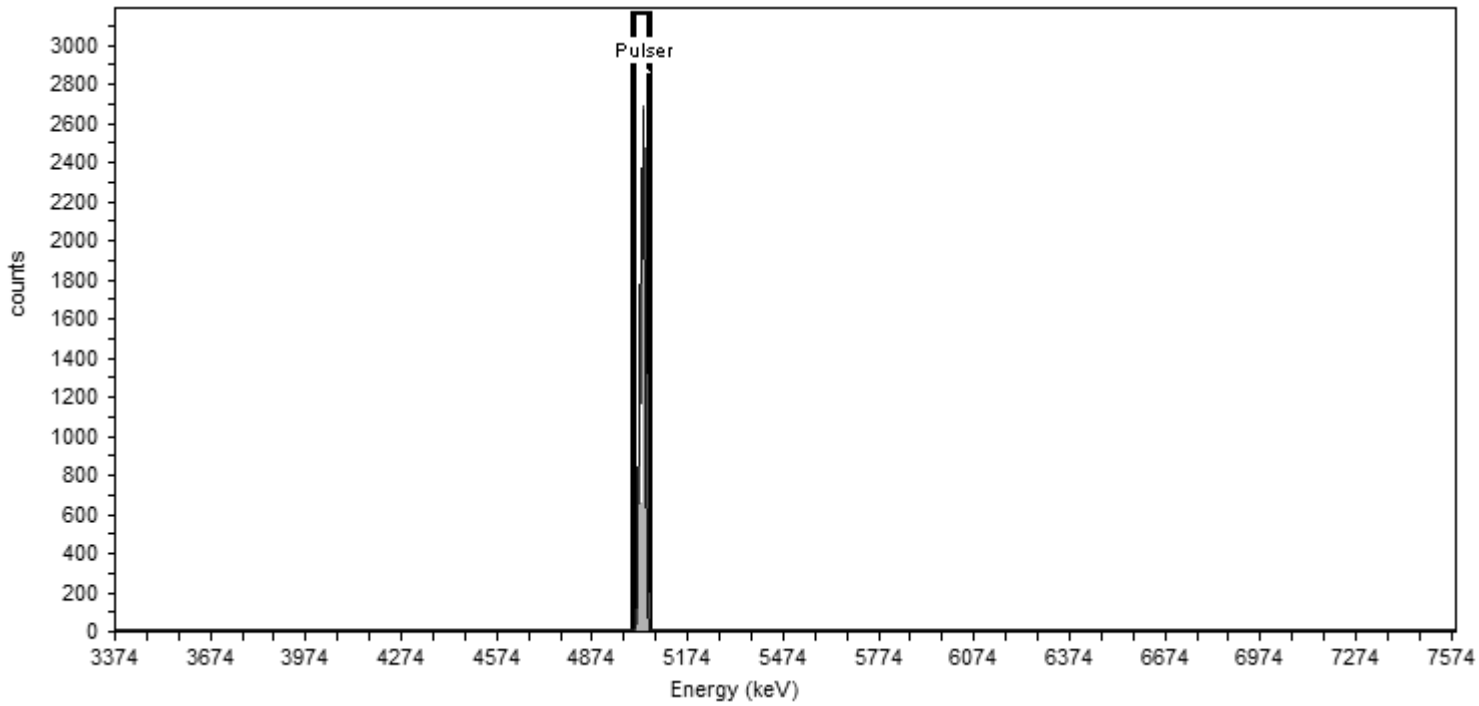
Batch Name: August2016b
Description:

Acquisition

Detector: AV201 , SN: 50-117i5
Acquisition Start Date: 9/8/2016 10:49:48AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9885;AV201-20151017b
Calibration Date: 10/18/2015 3:55:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.321	5004.409	5054.232	14.64	5,636.46	6,019.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:46PM 9/7/2016

Sample

Sample Name: Pulser;AV203
Comment:

Spectrum #1 Analysis #1

Batch

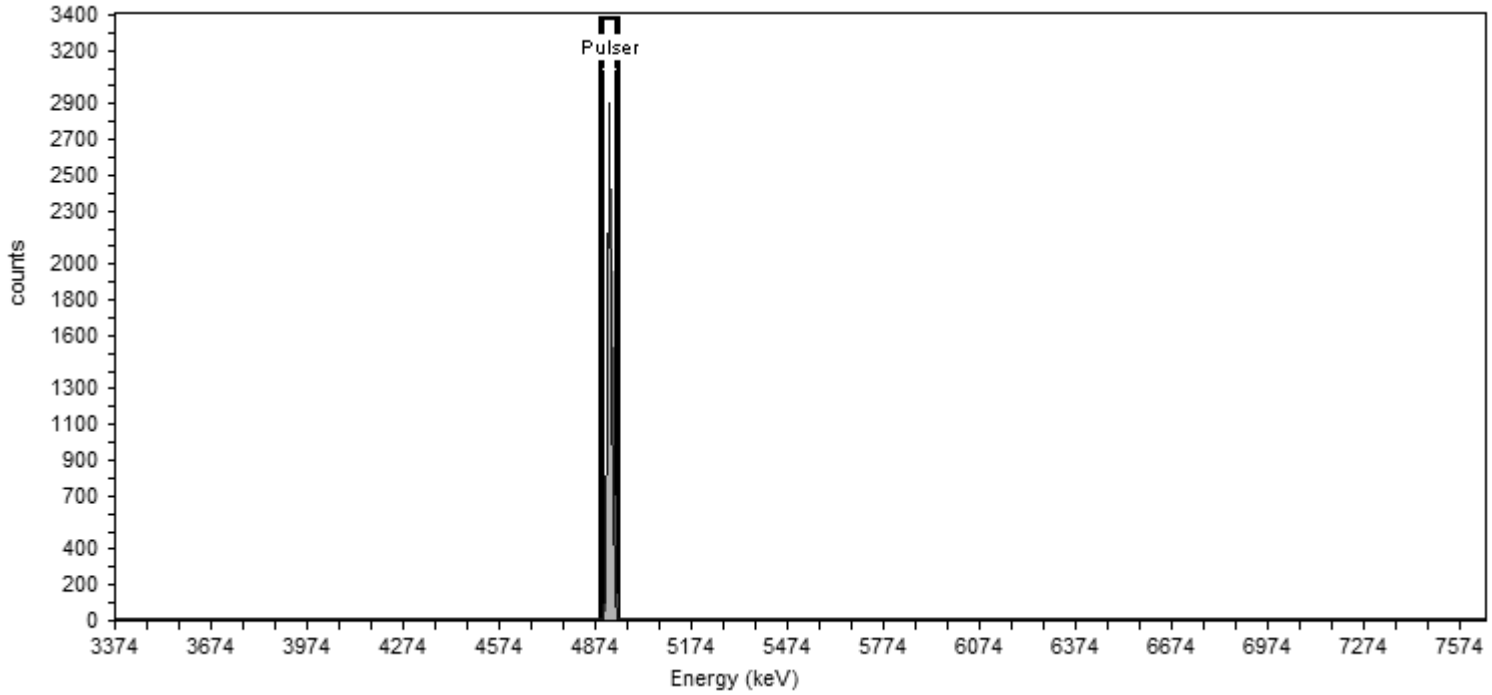
Batch Name: August2016b
Description:

Acquisition

Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 9/7/2016 12:23:20PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV203-20151018a
Calibration Date: 10/18/2015 6:42:12PM

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	4917.791	4893.673	4941.909	14.17	5,904.60	6,029.24

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:54PM 9/7/2016

Sample

Sample Name: Pulser;AV204
Comment:

Spectrum #1 Analysis #1

Batch

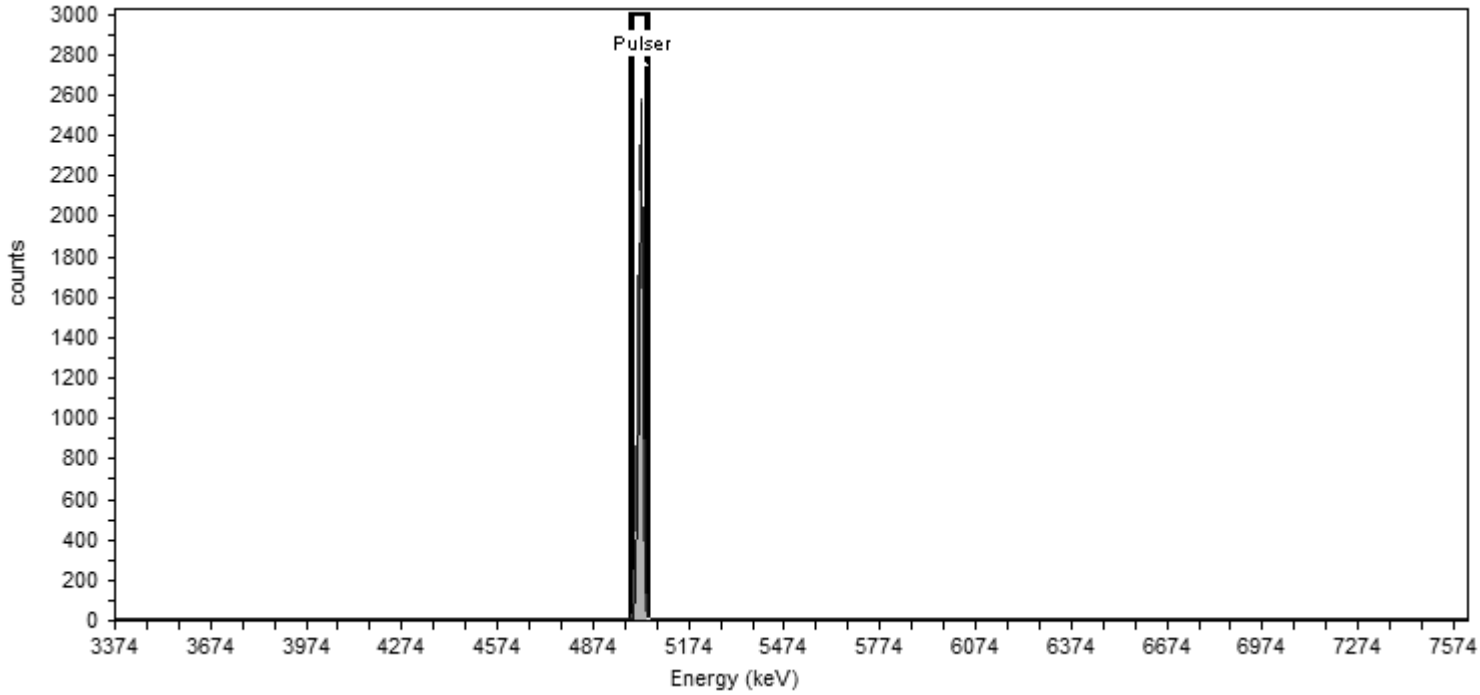
Batch Name: August2016b
Description:

Acquisition

Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 9/7/2016 12:23:20PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV204-20151018a
Calibration Date: 10/18/2015 6:42:20PM

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	5023.327	4997.201	5049.453	15.35	5,685.06	5,980.27

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:55PM 9/7/2016

Sample

Sample Name: Pulser;AV205
Comment:

Spectrum #1 Analysis #1

Batch

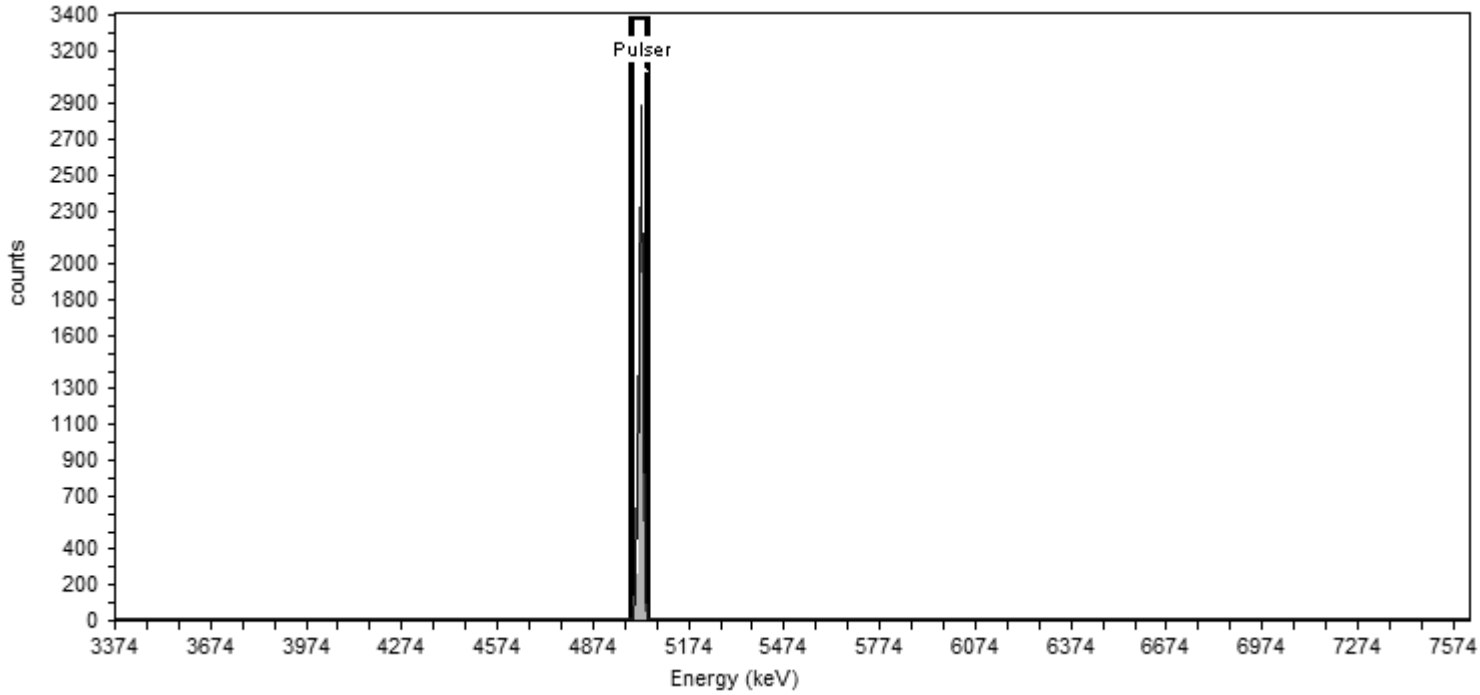
Batch Name: August2016b
Description:

Acquisition

Detector: AV205 , SN: 49-155dd3
Acquisition Start Date: 9/7/2016 12:23:20PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV205-20151018a
Calibration Date: 10/18/2015 6:42:32PM

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	5022.772	4997.879	5047.665	14.62	6,054.63	6,011.06

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:51PM 9/7/2016

Sample

Sample Name: Pulser;AV208
Comment:

Spectrum #1 Analysis #1

Batch

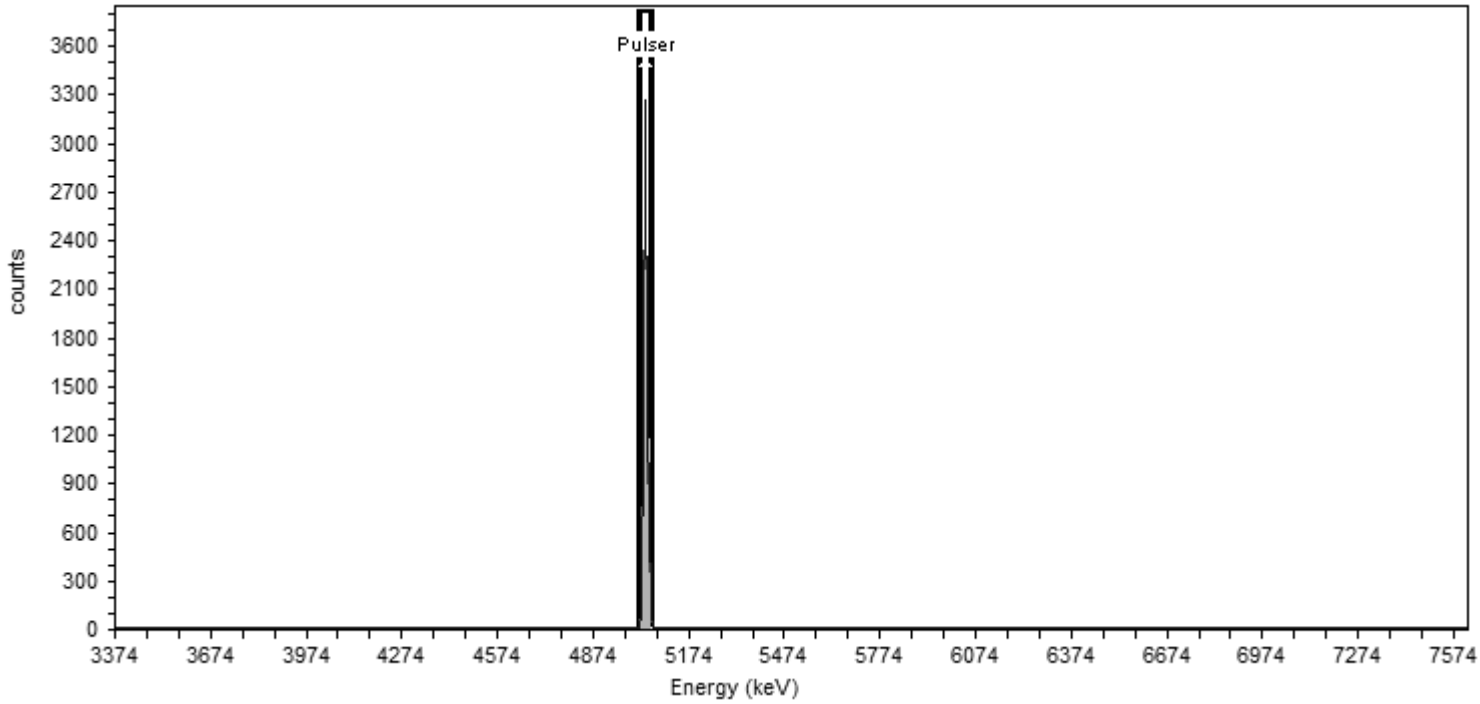
Batch Name: August2016b
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 9/7/2016 12:23:21PM
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	5037.523	5015.421	5059.625	12.98	6,085.13	5,862.41

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:57PM 9/7/2016

Sample

Sample Name: Pulser;AV209
Comment:

Spectrum #1 Analysis #1

Batch

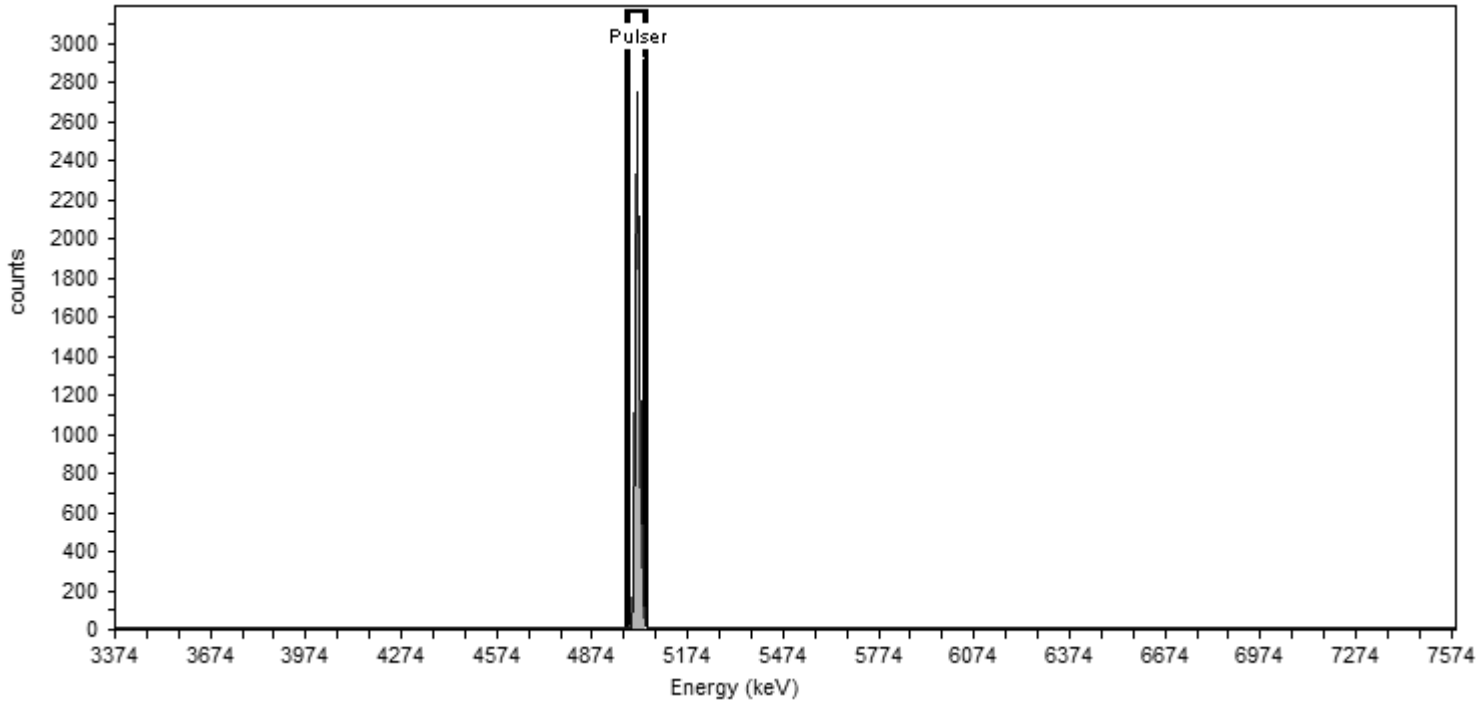
Batch Name: August2016b
Description:

Acquisition

Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 9/7/2016 12:23:21PM
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	5015.465	4989.854	5041.077	15.05	5,932.50	6,005.62

Initial Calibrations

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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

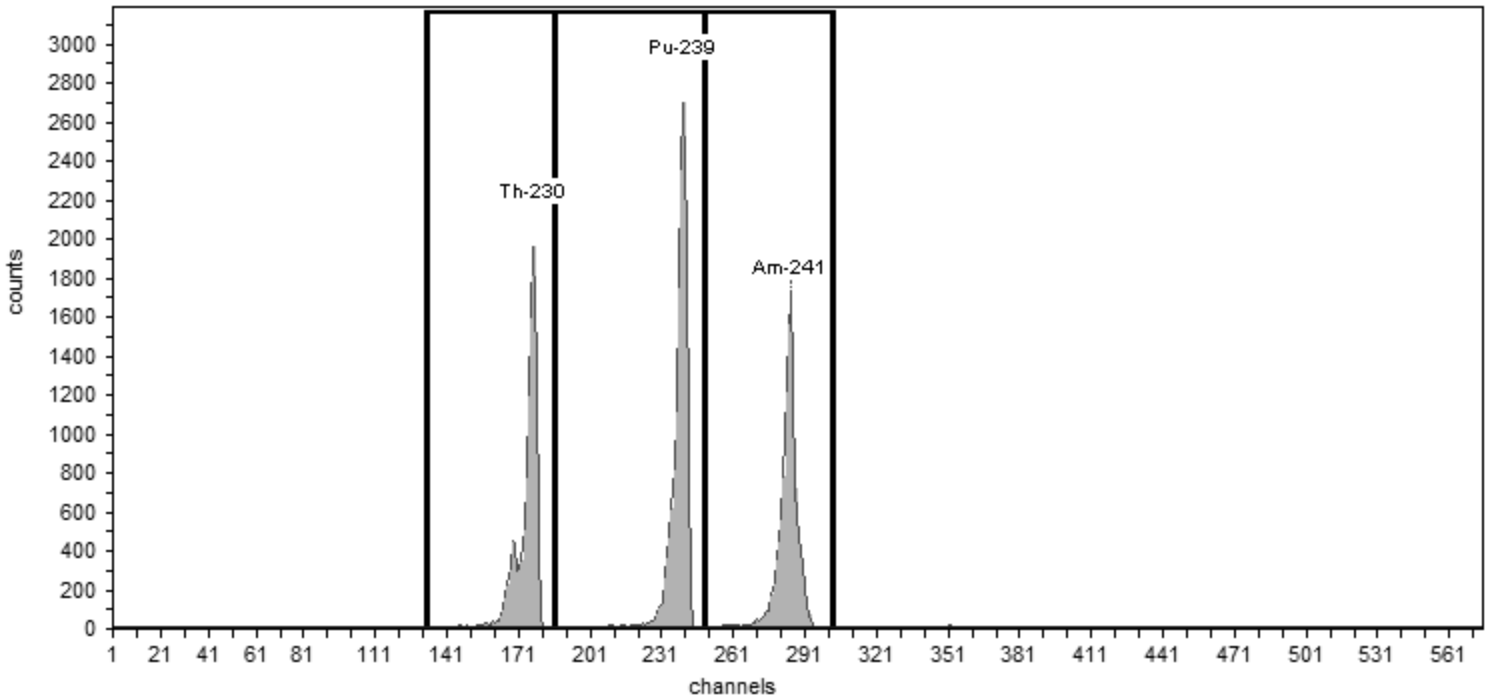
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 10/16/2015 4:27:06PM

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

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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

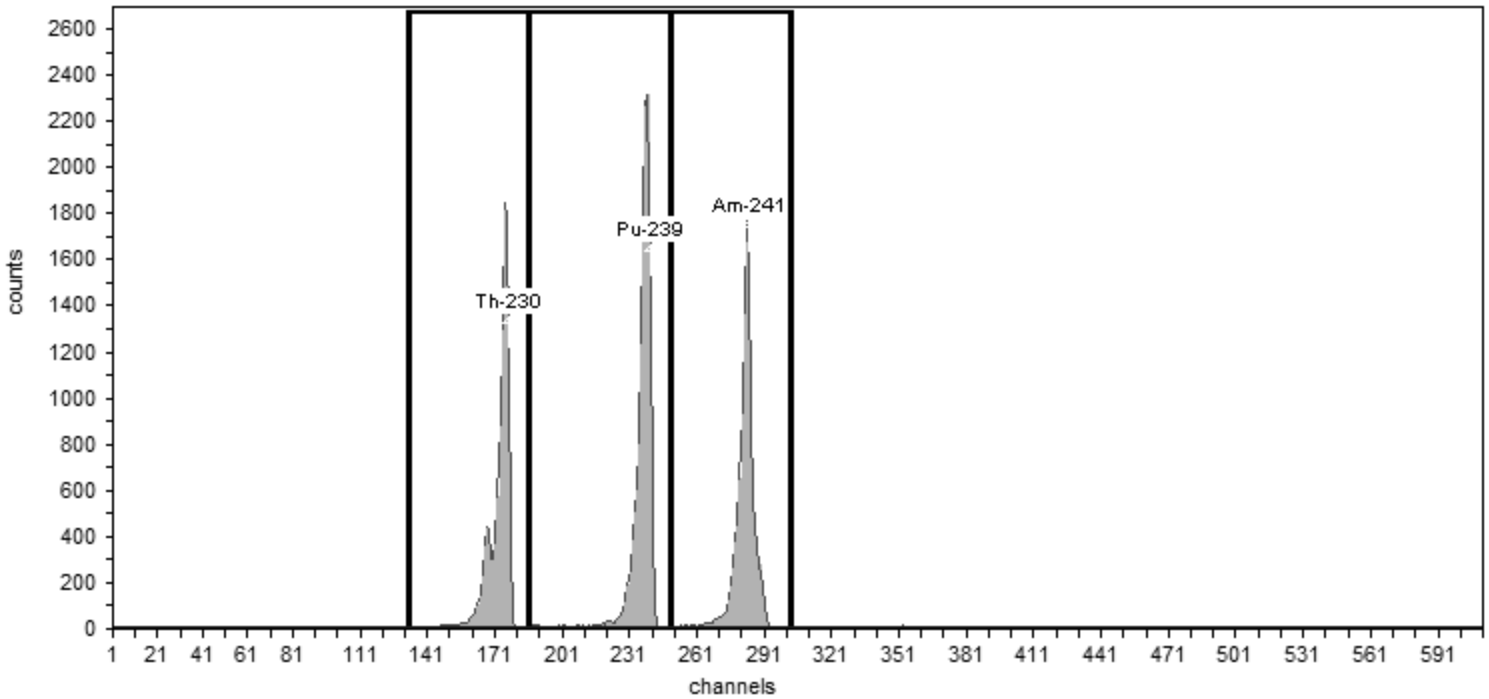
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 10/16/2015 3:51:18PM

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

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:46:47PM 10/16/2015

Calibration

Sample Name: IC-8876;AV150-20151016
Description:
Detector: AV150

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

Source Info

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

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

Acquisition

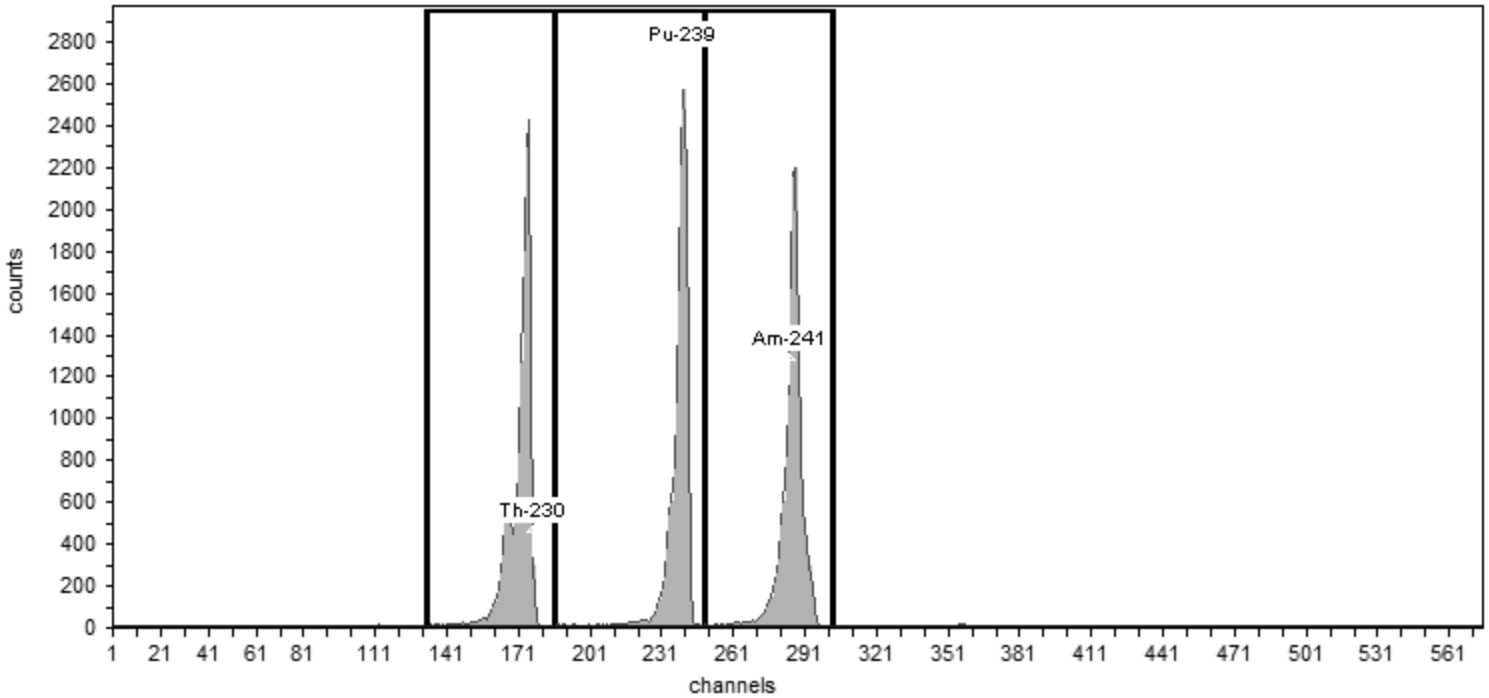
Detector: AV150 , SN: 50-05/R4
Acquisition Start Date: 10/16/2015 3:51:29PM

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

Efficiency Calibration Name: IC-8876;AV150-20151016

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

Efficiency: 24.45% +/- 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	31.57	14,812.00	105.80
Pu-239	240	5,155.40	186	249	32.92	14,414.00	102.96
Am-241	284	5,485.70	249	303	34.04	14,906.00	106.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:46:57PM 10/16/2015

Calibration

Sample Name: IC-9792;AV153-20151016
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 10/16/2015 6:46:57PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

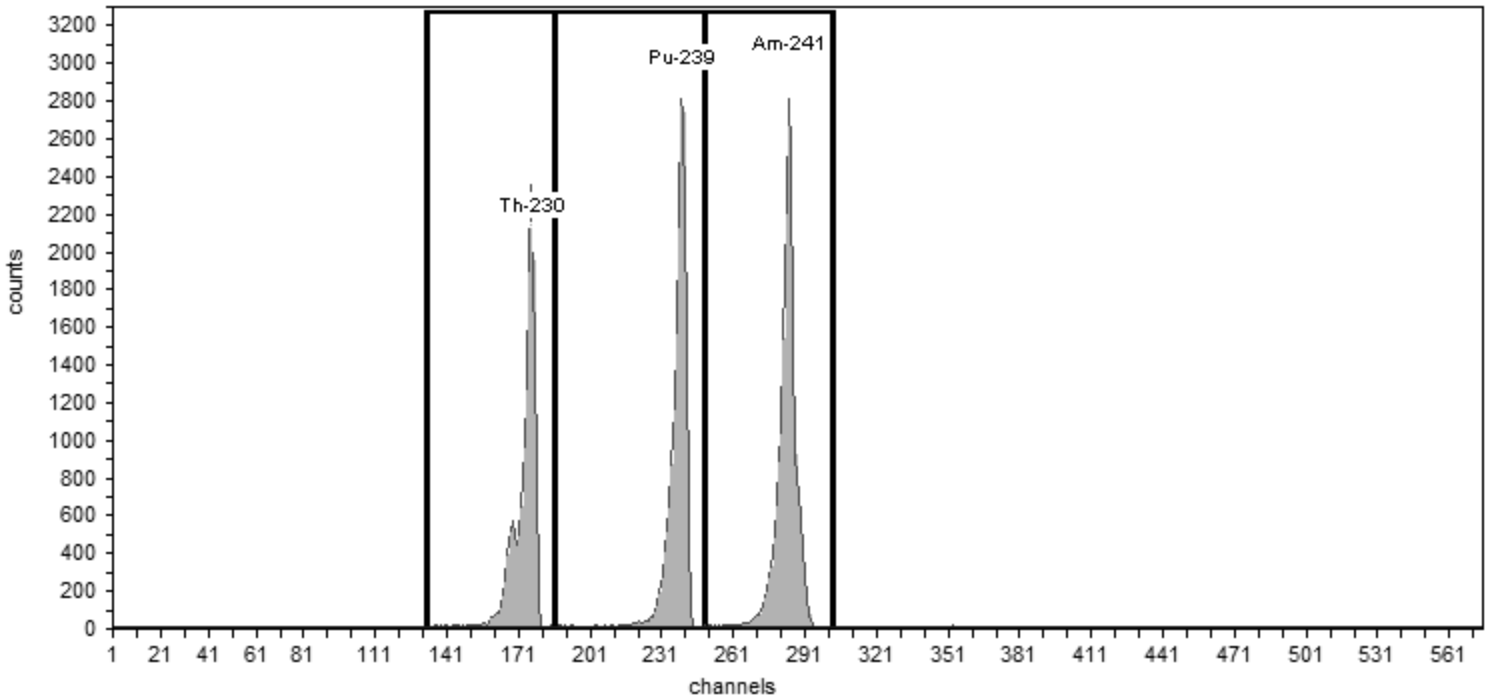
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 10/16/2015 3:52:22PM

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

Efficiency Calibration Name: IC-9792;AV153-20151016

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

Efficiency: 26.60% +/- 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	29.79	13,953.00	99.66
Pu-239	240	5,155.40	186	249	34.07	16,216.00	115.83
Am-241	284	5,485.70	249	303	33.42	18,314.00	130.81

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:54PM 10/17/2015

Calibration

Sample Name: IC-9817;AV171-20151016
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 10/17/2015 2:36:53PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

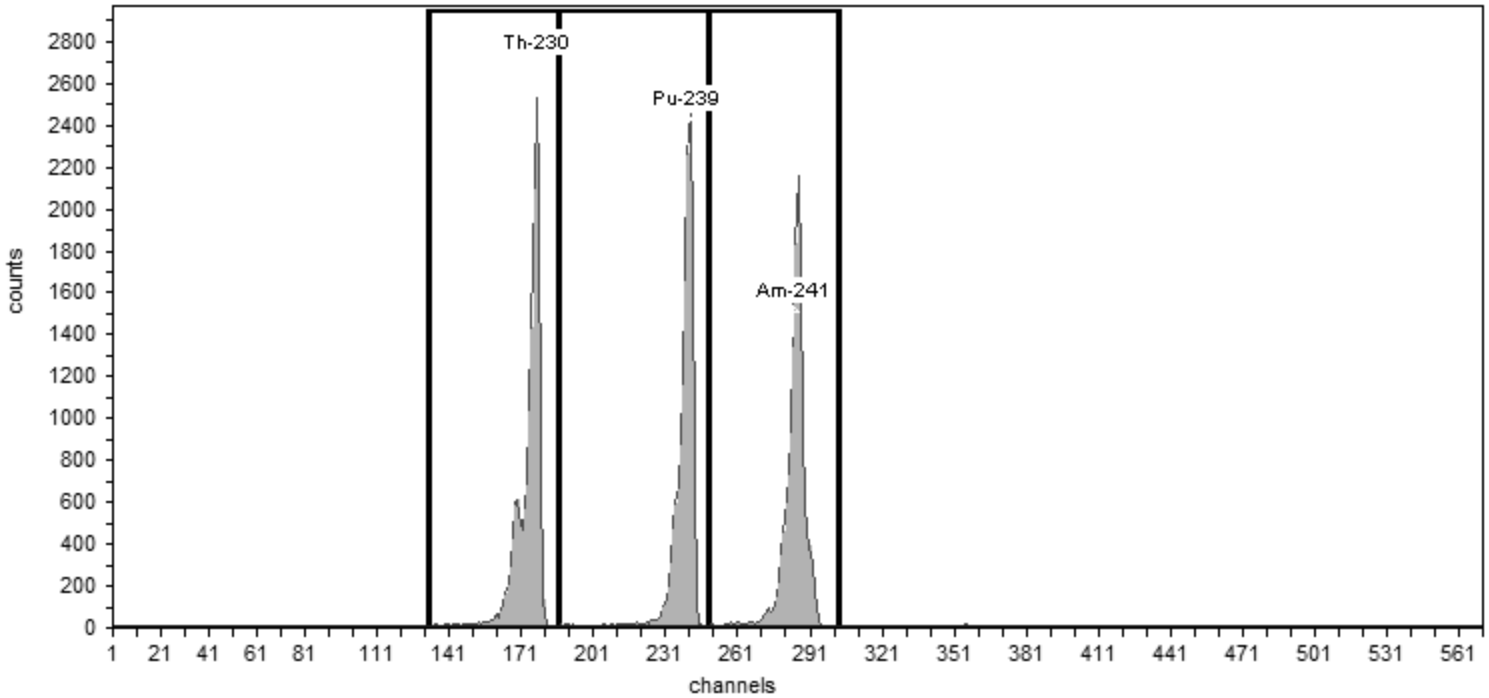
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 10/16/2015 6:59:39PM

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

Efficiency Calibration Name: IC-9817;AV171-20151016

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

Efficiency: 24.59% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.27	15,154.00	108.24
Pu-239	240	5,155.40	186	249	32.91	13,964.00	99.74
Am-241	284	5,485.70	249	303	33.24	14,078.00	100.56

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:38PM 11/23/2015

Calibration

Sample Name: IC-9884;AV172-20151016
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 10/17/2015 2:36:56PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

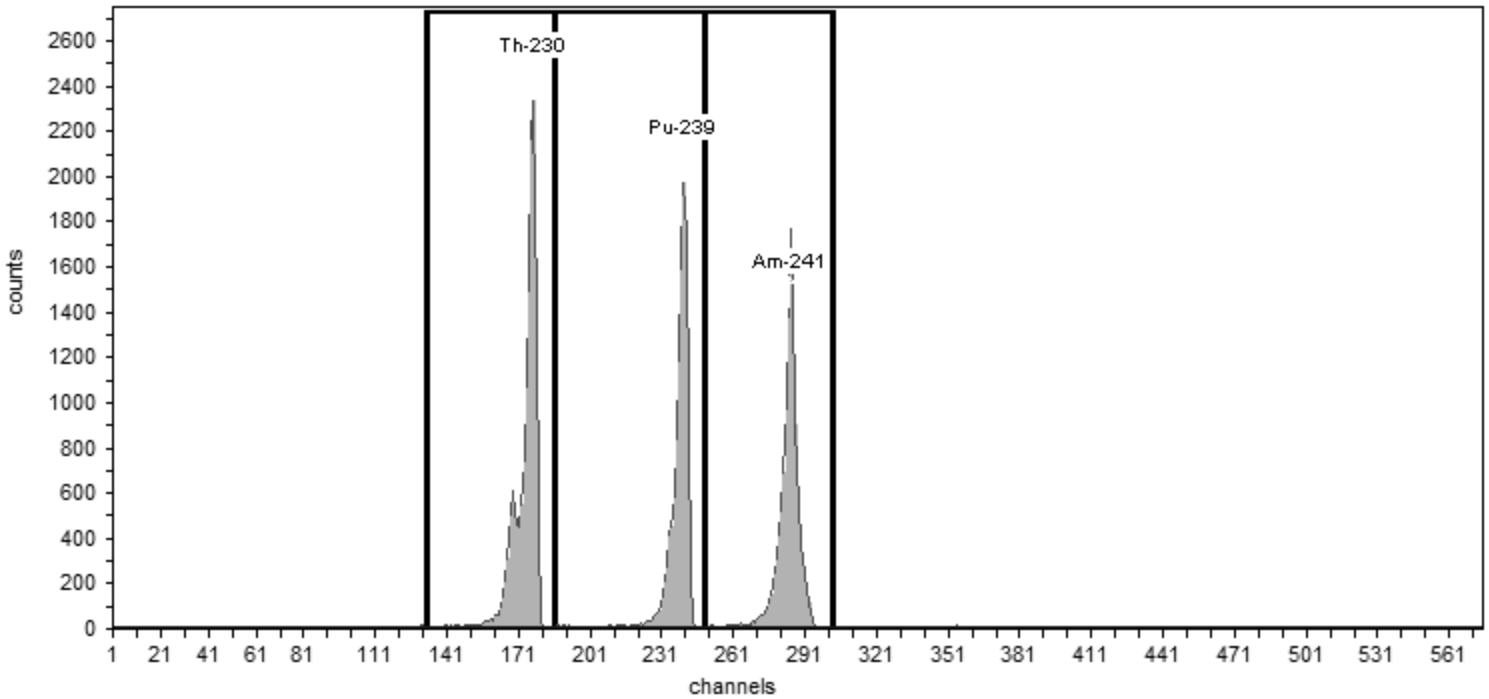
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 10/16/2015 6:59:52PM

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

Efficiency Calibration Name: IC-9884;AV172-20151016

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

Efficiency: 24.32% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	13,870.00	99.07
Pu-239	240	5,155.40	186	249	33.22	10,984.00	78.46
Am-241	284	5,485.70	249	303	32.36	11,196.00	79.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:30PM 10/17/2015

Calibration

Sample Name: IC-9886;AV188-20151017
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 10/17/2015 6:02:29PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

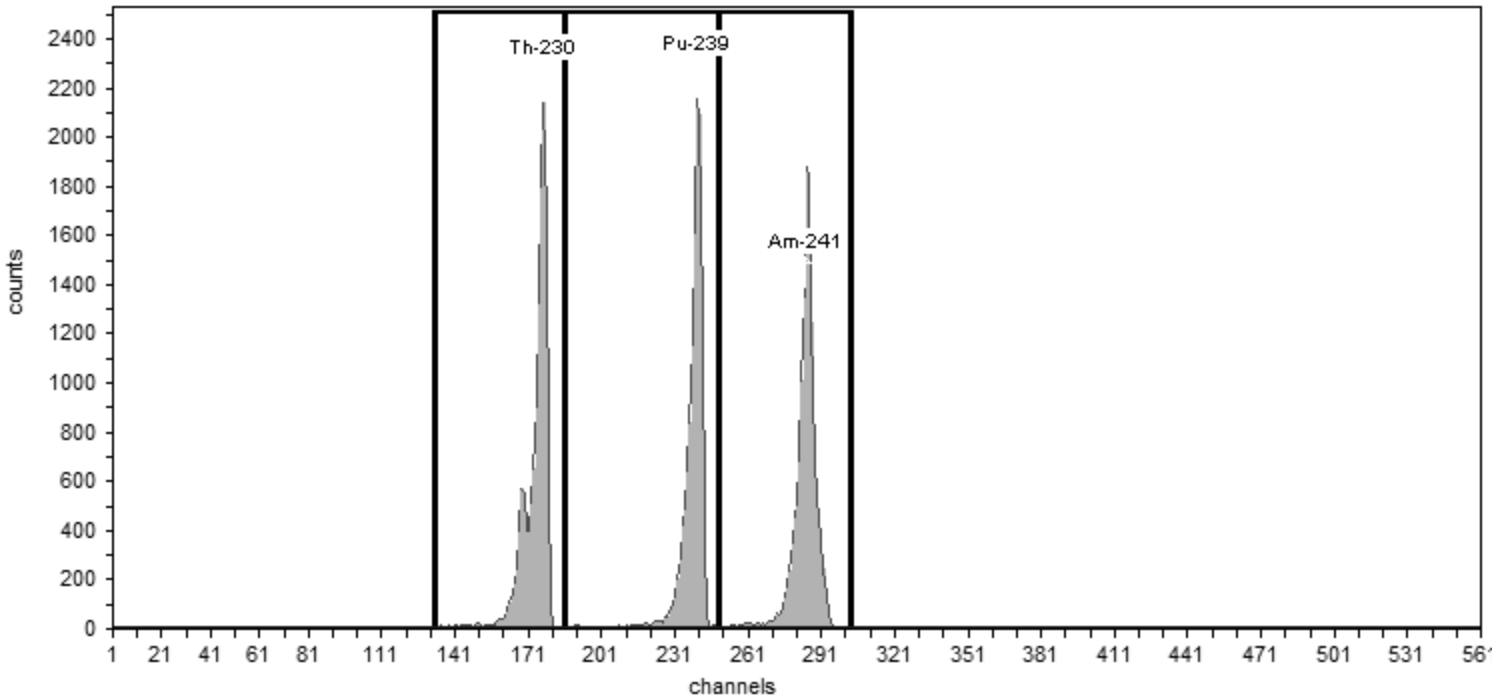
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 10/17/2015 2:51:09PM

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

Efficiency Calibration Name: IC-9886;AV188-20151017

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

Efficiency: 24.77% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.00	13,002.00	92.87
Pu-239	240	5,155.40	186	249	33.19	12,201.00	87.15
Am-241	284	5,485.70	249	303	35.49	12,768.00	91.20

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:38PM 10/18/2015

Calibration

Sample Name: IC-7107;AV189-20151017a
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 10/18/2015 3:55:37PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

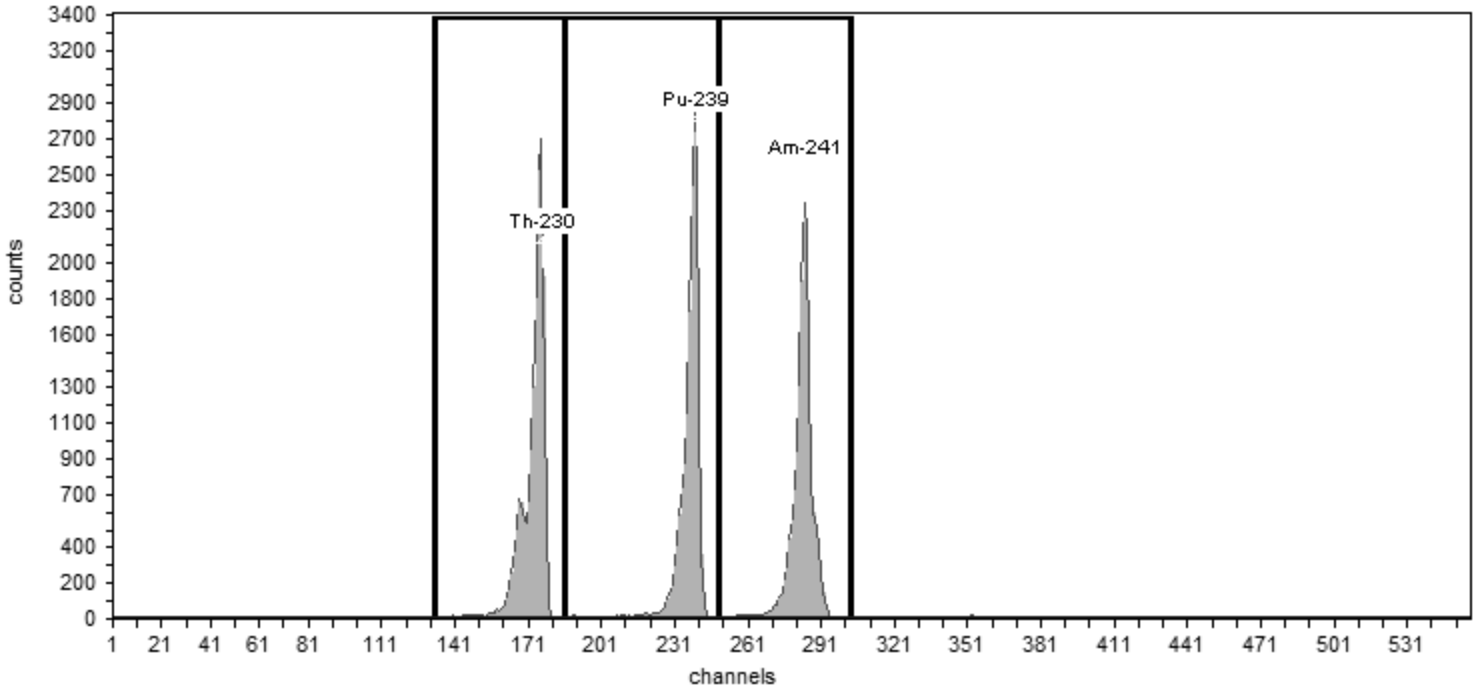
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 10/17/2015 6:19:19PM

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

Efficiency Calibration Name: IC-7107;AV189-20151017a

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

Efficiency: 26.37% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.17	16,725.00	119.46
Pu-239	240	5,155.40	186	249	33.04	16,324.00	116.60
Am-241	284	5,485.70	249	303	35.31	15,710.00	112.21

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:00PM 10/18/2015

Calibration

Sample Name: IC-8874;AV190-20151017
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 10/18/2015 3:54:59PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

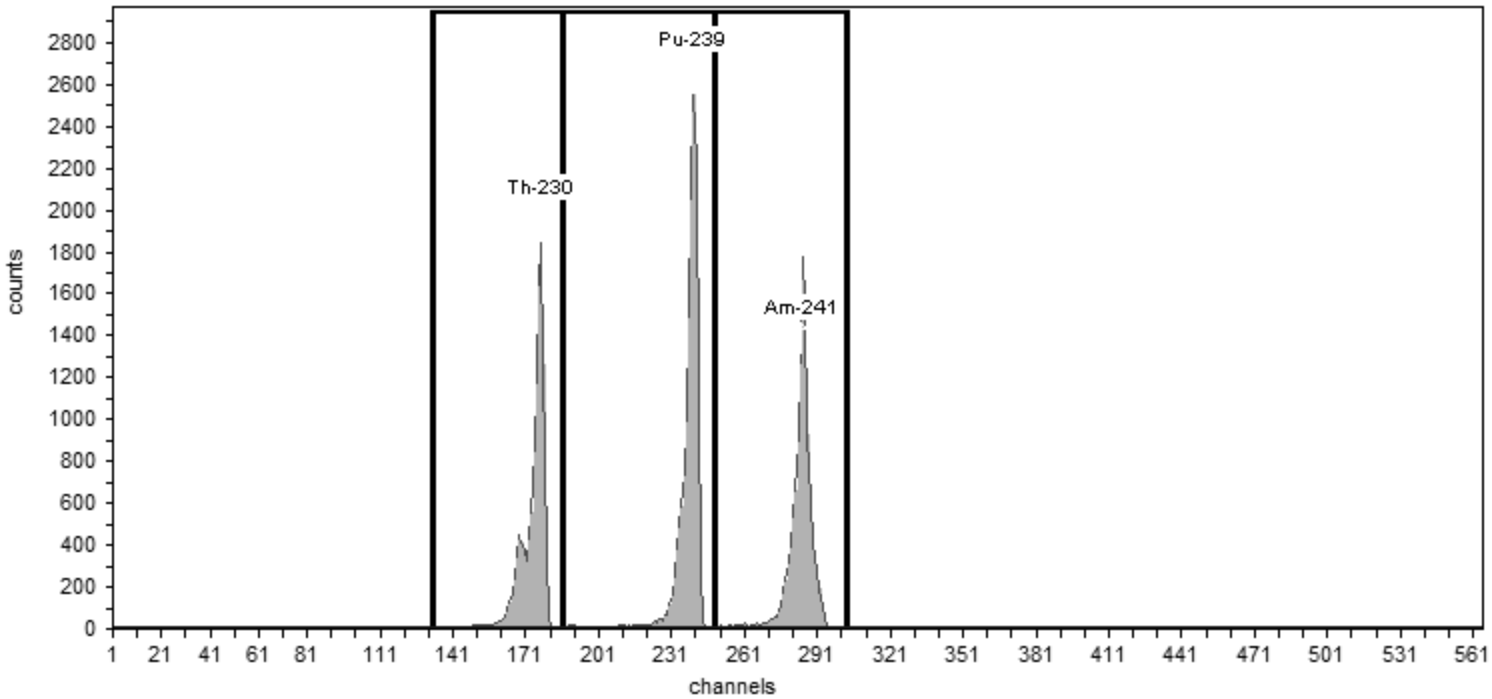
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 10/17/2015 6:13:15PM

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

Efficiency Calibration Name: IC-8874;AV190-20151017

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

Efficiency: 26.54% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.86	10,865.00	77.61
Pu-239	240	5,155.40	186	249	31.92	13,830.00	98.79
Am-241	284	5,485.70	249	303	30.54	11,151.00	79.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:05PM 10/18/2015

Calibration

Sample Name: IC-8875;AV191-20151017
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 10/18/2015 3:55:04PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

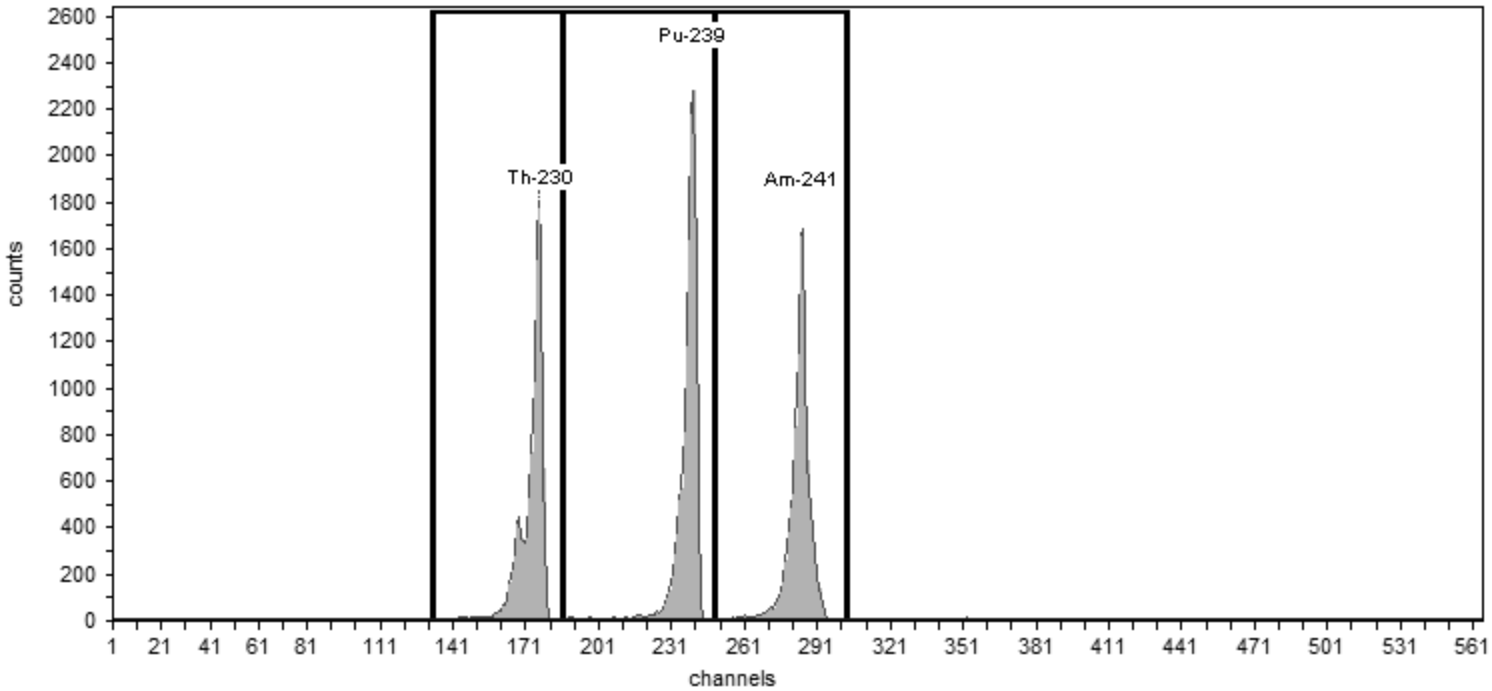
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 10/17/2015 6:13:26PM

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

Efficiency Calibration Name: IC-8875;AV191-20151017

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

Efficiency: 24.22% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.72	11,130.00	79.50
Pu-239	240	5,155.40	186	249	33.56	12,810.00	91.50
Am-241	284	5,485.70	249	303	34.44	11,195.00	79.96

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:28:25PM 11/23/2015

Calibration

Sample Name: IC-8877;AV193-20151017
Description:
Detector: AV193

Analyst: 60040
Analysis Date: 10/18/2015 3:55:11PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

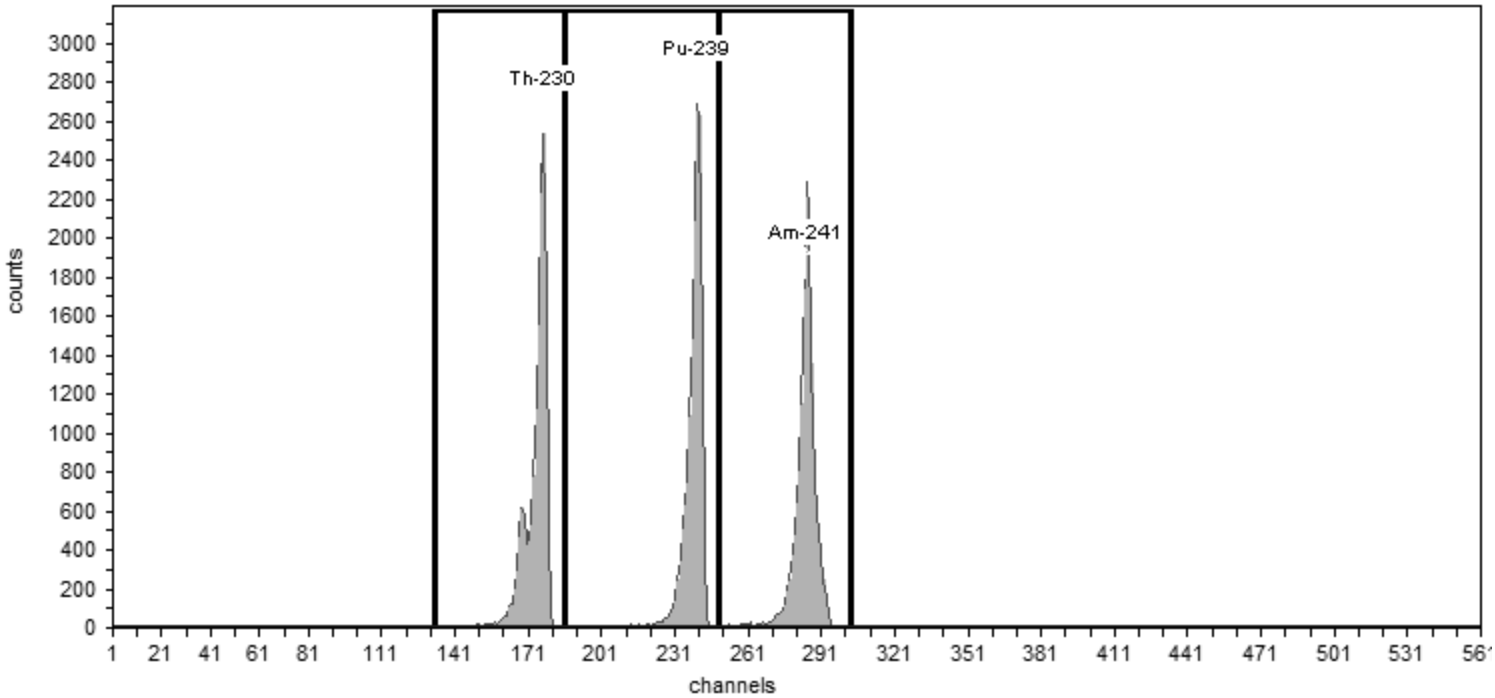
Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 10/17/2015 6:13:48PM

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

Efficiency Calibration Name: IC-8877;AV193-20151017

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

Efficiency: 25.42% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.15	14,591.00	104.22
Pu-239	240	5,155.40	186	249	33.33	14,933.00	106.66
Am-241	284	5,485.70	249	303	32.55	14,605.00	104.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:42PM 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

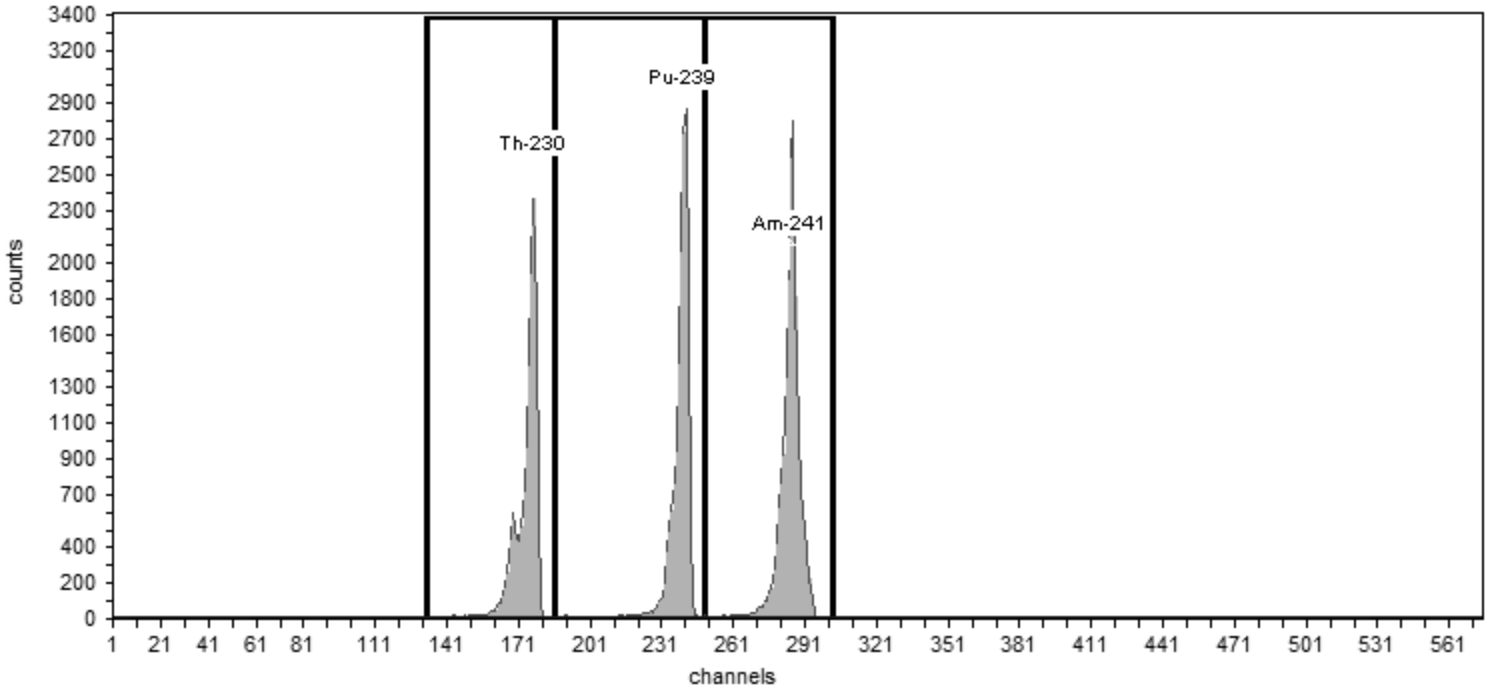
Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 10/17/2015 6:19:39PM

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
8:28:33PM 11/23/2015

Calibration

Sample Name: IC-9795;AV198-20151017
Description:
Detector: AV198

Analyst: 60040
Analysis Date: 10/18/2015 3:55:25PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

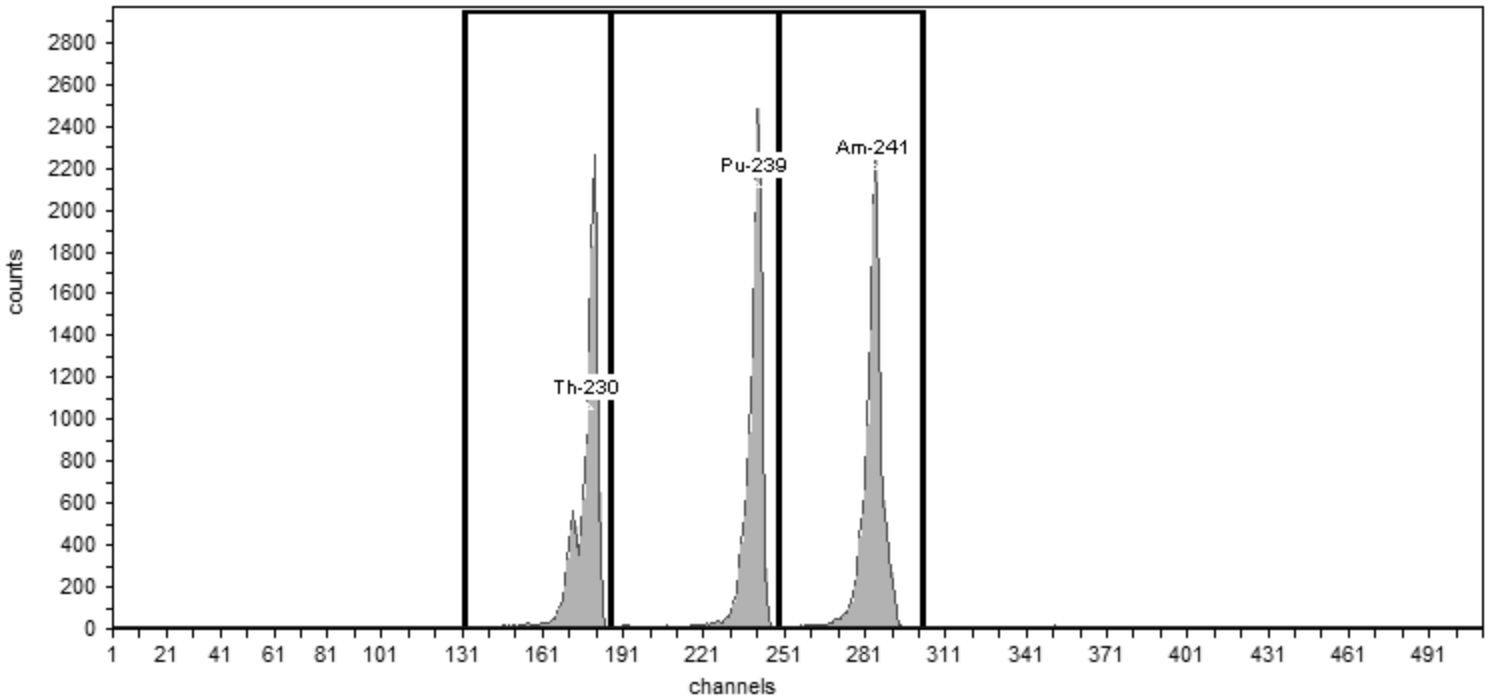
Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 10/17/2015 6:15:03PM

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

Efficiency Calibration Name: IC-9795;AV198-20151017

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

Efficiency: 26.02% +/- 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	29.73	12,790.00	91.36
Pu-239	240	5,155.40	186	249	30.64	13,076.00	93.40
Am-241	284	5,485.70	249	303	31.11	13,863.00	99.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:30PM 10/18/2015

Calibration

Sample Name: IC-9817;AV199-20151017
Description:
Detector: AV199

Analyst: 60040
Analysis Date: 10/18/2015 3:55:29PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

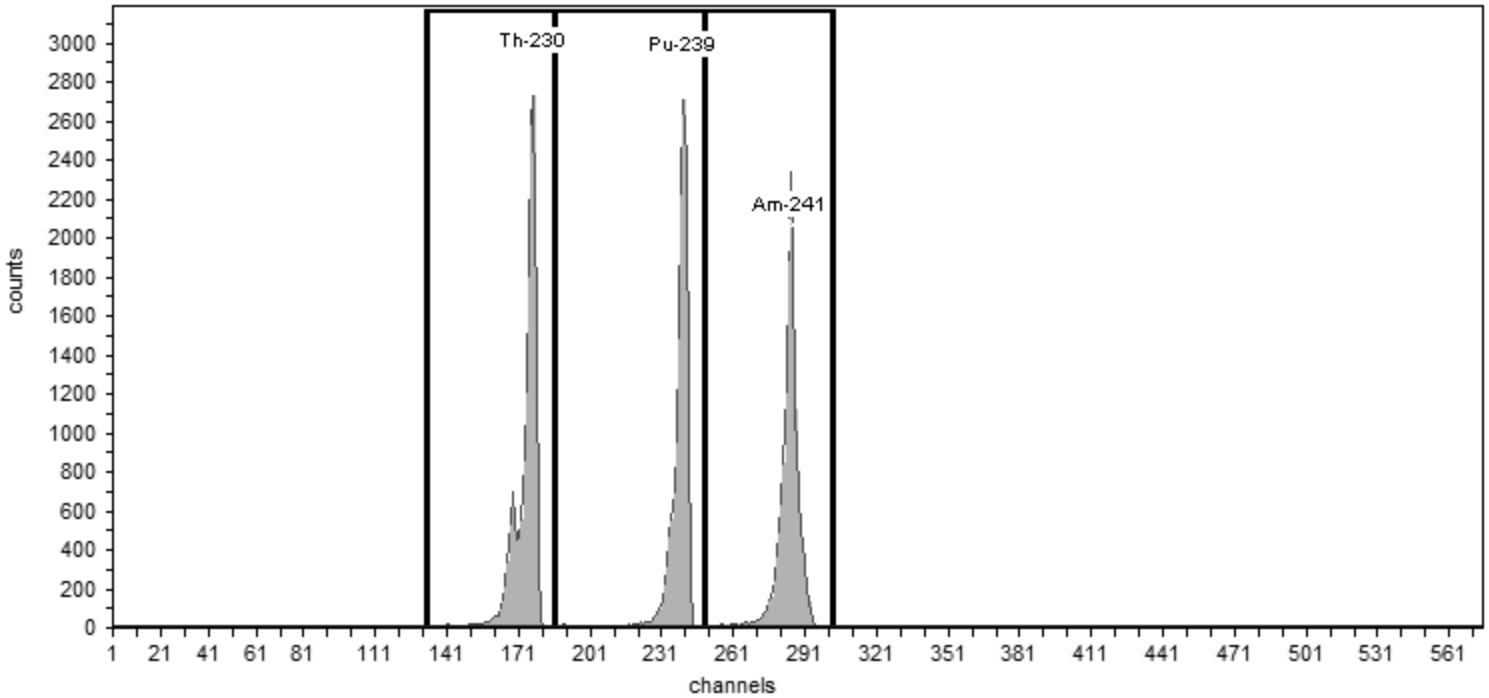
Detector: AV199 , SN: 50-117Z3
Acquisition Start Date: 10/17/2015 6:15:17PM

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

Efficiency Calibration Name: IC-9817;AV199-20151017

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

Efficiency: 24.71% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.96	15,446.00	110.33
Pu-239	240	5,155.40	186	249	29.88	13,902.00	99.30
Am-241	284	5,485.70	249	303	29.92	14,059.00	100.42

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

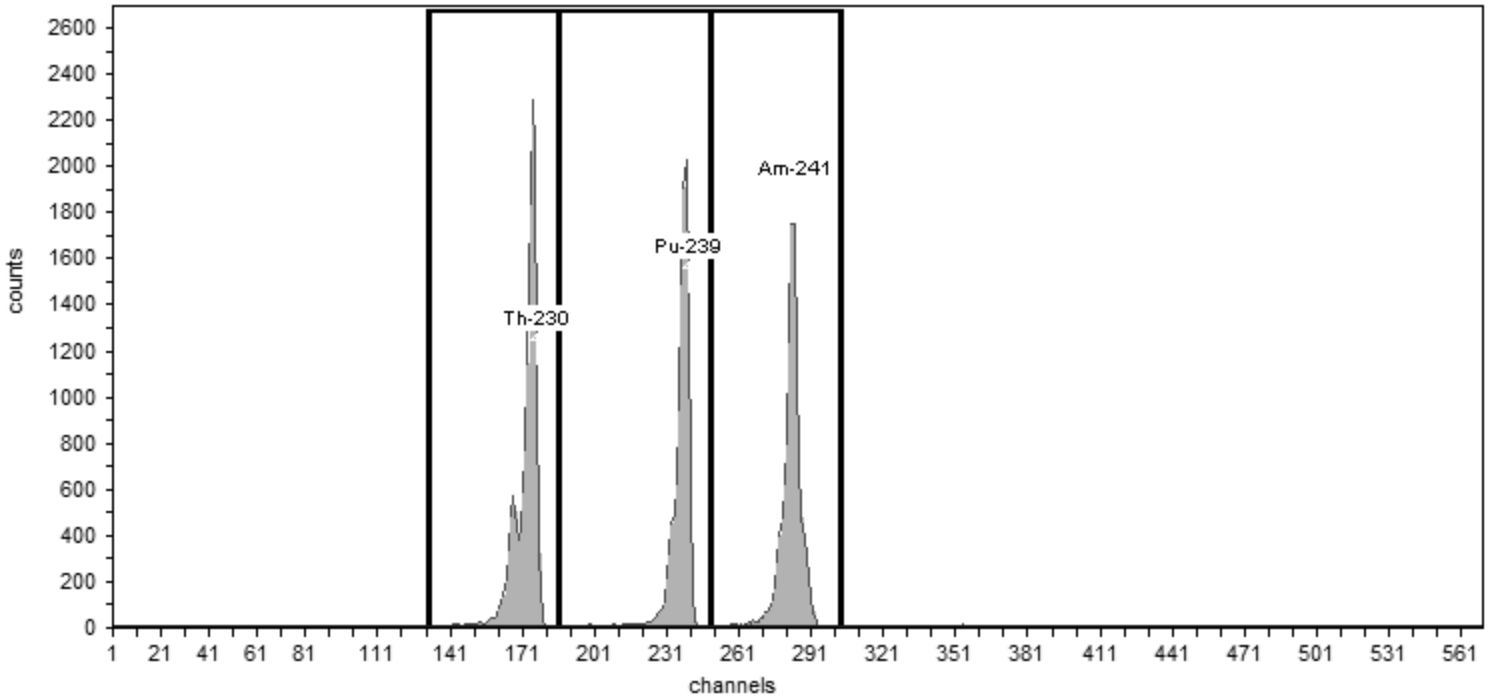
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 10/17/2015 6:15:29PM

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
3:55:50PM 10/18/2015

Calibration

Sample Name: IC-9885;AV201-20151017b
Description:
Detector: AV201

Analyst: 60040
Analysis Date: 10/18/2015 3:55:49PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

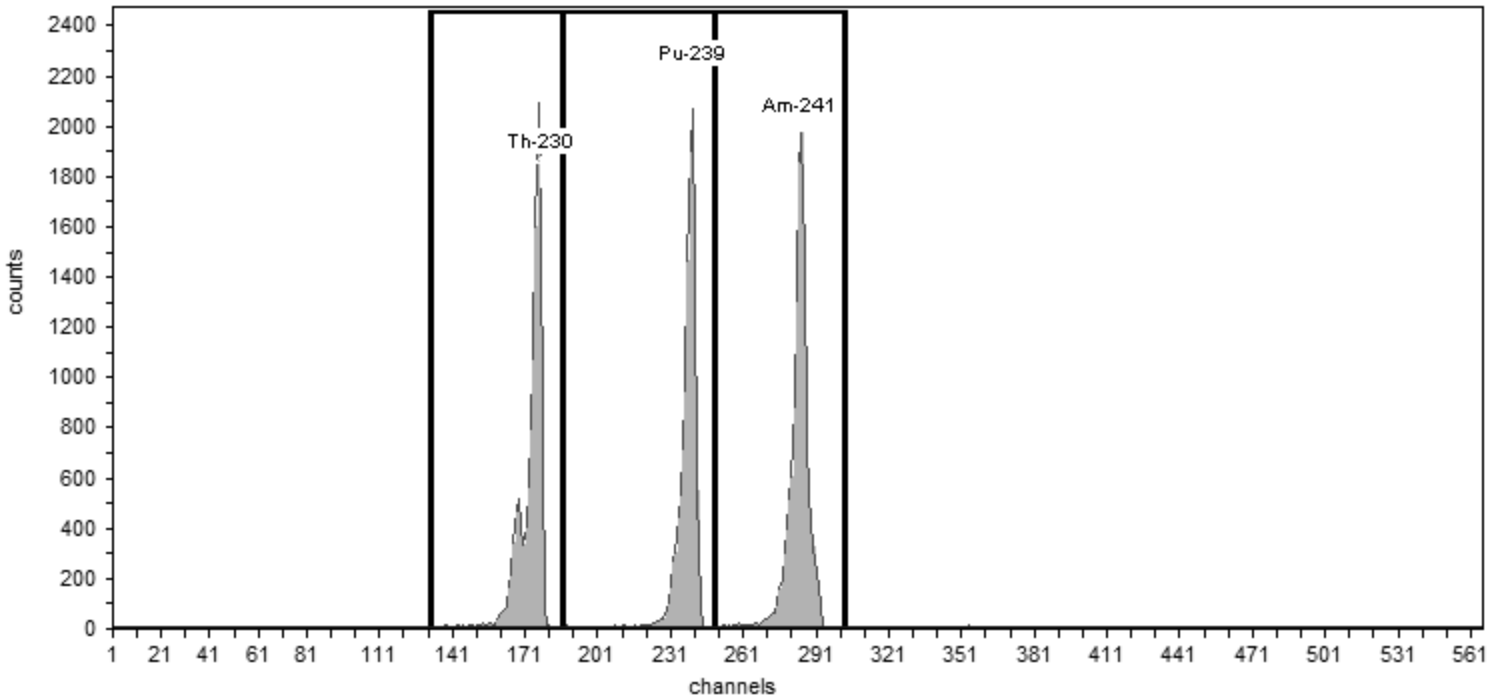
Detector: AV201 , SN: 50-117i5
Acquisition Start Date: 10/17/2015 6:23:00PM

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

Efficiency Calibration Name: IC-9885;AV201-20151017l

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

Efficiency: 25.32% +/- 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	27.85	11,900.00	85.00
Pu-239	240	5,155.40	186	249	31.99	11,332.00	80.94
Am-241	284	5,485.70	249	303	33.04	12,662.00	90.44

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:13PM 10/18/2015

Calibration

Sample Name: IC-7107;AV203-20151018a
Description:
Detector: AV203

Analyst: 60040
Analysis Date: 10/18/2015 6:42:12PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

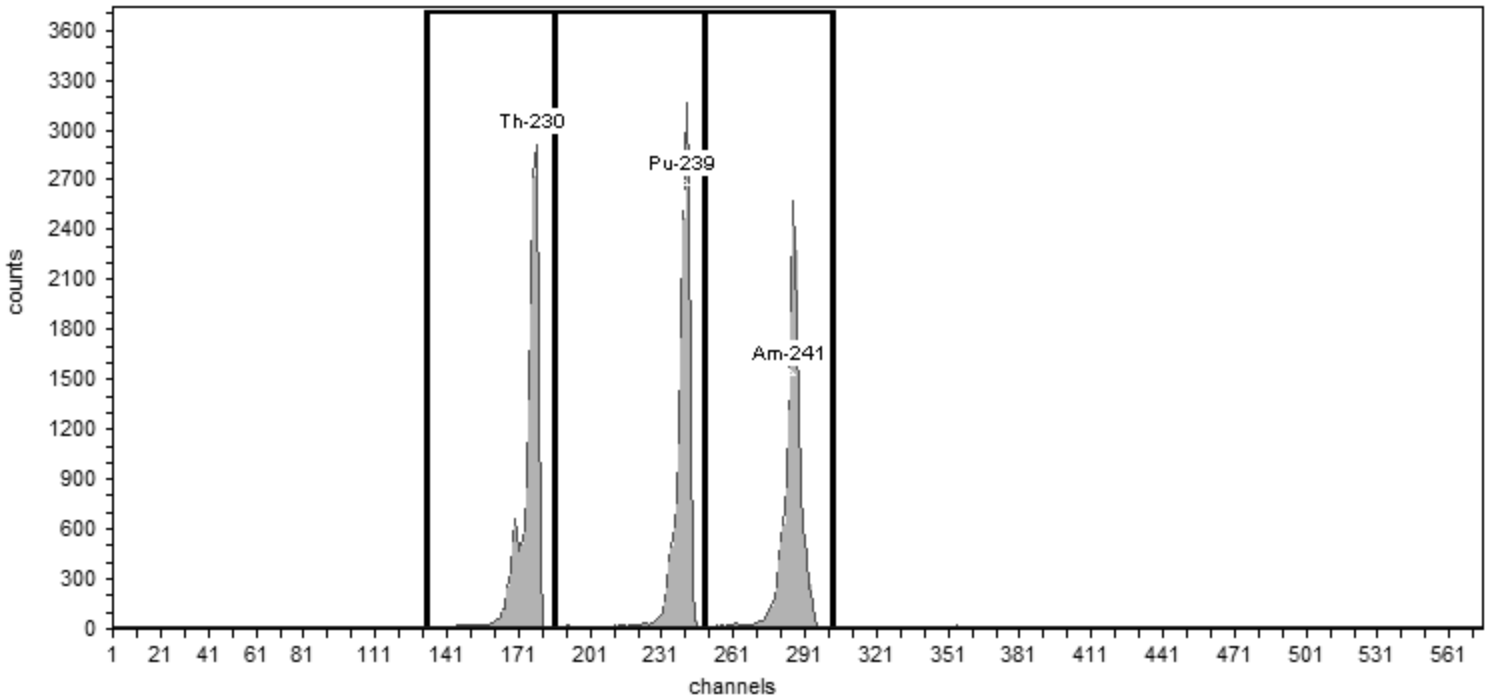
Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 10/18/2015 4:18:34PM

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

Efficiency Calibration Name: IC-7107;AV203-20151018a

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

Efficiency: 25.98% +/- 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	29.84	16,326.00	116.61
Pu-239	240	5,155.40	186	249	30.09	15,954.00	113.96
Am-241	284	5,485.70	249	303	30.75	15,747.00	112.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:28:52PM 11/23/2015

Calibration

Sample Name: IC-8874;AV204-20151018a
Description:
Detector: AV204

Analyst: 60040
Analysis Date: 10/18/2015 6:42:20PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

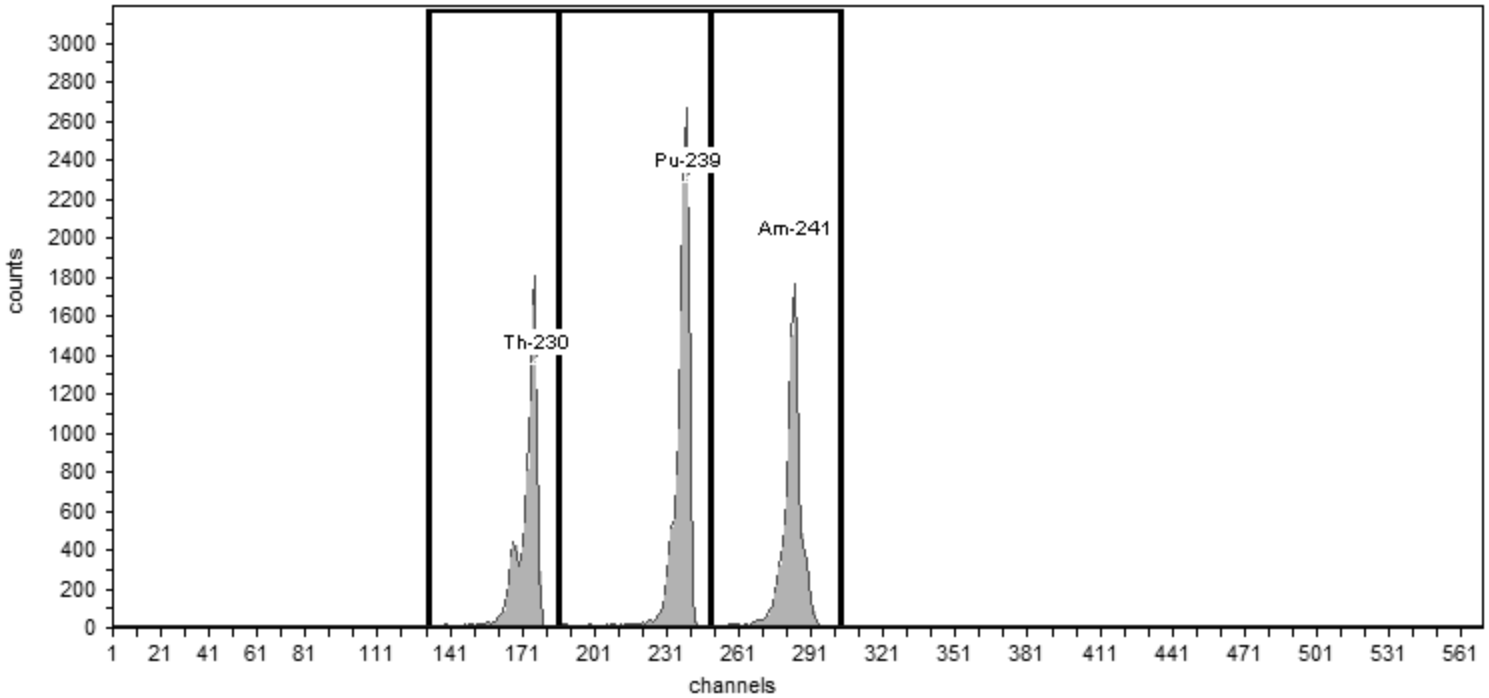
Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 10/18/2015 4:18:47PM

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

Efficiency Calibration Name: IC-8874;AV204-20151018a

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

Efficiency: 26.27% +/- 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	30.03	10,499.00	74.99
Pu-239	240	5,155.40	186	249	30.81	14,017.00	100.12
Am-241	284	5,485.70	249	303	31.52	10,980.00	78.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:33PM 10/18/2015

Calibration

Sample Name: IC-8875;AV205-20151018a
Description:
Detector: AV205

Analyst: 60040
Analysis Date: 10/18/2015 6:42:32PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

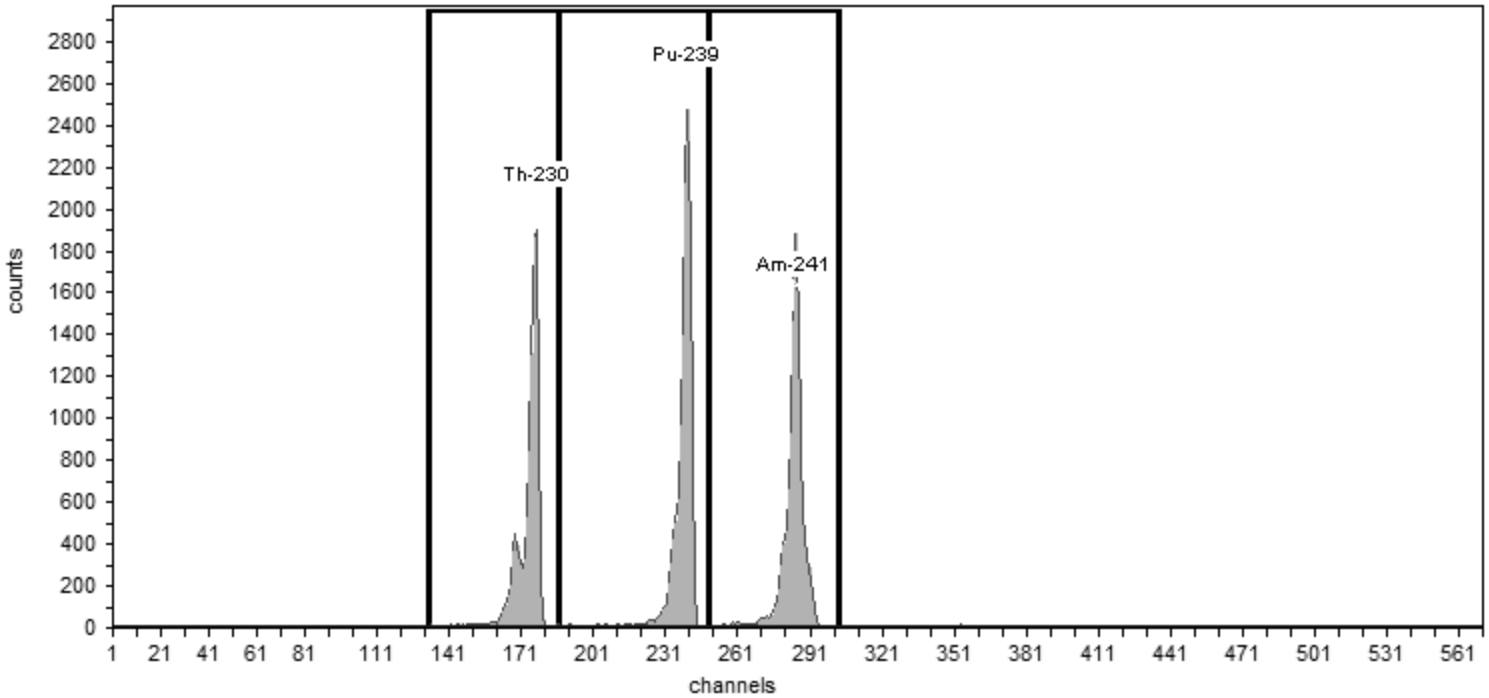
Detector: AV205 , SN: 49-155dd3
Acquisition Start Date: 10/18/2015 4:19:01PM

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

Efficiency Calibration Name: IC-8875;AV205-20151018a

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

Efficiency: 23.67% +/- 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	29.04	10,676.00	76.26
Pu-239	240	5,155.40	186	249	29.83	12,556.00	89.69
Am-241	284	5,485.70	249	303	28.83	11,134.00	79.53

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

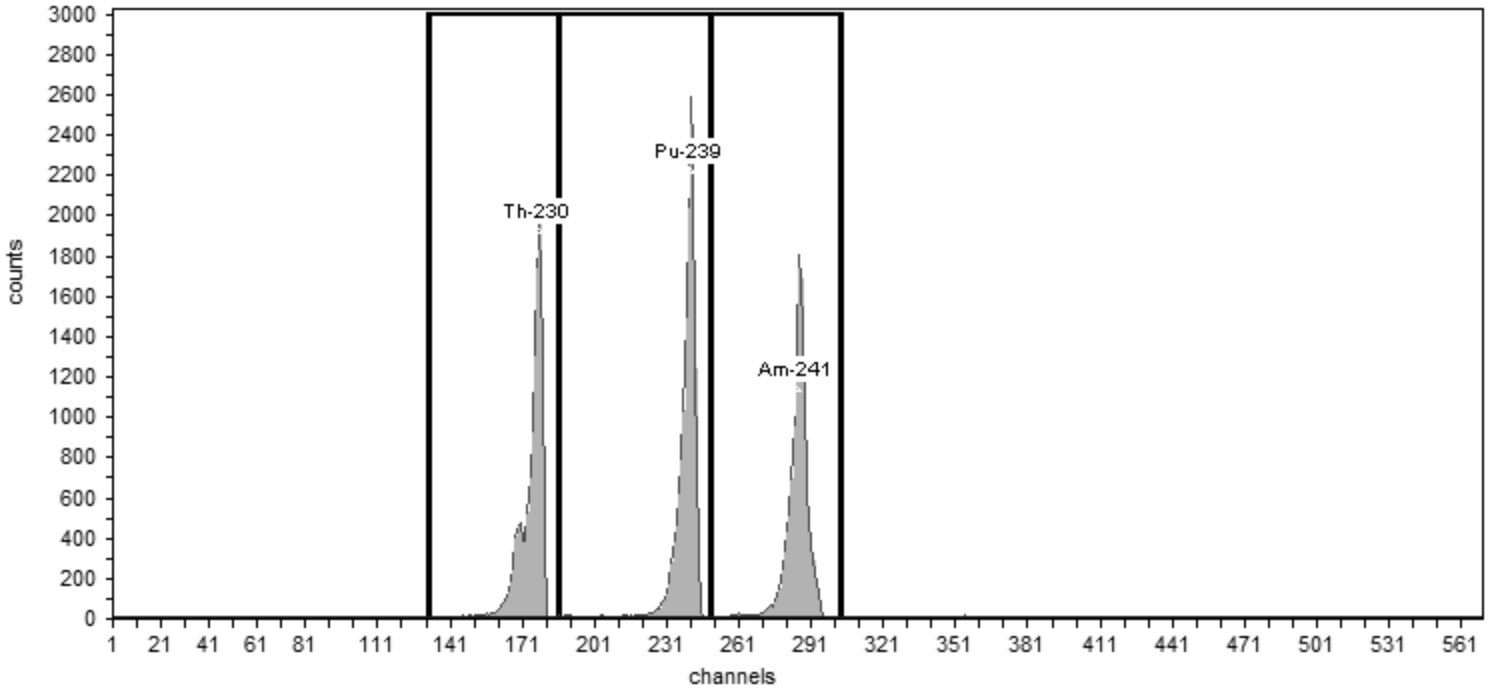
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 10/18/2015 4:19:21PM

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

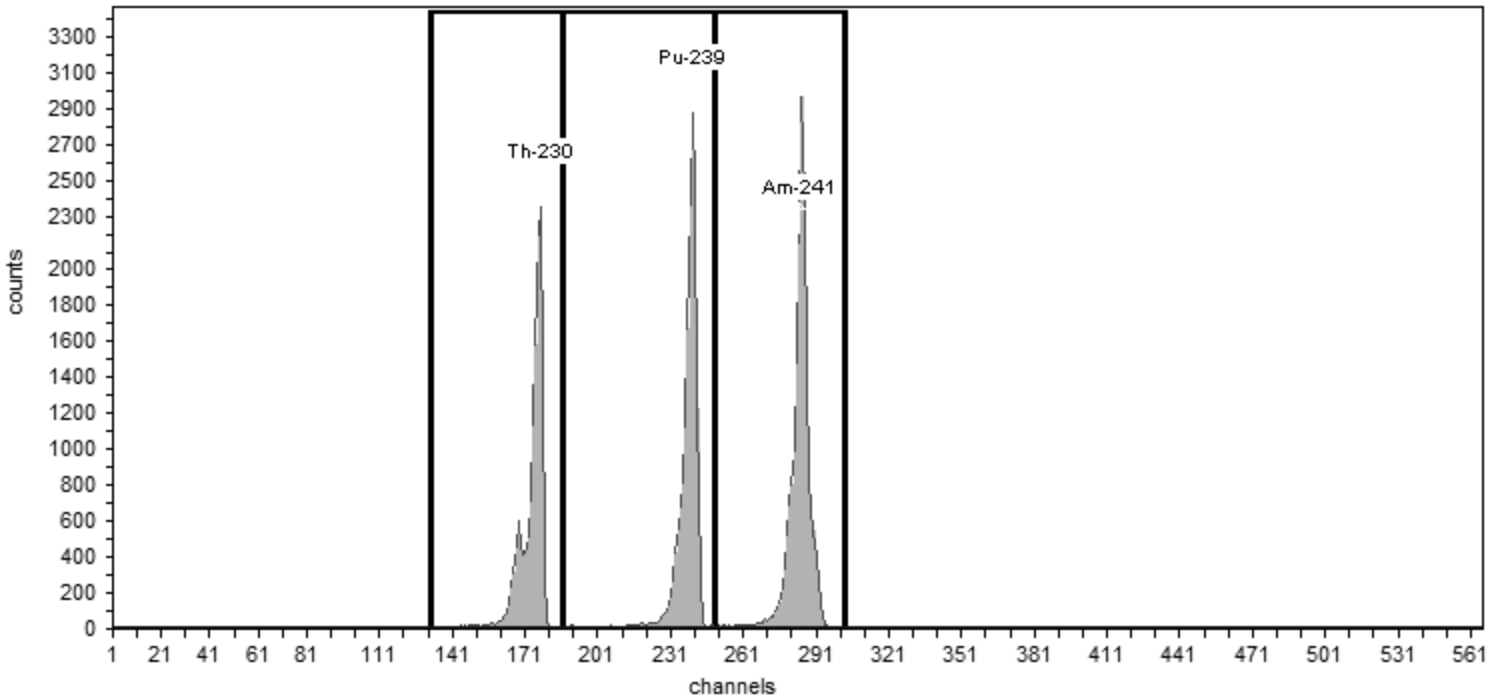
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 10/18/2015 4:11:29PM

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

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 160-268313/1	09/06/16 15:23	82233-334_00001	0.2654	0.20-0.32	99.3	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 160-268314/2	09/06/16 16:41	82234-334_00001	0.2286	0.20-0.32	95.1	95-105

Detector: AV150

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223447/1	10/16/15 15:51	82235-334_00001	0.2445	0.20-0.32		
ICV 160-223565/1	10/26/15 19:10	82247-334_00001	0.2449	0.20-0.32	100.1	95-105
CCV 160-268315/1	09/06/16 15:23	82235-334_00001	0.2347	0.20-0.32	96.0	95-105

Detector: AV153

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223450/1	10/16/15 15:52	82240-334_00001	0.2660	0.20-0.32		
ICV 160-223568/1	10/26/15 19:11	82243-334_00001	0.2646	0.20-0.32	99.5	95-105
CCV 160-268316/1	09/06/16 12:40	82240-334_00001	0.2573	0.20-0.32	96.7	95-105

Detector: AV171

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223468/1	10/16/15 18:59	82244-334_00001	0.2459	0.20-0.32		
ICV 160-223586/1	10/26/15 20:28	82241-334_00001	0.2539	0.20-0.32	103.3	95-105
CCV 160-268329/1	09/06/16 13:58	82244-334_00001	0.2413	0.20-0.32	98.2	95-105

Detector: AV172

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223469/1	10/16/15 18:59	82245-334_00001	0.2432	0.20-0.32		
ICV 160-223587/1	10/26/15 20:29	82234-334_00001	0.2387	0.20-0.32	98.2	95-105
CCV 160-268330/1	09/06/16 13:58	82245-334_00001	0.2381	0.20-0.32	97.9	95-105

Detector: AV188

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223485/1	10/17/15 14:51	82247-334_00001	0.2477	0.20-0.32		
ICV 160-223603/1	10/31/15 14:17	82235-334_00001	0.2452	0.20-0.32	99.0	95-105
CCV 160-268333/2	09/06/16 16:43	82247-334_00001	0.2361	0.20-0.32	95.3	95-105

Detector: AV189

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223486/1	10/17/15 18:19	82232-334_00001	0.2637	0.20-0.32		
ICV 160-223604/1	11/01/15 14:23	82233-334_00001	0.2658	0.20-0.32	100.8	95-105
CCV 160-268334/1	09/06/16 14:01	82232-334_00001	0.2630	0.20-0.32	99.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV190

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223487/1	10/17/15 18:13	82233-334_00001	0.2654	0.20-0.32		
ICV 160-223605/1	11/01/15 14:23	82232-334_00001	0.2608	0.20-0.32	98.3	95-105
CCV 160-268335/1	09/06/16 14:01	82233-334_00001	0.2682	0.20-0.32	101.1	95-105

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 160-268336/1	09/06/16 14:00	82234-334_00001	0.2371	0.20-0.32	97.9	95-105

Detector: AV193

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223490/1	10/17/15 18:13	82236-334_00001	0.2542	0.20-0.32		
ICV 160-223608/1	11/01/15 14:24	82246-334_00001	0.2559	0.20-0.32	100.6	95-105
CCV 160-268338/1	09/06/16 14:00	82236-334_00001	0.2486	0.20-0.32	97.8	95-105

Detector: 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 160-268339/1	09/06/16 08:59	82240-334_00001	0.2527	0.20-0.32	97.8	95-105

Detector: AV198

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223495/1	10/17/15 18:15	82243-334_00001	0.2602	0.20-0.32		
ICV 160-223613/1	11/01/15 14:25	82240-334_00001	0.2541	0.20-0.32	97.6	95-105
CCV 160-268340/1	09/06/16 12:40	82243-334_00001	0.2607	0.20-0.32	100.2	95-105

Detector: AV199

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223496/1	10/17/15 18:15	82244-334_00001	0.2471	0.20-0.32		
ICV 160-223614/1	11/01/15 14:25	82241-334_00001	0.2515	0.20-0.32	101.8	95-105
CCV 160-268341/2	09/06/16 15:22	82244-334_00001	0.2415	0.20-0.32	97.7	95-105

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 160-268342/1	09/06/16 12:41	82245-334_00001	0.2324	0.20-0.32	95.2	95-105

Detector: AV201

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223498/1	10/17/15 18:23	82246-334_00001	0.2532	0.20-0.32		
ICV 160-223616/1	11/01/15 14:26	82236-334_00001	0.2490	0.20-0.32	98.4	95-105
CCV 160-268343/1	09/06/16 12:48	82246-334_00001	0.2524	0.20-0.32	99.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV203

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223500/1	10/18/15 16:18	82232-334_00001	0.2598	0.20-0.32		
ICV 160-223618/2	11/01/15 18:11	82233-334_00001	0.2646	0.20-0.32	101.9	95-105
CCV 160-268345/1	09/06/16 12:42	82232-334_00001	0.2566	0.20-0.32	98.8	95-105

Detector: AV204

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223501/1	10/18/15 16:18	82233-334_00001	0.2627	0.20-0.32		
ICV 160-223619/1	11/01/15 16:10	82232-334_00001	0.2598	0.20-0.32	98.9	95-105
CCV 160-268346/1	09/06/16 12:42	82233-334_00001	0.2590	0.20-0.32	98.6	95-105

Detector: AV205

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223502/1	10/18/15 16:19	82234-334_00001	0.2367	0.20-0.32		
ICV 160-223620/1	11/01/15 16:02	82245-334_00001	0.2405	0.20-0.32	101.6	95-105
CCV 160-268347/1	09/06/16 12:49	82234-334_00001	0.2258	0.20-0.32	95.4	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 160-268350/1	09/06/16 11:23	82237-334_00003	0.2519	0.20-0.32	98.7	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 160-268351/1	09/06/16 11:23	82240-334_00001	0.2524	0.20-0.32	98.3	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

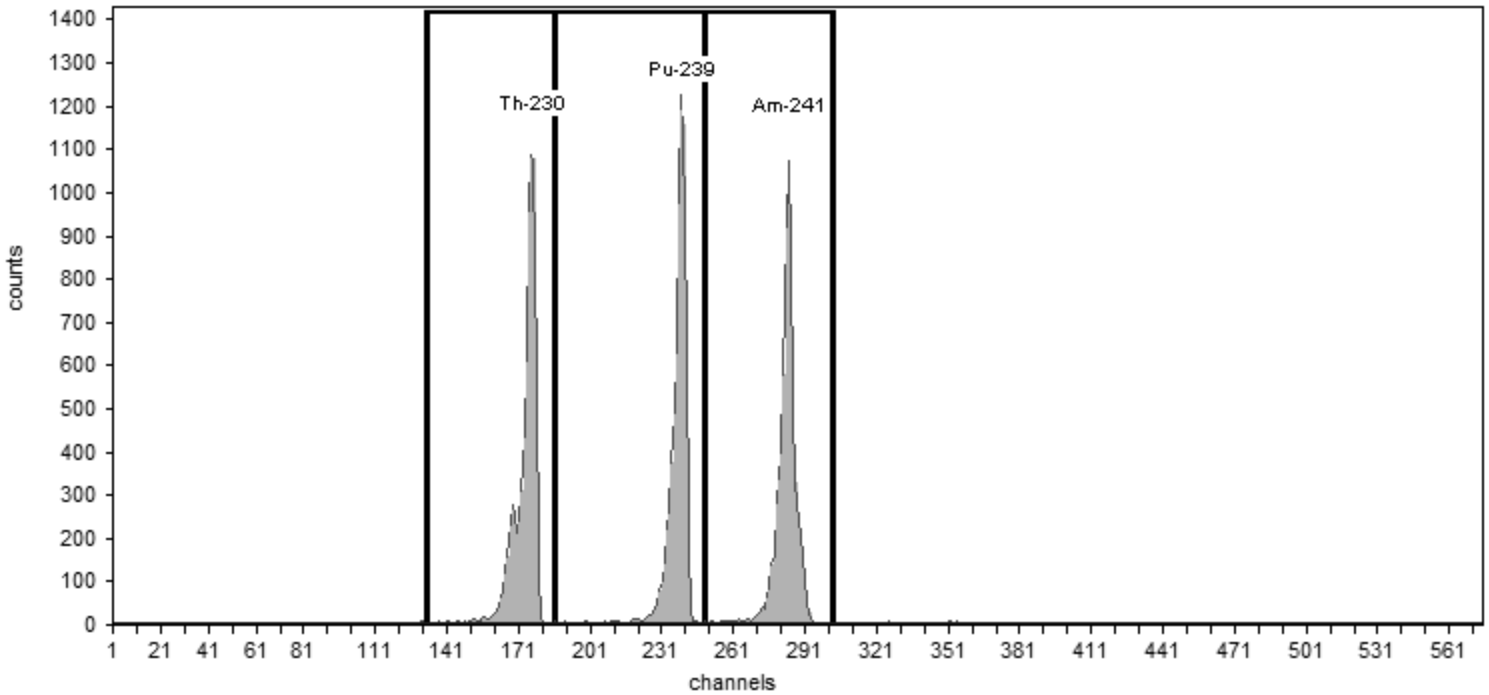
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 10/26/2015 7:10:27PM

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

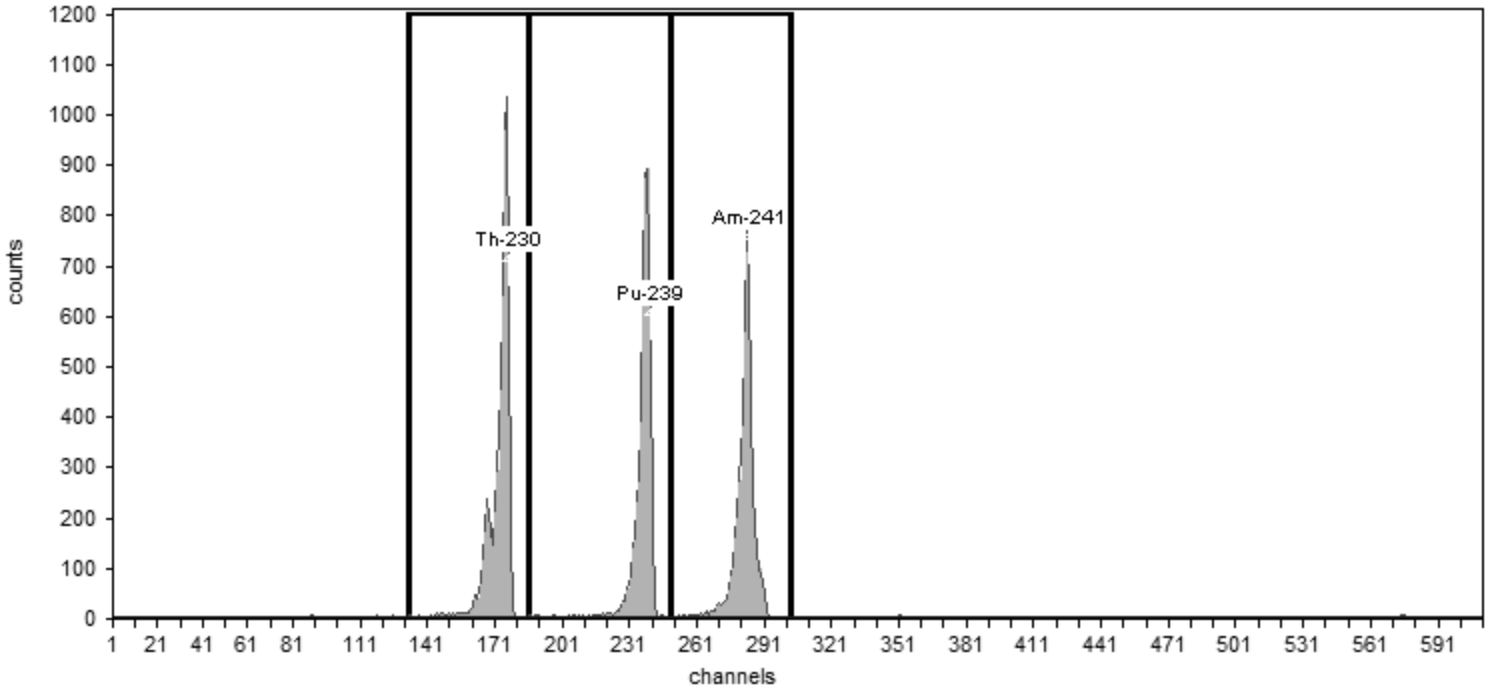
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 10/26/2015 7:10:42PM

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

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:30:17PM 11/23/2015

Calibration

Sample Name: ICV-9886;AV150-20151026
Description:
Detector: AV150

Analyst: 60040
Analysis Date: 10/26/2015 8:20:57PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

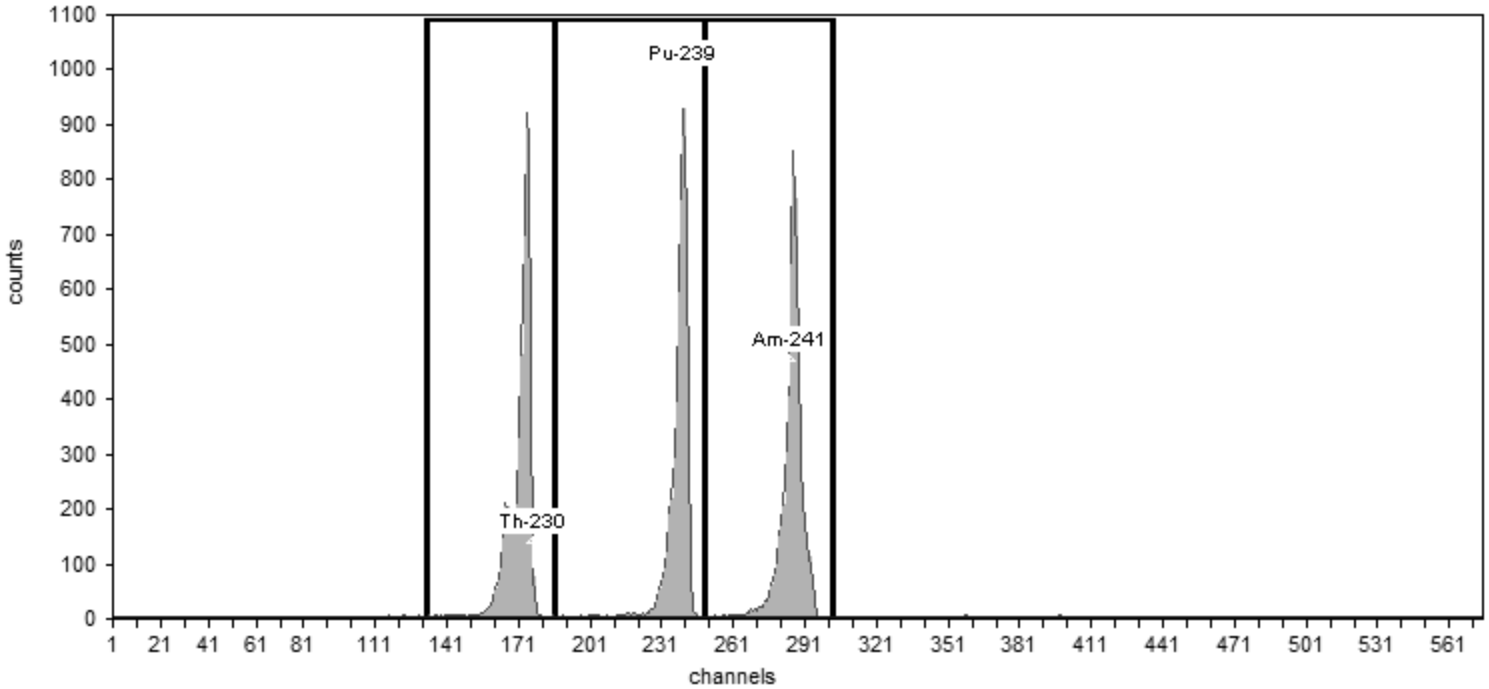
Detector: AV150 , SN: 50-05/R4
Acquisition Start Date: 10/26/2015 7:10:54PM

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

Efficiency Calibration Name: ICV-9886;AV150-2015102

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

Efficiency: 24.49% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.59	5,506.00	91.77
Pu-239	240	5,155.40	186	249	32.24	5,075.00	84.58
Am-241	284	5,485.70	249	303	31.73	5,498.00	91.63

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:07PM 10/26/2015

Calibration

Sample Name: ICV-9795;AV153-20151026
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 10/26/2015 8:21:06PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

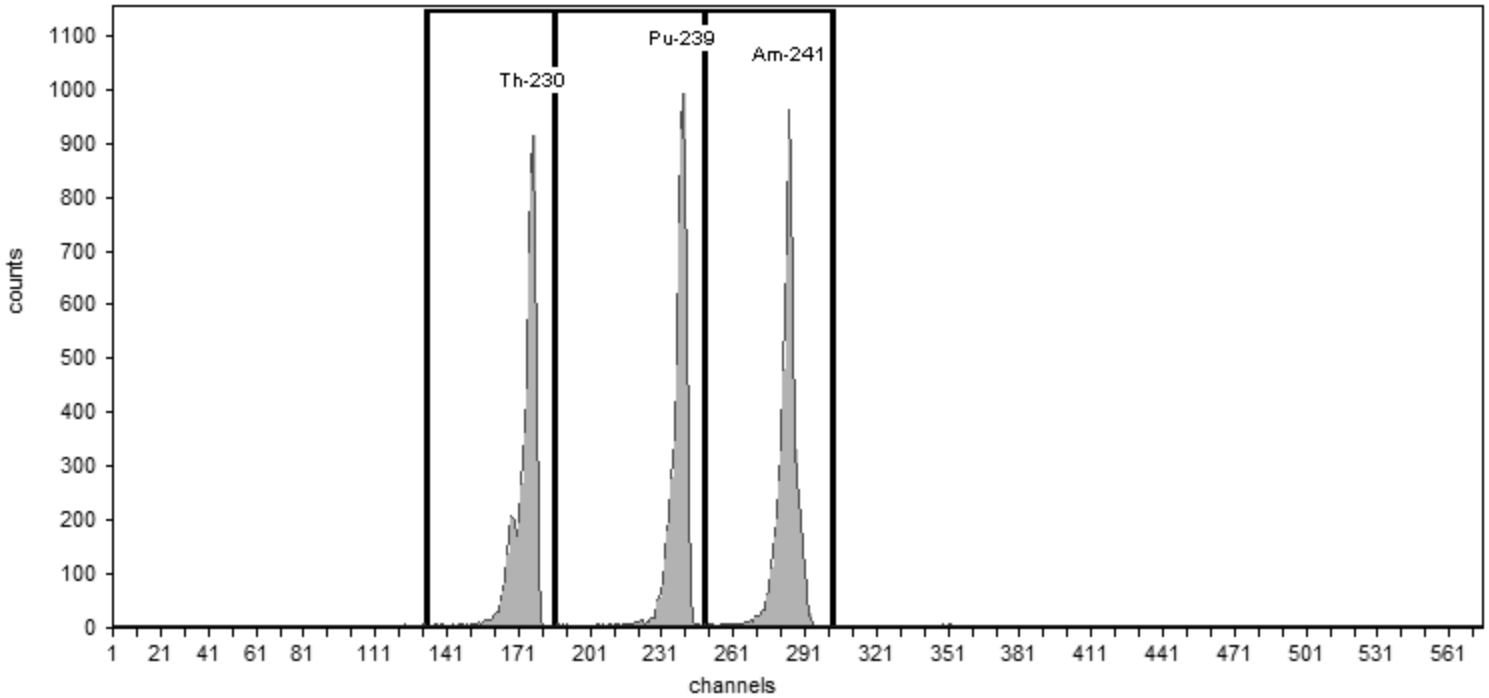
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 10/26/2015 7:11:41PM

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

Efficiency Calibration Name: ICV-9795;AV153-2015102

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

Efficiency: 26.46% +/- 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	30.33	5,618.00	93.63
Pu-239	240	5,155.40	186	249	32.54	5,595.00	93.25
Am-241	284	5,485.70	249	303	32.83	6,103.00	101.72

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:07PM 11/23/2015

Calibration

Sample Name: ICV-9793;AV171-20151026
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 10/27/2015 2:14:25PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

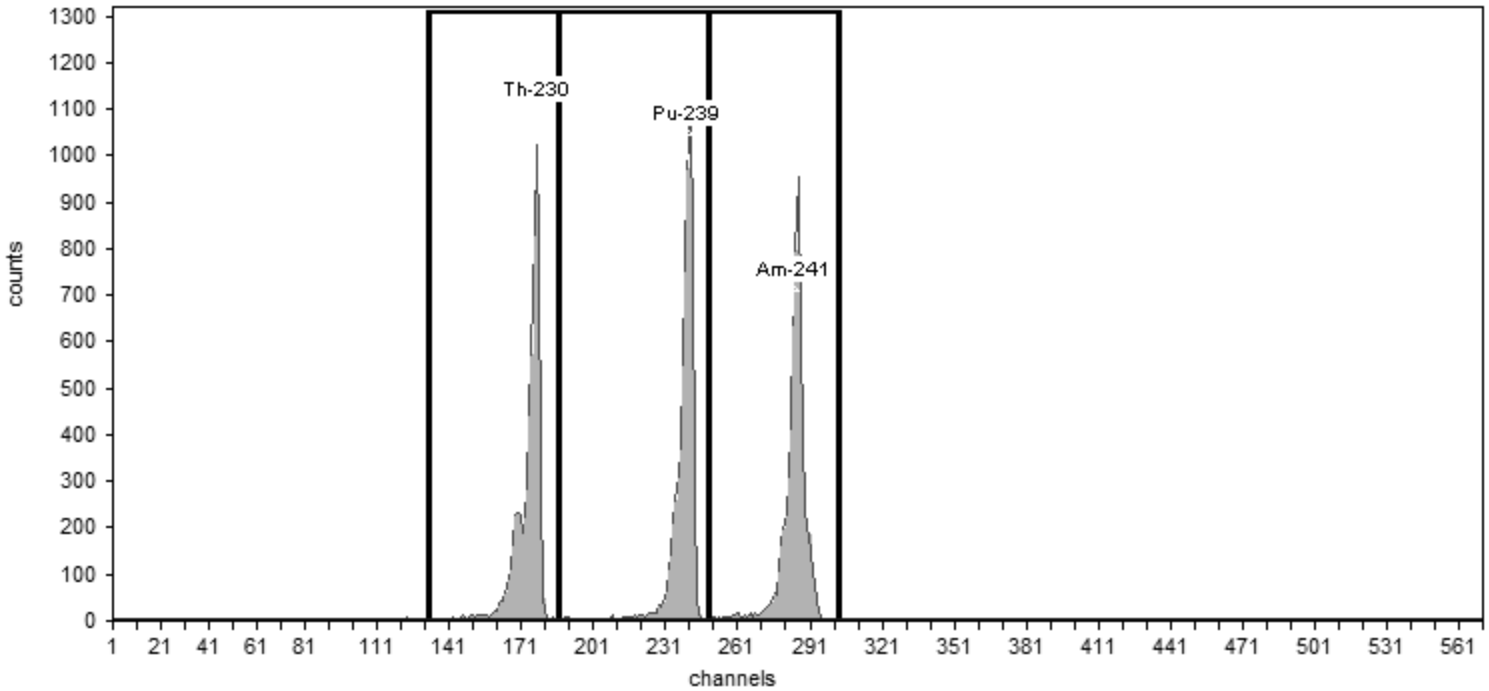
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 10/26/2015 8:28:50PM

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

Efficiency Calibration Name: ICV-9793;AV171-2015102

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

Efficiency: 25.39% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.10	6,053.00	100.88
Pu-239	240	5,155.40	186	249	33.57	6,203.00	103.38
Am-241	284	5,485.70	249	303	32.46	6,038.00	100.63

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:29PM 10/27/2015

Calibration

Sample Name: ICV-8875;AV172-20151026
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 10/27/2015 2:14:28PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

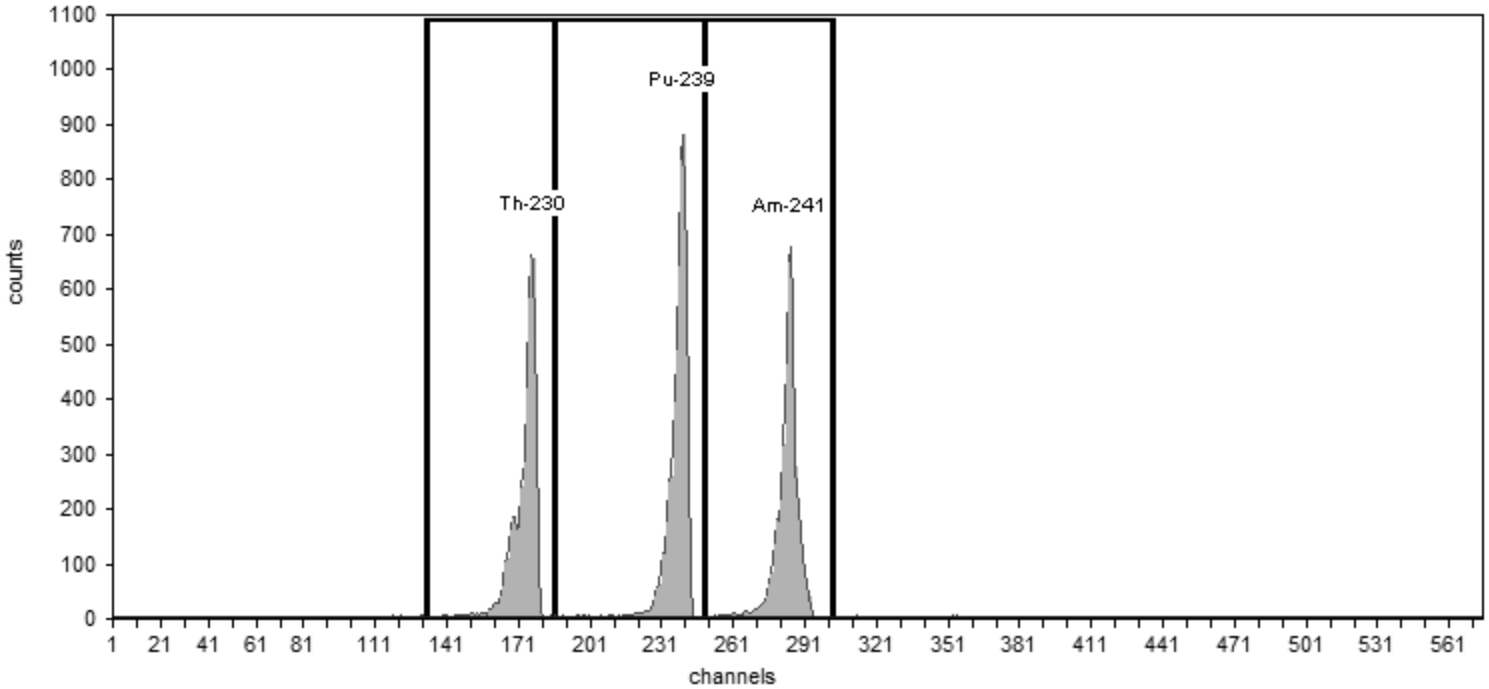
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 10/26/2015 8:29:08PM

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

Efficiency Calibration Name: ICV-8875;AV172-2015102

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

Efficiency: 23.87% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.98	4,676.00	77.93
Pu-239	240	5,155.40	186	249	38.38	5,497.00	91.62
Am-241	284	5,485.70	249	303	34.35	4,683.00	78.05

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:41PM 11/23/2015

Calibration

Sample Name: ICV-8876;AV188-20151031
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 10/31/2015 3:51:35PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

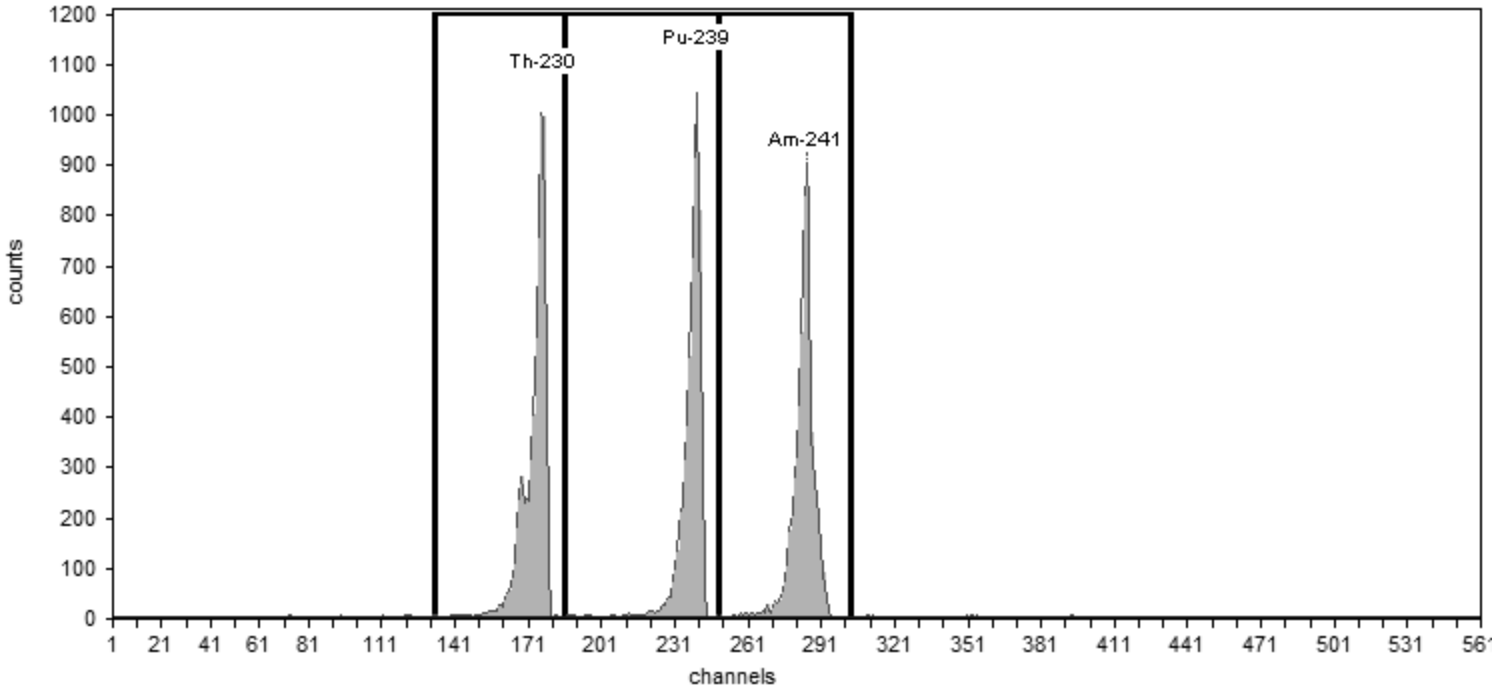
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 10/31/2015 2:17:22PM

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

Efficiency Calibration Name: ICV-8876;AV188-2015103

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

Efficiency: 24.52% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.48	6,534.00	108.90
Pu-239	240	5,155.40	186	249	34.12	6,102.00	101.70
Am-241	284	5,485.70	249	303	31.55	6,334.00	105.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:42PM 11/1/2015

Calibration

Sample Name: ICV-8874;AV189-20151101
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 11/1/2015 3:55:41PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

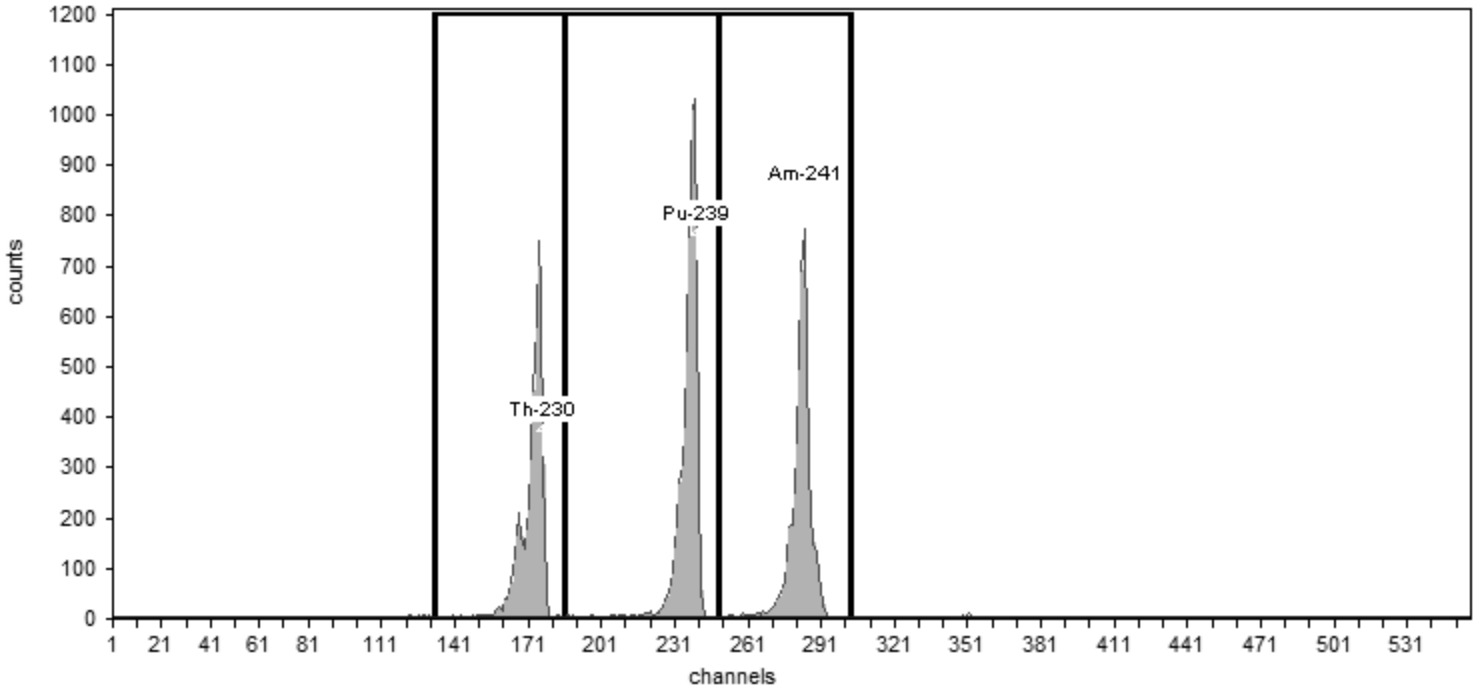
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 11/1/2015 2:23:08PM

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

Efficiency Calibration Name: ICV-8874;AV189-2015110

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

Efficiency: 26.58% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.61	4,557.00	75.95
Pu-239	240	5,155.40	186	249	33.80	5,981.00	99.68
Am-241	284	5,485.70	249	303	32.61	4,859.00	80.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:45PM 11/1/2015

Calibration

Sample Name: ICV-7107;AV190-20151101
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 11/1/2015 3:55:45PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

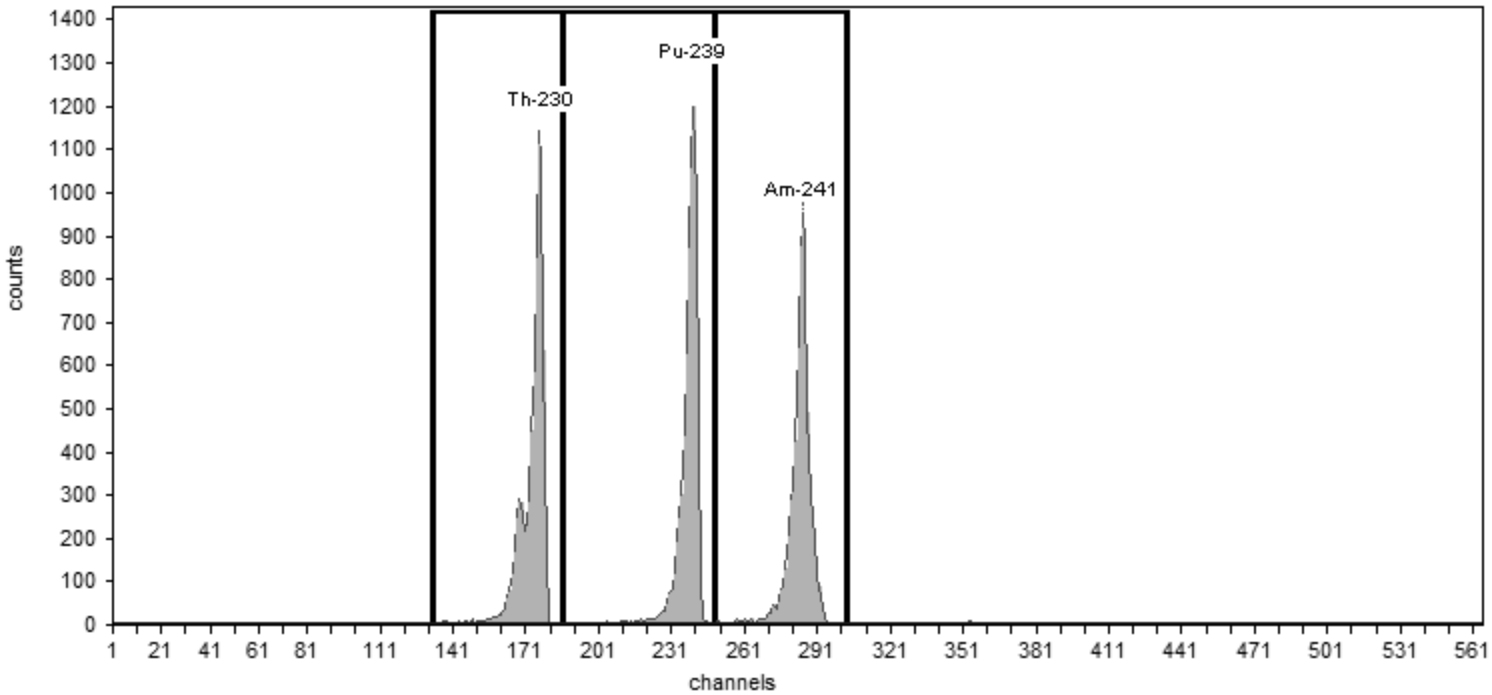
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 11/1/2015 2:23:19PM

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

Efficiency Calibration Name: ICV-7107;AV190-2015110

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

Efficiency: 26.08% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.46	7,072.00	117.87
Pu-239	240	5,155.40	186	249	36.05	6,965.00	116.08
Am-241	284	5,485.70	249	303	33.49	6,633.00	110.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:12:43PM 11/1/2015

Calibration

Sample Name: ICV-9884;AV191-20151101a
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 11/1/2015 7:12:41PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

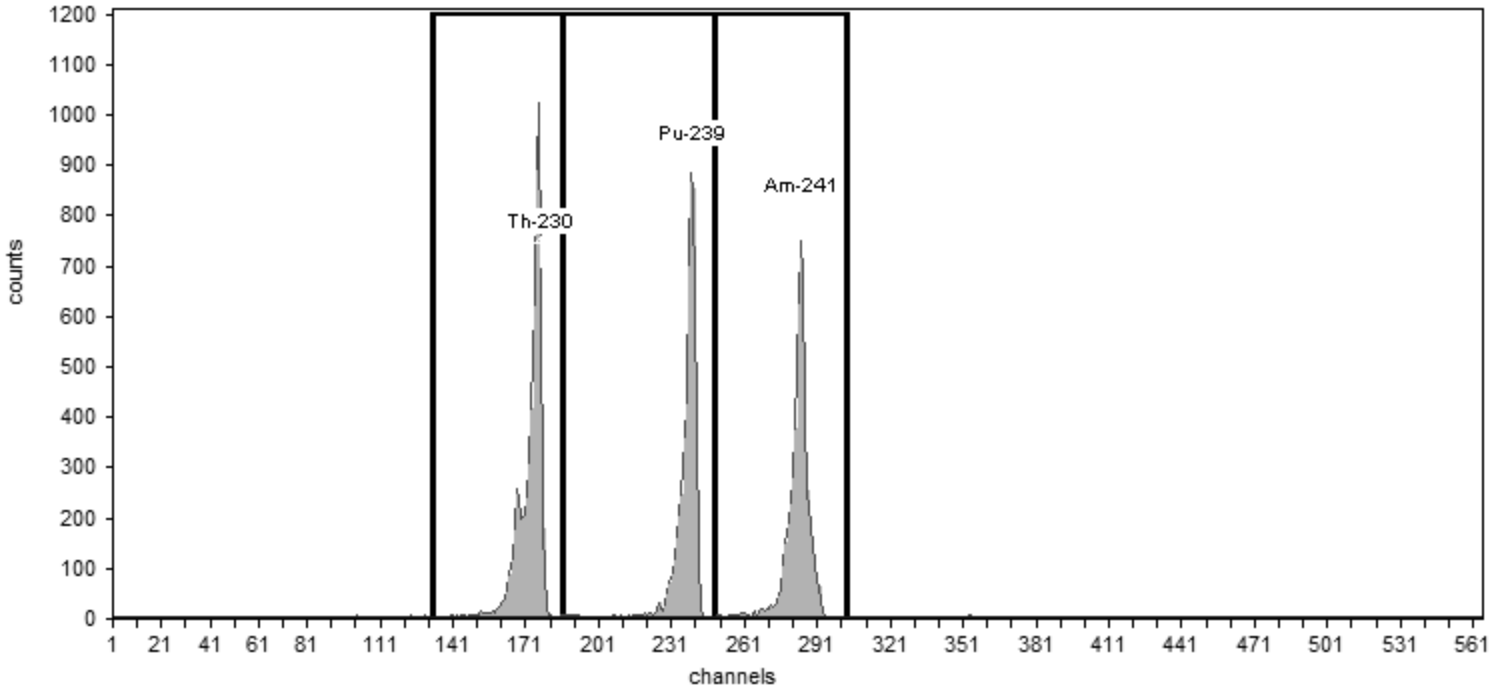
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 11/1/2015 6:11:24PM

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

Efficiency Calibration Name: ICV-9884;AV191-2015110

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

Efficiency: 24.64% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.76	5,906.00	98.43
Pu-239	240	5,155.40	186	249	28.60	4,838.00	80.63
Am-241	284	5,485.70	249	303	31.58	4,920.00	82.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:48PM 11/23/2015

Calibration

Sample Name: ICV-9885;AV193-20151101
Description:
Detector: AV193

Analyst: 60040
Analysis Date: 11/1/2015 3:55:53PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

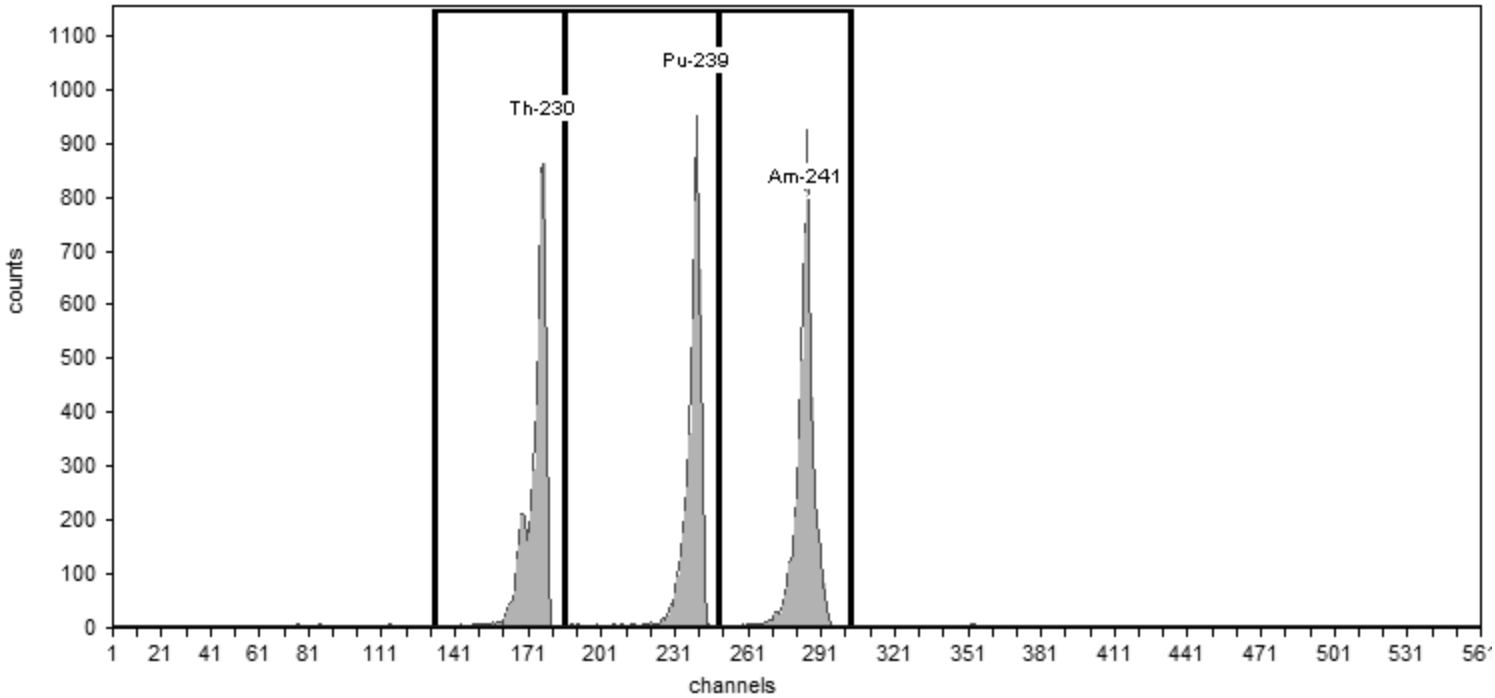
Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 11/1/2015 2:24:16PM

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

Efficiency Calibration Name: ICV-9885;AV193-2015110

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

Efficiency: 25.59% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.65	5,075.00	84.58
Pu-239	240	5,155.40	186	249	29.99	4,901.00	81.68
Am-241	284	5,485.70	249	303	30.60	5,573.00	92.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:56:20PM 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

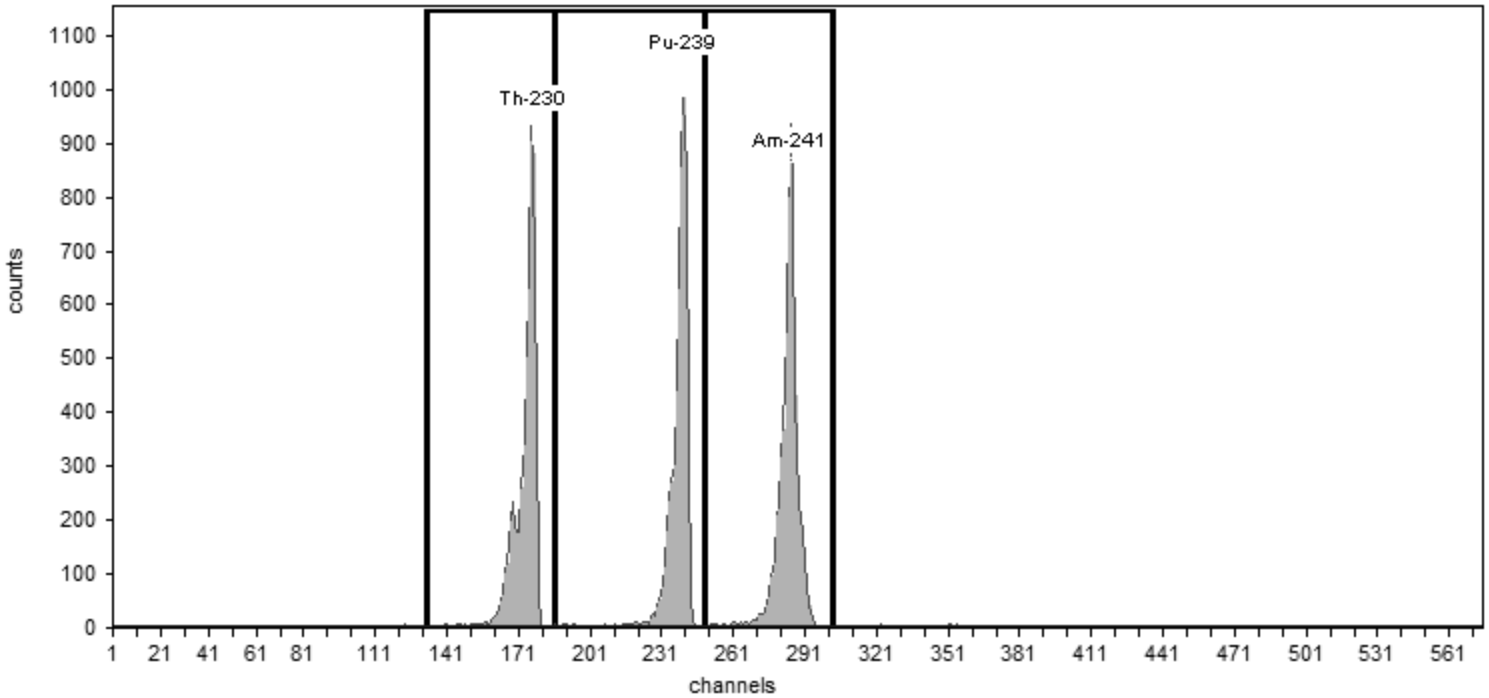
Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 11/1/2015 2:28:52PM

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 / Ch²

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
3:56:05PM 11/1/2015

Calibration

Sample Name: ICV-9792;AV198-20151101
Description:
Detector: AV198

Analyst: 60040
Analysis Date: 11/1/2015 3:56:05PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

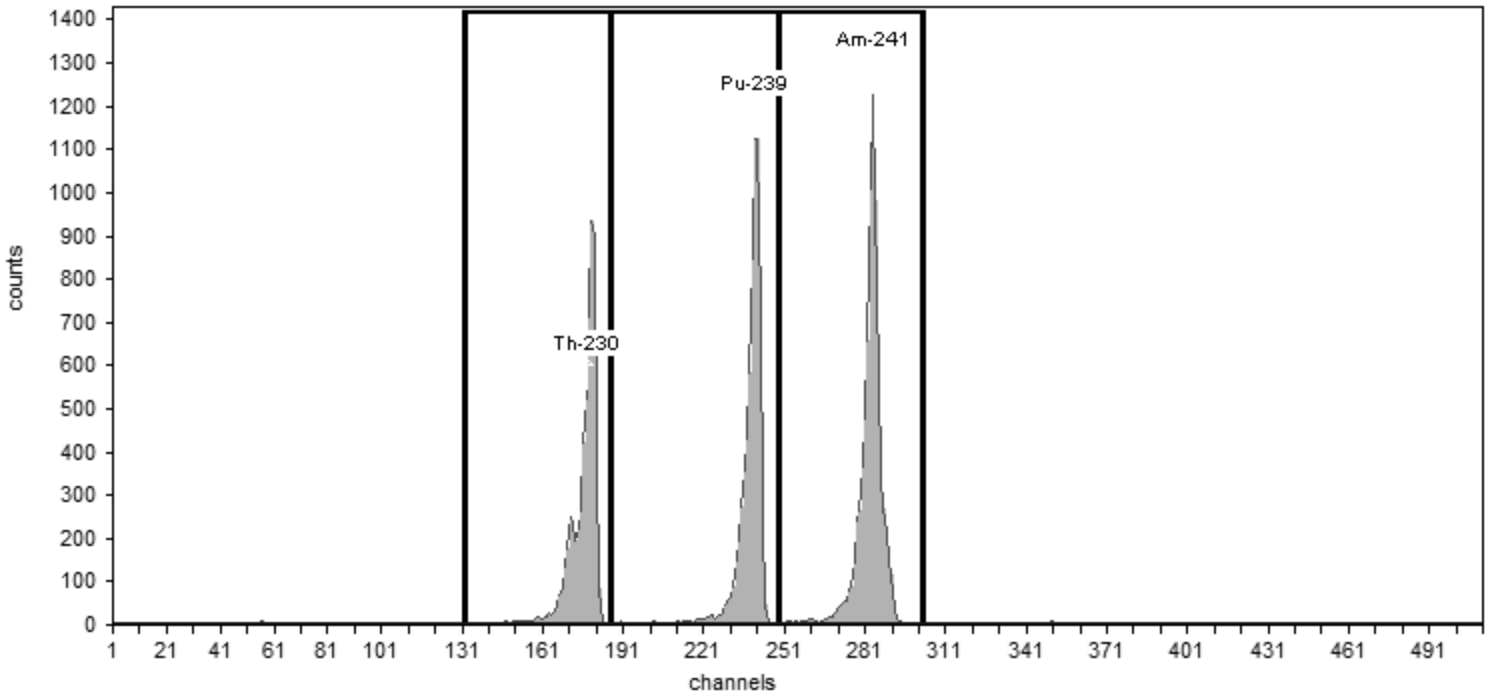
Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 11/1/2015 2:25:40PM

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

Efficiency Calibration Name: ICV-9792;AV198-2015110

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

Efficiency: 25.41% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.43	5,791.00	96.52
Pu-239	240	5,155.40	186	249	33.43	6,533.00	108.88
Am-241	284	5,485.70	249	303	30.71	7,524.00	125.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:06PM 11/23/2015

Calibration

Sample Name: ICV-9793;AV199-20151101
Description:
Detector: AV199

Analyst: 60040
Analysis Date: 11/1/2015 3:56:07PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

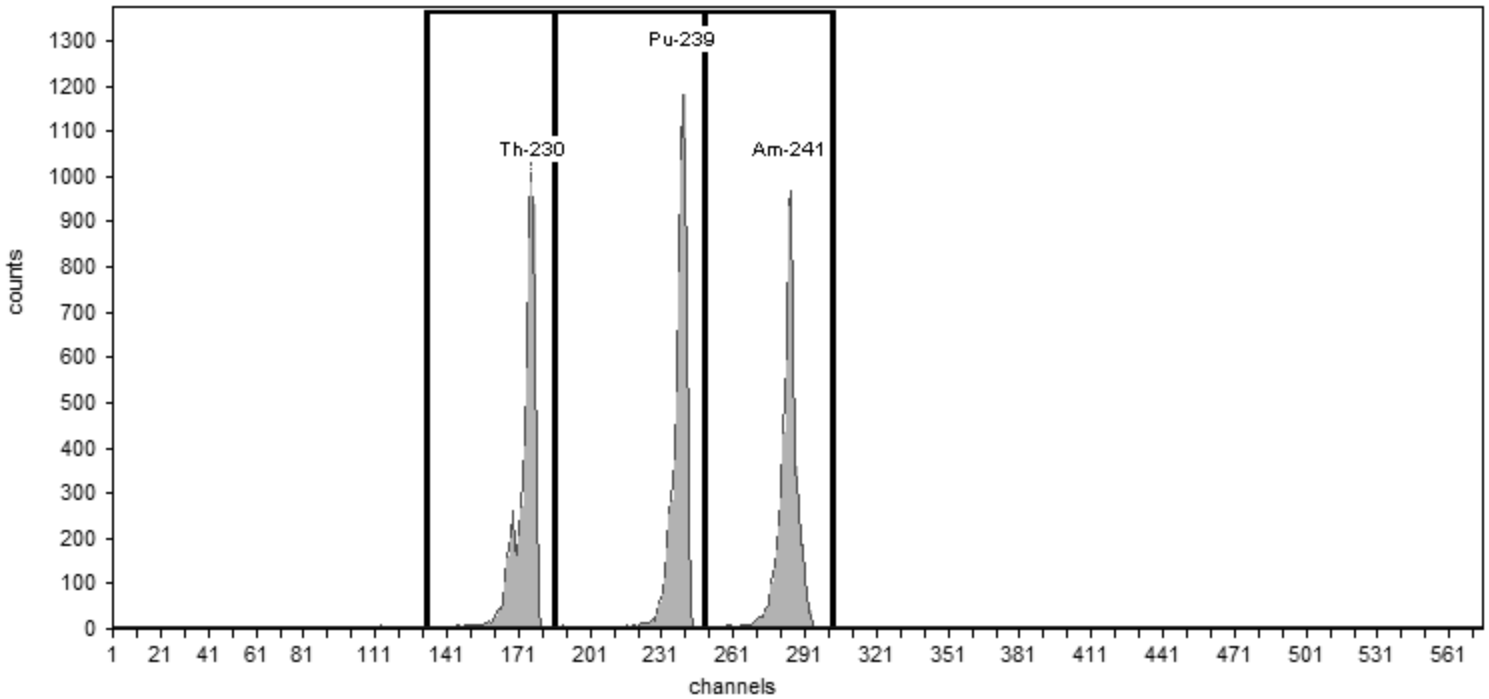
Detector: AV199 , SN: 50-117Z3
Acquisition Start Date: 11/1/2015 2:25:56PM

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

Efficiency Calibration Name: ICV-9793;AV199-2015110

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

Efficiency: 25.15% +/- 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	29.93	5,988.00	99.80
Pu-239	240	5,155.40	186	249	30.79	6,118.00	101.97
Am-241	284	5,485.70	249	303	31.69	6,015.00	100.25

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

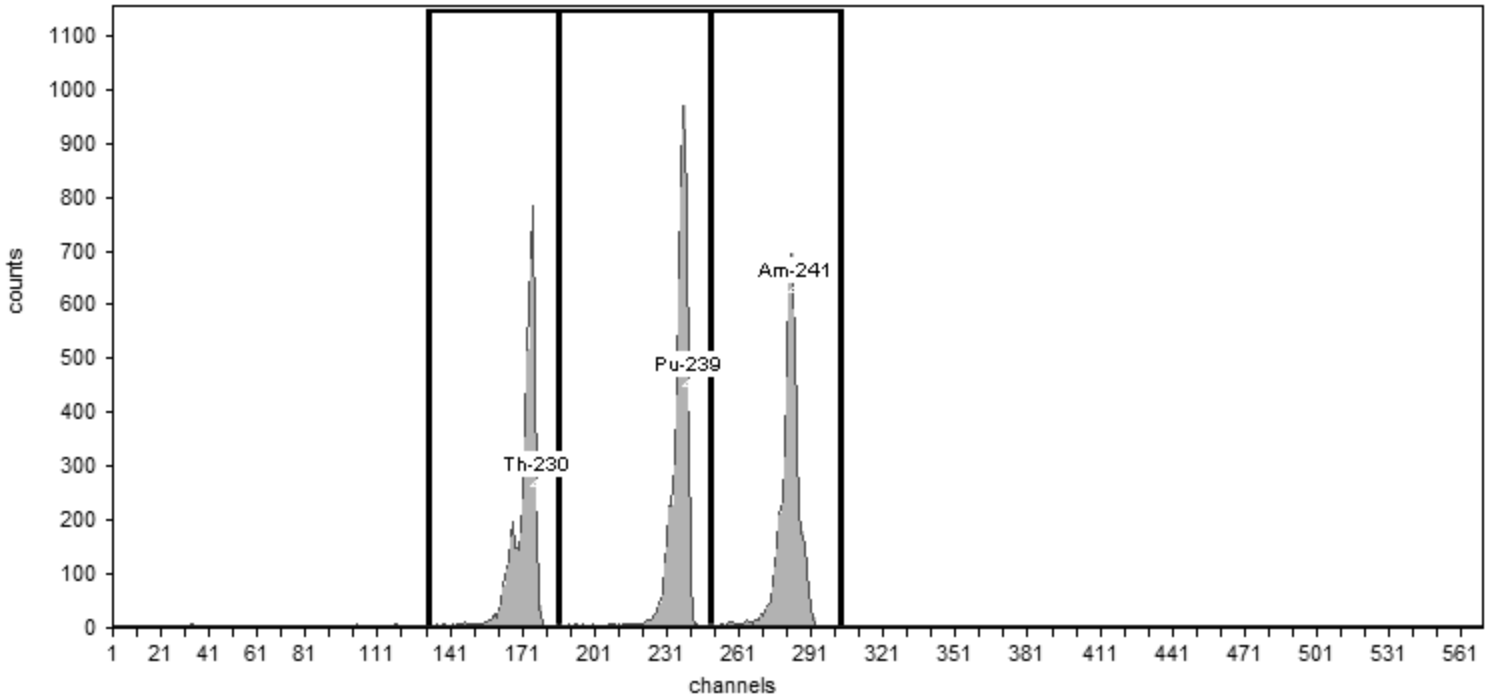
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 11/1/2015 2:26:11PM

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
8:32:13PM 11/23/2015

Calibration

Sample Name: ICV-8877;AV201-20151101
Description:
Detector: AV201

Analyst: 60040
Analysis Date: 11/1/2015 3:56:13PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

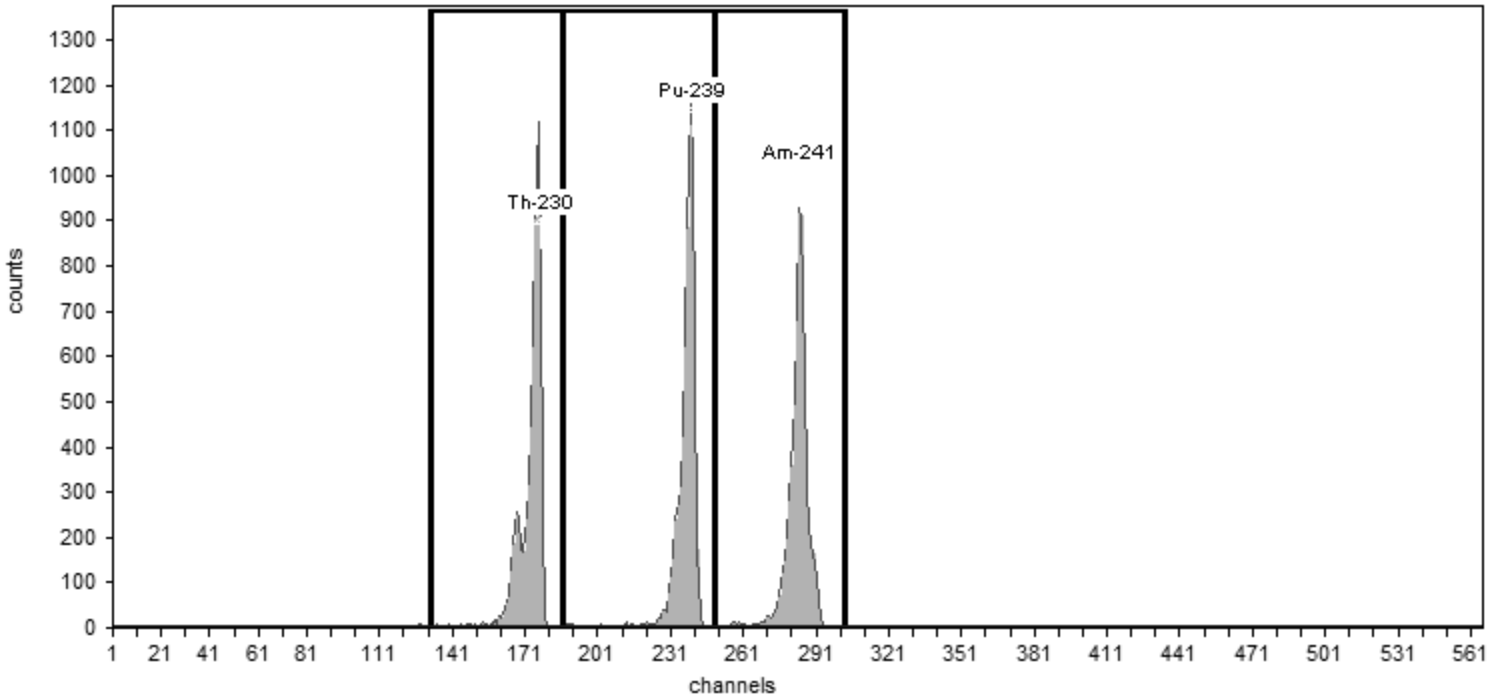
Detector: AV201 , SN: 50-117i5
Acquisition Start Date: 11/1/2015 2:26:23PM

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

Efficiency Calibration Name: ICV-8877;AV201-2015110

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

Efficiency: 24.90% +/- 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	28.32	6,168.00	102.80
Pu-239	240	5,155.40	186	249	31.87	6,313.00	105.22
Am-241	284	5,485.70	249	303	34.33	6,036.00	100.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:12:47PM 11/1/2015

Calibration

Sample Name: ICV-8874;AV203-20151101b
Description:
Detector: AV203

Analyst: 60040
Analysis Date: 11/1/2015 7:12:45PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

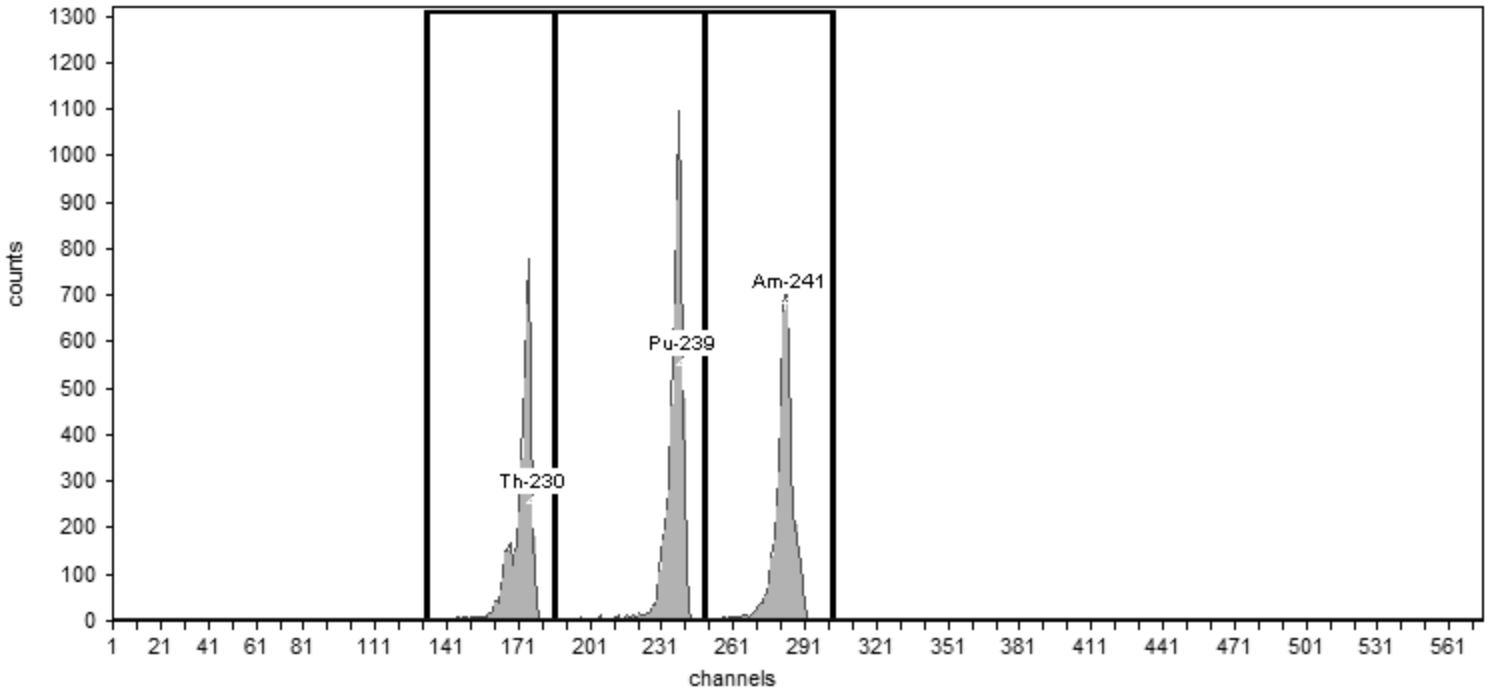
Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 11/1/2015 6:11:42PM

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

Efficiency Calibration Name: ICV-8874;AV203-2015110

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

Efficiency: 26.46% +/- 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	30.68	4,516.00	75.27
Pu-239	240	5,155.40	186	249	33.04	5,913.00	98.55
Am-241	284	5,485.70	249	303	33.43	4,905.00	81.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

Sample Name: ICV-7107;AV204-20151101a
Description:
Detector: AV204

Analyst: 60040
Analysis Date: 11/1/2015 6:06:55PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

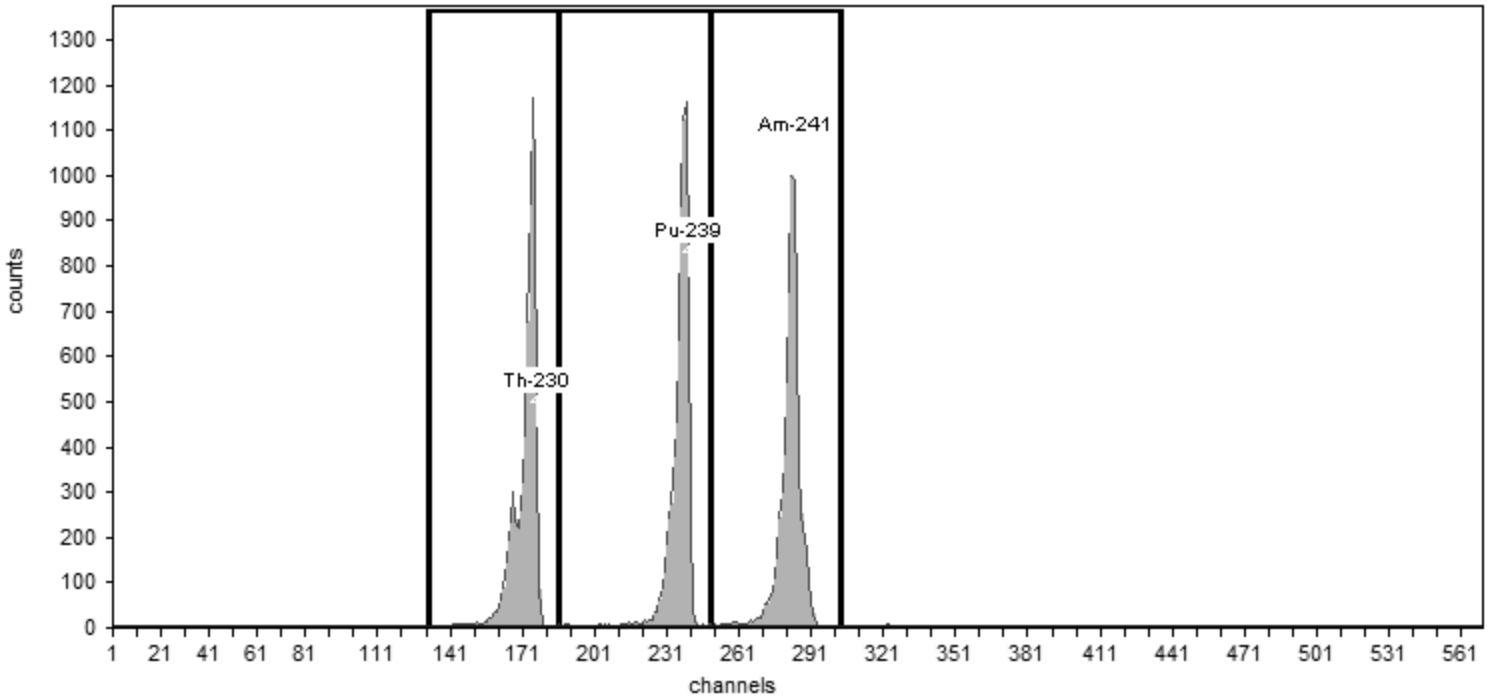
Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 11/1/2015 4:10:37PM

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

Efficiency Calibration Name: ICV-7107;AV204-2015110

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

Efficiency: 25.98% +/- 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	30.24	6,976.00	116.27
Pu-239	240	5,155.40	186	249	34.41	6,916.00	115.27
Am-241	284	5,485.70	249	303	35.82	6,695.00	111.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:06:43PM 11/1/2015

Calibration

Sample Name: ICV-9884;AV205-20151101
Description:
Detector: AV205

Analyst: 60040
Analysis Date: 11/1/2015 6:06:42PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

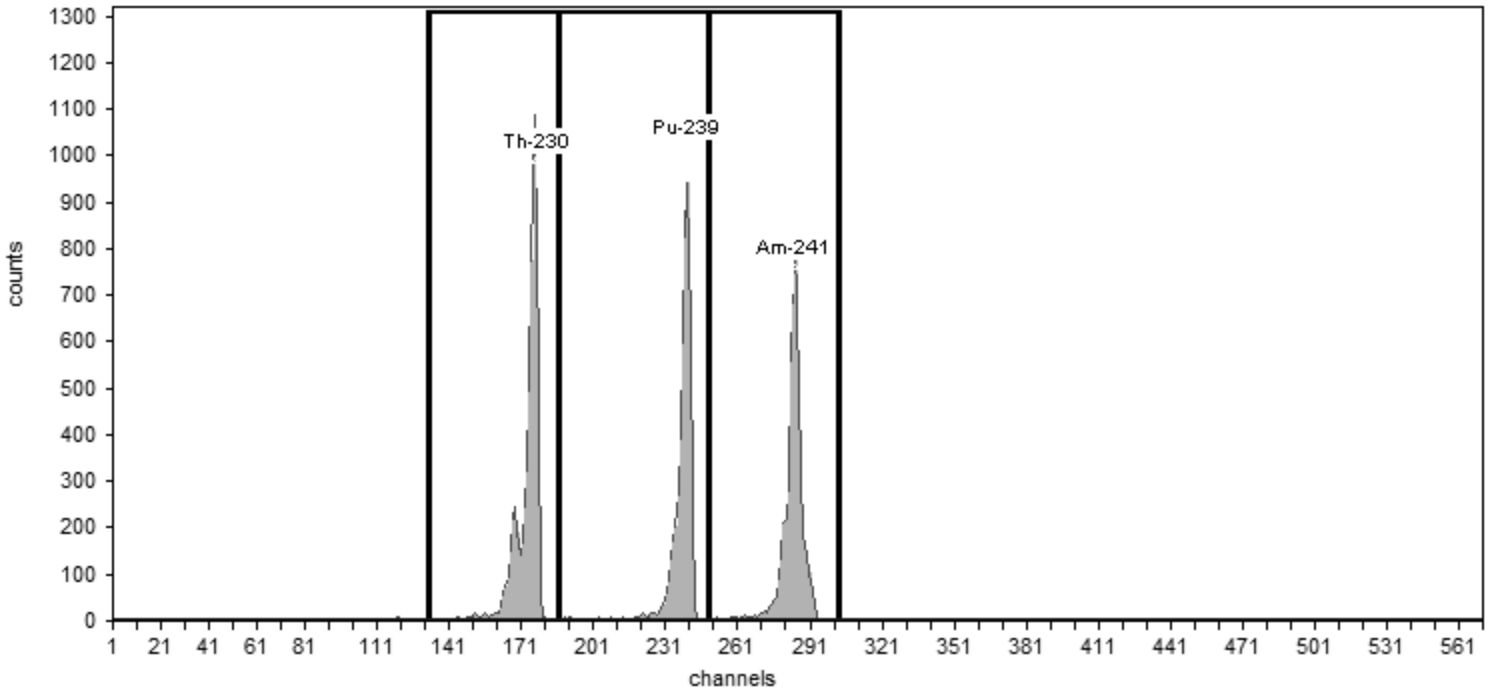
Detector: AV205 , SN: 49-155dd3
Acquisition Start Date: 11/1/2015 4:02:07PM

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

Efficiency Calibration Name: ICV-9884;AV205-2015110

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

Efficiency: 24.05% +/- 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	26.73	5,797.00	96.62
Pu-239	240	5,155.40	186	249	29.85	4,737.00	78.95
Am-241	284	5,485.70	249	303	29.82	4,752.00	79.20

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

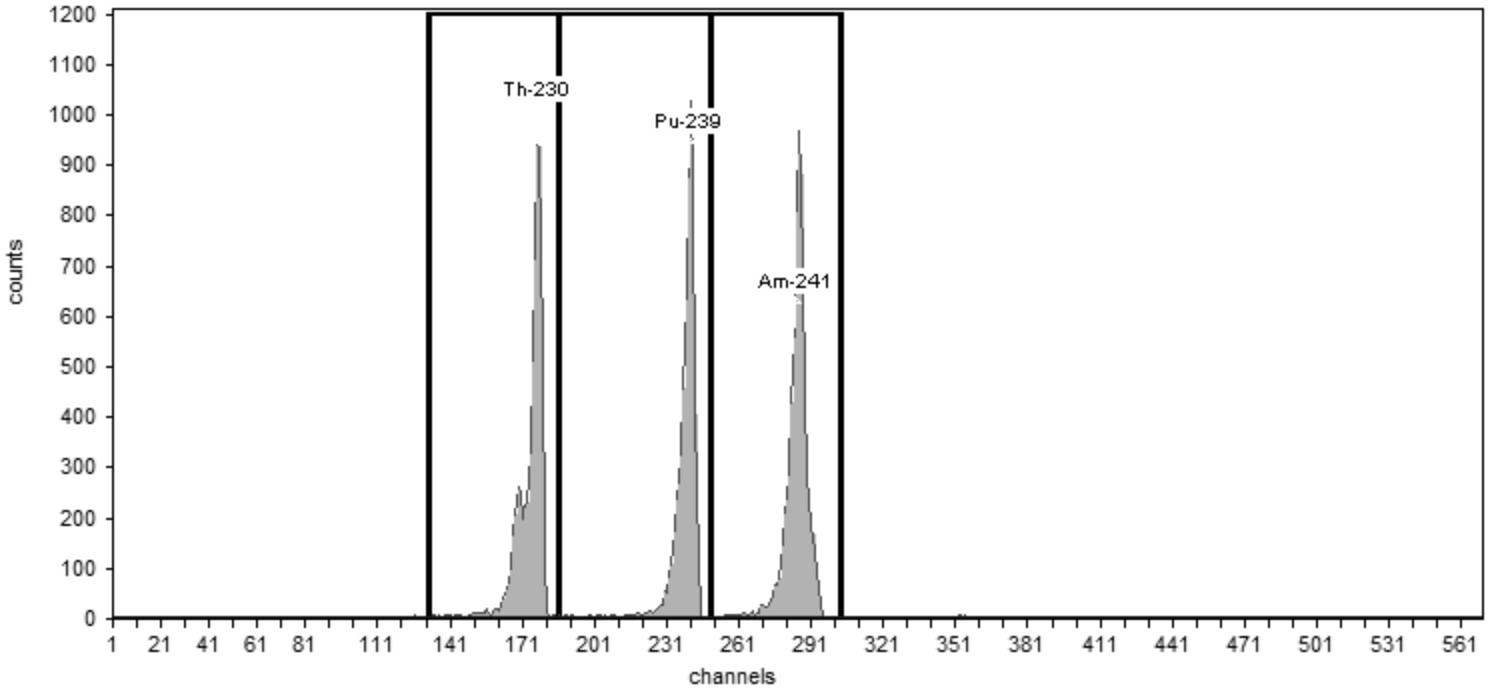
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 11/1/2015 4:11:10PM

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

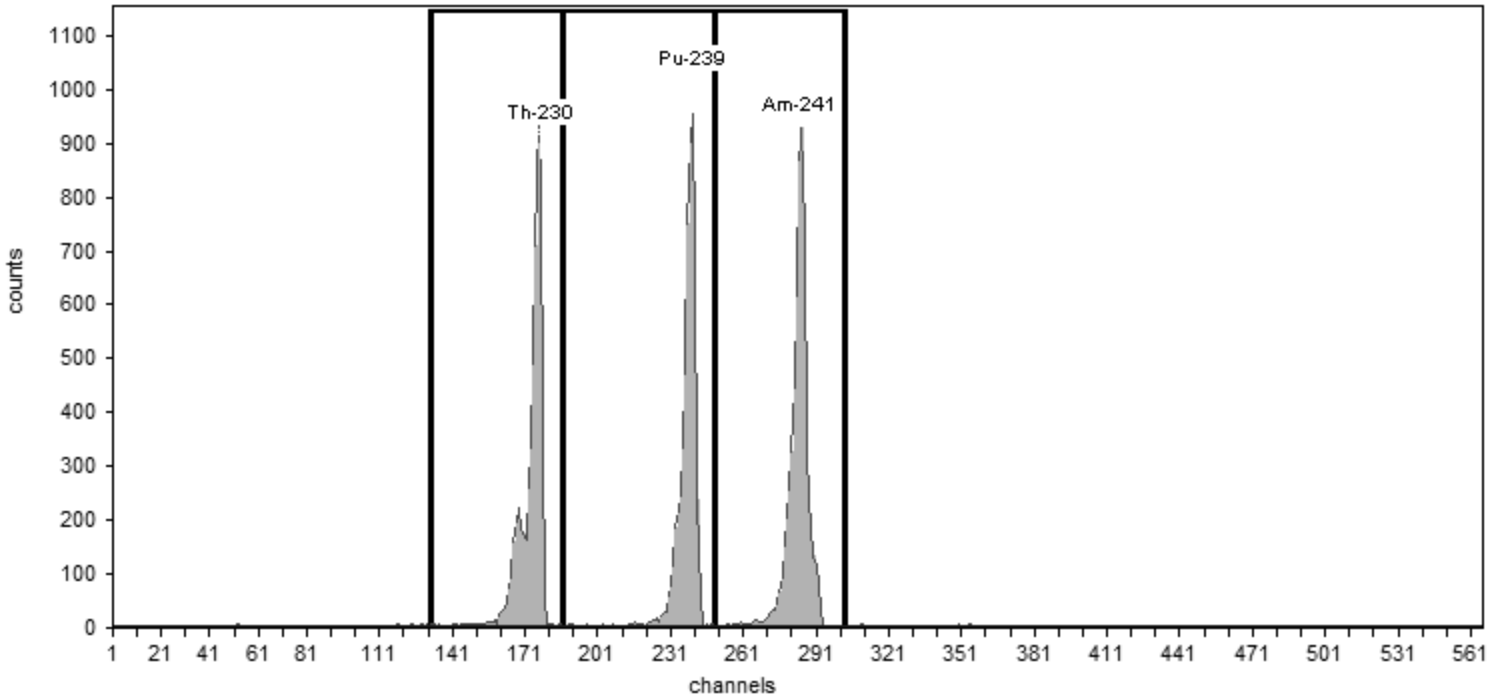
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 11/1/2015 4:11:24PM

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 / Ch^2

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

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:32:49PM 9/6/2016

Calibration

Sample Name: CCV-8874;AV148-20160906
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 9/6/2016 4:32:47PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

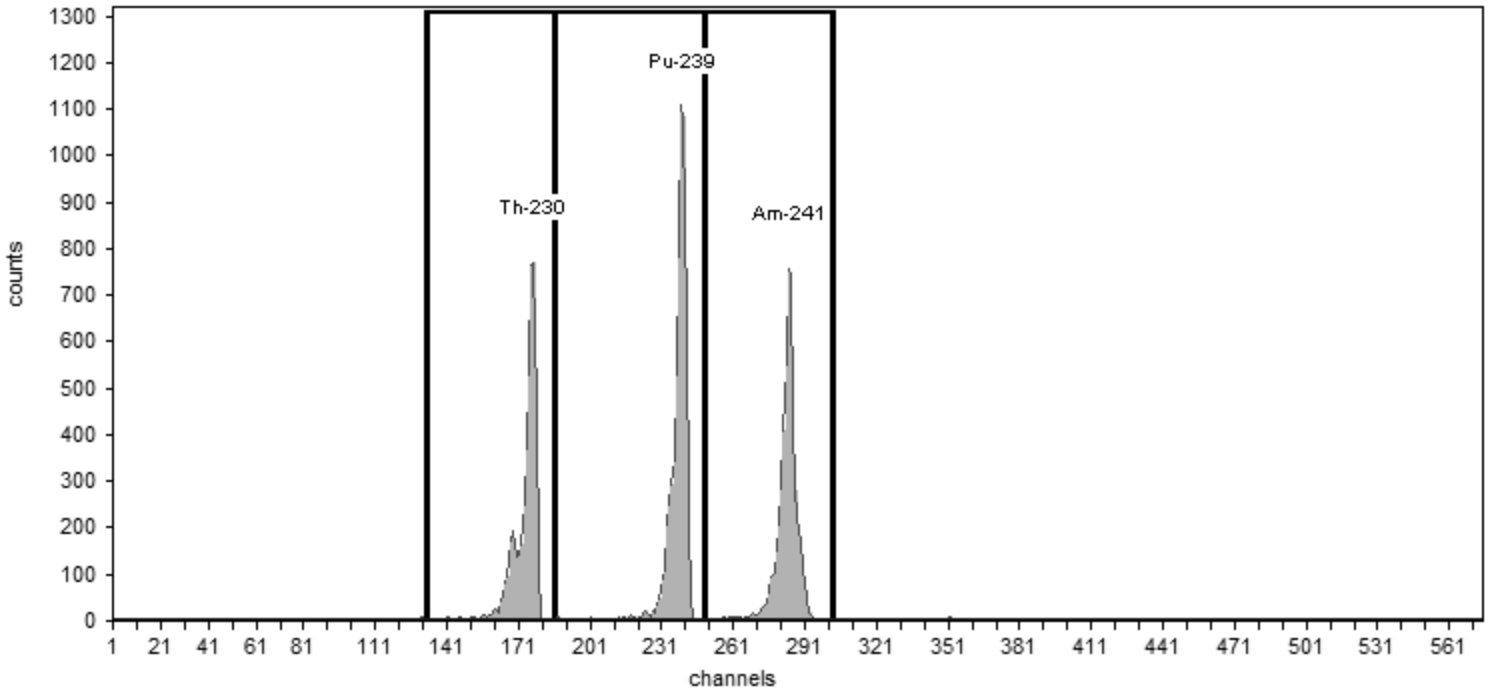
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 9/6/2016 3:23:05PM

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

Efficiency Calibration Name: CCV-8874;AV148-201609(

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

Efficiency: 26.54% +/- 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	30.69	4,593.00	76.55
Pu-239	240	5,155.40	186	249	30.57	5,910.00	98.50
Am-241	284	5,485.70	249	303	34.15	4,862.00	81.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:25:58AM 9/7/2016

Calibration

Sample Name: CCV-8875;AV149-20160906a
Description:
Detector: AV149

Analyst: 60040
Analysis Date: 9/7/2016 8:25:56AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

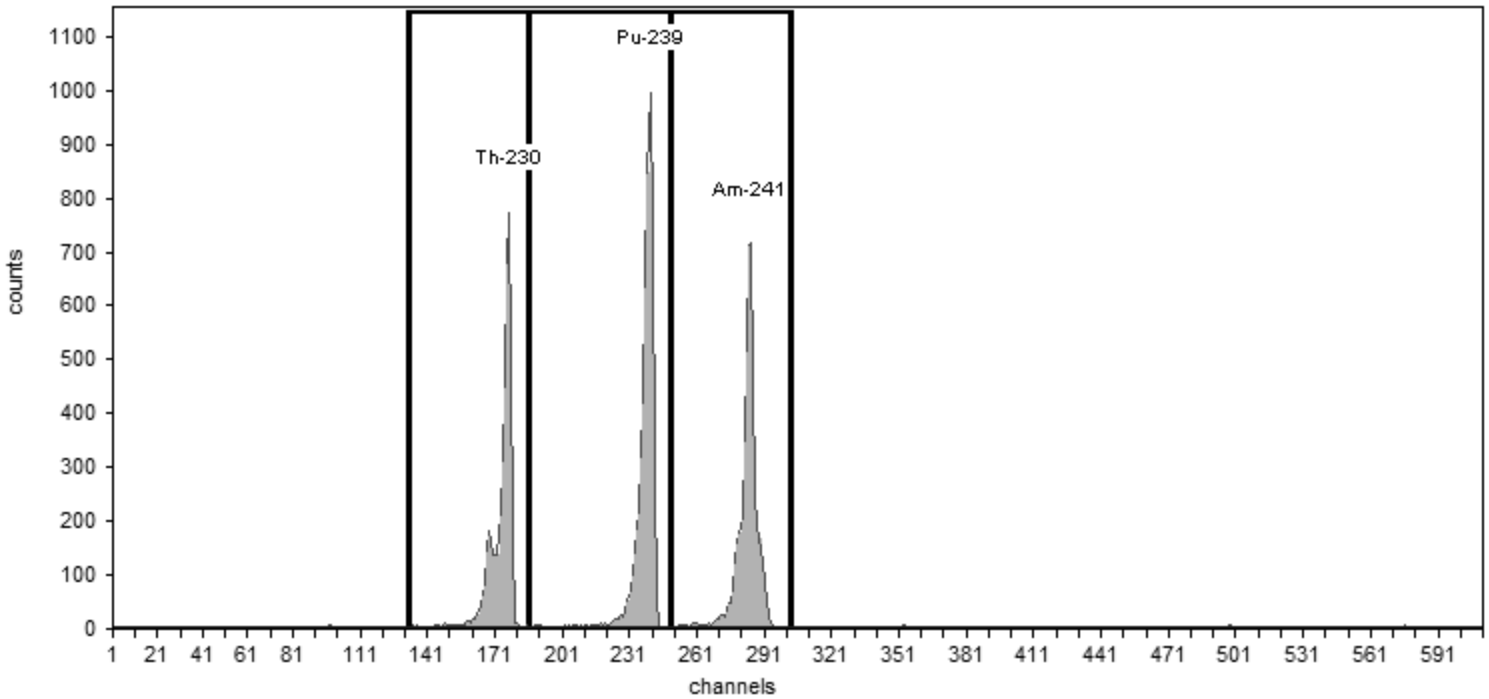
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 9/6/2016 4:41:41PM

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

Efficiency Calibration Name: CCV-8875;AV149-201609(

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

Efficiency: 22.86% +/- 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	28.52	4,333.00	72.22
Pu-239	240	5,155.40	186	249	30.99	5,250.00	87.50
Am-241	284	5,485.70	249	303	33.10	4,653.00	77.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:01PM 9/6/2016

Calibration

Sample Name: CCV-8876;AV150-20160906
Description:
Detector: AV150

Analyst: 60040
Analysis Date: 9/6/2016 4:33:00PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

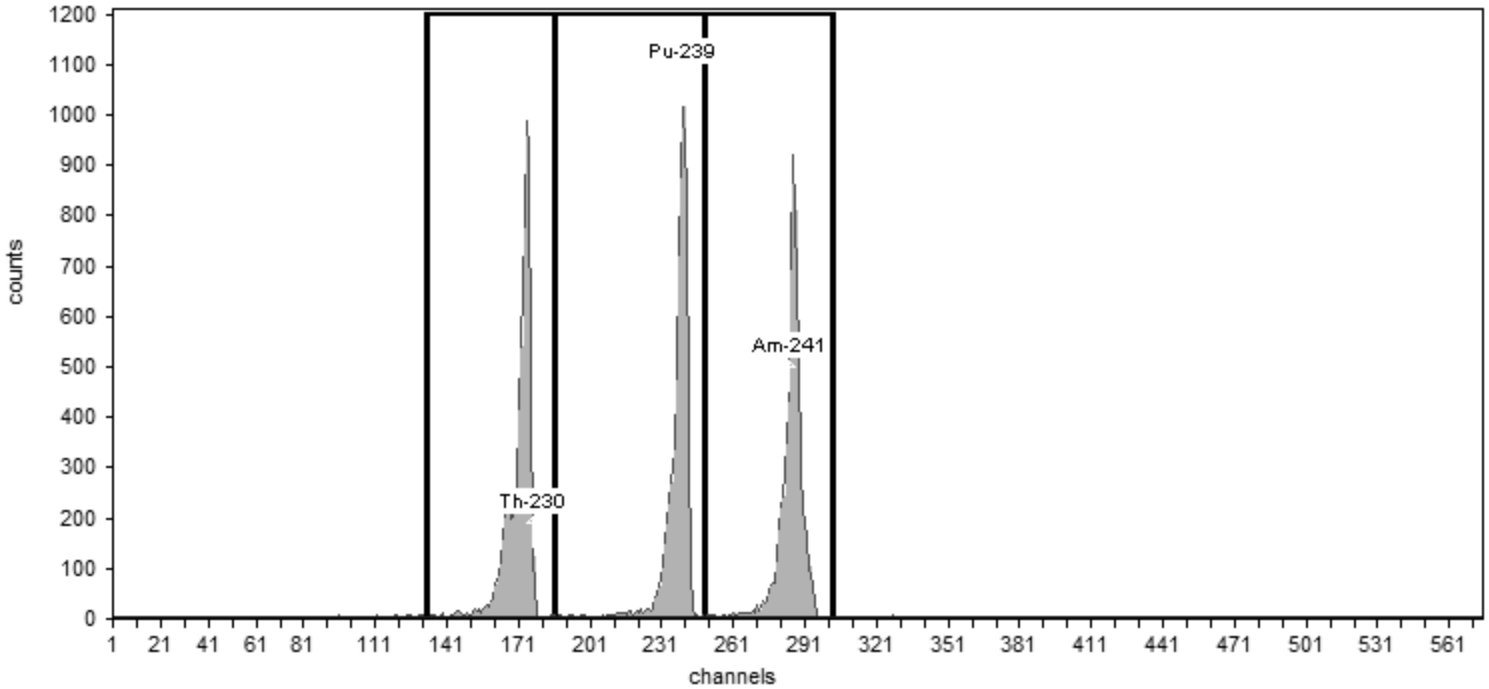
Detector: AV150 , SN: 50-05/R4
Acquisition Start Date: 9/6/2016 3:23:36PM

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

Efficiency Calibration Name: CCV-8876;AV150-201609(

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

Efficiency: 23.47% +/- 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	31.91	6,229.00	103.82
Pu-239	240	5,155.40	186	249	33.89	6,014.00	100.23
Am-241	284	5,485.70	249	303	31.02	5,928.00	98.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:42:57PM 9/6/2016

Calibration

Sample Name: CCV-9792;AV153-20160906
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 9/6/2016 1:42:56PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

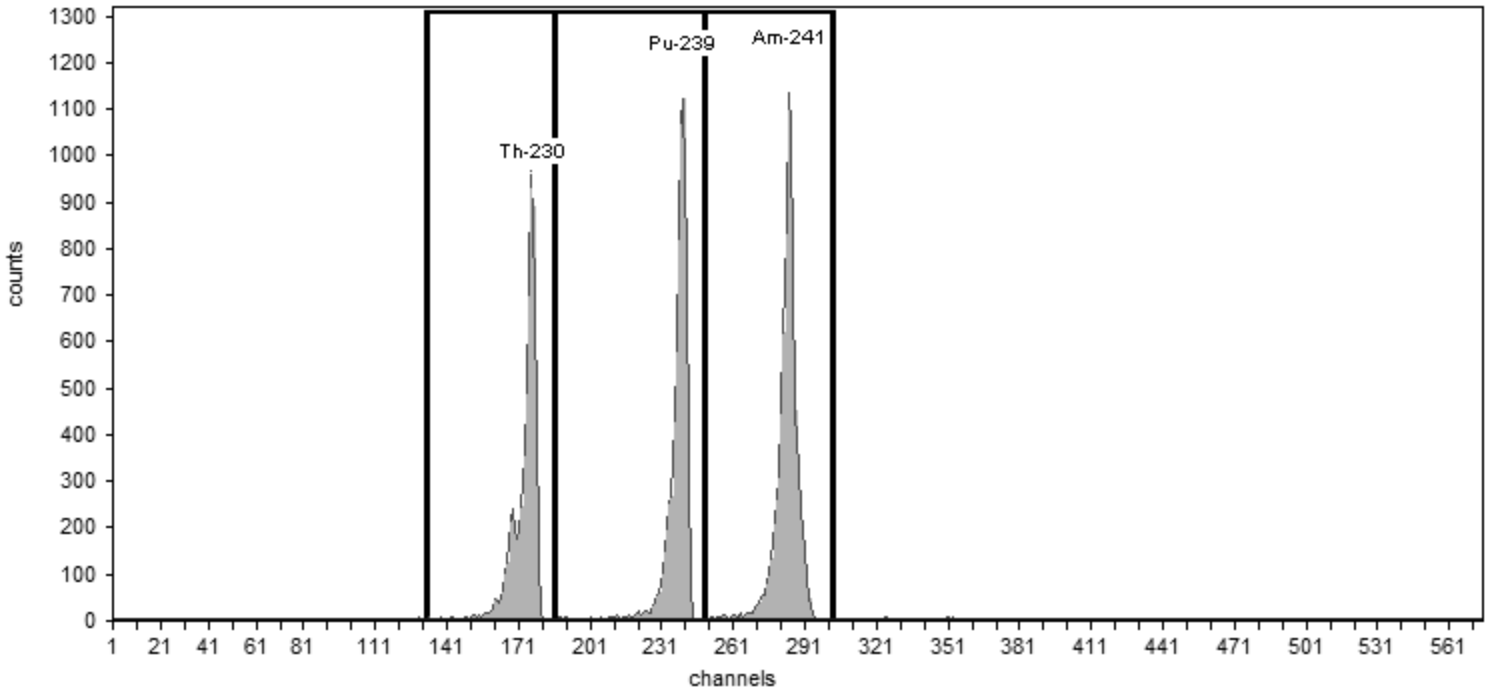
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 9/6/2016 12:40:03PM

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

Efficiency Calibration Name: CCV-9792;AV153-201609(

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

Efficiency: 25.73% +/- 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	29.41	5,799.00	96.65
Pu-239	240	5,155.40	186	249	34.24	6,531.00	108.85
Am-241	284	5,485.70	249	303	36.57	7,757.00	129.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:03PM 9/6/2016

Calibration

Sample Name: CCV-9817;AV171-20160906
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 9/6/2016 3:08:02PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

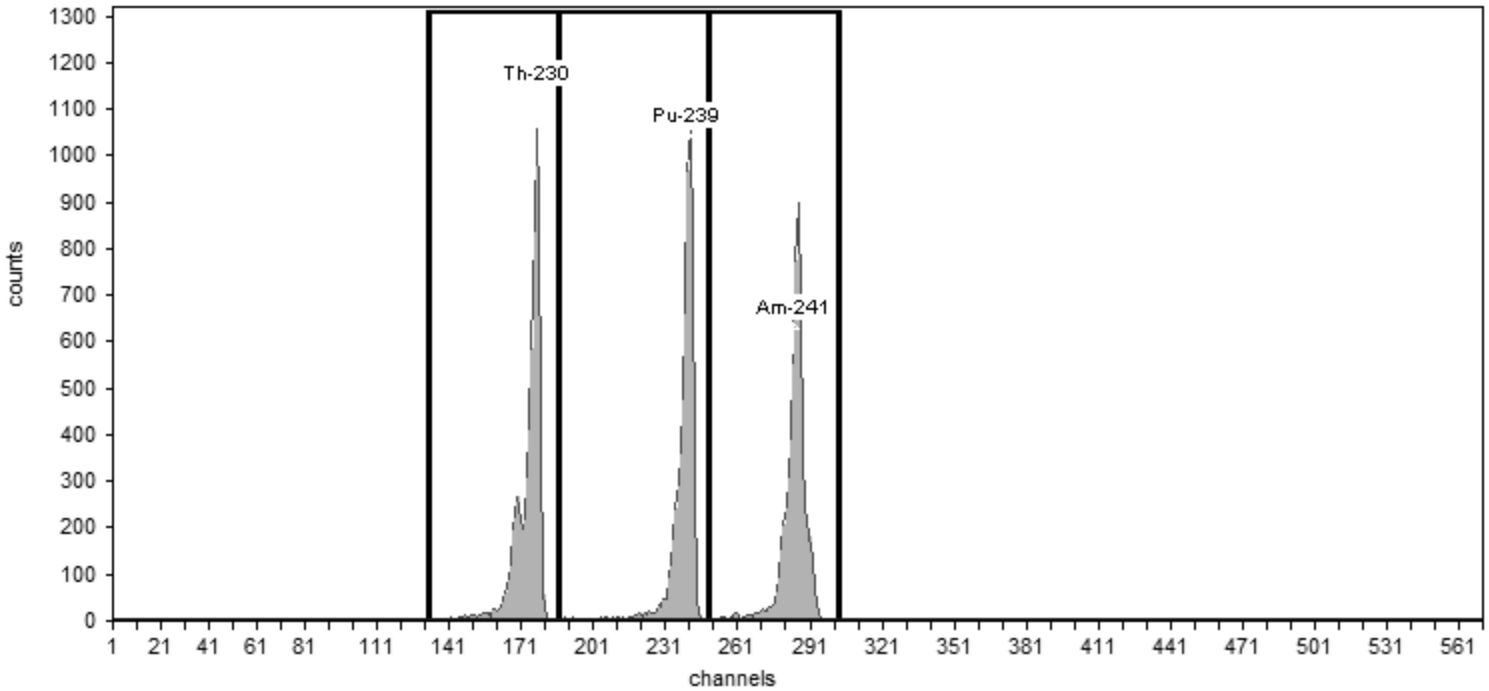
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 9/6/2016 1:58:39PM

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

Efficiency Calibration Name: CCV-9817;AV171-201609(

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

Efficiency: 24.13% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.34	6,385.00	106.42
Pu-239	240	5,155.40	186	249	32.02	5,919.00	98.65
Am-241	284	5,485.70	249	303	32.53	5,859.00	97.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:07:57PM 9/6/2016

Calibration

Sample Name: CCV-9884;AV172-20160906
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 9/6/2016 3:07:55PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

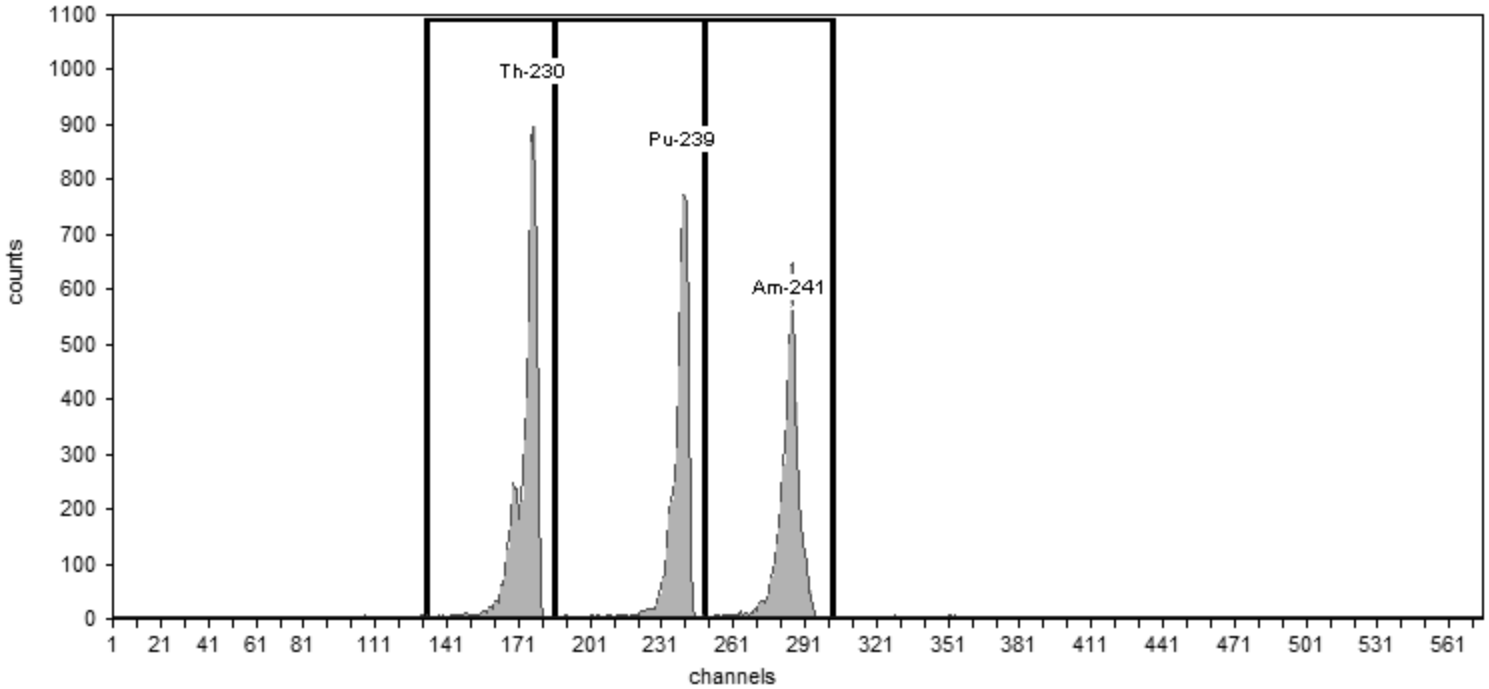
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 9/6/2016 1:58:23PM

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

Efficiency Calibration Name: CCV-9884;AV172-201609(

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

Efficiency: 23.81% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.22	5,799.00	96.65
Pu-239	240	5,155.40	186	249	35.29	4,725.00	78.75
Am-241	284	5,485.70	249	303	36.44	4,603.00	76.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:26:26AM 9/7/2016

Calibration

Sample Name: CCV-9886;AV188-20160906a
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 9/7/2016 8:26:24AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

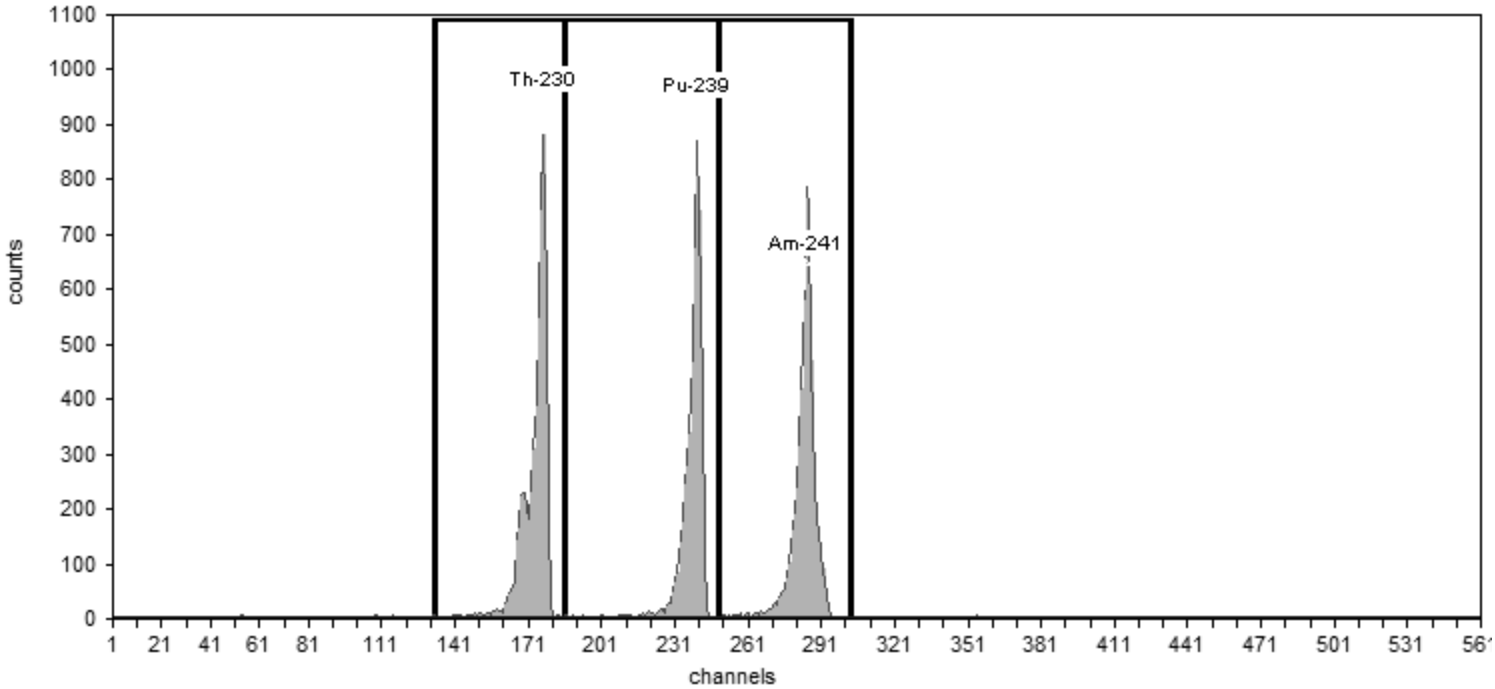
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 9/6/2016 4:43:03PM

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

Efficiency Calibration Name: CCV-9886;AV188-201609(

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

Efficiency: 23.61% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.18	5,400.00	90.00
Pu-239	240	5,155.40	186	249	31.08	4,858.00	80.97
Am-241	284	5,485.70	249	303	34.02	5,239.00	87.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:09:11PM 9/6/2016

Calibration

Sample Name: CCV-7107;AV189-20160906
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 9/6/2016 3:09:09PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

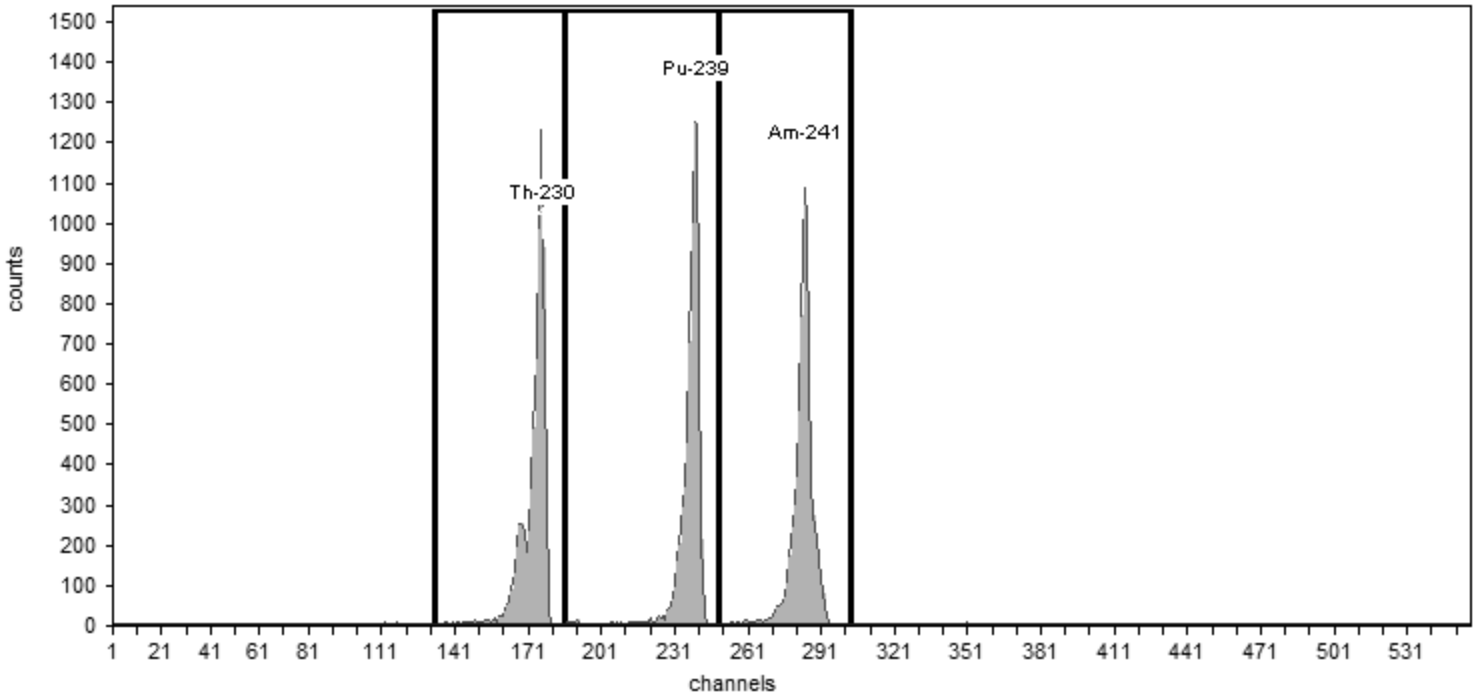
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 9/6/2016 2:01:25PM

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

Efficiency Calibration Name: CCV-7107;AV189-201609(

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

Efficiency: 26.30% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.32	6,906.00	115.10
Pu-239	240	5,155.40	186	249	33.93	7,095.00	118.25
Am-241	284	5,485.70	249	303	32.43	6,855.00	114.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:09:04PM 9/6/2016

Calibration

Sample Name: CCV-8874;AV190-20160906
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 9/6/2016 3:09:03PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

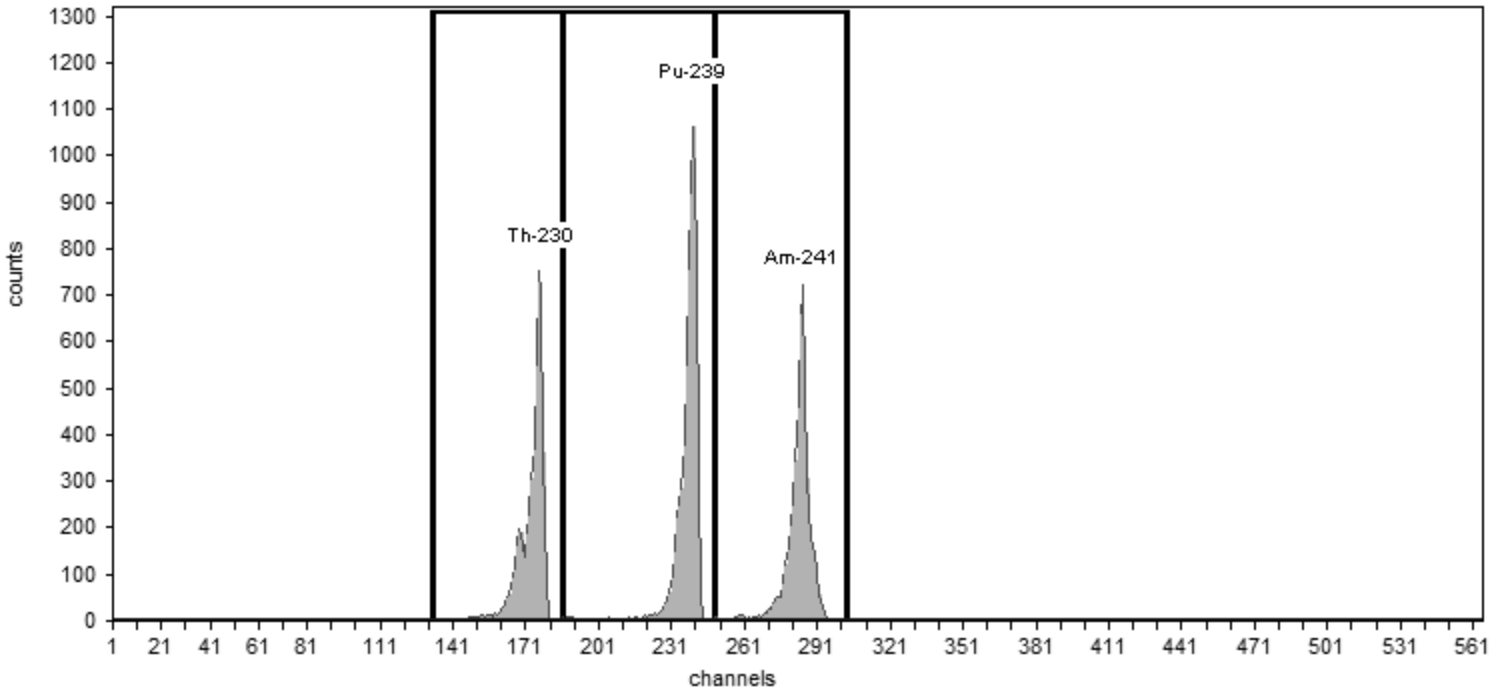
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 9/6/2016 2:01:07PM

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

Efficiency Calibration Name: CCV-8874;AV190-201609(

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

Efficiency: 26.82% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.02	4,680.00	78.00
Pu-239	240	5,155.40	186	249	34.66	6,081.00	101.35
Am-241	284	5,485.70	249	303	33.67	4,768.00	79.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:58PM 9/6/2016

Calibration

Sample Name: CCV-8875;AV191-20160906
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 9/6/2016 3:08:57PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

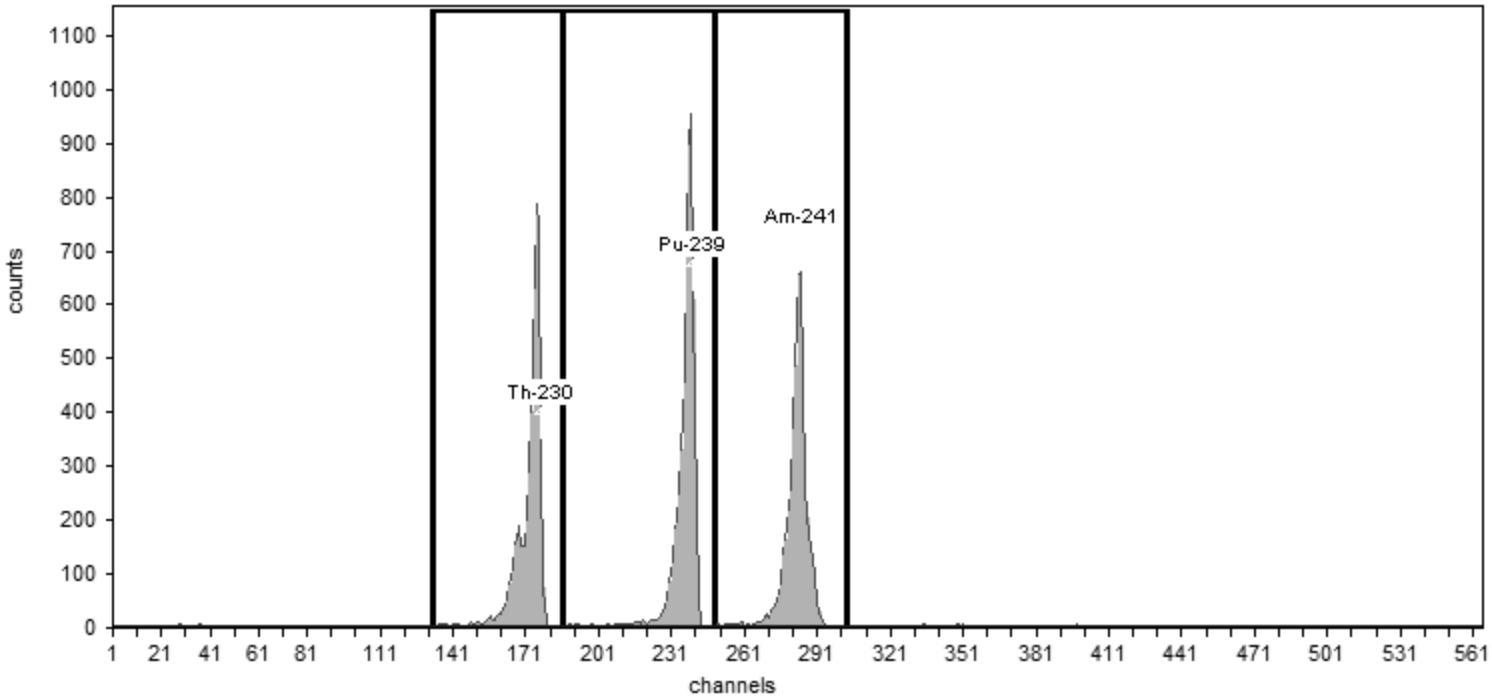
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 9/6/2016 2:00:53PM

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

Efficiency Calibration Name: CCV-8875;AV191-201609(

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

Efficiency: 23.71% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.15	4,714.00	78.57
Pu-239	240	5,155.40	186	249	31.68	5,316.00	88.60
Am-241	284	5,485.70	249	303	37.38	4,688.00	78.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:46PM 9/6/2016

Calibration

Sample Name: CCV-8877;AV193-20160906
Description:
Detector: AV193

Analyst: 60040
Analysis Date: 9/6/2016 3:08:45PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

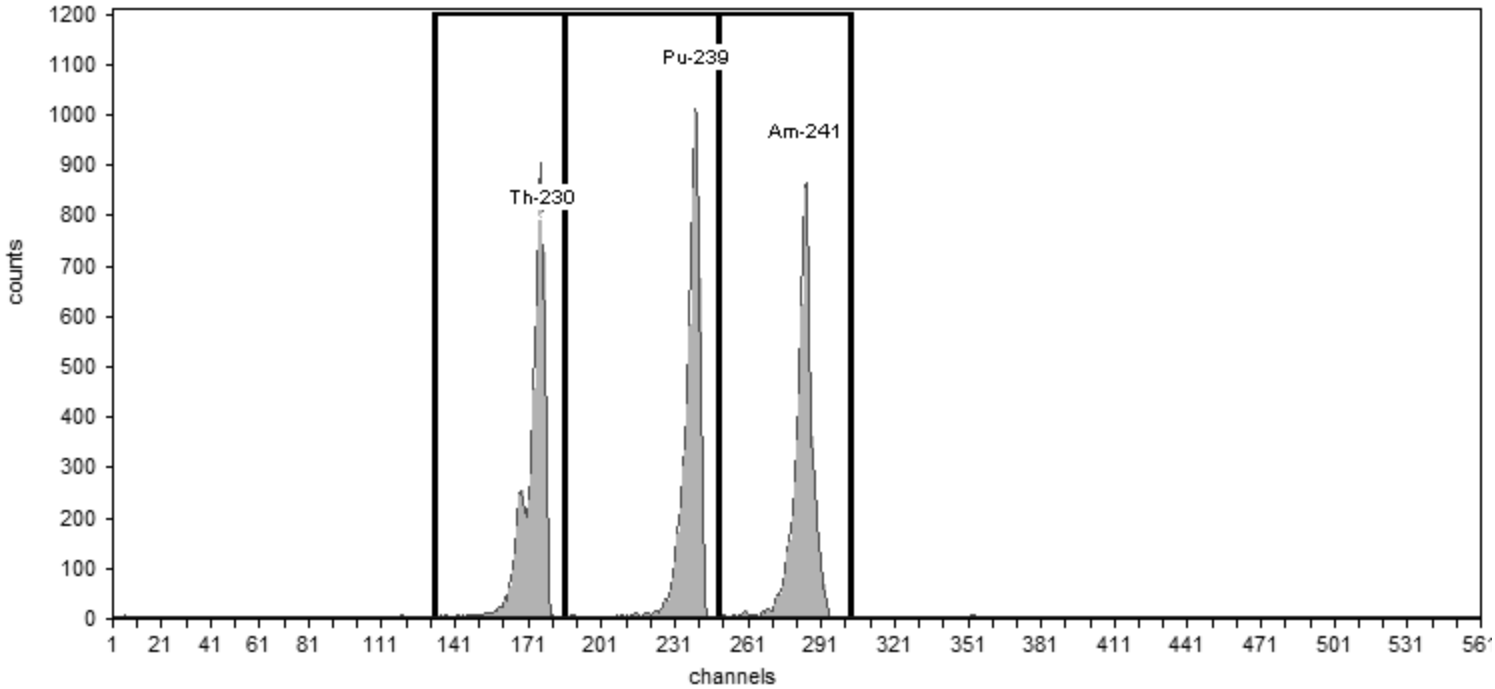
Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 9/6/2016 2:00:23PM

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

Efficiency Calibration Name: CCV-8877;AV193-201609(

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

Efficiency: 24.86% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.25	6,069.00	101.15
Pu-239	240	5,155.40	186	249	36.50	6,329.00	105.48
Am-241	284	5,485.70	249	303	36.32	6,087.00	101.45

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:59:54AM 9/6/2016

Calibration

Sample Name: CCV-9792;AV195-20160906a
Description:
Detector: AV195

Analyst: 60040
Analysis Date: 9/6/2016 9:59:53AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

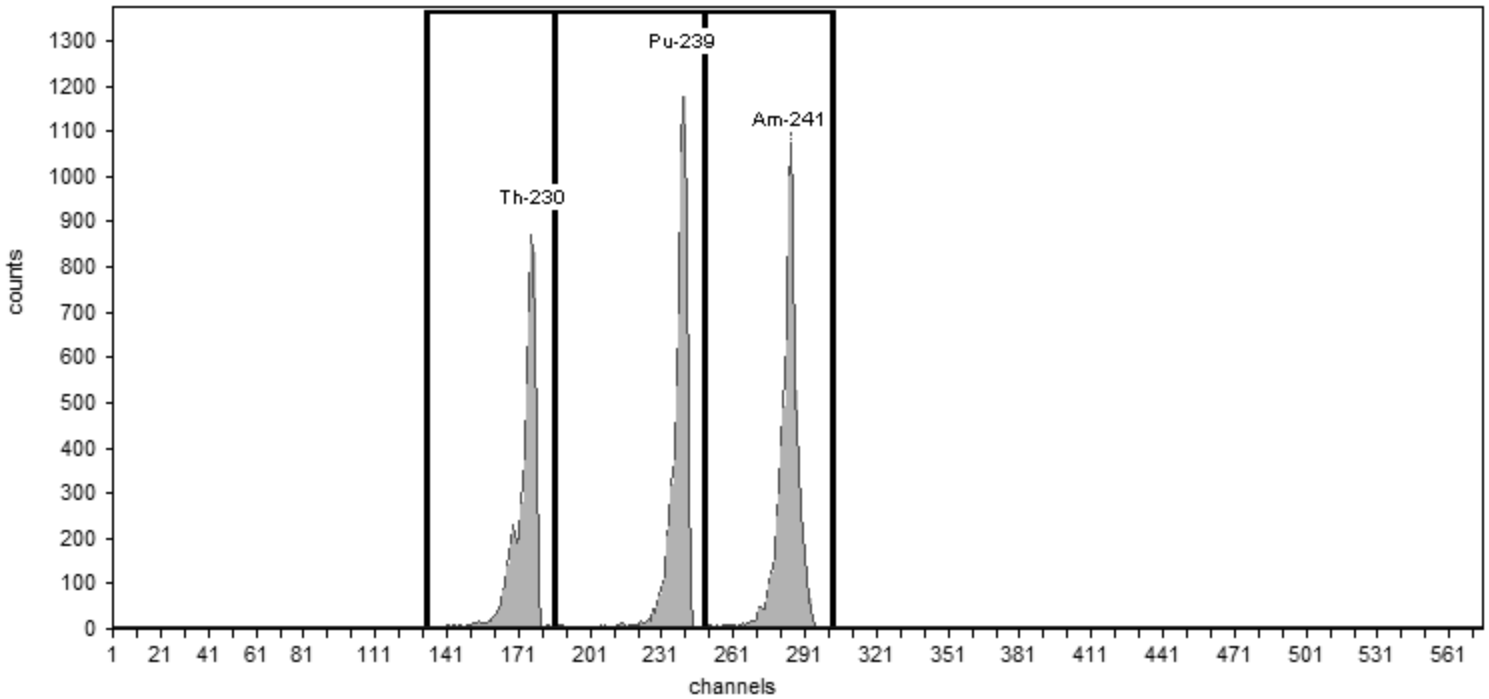
Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 9/6/2016 8:59:16AM

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

Efficiency Calibration Name: CCV-9792;AV195-201609(

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

Efficiency: 25.27% +/- 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	34.58	5,691.00	94.85
Pu-239	240	5,155.40	186	249	31.92	6,520.00	108.67
Am-241	284	5,485.70	249	303	33.59	7,513.00	125.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:35PM 9/6/2016

Calibration

Sample Name: CCV-9795;AV198-20160906
Description:
Detector: AV198

Analyst: 60040
Analysis Date: 9/6/2016 1:44:33PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

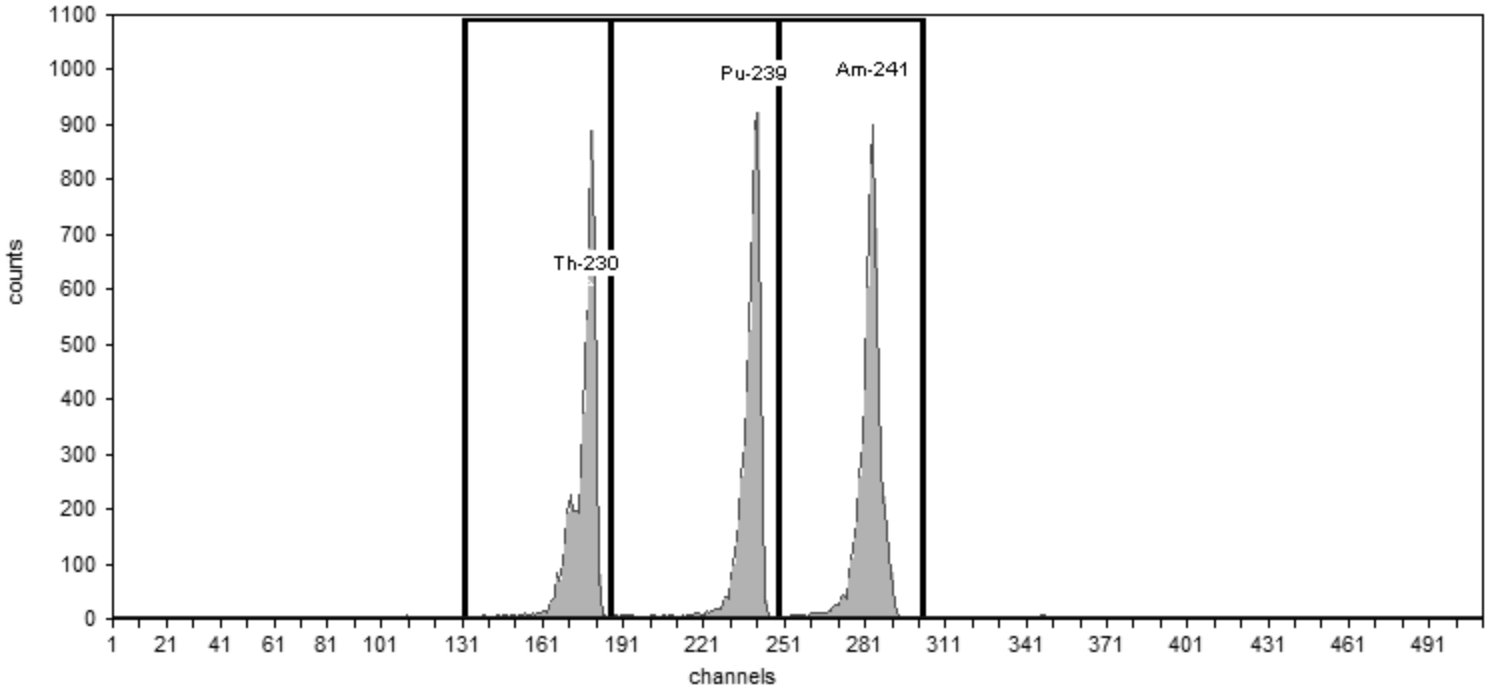
Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 9/6/2016 12:40:41PM

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

Efficiency Calibration Name: CCV-9795;AV198-201609(

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

Efficiency: 26.07% +/- 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	31.74	5,378.00	89.63
Pu-239	240	5,155.40	186	249	35.38	5,564.00	92.73
Am-241	284	5,485.70	249	303	35.17	6,111.00	101.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:32:42PM 9/6/2016

Calibration

Sample Name: CCV-9817;AV199-20160906a
Description:
Detector: AV199

Analyst: 60040
Analysis Date: 9/6/2016 4:32:40PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

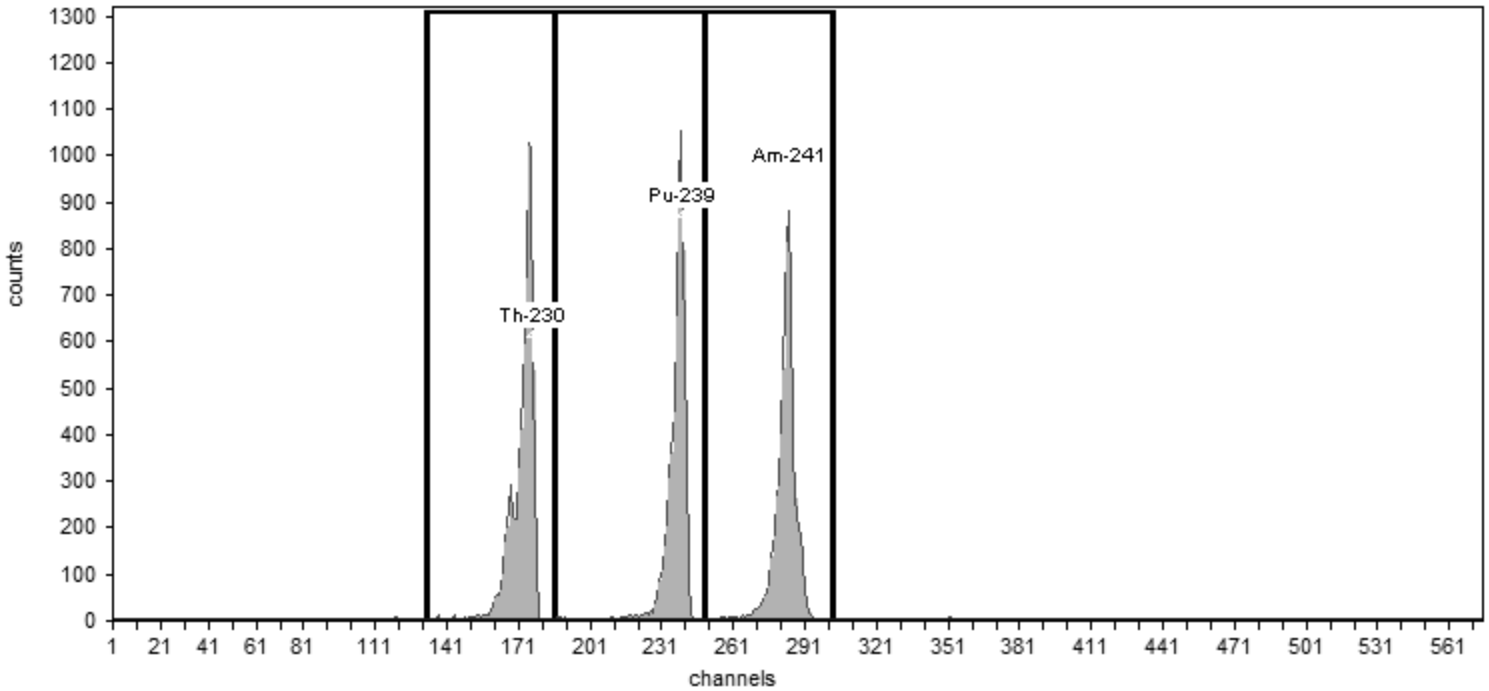
Detector: AV199 , SN: 50-117Z3
Acquisition Start Date: 9/6/2016 3:22:32PM

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

Efficiency Calibration Name: CCV-9817;AV199-201609(

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

Efficiency: 24.15% +/- 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	33.49	6,506.00	108.43
Pu-239	240	5,155.40	186	249	31.74	5,814.00	96.90
Am-241	284	5,485.70	249	303	33.87	5,858.00	97.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:45:10PM 9/6/2016

Calibration

Sample Name: CCV-9884;AV200-20160906
Description:
Detector: AV200

Analyst: 60040
Analysis Date: 9/6/2016 1:45:09PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

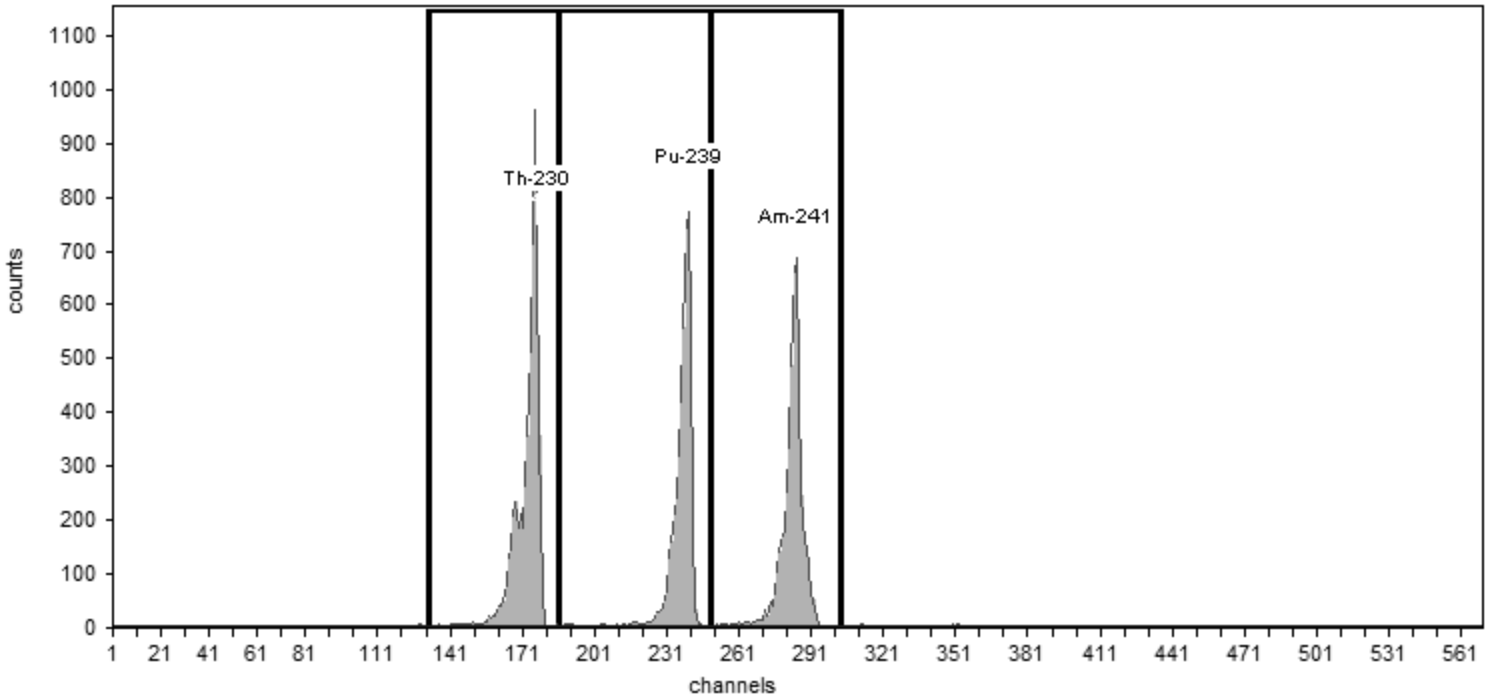
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 9/6/2016 12:41:17PM

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

Efficiency Calibration Name: CCV-9884;AV200-201609(

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

Efficiency: 23.24% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.74	5,592.00	93.20
Pu-239	240	5,155.40	186	249	35.63	4,627.00	77.12
Am-241	284	5,485.70	249	303	33.24	4,551.00	75.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:49:00PM 9/6/2016

Calibration

Sample Name: CCV-9885;AV201-20160906a
Description:
Detector: AV201

Analyst: 60040
Analysis Date: 9/6/2016 1:48:58PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

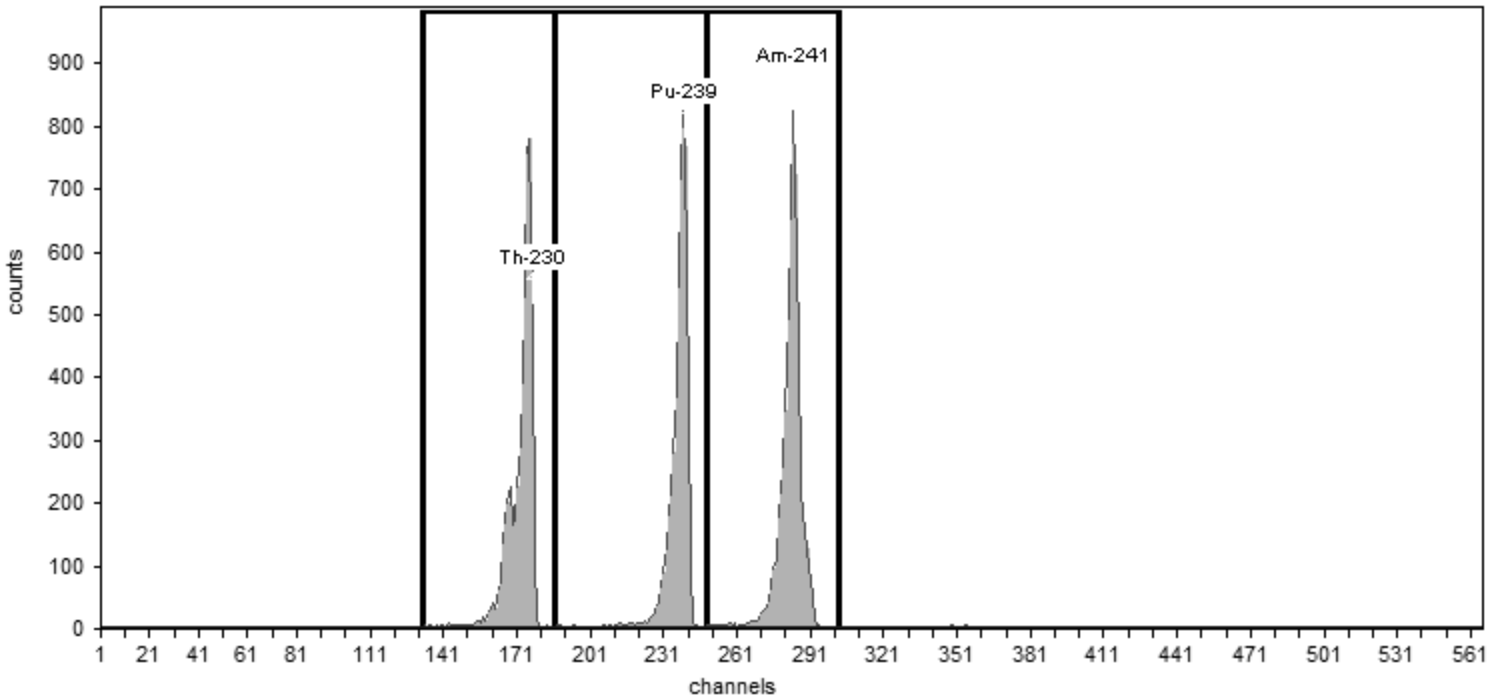
Detector: AV201 , SN: 50-117i5
Acquisition Start Date: 9/6/2016 12:48:53PM

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

Efficiency Calibration Name: CCV-9885;AV201-201609(

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

Efficiency: 25.24% +/- 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	32.07	5,013.00	83.55
Pu-239	240	5,155.40	186	249	34.38	4,860.00	81.00
Am-241	284	5,485.70	249	303	35.21	5,456.00	90.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:46:08PM 9/6/2016

Calibration

Sample Name: CCV-7107;AV203-20160906
Description:
Detector: AV203

Analyst: 60040
Analysis Date: 9/6/2016 1:46:07PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

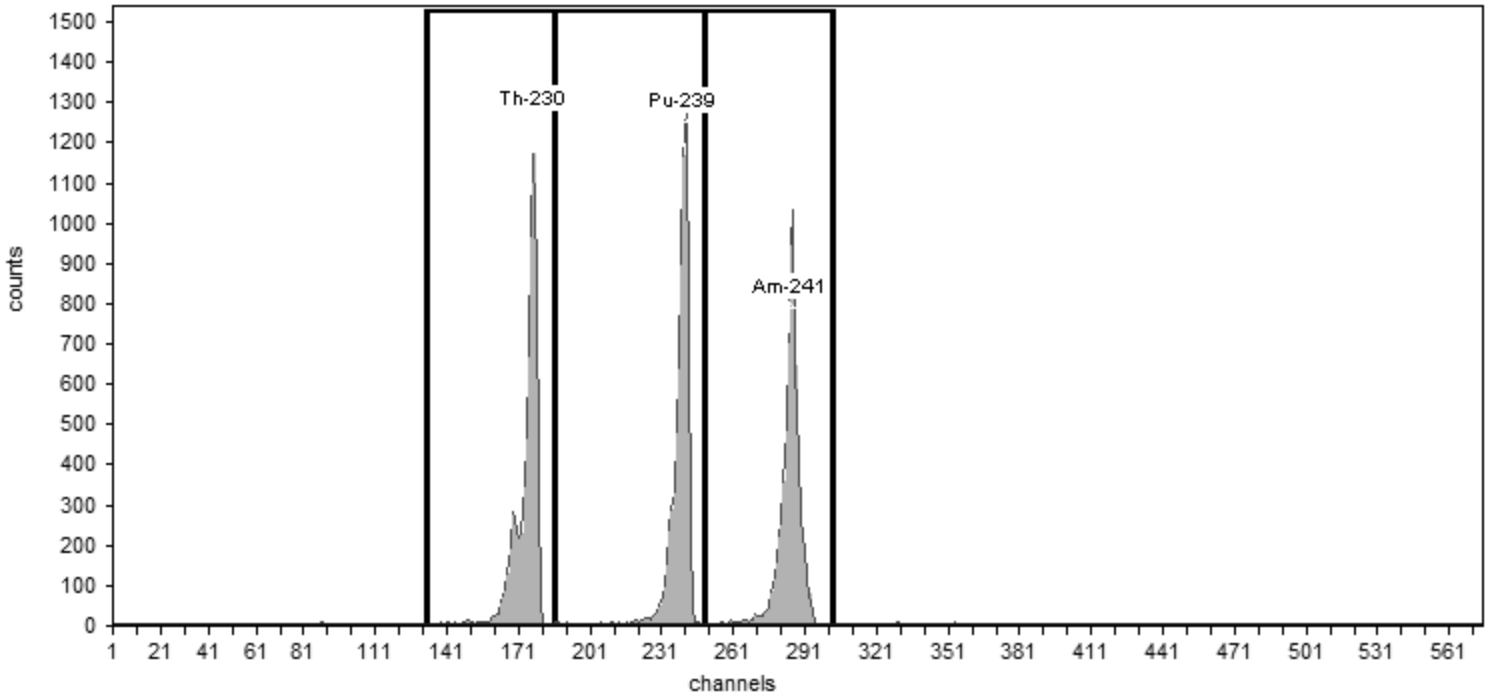
Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 9/6/2016 12:42:24PM

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

Efficiency Calibration Name: CCV-7107;AV203-201609(

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

Efficiency: 25.66% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.43	6,834.00	113.90
Pu-239	240	5,155.40	186	249	30.89	6,903.00	115.05
Am-241	284	5,485.70	249	303	32.94	6,600.00	110.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:46:26PM 9/6/2016

Calibration

Sample Name: CCV-8874;AV204-20160906
Description:
Detector: AV204

Analyst: 60040
Analysis Date: 9/6/2016 1:46:25PM
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: AV204 , SN: 50-117I4
Acquisition Start Date: 9/6/2016 12:42:43PM

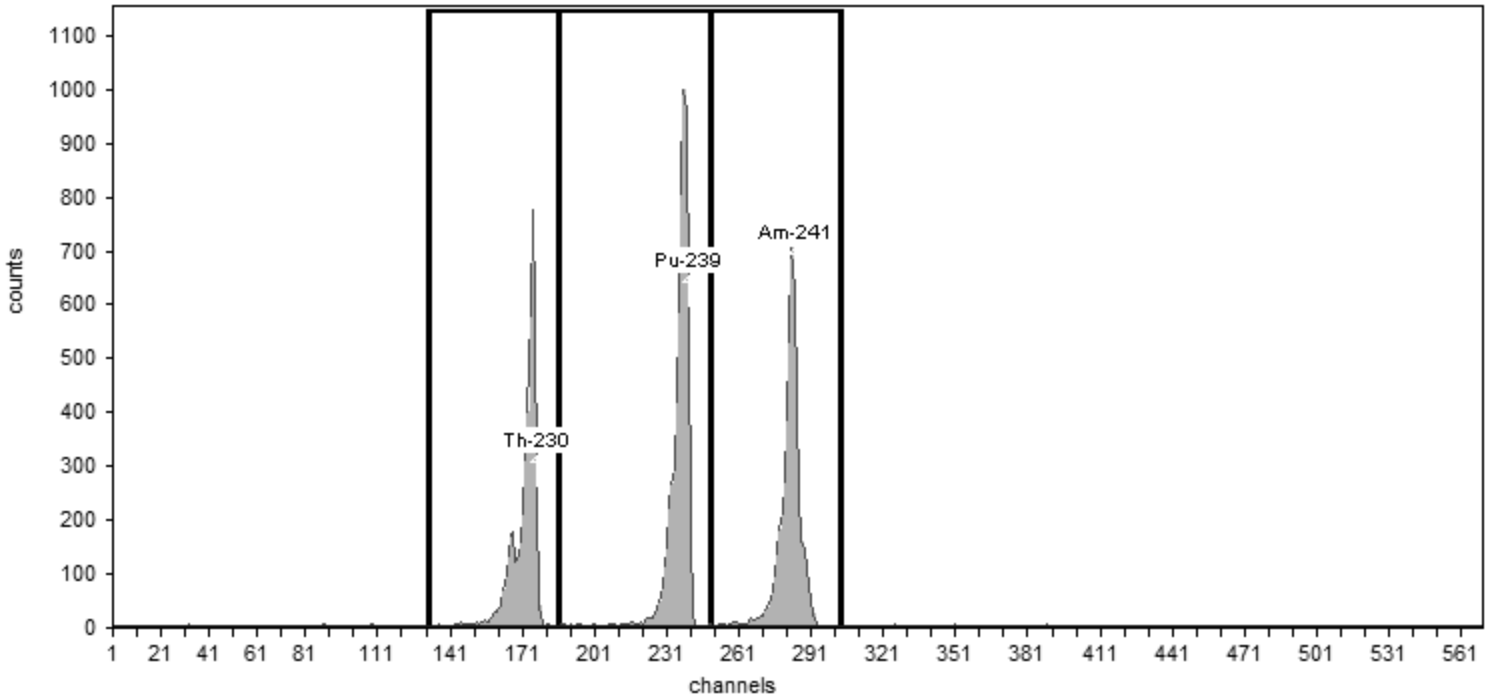
Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV204-201609(

Energy Calibration Equation:
Gain = 7.4575 keV / Ch

Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.90% +/- 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	27.75	4,425.00	73.75
Pu-239	240	5,155.40	186	249	35.19	5,900.00	98.33
Am-241	284	5,485.70	249	303	34.69	4,677.00	77.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:49:15PM 9/6/2016

Calibration

Sample Name: CCV-8875;AV205-20160906a
Description:
Detector: AV205

Analyst: 60040
Analysis Date: 9/6/2016 1:49:14PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

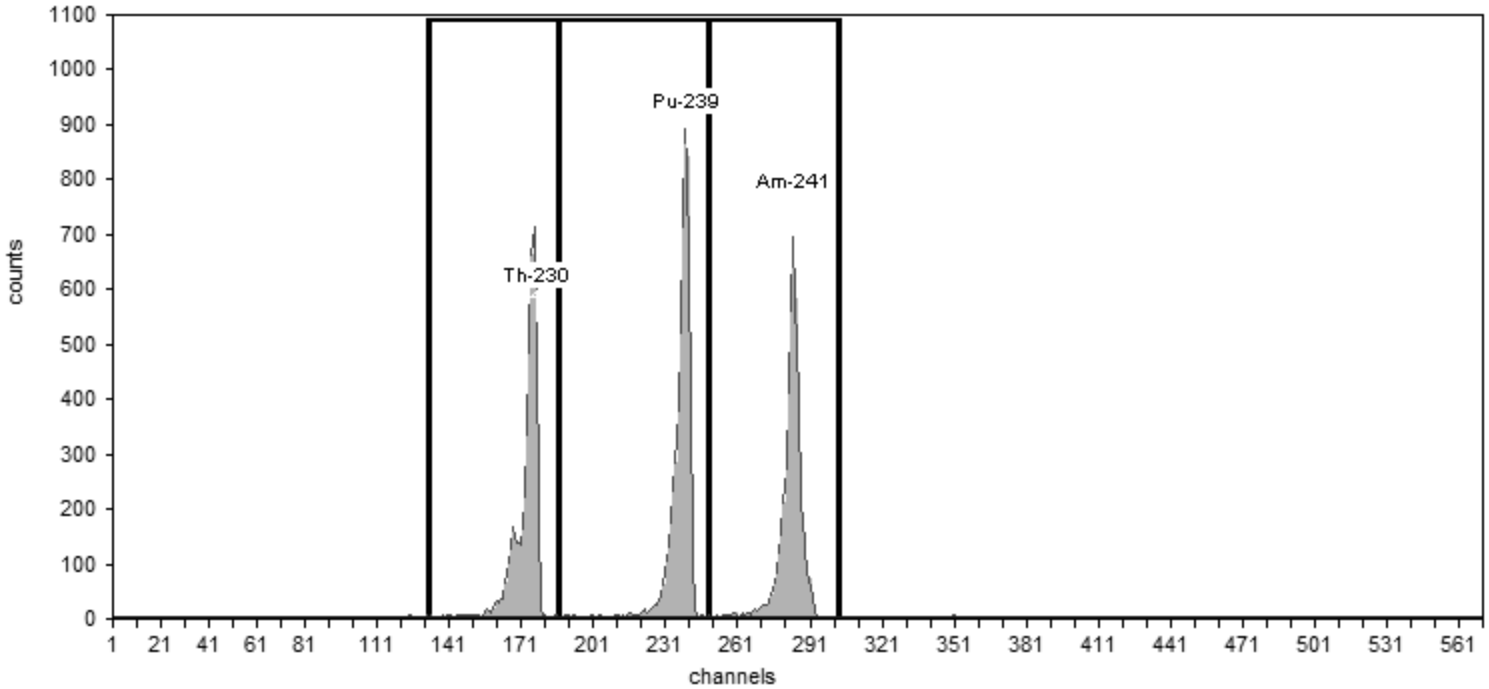
Detector: AV205 , SN: 49-155dd3
Acquisition Start Date: 9/6/2016 12:49:12PM

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

Efficiency Calibration Name: CCV-8875;AV205-201609(

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

Efficiency: 22.58% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.33	4,402.00	73.37
Pu-239	240	5,155.40	186	249	33.07	5,116.00	85.27
Am-241	284	5,485.70	249	303	35.24	4,512.00	75.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:29:42PM 9/6/2016

Calibration

Sample Name: CCV-9520;AV208-20160906
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 9/6/2016 12:29:41PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

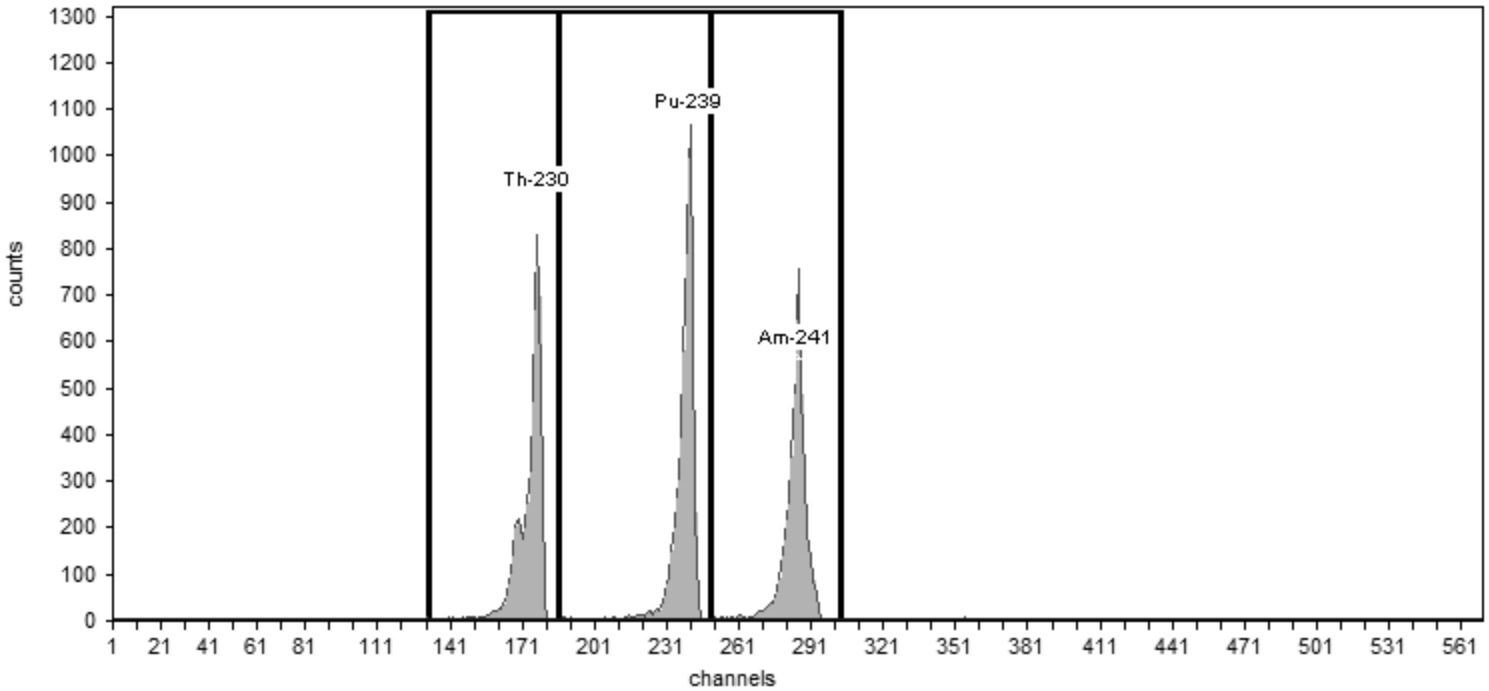
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 9/6/2016 11:23:04AM

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

Efficiency Calibration Name: CCV-9520;AV208-201609(

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

Efficiency: 25.19% +/- 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	30.34	5,123.00	85.38
Pu-239	240	5,155.40	186	249	33.98	6,148.00	102.47
Am-241	284	5,485.70	249	303	32.91	4,916.00	81.93

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:29:48PM 9/6/2016

Calibration

Sample Name: CCV-9792;AV209-20160906
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 9/6/2016 12:29:47PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

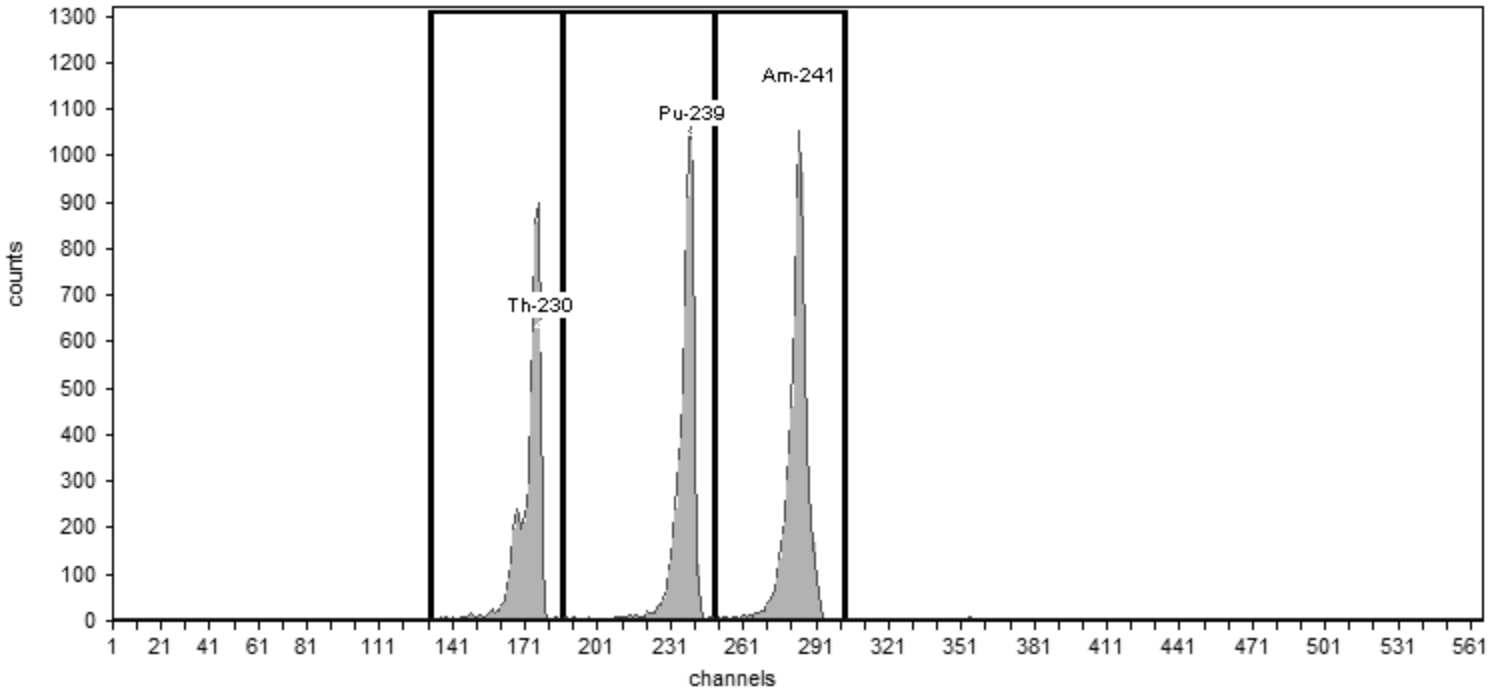
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 9/6/2016 11:23:23AM

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

Efficiency Calibration Name: CCV-9792;AV209-201609(

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

Efficiency: 25.24% +/- 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	33.36	5,733.00	95.55
Pu-239	240	5,155.40	186	249	33.25	6,494.00	108.23
Am-241	284	5,485.70	249	303	36.81	7,481.00	124.68

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:30AM 9/2/2016

Sample

Sample Name: ICB;AV148
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

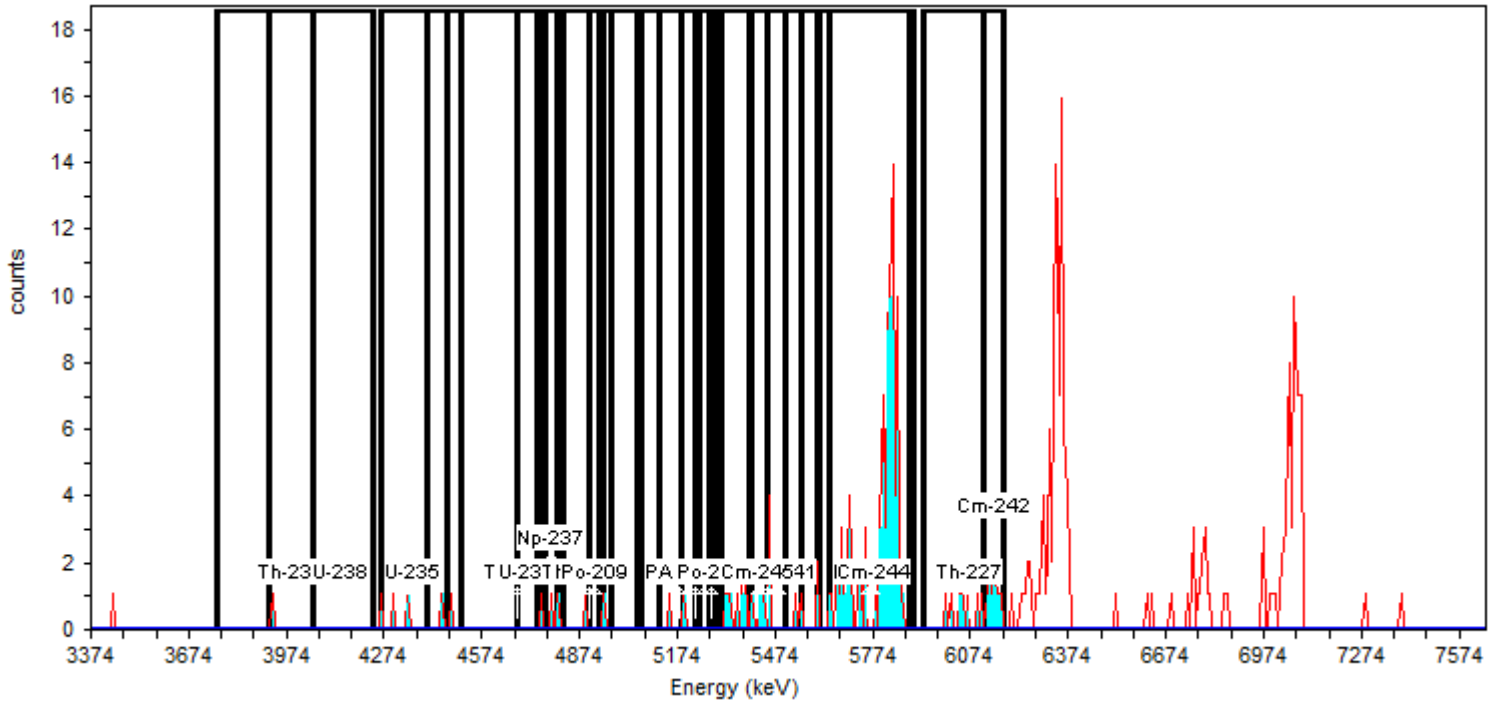
Batch Name: August2016
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 9/1/2016 3:17:27PM
Live Time: 960.00 min.
Real Time: 960.06 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: 304.00

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	4.00	4.167E-003	2.329E-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	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	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	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	10.00	1.042E-002	3.455E-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	19.00	1.979E-002	4.658E-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	87.00	9.062E-002	9.772E-003
Cm-244	5,775.74	5,641.51	5,902.52	87.00	9.062E-002	9.772E-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	9.00	9.375E-003	3.294E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:40AM 9/2/2016

Sample

Sample Name: ICB;AV149
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

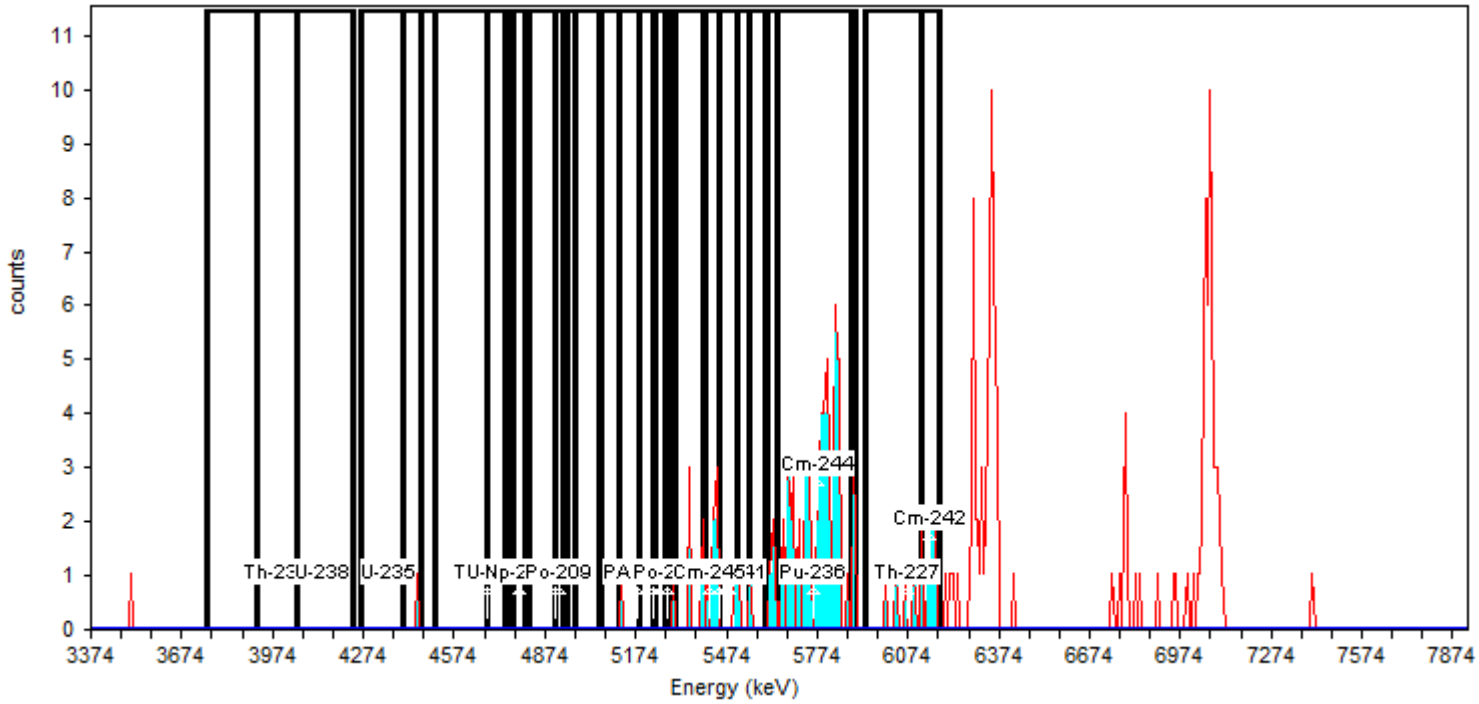
Batch Name: August2016
Description:

Acquisition

Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 9/1/2016 3:17:27PM
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: 229.00

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	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	18.00	1.875E-002	4.541E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	69.00	7.188E-002	8.715E-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	12.00	1.250E-002	3.756E-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
7:19:42AM 9/2/2016

Sample

Sample Name: ICB;AV150
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

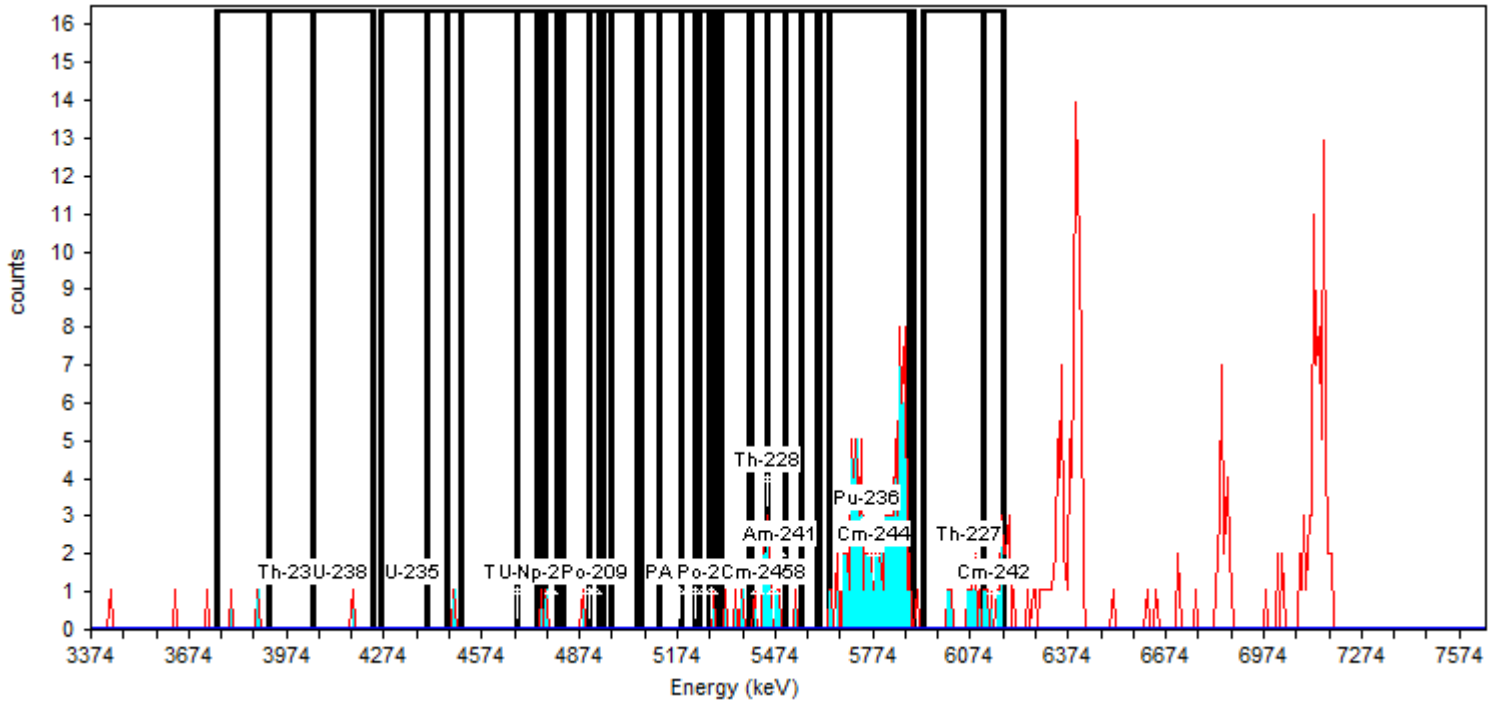
Batch Name: August2016
Description:

Acquisition

Detector: AV150 , SN: 50-05/R4
Acquisition Start Date: 9/1/2016 3:17:27PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8876;AV150-20151016
Calibration Date: 10/16/2015 6:46:46PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 318.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	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	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	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	4.00	4.167E-003	2.329E-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	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	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	91.00	9.479E-002	9.991E-003
Cm-244	5,775.74	5,641.51	5,902.52	91.00	9.479E-002	9.991E-003
Th-227	6,074.04	5,932.35	6,178.45	18.00	1.875E-002	4.541E-003
Cm-242	6,148.62	6,118.79	6,178.45	10.00	1.042E-002	3.455E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:51AM 9/2/2016

Sample

Sample Name: ICB;AV153
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

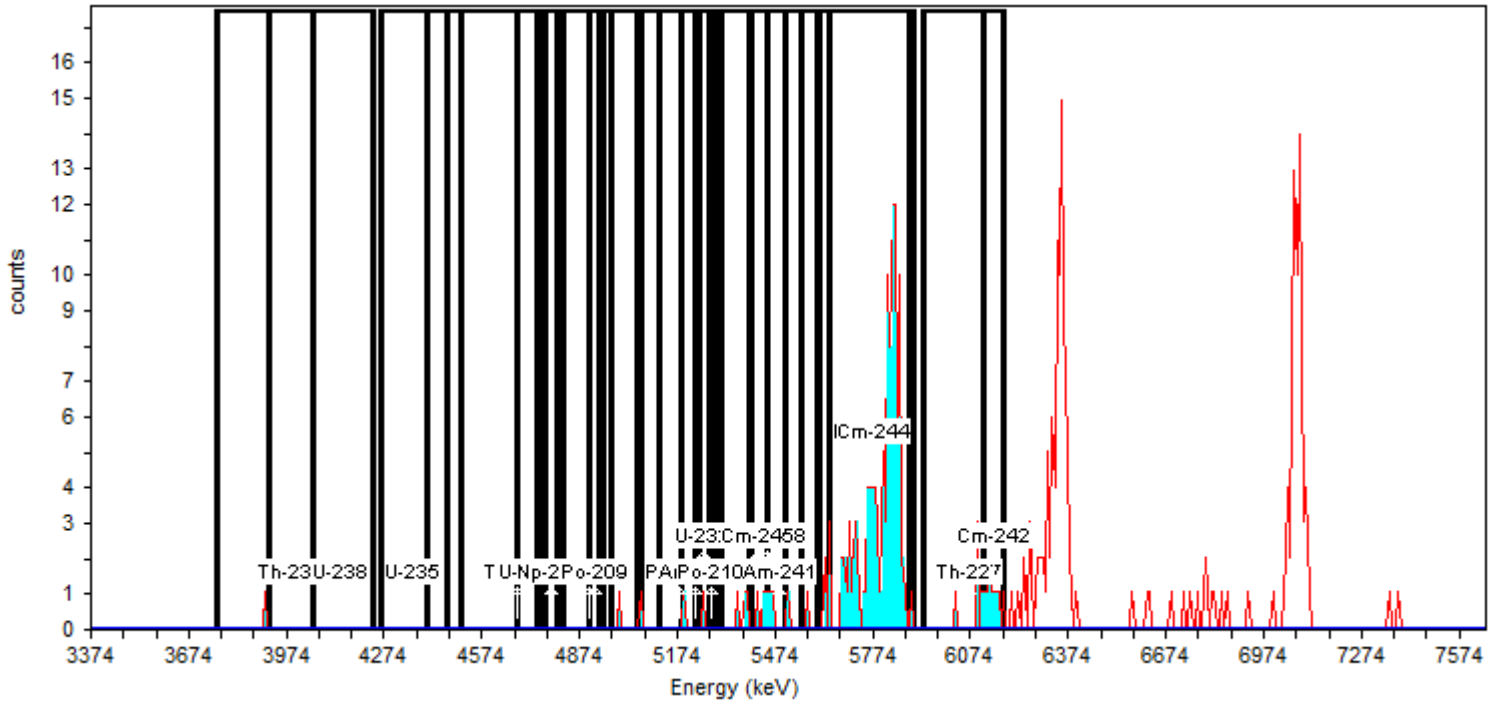
Batch Name: August2016
Description:

Acquisition

Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 9/1/2016 3:17:07PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9792;AV153-20151016
Calibration Date: 10/16/2015 6:46:57PM

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: 315.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	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	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	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	10.00	1.042E-002	3.455E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	3.00	3.125E-003	2.083E-003
Pu-236	5,760.83	5,611.67	5,887.60	111.00	1.156E-001	1.102E-002
Cm-244	5,775.74	5,641.51	5,902.52	110.00	1.146E-001	1.097E-002
Th-227	6,074.04	5,932.35	6,178.45	14.00	1.458E-002	4.034E-003
Cm-242	6,148.62	6,118.79	6,178.45	9.00	9.375E-003	3.294E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:20AM 9/2/2016

Sample

Sample Name: ICB;AV171
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

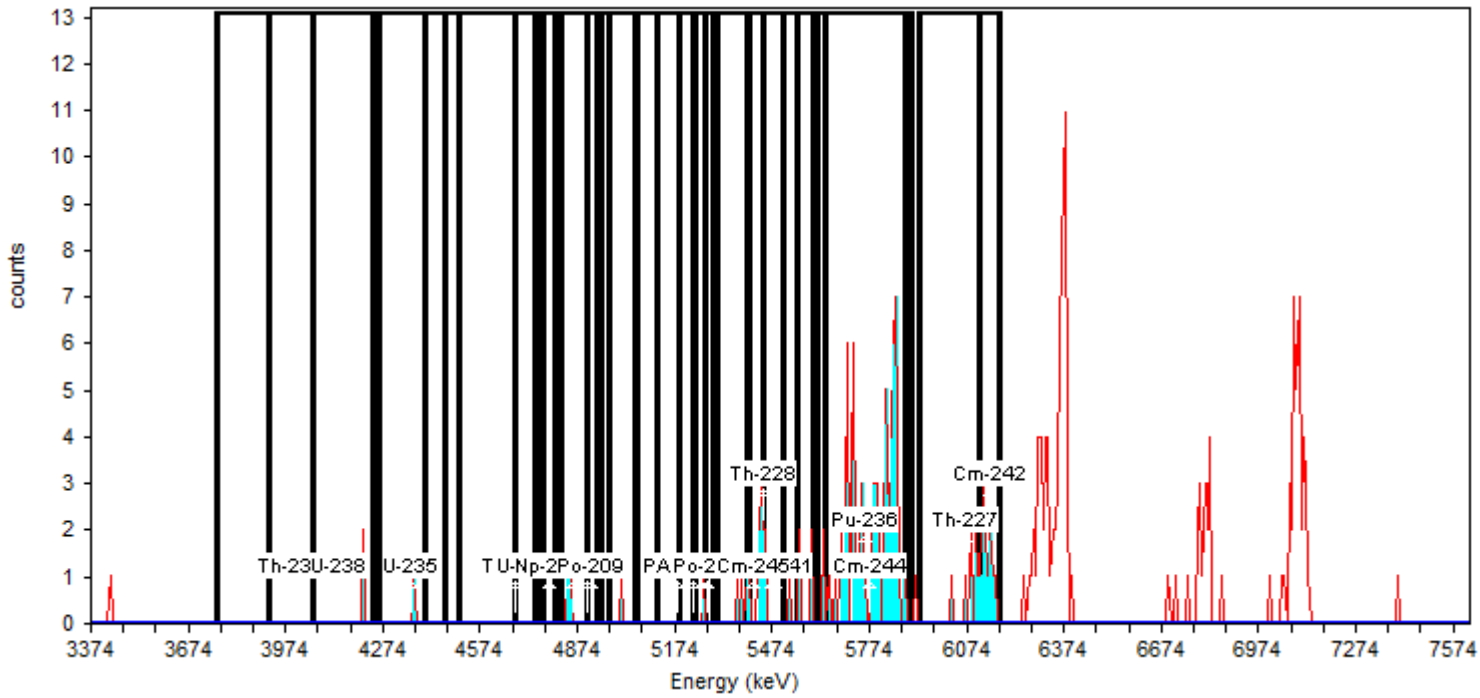
Batch Name: August2016
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 9/1/2016 3:17:13PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV171-20151016
Calibration Date: 10/17/2015 2:36:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 228.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	5.00	5.208E-003	2.552E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	65.00	6.771E-002	8.463E-003
Cm-244	5,775.74	5,641.51	5,902.52	63.00	6.563E-002	8.333E-003
Th-227	6,074.04	5,932.35	6,178.45	18.00	1.875E-002	4.541E-003
Cm-242	6,148.62	6,118.79	6,178.45	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:21AM 9/2/2016

Sample

Sample Name: ICB;AV172
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

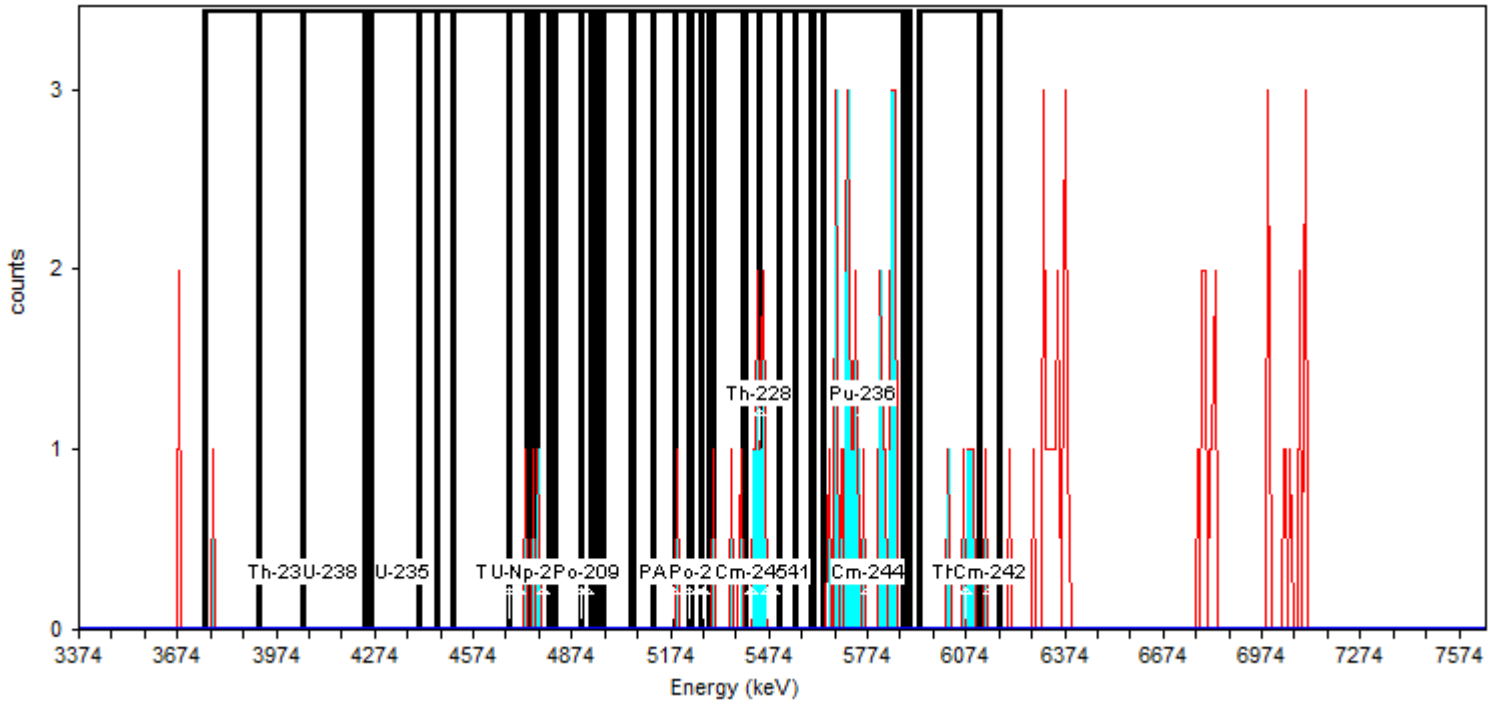
Batch Name: August2016
Description:

Acquisition

Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9884;AV172-20151016
Calibration Date: 10/17/2015 2:36:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 89.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	5.00	5.208E-003	2.552E-003
Pu-236	5,760.83	5,611.67	5,887.60	27.00	2.812E-002	5.512E-003
Cm-244	5,775.74	5,641.51	5,902.52	27.00	2.812E-002	5.512E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:52AM 9/2/2016

Sample

Sample Name: ICB;AV188
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

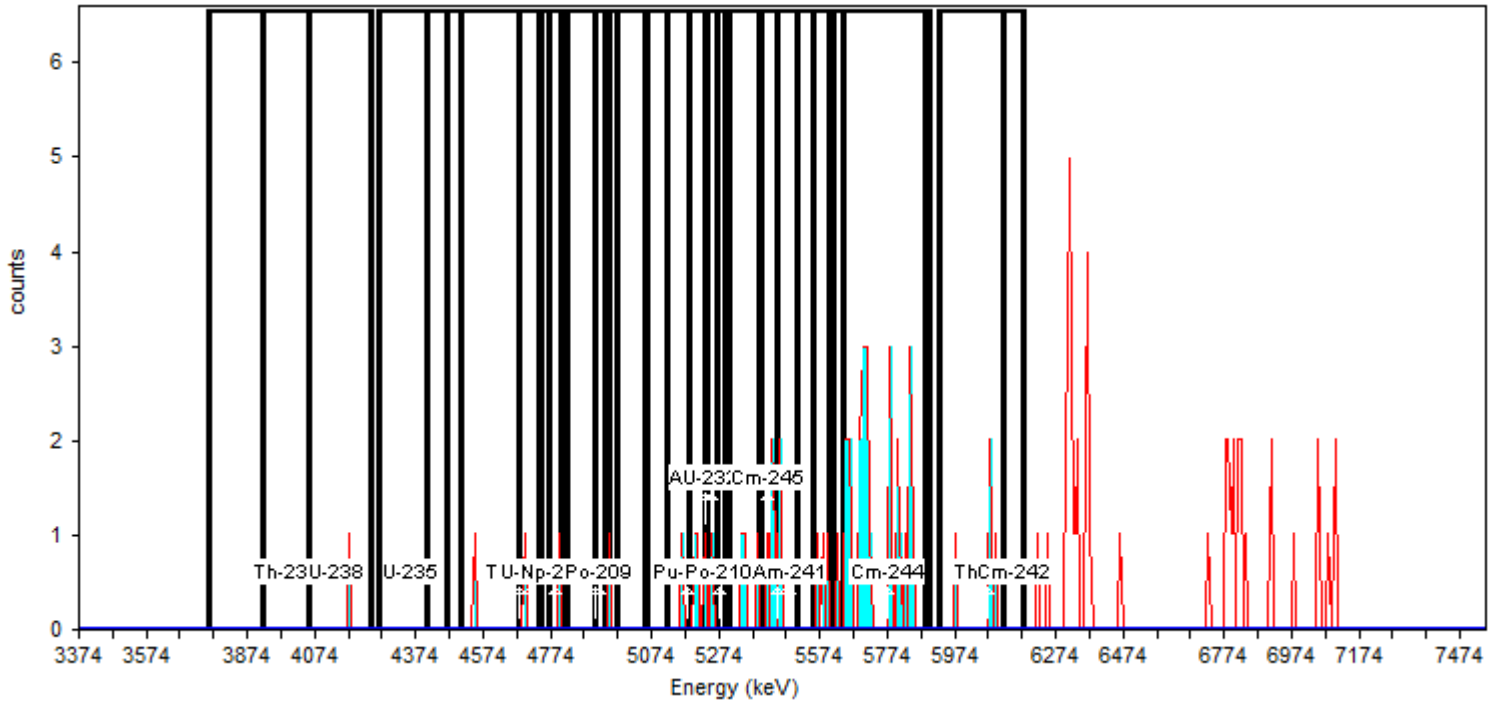
Batch Name: August2016
Description:

Acquisition

Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.06 min.
Calibration Name: IC-9886;AV188-20151017
Calibration Date: 10/17/2015 6:02:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 102.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	12.00	1.250E-002	3.756E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	30.00	3.125E-002	5.800E-003
Cm-244	5,775.74	5,641.51	5,902.52	29.00	3.021E-002	5.705E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:47AM 9/2/2016

Sample

Sample Name: ICB;AV189
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

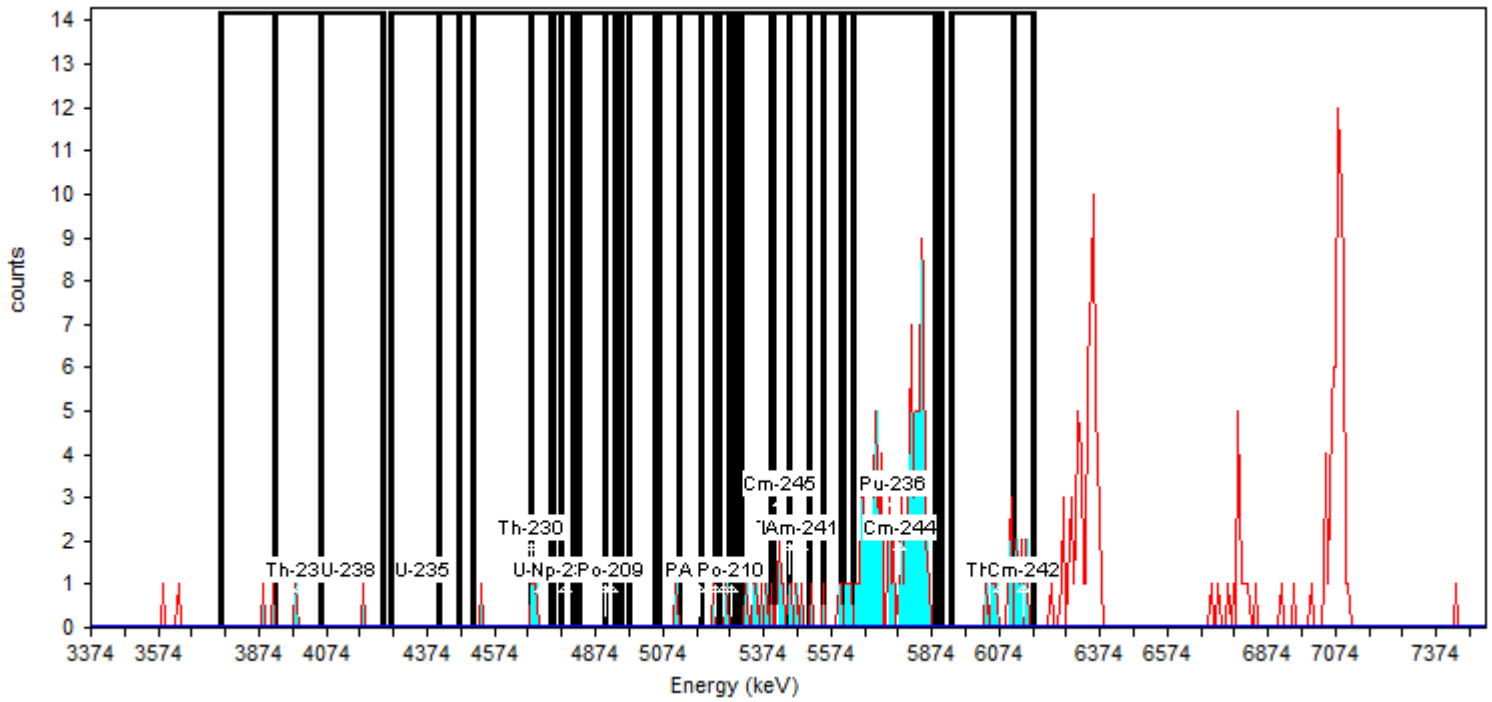
Batch Name: August2016
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-7107;AV189-20151017a
Calibration Date: 10/18/2015 3:55:37PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 265.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	3.00	3.125E-003	2.083E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	88.00	9.167E-002	9.827E-003
Cm-244	5,775.74	5,641.51	5,902.52	85.00	8.854E-002	9.660E-003
Th-227	6,074.04	5,932.35	6,178.45	16.00	1.667E-002	4.295E-003
Cm-242	6,148.62	6,118.79	6,178.45	7.00	7.292E-003	2.946E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:51AM 9/2/2016

Sample

Sample Name: ICB;AV190
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

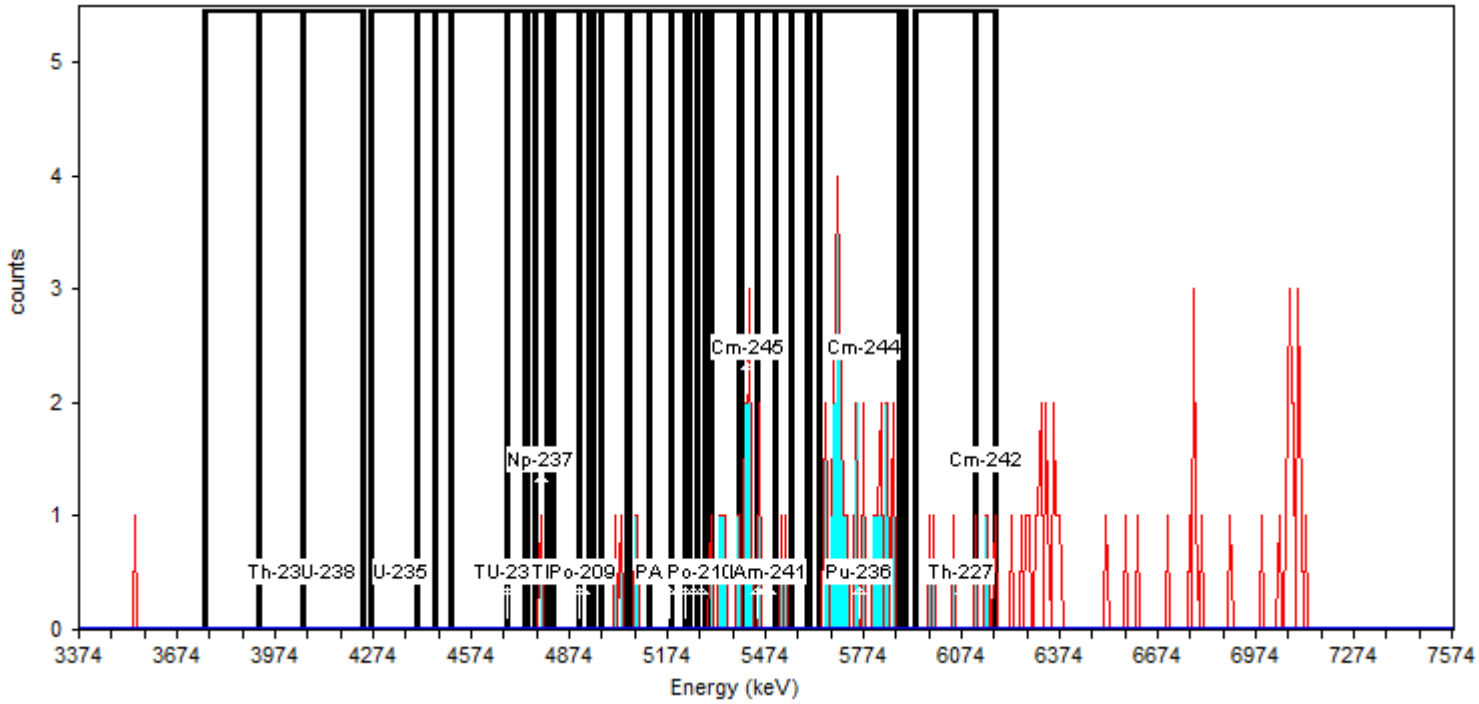
Batch Name: August2016
Description:

Acquisition

Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 9/1/2016 3:17:12PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV190-20151017
Calibration Date: 10/18/2015 3:54:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 105.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	5.00	5.208E-003	2.552E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	18.00	1.875E-002	4.541E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	32.00	3.333E-002	5.984E-003
Cm-244	5,775.74	5,641.51	5,902.52	32.00	3.333E-002	5.984E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:50AM 9/2/2016

Sample

Sample Name: ICB;AV191
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

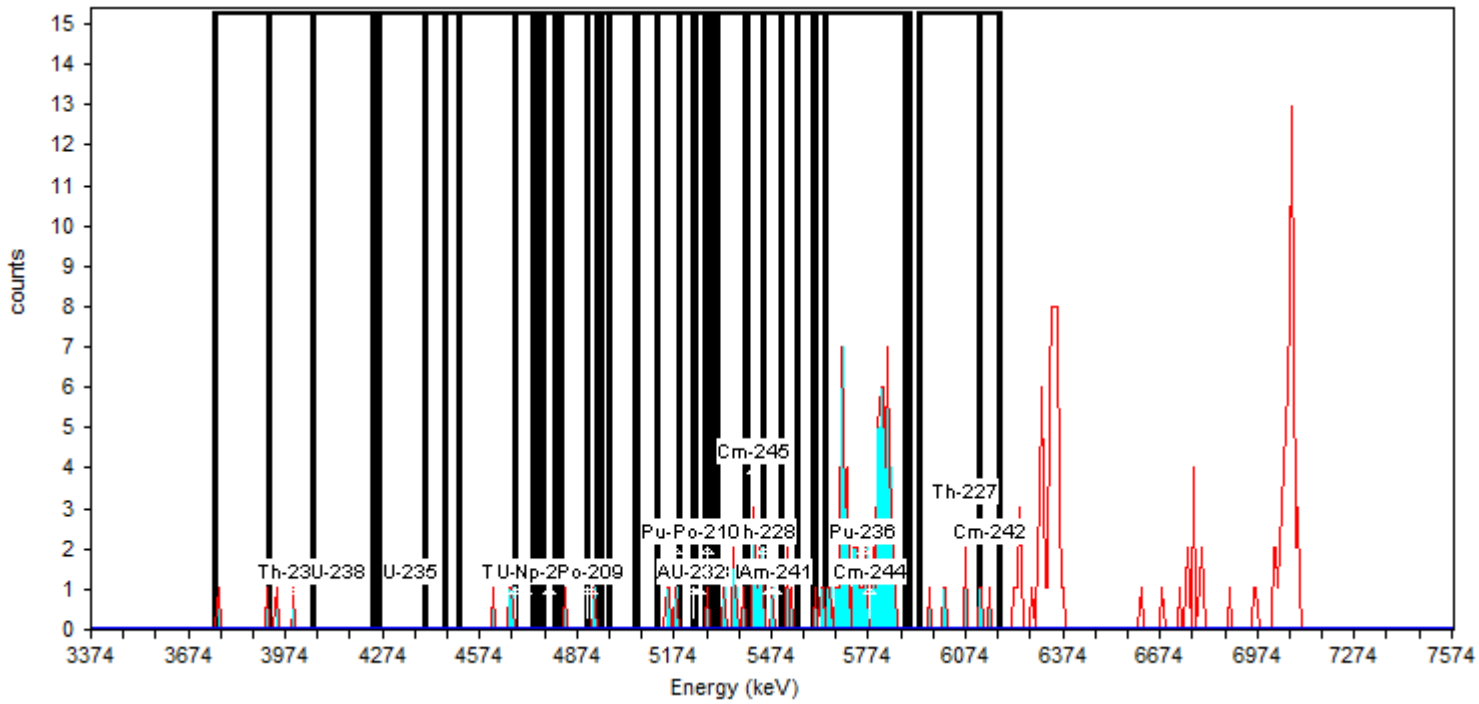
Batch Name: August2016
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 9/1/2016 3:17:13PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV191-20151017
Calibration Date: 10/18/2015 3:55:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 231.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	4.00	4.167E-003	2.329E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	71.00	7.396E-002	8.839E-003
Cm-244	5,775.74	5,641.51	5,902.52	68.00	7.083E-002	8.653E-003
Th-227	6,074.04	5,932.35	6,178.45	8.00	8.333E-003	3.125E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:02AM 9/2/2016

Sample

Sample Name: ICB;AV193
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

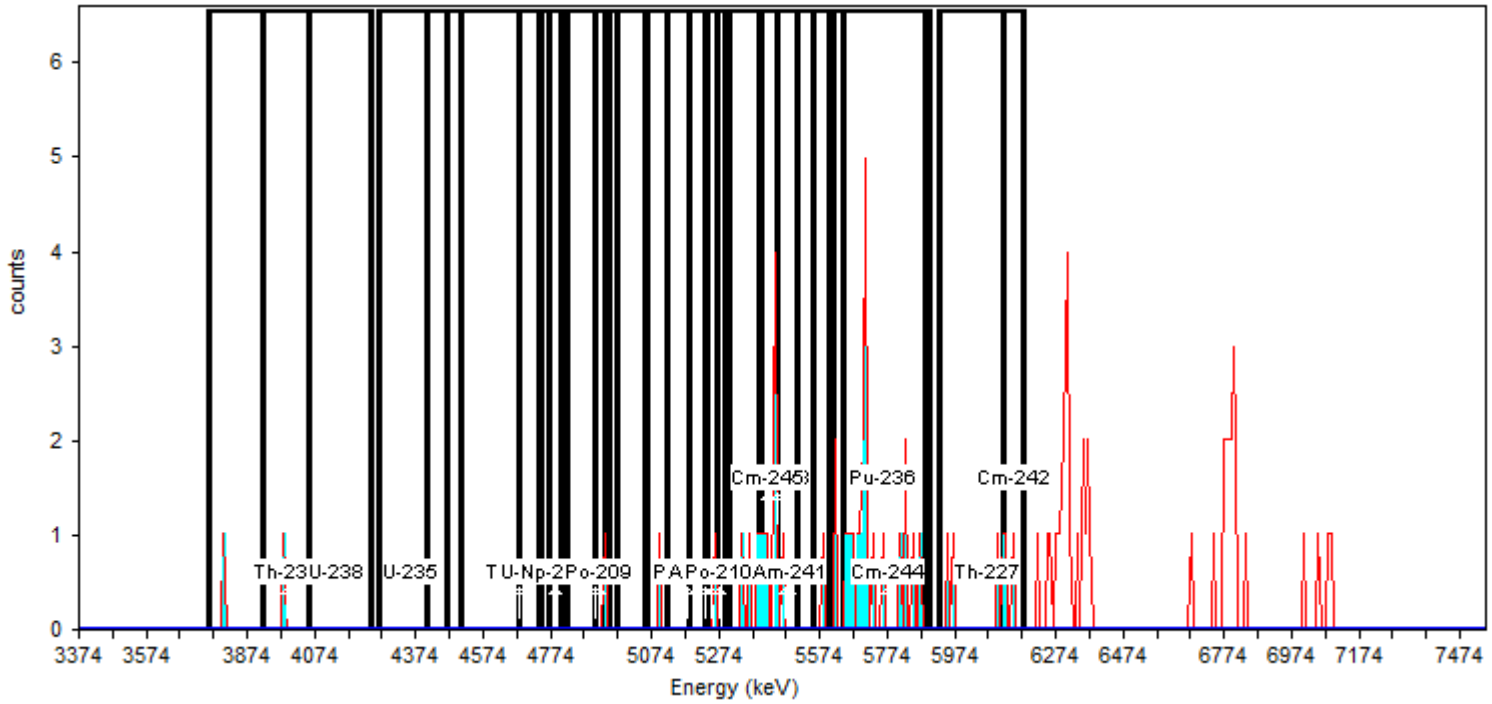
Batch Name: August2016
Description:

Acquisition

Detector: AV193 , SN: 50-119I5
Acquisition Start Date: 9/1/2016 3:17:13PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV193-20151017
Calibration Date: 10/18/2015 3:55:11PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 91.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	23.00	2.396E-002	5.103E-003
Cm-244	5,775.74	5,641.51	5,902.52	21.00	2.188E-002	4.886E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:01AM 9/2/2016

Sample

Sample Name: ICB;AV195
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

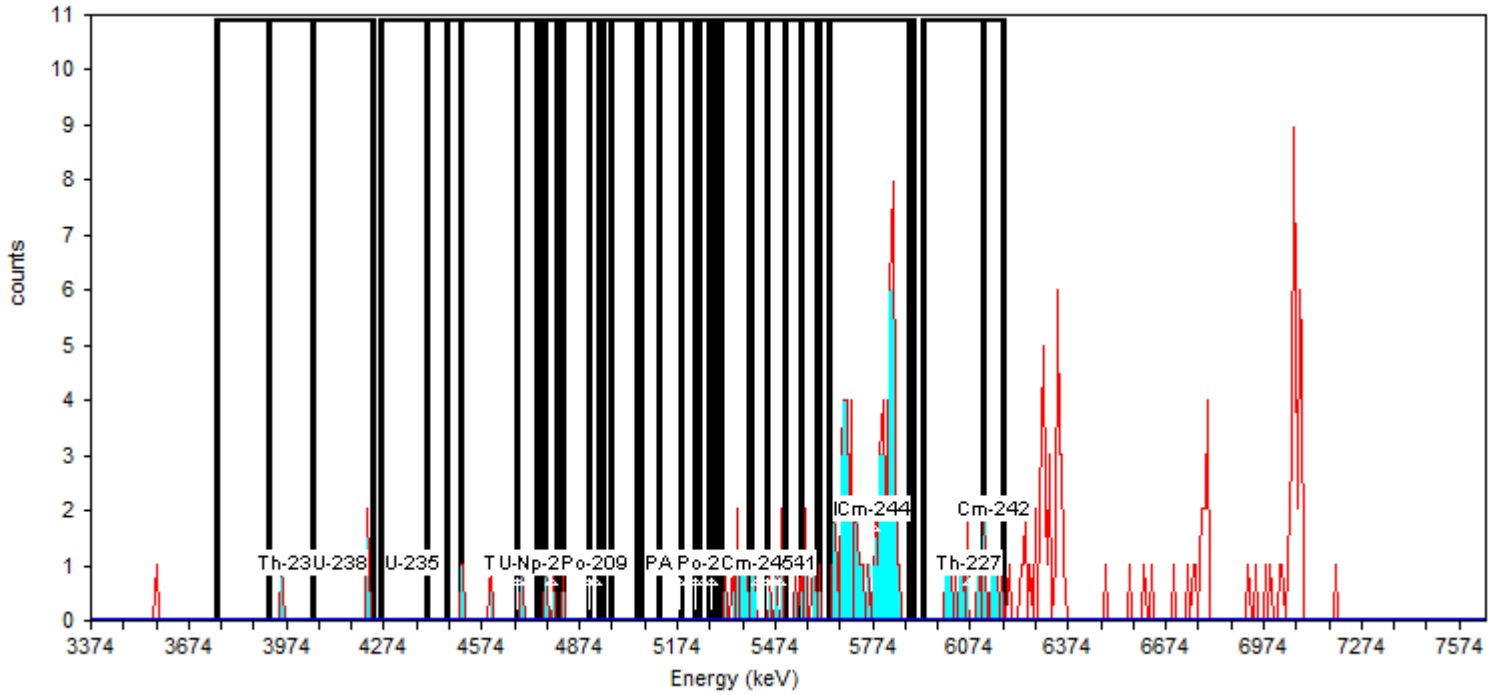
Batch Name: August2016
Description:

Acquisition

Detector: AV195 , SN: 50-117AA2
Acquisition Start Date: 9/1/2016 3:17:13PM
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: 195.00

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	4.00	4.167E-003	2.329E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	7.00	7.292E-003	2.946E-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	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	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	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	15.00	1.563E-002	4.167E-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	2.00	2.083E-003	1.804E-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	60.00	6.250E-002	8.136E-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	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
2:56:33AM 9/3/2016

Sample

Sample Name: ICB;AV198
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

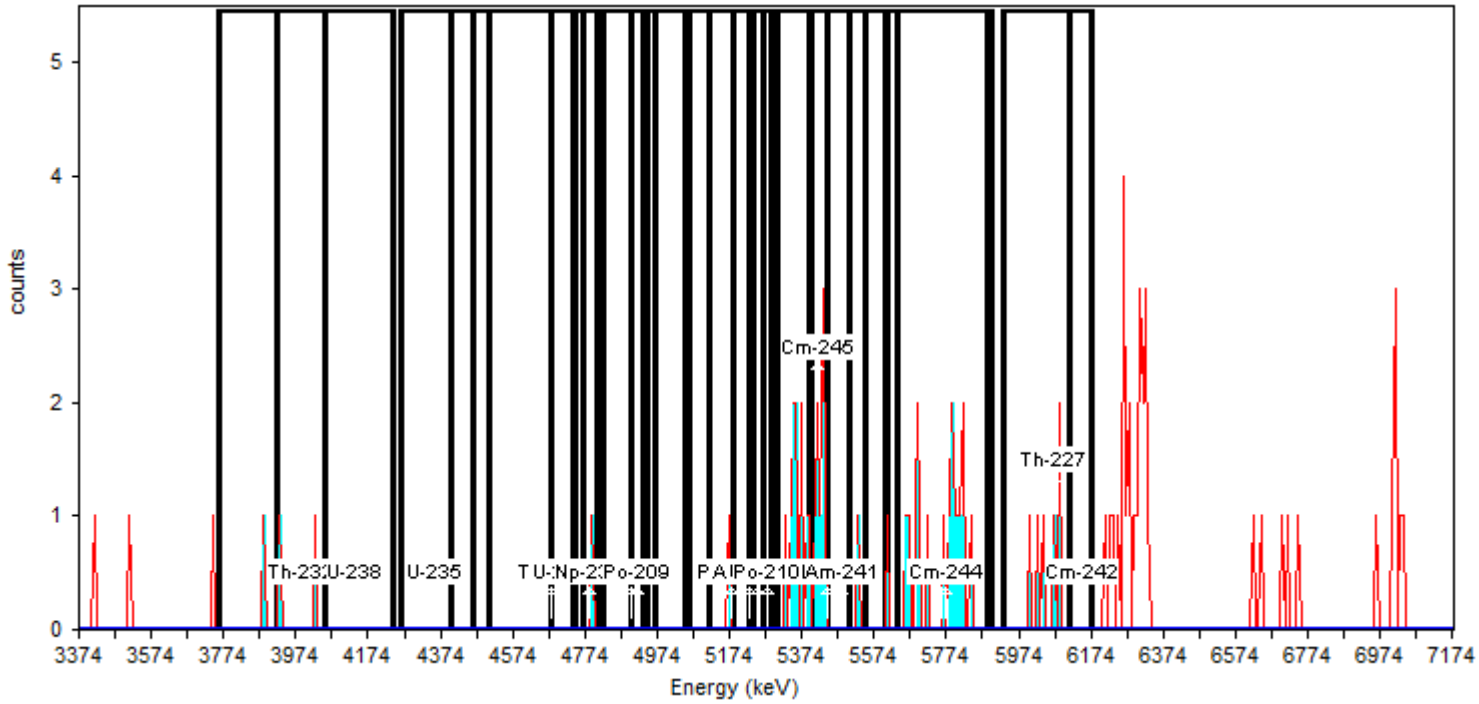
Batch Name: August2016a
Description:

Acquisition

Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 9/2/2016 10:55:26AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: CCV-9795;AV198-20151122
Calibration Date: 11/22/2015 4:27:37PM

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: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	3.00	3.125E-003	2.083E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	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	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	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	11.00	1.146E-002	3.608E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	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	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	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:16AM 9/2/2016

Sample

Sample Name: ICB;AV199
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

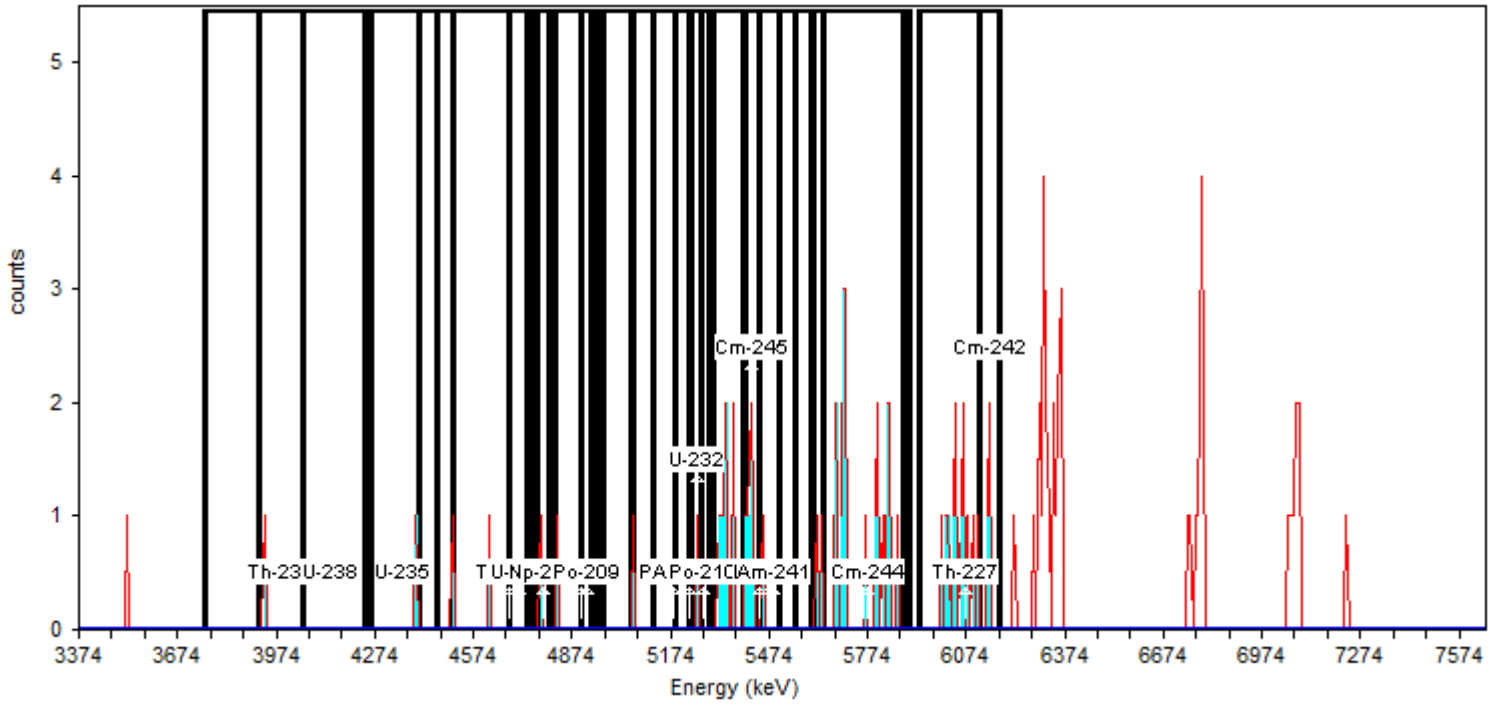
Batch Name: August2016
Description:

Acquisition

Detector: AV199 , SN: 50-117Z3
Acquisition Start Date: 9/1/2016 3:17:14PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV199-20151017
Calibration Date: 10/18/2015 3:55:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 98.00

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	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	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	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	13.00	1.354E-002	3.898E-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	21.00	2.188E-002	4.886E-003
Cm-244	5,775.74	5,641.51	5,902.52	19.00	1.979E-002	4.658E-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	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:56:37AM 9/3/2016

Sample

Sample Name: ICB;AV200
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

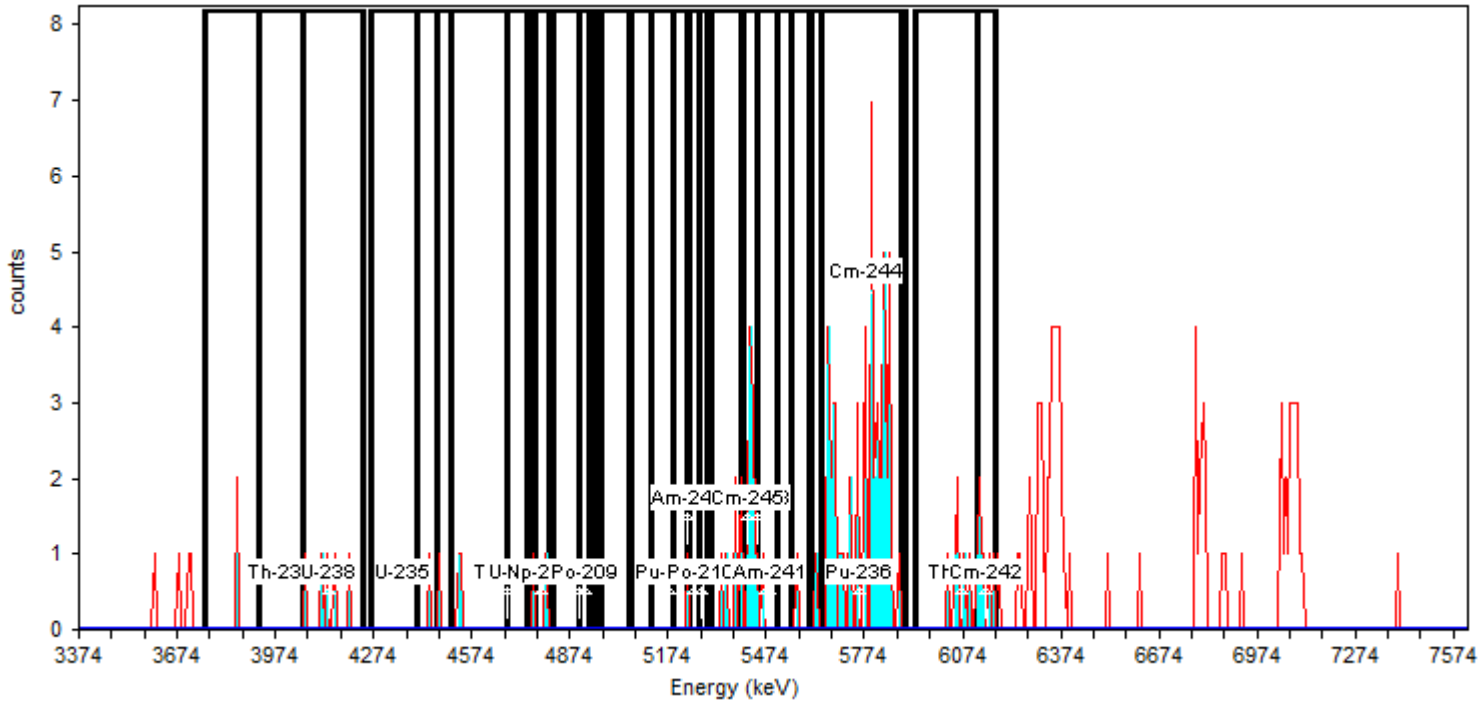
Batch Name: August2016a
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 9/2/2016 10:55:26AM
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: 181.00

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	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	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	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-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	17.00	1.771E-002	4.419E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	12.00	1.250E-002	3.756E-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	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
7:19:23AM 9/2/2016

Sample

Sample Name: ICB;AV201
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

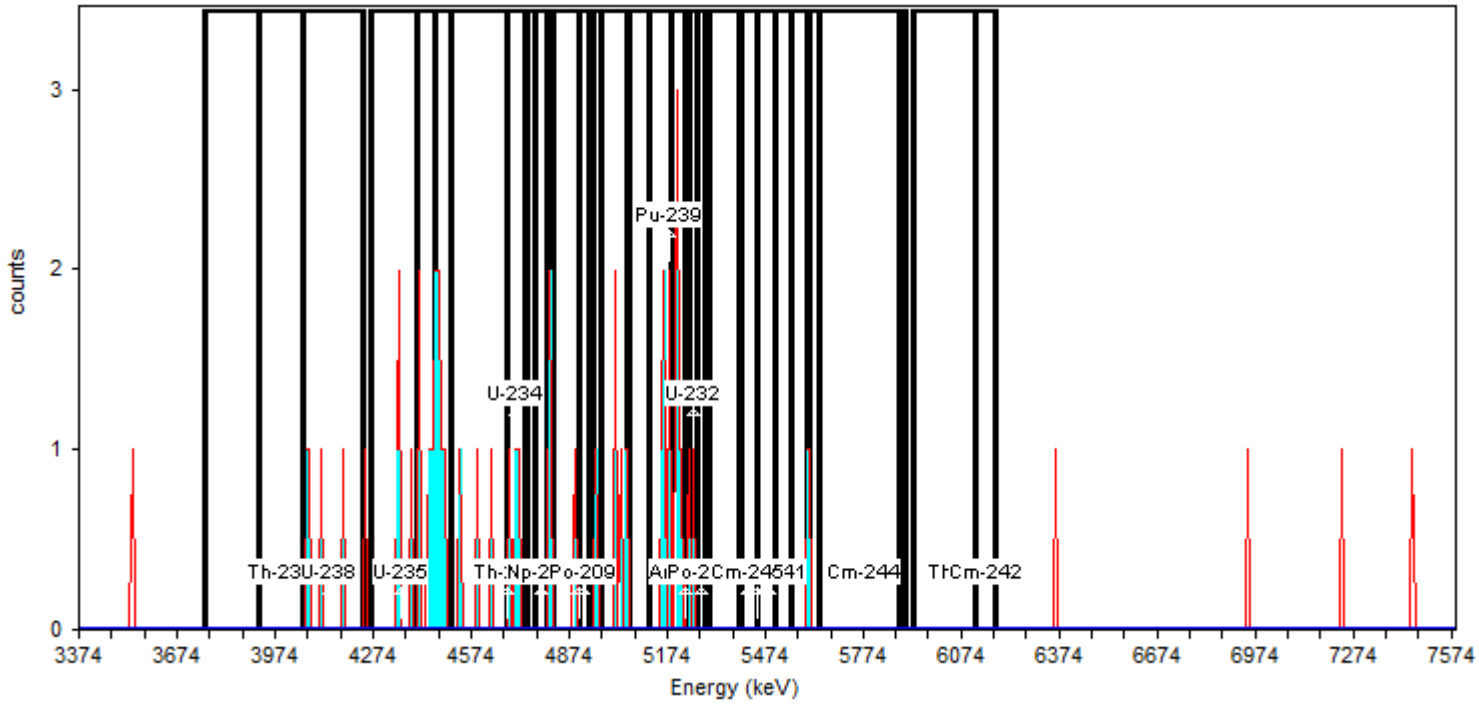
Batch Name: August2016
Description:

Acquisition

Detector: AV201 , SN: 50-117i5
Acquisition Start Date: 9/1/2016 3:17:15PM
Live Time: 960.00 min.
Real Time: 960.07 min.
Calibration Name: IC-9885;AV201-20151017b
Calibration Date: 10/18/2015 3:55:49PM

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: 55.00

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	4.00	4.167E-003	2.329E-003
U-235	4,358.81	4,261.86	4,463.21	11.00	1.146E-002	3.608E-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	8.00	8.333E-003	3.125E-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	9.00	9.375E-003	3.294E-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	16.00	1.667E-002	4.295E-003
Am-243	5,231.34	5,052.36	5,305.92	13.00	1.354E-002	3.898E-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	7.00	7.292E-003	2.946E-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	0.00	0.000E+000	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	1.00	1.042E-003	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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:21AM 9/2/2016

Sample

Sample Name: ICB;AV203
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

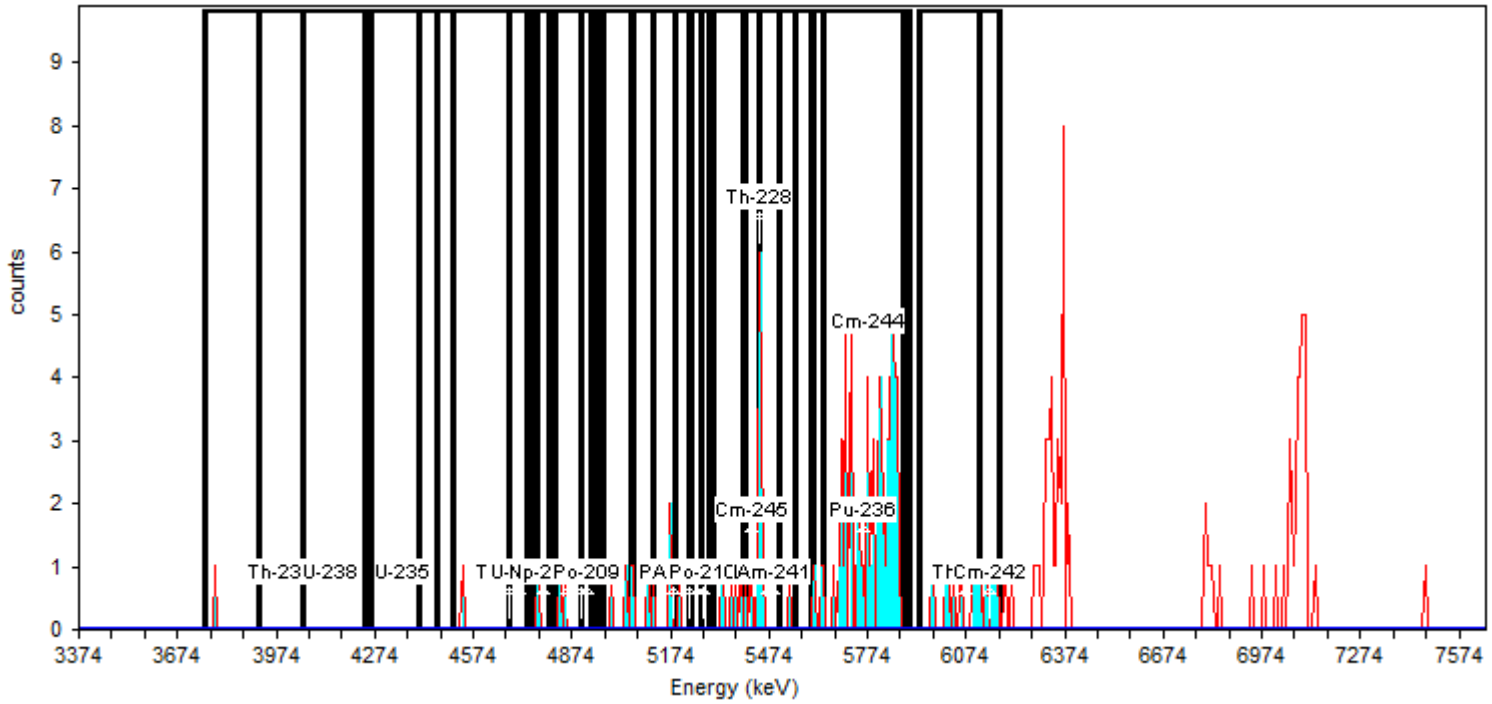
Batch Name: August2016
Description:

Acquisition

Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 9/1/2016 3:17:15PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-7107;AV203-20151018a
Calibration Date: 10/18/2015 6:42:12PM

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	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	9.00	9.375E-003	3.294E-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	9.00	9.375E-003	3.294E-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	12.00	1.250E-002	3.756E-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	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	16.00	1.667E-002	4.295E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	60.00	6.250E-002	8.136E-003
Cm-244	5,775.74	5,641.51	5,902.52	58.00	6.042E-002	8.001E-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	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
2:56:42AM 9/3/2016

Sample

Sample Name: ICB;AV204
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

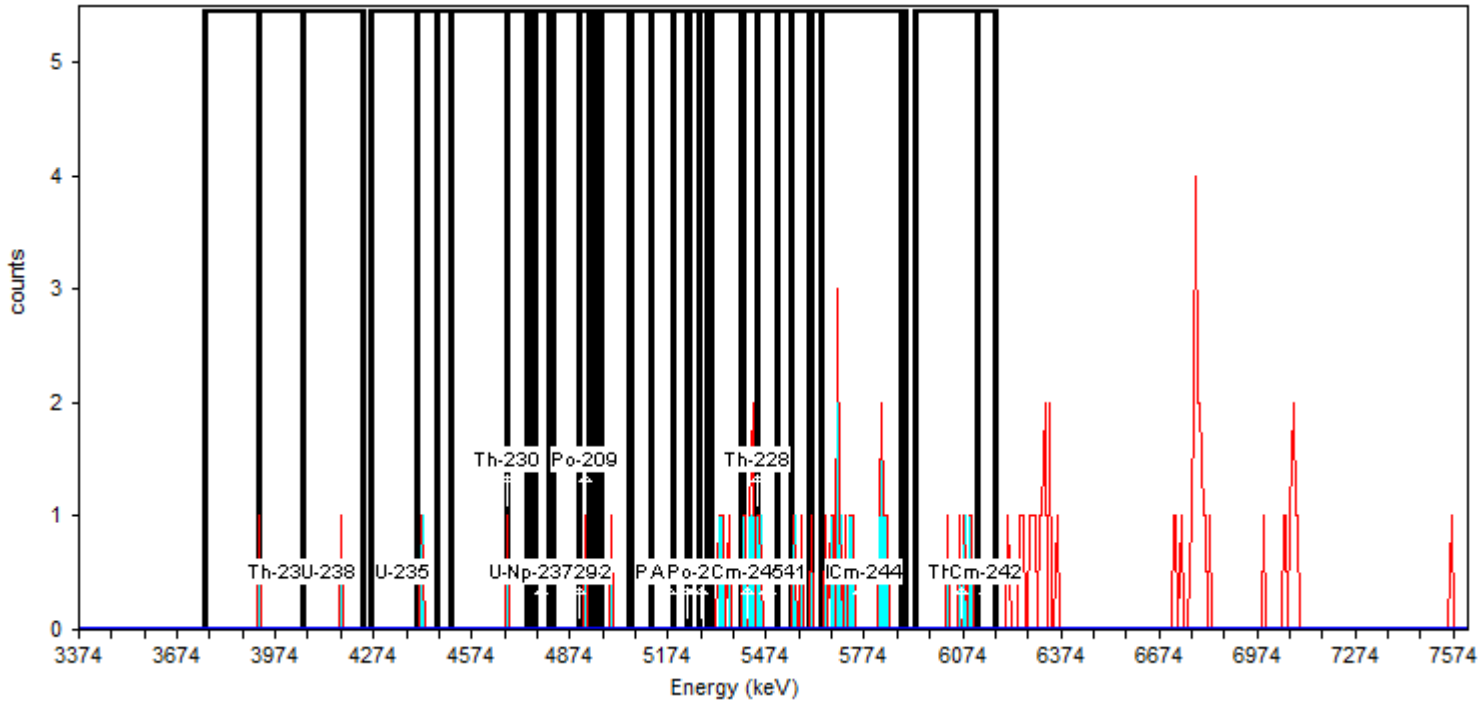
Batch Name: August2016a
Description:

Acquisition

Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 9/2/2016 10:55:27AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV204-20151018a
Calibration Date: 10/18/2015 6:42:20PM

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: 79.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	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	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	0.00	0.000E+000	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	5.00	5.208E-003	2.552E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	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	16.00	1.667E-002	4.295E-003
Cm-244	5,775.74	5,641.51	5,902.52	15.00	1.563E-002	4.167E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:36AM 9/2/2016

Sample

Sample Name: ICB;AV205
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

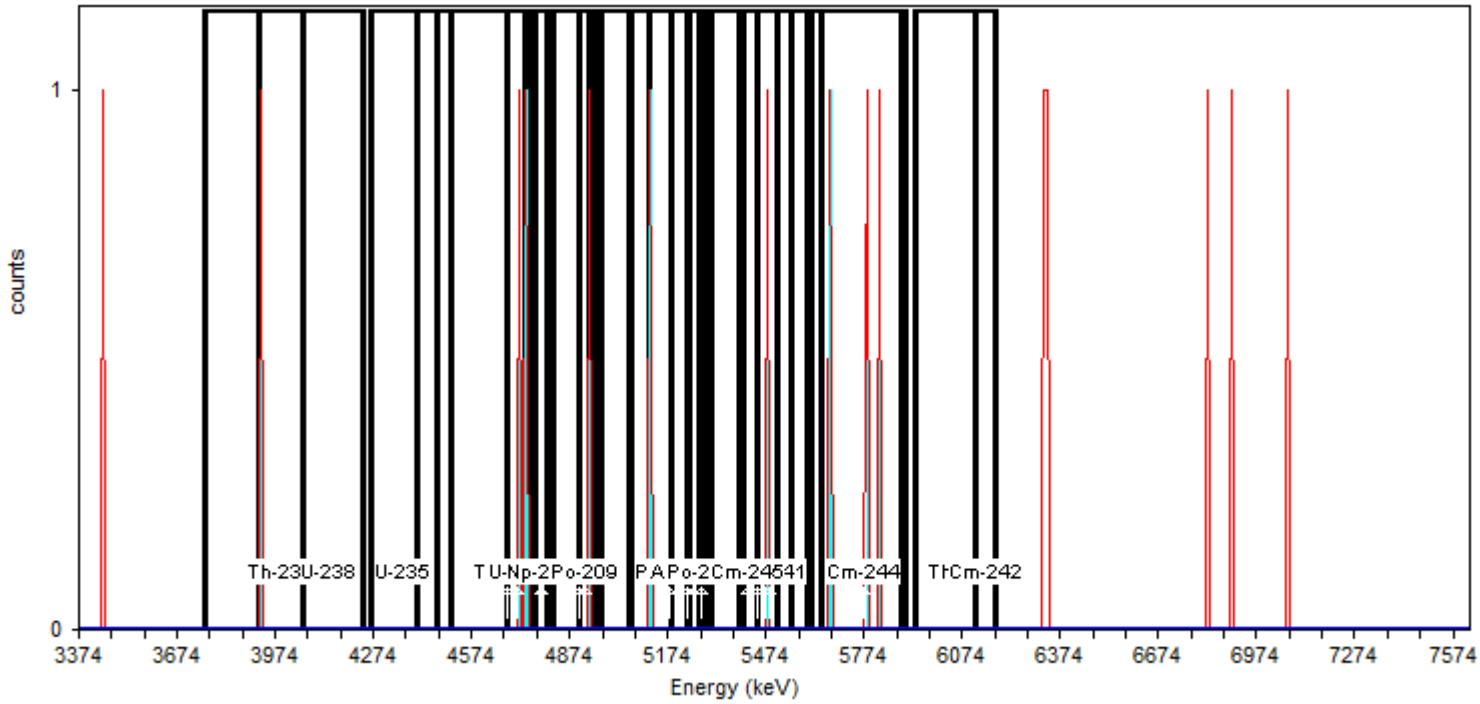
Batch Name: August2016
Description:

Acquisition

Detector: AV205 , SN: 49-155dd3
Acquisition Start Date: 9/1/2016 3:17:16PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV205-20151018a
Calibration Date: 10/18/2015 6:42:32PM

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: 15.00

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	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	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	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	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	1.00	1.042E-003	1.473E-003
Th-228	5,447.61	5,186.59	5,507.27	1.00	1.042E-003	1.473E-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	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	3.00	3.125E-003	2.083E-003
Cm-244	5,775.74	5,641.51	5,902.52	3.00	3.125E-003	2.083E-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
2:57:15AM 9/3/2016

Sample

Sample Name: ICB;AV208
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

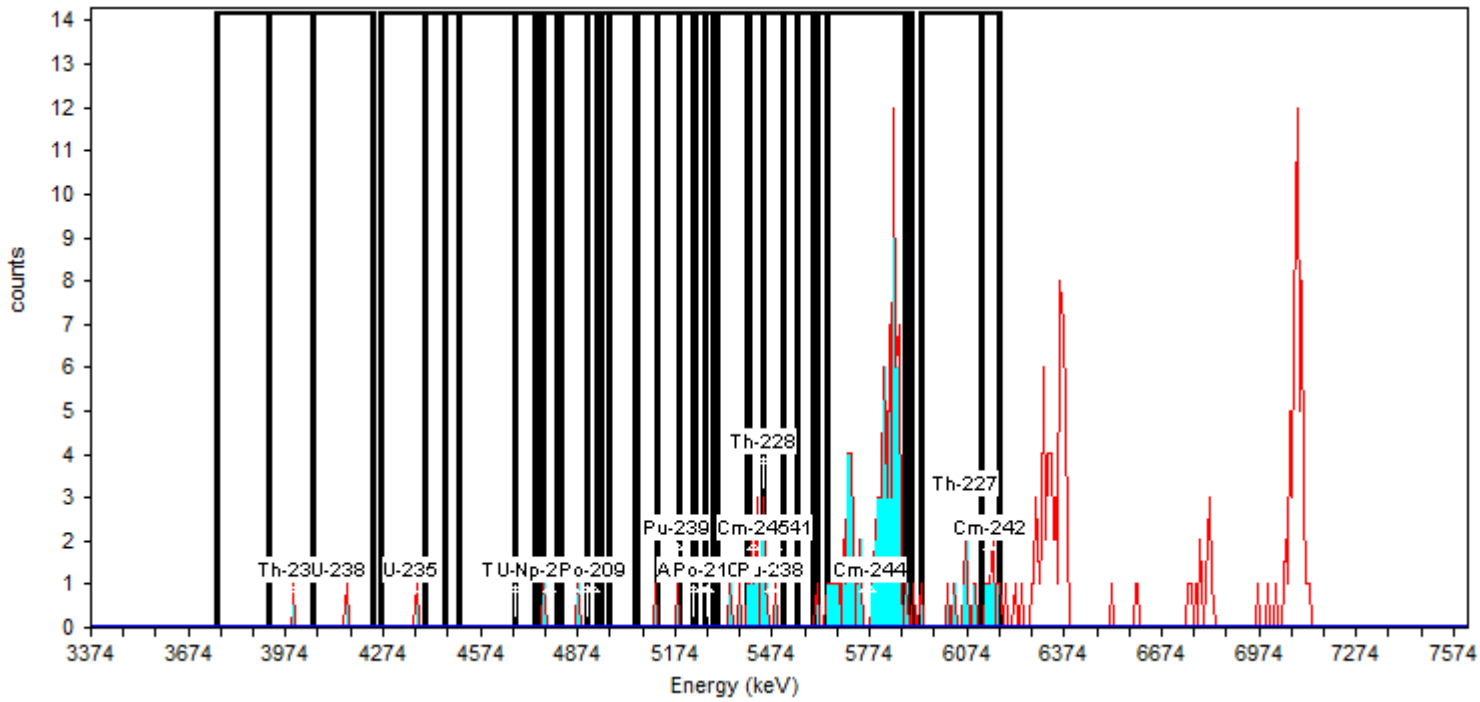
Batch Name: August2016a
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 9/2/2016 10:55:28AM
Live Time: 960.00 min.
Real Time: 960.00 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: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 242.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	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	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	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-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	17.00	1.771E-002	4.419E-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	81.00	8.438E-002	9.433E-003
Cm-244	5,775.74	5,641.51	5,902.52	80.00	8.333E-002	9.375E-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	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
7:20:33AM 9/2/2016

Sample

Sample Name: ICB;AV209
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

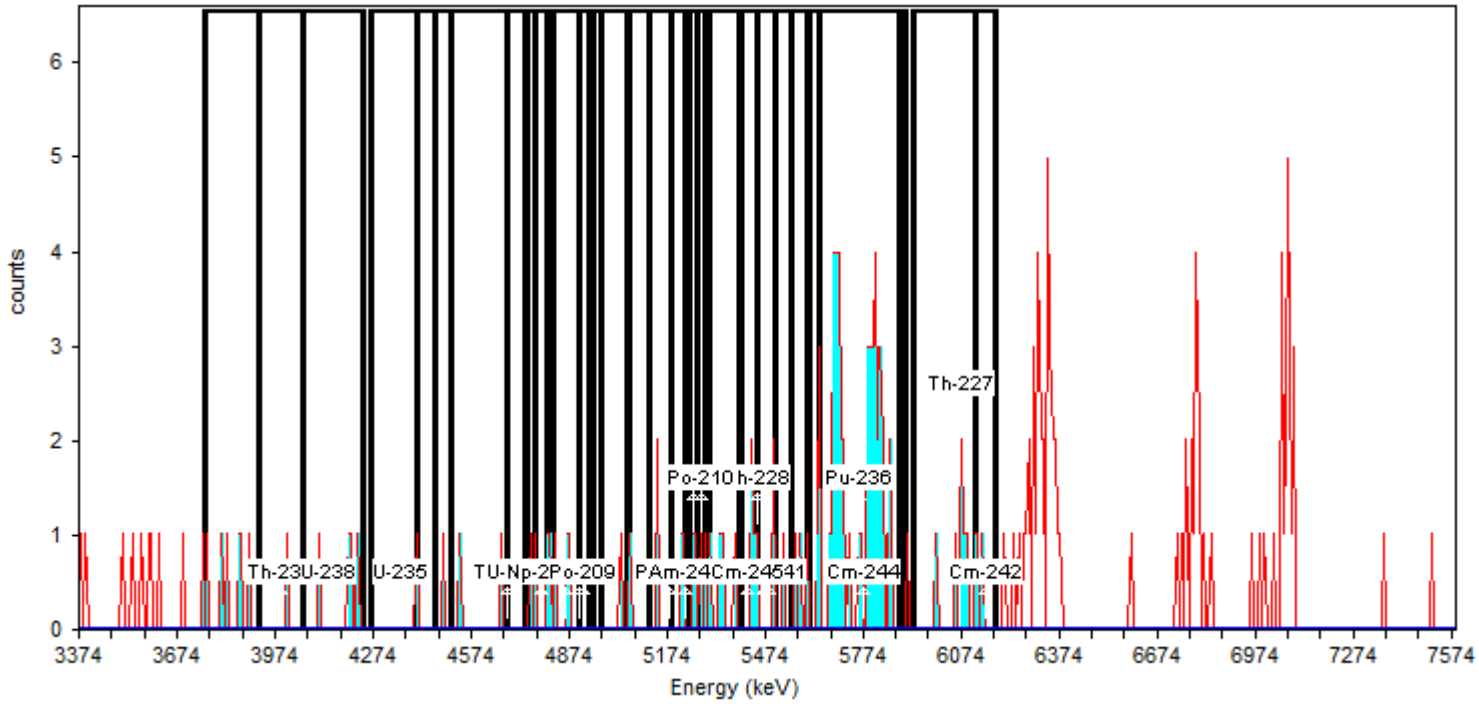
Batch Name: August2016
Description:

Acquisition

Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 9/1/2016 3:17:16PM
Live Time: 960.00 min.
Real Time: 960.16 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: 185.00

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	7.00	7.292E-003	2.946E-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	4.00	4.167E-003	2.329E-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	7.00	7.292E-003	2.946E-003
Th-229	4,858.46	4,739.14	5,119.48	9.00	9.375E-003	3.294E-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	6.00	6.250E-003	2.756E-003
Am-243	5,231.34	5,052.36	5,305.92	10.00	1.042E-002	3.455E-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	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	4.00	4.167E-003	2.329E-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	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	47.00	4.896E-002	7.217E-003
Cm-244	5,775.74	5,641.51	5,902.52	46.00	4.792E-002	7.141E-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	3.00	3.125E-003	2.083E-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
09/01/16 15:17	960	ICB 160-268020/1		268020			PS
09/06/16 15:23	60	CCV 160-268313/1		268313			PS
09/08/16 10:49	1	PULSER 160-268650/1		268650			ALD
09/08/16 15:56	400	160-18567-5	SU03-S-062-SS-P-00	268650	266565	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
09/01/16 15:17	960	ICB 160-268021/1		268021			PS
09/06/16 15:23	60	CCV 160-268314/1		268314			
09/06/16 16:41	60	CCV 160-268314/2		268314			PS
09/08/16 10:49	1	PULSER 160-268651/1		268651			ALD
09/08/16 15:56	400	160-18567-6	SU03-S-063-SS-P-00	268651	266565	A-01-R	ALD

Detector: AV150

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:51	140	IC 160-223447/1		223447			PS
10/26/15 19:10	60	ICV 160-223565/1		223565			PS
09/01/16 15:17	960	ICB 160-268022/1		268022			PS
09/06/16 15:23	60	CCV 160-268315/1		268315			PS
09/08/16 10:49	1	PULSER 160-268652/1		268652			ALD
09/08/16 15:56	400	160-18567-10	SU03-S-067-SS-P-00	268652	266565	A-01-R	ALD

Detector: AV153

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:52	140	IC 160-223450/1		223450			PS
10/26/15 19:11	60	ICV 160-223568/1		223568			PS
09/01/16 15:17	960	ICB 160-268025/1		268025			PS
09/06/16 12:40	60	CCV 160-268316/1		268316			PS
09/08/16 10:49	1	PULSER 160-268653/1		268653			ALD
09/08/16 15:56	400	160-18567-11	SU03-S-068-SS-P-00	268653	266565	A-01-R	ALD

Detector: AV171

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223468/1		223468			PS
10/26/15 20:28	60	ICV 160-223586/1		223586			PS
09/01/16 15:17	960	ICB 160-268043/1		268043			PS
09/06/16 13:58	60	CCV 160-268329/1		268329			PS
09/07/16 12:23	1	PULSER 160-268478/1		268478			ALD
09/07/16 14:38	400	MB 160-266565/1-A		268478	266565	A-01-R	ALD

Detector: AV172

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223469/1		223469			PS

Alpha Spectroscopy Run Log

Detector: AV172 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/26/15 20:29	60	ICV 160-223587/1		223587			PS
09/01/16 15:17	960	ICB 160-268044/1		268044			PS
09/06/16 13:58	60	CCV 160-268330/1		268330			PS
09/07/16 12:23	1	PULSER 160-268479/1		268479			ALD
09/07/16 14:38	400	LCS 160-266565/2-A		268479	266565	A-01-R	ALD

Detector: AV175

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 14:48	140	IC 160-223472/1		223472			PS
10/31/15 14:14	60	ICV 160-223590/1		223590			
10/31/15 17:26	60	ICV 160-223590/2		223590			PS
09/01/16 15:17	960	ICB 160-268047/1		268047			PS
09/07/16 08:37	60	CCV 160-268386/1		268386			PS
09/07/16 12:23	1	PULSER 160-268481/1		268481			ALD
09/07/16 14:38	400	ZZZZZ		268481			

Detector: AV188

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 14:51	140	IC 160-223485/1		223485			PS
10/31/15 14:17	60	ICV 160-223603/1		223603			PS
09/01/16 15:17	960	ICB 160-268052/1		268052			PS
09/06/16 13:58	60	CCV 160-268333/1		268333			
09/06/16 16:43	60	CCV 160-268333/2		268333			PS
09/08/16 10:49	1	PULSER 160-268671/1		268671			ALD
09/08/16 11:49	400	MB 160-266566/1-A		268671	266566	A-01-R	ALD
09/08/16 20:50	180	ZZZZZ		268671			

Detector: AV189

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:19	140	IC 160-223486/1		223486			PS
11/01/15 14:23	60	ICV 160-223604/1		223604			PS
09/01/16 15:17	960	ICB 160-268053/1		268053			PS
09/06/16 14:01	60	CCV 160-268334/1		268334			PS
09/08/16 10:49	1	PULSER 160-268672/1		268672			ALD
09/08/16 11:49	400	LCS 160-266566/2-A		268672	266566	A-01-R	ALD
09/08/16 20:50	180	ZZZZZ		268672			

Detector: AV190

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223487/1		223487			PS
11/01/15 14:23	60	ICV 160-223605/1		223605			PS
09/01/16 15:17	960	ICB 160-268054/1		268054			PS
09/06/16 14:01	60	CCV 160-268335/1		268335			PS
09/08/16 10:49	1	PULSER 160-268673/1		268673			ALD
09/08/16 11:49	400	160-18567-14	SU03-S-071-SS-P-00	268673	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268673			

Alpha Spectroscopy Run Log

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
09/01/16 15:17	960	ICB 160-268055/1		268055			PS
09/06/16 14:00	60	CCV 160-268336/1		268336			PS
09/08/16 10:49	1	PULSER 160-268674/1		268674			ALD
09/08/16 11:49	400	160-18567-14 DU	SU03-S-071-SS-P-00 DU	268674	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268674			

Detector: AV193

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223490/1		223490			PS
11/01/15 14:24	60	ICV 160-223608/1		223608			PS
09/01/16 15:17	960	ICB 160-268057/1		268057			PS
09/06/16 14:00	60	CCV 160-268338/1		268338			PS
09/08/16 10:49	1	PULSER 160-268675/1		268675			ALD
09/08/16 11:49	400	160-18567-15	SU03-S-072-SS-P-00	268675	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268675			

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
09/01/16 15:17	960	ICB 160-268059/1		268059			PS
09/06/16 08:59	60	CCV 160-268339/1		268339			PS
09/07/16 12:23	1	PULSER 160-268488/1		268488			ALD
09/07/16 14:38	400	160-18567-1	SU03-S-058-SS-P-00	268488	266565	A-01-R	ALD
09/08/16 10:49	1	PULSER 160-268676/1		268676			ALD
09/08/16 11:49	400	160-18567-16	SU03-S-073-SS-P-00	268676	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268676			

Detector: AV198

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:15	140	IC 160-223495/1		223495			PS
11/01/15 14:25	60	ICV 160-223613/1		223613			PS
09/02/16 10:55	960	ICB 160-268132/1		268132			PS
09/06/16 12:40	60	CCV 160-268340/1		268340			PS
09/07/16 12:23	1	PULSER 160-268489/1		268489			ALD
09/07/16 14:38	400	160-18567-2	SU03-S-059-SS-P-00	268489	266565	A-01-R	ALD
09/08/16 10:49	1	PULSER 160-268677/1		268677			ALD
09/08/16 11:49	400	160-18567-17	SU03-S-074-SS-P-00	268677	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268677			

Detector: AV199

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:15	140	IC 160-223496/1		223496			PS
11/01/15 14:25	60	ICV 160-223614/1		223614			PS
09/01/16 15:17	960	ICB 160-268062/1		268062			PS
09/06/16 12:41	60	CCV 160-268341/1		268341			

Alpha Spectroscopy Run Log

Detector: AV199 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/06/16 15:22	60	CCV 160-268341/2		268341			PS
09/07/16 12:23	1	PULSER 160-268490/1		268490			ALD
09/07/16 14:38	400	160-18567-3	SU03-S-060-SS-P-00	268490	266565	A-01-R	ALD
09/08/16 10:49	1	PULSER 160-268678/1		268678			ALD
09/08/16 11:49	400	160-18567-18	SU03-S-075-SS-P-00	268678	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268678			

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
09/02/16 10:55	960	ICB 160-268133/1		268133			PS
09/06/16 12:41	60	CCV 160-268342/1		268342			PS
09/07/16 12:23	1	PULSER 160-268491/1		268491			ALD
09/07/16 14:38	400	160-18567-4	SU03-S-061-SS-P-00	268491	266565	A-01-R	ALD
09/08/16 10:49	1	PULSER 160-268679/1		268679			ALD
09/08/16 11:49	400	160-18567-19	SU03-S-074-SS-DUP-00	268679	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268679			

Detector: AV201

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:23	140	IC 160-223498/1		223498			PS
11/01/15 14:26	60	ICV 160-223616/1		223616			PS
09/01/16 15:17	960	ICB 160-268064/1		268064			PS
09/06/16 12:48	60	CCV 160-268343/1		268343			PS
09/08/16 10:49	1	PULSER 160-268680/1		268680			ALD
09/08/16 11:49	400	160-18567-20	SU03-S-060-SS-DUP-00	268680	266566	A-01-R	ALD
09/08/16 20:54	400	ZZZZZ		268680			

Detector: AV203

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:18	140	IC 160-223500/1		223500			PS
11/01/15 16:01	60	ICV 160-223618/1		223618			
11/01/15 18:11	60	ICV 160-223618/2		223618			PS
09/01/16 15:17	960	ICB 160-268066/1		268066			PS
09/06/16 12:42	60	CCV 160-268345/1		268345			PS
09/07/16 12:23	1	PULSER 160-268494/1		268494			ALD
09/07/16 14:38	400	160-18567-7	SU03-S-064-SS-P-00	268494	266565	A-01-R	ALD

Detector: AV204

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:18	140	IC 160-223501/1		223501			PS
11/01/15 16:10	60	ICV 160-223619/1		223619			PS
09/02/16 10:55	960	ICB 160-268134/1		268134			PS
09/06/16 12:42	60	CCV 160-268346/1		268346			PS
09/07/16 12:23	1	PULSER 160-268495/1		268495			ALD
09/07/16 14:38	400	160-18567-8	SU03-S-065-SS-P-00	268495	266565	A-01-R	ALD

Alpha Spectroscopy Run Log

Detector: AV205

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/18/15 16:19	140	IC 160-223502/1		223502			PS
11/01/15 16:02	60	ICV 160-223620/1		223620			PS
09/01/16 15:17	960	ICB 160-268068/1		268068			PS
09/06/16 12:49	60	CCV 160-268347/1		268347			PS
09/07/16 12:23	1	PULSER 160-268496/1		268496			ALD
09/07/16 14:38	400	160-18567-9	SU03-S-066-SS-P-00	268496	266565	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
09/02/16 10:55	960	ICB 160-268137/1		268137			PS
09/06/16 11:23	60	CCV 160-268350/1		268350			PS
09/07/16 12:23	1	PULSER 160-268499/1		268499			ALD
09/07/16 14:38	400	160-18567-12	SU03-S-069-SS-P-00	268499	266565	A-01-R	ALD

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
09/01/16 15:17	960	ICB 160-268072/1		268072			PS
09/06/16 11:23	60	CCV 160-268351/1		268351			PS
09/07/16 12:23	1	PULSER 160-268500/1		268500			ALD
09/07/16 14:38	400	160-18567-13	SU03-S-070-SS-P-00	268500	266565	A-01-R	ALD

GAMMA SPECTROSCOPY

Method 901.1
Ra-226

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

Prep Batch: 265170

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 265170

Lab ID: MB 160-265170/1-A Analyzed: 09/07/16 16:23 Ts: 30 Sigma: 2
Client ID: Detector: GV15 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	-0.05210	0.132	0.132	U	pCi/g	0.500	0.389	268245

Lab ID: LCS 160-265170/2-A Analyzed: 09/07/16 16:24 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	96.96	1.55	10.2		pCi/g		1.12	268246
Cesium-137	29.30	0.674	3.12		pCi/g		0.236	268246
Cobalt-60	16.39	0.411	1.70		pCi/g		0.0748	268246

Lab ID: 160-18567-1 Analyzed: 09/07/16 15:22 Ts: 30 Sigma: 2
Client ID: SU03-S-058-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.03	0.215	0.241		pCi/g	0.500	0.167	268245

Lab ID: 160-18567-1 DU Analyzed: 09/07/16 16:25 Ts: 30 Sigma: 2
Client ID: SU03-S-058-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.124	0.205	0.236		pCi/g	0.500	0.152	268247

Lab ID: 160-18567-2 Analyzed: 09/07/16 16:27 Ts: 30 Sigma: 2
Client ID: SU03-S-059-SS-P-00 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.23	0.207	0.243		pCi/g	0.500	0.156	268241

Lab ID: 160-18567-3 Analyzed: 09/07/16 16:29 Ts: 30 Sigma: 2
Client ID: SU03-S-060-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.12	0.259	0.284		pCi/g	0.500	0.204	268237

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 265170

Lab ID: 160-18567-4 Analyzed: 09/07/16 16:30 Ts: 30 Sigma: 2
Client ID: SU03-S-061-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.07	0.208	0.236		pCi/g	0.500	0.138	268239

Lab ID: 160-18567-5 Analyzed: 09/07/16 17:48 Ts: 30 Sigma: 2
Client ID: SU03-S-062-SS-P-00 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.34	0.255	0.291		pCi/g	0.500	0.209	268247

Lab ID: 160-18567-6 Analyzed: 09/07/16 17:44 Ts: 30 Sigma: 2
Client ID: SU03-S-063-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.30	0.233	0.270		pCi/g	0.500	0.176	268246

Lab ID: 160-18567-7 Analyzed: 09/07/16 17:50 Ts: 30 Sigma: 2
Client ID: SU03-S-064-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.17	0.294	0.318		pCi/g	0.500	0.242	268245

Lab ID: 160-18567-8 Analyzed: 09/07/16 17:50 Ts: 30 Sigma: 2
Client ID: SU03-S-065-SS-P-00 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.13	0.194	0.227		pCi/g	0.500	0.191	268241

Lab ID: 160-18567-9 Analyzed: 09/07/16 17:51 Ts: 30 Sigma: 2
Client ID: SU03-S-066-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.32	0.292	0.322		pCi/g	0.500	0.236	268239

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 265170

Lab ID: 160-18567-10 Analyzed: 09/07/16 17:52 Ts: 30 Sigma: 2
Client ID: SU03-S-067-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.32	0.206	0.248		pCi/g	0.500	0.101	268238

Lab ID: 160-18567-11 Analyzed: 09/07/16 17:53 Ts: 30 Sigma: 2
Client ID: SU03-S-068-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.71	0.304	0.352		pCi/g	0.500	0.188	268237

Lab ID: 160-18567-12 Analyzed: 09/07/16 18:30 Ts: 30 Sigma: 2
Client ID: SU03-S-069-SS-P-00 Detector: GV3 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.57	0.270	0.315		pCi/g	0.500	0.211	268236

Lab ID: 160-18567-13 Analyzed: 09/07/16 18:30 Ts: 30 Sigma: 2
Client ID: SU03-S-070-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.61	0.304	0.347		pCi/g	0.500	0.228	268237

Lab ID: 160-18567-14 Analyzed: 09/07/16 18:31 Ts: 30 Sigma: 2
Client ID: SU03-S-071-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.78	0.280	0.336		pCi/g	0.500	0.112	268238

Lab ID: 160-18567-15 Analyzed: 09/07/16 18:32 Ts: 30 Sigma: 2
Client ID: SU03-S-072-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.68	0.334	0.376		pCi/g	0.500	0.237	268239

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 265170

Lab ID: 160-18567-16 Analyzed: 09/07/16 18:33 Ts: 30 Sigma: 2
Client ID: SU03-S-073-SS-P-00 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.30	0.217	0.256		pCi/g	0.500	0.171	268241

Lab ID: 160-18567-17 Analyzed: 09/07/16 18:33 Ts: 30 Sigma: 2
Client ID: SU03-S-074-SS-P-00 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.16	0.291	0.315		pCi/g	0.500	0.237	268245

Lab ID: 160-18567-18 Analyzed: 09/07/16 18:34 Ts: 30 Sigma: 2
Client ID: SU03-S-075-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.41	0.271	0.309		pCi/g	0.500	0.217	268246

Lab ID: 160-18567-19 Analyzed: 09/07/16 18:35 Ts: 30 Sigma: 2
Client ID: SU03-S-074-SS-DUP-00 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.39	0.242	0.281		pCi/g	0.500	0.181	268247

Lab ID: 160-18567-20 Analyzed: 09/07/16 19:11 Ts: 30 Sigma: 2
Client ID: SU03-S-060-SS-DUP-00 Detector: GV3 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.27	0.231	0.266		pCi/g	0.500	0.224	268236

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 265170

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 160-265170/1-A	Radium-226			-0.05210	U	pCi/g							-.78812042

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-265170/2-A	Americium-241		97.1	96.96		pCi/g	100	87 - 116					-.0175250174
LCS 160-265170/2-A	Cesium-137		29.5	29.30		pCi/g	99	87 - 120					-.0846682385
LCS 160-265170/2-A	Cobalt-60		16.6	16.39		pCi/g	99	87 - 115					-.1674652212

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-18567-1	Radium-226	1.03		1.124		pCi/g			9	0.20	0.55	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

SDG No.:

Batch Number: 265170 Batch Start Date: 08/17/16 10:53 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/17/16 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-265170/1		Fill_Geo-21, 901.1				291.18 g	8/17/2016	9/7/2016	Tuna Can
LCS 160-265170/2		Fill_Geo-21, 901.1				341.9 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-1-A	SU03-S-058-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	375.6 g	329.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-1-A DU	SU03-S-058-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	375.6 g	329.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-2-A	SU03-S-059-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	341.2 g	294.5 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-3-A	SU03-S-060-SS-P-00	Fill_Geo-21, 901.1	T	47.0 g	344.7 g	297.7 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-4-A	SU03-S-061-SS-P-00	Fill_Geo-21, 901.1	T	46.0 g	345.0 g	299 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-5-A	SU03-S-062-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	314.1 g	268 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-6-A	SU03-S-063-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	357.0 g	310.4 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-7-A	SU03-S-064-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	330.6 g	284.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-8-A	SU03-S-065-SS-P-00	Fill_Geo-21, 901.1	T	45.8 g	340.7 g	294.9 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-9-A	SU03-S-066-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	341.3 g	294.6 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-10-A	SU03-S-067-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	355.8 g	309.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-11-A	SU03-S-068-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	327.3 g	281.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-12-A	SU03-S-069-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	363.4 g	316.7 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-13-A	SU03-S-070-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	351.0 g	304.9 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-14-A	SU03-S-071-SS-P-00	Fill_Geo-21, 901.1	T	46.5 g	246.4 g	199.9 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-15-A	SU03-S-072-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	331.8 g	285.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-16-A	SU03-S-073-SS-P-00	Fill_Geo-21, 901.1	T	45.6 g	361.7 g	316.1 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-17-A	SU03-S-074-SS-P-00	Fill_Geo-21, 901.1	T	45.9 g	306.1 g	260.2 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-18-A	SU03-S-075-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	328.9 g	282.8 g	8/17/2016	9/7/2016	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.: 160-18567-1

SDG No.:

Batch Number: 265170 Batch Start Date: 08/17/16 10:53 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/17/16 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
160-18567-A-19-A	SU03-S-074-SS-DUP-00	Fill_Geo-21, 901.1	T	45.9 g	309.5 g	263.6 g	8/17/2016	9/7/2016	Tuna Can
160-18567-A-20-A	SU03-S-060-SS-DUP-00	Fill_Geo-21, 901.1	T	46.4 g	364.2 g	317.8 g	8/17/2016	9/7/2016	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
MB 160-265170/1		Fill_Geo-21, 901.1							
LCS 160-265170/2		Fill_Geo-21, 901.1		# g					
160-18567-A-1-A	SU03-S-058-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-1-A DU	SU03-S-058-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-2-A	SU03-S-059-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-3-A	SU03-S-060-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-4-A	SU03-S-061-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-5-A	SU03-S-062-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-6-A	SU03-S-063-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-7-A	SU03-S-064-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-8-A	SU03-S-065-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-9-A	SU03-S-066-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-10-A	SU03-S-067-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-11-A	SU03-S-068-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-12-A	SU03-S-069-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-13-A	SU03-S-070-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-14-A	SU03-S-071-SS-P-00	Fill_Geo-21, 901.1	T						

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

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-18567-1

SDG No.:

Batch Number: 265170 Batch Start Date: 08/17/16 10:53 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 08/17/16 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
160-18567-A-15-A	SU03-S-072-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-16-A	SU03-S-073-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-17-A	SU03-S-074-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-18-A	SU03-S-075-SS-P-00	Fill_Geo-21, 901.1	T						
160-18567-A-19-A	SU03-S-074-SS-DUP-00	Fill_Geo-21, 901.1	T						
160-18567-A-20-A	SU03-S-060-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: 15_Gamma_20161115

Sample Description: 265170_Gamma_MB 160-265170~1-A
Detector: Detector #15
Batch ID: 265170
Work Order Number: Gamma
Lot Number: MB 160-265170~1-A

Decay to Time: 9/7/2016 16:22 Live Time: 1800 sec
Acquisition Time: 9/7/2016 16:23:23 Real Time: 1802 sec
Analysis Time: 9/8/2016 01:48 Dead Time: 0.10 %
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_2016-09-03_2257.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	1.473E+00	122.6	1.806E+00	1.807E+00	6.375E+00
NA-22	-2.817E-01	112.2	3.162E-01	3.165E-01	1.138E+00
K-40	-3.425E+00	162.8	5.575E+00	5.578E+00	1.057E+01
Sc-46	-2.059E-02	2128.4	4.382E-01	4.382E-01	1.607E+00
CR-51	1.307E+00	169.7	2.217E+00	2.218E+00	7.754E+00
MN-54	-1.589E-01	178.6	2.838E-01	2.839E-01	1.009E+00
FE-59	-9.525E-03	4134.8	3.939E-01	3.939E-01	9.674E-01
Co-56	-2.073E-01	140.5	2.913E-01	2.915E-01	1.012E+00
CO-57	0.000E+00	1.#INF	3.375E-02	3.375E-02	6.497E-01
CO-58	1.148E-01	234.5	2.692E-01	2.693E-01	1.001E+00
CO-60	-1.616E-02	250.4	4.047E-02	4.048E-02	1.212E+00
ZN-65	0.000E+00	1.#INF	1.485E-01	1.485E-01	2.897E+00
NB-94	3.605E-01	38.7	1.394E-01	1.407E-01	3.809E-01
ZR-95	4.285E-01	116.2	4.977E-01	4.982E-01	1.263E+00
NB-95	-9.084E-03	2580.7	2.344E-01	2.344E-01	9.167E-01
RU-103	-2.365E-01	107.2	2.534E-01	2.537E-01	9.328E-01
RH-106	0.000E+00	1.#INF	4.603E-01	4.603E-01	1.907E+01
AG-108M	-4.380E-02	598.3	2.620E-01	2.620E-01	6.338E-01
AG-110M	4.461E-01	31.6	1.411E-01	1.429E-01	2.187E+00
SN-113	3.024E-01	118.1	3.570E-01	3.573E-01	1.239E+00
SB-124	-2.319E-01	122.7	2.845E-01	2.848E-01	1.829E+00
SB-125	-2.440E-01	71.2	1.737E-01	1.741E-01	2.432E+00
I-131	-9.136E-02	131.5	1.201E-01	1.202E-01	7.761E-01
Gd-153	-7.081E-01	178.3	1.263E+00	1.263E+00	4.246E+00
Ga-68	1.821E+01	37.8	6.882E+00	6.958E+00	1.917E+01
Tc-99m	0.000E+00	1.#INF	4.275E-02	4.275E-02	9.675E-01
BA-133	0.000E+00	1.#INF	1.628E-01	1.628E-01	6.632E-01
CS-134	1.232E-01	127.7	1.573E-01	1.574E-01	1.908E+00
CS-137	-4.085E-01	103.4	4.222E-01	4.228E-01	1.451E+00
CE-139	1.367E-02	1770.6	2.420E-01	2.420E-01	8.510E-01
Ba-140	-1.126E+00	91.1	1.025E+00	1.027E+00	3.715E+00
La-140	1.762E-01	140.1	2.469E-01	2.471E-01	7.975E-01
CE-141	-3.186E-02	1360.1	4.333E-01	4.333E-01	1.510E+00

CE-144	-1.649E-01	1306.0	2.153E+00	2.153E+00	7.432E+00
PM-144	-3.451E-01	66.5	2.295E-01	2.302E-01	1.047E+00
EU-152	1.623E+00	37.8	6.135E-01	6.194E-01	4.022E+00
EU-154	1.686E+00	37.8	6.371E-01	6.429E-01	7.667E+00
EU-155	0.000E+00	1.#INF	2.530E-01	2.530E-01	6.374E+00
HF-181	2.806E-01	131.8	3.700E-01	3.702E-01	9.669E-01
Ta-182	0.000E+00	1.#INF	3.058E-01	3.058E-01	2.471E+00
Hg-203	0.000E+00	1.#INF	8.385E-02	8.385E-02	9.649E-01
TL-208	-6.815E-03	257.9	1.758E-02	1.758E-02	1.001E+00
pm-146	-3.134E-01	403.1	1.263E+00	1.263E+00	3.157E+00
y-88	-6.974E-01	48.2	3.364E-01	3.383E-01	1.402E+00
Cd-113m	-2.505E+03	110.4	2.765E+03	2.770E+03	9.561E+03
Cd-109	0.000E+00	1.#INF	3.309E+00	3.309E+00	2.882E+01
Cf-251	8.346E-01	102.9	8.584E-01	8.616E-01	2.286E+00
Cf-249	2.460E-01	149.2	3.671E-01	3.673E-01	1.578E+00
Sn-126	2.250E-01	1087.0	2.446E+00	2.446E+00	8.552E+00
PB-210	9.547E+00	57.5	5.491E+00	5.520E+00	1.664E+01
PB-212	2.584E-02	1784.5	4.610E-01	4.610E-01	1.616E+00
PB-214	3.336E-02	1490.9	4.973E-01	4.973E-01	1.805E+00
BI-207	-1.450E-02	1374.8	1.994E-01	1.994E-01	7.696E-01
BI-212	2.299E-01	1236.9	2.844E+00	2.844E+00	1.115E+01
BI-214	-5.613E-01	126.8	7.116E-01	7.122E-01	4.193E+00
BI-210M	3.203E-01	104.6	3.351E-01	3.356E-01	1.154E+00
AC-228	-1.064E+00	107.8	1.146E+00	1.148E+00	3.933E+00
TH-227	-4.048E+00	125.6	5.084E+00	5.089E+00	1.719E+01
TH-229	6.945E-01	612.9	4.256E+00	4.257E+00	1.165E+01
TH-234	-8.590E+00	61.3	5.267E+00	5.286E+00	2.531E+01
PA-231	5.539E+00	122.5	6.788E+00	6.794E+00	3.268E+01
PA-233	7.119E-01	111.0	7.905E-01	7.915E-01	2.053E+00
PA-234	3.132E-01	415.0	1.300E+00	1.300E+00	4.467E+00
PA-234M	-6.605E+00	363.3	2.400E+01	2.400E+01	1.285E+02
U-235	-8.823E-01	264.1	2.330E+00	2.331E+00	7.902E+00
AM-241	4.712E-01	156.3	7.365E-01	7.369E-01	2.520E+00
Np-237	-1.537E-01	1594.5	2.451E+00	2.451E+00	8.378E+00
Ir-192	1.784E-01	150.1	2.678E-01	2.680E-01	9.311E-01
Cs-136	1.068E-01	140.4	1.500E-01	1.501E-01	1.078E+00
Np-239	9.054E-01	190.6	1.725E+00	1.726E+00	5.802E+00
Nd-147	1.441E+00	102.1	1.472E+00	1.474E+00	3.832E+00
Total	4.837E+01				

Analyst: Aaron Schroder

Sample description
265170_Gamma_MB 160-265170~1-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161115.An1

Acquisition information
Start time: 9/7/2016 4:23:23 PM
Live time: 1800
Real time: 1802
Dead time: 0.10 %
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	9/7/2016 4:22:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2016-09-03_2257.PBC 9/3/2016 10:57:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0068

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.55	14.	57.52	0.70	1.957E-02	46.54	4.250	PBC<MDA	PB210
59.54	8.	156.31	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
80.99	5.	226.72	0.98	3.557E-02	80.99	34.060	PBC<MDA	BA133
106.13	14.	190.57	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
123.10	4.	289.26	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
131.29	4.	415.01	1.02	3.775E-02	131.29	18.000	PBC<MDA	PA234
136.30	5.	316.86	1.03	3.725E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.985E-01	CO57
176.60	8.	102.85	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251
193.51	2.	612.86	1.08	3.030E-02	193.51	4.400	PBC<MDA	TH229
256.24	2.	318.20	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
265.83	7.	104.61	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
284.30	4.	224.54	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
300.03	5.	197.67	1.17	2.177E-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.	163.19	1.17	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.986E+00	PA231
					300.18	6.200	2.376E+00	PA233
300.18	6.	173.46	1.17	2.176E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.987E+00	PA231
					300.18	6.200	2.376E+00	PA233

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
302.65	6.	182.85	1.18	2.162E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.108E-01	BA133
312.01	6.	138.68	1.18	2.112E-02	312.01	36.000	PBC<MDA	PA233
316.49	6.	150.09	1.19	2.089E-02	316.49	87.040	PBC<MDA	Ir192
320.08	5.	169.69	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
328.76	7.	140.12	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140
333.44	7.	149.19	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
340.57	7.	140.40	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
344.29	7.	151.83	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
391.69	6.	118.06	1.25	1.767E-02	391.69	64.000	PBC<MDA	SN113
433.94	-1.	598.28	1.29	1.629E-02	433.94	90.480	PBC<MDA	AG108M
477.60	4.	122.58	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
482.00	5.	131.84	1.33	1.497E-02	482.00	80.500	PBC<MDA	HF181
487.02	3.	210.13	1.33	1.485E-02	487.02	45.500	PBC<MDA	La140
511.86	32.	35.31	2.60	1.426E-02	511.86	20.000	6.234E+00	RH106
531.00	5.	102.15	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
563.24	1.	956.50	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
635.89	4.	97.06	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
657.76	10.	31.62	1.47	1.160E-02	657.76	94.640	5.060E-01	AG110M
702.63	7.	38.67	1.50	1.098E-02	702.63	97.900	PBC<MDA	NB94
756.73	4.	116.15	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
763.94	3.	129.10	1.55	1.024E-02	763.94	22.280	PBC<MDA	AG110M
795.87	4.	127.70	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
810.78	2.	234.52	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
860.56	1.	354.44	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
871.10	1.	331.66	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
937.49	6.	46.58	1.68	8.598E-03	937.49	34.360	PBC<MDA	AG110M
964.11	7.	37.80	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
996.33	7.	37.80	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1001.00	-1.	363.33	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1077.40	7.	37.80	1.77	7.623E-03	1077.40	3.300	PBC<MDA	Ga68
1120.29	-3.	154.00	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	1.	376.30	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1460.83	-4.	162.79	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.55	23.	14.	0.008	57.52	0.697s
TH-227	200.23	50.14	122.	-13.	-0.007	125.59	0.950s
AM-241	237.79	59.54	81.	8.	0.005	156.31	0.958
TH-234	252.78	63.29	106.	-17.	-0.010	61.32	0.962s
BA-133	323.54	80.99	37.	5.	0.003	226.72	0.978s
EU-155	345.74	86.54	227.	0.	0.000	1000.00	0.983s
Sn-126	347.33	86.94	227.	0.	0.000	1000.00	0.984s
Sn-126	349.84	87.57	227.	0.	0.000	1000.00	0.984s
Cd-109	351.72	88.04	227.	0.	0.000	1000.00	0.985s
Nd-147	363.95	91.10	227.	0.	0.000	1000.00	0.987s
TH-234	369.91	92.59	329.	-39.	-0.022	35.46	0.989s
AC-228	372.95	93.35	319.	-15.	-0.008	175.13	0.990s
Gd-153	389.54	97.50	333.	-15.	-0.008	178.30	0.993s
Np-239	397.53	99.50	348.	-15.	-0.008	181.76	0.995s
Gd-153	412.32	103.20	363.	-15.	-0.008	184.88	0.998s
Np-239	414.32	103.70	378.	-8.	-0.005	325.93	0.999s
EU-155	420.77	105.31	386.	0.	0.000	1000.00	1.001s
Np-239	424.03	106.13	366.	14.	0.008	190.57	1.001s
EU-152	486.57	121.78	50.	-9.	-0.005	116.00	1.016s
CO-57	487.72	122.06	59.	0.	0.000	1000.00	1.016s
EU-154	491.87	123.10	50.	4.	0.002	289.26	1.017s
PA-234	524.63	131.29	124.	4.	0.002	415.01	1.024s
HF-181	544.63	136.30	123.	5.	0.003	316.86	1.029s
CO-57	545.33	136.47	128.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	128.	0.	0.000	1000.00	1.032s
U-235	574.56	143.79	134.	-6.	-0.004	264.13	1.036s
Ba-140	650.01	162.66	66.	-12.	-0.007	139.60	1.053s
Cf-251	705.73	176.60	18.	8.	0.005	102.85	1.065s
TH-229	773.33	193.51	29.	2.	0.001	612.86	1.080s
TH-229	842.65	210.85	30.	-5.	-0.003	155.18	1.096s
Cf-251	907.22	227.00	22.	-1.	-0.001	883.18	1.110s
PB-214	967.17	242.00	41.	-10.	-0.005	99.86	1.123s
EU-152	977.95	244.69	36.	-8.	-0.004	121.68	1.126
TH-227	1024.12	256.24	11.	2.	0.001	318.20	1.136s
Cd-113m	1053.94	263.70	22.	-6.	-0.004	110.41	1.142s
BI-210M	1062.46	265.83	22.	7.	0.004	104.61	1.144s
TL-208	1108.25	277.28	34.	-9.	-0.005	103.12	1.154s
Hg-203	1115.91	279.20	41.	0.	0.000	1000.00	1.156s
I-131	1136.30	284.30	20.	4.	0.002	224.54	1.160
PB-214	1179.44	295.09	27.	-9.	-0.005	118.81	1.170s
PB-212	1199.19	300.03	37.	5.	0.003	197.67	1.174s
PA-231	1199.35	300.07	41.	6.	0.003	163.19	1.174s
PA-233	1199.79	300.18	47.	6.	0.003	173.46	1.174
PA-231	1209.66	302.65	53.	6.	0.003	182.85	1.176s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1210.47	302.85	76.	-7.	-0.004	177.68	1.176s
Ba-140	1218.46	304.85	69.	-2.	-0.001	779.72	1.178s
PA-233	1247.09	312.01	30.	6.	0.003	138.68	1.184s
Ir-192	1265.00	316.49	35.	6.	0.003	150.09	1.188s
CR-51	1279.37	320.08	31.	5.	0.003	169.69	1.191s
La-140	1314.06	328.76	48.	7.	0.004	140.12	1.199s
Cf-249	1332.77	333.44	55.	7.	0.004	149.19	1.203s
Cs-136	1361.28	340.57	49.	7.	0.004	140.40	1.209s
EU-152	1376.13	344.29	56.	7.	0.004	151.83	1.212s
HF-181	1382.30	345.83	46.	-8.	-0.005	118.24	1.213s
BA-133	1422.97	356.00	6.	0.	0.000	1000.00	1.222s
I-131	1456.89	364.48	16.	-6.	-0.003	136.76	1.229s
BA-133	1534.29	383.84	40.	-6.	-0.003	108.68	1.246s
Cf-249	1550.72	387.95	43.	0.	0.000	1000.00	1.249s
SN-113	1565.67	391.69	23.	6.	0.003	118.06	1.253s
SB-125	1710.36	427.88	16.	-8.	-0.004	104.08	1.283s
AG-108M	1734.60	433.94	9.	-1.	-0.001	598.28	1.288s
pm-146	1814.35	453.88	9.	-1.	-0.001	525.62	1.304s
SB-125	1852.29	463.37	31.	-9.	-0.005	96.54	1.312s
BE-7	1909.18	477.60	11.	4.	0.002	122.58	1.324s
HF-181	1926.79	482.00	15.	5.	0.003	131.84	1.328s
La-140	1946.87	487.02	20.	3.	0.002	210.13	1.332s
RU-103	1987.00	497.05	18.	-6.	-0.003	107.16	1.340s
RH-106	2046.22	511.86	14.	32.	0.018	35.31	2.602
Nd-147	2122.75	531.00	4.	5.	0.003	102.15	1.368s
Ba-140	2147.78	537.26	18.	-7.	-0.004	91.06	1.373s
CS-134	2251.67	563.24	9.	1.	0.000	956.50	1.394s
CS-134	2276.00	569.32	9.	-1.	0.000	636.40	1.399s
TL-208	2330.79	583.02	13.	-2.	-0.001	374.72	1.410s
SB-125	2400.69	600.50	56.	-9.	-0.005	128.64	1.424s
SB-124	2409.62	602.73	65.	-5.	-0.003	122.67	1.425s
CS-134	2417.53	604.71	70.	0.	0.000	1000.00	1.427s
BI-214	2435.93	609.31	75.	-6.	-0.003	126.78	1.430s
RU-103	2439.88	610.30	69.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	69.	0.	0.000	1000.00	1.435s
PM-144	2470.93	618.06	69.	0.	0.000	1000.00	1.437s
RH-106	2486.35	621.92	69.	0.	0.000	1000.00	1.440s
SB-125	2542.23	635.89	4.	4.	0.002	97.06	1.451s
AG-110M	2629.71	657.76	0.	10.	0.006	31.62	1.469s
CS-137	2645.30	661.66	24.	-7.	-0.004	103.35	1.472s
PM-144	2784.82	696.54	15.	-7.	-0.004	66.51	1.499s
NB-94	2809.17	702.63	0.	7.	0.004	38.67	1.503s
SB-124	2889.79	722.79	8.	-1.	0.000	487.44	1.519s
AG-108M	2890.40	722.94	9.	0.	0.000	1000.00	1.519s
EU-154	2892.07	723.36	9.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	9.	0.	0.000	1000.00	1.520s
pm-146	2941.53	735.72	14.	-4.	-0.002	65.68	1.529s
pm-146	2987.29	747.16	14.	-2.	-0.001	403.11	1.537s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3025.56	756.73	5.	4.	0.002	116.15	1.544s
AG-110M	3054.42	763.94	6.	3.	0.002	129.10	1.550s
PA-234M	3064.30	766.41	22.	-9.	-0.005	77.92	1.552s
BI-212	3140.33	785.42	5.	-1.	0.000	698.21	1.566s
CS-134	3182.12	795.87	9.	4.	0.002	127.70	1.574s
CS-134	3206.46	801.95	22.	-8.	-0.004	91.81	1.578s
CO-58	3241.75	810.78	10.	2.	0.001	234.52	1.585s
La-140	3261.74	815.77	12.	0.	0.000	1000.00	1.589s
Cs-136	3272.66	818.50	12.	-1.	0.000	593.97	1.591s
MN-54	3338.05	834.85	10.	-3.	-0.002	178.61	1.603s
Co-56	3385.75	846.77	9.	-3.	-0.002	140.50	1.612s
TL-208	3440.93	860.56	5.	1.	0.001	354.44	1.622s
NB-94	3483.06	871.10	5.	1.	0.001	331.66	1.629s
EU-154	3491.60	873.23	8.	-2.	-0.001	270.80	1.631s
PA-234	3520.80	880.53	21.	-3.	-0.002	203.47	1.636s
PA-234	3531.64	883.24	25.	0.	0.000	1000.00	1.638s
AG-110M	3537.42	884.68	25.	0.	0.000	1000.00	1.639s
y-88	3590.85	898.04	16.	-10.	-0.006	48.23	1.649s
AC-228	3642.98	911.07	11.	-5.	-0.003	107.77	1.658s
AG-110M	3748.69	937.49	0.	6.	0.003	46.58	1.677s
PA-234	3782.81	946.02	0.	0.	0.000	1000.00	1.683s
EU-152	3855.18	964.11	0.	7.	0.004	37.80	1.696s
AC-228	3874.63	968.97	7.	0.	0.000	1000.00	1.699s
EU-154	3984.09	996.33	0.	7.	0.004	37.80	1.718s
PA-234M	4002.77	1001.00	8.	-1.	0.000	363.33	1.722s
EU-154	4017.88	1004.77	7.	0.	0.000	1000.00	1.724s
Co-56	4150.18	1037.84	0.	0.	0.000	1000.00	1.747s
RH-106	4200.27	1050.36	10.	-5.	-0.003	158.36	1.755s
BI-207	4253.49	1063.66	0.	0.	0.000	1000.00	1.765s
Ga-68	4308.47	1077.40	0.	7.	0.004	37.80	1.774s
EU-152	4447.22	1112.07	10.	-4.	-0.002	135.53	1.797s
ZN-65	4461.11	1115.55	13.	0.	0.000	1000.00	1.800s
BI-214	4480.08	1120.29	6.	-3.	-0.001	154.00	1.803s
Sc-46	4481.13	1120.55	4.	0.	0.000	1000.00	1.803s
Ta-182	4484.13	1121.30	4.	0.	0.000	1000.00	1.803s
CO-60	4691.97	1173.24	6.	1.	0.001	376.30	1.838s
NA-22	5097.34	1274.53	5.	-3.	-0.002	112.25	1.902s
EU-154	5097.40	1274.54	9.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	0.	0.	0.000	1000.00	1.913s
CO-60	5329.36	1332.50	6.	-2.	-0.001	330.55	1.938s
AG-110M	5536.68	1384.30	6.	-3.	-0.001	218.12	1.970s
EU-152	5631.56	1408.00	11.	-7.	-0.004	113.82	1.984s
K-40	5843.03	1460.83	4.	-4.	-0.002	162.79	2.015s
SB-124	6764.43	1690.98	6.	-4.	-0.002	156.12	2.142s
BI-214	7058.76	1764.49	10.	-7.	-0.004	95.45	2.181s
Co-56	7086.23	1771.35	5.	0.	0.000	1000.00	2.184s

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	1.4733E+00				5.31E+01	
			477.60	1.473E+00	?(P	6.375E+00 1.23E+02 1.05E+01	G
NA-22	C	-2.8165E-01				9.50E+02	
			1274.53	-2.817E-01	?(	1.138E+00 1.12E+02 9.99E+01	G
K-40	N	-3.4248E+00				4.66E+11	
			1460.83	-3.425E+00	?(P	1.057E+01 1.63E+02 1.07E+01	G
Sc-46	F	-2.0589E-02				8.38E+01	
			889.28	-2.059E-02	%(	1.607E+00 2.13E+03 1.00E+02	G
			1120.55	0.000E+00	+	8.620E-01 1.00E+03 1.00E+02	G
CR-51	F	1.3066E+00				2.77E+01	
			320.08	1.307E+00	(P	7.754E+00 1.70E+02 9.94E+00	G
MN-54	C	-1.5889E-01				3.12E+02	
			834.85	-1.589E-01	?(P	1.009E+00 1.79E+02 1.00E+02	G
FE-59	F	-9.5254E-03				4.45E+01	
			1099.25	-9.525E-03	%(P	9.674E-01 4.13E+03 5.65E+01	G
			1291.60	0.000E+00	+	1.458E+00 1.00E+03 4.32E+01	G
Co-56	C	-2.0735E-01				7.73E+01	
			846.77	-2.073E-01	?(P	1.012E+00 1.40E+02 9.99E+01	G
			1238.28	-4.153E-02	%	1.679E+00 1.58E+03 6.61E+01	G
			1037.84	0.000E+00	+	3.680E+00 1.00E+03 1.41E+01	G
			1771.35	0.000E+00	+	9.746E+00 1.00E+03 1.55E+01	A
CO-58	C	1.1478E-01				7.09E+01	
			810.78	1.148E-01	?(	1.001E+00 2.35E+02 9.95E+01	G
CO-60	F	-1.6162E-02				1.93E+03	
			1332.50	-1.459E-01	?(P	1.212E+00 3.31E+02 1.00E+02	G
			1173.24	1.137E-01	?(P	1.076E+00 3.76E+02 9.99E+01	G
NB-94	I	3.6046E-01				7.41E+06	
			702.63	3.605E-01	?(P	3.809E-01 3.87E+01 9.79E+01	G
			871.10	6.074E-02	-	7.976E-01 3.32E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	4.2846E-01					6.40E+01	
			756.73	4.285E-01	?(	1.263E+00	1.16E+02	5.45E+01 G
			724.20	0.000E+00	-	1.931E+00	1.00E+03	4.42E+01 G
NB-95	I	-9.0842E-03					6.40E+01	
			765.79	-9.084E-03	%(	9.167E-01	2.58E+03	9.98E+01 G
RU-103	I	-2.3648E-01					3.93E+01	
			497.05	-2.365E-01	?(P	9.328E-01	1.07E+02	9.09E+01 G
			610.30	0.000E+00	+	3.242E+01	1.00E+03	5.75E+00 GA
AG-108M	C	-4.3797E-02					1.53E+05	
			433.94	-4.380E-02	?(P	6.338E-01	5.98E+02	9.05E+01 G
			722.94	0.000E+00	+	9.371E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	2.086E+00	1.00E+03	8.98E+01 G
AG-110M	F	4.4605E-01					2.50E+02	
			884.68	0.000E+00	?(	2.187E+00	1.00E+03	7.27E+01 G
			657.76	5.060E-01	?(	3.729E-01	3.16E+01	9.46E+01 G
			937.49	1.040E+00	?(P	1.386E+00	4.66E+01	3.44E+01 G
			1384.30	-9.975E-01	+	5.163E+00	2.18E+02	2.43E+01 G
			763.94	7.309E-01	?(	3.441E+00	1.29E+02	2.23E+01 G
SN-113	F	3.0235E-01					1.15E+02	
			391.69	3.024E-01	?(	1.239E+00	1.18E+02	6.40E+01 G
SB-124	F	-2.3193E-01					6.02E+01	
			602.73	-2.319E-01	?(P	1.829E+00	1.23E+02	9.83E+01 G
			1690.98	-9.101E-01	+	3.214E+00	1.56E+02	4.78E+01 G
			722.79	-3.994E-01	+	7.550E+00	4.87E+02	1.08E+01 G
SB-125	I	-2.4403E-01					1.01E+03	
			427.88	-9.114E-01	?(	2.432E+00	1.04E+02	2.96E+01 G
			600.50	-2.131E+00	+	9.382E+00	1.29E+02	1.79E+01 G
			635.89	1.503E+00	?(P	5.116E+00	9.71E+01	1.13E+01 G
			463.37	-2.976E+00	+	9.790E+00	9.65E+01	1.05E+01 G
I-131	I	-9.1358E-02					8.02E+00	
			364.48	-2.181E-01	?(	7.761E-01	1.37E+02	8.17E+01 G
			284.30	1.595E+00	?(	9.393E+00	2.25E+02	6.14E+00 G
			636.97	-1.163E-01	% P	1.094E+01	2.40E+03	7.17E+00 G
Gd-153	F	-7.0809E-01					2.42E+02	
			97.50	-7.081E-01	?(	4.246E+00	1.78E+02	3.00E+01 G
			103.20	-9.698E-01	+	6.027E+00	1.85E+02	2.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	1.8209E+01					4.71E-02	
			1077.40	1.821E+01	?(	1.917E+01	3.78E+01	3.30E+00 G
CS-134	I	1.2316E-01					7.54E+02	
			604.71	0.000E+00	?(	1.908E+00	1.00E+03	9.76E+01 G
			795.87	2.439E-01	?(P	1.111E+00	1.28E+02	8.55E+01 G
			569.32	-1.842E-01	+	4.539E+00	6.36E+02	1.54E+01 G
			801.95	-5.050E+00	+	1.583E+01	9.18E+01	8.69E+00 G
			563.24	3.267E-01	(P	8.557E+00	9.56E+02	8.35E+00 G
CS-137	I	-4.0853E-01					1.10E+04	
			661.66	-4.085E-01	(	1.451E+00	1.03E+02	8.52E+01 G
CE-139	F	1.3667E-02					1.38E+02	
			165.85	1.367E-02	&(	8.510E-01	1.77E+03	7.99E+01 G
Ba-140	I	-1.1257E+00					1.28E+01	
			537.26	-1.126E+00	&(P	3.715E+00	9.11E+01	2.44E+01 G
			162.66	-3.187E+00	+ P	1.073E+01	1.40E+02	6.22E+00 G
			304.85	-9.092E-01	+	2.486E+01	7.80E+02	4.29E+00 G
La-140	I	1.7624E-01					1.28E+01	
			1596.21	-3.166E-02	%(P	7.975E-01	2.15E+03	9.54E+01 G
			487.02	2.563E-01	?(	1.932E+00	2.10E+02	4.55E+01 G
			328.76	9.738E-01	?(	4.700E+00	1.40E+02	2.03E+01 G
			815.77	0.000E+00	-	4.647E+00	1.00E+03	2.33E+01 G
CE-141	I	-3.1860E-02					3.25E+01	
			145.44	-3.186E-02	%(	1.510E+00	1.36E+03	4.82E+01 G
CE-144	I	-1.6488E-01					2.85E+02	
			133.54	-1.649E-01	%(P	7.432E+00	1.31E+03	1.11E+01 G
PM-144	C	-3.4512E-01					3.63E+02	
			696.54	-3.451E-01	?(P	1.047E+00	6.65E+01	9.90E+01 G
			618.06	0.000E+00	+	1.901E+00	1.00E+03	9.91E+01 G
EU-152	F	1.6233E+00					4.94E+03	
			344.29	7.694E-01	?(	4.022E+00	1.52E+02	2.65E+01 G
			1112.07	-1.922E+00	+	9.375E+00	1.36E+02	1.36E+01 G
			121.78	-4.547E-01	+	1.802E+00	1.16E+02	2.86E+01 G
			778.92	1.421E-01	%	5.448E+00	1.39E+03	1.29E+01 G
			964.11	3.173E+00	?(	3.340E+00	3.78E+01	1.46E+01 G
			244.69	-2.257E+00	+ P	8.881E+00	1.22E+02	7.58E+00 G
			1408.00	-3.221E+00	+	8.080E+00	1.14E+02	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	1.6855E+00					3.14E+03	
			873.23	-7.433E-01	?(	7.667E+00	2.71E+02	1.23E+01 G
			123.10	1.241E-01	+	1.259E+00	2.89E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.942E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	4.212E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	+	5.728E+00	1.00E+03	1.80E+01 G
			996.33	4.497E+00	?(	4.735E+00	3.78E+01	1.06E+01 G
HF-181	F	2.8061E-01					4.24E+01	
			482.00	2.084E-01	?(P	9.669E-01	1.32E+02	8.05E+01 G
			133.02	-4.496E-02	% P	1.901E+00	1.22E+03	4.33E+01 G
			345.83	-1.595E+00	&	6.457E+00	1.18E+02	1.51E+01 G
			136.30	1.275E+00	?(	1.387E+01	3.17E+02	5.85E+00 G
TL-208	N	-6.8150E-03					6.98E+02	
			583.02	-1.026E-01	?(	1.001E+00	3.75E+02	8.45E+01 G
			277.28	-3.542E+00	+ P	1.142E+01	1.03E+02	6.31E+00 G
			860.56	6.447E-01	?(	6.177E+00	3.54E+02	1.24E+01 G
pm-146	C	-3.1337E-01					2.02E+03	
			747.16	-3.134E-01	?(	3.157E+00	4.03E+02	3.40E+01 G
			735.72	-1.039E+00	+ P	4.773E+00	6.57E+01	2.25E+01 G
			453.88	-7.335E-02	+ P	9.224E-01	5.26E+02	6.50E+01 G
y-88	F	-6.9743E-01					1.07E+02	
			898.04	-6.974E-01	?(P	1.402E+00	4.82E+01	9.37E+01 G
			1836.06	-4.794E-02	% P	8.706E-01	1.64E+03	9.92E+01 G
Cd-113m		-2.5045E+03					5.33E+03	
			263.70	-2.505E+03	?(	9.561E+03	1.10E+02	6.00E-03 K
Cf-251	T	8.3458E-01					3.28E+05	
			176.60	8.346E-01	&(	2.286E+00	1.03E+02	1.70E+01 G
			227.00	-3.277E-01	-	8.050E+00	8.83E+02	6.30E+00 GA
Cf-249	T	2.4604E-01					1.28E+05	
			387.95	0.000E+00	?(	1.578E+00	1.00E+03	6.60E+01 G
			333.44	1.293E+00	?(	6.640E+00	1.49E+02	1.55E+01 G
Sn-126		2.2500E-01					3.65E+07	
			87.57	0.000E+00	-	2.919E+00	1.00E+03	3.75E+01 GA
			64.28	2.250E-01	%(	8.552E+00	1.09E+03	9.70E+00 G
			86.94	0.000E+00	&	1.215E+01	1.00E+03	9.04E+00 GA
PB-210	N	9.5469E+00					8.14E+03	
			46.54	9.547E+00	(P	1.664E+01	5.75E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.5836E-02					6.98E+02	
			238.63	2.584E-02	&(P	1.616E+00	1.78E+03	4.33E+01 G
			300.03	3.516E+00	? P	2.414E+01	1.98E+02	3.28E+00 GA
PB-214	N	3.3357E-02					5.84E+05	
			351.93	3.336E-02	%(P	1.805E+00	1.49E+03	3.76E+01 G
			295.09	-1.153E+00	+ P	3.505E+00	1.19E+02	1.93E+01 G
			242.00	-2.787E+00	+	9.467E+00	9.99E+01	7.43E+00 GA
BI-207	C	-1.4501E-02					1.18E+04	
			569.70	-1.450E-02	%(	7.696E-01	1.37E+03	9.77E+01 G
			1063.66	0.000E+00	+	7.129E-01	1.00E+03	7.45E+01 G
BI-212	N	2.2990E-01					6.98E+02	
			727.17	2.299E-01	%(	1.115E+01	1.24E+03	7.55E+00 G
			785.42	-2.894E+00	+	5.546E+01	6.98E+02	1.28E+00 GA
BI-214	N	-5.6133E-01					5.84E+05	
			609.31	-5.613E-01	?(P	4.193E+00	1.27E+02	4.61E+01 G
			1120.29	-1.255E+00	+ P	7.060E+00	1.54E+02	1.51E+01 G
			1764.49	-5.066E+00	+ P	1.275E+01	9.55E+01	1.54E+01 G
BI-210M	T	3.2034E-01					1.10E+09	
			265.83	3.203E-01	&(	1.154E+00	1.05E+02	5.00E+01 G
			304.90	8.801E-08	%	3.770E+00	1.21E+09	2.80E+01 G
AC-228	N	-1.0637E+00					2.10E+03	
			911.07	-1.064E+00	?(P	3.933E+00	1.08E+02	2.90E+01 G
			968.97	0.000E+00	+	5.726E+00	1.00E+03	1.75E+01 G
			338.32	1.477E-01	& P	9.216E+00	1.77E+03	1.20E+01 G
			93.35	-3.849E+00	+	2.268E+01	1.75E+02	5.56E+00 XA
TH-227	N	-4.0480E+00					7.95E+03	
			50.14	-4.048E+00	?(	1.719E+01	1.26E+02	8.00E+00 G
			256.24	6.463E-01	+	5.870E+00	3.18E+02	7.00E+00 G
TH-229	N	6.9449E-01					2.68E+06	
			193.51	6.945E-01	?(	1.165E+01	6.13E+02	4.40E+00 G
			210.85	-3.489E+00	+ P	1.854E+01	1.55E+02	2.99E+00 G
TH-234	N	-8.5897E+00					1.63E+12	
			63.29	-8.590E+00	(P	2.531E+01	6.13E+01	3.81E+00 G
			92.59	-1.029E+01	+ P	2.298E+01	3.55E+01	5.58E+00 G
PA-231	N	5.5392E+00					1.20E+07	
			302.65	5.157E+00	?(	3.268E+01	1.83E+02	2.88E+00 G
			300.07	5.986E+00	?(	3.394E+01	1.63E+02	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	7.1193E-01					7.82E+08	
			312.01	4.253E-01	?(	2.053E+00	1.39E+02	3.60E+01 G
			300.18	2.376E+00	&(	1.430E+01	1.73E+02	6.20E+00 G
PA-234	N	3.1321E-01					1.63E+12	
			131.29	3.132E-01	&(P	4.467E+00	4.15E+02	1.80E+01 G
			946.02	0.000E+00	-	3.582E+00	1.00E+03	1.34E+01 G
			569.47	-1.728E-01	%	8.915E+00	1.33E+03	8.20E+00 G
			883.24	0.000E+00	-	1.654E+01	1.00E+03	9.60E+00 G
			880.53	-3.402E+00	+	2.473E+01	2.03E+02	6.00E+00 GA
PA-234M	N	-6.6049E+00					1.63E+12	
			1001.00	-6.605E+00	?(P	1.285E+02	3.63E+02	8.37E-01 G
			766.41	-1.730E+02	+	4.533E+02	7.79E+01	2.94E-01 G
U-235	N	-8.8231E-01					2.57E+11	
			143.79	-8.823E-01	&(P	7.902E+00	2.64E+02	1.10E+01 G
			205.33	6.133E-02	% P	8.770E+00	5.06E+03	5.01E+00 G
			163.38	-8.345E-02	% P	1.410E+01	6.57E+03	5.08E+00 G
AM-241	T	4.7116E-01					1.58E+05	
			59.54	4.712E-01	?(	2.520E+00	1.56E+02	3.59E+01 G
Np-237	F	-1.5374E-01					2.14E+06	
			86.49	-1.537E-01	%(	8.378E+00	1.59E+03	1.31E+01 G
Ir-192	F	1.7845E-01					7.40E+01	
			316.49	1.784E-01	?(	9.311E-01	1.50E+02	8.70E+01 G
			468.06	-2.334E-02	%	2.219E+00	2.64E+03	5.18E+01 G
			308.44	-7.832E-08	%	3.355E+00	1.21E+09	3.18E+01 G
Cs-136	F	1.0685E-01					1.30E+01	
			818.50	-4.795E-02	?(	1.078E+00	5.94E+02	1.00E+02 G
			1048.07	-2.965E-02	%	1.284E+00	1.08E+03	8.00E+01 G
			340.57	4.369E-01	?(	2.112E+00	1.40E+02	4.69E+01 G
Np-239	T	9.0538E-01					2.36E+00	
			103.70	-5.073E-01	+	5.580E+00	3.26E+02	2.40E+01 X
			106.13	9.054E-01	?(	5.802E+00	1.91E+02	2.27E+01 G
			99.50	-1.413E+00	+	8.637E+00	1.82E+02	1.50E+01 X
Nd-147		1.4411E+00					1.11E+01	
			531.00	1.441E+00	?(	3.832E+00	1.02E+02	1.30E+01 G
			91.10	0.000E+00	-	3.810E+00	1.00E+03	2.83E+01 G

(- This peak used in the nuclide activity average.

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  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	122.	-13.	-0.007	125.59	-4.048E+00	
AM-241	59.54	81.	8.	0.005	156.31	4.712E-01	
TH-234	63.29	106.	-17.	-0.010	61.32	-8.590E+00	P
BA-133	80.99	37.	5.	0.003	226.72	2.346E-01	P
TH-234	92.59	329.	-39.	-0.022	35.46	-1.029E+01	P
AC-228	93.35	319.	-15.	-0.008	175.13	-3.849E+00	
Gd-153	97.50	333.	-15.	-0.008	178.30	-7.081E-01	
Np-239	99.50	348.	-15.	-0.008	181.76	-1.413E+00	
Gd-153	103.20	363.	-15.	-0.008	184.88	-9.698E-01	
Np-239	103.70	378.	-8.	-0.005	325.93	-5.073E-01	
Np-239	106.13	366.	14.	0.008	190.57	9.054E-01	
EU-152	121.78	50.	-9.	-0.005	116.00	-4.547E-01	
EU-154	123.10	50.	4.	0.002	289.26	1.241E-01	
PA-234	131.29	124.	4.	0.002	415.01	3.132E-01	P
HF-181	136.30	123.	5.	0.003	316.86	1.275E+00	
U-235	143.79	134.	-6.	-0.004	264.13	-8.823E-01	P
Ba-140	162.66	66.	-12.	-0.007	139.60	-3.187E+00	P
Cf-251	176.60	18.	8.	0.005	102.85	8.346E-01	
TH-229	193.51	29.	2.	0.001	612.86	6.945E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	210.85	30.	-5.	-0.003	155.18	-3.489E+00	P
Cf-251	227.00	22.	-1.	-0.001	883.18	-3.277E-01	
PB-214	242.00	41.	-10.	-0.005	99.86	-2.787E+00	
EU-152	244.69	36.	-8.	-0.004	121.68	-2.257E+00	P
TH-227	256.24	11.	2.	0.001	318.20	6.463E-01	
Cd-113m	263.70	22.	-6.	-0.004	110.41	-2.505E+03	
BI-210M	265.83	22.	7.	0.004	104.61	3.203E-01	
TL-208	277.28	34.	-9.	-0.005	103.12	-3.542E+00	P
I-131	284.30	20.	4.	0.002	224.54	1.595E+00	
PB-214	295.09	27.	-9.	-0.005	118.81	-1.153E+00	P
PB-212	300.03	37.	5.	0.003	197.67	3.516E+00	P
PA-231	300.07	41.	6.	0.003	163.19	5.986E+00	
PA-233	300.18	47.	6.	0.003	173.46	2.376E+00	
PA-231	302.65	53.	6.	0.003	182.85	5.157E+00	
BA-133	302.85	76.	-7.	-0.004	177.68	-9.930E-01	
Ba-140	304.85	69.	-2.	-0.001	779.72	-9.092E-01	
PA-233	312.01	30.	6.	0.003	138.68	4.253E-01	
Ir-192	316.49	35.	6.	0.003	150.09	1.784E-01	
CR-51	320.08	31.	5.	0.003	169.69	1.307E+00	P
La-140	328.76	48.	7.	0.004	140.12	9.738E-01	
Cf-249	333.44	55.	7.	0.004	149.19	1.293E+00	
Cs-136	340.57	49.	7.	0.004	140.40	4.369E-01	
EU-152	344.29	56.	7.	0.004	151.83	7.694E-01	
HF-181	345.83	46.	-8.	-0.005	118.24	-1.595E+00	
I-131	364.48	16.	-6.	-0.003	136.76	-2.181E-01	
BA-133	383.84	40.	-6.	-0.003	108.68	-2.147E+00	P
SN-113	391.69	23.	6.	0.003	118.06	3.024E-01	
SB-125	427.88	16.	-8.	-0.004	104.08	-9.114E-01	
AG-108M	433.94	9.	-1.	-0.001	598.28	-4.380E-02	P
pm-146	453.88	9.	-1.	-0.001	525.62	-7.335E-02	P
SB-125	463.37	31.	-9.	-0.005	96.54	-2.976E+00	
BE-7	477.60	11.	4.	0.002	122.58	1.473E+00	P
HF-181	482.00	15.	5.	0.003	131.84	2.084E-01	P
La-140	487.02	20.	3.	0.002	210.13	2.563E-01	
RU-103	497.05	18.	-6.	-0.003	107.16	-2.365E-01	P
RH-106	511.86	14.	32.	0.018	35.31	6.234E+00	
Nd-147	531.00	4.	5.	0.003	102.15	1.441E+00	
Ba-140	537.26	18.	-7.	-0.004	91.06	-1.126E+00	P
CS-134	563.24	9.	1.	0.000	956.50	3.267E-01	P
CS-134	569.32	9.	-1.	0.000	636.40	-1.842E-01	
TL-208	583.02	13.	-2.	-0.001	374.72	-1.026E-01	
SB-125	600.50	56.	-9.	-0.005	128.64	-2.131E+00	
SB-124	602.73	65.	-5.	-0.003	122.67	-2.319E-01	P
BI-214	609.31	75.	-6.	-0.003	126.78	-5.613E-01	P
SB-125	635.89	4.	4.	0.002	97.06	1.503E+00	P
AG-110M	657.76	0.	10.	0.006	31.62	5.060E-01	
CS-137	661.66	24.	-7.	-0.004	103.35	-4.085E-01	
PM-144	696.54	15.	-7.	-0.004	66.51	-3.451E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	702.63	0.	7.	0.004	38.67	3.605E-01		P
SB-124	722.79	8.	-1.	0.000	487.44	-3.994E-01		
pm-146	735.72	14.	-4.	-0.002	65.68	-1.039E+00		P
pm-146	747.16	14.	-2.	-0.001	403.11	-3.134E-01		
ZR-95	756.73	5.	4.	0.002	116.15	4.285E-01		
AG-110M	763.94	6.	3.	0.002	129.10	7.309E-01		
PA-234M	766.41	22.	-9.	-0.005	77.92	-1.730E+02		
BI-212	785.42	5.	-1.	0.000	698.21	-2.894E+00		
CS-134	795.87	9.	4.	0.002	127.70	2.439E-01		P
CS-134	801.95	22.	-8.	-0.004	91.81	-5.050E+00		
CO-58	810.78	10.	2.	0.001	234.52	1.148E-01		
Cs-136	818.50	12.	-1.	0.000	593.97	-4.795E-02		
MN-54	834.85	10.	-3.	-0.002	178.61	-1.589E-01		P
Co-56	846.77	9.	-3.	-0.002	140.50	-2.073E-01		P
TL-208	860.56	5.	1.	0.001	354.44	6.447E-01		
NB-94	871.10	5.	1.	0.001	331.66	6.074E-02		
EU-154	873.23	8.	-2.	-0.001	270.80	-7.433E-01		
PA-234	880.53	21.	-3.	-0.002	203.47	-3.402E+00		
y-88	898.04	16.	-10.	-0.006	48.23	-6.974E-01		P
AC-228	911.07	11.	-5.	-0.003	107.77	-1.064E+00		P
AG-110M	937.49	0.	6.	0.003	46.58	1.040E+00		P
EU-152	964.11	0.	7.	0.004	37.80	3.173E+00		
EU-154	996.33	0.	7.	0.004	37.80	4.497E+00		
PA-234M	1001.00	8.	-1.	0.000	363.33	-6.605E+00		P
RH-106	1050.36	10.	-5.	-0.003	158.36	-2.132E+01		
Ga-68	1077.40	0.	7.	0.004	37.80	1.821E+01		
EU-152	1112.07	10.	-4.	-0.002	135.53	-1.922E+00		
BI-214	1120.29	6.	-3.	-0.001	154.00	-1.255E+00		P
CO-60	1173.24	6.	1.	0.001	376.30	1.137E-01		P
NA-22	1274.53	5.	-3.	-0.002	112.25	-2.817E-01		
CO-60	1332.50	6.	-2.	-0.001	330.55	-1.459E-01		P
AG-110M	1384.30	6.	-3.	-0.001	218.12	-9.975E-01		
EU-152	1408.00	11.	-7.	-0.004	113.82	-3.221E+00		
K-40	1460.83	4.	-4.	-0.002	162.79	-3.425E+00		P
SB-124	1690.98	6.	-4.	-0.002	156.12	-9.101E-01		
BI-214	1764.49	10.	-7.	-0.004	95.45	-5.066E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.4732E+00	1.4733E+00	1.226E+02%	6.38E+00
NA-22	#A	-2.8165E-01	-2.8165E-01	1.122E+02%	1.14E+00
K-40	#A	-3.4248E+00	-3.4248E+00	1.628E+02%	1.06E+01
Sc-46	#A	-2.0589E-02	-2.0589E-02	2.128E+03%	1.61E+00

CR-51	#A	1.3066E+00	1.3066E+00	1.697E+02%	7.75E+00
MN-54	#A	-1.5889E-01	-1.5889E-01	1.786E+02%	1.01E+00
FE-59	#A	-9.5253E-03	-9.5254E-03	4.135E+03%	9.67E-01
Co-56	#A	-2.0734E-01	-2.0735E-01	1.405E+02%	1.01E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.50E-01
CO-58	#A	1.1478E-01	1.1478E-01	2.345E+02%	1.00E+00
CO-60	#A	-1.6162E-02	-1.6162E-02	2.504E+02%	1.21E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.90E+00
NB-94	#A	3.6046E-01	3.6046E-01	3.867E+01%	3.81E-01
ZR-95	#A	4.2846E-01	4.2846E-01	1.162E+02%	1.26E+00
NB-95	#A	-9.0841E-03	-9.0842E-03	2.581E+03%	9.17E-01
RU-103	#A	-2.3648E-01	-2.3648E-01	1.072E+02%	9.33E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.91E+01
AG-108M	#A	-4.3797E-02	-4.3797E-02	5.983E+02%	6.34E-01
AG-110M	#A	4.4605E-01	4.4605E-01	3.162E+01%	2.19E+00
SN-113	#A	3.0235E-01	3.0235E-01	1.181E+02%	1.24E+00
SB-124	#A	-2.3193E-01	-2.3193E-01	1.227E+02%	1.83E+00
SB-125	#A	-2.4403E-01	-2.4403E-01	7.116E+01%	2.43E+00
I-131	#A	-9.1350E-02	-9.1358E-02	1.315E+02%	7.76E-01
Gd-153	#A	-7.0809E-01	-7.0809E-01	1.783E+02%	4.25E+00
Ga-68	#A	1.7953E+01	1.8209E+01	3.780E+01%	1.92E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.67E-01
BA-133	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.63E-01
CS-134	#A	1.2316E-01	1.2316E-01	1.277E+02%	1.91E+00
CS-137	#A	-4.0853E-01	-4.0853E-01	1.034E+02%	1.45E+00
CE-139	#A	1.3666E-02	1.3667E-02	1.771E+03%	8.51E-01
Ba-140	#A	-1.1256E+00	-1.1257E+00	9.106E+01%	3.72E+00
La-140	#A	1.7623E-01	1.7624E-01	1.401E+02%	7.97E-01
CE-141	#A	-3.1859E-02	-3.1860E-02	1.360E+03%	1.51E+00
CE-144	#A	-1.6488E-01	-1.6488E-01	1.306E+03%	7.43E+00
PM-144	#A	-3.4512E-01	-3.4512E-01	6.651E+01%	1.05E+00
EU-152	#A	1.6233E+00	1.6233E+00	3.780E+01%	4.02E+00
EU-154	#A	1.6855E+00	1.6855E+00	3.780E+01%	7.67E+00
EU-155	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.37E+00
HF-181	#A	2.8060E-01	2.8061E-01	1.318E+02%	9.67E-01
Ta-182	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.47E+00
Hg-203	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.65E-01
TL-208	#A	-6.8150E-03	-6.8150E-03	2.579E+02%	1.00E+00
pm-146	#A	-3.1337E-01	-3.1337E-01	4.031E+02%	3.16E+00
y-88	#A	-6.9742E-01	-6.9743E-01	4.823E+01%	1.40E+00
Cd-113m	#A	-2.5045E+03	-2.5045E+03	1.104E+02%	9.56E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.88E+01
Cf-251	#A	8.3458E-01	8.3458E-01	1.029E+02%	2.29E+00
Cf-249	#A	2.4604E-01	2.4604E-01	1.492E+02%	1.58E+00
Sn-126	#A	2.2500E-01	2.2500E-01	1.087E+03%	8.55E+00
PB-210	A	9.5469E+00	9.5469E+00	5.752E+01%	1.66E+01
PB-212	#A	2.5836E-02	2.5836E-02	1.785E+03%	1.62E+00
PB-214	#A	3.3357E-02	3.3357E-02	1.491E+03%	1.81E+00
BI-207	#A	-1.4501E-02	-1.4501E-02	1.375E+03%	7.70E-01

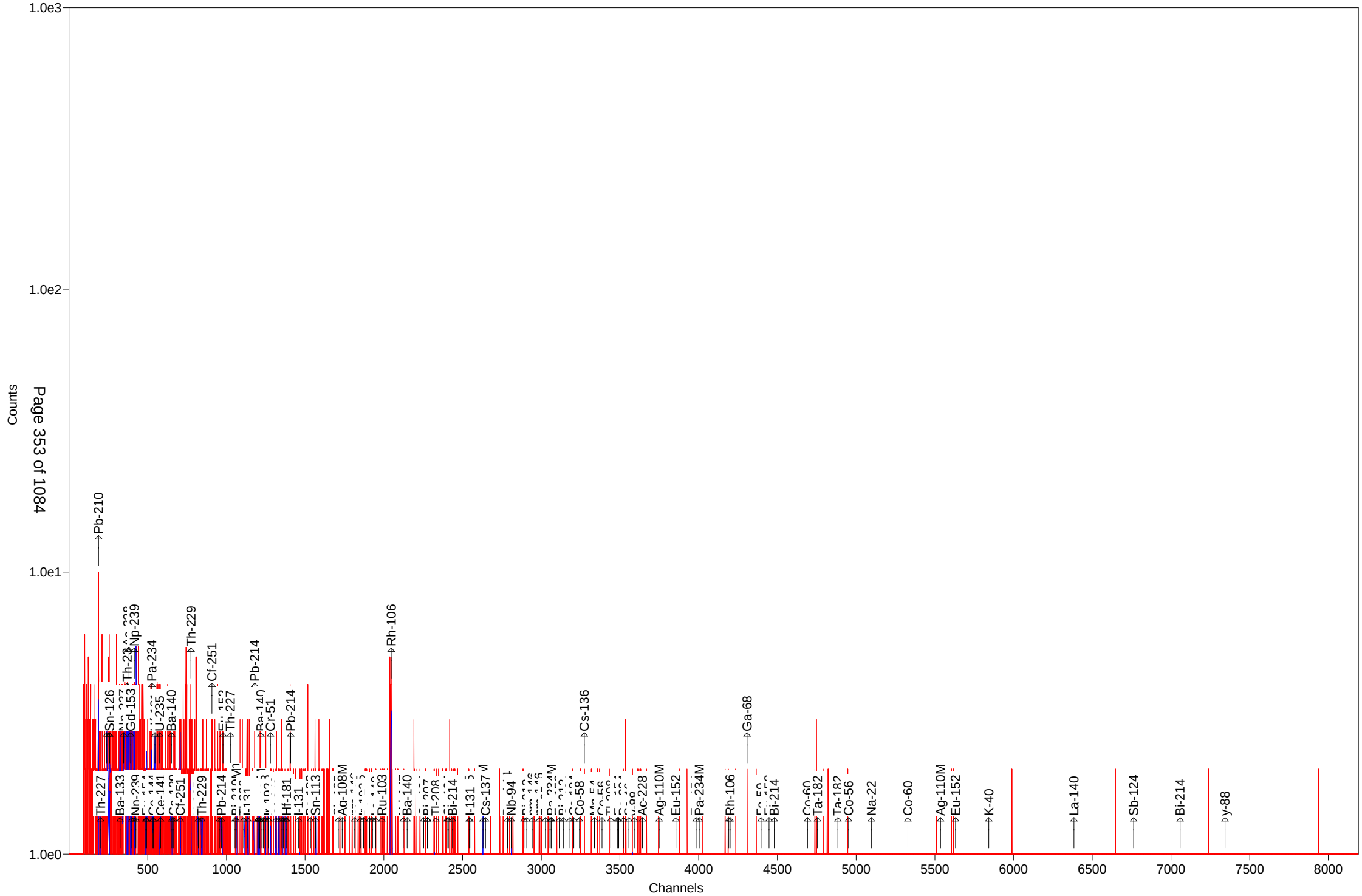
BI-212 #A	2.2990E-01	2.2990E-01	1.237E+03%	1.11E+01
BI-214 #A	-5.6133E-01	-5.6133E-01	1.268E+02%	4.19E+00
BI-210M#A	3.2034E-01	3.2034E-01	1.046E+02%	1.15E+00
AC-228 #A	-1.0637E+00	-1.0637E+00	1.078E+02%	3.93E+00
TH-227 #A	-4.0480E+00	-4.0480E+00	1.256E+02%	1.72E+01
TH-229 #A	6.9449E-01	6.9449E-01	6.129E+02%	1.16E+01
TH-234 #A	-8.5897E+00	-8.5897E+00	6.132E+01%	2.53E+01
PA-231 #A	5.5392E+00	5.5392E+00	1.225E+02%	3.27E+01
PA-233 #A	7.1193E-01	7.1193E-01	1.110E+02%	2.05E+00
PA-234 #A	3.1321E-01	3.1321E-01	4.150E+02%	4.47E+00
PA-234M#A	-6.6049E+00	-6.6049E+00	3.633E+02%	1.29E+02
U-235 #A	-8.8231E-01	-8.8231E-01	2.641E+02%	7.90E+00
AM-241 #A	4.7116E-01	4.7116E-01	1.563E+02%	2.52E+00
Np-237 #A	-1.5374E-01	-1.5374E-01	1.595E+03%	8.38E+00
Ir-192 #A	1.7845E-01	1.7845E-01	1.501E+02%	9.31E-01
Cs-136 #A	1.0684E-01	1.0685E-01	1.404E+02%	1.08E+00
Np-239 #A	9.0513E-01	9.0538E-01	1.906E+02%	5.80E+00
Nd-147 #A	1.4410E+00	1.4411E+00	1.021E+02%	3.83E+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) 9.547E+00 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 9.5469494E+00 Bq/Sample

265170_Gamma_MB 160-265170~1-A. 15_Gamma_20161115.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162152

Sample Description: 265170_Gamma_LCS 160-265170~2-A
Detector: Detector #16
Batch ID: 265170
Work Order Number: Gamma
Lot Number: LCS 160-265170~2-A

Decay to Time: 9/7/2016 16:24 Live Time: 1800 sec
Acquisition Time: 9/7/2016 16:24:38 Real Time: 1825 sec
Analysis Time: 9/7/2016 16:55 Dead Time: 1.35 %
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_2016-09-03_2304.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	-1.487E+01	100.0	1.487E+01	1.489E+01	4.929E+01
NA-22	-1.024E+00	109.5	1.121E+00	1.122E+00	2.334E+00
K-40	5.831E+00	85.7	4.998E+00	5.007E+00	1.328E+01
Sc-46	5.555E-01	275.4	1.530E+00	1.530E+00	5.136E+00
CR-51	0.000E+00	1.#INF	5.900E+00	5.900E+00	4.413E+01
MN-54	-1.975E+00	62.9	1.242E+00	1.246E+00	3.618E+00
FE-59	-4.425E+00	81.3	3.596E+00	3.602E+00	7.506E+00
Co-56	-1.452E-01	91.7	1.332E-01	1.334E-01	3.444E+00
CO-57	8.330E-01	91.3	7.608E-01	7.620E-01	2.140E+00
CO-58	-1.931E+00	79.7	1.539E+00	1.542E+00	5.097E+00
CO-60	2.073E+02	1.3	2.600E+00	1.073E+01	9.465E-01
ZN-65	0.000E+00	1.#INF	1.165E+00	1.165E+00	1.058E+01
NB-94	-6.560E-02	1617.0	1.061E+00	1.061E+00	3.596E+00
ZR-95	1.728E+00	72.5	1.252E+00	1.255E+00	5.095E+00
NB-95	-4.200E-03	25122.2	1.055E+00	1.055E+00	3.330E+00
RU-103	3.331E-01	402.0	1.339E+00	1.339E+00	3.135E+00
RH-106	1.277E+01	130.7	1.669E+01	1.670E+01	5.548E+01
AG-108M	-1.711E+00	83.7	1.433E+00	1.435E+00	3.648E+00
AG-110M	5.835E-01	98.8	5.762E-01	5.770E-01	7.052E+00
SN-113	-2.183E+00	101.0	2.206E+00	2.209E+00	7.310E+00
SB-124	1.031E+00	160.1	1.651E+00	1.652E+00	5.499E+00
SB-125	6.434E+00	69.0	4.439E+00	4.451E+00	1.006E+01
I-131	3.885E-01	135.3	5.257E-01	5.261E-01	3.224E+00
Gd-153	1.436E+00	175.4	2.518E+00	2.520E+00	1.475E+01
Ga-68	-1.230E+01	558.1	6.867E+01	6.867E+01	1.454E+02
Tc-99m	1.083E-07	1074097612.2	1.164E+00	1.164E+00	3.873E+00
BA-133	-1.906E+00	94.3	1.797E+00	1.800E+00	5.957E+00
CS-134	1.064E+00	76.0	8.082E-01	8.101E-01	5.620E+00
CS-137	3.706E+02	1.2	4.263E+00	1.975E+01	2.980E+00
CE-139	-9.632E-01	95.0	9.150E-01	9.196E-01	3.031E+00
Ba-140	2.046E-01	98.2	2.010E-01	2.012E-01	1.111E+01
La-140	1.013E+00	116.5	1.180E+00	1.182E+00	1.417E+00
CE-141	-1.233E+00	121.9	1.504E+00	1.505E+00	3.789E+00

CE-144	-2.597E+00	342.1	8.885E+00	8.886E+00	2.952E+01
PM-144	1.251E+00	74.6	9.334E-01	9.356E-01	3.285E+00
EU-152	4.872E+00	62.4	3.038E+00	3.049E+00	1.846E+01
EU-154	-1.800E+01	65.8	1.184E+01	1.187E+01	3.906E+01
EU-155	3.508E+00	174.6	6.125E+00	6.128E+00	2.028E+01
HF-181	-1.976E+00	97.0	1.916E+00	1.919E+00	6.349E+00
Ta-182	1.536E+00	296.6	4.556E+00	4.556E+00	1.534E+01
Hg-203	-2.213E-01	454.8	1.007E+00	1.007E+00	3.372E+00
TL-208	3.266E+00	57.5	1.877E+00	1.885E+00	3.012E+00
pm-146	6.978E-01	151.7	1.059E+00	1.059E+00	7.722E+00
y-88	1.896E+00	83.8	1.590E+00	1.593E+00	3.439E+00
Cd-113m	6.181E+03	226.4	1.399E+04	1.400E+04	4.672E+04
Cd-109	6.872E+01	25.6	1.759E+01	1.800E+01	4.414E+01
Cf-251	1.561E+00	283.7	4.430E+00	4.432E+00	1.122E+01
Cf-249	-3.581E-01	81.4	2.916E-01	2.922E-01	6.520E+00
Sn-126	-1.980E+01	216.1	4.277E+01	4.278E+01	1.412E+02
PB-210	9.969E+03	0.9	8.983E+01	5.922E+02	1.671E+02
PB-212	8.503E+00	15.8	1.345E+00	1.453E+00	4.094E+00
PB-214	8.687E+00	26.9	2.339E+00	2.383E+00	6.028E+00
BI-207	6.086E-01	194.4	1.183E+00	1.183E+00	2.867E+00
BI-212	4.028E+00	365.8	1.474E+01	1.474E+01	4.972E+01
BI-214	4.250E+00	37.9	1.609E+00	1.624E+00	4.098E+00
BI-210M	-2.144E+00	84.0	1.801E+00	1.805E+00	5.961E+00
AC-228	2.483E+01	19.7	4.885E+00	5.047E+00	9.894E+00
TH-227	-3.912E+01	167.3	6.543E+01	6.547E+01	2.161E+02
TH-229	3.724E+00	489.4	1.823E+01	1.823E+01	4.623E+01
TH-234	-6.104E+01	141.5	8.639E+01	8.645E+01	3.603E+02
PA-231	0.000E+00	1.#INF	1.648E+01	1.648E+01	1.824E+02
PA-233	-1.605E+00	222.5	3.570E+00	3.571E+00	1.188E+01
PA-234	1.520E+00	261.1	3.968E+00	3.969E+00	1.894E+01
PA-234M	-2.651E+02	85.0	2.252E+02	2.256E+02	6.063E+02
U-235	4.152E+00	99.3	4.123E+00	4.129E+00	1.673E+01
AM-241	1.227E+03	0.8	9.808E+00	6.441E+01	1.414E+01
Np-237	-6.119E+00	174.2	1.066E+01	1.067E+01	3.530E+01
Ir-192	1.095E+00	85.4	9.357E-01	9.380E-01	4.999E+00
Cs-136	-1.927E+00	85.4	1.645E+00	1.648E+00	5.452E+00
Np-239	3.277E+00	175.4	5.747E+00	5.750E+00	1.903E+01
Nd-147	9.822E+00	88.8	8.722E+00	8.740E+00	2.025E+01
Total	1.815E+04				

Analyst: Mike Aldridge

TestAmerica Inc Spectrum name: 16_Gamma_20162152.An1

Sample description
265170_Gamma_LCS 160-265170~2-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162152.An1

Acquisition information
Start time: 9/7/2016 4:24:38 PM
Live time: 1800
Real time: 1825
Dead time: 1.35 %
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	9/7/2016 4:24:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-09-03_2304.PBC 9/3/2016 11:04:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 34 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1780

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.55	17938.	0.90	0.96	2.349E-02	46.54	4.250	9.969E+03	PB210
49.70	101.	89.66	0.96	2.605E-02	50.14	8.000	2.663E+01	TH227
59.54	26368.	0.80	0.97	3.327E-02	59.54	35.900	1.227E+03	AM241
79.45	66.	61.06	0.54	4.311E-02				
87.84	213.	25.60	1.12	4.546E-02	86.94	9.040	2.897E+01	Sn126
					87.57	37.500	6.962E+00	Sn126
					88.04	3.790	6.872E+01	Cd109
103.20	64.	175.37	1.01	4.755E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	3.098E+00	Np239
103.70	64.	174.39	1.01	4.758E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	3.099E+00	Np239
105.31	64.	174.61	1.01	4.766E-02	105.31	21.200	PBC<MDA	EU155
106.13	64.	175.38	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
110.42	94.	43.11	0.46	4.775E-02				
121.66	52.	91.33	1.03	4.729E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	7.068E-01	CO57
136.56	16.	507.31	1.04	4.573E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.844E+00	CO57
162.66	56.	98.22	1.07	4.136E-02	162.66	6.220	PBC<MDA	Ba140
163.38	10.	573.97	1.07	4.123E-02	163.38	5.080	PBC<MDA	U235
176.60	19.	283.75	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
193.51	11.	489.43	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	54.	99.30	1.11	3.577E-02	205.33	5.010	PBC<MDA	U235
227.00	54.	94.69	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.35	242.	19.83	0.89	3.219E-02	238.63	43.300	9.007E+00	PB212
244.49	54.	108.65	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
263.70	20.	226.38	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	42.	89.73	1.17	2.890E-02	277.28	6.310	PBC<MDA	TL208
294.93	81.	43.90	2.79	2.765E-02	295.09	19.300	PBC<MDA	PB214
328.76	40.	116.49	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
333.44	48.	131.44	1.22	2.533E-02	333.44	15.510	PBC<MDA	Cf249
338.18	44.	144.16	1.23	2.506E-02	338.32	12.010	PBC<MDA	AC228
343.14	56.	45.57	0.58	2.481E-02				
351.56	156.	29.00	0.70	2.438E-02	351.93	37.600	8.826E+00	PB214
403.09	92.	34.11	0.32	2.209E-02				
427.88	35.	141.47	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
453.88	33.	151.73	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
463.37	55.	85.25	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
468.06	54.	85.44	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
497.05	10.	402.00	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.07	251.	27.56	3.85	1.858E-02	511.86	20.000	3.751E+01	RH106
531.00	42.	88.79	1.40	1.807E-02	531.00	13.000	PBC<MDA	Nd147
569.32	18.	132.30	1.43	1.717E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.973E+00	PA234
					569.70	97.740	5.852E-01	BI207
569.70	5.	479.01	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.105E+00	PA234
					569.70	97.740	1.767E-01	BI207
583.55	122.	24.59	1.32	1.686E-02	583.02	84.500	4.400E+00	TL208
600.50	38.	124.76	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
602.73	30.	160.11	1.46	1.646E-02	602.73	98.260	PBC<MDA	SB124
609.65	58.	37.87	1.15	1.633E-02	609.31	46.090	4.250E+00	BI214
618.06	37.	125.24	1.47	1.616E-02	618.06	99.100	PBC<MDA	PM144
621.92	37.	130.71	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106
636.97	19.	135.31	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
661.76	8736.	1.15	1.50	1.537E-02	661.66	85.210	3.706E+02	CS137
696.54	32.	81.22	1.54	1.479E-02	696.54	99.000	PBC<MDA	PM144
724.20	36.	72.48	1.57	1.437E-02	724.20	44.150	PBC<MDA	ZR95
727.17	8.	365.84	1.57	1.433E-02	727.17	7.550	PBC<MDA	BI212
756.73	8.	398.13	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
778.92	29.	100.42	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.42	34.	84.22	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
795.87	37.	75.96	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
860.56	15.	223.85	1.69	1.264E-02	860.56	12.420	PBC<MDA	TL208
879.61	29.	115.25	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
889.28	12.	275.40	1.71	1.234E-02	889.28	99.984	PBC<MDA	Sc46
898.04	39.	83.85	1.72	1.225E-02	898.04	93.700	PBC<MDA	y88
911.07	157.	19.68	1.73	1.211E-02	911.07	29.000	2.483E+01	AC228
946.02	15.	261.07	1.76	1.178E-02	946.02	13.400	PBC<MDA	PA234
964.11	18.	157.30	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
965.65	42.	68.64	1.78	1.157E-02	968.97	17.460	PBC<MDA	AC228
996.33	39.	61.87	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1004.77	4.	875.26	1.81	1.126E-02	1004.77	18.010	PBC<MDA	EU154
1063.66	17.	194.36	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1112.07	27.	107.92	1.90	1.043E-02	1112.07	13.644	PBC<MDA	EU152
1120.90	10.	296.65	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.536E+00	Ta182
1173.41	3694.	1.82	2.04	1.002E-02	1173.24	99.900	2.051E+02	CO60
1238.28	15.	111.24	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1332.68	3429.	1.72	2.01	9.096E-03	1332.50	99.980	2.095E+02	CO60
1384.30	9.	98.76	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	13.	27.74	2.14	8.723E-03	1408.00	21.005	3.941E+00	EU152
1461.01	10.	85.71	2.19	8.482E-03	1460.83	10.670	PBC<MDA	K40
1596.21	4.	209.54	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1764.02	5.	164.10	2.43	7.342E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	81.97	2.43	7.320E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	6.	111.28	2.48	7.121E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
198.34	49.65	4083.	99.	3.796E+03	91.93	0.962	-	c
317.45	79.45	578.	66.	1.523E+03	61.06	0.539	-	sM
441.26	110.42	516.	94.	1.968E+03	43.11	0.456	-	sM
1372.68	343.14	307.	67.	2.683E+03	39.18	1.231	-	sD
1611.53	403.09	255.	92.	4.166E+03	34.11	0.316	-	sM
2043.38	511.07	570.	251.	1.349E+04	27.56	3.852	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.54	4091.	17938.	9.966	0.90	0.959D
TH-227	200.26	50.14	30966.	-149.	-0.083	167.28	0.963
AM-241	237.85	59.54	4179.	26368.	14.649	0.80	0.974
TH-234	252.82	63.29	35433.	-149.	-0.083	141.53	0.975
Sn-126	256.79	64.28	36465.	-125.	-0.069	216.07	0.976
BA-133	323.60	80.99	1666.	-39.	-0.022	540.35	0.991
Np-237	345.59	86.49	6408.	-65.	-0.036	174.23	0.996s
EU-155	345.80	86.54	6353.	-66.	-0.037	170.86	0.996s
Sn-126	347.39	86.94	6287.	-66.	-0.037	169.93	0.997
Sn-126	349.91	87.57	6221.	-66.	-0.037	168.92	0.997
Cd-109	350.99	87.84	831.	213.	0.119	25.60	1.118
Nd-147	364.02	91.10	6255.	-66.	-0.037	168.84	1.001s
TH-234	369.98	92.59	6362.	-96.	-0.053	221.04	1.002
AC-228	373.02	93.35	6377.	0.	0.000	1000.00	1.003
Gd-153	389.61	97.50	6377.	0.	0.000	1000.00	1.007s
Np-239	397.61	99.50	6377.	0.	0.000	1000.00	1.008
Gd-153	412.40	103.20	6201.	64.	0.035	175.37	1.012s
Np-239	414.40	103.70	6137.	64.	0.035	174.39	1.012s
EU-155	420.85	105.31	6172.	64.	0.035	174.61	1.014s
Np-239	424.11	106.13	6236.	64.	0.035	175.38	1.014s
EU-152	486.67	121.78	1071.	-34.	-0.019	137.20	1.029
CO-57	487.81	122.06	1080.	52.	0.029	91.33	1.029s
EU-154	491.96	123.10	1300.	-47.	-0.026	109.47	1.030
PA-234	524.73	131.29	3663.	-18.	-0.010	478.57	1.038
HF-181	531.64	133.02	3292.	-59.	-0.033	137.61	1.039s
CE-144	533.70	133.54	3334.	-24.	-0.013	342.13	1.040s
CO-57	545.43	136.47	3374.	16.	0.009	507.31	1.042s
CE-141	581.29	145.44	945.	-47.	-0.026	121.93	1.050s
Ba-140	650.14	162.66	1476.	56.	0.031	98.22	1.066s
U-235	653.01	163.38	1532.	10.	0.005	573.97	1.067s
CE-139	662.90	165.85	1466.	-58.	-0.032	95.00	1.069s
Cf-251	705.88	176.60	825.	19.	0.011	283.75	1.079
TH-229	773.49	193.51	825.	11.	0.006	489.43	1.094s
U-235	820.76	205.33	810.	54.	0.030	99.30	1.105s
TH-229	842.82	210.85	1012.	-64.	-0.036	93.67	1.110s
Cf-251	907.40	227.00	741.	54.	0.030	94.69	1.125s
PB-212	953.91	238.63	460.	213.	0.118	15.81	1.136D
PB-214	967.37	242.00	2019.	-57.	-0.032	111.59	1.139s
EU-152	978.14	244.69	1691.	54.	0.030	108.65	1.141s
TH-227	1024.32	256.24	748.	-6.	-0.003	893.39	1.152s
Cd-113m	1054.15	263.70	1015.	20.	0.011	226.38	1.158s
BI-210M	1062.67	265.83	1136.	-57.	-0.032	84.01	1.160
TL-208	1108.46	277.28	685.	42.	0.023	89.73	1.171
Hg-203	1116.13	279.20	896.	-9.	-0.005	454.82	1.173

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1179.04	294.93	339.	81.	0.045	43.90	2.788s
PB-212	1199.42	300.03	2837.	-54.	-0.030	65.99	1.191
PA-231	1199.58	300.07	2888.	-52.	-0.029	146.19	1.192s
PA-233	1200.02	300.18	2940.	-31.	-0.017	247.44	1.192s
PA-231	1209.90	302.65	2971.	0.	0.000	1000.00	1.194s
Ir-192	1233.05	308.44	1822.	-52.	-0.029	117.57	1.199s
PA-233	1247.34	312.01	1874.	-28.	-0.015	222.48	1.202s
Ir-192	1265.24	316.49	1902.	0.	0.000	1000.00	1.206s
CR-51	1279.62	320.08	1902.	0.	0.000	1000.00	1.210s
La-140	1314.31	328.76	556.	40.	0.022	116.49	1.217s
Cf-249	1333.02	333.44	1985.	48.	0.027	131.44	1.222
AC-228	1352.54	338.32	2033.	44.	0.025	144.16	1.226
Cs-136	1361.54	340.57	2077.	0.	0.000	1000.00	1.228s
EU-152	1376.40	344.29	2134.	-33.	-0.018	197.30	1.231s
HF-181	1382.56	345.83	2569.	-54.	-0.030	66.41	1.233s
PB-214	1405.50	351.56	430.	146.	0.081	31.19	0.696s
BA-133	1423.24	356.00	1150.	-51.	-0.029	94.28	1.242s
I-131	1457.16	364.48	556.	-13.	-0.007	341.60	1.250s
BA-133	1534.57	383.84	1326.	-55.	-0.031	94.59	1.267s
Cf-249	1551.01	387.95	1381.	-55.	-0.031	96.22	1.271s
SN-113	1565.96	391.69	1614.	-57.	-0.032	101.05	1.274
SB-125	1710.67	427.88	563.	35.	0.019	141.47	1.307s
AG-108M	1734.91	433.94	682.	-58.	-0.032	83.71	1.312s
pm-146	1814.67	453.88	608.	33.	0.019	151.73	1.330s
SB-125	1852.61	463.37	1089.	55.	0.031	85.25	1.338
Ir-192	1871.38	468.06	1045.	54.	0.030	85.44	1.342s
BE-7	1909.51	477.60	1484.	-55.	-0.031	100.04	1.351
HF-181	1927.12	482.00	1422.	-56.	-0.031	96.99	1.355s
La-140	1947.21	487.02	1559.	-55.	-0.031	101.52	1.359
RU-103	1987.33	497.05	412.	10.	0.006	402.00	1.368s
RH-106	2046.57	511.86	1101.	-86.	-0.048	55.44	2.631s
Nd-147	2123.10	531.00	316.	42.	0.023	88.79	1.398s
Ba-140	2148.14	537.26	330.	-22.	-0.012	311.83	1.404s
CS-134	2276.36	569.32	264.	18.	0.010	132.30	1.432s
PA-234	2276.96	569.47	324.	-29.	-0.016	90.70	1.432
BI-207	2277.89	569.70	324.	5.	0.003	479.01	1.432s
TL-208	2331.16	583.02	256.	58.	0.032	57.47	1.444s
SB-125	2401.07	600.50	1103.	38.	0.021	124.76	1.460s
SB-124	2409.99	602.73	1141.	30.	0.017	160.11	1.462s
CS-134	2417.91	604.71	1171.	0.	0.000	1000.00	1.463s
BI-214	2437.65	609.65	128.	58.	0.032	37.87	1.151
RU-103	2440.26	610.30	1171.	0.	0.000	1000.00	1.468
AG-108M	2456.19	614.28	1171.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	1054.	37.	0.021	125.24	1.475s
RH-106	2486.73	621.92	1132.	37.	0.020	130.71	1.479s
SB-125	2542.62	635.89	271.	-22.	-0.012	109.51	1.491s
I-131	2546.96	636.97	310.	19.	0.010	135.31	1.492s
AG-110M	2630.10	657.76	9136.	-37.	-0.021	361.00	1.510s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2646.08	661.76	210.	8736.	4.853	1.15	1.497
PM-144	2785.22	696.54	324.	32.	0.018	81.22	1.544s
SB-124	2890.19	722.79	414.	-40.	-0.022	73.62	1.567s
AG-108M	2890.80	722.94	454.	-36.	-0.020	85.40	1.567s
EU-154	2892.47	723.36	490.	0.	0.000	1000.00	1.567
ZR-95	2895.84	724.20	325.	36.	0.020	72.48	1.568s
BI-212	2907.73	727.17	408.	8.	0.004	365.84	1.570
pm-146	2987.69	747.16	187.	-6.	-0.003	513.18	1.588s
ZR-95	3025.97	756.73	205.	8.	0.004	398.13	1.596
PA-234M	3064.70	766.41	257.	-28.	-0.016	92.33	1.605
EU-152	3114.73	778.92	182.	29.	0.016	100.42	1.615
BI-212	3140.74	785.42	178.	34.	0.019	84.22	1.621
CS-134	3182.53	795.87	380.	37.	0.021	75.96	1.630s
CS-134	3206.86	801.95	559.	-43.	-0.024	78.72	1.635s
CO-58	3242.16	810.78	640.	-46.	-0.025	79.69	1.643s
La-140	3262.14	815.77	686.	-46.	-0.025	82.17	1.647s
Cs-136	3273.06	818.50	732.	-46.	-0.025	85.36	1.649s
MN-54	3338.46	834.85	306.	-46.	-0.026	62.88	1.663s
Co-56	3386.15	846.77	270.	-25.	-0.014	145.88	1.674s
TL-208	3441.33	860.56	231.	15.	0.008	223.85	1.685
NB-94	3483.47	871.10	418.	-48.	-0.027	62.11	1.695s
EU-154	3492.00	873.23	509.	-50.	-0.028	65.77	1.696
PA-234	3521.21	880.53	544.	29.	0.016	115.25	1.703s
PA-234	3532.05	883.24	573.	0.	0.000	1000.00	1.705
AG-110M	3537.82	884.68	573.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	571.	12.	0.007	275.40	1.710s
y-88	3591.26	898.04	215.	39.	0.022	83.85	1.718s
AC-228	3643.38	911.07	165.	157.	0.087	19.68	1.729
AG-110M	3749.09	937.49	320.	-8.	-0.005	407.99	1.751s
PA-234	3783.21	946.02	300.	15.	0.008	261.07	1.759
EU-152	3855.58	964.11	376.	18.	0.010	157.30	1.774
AC-228	3875.02	968.97	393.	42.	0.023	68.64	1.778s
EU-154	3984.48	996.33	266.	39.	0.021	61.87	1.801
PA-234M	4003.15	1001.00	464.	-45.	-0.025	84.96	1.805s
EU-154	4018.27	1004.77	545.	4.	0.002	875.26	1.808
Cs-136	4191.49	1048.07	253.	-5.	-0.003	452.11	1.845s
RH-106	4200.65	1050.36	355.	-27.	-0.015	100.55	1.847s
BI-207	4253.86	1063.66	208.	17.	0.009	194.36	1.858s
Ga-68	4308.84	1077.40	267.	-7.	-0.004	558.12	1.870
FE-59	4396.27	1099.25	277.	-47.	-0.026	81.26	1.888s
EU-152	4447.58	1112.07	411.	27.	0.015	107.92	1.899
ZN-65	4461.46	1115.55	438.	0.	0.000	1000.00	1.901s
Ta-182	4484.49	1121.30	435.	10.	0.006	296.65	1.906s
CO-60	4693.00	1173.41	106.	3694.	2.052	1.82	2.045
Ta-182	4755.57	1189.05	91.	-3.	-0.001	839.64	1.963s
Ta-182	4885.06	1221.41	102.	-29.	-0.016	82.76	1.990s
Co-56	4952.57	1238.28	45.	15.	0.008	111.24	2.004s
NA-22	5097.62	1274.53	62.	-17.	-0.010	109.49	2.034

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	5097.68	1274.54	80.	0.	0.000	1000.00	2.034
CO-60	5330.31	1332.68	8.	3429.	1.905	1.72	2.011
AG-110M	5536.89	1384.30	12.	9.	0.005	98.76	2.124s
EU-152	5631.75	1408.00	0.	13.	0.007	27.74	2.143
K-40	5843.19	1460.83	16.	10.	0.005	85.71	2.186s
La-140	6385.02	1596.21	13.	4.	0.002	209.54	2.294s
SB-124	6764.37	1690.98	13.	-1.	-0.001	702.57	2.369s
BI-214	7058.61	1764.49	29.	5.	0.003	164.10	2.427
Co-56	7086.08	1771.35	20.	8.	0.005	81.97	2.433s
y-88	7345.12	1836.06	7.	6.	0.004	111.28	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	Nuclide Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.4867E+01				5.31E+01	
			477.60	-1.487E+01	&(	4.929E+01 1.00E+02 1.05E+01	G
NA-22	C	-1.0241E+00				9.50E+02	
			1274.53	-1.024E+00	&(	2.334E+00 1.09E+02 9.99E+01	G
K-40	N	5.8315E+00				4.66E+11	
			1460.83	5.831E+00	?(P	1.328E+01 8.57E+01 1.07E+01	G
Sc-46	F	5.5552E-01				8.38E+01	
			889.28	5.555E-01	*(	5.136E+00 2.75E+02 1.00E+02	G
			1120.55	-1.797E-01	& P	5.390E+00 1.15E+03 1.00E+02	G
MN-54	C	-1.9752E+00				3.12E+02	
			834.85	-1.975E+00	?(P	3.618E+00 6.29E+01 1.00E+02	G
FE-59	F	-4.4246E+00				4.45E+01	
			1099.25	-4.425E+00	?(	7.506E+00 8.13E+01 5.65E+01	G
			1291.60	4.602E-02	%	4.426E+00 4.43E+03 4.32E+01	G
Co-56	C	-1.4523E-01				7.73E+01	
			846.77	-1.086E+00	?(	3.444E+00 1.46E+02 9.99E+01	G
			1238.28	1.278E+00	(P	2.982E+00 1.11E+02 6.61E+01	G
			1037.84	1.074E+00	%	2.680E+01 1.18E+03 1.41E+01	G
			1771.35	4.150E+00	?	1.150E+01 8.20E+01 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	8.3296E-01					2.72E+02	
			122.06	7.068E-01	?(	2.140E+00	9.13E+01	8.56E+01 G
			136.47	1.844E+00	&(	3.109E+01	5.07E+02	1.07E+01 G
CO-58	C	-1.9310E+00					7.09E+01	
			810.78	-1.931E+00	?(	5.097E+00	7.97E+01	9.95E+01 G
CO-60	F	2.0728E+02					1.93E+03	
			1332.50	2.095E+02	(P	9.465E-01	1.72E+00	1.00E+02 G
			1173.24	2.051E+02	(P	2.817E+00	1.82E+00	9.99E+01 G
NB-94	I	-6.5604E-02					7.41E+06	
			702.63	-6.560E-02	%(	3.596E+00	1.62E+03	9.79E+01 G
			871.10	-2.125E+00	+	4.350E+00	6.21E+01	9.99E+01 G
ZR-95	I	1.7276E+00					6.40E+01	
			756.73	5.621E-01	?(	5.095E+00	3.98E+02	5.45E+01 G
			724.20	3.165E+00	&(	7.596E+00	7.25E+01	4.42E+01 G
NB-95	I	-4.1997E-03					6.40E+01	
			765.79	-4.200E-03	%(P	3.330E+00	2.51E+04	9.98E+01 G
RU-103	I	3.3305E-01					3.93E+01	
			497.05	3.331E-01	(	3.135E+00	4.02E+02	9.09E+01 G
			610.30	0.000E+00	-	9.606E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.2765E+01					3.74E+02	
			621.92	1.277E+01	&(	5.548E+01	1.31E+02	9.93E+00 G
			1050.36	-8.831E+01	+	2.960E+02	1.01E+02	1.56E+00 G
			511.86	-1.291E+01	+	2.355E+01	5.54E+01	2.00E+01 GA
AG-108M	C	-1.7115E+00					1.53E+05	
			433.94	-1.711E+00	?(P	3.648E+00	8.37E+01	9.05E+01 G
			722.94	-1.529E+00	+	4.334E+00	8.54E+01	9.08E+01 G
			614.28	0.000E+00	&	6.177E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.8350E-01					2.50E+02	
			884.68	0.000E+00	?(	7.052E+00	1.00E+03	7.27E+01 G
			657.76	-1.426E+00	+	1.704E+01	3.61E+02	9.46E+01 G
			937.49	-1.123E+00	+ P	1.174E+01	4.08E+02	3.44E+01 G
			1384.30	2.329E+00	?(	4.880E+00	9.88E+01	2.43E+01 G
			763.94	-1.872E-01	% P	1.489E+01	2.52E+03	2.23E+01 G
SN-113	F	-2.1831E+00					1.15E+02	
			391.69	-2.183E+00	?(	7.310E+00	1.01E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	1.0314E+00					6.02E+01	
			602.73	1.031E+00	&(	5.499E+00	1.60E+02	9.83E+01 G
			1690.98	-1.793E-01	- P	3.007E+00	7.03E+02	4.78E+01 G
			722.79	-1.429E+01	+	3.482E+01	7.36E+01	1.08E+01 G
SB-125	I	6.4337E+00					1.01E+03	
			427.88	3.062E+00	?(P	1.006E+01	1.41E+02	2.96E+01 G
			600.50	7.155E+00	&(	2.967E+01	1.25E+02	1.79E+01 G
			635.89	-6.725E+00	+	2.464E+01	1.10E+02	1.13E+01 G
			463.37	1.474E+01	&(	4.160E+01	8.52E+01	1.05E+01 G
I-131	I	3.8852E-01					8.02E+00	
			364.48	-3.805E-01	?(P	3.224E+00	3.42E+02	8.17E+01 G
			284.30	9.560E-01	&	3.925E+01	1.69E+03	6.14E+00 G
			636.97	9.151E+00	?(	4.153E+01	1.35E+02	7.17E+00 G
Gd-153	F	1.4358E+00					2.42E+02	
			97.50	0.000E+00	?(	1.475E+01	1.00E+03	3.00E+01 G
			103.20	3.412E+00	?(	1.981E+01	1.75E+02	2.18E+01 G
Ga-68	C	-1.2304E+01					4.71E-02	
			1077.40	-1.230E+01	?(	1.454E+02	5.58E+02	3.30E+00 G
Tc-99m	I	1.0833E-07					2.51E-01	
			140.51	1.083E-07	%(	3.873E+00	1.07E+09	8.93E+01 G
BA-133	F	-1.9061E+00					3.85E+03	
			356.00	-1.906E+00	?(	5.957E+00	9.43E+01	6.20E+01 G
			302.85	7.818E-01	%	2.842E+01	1.09E+03	1.83E+01 G
			383.84	-1.494E+01	+	4.682E+01	9.46E+01	8.94E+00 GA
			80.99	-1.460E+00	& P	7.215E+00	5.40E+02	3.41E+01 GA
CS-134	I	1.0640E+00					7.54E+02	
			604.71	0.000E+00	?(	5.620E+00	1.00E+03	9.76E+01 G
			795.87	1.801E+00	(	4.534E+00	7.60E+01	8.55E+01 G
			569.32	3.717E+00	(	1.651E+01	1.32E+02	1.54E+01 G
			801.95	-2.077E+01	&	5.417E+01	7.87E+01	8.69E+00 G
			563.24	-1.025E+00	&	3.111E+01	1.29E+03	8.35E+00 G
CS-137	I	3.7063E+02					1.10E+04	
			661.66	3.706E+02	(P	2.980E+00	1.15E+00	8.52E+01 G
CE-139	F	-9.6319E-01					1.38E+02	
			165.85	-9.632E-01	&(	3.031E+00	9.50E+01	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	2.0460E-01					1.28E+01	
			537.26	-2.818E+00	?(P	1.111E+01	3.12E+02	2.44E+01 G
			162.66	1.206E+01	&(	3.924E+01	9.82E+01	6.22E+00 G
			304.85	-1.491E-01	% P	1.219E+02	1.14E+04	4.29E+00 G
La-140	I	1.0132E+00					1.28E+01	
			1596.21	3.183E-01	?(	1.417E+00	2.10E+02	9.54E+01 G
			487.02	-3.521E+00	+	1.185E+01	1.02E+02	4.55E+01 G
			328.76	4.279E+00	(	1.204E+01	1.16E+02	2.03E+01 G
			815.77	-8.310E+00	+	2.263E+01	8.22E+01	2.33E+01 G
CE-141	I	-1.2331E+00					3.25E+01	
			145.44	-1.233E+00	?(	3.789E+00	1.22E+02	4.82E+01 G
CE-144	I	-2.5971E+00					2.85E+02	
			133.54	-2.597E+00	?(	2.952E+01	3.42E+02	1.11E+01 G
PM-144	C	1.2506E+00					3.63E+02	
			696.54	1.218E+00	&(P	3.285E+00	8.12E+01	9.90E+01 G
			618.06	1.283E+00	?(	5.341E+00	1.25E+02	9.91E+01 G
EU-152	F	4.8721E+00					4.94E+03	
			344.29	-2.816E+00	&(	1.846E+01	1.97E+02	2.65E+01 G
			1112.07	1.054E+01	(	3.794E+01	1.08E+02	1.36E+01 G
			121.78	-1.397E+00	+	6.378E+00	1.37E+02	2.86E+01 G
			778.92	9.143E+00	(	2.068E+01	1.00E+02	1.29E+01 G
			964.11	5.775E+00	(	3.047E+01	1.57E+02	1.46E+01 G
			244.69	1.251E+01	&(P	4.508E+01	1.09E+02	7.58E+00 G
			1408.00	3.941E+00		2.235E+00	2.77E+01	2.10E+01 GA
EU-154	I	-1.7996E+01					3.14E+03	
			873.23	-1.800E+01	(	3.906E+01	6.58E+01	1.23E+01 G
			123.10	-1.356E+00	+	4.926E+00	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	+	7.434E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	2.022E+01	1.00E+03	2.02E+01 G
			1004.77	1.035E+00	+	3.055E+01	8.75E+02	1.80E+01 G
			996.33	1.786E+01	+	3.641E+01	6.19E+01	1.06E+01 G
EU-155	I	3.5079E+00					1.81E+03	
			105.31	3.508E+00	&(	2.028E+01	1.75E+02	2.12E+01 G
			86.54	-2.651E+00	+	1.499E+01	1.71E+02	3.07E+01 G
HF-181	F	-1.9757E+00					4.24E+01	
			482.00	-1.976E+00	?(	6.349E+00	9.70E+01	8.05E+01 G
			133.02	-1.646E+00	&	7.503E+00	1.38E+02	4.33E+01 G
			345.83	-8.021E+00	+ P	3.570E+01	6.64E+01	1.51E+01 G
			136.30	1.583E-06	&	5.660E+01	1.07E+09	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	1.5357E+00					1.14E+02	
			1121.30	1.536E+00	?(	1.534E+01	2.97E+02	3.49E+01 G
			1221.41	-6.217E+00	+	1.054E+01	8.28E+01	2.70E+01 G
			1189.05	-9.222E-01	+	1.628E+01	8.40E+02	1.62E+01 G
Hg-203	F	-2.2131E-01					4.66E+01	
			279.20	-2.213E-01	?(	3.372E+00	4.55E+02	8.15E+01 G
TL-208	N	3.2660E+00					6.98E+02	
			583.02	2.257E+00	?(P	3.012E+00	5.75E+01	8.45E+01 G
			277.28	1.276E+01	(P	3.798E+01	8.97E+01	6.31E+00 G
			860.56	5.311E+00	(P	2.602E+01	2.24E+02	1.24E+01 G
pm-146	C	6.9778E-01					2.02E+03	
			747.16	-6.593E-01	?(	7.722E+00	5.13E+02	3.40E+01 G
			735.72	-2.897E-01	%	1.194E+01	1.80E+03	2.25E+01 G
			453.88	1.408E+00	&(P	4.960E+00	1.52E+02	6.50E+01 G
y-88	F	1.8961E+00					1.07E+02	
			898.04	1.896E+00	&(	3.439E+00	8.38E+01	9.37E+01 G
			1836.06	4.981E-01	-	1.159E+00	1.11E+02	9.92E+01 G
Cd-113m		6.1814E+03					5.33E+03	
			263.70	6.181E+03	?(	4.672E+04	2.26E+02	6.00E-03 K
Cd-109	F	6.8723E+01					4.53E+02	
			88.04	6.872E+01	(	4.414E+01	2.56E+01	3.79E+00 G
Cf-251	T	1.5613E+00					3.28E+05	
			176.60	1.561E+00	&(	1.122E+01	2.84E+02	1.70E+01 G
			227.00	1.438E+01	&	3.428E+01	9.47E+01	6.30E+00 GA
Cf-249	T	-3.5806E-01					1.28E+05	
			387.95	-2.045E+00	?(	6.520E+00	9.62E+01	6.60E+01 G
			333.44	6.820E+00	(	2.974E+01	1.31E+02	1.55E+01 G
Sn-126		-1.9795E+01					3.65E+07	
			87.57	-2.161E+00	+	1.208E+01	1.69E+02	3.75E+01 GA
			64.28	-1.980E+01	(	1.412E+02	2.16E+02	9.70E+00 G
			86.94	-8.985E+00	+	5.055E+01	1.70E+02	9.04E+00 GA
PB-210	N	9.9689E+03					8.14E+03	
			46.54	9.969E+03	(P	1.671E+02	9.01E-01	4.25E+00 G
PB-212	N	8.5032E+00					6.98E+02	
			238.63	8.503E+00	(P	4.094E+00	1.58E+01	4.33E+01 G
			300.03	-3.341E+01	- P	1.556E+02	6.60E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	8.6874E+00					5.84E+05	
			351.93	8.826E+00	(P	6.028E+00	3.12E+01	3.76E+01 G
			295.09	8.418E+00	*(P	9.217E+00	4.39E+01	1.93E+01 G
			242.00	-1.346E+01	-	4.980E+01	1.12E+02	7.43E+00 GA
BI-207	C	6.0864E-01					1.18E+04	
			569.70	1.767E-01	(	2.867E+00	4.79E+02	9.77E+01 G
			1063.66	1.175E+00	?(	4.834E+00	1.94E+02	7.45E+01 G
BI-212	N	4.0279E+00					6.98E+02	
			727.17	4.028E+00	(	4.972E+01	3.66E+02	7.55E+00 G
			785.42	1.099E+02	P	2.080E+02	8.42E+01	1.28E+00 GA
BI-214	N	4.2496E+00					5.84E+05	
			609.31	4.250E+00	(P	4.098E+00	3.79E+01	4.61E+01 G
			1120.29	-1.190E+00	% P	3.569E+01	1.15E+03	1.51E+01 G
			1764.49	2.389E+00	- P	1.369E+01	1.64E+02	1.54E+01 G
BI-210M	T	-2.1435E+00					1.10E+09	
			265.83	-2.144E+00	(	5.961E+00	8.40E+01	5.00E+01 G
			304.90	-4.568E-02	% P	1.867E+01	5.73E+03	2.80E+01 G
AC-228	N	2.4826E+01					2.10E+03	
			911.07	2.483E+01	(	9.894E+00	1.97E+01	2.90E+01 G
			968.97	1.153E+01	&	2.616E+01	6.86E+01	1.75E+01 G
			338.32	8.207E+00	-	3.927E+01	1.44E+02	1.20E+01 G
			93.35	0.000E+00	-	8.052E+01	1.00E+03	5.56E+00 XA
TH-227	N	-3.9117E+01					7.95E+03	
			50.14	-3.912E+01	(	2.161E+02	1.67E+02	8.00E+00 G
			256.24	-1.557E+00	+	3.378E+01	8.93E+02	7.00E+00 G
TH-229	N	3.7239E+00					2.68E+06	
			193.51	3.724E+00	?(	4.623E+01	4.89E+02	4.40E+00 G
			210.85	-3.393E+01	+	7.989E+01	9.37E+01	2.99E+00 G
TH-234	N	-6.1036E+01					1.63E+12	
			63.29	-6.104E+01	(P	3.603E+02	1.42E+02	3.81E+00 G
			92.59	-2.050E+01	+ P	8.031E+01	2.21E+02	5.58E+00 G
PA-233	C	-1.6045E+00					7.82E+08	
			312.01	-1.605E+00	?(	1.188E+01	2.22E+02	3.60E+01 G
			300.18	-1.019E+01	+	8.379E+01	2.47E+02	6.20E+00 G
PA-234	N	1.5199E+00					1.63E+12	
			131.29	-1.191E+00	?(	1.894E+01	4.79E+02	1.80E+01 G
			946.02	5.162E+00	(P	2.938E+01	2.61E+02	1.34E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47-1.132E+01 +   3.416E+01 9.07E+01 8.20E+00 G
                          883.24 0.000E+00 -   5.333E+01 1.00E+03 9.60E+00 G
                          880.53 2.161E+01 &   8.300E+01 1.15E+02 6.00E+00 GA

PA-234M  N  -2.6511E+02                                     1.63E+12
                         1001.00-2.651E+02 ?(P 6.063E+02 8.50E+01 8.37E-01 G
                          766.41-3.883E+02 & P 1.062E+03 9.23E+01 2.94E-01 G

U-235    N   4.1524E+00                                     2.57E+11
                          143.79-8.764E-01 %(P 1.673E+01 2.74E+03 1.10E+01 G
                          205.33 1.677E+01 &(P 4.194E+01 9.93E+01 5.01E+00 G
                          163.38 2.563E+00 ?(P 4.911E+01 5.74E+02 5.08E+00 G

AM-241   T   1.2266E+03                                     1.58E+05
                           59.54 1.227E+03  (P 1.414E+01 8.00E-01 3.59E+01 G

Np-237   F  -6.1195E+00                                     2.14E+06
                           86.49-6.119E+00 ?(  3.530E+01 1.74E+02 1.31E+01 G

Ir-192   F   1.0952E+00                                     7.40E+01
                          316.49 0.000E+00 ?(  4.999E+00 1.00E+03 8.70E+01 G
                          468.06 2.937E+00 &(  8.311E+00 8.54E+01 5.18E+01 G
                          308.44-3.378E+00 &   1.317E+01 1.18E+02 3.18E+01 G

Cs-136   F  -1.9269E+00                                     1.30E+01
                          818.50-1.927E+00 ?(  5.452E+00 8.54E+01 1.00E+02 G
                         1048.07-3.184E-01 +   4.892E+00 4.52E+02 8.00E+01 G
                          340.57 0.000E+00 +   1.021E+01 1.00E+03 4.69E+01 G

Np-239   T   3.2767E+00                                     2.36E+00
                          103.70 3.099E+00 ?   1.789E+01 1.74E+02 2.40E+01 X
                          106.13 3.277E+00 ?(  1.903E+01 1.75E+02 2.27E+01 G
                           99.50 0.000E+00 &   2.937E+01 1.00E+03 1.50E+01 X

Nd-147       9.8224E+00                                     1.11E+01
                          531.00 9.822E+00 &(  2.025E+01 8.88E+01 1.30E+01 G
                           91.10-2.827E+00 -   1.580E+01 1.69E+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	30966.	-149.	-0.083	167.28	-3.912E+01	
TH-234	63.29	35433.	-149.	-0.083	141.53	-6.104E+01	P
Sn-126	64.28	36465.	-125.	-0.069	216.07	-1.980E+01	
BA-133	80.99	1666.	-39.	-0.022	540.35	-1.460E+00	P
Np-237	86.49	6408.	-65.	-0.036	174.23	-6.119E+00	
EU-155	86.54	6353.	-66.	-0.037	170.86	-2.651E+00	
Sn-126	86.94	6287.	-66.	-0.037	169.93	-8.985E+00	
Sn-126	87.57	6221.	-66.	-0.037	168.92	-2.161E+00	
Nd-147	91.10	6255.	-66.	-0.037	168.84	-2.827E+00	
TH-234	92.59	6362.	-96.	-0.053	221.04	-2.050E+01	P
Gd-153	103.20	6201.	64.	0.035	175.37	3.412E+00	
Np-239	103.70	6137.	64.	0.035	174.39	3.099E+00	
EU-155	105.31	6172.	64.	0.035	174.61	3.508E+00	
Np-239	106.13	6236.	64.	0.035	175.38	3.277E+00	
EU-154	123.10	1300.	-47.	-0.026	109.47	-1.356E+00	
HF-181	133.02	3292.	-59.	-0.033	137.61	-1.646E+00	
CE-144	133.54	3334.	-24.	-0.013	342.13	-2.597E+00	
CE-141	145.44	945.	-47.	-0.026	121.93	-1.233E+00	
Ba-140	162.66	1476.	56.	0.031	98.22	1.206E+01	
U-235	163.38	1532.	10.	0.005	573.97	2.563E+00	P
CE-139	165.85	1466.	-58.	-0.032	95.00	-9.632E-01	
Cf-251	176.60	825.	19.	0.011	283.75	1.561E+00	
TH-229	193.51	825.	11.	0.006	489.43	3.724E+00	
U-235	205.33	810.	54.	0.030	99.30	1.677E+01	P
TH-229	210.85	1012.	-64.	-0.036	93.67	-3.393E+01	
Cf-251	227.00	741.	54.	0.030	94.69	1.438E+01	
TH-227	256.24	748.	-6.	-0.003	893.39	-1.557E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	263.70	1015.	20.	0.011	226.38	6.181E+03	
BI-210M	265.83	1136.	-57.	-0.032	84.01	-2.144E+00	
Hg-203	279.20	896.	-9.	-0.005	454.82	-2.213E-01	
PA-231	300.07	2888.	-52.	-0.029	146.19	-4.317E+01	
PA-233	300.18	2940.	-31.	-0.017	247.44	-1.019E+01	
Ir-192	308.44	1822.	-52.	-0.029	117.57	-3.378E+00	
PA-233	312.01	1874.	-28.	-0.015	222.48	-1.605E+00	
La-140	328.76	556.	40.	0.022	116.49	4.279E+00	
HF-181	345.83	2569.	-54.	-0.030	66.41	-8.021E+00	P
BA-133	356.00	1150.	-51.	-0.029	94.28	-1.906E+00	
I-131	364.48	556.	-13.	-0.007	341.60	-3.805E-01	P
BA-133	383.84	1326.	-55.	-0.031	94.59	-1.494E+01	
SN-113	391.69	1614.	-57.	-0.032	101.05	-2.183E+00	
SB-125	427.88	563.	35.	0.019	141.47	3.062E+00	P
AG-108M	433.94	682.	-58.	-0.032	83.71	-1.711E+00	P
pm-146	453.88	608.	33.	0.019	151.73	1.408E+00	P
SB-125	463.37	1089.	55.	0.031	85.25	1.474E+01	
Ir-192	468.06	1045.	54.	0.030	85.44	2.937E+00	
BE-7	477.60	1484.	-55.	-0.031	100.04	-1.487E+01	
HF-181	482.00	1422.	-56.	-0.031	96.99	-1.976E+00	
La-140	487.02	1559.	-55.	-0.031	101.52	-3.521E+00	
RU-103	497.05	412.	10.	0.006	402.00	3.331E-01	
RH-106	511.86	1101.	-86.	-0.048	55.44	-1.291E+01	
Nd-147	531.00	316.	42.	0.023	88.79	9.822E+00	
Ba-140	537.26	330.	-22.	-0.012	311.83	-2.818E+00	P
CS-134	569.32	264.	18.	0.010	132.30	3.717E+00	
BI-207	569.70	324.	5.	0.003	479.01	1.767E-01	
SB-125	600.50	1103.	38.	0.021	124.76	7.155E+00	
SB-124	602.73	1141.	30.	0.017	160.11	1.031E+00	
PM-144	618.06	1054.	37.	0.021	125.24	1.283E+00	
RH-106	621.92	1132.	37.	0.020	130.71	1.277E+01	
SB-125	635.89	271.	-22.	-0.012	109.51	-6.725E+00	
I-131	636.97	310.	19.	0.010	135.31	9.151E+00	
AG-110M	657.76	9136.	-37.	-0.021	361.00	-1.426E+00	
PM-144	696.54	324.	32.	0.018	81.22	1.218E+00	P
SB-124	722.79	414.	-40.	-0.022	73.62	-1.429E+01	
AG-108M	722.94	454.	-36.	-0.020	85.40	-1.529E+00	
ZR-95	724.20	325.	36.	0.020	72.48	3.165E+00	
pm-146	747.16	187.	-6.	-0.003	513.18	-6.593E-01	
ZR-95	756.73	205.	8.	0.004	398.13	5.621E-01	
PA-234M	766.41	257.	-28.	-0.016	92.33	-3.883E+02	P
CS-134	795.87	380.	37.	0.021	75.96	1.801E+00	
CS-134	801.95	559.	-43.	-0.024	78.72	-2.077E+01	
CO-58	810.78	640.	-46.	-0.025	79.69	-1.931E+00	
La-140	815.77	686.	-46.	-0.025	82.17	-8.310E+00	
Cs-136	818.50	732.	-46.	-0.025	85.36	-1.927E+00	
MN-54	834.85	306.	-46.	-0.026	62.88	-1.975E+00	P
Co-56	846.77	270.	-25.	-0.014	145.88	-1.086E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	871.10	418.	-48.	-0.027	62.11	-2.125E+00		
EU-154	873.23	509.	-50.	-0.028	65.77	-1.800E+01		
Sc-46	889.28	571.	12.	0.007	275.40	5.555E-01		
y-88	898.04	215.	39.	0.022	83.85	1.896E+00		
AG-110M	937.49	320.	-8.	-0.005	407.99	-1.123E+00		P
EU-154	996.33	266.	39.	0.021	61.87	1.786E+01		
PA-234M	1001.00	464.	-45.	-0.025	84.96	-2.651E+02		P
EU-154	1004.77	545.	4.	0.002	875.26	1.035E+00		
Cs-136	1048.07	253.	-5.	-0.003	452.11	-3.184E-01		
RH-106	1050.36	355.	-27.	-0.015	100.55	-8.831E+01		
BI-207	1063.66	208.	17.	0.009	194.36	1.175E+00		
Ga-68	1077.40	267.	-7.	-0.004	558.12	-1.230E+01		
FE-59	1099.25	277.	-47.	-0.026	81.26	-4.425E+00		
Co-56	1238.28	45.	15.	0.008	111.24	1.278E+00		P
NA-22	1274.53	62.	-17.	-0.010	109.49	-1.024E+00		
AG-110M	1384.30	12.	9.	0.005	98.76	2.329E+00		
La-140	1596.21	13.	4.	0.002	209.54	3.183E-01		
SB-124	1690.98	13.	-1.	-0.001	702.57	-1.793E-01		P
Co-56	1771.35	20.	8.	0.005	81.97	4.150E+00		
y-88	1836.06	7.	6.	0.004	111.28	4.981E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.4867E+01	-1.4867E+01	1.000E+02%	4.93E+01
NA-22	#A	-1.0241E+00	-1.0241E+00	1.095E+02%	2.33E+00
K-40	#A	5.8315E+00	5.8315E+00	8.571E+01%	1.33E+01
Sc-46	#A	5.5552E-01	5.5552E-01	2.754E+02%	5.14E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.41E+01
MN-54	#A	-1.9752E+00	-1.9752E+00	6.288E+01%	3.62E+00
FE-59	#A	-4.4246E+00	-4.4246E+00	8.126E+01%	7.51E+00
Co-56	#A	-1.4523E-01	-1.4523E-01	9.172E+01%	3.44E+00
CO-57	#A	8.3296E-01	8.3296E-01	9.133E+01%	2.14E+00
CO-58	#A	-1.9310E+00	-1.9310E+00	7.969E+01%	5.10E+00
CO-60		2.0728E+02	2.0728E+02	1.255E+00%	9.46E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.06E+01
NB-94	#A	-6.5604E-02	-6.5604E-02	1.617E+03%	3.60E+00
ZR-95	#A	1.7276E+00	1.7276E+00	7.248E+01%	5.09E+00
NB-95	#A	-4.1997E-03	-4.1997E-03	2.512E+04%	3.33E+00
RU-103	#A	3.3305E-01	3.3305E-01	4.020E+02%	3.13E+00
RH-106	#A	1.2765E+01	1.2765E+01	1.307E+02%	5.55E+01
AG-108M	#A	-1.7115E+00	-1.7115E+00	8.371E+01%	3.65E+00
AG-110M	#A	5.8350E-01	5.8350E-01	9.876E+01%	7.05E+00
SN-113	#A	-2.1831E+00	-2.1831E+00	1.010E+02%	7.31E+00

SB-124 #A	1.0314E+00	1.0314E+00	1.601E+02%		5.50E+00
SB-125 #A	6.4337E+00	6.4337E+00	6.900E+01%		1.01E+01
I-131 #A	3.8850E-01	3.8852E-01	1.353E+02%		3.22E+00
Gd-153 #A	1.4358E+00	1.4358E+00	1.754E+02%		1.47E+01
Ga-68 #A	-1.2225E+01	-1.2304E+01	5.581E+02%		1.45E+02
Tc-99m #A	1.0820E-07	1.0833E-07	1.074E+09%		3.87E+00
BA-133 #A	-1.9061E+00	-1.9061E+00	9.428E+01%		5.96E+00
CS-134 #A	1.0640E+00	1.0640E+00	7.596E+01%		5.62E+00
CS-137	3.7063E+02	3.7063E+02	1.150E+00%		2.98E+00
CE-139 #A	-9.6318E-01	-9.6319E-01	9.500E+01%		3.03E+00
Ba-140 #A	2.0460E-01	2.0460E-01	9.822E+01%		1.11E+01
La-140 #A	1.0132E+00	1.0132E+00	1.165E+02%		1.42E+00
CE-141 #A	-1.2331E+00	-1.2331E+00	1.219E+02%		3.79E+00
CE-144 #A	-2.5971E+00	-2.5971E+00	3.421E+02%		2.95E+01
PM-144 #A	1.2506E+00	1.2506E+00	7.464E+01%		3.28E+00
EU-152 A	4.8721E+00	4.8721E+00	6.235E+01%		1.85E+01
EU-154 #A	-1.7996E+01	-1.7996E+01	6.577E+01%		3.91E+01
EU-155 #A	3.5079E+00	3.5079E+00	1.746E+02%		2.03E+01
HF-181 #A	-1.9756E+00	-1.9757E+00	9.699E+01%		6.35E+00
Ta-182 #A	1.5357E+00	1.5357E+00	2.966E+02%		1.53E+01
Hg-203 #A	-2.2130E-01	-2.2131E-01	4.548E+02%		3.37E+00
TL-208	3.2660E+00	3.2660E+00	5.747E+01%		3.01E+00
pm-146 #A	6.9778E-01	6.9778E-01	1.517E+02%		7.72E+00
y-88 #A	1.8961E+00	1.8961E+00	8.385E+01%		3.44E+00
Cd-113m#A	6.1814E+03	6.1814E+03	2.264E+02%		4.67E+04
Cd-109	6.8723E+01	6.8723E+01	2.560E+01%		4.41E+01
Cf-251 #A	1.5613E+00	1.5613E+00	2.837E+02%		1.12E+01
Cf-249 A	-3.5806E-01	-3.5806E-01	8.145E+01%		6.52E+00
Sn-126 #A	-1.9795E+01	-1.9795E+01	2.161E+02%		1.41E+02
PB-210	9.9689E+03	9.9689E+03	9.011E-01%		1.67E+02
PB-212 #	8.5032E+00	8.5032E+00	1.581E+01%		4.09E+00
PB-214	8.6874E+00	8.6874E+00	2.693E+01%		6.03E+00
BI-207 #A	6.0864E-01	6.0864E-01	1.944E+02%		2.87E+00
BI-212 A	4.0279E+00	4.0279E+00	3.658E+02%		4.97E+01
BI-214	4.2496E+00	4.2496E+00	3.787E+01%		4.10E+00
BI-210M#A	-2.1435E+00	-2.1435E+00	8.401E+01%		5.96E+00
AC-228 #	2.4826E+01	2.4826E+01	1.968E+01%		9.89E+00
TH-227 #A	-3.9117E+01	-3.9117E+01	1.673E+02%		2.16E+02
TH-229 #A	3.7239E+00	3.7239E+00	4.894E+02%		4.62E+01
TH-234 #A	-6.1036E+01	-6.1036E+01	1.415E+02%		3.60E+02
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.82E+02
PA-233 #A	-1.6045E+00	-1.6045E+00	2.225E+02%		1.19E+01
PA-234 A	1.5199E+00	1.5199E+00	2.611E+02%		1.89E+01
PA-234M#A	-2.6511E+02	-2.6511E+02	8.496E+01%		6.06E+02
U-235 #A	4.1524E+00	4.1524E+00	9.930E+01%		1.67E+01
AM-241	1.2266E+03	1.2266E+03	7.996E-01%		1.41E+01
Np-237 #A	-6.1195E+00	-6.1195E+00	1.742E+02%		3.53E+01
Ir-192 #A	1.0952E+00	1.0952E+00	8.544E+01%		5.00E+00
Cs-136 #A	-1.9269E+00	-1.9269E+00	8.536E+01%		5.45E+00

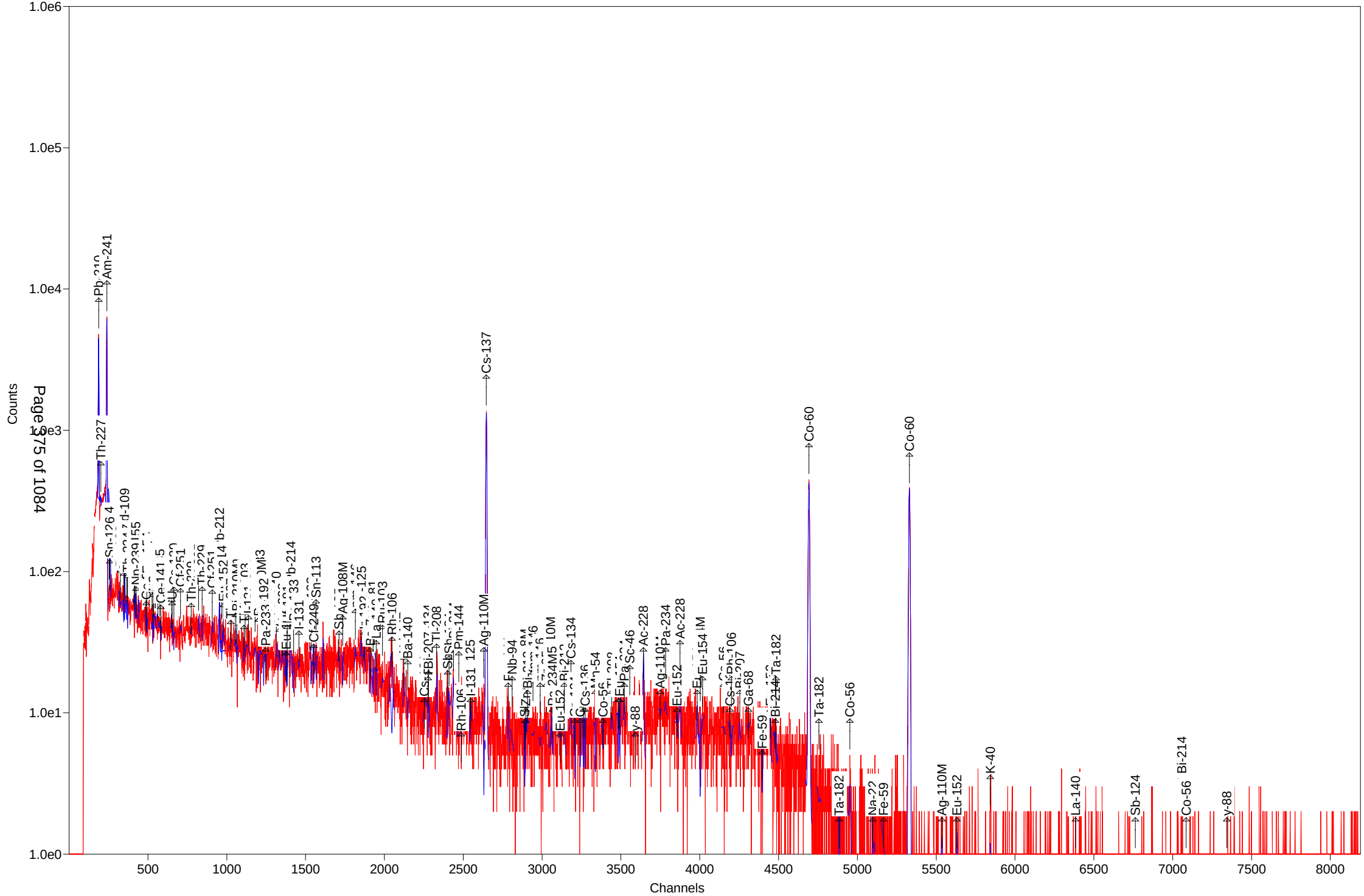
Np-239 #A	3.2763E+00	3.2767E+00	1.754E+02%	1.90E+01
Nd-147 #A	9.8222E+00	9.8224E+00	8.879E+01%	2.02E+01

- 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) 1.187E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 1.1872730E+04 Bq/Sample

265170_Gamma_LCS 160-265170~2-A. 16_Gamma_20162152.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161114

Sample Description: 265170_Gamma_160-18567-A-1-B
Detector: Detector #15
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-1-B

Decay to Time: 9/7/2016 15:21 Live Time: 1800 sec
Acquisition Time: 9/7/2016 15:22:41 Real Time: 1803 sec
Analysis Time: 9/7/2016 15:54 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_2016-09-03_2257.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	-6.583E+00	103.2	6.794E+00	6.802E+00	2.229E+01
NA-22	-1.155E+00	59.9	6.916E-01	6.940E-01	2.262E+00
K-40	2.442E+02	6.6	1.602E+01	2.032E+01	1.537E+01
Sc-46	8.236E-02	755.0	6.218E-01	6.218E-01	2.203E+00
CR-51	4.383E+00	156.4	6.855E+00	6.859E+00	2.303E+01
MN-54	3.484E-01	160.1	5.579E-01	5.582E-01	1.349E+00
FE-59	1.145E+00	91.8	1.051E+00	1.052E+00	2.360E+00
Co-56	1.285E-01	429.3	5.517E-01	5.518E-01	1.359E+00
CO-57	9.124E-02	357.0	3.257E-01	3.258E-01	1.111E+00
CO-58	5.478E-01	81.5	4.466E-01	4.475E-01	1.506E+00
CO-60	-7.023E-01	134.2	9.422E-01	9.429E-01	2.365E+00
ZN-65	-1.784E-01	1057.9	1.887E+00	1.887E+00	6.598E+00
NB-94	4.354E-01	75.4	3.285E-01	3.293E-01	1.181E+00
ZR-95	1.318E-01	913.4	1.204E+00	1.204E+00	2.901E+00
NB-95	7.201E-01	79.1	5.696E-01	5.708E-01	1.907E+00
RU-103	-6.886E-01	118.2	8.141E-01	8.149E-01	1.524E+00
RH-106	-4.315E+00	220.7	9.524E+00	9.527E+00	3.229E+01
AG-108M	-2.323E-01	313.5	7.282E-01	7.283E-01	1.283E+00
AG-110M	4.956E-01	77.4	3.834E-01	3.842E-01	2.998E+00
SN-113	6.047E-01	111.7	6.752E-01	6.759E-01	2.284E+00
SB-124	-6.437E-01	137.7	8.866E-01	8.873E-01	3.602E+00
SB-125	8.207E-01	90.3	7.407E-01	7.419E-01	3.987E+00
I-131	6.788E-01	87.4	5.932E-01	5.943E-01	1.272E+00
Gd-153	1.073E+00	182.9	1.963E+00	1.964E+00	8.199E+00
Ga-68	-1.044E+01	250.8	2.618E+01	2.619E+01	6.145E+01
Tc-99m	0.000E+00	1.#INF	1.815E-01	1.815E-01	2.471E+00
BA-133	5.987E-01	191.1	1.144E+00	1.145E+00	3.857E+00
CS-134	4.380E-01	67.7	2.966E-01	2.975E-01	3.543E+00
CS-137	-2.263E-01	315.7	7.144E-01	7.145E-01	2.477E+00
CE-139	4.695E-01	99.9	4.692E-01	4.713E-01	1.568E+00
Ba-140	-9.595E-01	337.5	3.238E+00	3.239E+00	5.574E+00
La-140	2.176E-02	104.0	2.262E-02	2.265E-02	2.012E+00
CE-141	1.221E-01	1093.6	1.336E+00	1.336E+00	4.483E+00

CE-144	-3.820E+00	79.8	3.048E+00	3.054E+00	1.831E+01
PM-144	1.194E+00	28.9	3.455E-01	3.510E-01	6.904E-01
EU-152	1.803E+00	84.4	1.521E+00	1.524E+00	8.790E+00
EU-154	2.810E+00	96.1	2.699E+00	2.703E+00	9.342E+00
EU-155	-1.032E-06	340282692.0	3.511E+00	3.511E+00	1.175E+01
HF-181	-5.514E-01	104.7	5.772E-01	5.779E-01	3.079E+00
Ta-182	3.032E+00	67.1	2.035E+00	2.040E+00	6.736E+00
Hg-203	5.052E-01	86.2	4.354E-01	4.364E-01	1.457E+00
TL-208	7.436E+00	9.5	7.038E-01	8.026E-01	8.947E-01
pm-146	-1.306E+00	159.3	2.081E+00	2.082E+00	4.886E+00
y-88	-1.046E+00	59.7	6.239E-01	6.262E-01	2.027E+00
Cd-113m	-8.236E+03	89.9	7.405E+03	7.424E+03	2.473E+04
Cd-109	0.000E+00	1.#INF	2.051E+01	2.051E+01	6.866E+01
Cf-251	6.051E-01	375.1	2.270E+00	2.270E+00	5.893E+00
Cf-249	4.492E-01	175.7	7.894E-01	7.897E-01	2.728E+00
Sn-126	4.275E+00	145.7	6.227E+00	6.231E+00	2.082E+01
PB-210	-2.274E+01	60.1	1.367E+01	1.373E+01	5.963E+01
PB-212	2.232E+01	5.3	1.173E+00	1.861E+00	1.822E+00
PB-214	1.616E+01	8.8	1.426E+00	1.655E+00	2.323E+00
BI-207	4.231E-01	88.3	3.735E-01	3.742E-01	1.265E+00
BI-212	9.655E+00	85.7	8.276E+00	8.291E+00	2.778E+01
BI-214	1.255E+01	10.5	1.312E+00	1.465E+00	2.039E+00
BI-210M	1.046E+00	92.0	9.618E-01	9.638E-01	2.475E+00
AC-228	2.193E+01	9.7	2.132E+00	2.408E+00	2.942E+00
TH-227	-8.427E+00	105.7	8.907E+00	8.919E+00	2.971E+01
TH-229	1.286E+00	313.1	4.028E+00	4.029E+00	2.405E+01
TH-234	-8.471E+00	187.4	1.587E+01	1.588E+01	5.397E+01
PA-231	-1.749E+01	150.0	2.624E+01	2.625E+01	8.789E+01
PA-233	1.203E+00	149.4	1.798E+00	1.799E+00	6.040E+00
PA-234	-2.330E+00	79.5	1.853E+00	1.857E+00	1.085E+01
PA-234M	4.382E+01	87.2	3.821E+01	3.827E+01	3.514E+02
U-235	9.731E-01	141.8	1.380E+00	1.381E+00	1.978E+01
AM-241	-1.662E+00	111.5	1.854E+00	1.856E+00	6.179E+00
Np-237	0.000E+00	1.#INF	6.136E+00	6.136E+00	2.043E+01
Ir-192	5.533E-01	145.9	8.072E-01	8.079E-01	2.475E+00
Cs-136	2.245E-01	100.0	2.245E-01	2.248E-01	2.178E+00
Np-239	-1.347E+00	241.9	3.259E+00	3.260E+00	1.087E+01
Nd-147	-3.397E+00	119.7	4.068E+00	4.072E+00	9.824E+00
Total	4.118E+02				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-1-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161114.An1

Acquisition information
Start time: 9/7/2016 3:22:41 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	9/7/2016 3:21:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2016-09-03_2257.PBC 9/3/2016 10:57:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2397

***** 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
63.24	52.	50.75	0.69	2.921E-02	63.29	3.810	PBC<MDA	TH234
64.31	22.	145.66	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.86	172.	12.77	0.97	3.382E-02				
77.22	281.	8.66	0.97	3.455E-02				
87.52	66.	29.68	0.98	3.698E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	2.618E+01	Cd109
90.00	50.	33.17	0.73	3.739E-02				
91.10	28.	186.08	0.99	3.755E-02	91.10	28.300	PBC<MDA	Nd147
92.54	9.	241.76	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
93.30	28.	181.69	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
97.50	28.	182.94	0.99	3.829E-02	97.50	30.000	PBC<MDA	Gd153
99.50	28.	184.56	1.00	3.846E-02	99.50	15.000	PBC<MDA	Np239
103.20	11.	488.98	1.00	3.867E-02	103.20	21.800	PBC<MDA	Gd153
121.78	23.	92.06	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.813E-01	CO57
122.06	5.	357.00	1.02	3.846E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	9.124E-02	CO57
123.10	14.	141.59	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
165.85	23.	99.95	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
176.60	6.	375.09	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251
186.18	69.	30.81	0.68	3.117E-02				
205.33	13.	141.81	1.09	2.900E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	8.	313.12	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229
227.00	3.	623.16	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.75	413.	6.41	1.05	2.591E-02	238.63	43.300	2.046E+01	PB212
242.12	56.	25.81	1.12	2.565E-02	242.00	7.430	1.630E+01	PB214
265.83	17.	94.05	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
279.20	17.	86.19	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
295.55	123.	16.34	1.08	2.202E-02	295.09	19.300	1.514E+01	PB214
300.30	25.	44.94	0.47	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.18	6.200	PBC<MDA	PA233
304.90	16.	158.13	1.18	2.150E-02	304.85	4.290	9.865E+00	Ba140
					304.90	28.000	1.512E+00	BI210M
308.44	16.	153.82	1.18	2.131E-02	308.44	31.750	PBC<MDA	Ir192
312.01	16.	149.44	1.18	2.112E-02	312.01	36.000	PBC<MDA	PA233
316.49	17.	145.90	1.19	2.089E-02	316.49	87.040	PBC<MDA	Ir192
320.08	16.	156.40	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
328.76	13.	171.96	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	175.72	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
338.14	95.	15.88	1.40	1.983E-02	338.32	12.010	2.206E+01	AC228
340.57	13.	179.09	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
344.29	13.	182.77	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
345.83	6.	435.08	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.87	217.	8.82	1.01	1.923E-02	351.93	37.600	1.668E+01	PB214
356.00	13.	191.13	1.22	1.906E-02	356.00	62.050	PBC<MDA	BA133
364.48	5.	274.95	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
391.69	12.	111.66	1.25	1.767E-02	391.69	64.000	PBC<MDA	SN113
463.37	13.	90.25	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	2.	635.33	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
511.86	48.	45.57	2.60	1.426E-02	511.86	20.000	9.351E+00	RH106
569.32	13.	67.71	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.668E+00	PA234
					569.70	97.740	5.596E-01	BI207
569.70	10.	88.28	1.40	1.307E-02	569.32	15.380	2.687E+00	CS134
					569.47	8.200	5.042E+00	PA234
					569.70	97.740	4.231E-01	BI207
583.41	145.	9.46	1.41	1.282E-02	583.02	84.500	7.436E+00	TL208
609.55	129.	10.45	1.97	1.236E-02	609.31	46.090	1.255E+01	BI214
					610.30	5.750	1.008E+02	RU103
636.97	10.	87.40	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
657.76	14.	77.36	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
696.54	24.	28.94	1.50	1.106E-02	696.54	99.000	1.194E+00	PM144
702.63	10.	93.35	1.50	1.098E-02	702.63	97.900	PBC<MDA	NB94
727.39	14.	85.72	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
756.73	1.	913.44	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
765.79	13.	79.10	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.446E+02	PA234M
766.41	10.	87.18	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.874E+02	PA234M
785.09	8.	105.33	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
810.78	10.	81.52	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
815.77	8.	111.05	1.59	9.682E-03	815.77	23.280	PBC<MDA	La140
834.85	6.	160.14	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
846.77	2.	429.35	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.90	34.	22.71	2.11	9.252E-03	860.56	12.420	1.660E+01	TL208
871.10	6.	118.53	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
873.23	6.	96.06	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
889.28	1.	754.98	1.64	8.996E-03	889.28	99.984	PBC<MDA	Sc46
911.71	101.	11.22	1.92	8.811E-03	911.07	29.000	2.187E+01	AC228
964.11	8.	148.98	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
969.60	13.	80.53	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
1048.07	5.	100.00	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1099.25	9.	91.76	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1120.24	3.	348.58	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.25	14.	67.10	1.80	7.362E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.032E+00	Ta182
1221.22	4.	301.53	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1384.30	3.	176.21	1.97	6.114E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	1.	427.57	1.98	6.023E-03	1408.00	21.005	PBC<MDA	EU152
1461.17	273.	6.56	1.58	5.828E-03	1460.83	10.670	2.442E+02	K40
1764.69	6.	92.74	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	5.	130.51	2.18	4.898E-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	
299.05	74.84	156.	172.	5.100E+03	12.77	0.972	-	D
308.48	77.20	155.	281.	8.122E+03	8.66	0.975	-	D
359.36	90.00	130.	63.	1.685E+03	28.54	0.986	-	sD
744.04	186.18	97.	69.	2.226E+03	30.81	0.679	-	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	345.	-34.	-0.019	60.10	0.946s
TH-227	200.23	50.14	382.	-27.	-0.015	105.70	0.950s
AM-241	237.79	59.54	523.	-29.	-0.016	111.54	0.958s
TH-234	252.78	63.29	512.	-17.	-0.009	187.37	0.962s
Sn-126	256.75	64.28	510.	22.	0.012	145.66	0.963s
BA-133	323.54	80.99	1148.	-32.	-0.018	68.77	0.978s
Np-237	345.53	86.49	1402.	0.	0.000	193.23	0.983A
EU-155	345.74	86.54	1375.	-27.	-0.015	196.56	0.983s
Sn-126	349.84	87.57	1283.	66.	0.037	29.68	0.984D
Cd-109	351.72	88.04	1345.	0.	0.000	1000.00	0.985A
Nd-147	363.95	91.10	1311.	28.	0.015	186.08	0.987D
TH-234	369.91	92.59	248.	9.	0.005	241.76	0.989D
AC-228	372.95	93.35	1254.	28.	0.015	181.69	0.990s
Gd-153	389.54	97.50	1282.	28.	0.015	182.94	0.993
Np-239	397.53	99.50	1310.	28.	0.015	184.56	0.995s
Gd-153	412.32	103.20	1337.	11.	0.006	488.98	0.998s
Np-239	424.03	106.13	1321.	-21.	-0.012	241.94	1.001s
EU-152	486.57	121.78	205.	23.	0.013	92.06	1.016s
CO-57	487.72	122.06	184.	5.	0.003	357.00	1.016s
EU-154	491.87	123.10	204.	14.	0.008	141.59	1.017s
PA-234	524.63	131.29	778.	-29.	-0.016	79.54	1.024s
HF-181	531.54	133.02	805.	-29.	-0.016	79.31	1.026s
CE-144	533.60	133.54	833.	-29.	-0.016	79.78	1.026s
HF-181	544.63	136.30	859.	-27.	-0.015	152.17	1.029s
Tc-99m	561.46	140.51	887.	0.	0.000	1000.00	1.032s
U-235	574.56	143.79	893.	-6.	-0.004	367.27	1.036s
Ba-140	650.01	162.66	300.	-24.	-0.013	97.00	1.053s
CE-139	662.77	165.85	250.	23.	0.013	99.95	1.055
Cf-251	705.73	176.60	143.	6.	0.003	375.09	1.065s
TH-229	773.33	193.51	139.	-3.	-0.002	664.76	1.080s
U-235	820.60	205.33	96.	13.	0.007	141.81	1.091s
TH-229	842.65	210.85	177.	8.	0.004	313.12	1.096s
Cf-251	907.22	227.00	99.	3.	0.002	623.16	1.110s
PB-212	953.72	238.63	54.	451.	0.251	5.26	1.120D
PB-214	967.17	242.00	76.	56.	0.031	25.81	1.123D
EU-152	977.95	244.69	723.	-22.	-0.012	108.47	1.126s
TH-227	1024.12	256.24	132.	-24.	-0.013	93.07	1.136s
Cd-113m	1053.94	263.70	174.	-21.	-0.012	89.91	1.142s
BI-210M	1062.46	265.83	117.	17.	0.009	94.05	1.144s
TL-208	1108.25	277.28	109.	-4.	-0.002	345.54	1.154s
Hg-203	1115.91	279.20	99.	17.	0.009	86.19	1.156s
I-131	1136.30	284.30	72.	-2.	-0.001	833.67	1.160s
PB-214	1181.26	295.55	61.	116.	0.064	17.49	1.083s
PB-212	1200.29	300.30	32.	25.	0.014	44.94	0.467s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1199.35	300.07	437.	-20.	-0.011	152.76	1.174s
PA-233	1199.79	300.18	417.	-20.	-0.011	149.35	1.174s
PA-231	1209.66	302.65	423.	-20.	-0.011	150.01	1.176s
BA-133	1210.47	302.85	442.	-15.	-0.008	198.67	1.176s
BI-210M	1218.64	304.90	327.	16.	0.009	158.13	1.178s
Ir-192	1232.81	308.44	311.	16.	0.009	153.82	1.181
PA-233	1247.09	312.01	294.	16.	0.009	149.44	1.184s
Ir-192	1265.00	316.49	282.	17.	0.009	145.90	1.188s
CR-51	1279.37	320.08	314.	16.	0.009	156.40	1.191
La-140	1314.06	328.76	250.	13.	0.007	171.96	1.199s
Cf-249	1332.77	333.44	263.	13.	0.007	175.72	1.203
AC-228	1351.58	338.14	30.	95.	0.053	15.88	1.399s
Cs-136	1361.28	340.57	276.	13.	0.007	179.09	1.209s
EU-152	1376.13	344.29	290.	13.	0.007	182.77	1.212s
HF-181	1382.30	345.83	301.	6.	0.003	435.08	1.213s
PB-214	1406.44	351.87	35.	217.	0.121	8.82	1.012
BA-133	1422.97	356.00	290.	13.	0.007	191.13	1.222s
I-131	1456.89	364.48	48.	5.	0.003	274.95	1.229s
BA-133	1534.29	383.84	127.	-15.	-0.008	126.57	1.246s
Cf-249	1550.72	387.95	139.	0.	0.000	1000.00	1.249s
SN-113	1565.67	391.69	88.	12.	0.007	111.66	1.253s
SB-125	1710.36	427.88	48.	-4.	-0.002	342.78	1.283s
AG-108M	1734.60	433.94	45.	-6.	-0.003	313.52	1.288s
pm-146	1814.35	453.88	74.	-9.	-0.005	207.18	1.304s
SB-125	1852.29	463.37	61.	13.	0.007	90.25	1.312s
Ir-192	1871.05	468.06	88.	2.	0.001	635.33	1.316s
BE-7	1909.18	477.60	171.	-19.	-0.010	103.19	1.324s
HF-181	1926.79	482.00	189.	-19.	-0.010	104.67	1.328s
La-140	1946.87	487.02	186.	-7.	-0.004	261.07	1.332s
RU-103	1987.00	497.05	52.	-16.	-0.009	118.23	1.340
RH-106	2046.22	511.86	63.	48.	0.027	45.57	2.602s
Nd-147	2122.75	531.00	39.	-11.	-0.006	119.74	1.368s
Ba-140	2147.78	537.26	44.	-6.	-0.003	337.49	1.373s
CS-134	2251.67	563.24	44.	-3.	-0.002	647.02	1.394s
CS-134	2276.00	569.32	32.	13.	0.007	67.71	1.399s
BI-207	2277.52	569.70	32.	10.	0.005	88.28	1.399s
TL-208	2332.35	583.41	10.	145.	0.081	9.46	1.410
SB-125	2400.69	600.50	285.	-14.	-0.008	172.71	1.424s
SB-124	2409.62	602.73	271.	-14.	-0.008	137.74	1.425s
BI-214	2436.90	609.55	15.	129.	0.072	10.45	1.971s
RU-103	2439.88	610.30	257.	-16.	-0.009	146.20	1.431s
AG-108M	2455.81	614.28	241.	-16.	-0.009	141.48	1.435s
PM-144	2470.93	618.06	225.	-16.	-0.009	136.64	1.437s
RH-106	2486.35	621.92	209.	-9.	-0.005	220.72	1.440
SB-125	2542.23	635.89	41.	-10.	-0.006	130.15	1.451s
I-131	2546.57	636.97	31.	10.	0.005	87.40	1.452s
AG-110M	2629.71	657.76	48.	14.	0.008	77.36	1.469s
CS-137	2645.30	661.66	78.	-4.	-0.002	315.69	1.472s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2784.82	696.54	5.	24.	0.013	28.94	1.499s
NB-94	2809.17	702.63	19.	10.	0.006	93.35	1.503s
SB-124	2889.79	722.79	94.	-6.	-0.003	232.14	1.519s
AG-108M	2890.40	722.94	88.	0.	0.000	1000.00	1.519s
EU-154	2892.07	723.36	94.	-6.	-0.004	214.01	1.519s
ZR-95	2895.44	724.20	87.	0.	0.000	1000.00	1.520s
BI-212	2907.33	727.17	65.	14.	0.008	85.72	1.522s
pm-146	2987.29	747.16	37.	-8.	-0.005	159.35	1.537s
ZR-95	3025.56	756.73	33.	1.	0.001	913.44	1.544s
AG-110M	3054.42	763.94	54.	-11.	-0.006	99.17	1.550s
NB-95	3061.80	765.79	48.	13.	0.007	79.10	1.551s
PA-234M	3064.30	766.41	34.	10.	0.006	87.18	1.552s
EU-152	3114.33	778.92	23.	-3.	-0.002	312.25	1.561s
BI-212	3140.33	785.42	14.	8.	0.004	105.33	1.566s
CS-134	3182.12	795.87	62.	-8.	-0.005	147.40	1.574s
CO-58	3241.75	810.78	26.	10.	0.005	81.52	1.585s
La-140	3261.74	815.77	35.	8.	0.004	111.05	1.589s
Cs-136	3272.66	818.50	57.	-4.	-0.002	282.78	1.591s
MN-54	3338.05	834.85	19.	6.	0.003	160.14	1.603s
Co-56	3385.75	846.77	19.	2.	0.001	429.35	1.612s
TL-208	3442.26	860.90	5.	34.	0.019	22.71	2.108s
NB-94	3483.06	871.10	18.	6.	0.003	118.53	1.629s
EU-154	3491.60	873.23	12.	6.	0.003	96.06	1.631
PA-234	3520.80	880.53	43.	-7.	-0.004	143.87	1.636s
PA-234	3531.64	883.24	49.	0.	0.000	1000.00	1.638s
AG-110M	3537.42	884.68	49.	0.	0.000	1000.00	1.639s
Sc-46	3555.81	889.28	50.	1.	0.001	754.98	1.642s
y-88	3590.85	898.04	36.	-16.	-0.009	59.67	1.649s
AC-228	3645.54	911.71	5.	101.	0.056	11.22	1.917
AG-110M	3748.69	937.49	35.	-10.	-0.006	108.31	1.677s
PA-234	3782.81	946.02	20.	-1.	-0.001	988.26	1.683s
EU-152	3855.18	964.11	73.	8.	0.005	148.98	1.696s
AC-228	3874.63	968.97	50.	13.	0.007	80.53	1.699s
EU-154	3984.09	996.33	62.	-12.	-0.007	97.18	1.718
Co-56	4150.18	1037.84	15.	-2.	-0.001	431.57	1.747s
Cs-136	4191.11	1048.07	10.	5.	0.003	100.00	1.754s
RH-106	4200.27	1050.36	5.	0.	0.000	1000.00	1.755s
BI-207	4253.49	1063.66	30.	-13.	-0.007	96.69	1.765s
Ga-68	4308.47	1077.40	20.	-4.	-0.002	250.83	1.774s
FE-59	4395.90	1099.25	11.	9.	0.005	91.76	1.789s
EU-152	4447.22	1112.07	94.	-14.	-0.008	101.77	1.797s
BI-214	4480.08	1120.29	63.	3.	0.002	348.58	1.803s
Sc-46	4481.13	1120.55	60.	-12.	-0.007	96.91	1.803s
Ta-182	4484.13	1121.30	37.	14.	0.008	67.10	1.803s
CO-60	4691.97	1173.24	27.	-2.	-0.001	604.18	1.838
Ta-182	4755.25	1189.05	27.	-2.	-0.001	549.23	1.848s
Ta-182	4884.75	1221.41	21.	4.	0.002	301.53	1.869s
Co-56	4952.26	1238.28	27.	-3.	-0.001	444.41	1.879s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NA-22	5097.34	1274.53	27.	-14.	-0.008	59.89	1.902s
EU-154	5097.40	1274.54	40.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	16.	-1.	-0.001	914.69	1.913s
CO-60	5329.36	1332.50	27.	-8.	-0.004	134.16	1.938s
AG-110M	5536.68	1384.30	6.	3.	0.002	176.21	1.970s
EU-152	5631.56	1408.00	6.	1.	0.001	427.57	1.984s
K-40	5844.37	1461.17	10.	273.	0.152	6.56	1.579
La-140	6384.98	1596.21	12.	-8.	-0.004	235.37	2.092s
SB-124	6764.43	1690.98	6.	-1.	-0.001	600.00	2.142s
BI-214	7058.76	1764.49	12.	6.	0.003	92.74	2.181s
Co-56	7086.23	1771.35	18.	5.	0.003	130.51	2.184s

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	-6.5835E+00				5.31E+01	
			477.60	-6.583E+00	(P	2.229E+01 1.03E+02 1.05E+01	G
NA-22	C	-1.1548E+00				9.50E+02	
			1274.53	-1.155E+00	?(	2.262E+00 5.99E+01 9.99E+01	G
K-40	N	2.4420E+02				4.66E+11	
			1460.83	2.442E+02	(P	1.537E+01 6.56E+00 1.07E+01	G
Sc-46	F	8.2357E-02				8.38E+01	
			889.28	8.236E-02	?(	2.203E+00 7.55E+02 1.00E+02	G
			1120.55	-8.925E-01	+	2.923E+00 9.69E+01 1.00E+02	G
CR-51	F	4.3827E+00				2.77E+01	
			320.08	4.383E+00	?(P	2.303E+01 1.56E+02 9.94E+00	G
MN-54	C	3.4837E-01				3.12E+02	
			834.85	3.484E-01	?(P	1.349E+00 1.60E+02 1.00E+02	G
FE-59	F	1.1453E+00				4.45E+01	
			1099.25	1.145E+00	?(P	2.360E+00 9.18E+01 5.65E+01	G
			1291.60	-1.978E-01	-	4.223E+00 9.15E+02 4.32E+01	G
Co-56	C	1.2850E-01				7.73E+01	
			846.77	1.285E-01	?(P	1.359E+00 4.29E+02 9.99E+01	G
			1238.28	-3.323E-01	+	3.336E+00 4.44E+02 6.61E+01	G
			1037.84	-9.986E-01	&	1.036E+01 4.32E+02 1.41E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1771.35	3.599E+00	?	1.651E+01	1.31E+02	1.55E+01 A
CO-57	C	9.1241E-02				2.72E+02		
			122.06	9.124E-02	&(	1.111E+00	3.57E+02	8.56E+01 G
			136.47	-3.918E-02	&	1.976E+01	1.50E+04	1.07E+01 G
CO-58	C	5.4778E-01				7.09E+01		
			810.78	5.478E-01	?(	1.506E+00	8.15E+01	9.95E+01 G
CO-60	F	-7.0228E-01				1.93E+03		
			1332.50	-7.023E-01	?(P	2.365E+00	1.34E+02	1.00E+02 G
			1173.24	-1.483E-01	+ P	2.112E+00	6.04E+02	9.99E+01 G
ZN-65	F	-1.7840E-01				2.44E+02		
			1115.55	-1.784E-01	&(	6.598E+00	1.06E+03	5.06E+01 G
NB-94	I	4.3543E-01				7.41E+06		
			702.63	5.388E-01	&(P	1.181E+00	9.33E+01	9.79E+01 G
			871.10	3.341E-01	?(	1.382E+00	1.19E+02	9.99E+01 G
ZR-95	I	1.3183E-01				6.40E+01		
			756.73	1.318E-01	?(	2.901E+00	9.13E+02	5.45E+01 G
			724.20	0.000E+00	-	5.427E+00	1.00E+03	4.42E+01 G
NB-95	I	7.2008E-01				6.40E+01		
			765.79	7.201E-01	?(	1.907E+00	7.91E+01	9.98E+01 G
RU-103	I	-6.8857E-01				3.93E+01		
			497.05	-6.886E-01	(P	1.524E+00	1.18E+02	9.09E+01 G
			610.30	-1.231E+01	+	6.055E+01	1.46E+02	5.75E+00 GA
RH-106	I	-4.3151E+00				3.74E+02		
			621.92	-4.315E+00	?(	3.229E+01	2.21E+02	9.93E+00 G
			1050.36	0.000E+00	+	6.000E+01	1.00E+03	1.56E+00 G
			511.86	9.351E+00	?	7.733E+00	4.56E+01	2.00E+01 GA
AG-108M	C	-2.3226E-01				1.53E+05		
			433.94	-2.323E-01	?(P	1.283E+00	3.14E+02	9.05E+01 G
			722.94	0.000E+00	&	2.648E+00	1.00E+03	9.08E+01 G
			614.28	-7.940E-01	+	3.779E+00	1.41E+02	8.98E+01 G
AG-110M	F	4.9561E-01				2.50E+02		
			884.68	0.000E+00	?(	2.998E+00	1.00E+03	7.27E+01 G
			657.76	6.834E-01	?(	1.768E+00	7.74E+01	9.46E+01 G
			937.49	-1.969E+00	& P	5.729E+00	1.08E+02	3.44E+01 G
			1384.30	1.247E+00	?(	5.163E+00	1.76E+02	2.43E+01 G
			763.94	-2.680E+00	+	9.003E+00	9.92E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	6.0471E-01					1.15E+02	
			391.69	6.047E-01	(	2.284E+00	1.12E+02	6.40E+01 G
SB-124	F	-6.4372E-01					6.02E+01	
			602.73	-6.437E-01	?(P	3.602E+00	1.38E+02	9.83E+01 G
			1690.98	-2.275E-01	+	3.214E+00	6.00E+02	4.78E+01 G
			722.79	-2.876E+00	+	2.295E+01	2.32E+02	1.08E+01 G
SB-125	I	8.2069E-01					1.01E+03	
			427.88	-4.557E-01	?(	3.987E+00	3.43E+02	2.96E+01 G
			600.50	-3.480E+00	+	2.024E+01	1.73E+02	1.79E+01 G
			635.89	-4.260E+00	+ P	1.345E+01	1.30E+02	1.13E+01 G
			463.37	4.429E+00	(	1.346E+01	9.03E+01	1.05E+01 G
I-131	I	6.7875E-01					8.02E+00	
			364.48	1.818E-01	?(	1.272E+00	2.75E+02	8.17E+01 G
			284.30	-7.977E-01	+	1.685E+01	8.34E+02	6.14E+00 G
			636.97	6.342E+00	?(P	1.873E+01	8.74E+01	7.17E+00 G
Gd-153	F	1.0732E+00					2.42E+02	
			97.50	1.346E+00	?(	8.199E+00	1.83E+02	3.00E+01 G
			103.20	6.983E-01	?(	1.141E+01	4.89E+02	2.18E+01 G
Ga-68	C	-1.0438E+01					4.71E-02	
			1077.40	-1.044E+01	&(	6.145E+01	2.51E+02	3.30E+00 G
BA-133	F	5.9866E-01					3.85E+03	
			356.00	5.987E-01	?(	3.857E+00	1.91E+02	6.20E+01 G
			302.85	-2.117E+00	+	1.412E+01	1.99E+02	1.83E+01 G
			383.84	-5.261E+00	+ P	1.912E+01	1.27E+02	8.94E+00 GA
			80.99	-1.472E+00	& P	7.365E+00	6.88E+01	3.41E+01 GA
CS-134	I	4.3802E-01					7.54E+02	
			604.71	-5.292E-02	%(	3.543E+00	1.96E+03	9.76E+01 G
			795.87	-5.445E-01	+ P	2.594E+00	1.47E+02	8.55E+01 G
			569.32	3.554E+00	(	7.976E+00	6.77E+01	1.54E+01 G
			801.95	-5.423E-01	%	2.686E+01	1.41E+03	8.69E+00 G
			563.24	-1.523E+00	& P	1.696E+01	6.47E+02	8.35E+00 G
CS-137	I	-2.2629E-01					1.10E+04	
			661.66	-2.263E-01	?(	2.477E+00	3.16E+02	8.52E+01 G
CE-139	F	4.6947E-01					1.38E+02	
			165.85	4.695E-01	?(	1.568E+00	9.99E+01	7.99E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I -9.5950E-01					1.28E+01	
		537.26	-9.595E-01	&(P	5.574E+00	3.37E+02	2.44E+01 G
		162.66	-6.361E+00	+ P	2.206E+01	9.70E+01	6.22E+00 G
		304.85	2.298E-06	&	6.166E+01	7.93E+08	4.29E+00 G
La-140	I 2.1756E-02					1.28E+01	
		1596.21	-8.252E-01	?(P	2.012E+00	2.35E+02	9.54E+01 G
		487.02	-6.140E-01	+	5.453E+00	2.61E+02	4.55E+01 G
		328.76	1.778E+00	?(	1.031E+01	1.72E+02	2.03E+01 G
		815.77	1.961E+00	?(	7.468E+00	1.11E+02	2.33E+01 G
CE-141	I 1.2213E-01					3.25E+01	
		145.44	1.221E-01	&(	4.483E+00	1.09E+03	4.82E+01 G
CE-144	I -3.8200E+00					2.85E+02	
		133.54	-3.820E+00	?(P	1.831E+01	7.98E+01	1.11E+01 G
PM-144	C 1.1938E+00					3.63E+02	
		696.54	1.194E+00	*(P	6.904E-01	2.89E+01	9.90E+01 G
		618.06	-7.250E-01	-	3.333E+00	1.37E+02	9.91E+01 G
EU-152	F 1.8031E+00					4.94E+03	
		344.29	1.428E+00	(	8.790E+00	1.83E+02	2.65E+01 G
		1112.07	-7.674E+00	+	2.632E+01	1.02E+02	1.36E+01 G
		121.78	1.141E+00	&(	3.508E+00	9.21E+01	2.86E+01 G
		778.92	-1.421E+00	+	1.075E+01	3.12E+02	1.29E+01 G
		964.11	3.779E+00	(	1.927E+01	1.49E+02	1.46E+01 G
		244.69	-6.319E+00	+ P	3.688E+01	1.08E+02	7.58E+00 G
		1408.00	5.855E-01	?	6.062E+00	4.28E+02	2.10E+01 GA
EU-154	I 2.8099E+00					3.14E+03	
		873.23	2.810E+00	?(	9.342E+00	9.61E+01	1.23E+01 G
		123.10	5.143E-01	-	2.454E+00	1.42E+02	4.08E+01 G
		1274.54	0.000E+00	-	7.752E+00	1.00E+03	3.52E+01 G
		723.36	-1.667E+00	-	1.225E+01	2.14E+02	2.02E+01 G
		1004.77	-2.749E-09	%	8.970E+00	1.36E+11	1.80E+01 G
		996.33	-7.709E+00	+	2.531E+01	9.72E+01	1.06E+01 G
EU-155	I -1.0318E-06					1.81E+03	
		105.31	-1.032E-06	%(	1.175E+01	3.40E+08	2.12E+01 G
		86.54	-1.319E+00	+	8.632E+00	1.97E+02	3.07E+01 G
HF-181	F -5.5139E-01					4.24E+01	
		482.00	-8.553E-01	&(P	3.079E+00	1.05E+02	8.05E+01 G
		133.02	-9.794E-01	+ P	4.607E+00	7.93E+01	4.33E+01 G
		345.83	1.072E+00	?(	1.581E+01	4.35E+02	1.51E+01 G
		136.30	-6.999E+00	+	3.551E+01	1.52E+02	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	3.0323E+00					1.14E+02	
			1121.30	3.032E+00	?(	6.736E+00	6.71E+01	3.49E+01 G
			1221.41	1.067E+00	- P	7.319E+00	3.02E+02	2.70E+01 G
			1189.05	-1.022E+00	- P	1.322E+01	5.49E+02	1.62E+01 G
Hg-203	F	5.0520E-01					4.66E+01	
			279.20	5.052E-01	?(	1.457E+00	8.62E+01	8.15E+01 G
TL-208	N	7.4363E+00					6.98E+02	
			583.02	7.436E+00	(	8.947E-01	9.46E+00	8.45E+01 G
			277.28	-1.385E+00	- P	1.952E+01	3.46E+02	6.31E+00 G
			860.56	1.660E+01	+	6.177E+00	2.27E+01	1.24E+01 G
pm-146	C	-1.3057E+00					2.02E+03	
			747.16	-1.306E+00	(	4.886E+00	1.59E+02	3.40E+01 G
			735.72	-2.670E-02	% P	6.901E+00	1.06E+04	2.25E+01 G
			453.88	-5.085E-01	+ P	2.333E+00	2.07E+02	6.50E+01 G
y-88	F	-1.0456E+00					1.07E+02	
			898.04	-1.046E+00	?(P	2.027E+00	5.97E+01	9.37E+01 G
			1836.06	-4.794E-02	% P	8.706E-01	1.36E+03	9.92E+01 G
Cd-113m		-8.2365E+03					5.33E+03	
			263.70	-8.236E+03	(	2.473E+04	8.99E+01	6.00E-03 K
Cf-251	T	6.0511E-01					3.28E+05	
			176.60	6.051E-01	*(	5.893E+00	3.75E+02	1.70E+01 G
			227.00	9.831E-01	?	1.608E+01	6.23E+02	6.30E+00 GA
Cf-249	T	4.4920E-01					1.28E+05	
			387.95	0.000E+00	&(	2.728E+00	1.00E+03	6.60E+01 G
			333.44	2.361E+00	&(	1.398E+01	1.76E+02	1.55E+01 G
Sn-126		4.2748E+00					3.65E+07	
			87.57	2.652E+00	}	6.796E+00	2.97E+01	3.75E+01 GA
			64.28	4.275E+00	?(	2.082E+01	1.46E+02	9.70E+00 G
			86.94	0.000E+00	}	2.869E+01	2.14E+03	9.04E+00 GA
PB-210	N	-2.2740E+01					8.14E+03	
			46.54	-2.274E+01	(P	5.963E+01	6.01E+01	4.25E+00 G
PB-212	N	2.2322E+01					6.98E+02	
			238.63	2.232E+01	(P	1.822E+00	5.26E+00	4.33E+01 G
			300.03	1.978E+01	- P	2.249E+01	4.49E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.6161E+01					5.84E+05	
			351.93	1.668E+01	(P	2.323E+00	8.82E+00	3.76E+01 G
			295.09	1.514E+01	*(P	5.106E+00	1.75E+01	1.93E+01 G
			242.00	1.630E+01		1.264E+01	2.58E+01	7.43E+00 GA
BI-207	C	4.2312E-01					1.18E+04	
			569.70	4.231E-01	(	1.265E+00	8.83E+01	9.77E+01 G
			1063.66	-1.258E+00	+	2.731E+00	9.67E+01	7.45E+01 G
BI-212	N	9.6551E+00					6.98E+02	
			727.17	9.655E+00	?(	2.778E+01	8.57E+01	7.55E+00 G
			785.42	3.473E+01	?	8.746E+01	1.05E+02	1.28E+00 GA
BI-214	N	1.2553E+01					5.84E+05	
			609.31	1.255E+01	(P	2.039E+00	1.05E+01	4.61E+01 G
			1120.29	1.628E+00	- P	1.978E+01	3.49E+02	1.51E+01 G
			1764.49	4.295E+00	- P	1.370E+01	9.27E+01	1.54E+01 G
BI-210M	T	1.0456E+00					1.10E+09	
			265.83	7.847E-01	&(	2.475E+00	9.40E+01	5.00E+01 G
			304.90	1.512E+00	&(	8.029E+00	1.58E+02	2.80E+01 G
AC-228	N	2.1929E+01					2.10E+03	
			911.07	2.187E+01	(P	2.942E+00	1.12E+01	2.90E+01 G
			968.97	5.031E+00	-	1.358E+01	8.05E+01	1.75E+01 G
			338.32	2.206E+01	*(P	6.626E+00	1.59E+01	1.20E+01 G
			93.35	7.315E+00	-	4.427E+01	1.82E+02	5.56E+00 XA
TH-227	N	-8.4266E+00					7.95E+03	
			50.14	-8.427E+00	?(	2.971E+01	1.06E+02	8.00E+00 G
			256.24	-7.652E+00	+	1.818E+01	9.31E+01	7.00E+00 G
TH-229	N	1.2863E+00					2.68E+06	
			193.51	-1.389E+00	?(	2.405E+01	6.65E+02	4.40E+00 G
			210.85	5.223E+00	?(P	4.228E+01	3.13E+02	2.99E+00 G
TH-234	N	-8.4710E+00					1.63E+12	
			63.29	-8.471E+00	?(P	5.397E+01	1.87E+02	3.81E+00 G
			92.59	2.463E+00	+ P	2.007E+01	2.42E+02	5.58E+00 G
PA-231	N	-1.7490E+01					1.20E+07	
			302.65	-1.749E+01	?(	8.789E+01	1.50E+02	2.88E+00 G
			300.07	-2.030E+01	+	1.039E+02	1.53E+02	2.46E+00 G
PA-233	C	1.2030E+00					7.82E+08	
			312.01	1.203E+00	?(	6.040E+00	1.49E+02	3.60E+01 G
			300.18	-8.058E+00	+	4.032E+01	1.49E+02	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -2.3302E+00                                      1.63E+12
                         131.29-2.330E+00 &(P 1.085E+01 7.95E+01 1.80E+01 G
                         946.02-4.860E-01 +   1.145E+01 9.88E+02 1.34E+01 G
                         569.47 2.440E-01 %   1.770E+01 2.03E+03 8.20E+00 G
                         883.24 0.000E+00 +   2.267E+01 1.00E+03 9.60E+00 G
                         880.53-6.804E+00 +   3.383E+01 1.44E+02 6.00E+00 GA

PA-234M  N   4.3824E+01                                      1.63E+12
                        1001.00-6.605E+00 &(P 3.514E+02 1.41E+03 8.37E-01 G
                         766.41 1.874E+02 ?(  5.523E+02 8.72E+01 2.94E-01 G

U-235    N   9.7311E-01                                      2.57E+11
                         143.79-8.823E-01 &(P 1.978E+01 3.67E+02 1.10E+01 G
                         205.33 5.032E+00 *(P 1.848E+01 1.42E+02 5.01E+00 G
                         163.38-8.345E-02 % P 2.805E+01 9.09E+03 5.08E+00 G

AM-241   T  -1.6625E+00                                      1.58E+05
                          59.54-1.662E+00 &(  6.179E+00 1.12E+02 3.59E+01 G

Ir-192   F   5.5326E-01                                      7.40E+01
                         316.49 5.047E-01 &(  2.475E+00 1.46E+02 8.70E+01 G
                         468.06 1.470E-01 &(  3.249E+00 6.35E+02 5.18E+01 G
                         308.44 1.348E+00 ?(  6.969E+00 1.54E+02 3.18E+01 G

Cs-136   F   2.2446E-01                                      1.30E+01
                         818.50-2.206E-01 ?(  2.178E+00 2.83E+02 1.00E+02 G
                        1048.07 4.447E-01 &(  1.552E+00 1.00E+02 8.00E+01 G
                         340.57 7.977E-01 ?(  4.815E+00 1.79E+02 4.69E+01 G

Np-239   T  -1.3468E+00                                      2.36E+00
                         103.70 9.131E-07 %   1.040E+01 3.40E+08 2.40E+01 X
                         106.13-1.347E+00  (  1.087E+01 2.42E+02 2.27E+01 G
                          99.50 2.686E+00 &   1.651E+01 1.85E+02 1.50E+01 X

Nd-147      -3.3969E+00                                      1.11E+01
                         531.00-3.397E+00 ?(  9.824E+00 1.20E+02 1.30E+01 G
                          91.10 1.446E+00 +   8.962E+00 1.86E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
```

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	345.	-34.	-0.019	60.10	-2.274E+01	P
TH-227	50.14	382.	-27.	-0.015	105.70	-8.427E+00	
AM-241	59.54	523.	-29.	-0.016	111.54	-1.662E+00	
BA-133	80.99	1148.	-32.	-0.018	68.77	-1.472E+00	P
EU-155	86.54	1375.	-27.	-0.015	196.56	-1.319E+00	
Nd-147	91.10	1311.	28.	0.015	186.08	1.446E+00	
Gd-153	97.50	1282.	28.	0.015	182.94	1.346E+00	
Np-239	99.50	1310.	28.	0.015	184.56	2.686E+00	
Gd-153	103.20	1337.	11.	0.006	488.98	6.983E-01	
Np-239	106.13	1321.	-21.	-0.012	241.94	-1.347E+00	
EU-152	121.78	205.	23.	0.013	92.06	1.141E+00	
CO-57	122.06	184.	5.	0.003	357.00	9.124E-02	
EU-154	123.10	204.	14.	0.008	141.59	5.143E-01	
PA-234	131.29	778.	-29.	-0.016	79.54	-2.330E+00	P
HF-181	133.02	805.	-29.	-0.016	79.31	-9.794E-01	P
CE-144	133.54	833.	-29.	-0.016	79.78	-3.820E+00	P
HF-181	136.30	859.	-27.	-0.015	152.17	-6.999E+00	
U-235	143.79	893.	-6.	-0.004	367.27	-8.823E-01	P
Ba-140	162.66	300.	-24.	-0.013	97.00	-6.361E+00	P
CE-139	165.85	250.	23.	0.013	99.95	4.695E-01	
Cf-251	176.60	143.	6.	0.003	375.09	6.051E-01	
TH-229	193.51	139.	-3.	-0.002	664.76	-1.389E+00	
U-235	205.33	96.	13.	0.007	141.81	5.032E+00	P
TH-229	210.85	177.	8.	0.004	313.12	5.223E+00	P
Cf-251	227.00	99.	3.	0.002	623.16	9.831E-01	
EU-152	244.69	723.	-22.	-0.012	108.47	-6.319E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	256.24	132.	-24.	-0.013	93.07	-7.652E+00	
Cd-113m	263.70	174.	-21.	-0.012	89.91	-8.236E+03	
BI-210M	265.83	117.	17.	0.009	94.05	7.847E-01	
Hg-203	279.20	99.	17.	0.009	86.19	5.052E-01	
I-131	284.30	72.	-2.	-0.001	833.67	-7.977E-01	
PA-231	300.07	437.	-20.	-0.011	152.76	-2.030E+01	
PA-233	300.18	417.	-20.	-0.011	149.35	-8.058E+00	
PA-231	302.65	423.	-20.	-0.011	150.01	-1.749E+01	
BA-133	302.85	442.	-15.	-0.008	198.67	-2.117E+00	
BI-210M	304.90	327.	16.	0.009	158.13	1.512E+00	
Ir-192	308.44	311.	16.	0.009	153.82	1.348E+00	
PA-233	312.01	294.	16.	0.009	149.44	1.203E+00	
Ir-192	316.49	282.	17.	0.009	145.90	5.047E-01	
CR-51	320.08	314.	16.	0.009	156.40	4.383E+00	P
La-140	328.76	250.	13.	0.007	171.96	1.778E+00	
Cf-249	333.44	263.	13.	0.007	175.72	2.361E+00	
Cs-136	340.57	276.	13.	0.007	179.09	7.977E-01	
EU-152	344.29	290.	13.	0.007	182.77	1.428E+00	
HF-181	345.83	301.	6.	0.003	435.08	1.072E+00	
BA-133	356.00	290.	13.	0.007	191.13	5.987E-01	
I-131	364.48	48.	5.	0.003	274.95	1.818E-01	
BA-133	383.84	127.	-15.	-0.008	126.57	-5.261E+00	P
SN-113	391.69	88.	12.	0.007	111.66	6.047E-01	
SB-125	427.88	48.	-4.	-0.002	342.78	-4.557E-01	
AG-108M	433.94	45.	-6.	-0.003	313.52	-2.323E-01	P
pm-146	453.88	74.	-9.	-0.005	207.18	-5.085E-01	P
SB-125	463.37	61.	13.	0.007	90.25	4.429E+00	
Ir-192	468.06	88.	2.	0.001	635.33	1.470E-01	
BE-7	477.60	171.	-19.	-0.010	103.19	-6.583E+00	P
HF-181	482.00	189.	-19.	-0.010	104.67	-8.553E-01	P
La-140	487.02	186.	-7.	-0.004	261.07	-6.140E-01	
RU-103	497.05	52.	-16.	-0.009	118.23	-6.886E-01	P
RH-106	511.86	63.	48.	0.027	45.57	9.351E+00	
Nd-147	531.00	39.	-11.	-0.006	119.74	-3.397E+00	
Ba-140	537.26	44.	-6.	-0.003	337.49	-9.595E-01	P
CS-134	563.24	44.	-3.	-0.002	647.02	-1.523E+00	P
CS-134	569.32	32.	13.	0.007	67.71	3.554E+00	
BI-207	569.70	32.	10.	0.005	88.28	4.231E-01	
SB-125	600.50	285.	-14.	-0.008	172.71	-3.480E+00	
SB-124	602.73	271.	-14.	-0.008	137.74	-6.437E-01	P
RU-103	610.30	257.	-16.	-0.009	146.20	-1.231E+01	
AG-108M	614.28	241.	-16.	-0.009	141.48	-7.940E-01	
RH-106	621.92	209.	-9.	-0.005	220.72	-4.315E+00	
SB-125	635.89	41.	-10.	-0.006	130.15	-4.260E+00	P
I-131	636.97	31.	10.	0.005	87.40	6.342E+00	P
AG-110M	657.76	48.	14.	0.008	77.36	6.834E-01	
CS-137	661.66	78.	-4.	-0.002	315.69	-2.263E-01	
NB-94	702.63	19.	10.	0.006	93.35	5.388E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
SB-124	722.79	94.	-6.	-0.003	232.14	-2.876E+00		
EU-154	723.36	94.	-6.	-0.004	214.01	-1.667E+00		
pm-146	747.16	37.	-8.	-0.005	159.35	-1.306E+00		
ZR-95	756.73	33.	1.	0.001	913.44	1.318E-01		
AG-110M	763.94	54.	-11.	-0.006	99.17	-2.680E+00		
NB-95	765.79	48.	13.	0.007	79.10	7.201E-01		
PA-234M	766.41	34.	10.	0.006	87.18	1.874E+02		
EU-152	778.92	23.	-3.	-0.002	312.25	-1.421E+00		
CS-134	795.87	62.	-8.	-0.005	147.40	-5.445E-01		P
CO-58	810.78	26.	10.	0.005	81.52	5.478E-01		
La-140	815.77	35.	8.	0.004	111.05	1.961E+00		
Cs-136	818.50	57.	-4.	-0.002	282.78	-2.206E-01		
MN-54	834.85	19.	6.	0.003	160.14	3.484E-01		P
Co-56	846.77	19.	2.	0.001	429.35	1.285E-01		P
NB-94	871.10	18.	6.	0.003	118.53	3.341E-01		
EU-154	873.23	12.	6.	0.003	96.06	2.810E+00		
PA-234	880.53	43.	-7.	-0.004	143.87	-6.804E+00		
Sc-46	889.28	50.	1.	0.001	754.98	8.236E-02		
y-88	898.04	36.	-16.	-0.009	59.67	-1.046E+00		P
AG-110M	937.49	35.	-10.	-0.006	108.31	-1.969E+00		P
PA-234	946.02	20.	-1.	-0.001	988.26	-4.860E-01		
EU-152	964.11	73.	8.	0.005	148.98	3.779E+00		
EU-154	996.33	62.	-12.	-0.007	97.18	-7.709E+00		
Co-56	1037.84	15.	-2.	-0.001	431.57	-9.986E-01		
Cs-136	1048.07	10.	5.	0.003	100.00	4.447E-01		
BI-207	1063.66	30.	-13.	-0.007	96.69	-1.258E+00		
Ga-68	1077.40	20.	-4.	-0.002	250.83	-1.044E+01		
FE-59	1099.25	11.	9.	0.005	91.76	1.145E+00		P
EU-152	1112.07	94.	-14.	-0.008	101.77	-7.674E+00		
Sc-46	1120.55	60.	-12.	-0.007	96.91	-8.925E-01		
CO-60	1173.24	27.	-2.	-0.001	604.18	-1.483E-01		P
Co-56	1238.28	27.	-3.	-0.001	444.41	-3.323E-01		
NA-22	1274.53	27.	-14.	-0.008	59.89	-1.155E+00		
FE-59	1291.60	16.	-1.	-0.001	914.69	-1.978E-01		
CO-60	1332.50	27.	-8.	-0.004	134.16	-7.023E-01		P
AG-110M	1384.30	6.	3.	0.002	176.21	1.247E+00		
EU-152	1408.00	6.	1.	0.001	427.57	5.855E-01		
La-140	1596.21	12.	-8.	-0.004	235.37	-8.252E-01		P
SB-124	1690.98	6.	-1.	-0.001	600.00	-2.275E-01		
Co-56	1771.35	18.	5.	0.003	130.51	3.599E+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 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-6.5834E+00	-6.5835E+00	1.032E+02%	2.23E+01
NA-22	#A	-1.1548E+00	-1.1548E+00	5.989E+01%	2.26E+00
K-40		2.4420E+02	2.4420E+02	6.559E+00%	1.54E+01
Sc-46	#A	8.2356E-02	8.2357E-02	7.550E+02%	2.20E+00
CR-51	#A	4.3825E+00	4.3827E+00	1.564E+02%	2.30E+01
MN-54	#A	3.4837E-01	3.4837E-01	1.601E+02%	1.35E+00
FE-59	#A	1.1452E+00	1.1453E+00	9.176E+01%	2.36E+00
Co-56	#A	1.2850E-01	1.2850E-01	4.293E+02%	1.36E+00
CO-57	#A	9.1241E-02	9.1241E-02	3.570E+02%	1.11E+00
CO-58	#A	5.4778E-01	5.4778E-01	8.152E+01%	1.51E+00
CO-60	#A	-7.0228E-01	-7.0228E-01	1.342E+02%	2.37E+00
ZN-65	#A	-1.7840E-01	-1.7840E-01	1.058E+03%	6.60E+00
NB-94	#A	4.3543E-01	4.3543E-01	7.544E+01%	1.18E+00
ZR-95	#A	1.3183E-01	1.3183E-01	9.134E+02%	2.90E+00
NB-95	#A	7.2007E-01	7.2008E-01	7.910E+01%	1.91E+00
RU-103	#A	-6.8855E-01	-6.8857E-01	1.182E+02%	1.52E+00
RH-106	#A	-4.3151E+00	-4.3151E+00	2.207E+02%	3.23E+01
AG-108M	#A	-2.3226E-01	-2.3226E-01	3.135E+02%	1.28E+00
AG-110M	#A	4.9561E-01	4.9561E-01	7.736E+01%	3.00E+00
SN-113	#A	6.0470E-01	6.0471E-01	1.117E+02%	2.28E+00
SB-124	#A	-6.4371E-01	-6.4372E-01	1.377E+02%	3.60E+00
SB-125	#A	8.2069E-01	8.2069E-01	9.025E+01%	3.99E+00
I-131	#A	6.7868E-01	6.7875E-01	8.740E+01%	1.27E+00
Gd-153	#A	1.0732E+00	1.0732E+00	1.829E+02%	8.20E+00
Ga-68	#A	-1.0260E+01	-1.0438E+01	2.508E+02%	6.15E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.47E+00
BA-133	#A	5.9866E-01	5.9866E-01	1.911E+02%	3.86E+00
CS-134	#A	4.3802E-01	4.3802E-01	6.771E+01%	3.54E+00
CS-137	#A	-2.2629E-01	-2.2629E-01	3.157E+02%	2.48E+00
CE-139	#A	4.6947E-01	4.6947E-01	9.995E+01%	1.57E+00
Ba-140	#A	-9.5944E-01	-9.5950E-01	3.375E+02%	5.57E+00
La-140	#A	2.1755E-02	2.1756E-02	1.040E+02%	2.01E+00
CE-141	#A	1.2213E-01	1.2213E-01	1.094E+03%	4.48E+00
CE-144	#A	-3.8200E+00	-3.8200E+00	7.978E+01%	1.83E+01
PM-144	#	1.1938E+00	1.1938E+00	2.894E+01%	6.90E-01
EU-152	#A	1.8031E+00	1.8031E+00	8.438E+01%	8.79E+00
EU-154	#A	2.8099E+00	2.8099E+00	9.606E+01%	9.34E+00
EU-155	#A	-1.0318E-06	-1.0318E-06	3.403E+08%	1.18E+01
HF-181	#A	-5.5138E-01	-5.5139E-01	1.047E+02%	3.08E+00
Ta-182	#A	3.0323E+00	3.0323E+00	6.710E+01%	6.74E+00
Hg-203	#A	5.0519E-01	5.0520E-01	8.619E+01%	1.46E+00
TL-208		7.4363E+00	7.4363E+00	9.464E+00%	8.95E-01
pm-146	#A	-1.3057E+00	-1.3057E+00	1.593E+02%	4.89E+00

y-88	#A	-1.0456E+00	-1.0456E+00	5.967E+01%	2.03E+00
Cd-113m	#A	-8.2365E+03	-8.2365E+03	8.991E+01%	2.47E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.87E+01
Cf-251	#A	6.0511E-01	6.0511E-01	3.751E+02%	5.89E+00
Cf-249	#A	4.4920E-01	4.4920E-01	1.757E+02%	2.73E+00
Sn-126	#A	4.2748E+00	4.2748E+00	1.457E+02%	2.08E+01
PB-210	#A	-2.2740E+01	-2.2740E+01	6.010E+01%	5.96E+01
PB-212		2.2322E+01	2.2322E+01	5.256E+00%	1.82E+00
PB-214		1.6161E+01	1.6161E+01	8.821E+00%	2.32E+00
BI-207	#A	4.2312E-01	4.2312E-01	8.828E+01%	1.26E+00
BI-212	#A	9.6551E+00	9.6551E+00	8.572E+01%	2.78E+01
BI-214		1.2553E+01	1.2553E+01	1.045E+01%	2.04E+00
BI-210M	#A	1.0456E+00	1.0456E+00	9.199E+01%	2.47E+00
AC-228		2.1929E+01	2.1929E+01	9.722E+00%	2.94E+00
TH-227	#A	-8.4266E+00	-8.4266E+00	1.057E+02%	2.97E+01
TH-229	#A	1.2863E+00	1.2863E+00	3.131E+02%	2.41E+01
TH-234	A	-8.4710E+00	-8.4710E+00	1.874E+02%	5.40E+01
PA-231	#A	-1.7490E+01	-1.7490E+01	1.500E+02%	8.79E+01
PA-233	#A	1.2030E+00	1.2030E+00	1.494E+02%	6.04E+00
PA-234	#A	-2.3302E+00	-2.3302E+00	7.954E+01%	1.08E+01
PA-234M	#A	4.3824E+01	4.3824E+01	8.718E+01%	3.51E+02
U-235	#A	9.7311E-01	9.7311E-01	1.418E+02%	1.98E+01
AM-241	#A	-1.6625E+00	-1.6625E+00	1.115E+02%	6.18E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.04E+01
Ir-192	#A	5.5325E-01	5.5326E-01	1.459E+02%	2.47E+00
Cs-136	#A	2.2445E-01	2.2446E-01	1.000E+02%	2.18E+00
Np-239	#A	-1.3464E+00	-1.3468E+00	2.419E+02%	1.09E+01
Nd-147	#A	-3.3966E+00	-3.3969E+00	1.197E+02%	9.82E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 3.246E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.2460568E+02 Bq/Sample

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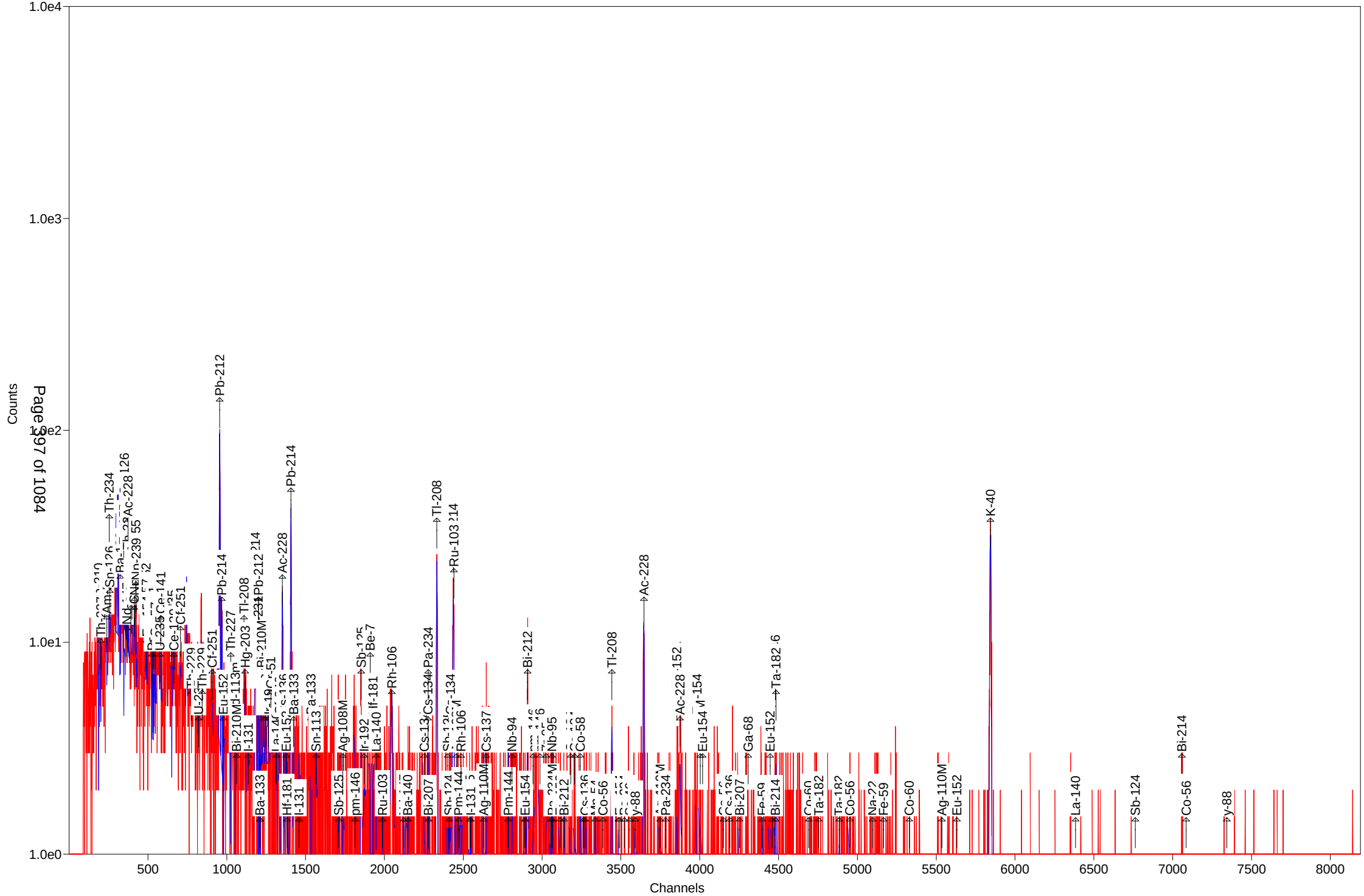
265170_Gamma_160-18567-A-1-B. 15_Gamma_20161114.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161174

Sample Description: 265170_Gamma_160-18567-A-1-C DU
Detector: Detector #17
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-1-C DU

Decay to Time: 9/7/2016 16:25 Live Time: 1800 sec
Acquisition Time: 9/7/2016 16:25:48 Real Time: 1837 sec
Analysis Time: 9/7/2016 16:56 Dead Time: 2.02 %
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_2016-09-04_0724.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	1.730E+00	201.4	3.484E+00	3.485E+00	1.202E+01
NA-22	2.744E-01	116.9	3.208E-01	3.211E-01	1.135E+00
K-40	2.525E+02	5.2	1.315E+01	1.844E+01	9.999E+00
Sc-46	4.419E-01	94.1	4.158E-01	4.164E-01	1.413E+00
CR-51	3.048E+00	121.9	3.715E+00	3.718E+00	1.254E+01
MN-54	-7.483E-01	96.3	7.206E-01	7.216E-01	1.654E+00
FE-59	-5.996E-01	204.8	1.228E+00	1.228E+00	2.821E+00
Co-56	9.190E-01	50.9	4.674E-01	4.698E-01	1.178E+00
CO-57	-1.851E-01	207.0	3.832E-01	3.833E-01	1.292E+00
CO-58	-5.526E-01	115.5	6.383E-01	6.389E-01	1.779E+00
CO-60	-1.853E-02	3409.5	6.318E-01	6.318E-01	1.410E+00
ZN-65	-2.126E+00	96.0	2.041E+00	2.044E+00	6.836E+00
NB-94	8.603E-02	104.3	8.976E-02	8.987E-02	1.442E+00
ZR-95	3.125E-01	265.0	8.282E-01	8.283E-01	2.068E+00
NB-95	-1.880E-01	327.6	6.160E-01	6.160E-01	2.124E+00
RU-103	-1.030E-01	436.7	4.500E-01	4.500E-01	1.155E+00
RH-106	4.424E+00	195.3	8.639E+00	8.642E+00	2.916E+01
AG-108M	-2.653E-01	207.5	5.503E-01	5.505E-01	1.273E+00
AG-110M	8.827E-01	28.8	2.546E-01	2.586E-01	2.183E+00
SN-113	5.282E-01	136.6	7.215E-01	7.220E-01	2.438E+00
SB-124	-5.406E-01	186.5	1.008E+00	1.009E+00	3.390E+00
SB-125	1.446E+00	75.1	1.086E+00	1.089E+00	3.528E+00
I-131	1.223E-01	350.4	4.288E-01	4.288E-01	1.140E+00
Gd-153	-1.037E+00	103.0	1.068E+00	1.070E+00	3.567E+00
Ga-68	1.978E+00	1103.8	2.184E+01	2.184E+01	5.146E+01
Tc-99m	1.688E-01	260.9	4.404E-01	4.405E-01	1.483E+00
BA-133	-1.075E-01	116.3	1.250E-01	1.251E-01	3.637E+00
CS-134	8.297E-02	85.5	7.093E-02	7.106E-02	3.353E+00
CS-137	-8.377E-01	90.0	7.542E-01	7.555E-01	2.524E+00
CE-139	3.588E-01	110.4	3.960E-01	3.975E-01	1.327E+00
Ba-140	3.972E-01	120.3	4.778E-01	4.782E-01	4.778E+00
La-140	3.534E-01	57.2	2.021E-01	2.030E-01	1.739E+00
CE-141	5.934E-01	125.0	7.419E-01	7.425E-01	2.484E+00

CE-144	0.000E+00	1.#INF	1.715E+00	1.715E+00	1.259E+01
PM-144	-4.532E-01	141.6	6.418E-01	6.423E-01	1.470E+00
EU-152	2.480E+00	79.9	1.982E+00	1.986E+00	6.591E+00
EU-154	-4.377E+00	87.3	3.823E+00	3.830E+00	1.289E+01
EU-155	5.379E-01	270.3	1.454E+00	1.454E+00	4.919E+00
HF-181	3.064E-01	172.0	5.271E-01	5.274E-01	1.571E+00
Ta-182	2.260E+00	73.8	1.668E+00	1.671E+00	6.567E+00
Hg-203	-1.017E-01	435.9	4.435E-01	4.435E-01	1.521E+00
TL-208	7.545E+00	8.5	6.406E-01	7.507E-01	8.164E-01
pm-146	2.214E+00	47.7	1.055E+00	1.061E+00	2.430E+00
y-88	1.946E-01	182.5	3.551E-01	3.552E-01	1.196E+00
Cd-113m	-2.821E+03	193.1	5.449E+03	5.452E+03	1.857E+04
Cd-109	0.000E+00	1.#INF	1.487E+01	1.487E+01	4.998E+01
Cf-251	1.667E+00	106.8	1.779E+00	1.785E+00	4.790E+00
Cf-249	-3.937E-01	112.4	4.427E-01	4.431E-01	2.596E+00
Sn-126	3.827E+00	118.1	4.521E+00	4.525E+00	1.513E+01
PB-210	6.115E+00	149.8	9.159E+00	9.166E+00	2.953E+01
PB-212	1.987E+01	5.5	1.087E+00	1.683E+00	1.995E+00
PB-214	1.495E+01	7.5	1.114E+00	1.358E+00	2.013E+00
BI-207	1.449E-01	179.4	2.600E-01	2.601E-01	1.071E+00
BI-212	7.930E+00	95.8	7.597E+00	7.608E+00	2.556E+01
BI-214	1.369E+01	9.1	1.247E+00	1.435E+00	1.847E+00
BI-210M	1.402E-01	478.5	6.708E-01	6.709E-01	2.305E+00
AC-228	2.145E+01	7.0	1.499E+00	1.856E+00	2.869E+00
TH-227	-6.121E+00	110.0	6.734E+00	6.743E+00	1.907E+01
TH-229	-2.807E+00	292.8	8.219E+00	8.222E+00	2.235E+01
TH-234	1.204E+01	39.3	4.733E+00	4.775E+00	2.901E+01
PA-231	1.152E+01	105.8	1.219E+01	1.221E+01	5.571E+01
PA-233	6.916E-01	149.8	1.036E+00	1.037E+00	4.857E+00
PA-234	1.628E+00	137.7	2.243E+00	2.244E+00	7.500E+00
PA-234M	4.170E+01	88.3	3.681E+01	3.687E+01	2.749E+02
U-235	-5.861E-01	508.8	2.982E+00	2.982E+00	1.206E+01
AM-241	5.757E-01	230.0	1.324E+00	1.324E+00	3.776E+00
Np-237	-2.742E+00	168.0	4.608E+00	4.611E+00	1.537E+01
Ir-192	-2.010E-02	70.4	1.415E-02	1.420E-02	1.352E+00
Cs-136	5.094E-01	95.1	4.844E-01	4.853E-01	1.031E+00
Np-239	-1.361E+00	113.2	1.541E+00	1.543E+00	5.149E+00
Nd-147	3.019E+00	96.8	2.924E+00	2.929E+00	7.326E+00
Total	4.477E+02				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-1-C DU

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161174.An1

Acquisition information
Start time: 9/7/2016 4:25:48 PM
Live time: 1800
Real time: 1837
Dead time: 2.02 %
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	9/7/2016 4:25:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2016-09-04_0724.PBC 9/4/2016 7:24:49 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1120

***** 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
46.64	10.	149.79	0.53	2.108E-02	46.54	4.250	PBC<MDA	PB210
59.54	11.	229.98	0.79	2.957E-02	59.54	35.900	PBC<MDA	AM241
63.44	59.	43.37	0.65	3.172E-02	63.29	3.810	PBC<MDA	TH234
64.35	21.	118.14	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
74.86	207.	10.65	0.80	3.682E-02				
77.13	293.	8.28	0.80	3.762E-02				
80.99	8.	336.33	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
87.12	99.	21.28	0.58	4.040E-02	86.49	13.100	1.039E+01	Np237
					86.54	30.700	4.434E+00	EU155
					86.94	9.040	1.502E+01	Sn126
					87.57	37.500	3.610E+00	Sn126
92.58	39.	55.35	0.82	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.34	26.	155.95	0.82	4.156E-02	93.35	5.561	PBC<MDA	AC228
105.31	9.	270.33	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155
123.10	21.	113.47	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
129.13	28.	45.81	0.62	4.230E-02				
131.29	22.	137.73	0.85	4.212E-02	131.29	18.000	PBC<MDA	PA234
133.02	5.	570.53	0.86	4.197E-02	133.02	43.300	PBC<MDA	HF181
140.51	11.	260.95	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	21.	125.03	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
162.66	19.	120.29	0.88	3.813E-02	162.66	6.220	PBC<MDA	Ba140
165.55	20.	110.37	0.89	3.825E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	19.	106.75	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251
205.33	-2.	959.54	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
238.51	463.	5.84	0.94	2.990E-02	238.63	43.300	1.988E+01	PB212
241.93	54.	28.28	0.96	2.960E-02	242.00	7.430	1.356E+01	PB214
265.83	4.	478.52	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
277.54	19.	84.24	1.29	2.694E-02	277.28	6.310	PBC<MDA	TL208
295.13	132.	12.38	0.84	2.579E-02	295.09	19.300	1.478E+01	PB214
300.07	14.	145.06	1.01	2.550E-02				
300.18	14.	149.85	1.01	2.549E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.245E+01	PA231
					300.18	6.200	4.941E+00	PA233
300.66	14.	140.06	1.01	2.550E-02	300.18	6.200	PBC<MDA	PA233
302.65	14.	154.18	1.01	2.534E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.685E+00	BA133
302.85	14.	158.72	1.01	2.533E-02	302.65	2.880	1.072E+01	PA231
					302.85	18.330	1.685E+00	BA133
304.85	4.	569.15	1.02	2.522E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	3.147E-01	BI210M
319.70	13.	121.87	1.03	2.437E-02	320.08	9.940	PBC<MDA	CR51
328.76	25.	57.19	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	6.	264.02	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.32	122.	11.79	1.08	2.344E-02	338.32	12.010	2.415E+01	AC228
340.57	12.	173.69	1.05	2.333E-02	340.57	46.900	PBC<MDA	Cs136
344.29	12.	177.82	1.05	2.315E-02	344.29	26.500	PBC<MDA	EU152
345.83	6.	378.26	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.97	232.	8.29	0.92	2.279E-02	351.93	37.600	1.504E+01	PB214
364.48	4.	350.45	1.07	2.223E-02	364.48	81.700	PBC<MDA	I131
383.84	14.	121.32	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
391.69	13.	136.60	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
427.88	6.	234.82	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
453.88	9.	153.14	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
463.37	7.	215.98	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	104.04	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
477.60	6.	201.38	1.17	1.832E-02	477.60	10.520	PBC<MDA	BE7
482.00	7.	172.02	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
487.02	12.	100.93	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
511.86	115.	18.73	2.45	1.742E-02	511.86	20.000	1.829E+01	RH106
531.00	12.	96.85	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
569.32	7.	113.39	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.943E+00	PA234
					569.70	97.740	2.470E-01	BI207
569.70	5.	179.38	1.25	1.611E-02	569.32	15.380	1.083E+00	CS134
					569.47	8.200	2.032E+00	PA234
					569.70	97.740	1.705E-01	BI207
583.26	182.	8.49	1.06	1.583E-02	583.02	84.500	7.545E+00	TL208
609.36	174.	9.11	0.79	1.533E-02	609.31	46.090	1.369E+01	BI214
					610.30	5.750	1.098E+02	RU103
621.92	12.	195.27	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
635.89	10.	75.09	1.31	1.486E-02	635.89	11.310	PBC<MDA	SB125
727.24	14.	95.80	1.39	1.345E-02	727.17	7.550	PBC<MDA	BI212
747.16	18.	47.66	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	4.	264.97	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
766.41	16.	88.27	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	11.	90.34	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152
785.18	6.	178.21	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
795.87	10.	139.89	1.45	1.257E-02	795.87	85.530	PBC<MDA	CS134
818.50	10.	95.11	1.47	1.231E-02	818.50	100.000	PBC<MDA	Cs136
860.94	47.	14.59	0.58	1.185E-02	860.56	12.420	1.774E+01	TL208
871.10	6.	104.34	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
889.28	9.	94.08	1.53	1.156E-02	889.28	99.984	PBC<MDA	Sc46
898.04	2.	533.31	1.53	1.148E-02	898.04	93.700	PBC<MDA	y88
911.25	122.	10.27	1.26	1.135E-02	911.07	29.000	2.052E+01	AC228
964.11	11.	133.08	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.22	72.	13.98	1.36	1.083E-02	968.97	17.460	2.114E+01	AC228
1037.84	4.	196.95	1.65	1.028E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	2.	869.91	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1120.27	61.	15.75	1.85	9.697E-03	1120.29	15.100	2.310E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.000E+01	Ta182
1121.15	13.	88.97	1.72	9.691E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.195E+00	Ta182
1221.41	10.	117.78	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	23.	50.86	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	4.	116.91	1.84	8.779E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.793E-01	EU154
1384.30	13.	28.85	1.93	8.233E-03	1384.30	24.290	3.524E+00	AG110M
1408.00	10.	84.08	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1460.86	383.	5.21	1.48	7.894E-03	1460.83	10.670	2.525E+02	K40
1764.76	7.	109.40	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	89.28	2.22	6.783E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	3.	182.48	2.26	6.593E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.84	74.85	138.	207.	5.609E+03	10.65	0.802	- D
307.93	77.12	147.	293.	7.784E+03	8.28	0.804	- D
347.92	87.12	153.	90.	2.226E+03	22.13	0.813	- sD
515.83	129.13	63.	28.	6.619E+02	45.81	0.621	- 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	186.04	46.64	92.	10.	0.005	149.79	0.529s
TH-227	200.03	50.14	177.	-21.	-0.012	110.02	0.778s
AM-241	237.59	59.54	222.	11.	0.006	229.98	0.787
TH-234	252.59	63.29	167.	35.	0.019	55.84	0.791D
Sn-126	256.56	64.28	311.	21.	0.012	118.14	0.792s
BA-133	323.36	80.99	246.	8.	0.004	336.33	0.807s
Np-237	345.35	86.49	944.	-26.	-0.014	168.05	0.813
EU-155	345.56	86.54	867.	-13.	-0.007	312.57	0.813D
Sn-126	349.67	87.57	854.	53.	0.030	38.98	0.814D
Cd-109	351.55	88.04	848.	0.	0.000	1000.00	0.814A
Nd-147	363.79	91.10	854.	0.	0.000	1000.00	0.817s
TH-234	369.74	92.59	213.	39.	0.022	55.35	0.818D
AC-228	372.78	93.35	805.	26.	0.014	155.95	0.819s
Gd-153	389.37	97.50	283.	-24.	-0.013	103.03	0.823s
Np-239	397.37	99.50	341.	-8.	-0.004	338.68	0.825
Np-239	414.16	103.70	358.	0.	0.000	1000.00	0.829s
EU-155	420.61	105.31	277.	9.	0.005	270.33	0.830s
Np-239	423.88	106.13	352.	-24.	-0.013	113.20	0.831s
EU-152	486.43	121.78	289.	-23.	-0.013	106.02	0.846s
CO-57	487.57	122.06	312.	-12.	-0.007	207.00	0.846s
EU-154	491.73	123.10	282.	21.	0.012	113.47	0.847s
PA-234	524.49	131.29	457.	22.	0.012	137.73	0.855s
HF-181	531.41	133.02	480.	5.	0.003	570.53	0.856s
CE-144	533.46	133.54	485.	0.	0.000	1000.00	0.857s
HF-181	544.50	136.30	485.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	485.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	394.	11.	0.006	260.95	0.863
U-235	574.43	143.79	410.	-5.	-0.003	508.83	0.866s
CE-141	581.05	145.44	331.	21.	0.012	125.03	0.868s
Ba-140	649.90	162.66	250.	19.	0.011	120.29	0.884s
U-235	652.78	163.38	258.	-23.	-0.013	104.46	0.885s
CE-139	662.67	165.85	227.	20.	0.011	110.37	0.887s
Cf-251	705.64	176.60	120.	19.	0.010	106.75	0.897s
TH-229	773.25	193.51	157.	-8.	-0.004	292.76	0.913s
U-235	820.52	205.33	136.	-2.	-0.001	959.54	0.924s
TH-229	842.58	210.85	233.	-27.	-0.015	102.47	0.929s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	907.16	227.00	123.	-10.	-0.006	193.76	0.944s
PB-212	953.67	238.63	88.	463.	0.257	5.47	0.954D
PB-214	967.13	242.00	88.	54.	0.030	28.28	0.957D
EU-152	977.91	244.69	797.	-9.	-0.005	470.48	0.960s
Cd-113m	1053.91	263.70	130.	-8.	-0.005	193.13	0.978
BI-210M	1062.44	265.83	138.	4.	0.002	478.52	0.979s
TL-208	1109.26	277.54	68.	19.	0.011	84.24	1.286s
Hg-203	1115.89	279.20	150.	-4.	-0.002	435.89	0.992s
I-131	1136.28	284.30	96.	-5.	-0.003	338.43	0.996s
PB-214	1179.60	295.13	43.	132.	0.074	12.38	0.844
PB-212	1199.19	300.03	187.	14.	0.008	140.06	1.011s
PA-231	1199.35	300.07	201.	14.	0.008	145.06	1.011s
PA-233	1199.79	300.18	215.	14.	0.008	149.85	1.011s
PA-231	1209.66	302.65	229.	14.	0.008	154.18	1.013s
BA-133	1210.47	302.85	243.	14.	0.008	158.72	1.013s
Ba-140	1218.46	304.85	257.	4.	0.002	569.15	1.015s
BI-210M	1218.64	304.90	261.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	261.	0.	0.000	1000.00	1.019s
Ir-192	1265.01	316.49	112.	-16.	-0.009	94.88	1.026s
CR-51	1279.38	320.08	124.	13.	0.007	121.87	1.029s
La-140	1314.07	328.76	51.	25.	0.014	57.19	1.037s
Cf-249	1332.79	333.44	62.	6.	0.003	264.02	1.041s
AC-228	1352.30	338.32	26.	122.	0.068	11.79	1.080s
Cs-136	1361.30	340.57	214.	12.	0.007	173.69	1.048s
EU-152	1376.16	344.29	226.	12.	0.007	177.82	1.051
HF-181	1382.33	345.83	238.	6.	0.003	378.26	1.053s
PB-214	1406.89	351.97	37.	232.	0.129	8.29	0.923
BA-133	1423.00	356.00	366.	-16.	-0.009	169.98	1.062s
I-131	1456.93	364.48	55.	4.	0.002	350.45	1.070
BA-133	1534.34	383.84	131.	14.	0.008	121.32	1.087s
Cf-249	1550.77	387.95	182.	-17.	-0.010	112.44	1.091s
SN-113	1565.73	391.69	148.	13.	0.007	136.60	1.094s
SB-125	1710.44	427.88	55.	6.	0.003	234.82	1.127s
AG-108M	1734.69	433.94	66.	-8.	-0.005	207.45	1.132s
pm-146	1814.44	453.88	49.	9.	0.005	153.14	1.150s
SB-125	1852.38	463.37	96.	7.	0.004	215.98	1.158s
Ir-192	1871.15	468.06	65.	11.	0.006	104.04	1.163s
BE-7	1909.29	477.59	70.	6.	0.003	201.38	1.171s
HF-181	1926.89	482.00	69.	7.	0.004	172.02	1.175s
La-140	1946.98	487.02	36.	12.	0.007	100.93	1.180s
RU-103	1987.11	497.05	44.	-3.	-0.002	436.74	1.188s
RH-106	2046.35	511.86	53.	115.	0.064	18.73	2.452s
Nd-147	2122.88	531.00	32.	12.	0.007	96.85	1.219s
Ba-140	2147.92	537.26	49.	-7.	-0.004	181.02	1.224s
CS-134	2251.82	563.24	41.	-6.	-0.003	218.22	1.247s
CS-134	2276.15	569.32	28.	7.	0.004	113.39	1.252s
PA-234	2276.75	569.47	44.	-6.	-0.004	150.34	1.253s
BI-207	2277.67	569.70	35.	5.	0.003	179.38	1.253

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	2331.90	583.26	13.	182.	0.101	8.49	1.055
SB-125	2400.86	600.50	388.	-15.	-0.008	102.67	1.280s
SB-124	2409.78	602.73	373.	-15.	-0.008	186.54	1.282s
CS-134	2417.70	604.71	358.	-15.	-0.008	182.62	1.284s
BI-214	2436.31	609.36	20.	174.	0.097	9.11	0.794s
AG-108M	2455.98	614.28	343.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	343.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	266.	12.	0.007	195.27	1.299s
SB-125	2542.41	635.89	24.	10.	0.006	75.09	1.311s
AG-110M	2629.90	657.76	107.	-21.	-0.011	74.00	1.330s
CS-137	2645.49	661.66	130.	-19.	-0.010	90.04	1.333s
PM-144	2785.03	696.54	52.	-11.	-0.006	141.62	1.363s
NB-94	2809.38	702.63	48.	-3.	-0.002	495.70	1.368s
SB-124	2890.01	722.79	109.	-13.	-0.007	119.25	1.386s
AG-108M	2890.61	722.94	96.	-10.	-0.006	136.83	1.386s
EU-154	2892.29	723.36	86.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	86.	0.	0.000	1000.00	1.387s
BI-212	2907.54	727.17	89.	14.	0.008	95.80	1.390s
pm-146	2941.74	735.72	39.	-2.	-0.001	641.29	1.397s
pm-146	2987.51	747.16	13.	18.	0.010	47.66	1.407s
ZR-95	3025.79	756.73	26.	4.	0.002	264.97	1.415s
AG-110M	3054.64	763.94	99.	-21.	-0.012	70.59	1.421s
NB-95	3062.03	765.79	100.	-4.	-0.002	327.63	1.423s
PA-234M	3064.52	766.41	92.	16.	0.009	88.27	1.423s
EU-152	3114.56	778.92	22.	11.	0.006	90.34	1.434s
BI-212	3140.56	785.42	26.	6.	0.003	178.21	1.440
CS-134	3182.35	795.87	48.	10.	0.006	139.89	1.448s
CS-134	3206.69	801.95	48.	-14.	-0.008	106.61	1.454s
CO-58	3241.99	810.78	62.	-12.	-0.007	115.51	1.461s
Cs-136	3272.90	818.50	19.	10.	0.006	95.11	1.467s
MN-54	3338.30	834.85	51.	-16.	-0.009	96.29	1.481s
TL-208	3442.68	860.94	0.	47.	0.026	14.59	0.581s
NB-94	3483.32	871.10	19.	6.	0.004	104.34	1.512s
EU-154	3491.85	873.23	43.	-11.	-0.006	87.35	1.514s
PA-234	3521.06	880.53	41.	-1.	-0.001	687.39	1.520
PA-234	3531.90	883.24	43.	0.	0.000	1000.00	1.522s
AG-110M	3537.67	884.68	43.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	33.	9.	0.005	94.08	1.527s
y-88	3591.11	898.04	19.	2.	0.001	533.31	1.534s
AC-228	3643.98	911.25	9.	122.	0.068	10.27	1.261
AG-110M	3748.95	937.49	28.	-7.	-0.004	164.75	1.567s
PA-234	3783.07	946.02	37.	-15.	-0.009	87.47	1.574s
EU-152	3855.45	964.11	103.	11.	0.006	133.08	1.589s
AC-228	3875.88	969.22	8.	72.	0.040	13.98	1.359
EU-154	3984.36	996.33	61.	-14.	-0.008	84.65	1.616s
PA-234M	4003.04	1001.00	78.	-4.	-0.002	310.36	1.620s
Co-56	4150.45	1037.84	16.	4.	0.002	196.95	1.650s
Cs-136	4191.39	1048.07	56.	-12.	-0.006	96.24	1.658s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	4200.55	1050.36	72.	-2.	-0.001	801.39	1.661s
BI-207	4253.77	1063.66	35.	2.	0.001	869.91	1.671
FE-59	4396.18	1099.25	30.	-6.	-0.003	204.80	1.700s
EU-152	4447.49	1112.07	173.	-19.	-0.010	101.53	1.711s
ZN-65	4461.38	1115.55	154.	-19.	-0.010	96.00	1.713s
BI-214	4480.29	1120.27	8.	61.	0.034	15.75	1.853
Sc-46	4481.41	1120.55	135.	-19.	-0.010	90.10	1.717
Ta-182	4484.41	1121.30	64.	13.	0.007	88.97	1.718
CO-60	4692.24	1173.24	30.	-6.	-0.003	159.33	1.760s
Ta-182	4885.02	1221.41	27.	10.	0.006	117.78	1.798
Co-56	4952.53	1238.28	21.	23.	0.013	50.86	1.812s
NA-22	5097.60	1274.53	11.	4.	0.002	116.91	1.840s
EU-154	5097.66	1274.54	15.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	21.	-2.	-0.001	454.68	1.854s
AG-110M	5536.92	1384.30	0.	13.	0.007	28.85	1.926s
EU-152	5631.79	1408.00	11.	10.	0.005	84.08	1.944s
K-40	5843.38	1460.86	7.	383.	0.213	5.21	1.477s
La-140	6385.15	1596.21	17.	-5.	-0.003	390.43	2.087s
SB-124	6764.55	1690.98	0.	0.	0.000	1000.00	2.157s
BI-214	7058.84	1764.49	22.	7.	0.004	109.40	2.211s
Co-56	7086.31	1771.35	20.	8.	0.004	89.28	2.216s
y-88	7345.39	1836.06	7.	3.	0.002	182.48	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	1.7299E+00					5.31E+01	
			477.60	1.730E+00	(	1.202E+01	2.01E+02	1.05E+01 G
NA-22	C	2.7440E-01					9.50E+02	
			1274.53	2.744E-01	?(	1.135E+00	1.17E+02	9.99E+01 G
K-40	N	2.5252E+02					4.66E+11	
			1460.83	2.525E+02	(P	9.999E+00	5.21E+00	1.07E+01 G
Sc-46	F	4.4195E-01					8.38E+01	
			889.28	4.419E-01	?(	1.413E+00	9.41E+01	1.00E+02 G
			1120.55	-1.082E+00	+	3.262E+00	9.01E+01	1.00E+02 G
CR-51	F	3.0482E+00					2.77E+01	
			320.08	3.048E+00	?(P	1.254E+01	1.22E+02	9.94E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C -7.4835E-01					3.12E+02	
		834.85	-7.483E-01	?(	1.654E+00	9.63E+01	1.00E+02 G
FE-59	F -5.9960E-01					4.45E+01	
		1099.25	-5.996E-01	?(	2.821E+00	2.05E+02	5.65E+01 G
		1291.60	-3.454E-01	+	3.587E+00	4.55E+02	4.32E+01 G
Co-56	C 9.1901E-01					7.73E+01	
		846.77	1.026E-02	%(P	1.178E+00	4.66E+03	9.99E+01 G
		1238.28	2.123E+00	?(	2.270E+00	5.09E+01	6.61E+01 G
		1037.84	1.716E+00	?(P	8.055E+00	1.97E+02	1.41E+01 G
		1771.35	4.079E+00	?	1.241E+01	8.93E+01	1.55E+01 A
CO-57	C -1.8510E-01					2.72E+02	
		122.06	-1.851E-01	*(	1.292E+00	2.07E+02	8.56E+01 G
		136.47	0.000E+00	+	1.316E+01	1.00E+03	1.07E+01 G
CO-58	C -5.5255E-01					7.09E+01	
		810.78	-5.526E-01	?(P	1.779E+00	1.16E+02	9.95E+01 G
CO-60	F -1.8531E-02					1.93E+03	
		1332.50	-1.853E-02	%(P	1.410E+00	3.41E+03	1.00E+02 G
		1173.24	-3.582E-01	+ P	1.678E+00	1.59E+02	9.99E+01 G
ZN-65	F -2.1264E+00					2.44E+02	
		1115.55	-2.126E+00	?(	6.836E+00	9.60E+01	5.06E+01 G
NB-94	I 8.6031E-02					7.41E+06	
		702.63	-1.322E-01	?(P	1.442E+00	4.96E+02	9.79E+01 G
		871.10	2.999E-01	?(	1.082E+00	1.04E+02	9.99E+01 G
ZR-95	I 3.1255E-01					6.40E+01	
		756.73	3.125E-01	?(	2.068E+00	2.65E+02	5.45E+01 G
		724.20	0.000E+00	-	4.284E+00	1.00E+03	4.42E+01 G
NB-95	I -1.8800E-01					6.40E+01	
		765.79	-1.880E-01	?(	2.124E+00	3.28E+02	9.98E+01 G
RU-103	I -1.0304E-01					3.93E+01	
		497.05	-1.030E-01	(	1.155E+00	4.37E+02	9.09E+01 G
		610.30	-4.813E-04	%	5.616E+01	3.43E+06	5.75E+00 GA
RH-106	I 4.4244E+00					3.74E+02	
		621.92	4.424E+00	&(	2.916E+01	1.95E+02	9.93E+00 G
		1050.36	-5.243E+00	+	1.472E+02	8.01E+02	1.56E+00 G
		511.86	1.829E+01	?	5.859E+00	1.87E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	-2.6528E-01					1.53E+05	
			433.94	-2.653E-01	?(P	1.273E+00	2.07E+02	9.05E+01 G
			722.94	-4.717E-01	+	2.194E+00	1.37E+02	9.08E+01 G
			614.28	0.000E+00	+	3.611E+00	1.00E+03	8.98E+01 G
AG-110M	F	8.8266E-01					2.50E+02	
			884.68	0.000E+00	?(	2.183E+00	1.00E+03	7.27E+01 G
			657.76	-8.375E-01	+	2.059E+00	7.40E+01	9.46E+01 G
			937.49	-1.019E+00	+	3.983E+00	1.65E+02	3.44E+01 G
			1384.30	3.524E+00	?(P	2.047E+00	2.88E+01	2.43E+01 G
			763.94	-4.032E+00	+	9.440E+00	7.06E+01	2.23E+01 G
SN-113	F	5.2821E-01					1.15E+02	
			391.69	5.282E-01	&(P	2.438E+00	1.37E+02	6.40E+01 G
SB-124	F	-5.4061E-01					6.02E+01	
			602.73	-5.406E-01	?(	3.390E+00	1.87E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.218E+00	1.00E+03	4.78E+01 G
			722.79	-4.849E+00	+	1.955E+01	1.19E+02	1.08E+01 G
SB-125	I	1.4464E+00					1.01E+03	
			427.88	5.680E-01	?(	3.528E+00	2.35E+02	2.96E+01 G
			600.50	-3.024E+00	+ P	1.896E+01	1.03E+02	1.79E+01 G
			635.89	3.368E+00	?(	8.470E+00	7.51E+01	1.13E+01 G
			463.37	1.854E+00	?(P	1.374E+01	2.16E+02	1.05E+01 G
I-131	I	1.2235E-01					8.02E+00	
			364.48	1.223E-01	?(	1.140E+00	3.50E+02	8.17E+01 G
			284.30	-1.622E+00	+ P	1.651E+01	3.38E+02	6.14E+00 G
			636.97	-1.851E-01	%	1.798E+01	2.72E+03	7.17E+00 G
Gd-153	F	-1.0366E+00					2.42E+02	
			97.50	-1.037E+00	(	3.567E+00	1.03E+02	3.00E+01 G
			103.20	5.975E-02	%	5.423E+00	2.67E+03	2.18E+01 G
Ga-68	C	1.9784E+00					4.71E-02	
			1077.40	1.978E+00	%(	5.146E+01	1.10E+03	3.30E+00 G
Tc-99m	I	1.6875E-01					2.51E-01	
			140.51	1.688E-01	&(	1.483E+00	2.61E+02	8.93E+01 G
BA-133	F	-1.0748E-01					3.85E+03	
			356.00	-6.371E-01	?(	3.637E+00	1.70E+02	6.20E+01 G
			302.85	1.685E+00	?(	9.014E+00	1.59E+02	1.83E+01 G
			383.84	3.972E+00	& P	1.626E+01	1.21E+02	8.94E+00 GA
			80.99	3.317E-01	? P	3.184E+00	3.36E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	8.2971E-02					7.54E+02	
			604.71	-5.462E-01	?(	3.353E+00	1.83E+02	9.76E+01 G
			795.87	5.339E-01	?(	1.802E+00	1.40E+02	8.55E+01 G
			569.32	1.569E+00	?(	6.134E+00	1.13E+02	1.54E+01 G
			801.95	-6.990E+00	&	1.784E+01	1.07E+02	8.69E+00 G
			563.24	-2.330E+00	+ P	1.328E+01	2.18E+02	8.35E+00 G
CS-137	I	-8.3766E-01					1.10E+04	
			661.66	-8.377E-01	&(	2.524E+00	9.00E+01	8.52E+01 G
CE-139	F	3.5880E-01					1.38E+02	
			165.85	3.588E-01	?(	1.327E+00	1.10E+02	7.99E+01 G
Ba-140	I	3.9720E-01					1.28E+01	
			537.26	-9.241E-01	?(P	4.778E+00	1.81E+02	2.44E+01 G
			162.66	4.436E+00	&(	1.789E+01	1.20E+02	6.22E+00 G
			304.85	2.054E+00	?(	3.976E+01	5.69E+02	4.29E+00 G
La-140	I	3.5343E-01					1.28E+01	
			1596.21	-4.040E-01	?(P	1.739E+00	3.90E+02	9.54E+01 G
			487.02	8.220E-01	?(P	2.077E+00	1.01E+02	4.55E+01 G
			328.76	2.863E+00	?(	4.131E+00	5.72E+01	2.03E+01 G
			815.77	-6.137E-02	% P	8.275E+00	4.47E+03	2.33E+01 G
CE-141	I	5.9341E-01					3.25E+01	
			145.44	5.934E-01	?(	2.484E+00	1.25E+02	4.82E+01 G
PM-144	C	-4.5320E-01					3.63E+02	
			696.54	-4.532E-01	?(P	1.470E+00	1.42E+02	9.90E+01 G
			618.06	0.000E+00	+	3.289E+00	1.00E+03	9.91E+01 G
EU-152	F	2.4798E+00					4.94E+03	
			344.29	1.097E+00	&(	6.591E+00	1.78E+02	2.65E+01 G
			1112.07	-7.854E+00	+	2.672E+01	1.02E+02	1.36E+01 G
			121.78	-1.052E+00	&	3.726E+00	1.06E+02	2.86E+01 G
			778.92	3.746E+00	?(	8.200E+00	9.03E+01	1.29E+01 G
			964.11	3.866E+00	?(	1.746E+01	1.33E+02	1.46E+01 G
			244.69	-2.122E+00	+	3.349E+01	4.70E+02	7.58E+00 G
			1408.00	3.114E+00	?	5.837E+00	8.41E+01	2.10E+01 GA
EU-154	I	-4.3770E+00					3.14E+03	
			873.23	-4.377E+00	?(	1.289E+01	8.73E+01	1.23E+01 G
			123.10	6.804E-01	+	2.584E+00	1.13E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.733E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	9.345E+00	1.00E+03	2.02E+01 G
			1004.77	-2.927E-01	&	1.284E+01	1.25E+03	1.80E+01 G
			996.33	-6.801E+00	+	1.932E+01	8.46E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	5.3789E-01					1.81E+03	
			105.31	5.379E-01	*(P	4.919E+00	2.70E+02	2.12E+01 G
			86.54	-6.011E-01	+	6.289E+00	3.13E+02	3.07E+01 G
HF-181	F	3.0644E-01					4.24E+01	
			482.00	2.655E-01	?(	1.571E+00	1.72E+02	8.05E+01 G
			133.02	1.664E-01	(	3.203E+00	5.71E+02	4.33E+01 G
			345.83	9.274E-01	?(	1.192E+01	3.78E+02	1.51E+01 G
			136.30	0.000E+00	&	2.402E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.2596E+00					1.14E+02	
			1121.30	2.195E+00	(	6.567E+00	8.90E+01	3.49E+01 G
			1221.41	2.344E+00	(	6.072E+00	1.18E+02	2.70E+01 G
			1189.05	3.702E-01	%	1.121E+01	1.30E+03	1.62E+01 G
Hg-203	F	-1.0175E-01					4.66E+01	
			279.20	-1.017E-01	?(	1.521E+00	4.36E+02	8.15E+01 G
TL-208	N	7.5449E+00					6.98E+02	
			583.02	7.545E+00	(P	8.164E-01	8.49E+00	8.45E+01 G
			277.28	6.213E+00	- P	1.344E+01	8.42E+01	6.31E+00 G
			860.56	1.774E+01	+	2.781E+00	1.46E+01	1.24E+01 G
pm-146	C	2.2140E+00					2.02E+03	
			747.16	2.214E+00	&(P	2.430E+00	4.77E+01	3.40E+01 G
			735.72	-3.704E-01	-	5.891E+00	6.41E+02	2.25E+01 G
			453.88	4.101E-01	- P	1.587E+00	1.53E+02	6.50E+01 G
y-88	F	1.9457E-01					1.07E+02	
			898.04	9.037E-02	?(P	1.196E+00	5.33E+02	9.37E+01 G
			1836.06	2.930E-01	?(P	1.243E+00	1.82E+02	9.92E+01 G
Cd-113m		-2.8212E+03					5.33E+03	
			263.70	-2.821E+03	(	1.857E+04	1.93E+02	6.00E-03 K
Cf-251	T	1.6667E+00					3.28E+05	
			176.60	1.667E+00	&(	4.790E+00	1.07E+02	1.70E+01 G
			227.00	-2.946E+00	+	1.553E+01	1.94E+02	6.30E+00 GA
Cf-249	T	-3.9369E-01					1.28E+05	
			387.95	-6.877E-01	?(	2.596E+00	1.12E+02	6.60E+01 G
			333.44	8.573E-01	&(	5.976E+00	2.64E+02	1.55E+01 G
Sn-126		3.8267E+00					3.65E+07	
			87.57	1.948E+00	}	5.081E+00	3.90E+01	3.75E+01 GA
			64.28	3.827E+00	?(	1.513E+01	1.18E+02	9.70E+00 G
			86.94	2.323E-06	%	2.115E+01	2.71E+08	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	6.1147E+00					8.14E+03	
			46.54	6.115E+00	(P	2.953E+01	1.50E+02	4.25E+00 G
PB-212	N	1.9869E+01					6.98E+02	
			238.63	1.987E+01	(P	1.995E+00	5.47E+00	4.33E+01 G
			300.03	9.334E+00	&	4.409E+01	1.40E+02	3.28E+00 GA
PB-214	N	1.4953E+01					5.84E+05	
			351.93	1.504E+01	(P	2.013E+00	8.29E+00	3.76E+01 G
			295.09	1.478E+01	(P	3.693E+00	1.24E+01	1.93E+01 G
			242.00	1.356E+01		1.175E+01	2.83E+01	7.43E+00 GA
BI-207	C	1.4494E-01					1.18E+04	
			569.70	1.705E-01	(	1.071E+00	1.79E+02	9.77E+01 G
			1063.66	1.113E-01	(P	2.252E+00	8.70E+02	7.45E+01 G
BI-212	N	7.9300E+00					6.98E+02	
			727.17	7.930E+00	?(	2.556E+01	9.58E+01	7.55E+00 G
			785.42	2.051E+01	?	9.049E+01	1.78E+02	1.28E+00 GA
BI-214	N	1.3688E+01					5.84E+05	
			609.31	1.369E+01	(P	1.847E+00	9.11E+00	4.61E+01 G
			1120.29	2.310E+01	+ P	6.063E+00	1.58E+01	1.51E+01 G
			1764.49	3.484E+00	- P	1.314E+01	1.09E+02	1.54E+01 G
BI-210M	T	1.4018E-01					1.10E+09	
			265.83	1.402E-01	&(	2.305E+00	4.79E+02	5.00E+01 G
			304.90	0.000E+00	-	6.138E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1450E+01					2.10E+03	
			911.07	2.052E+01	(P	2.869E+00	1.03E+01	2.90E+01 G
			968.97	2.114E+01	(	4.667E+00	1.40E+01	1.75E+01 G
			338.32	2.415E+01	@(	5.195E+00	1.18E+01	1.20E+01 G
			93.35	6.233E+00	-	3.243E+01	1.56E+02	5.56E+00 XA
TH-227	N	-6.1210E+00					7.95E+03	
			50.14	-6.121E+00	?(	1.907E+01	1.10E+02	8.00E+00 G
			256.24	-2.789E-01	%	1.309E+01	1.69E+03	7.00E+00 G
TH-229	N	-2.8073E+00					2.68E+06	
			193.51	-2.807E+00	?(	2.235E+01	2.93E+02	4.40E+00 G
			210.85	-1.543E+01	+	4.221E+01	1.02E+02	2.99E+00 G
TH-234	N	1.2040E+01					1.63E+12	
			63.29	1.592E+01	(P	2.901E+01	5.58E+01	3.81E+00 G
			92.59	9.393E+00	(P	1.699E+01	5.54E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	1.1516E+01					1.20E+07	
			302.65	1.072E+01	?(	5.571E+01	1.54E+02	2.88E+00 G
			300.07	1.245E+01	(	6.088E+01	1.45E+02	2.46E+00 G
PA-233	C	6.9158E-01					7.82E+08	
			312.01	-4.023E-02	%(P	4.857E+00	2.54E+03	3.60E+01 G
			300.18	4.941E+00	(	2.496E+01	1.50E+02	6.20E+00 G
PA-234	N	1.6283E+00					1.63E+12	
			131.29	1.628E+00	?(	7.500E+00	1.38E+02	1.80E+01 G
			946.02	-5.818E+00	+	1.172E+01	8.75E+01	1.34E+01 G
			569.47	-2.733E+00	+	1.421E+01	1.50E+02	8.20E+00 G
			883.24	0.000E+00	-	1.650E+01	1.00E+03	9.60E+00 G
			880.53	-1.060E+00	+	2.596E+01	6.87E+02	6.00E+00 GA
PA-234M	N	4.1701E+01					1.63E+12	
			1001.00	-2.581E+01	&(P	2.749E+02	3.10E+02	8.37E-01 G
			766.41	2.339E+02	?(P	6.918E+02	8.83E+01	2.94E-01 G
U-235	N	-5.8606E-01					2.57E+11	
			143.79	-5.861E-01	(P	1.206E+01	5.09E+02	1.10E+01 G
			205.33	-7.212E-01	& P	1.911E+01	9.60E+02	5.01E+00 G
			163.38	-6.639E+00	+ P	2.230E+01	1.04E+02	5.08E+00 G
AM-241	T	5.7568E-01					1.58E+05	
			59.54	5.757E-01	&(	3.776E+00	2.30E+02	3.59E+01 G
Np-237	F	-2.7421E+00					2.14E+06	
			86.49	-2.742E+00	?(	1.537E+01	1.68E+02	1.31E+01 G
Ir-192	F	-2.0096E-02					7.40E+01	
			316.49	-4.246E-01	?(	1.352E+00	9.49E+01	8.70E+01 G
			468.06	6.602E-01	?(	2.327E+00	1.04E+02	5.18E+01 G
			308.44	0.000E+00	+	5.457E+00	1.00E+03	3.18E+01 G
Cs-136	F	5.0936E-01					1.30E+01	
			818.50	4.606E-01	?(	1.031E+00	9.51E+01	1.00E+02 G
			1048.07	-7.826E-01	+	2.547E+00	9.62E+01	8.00E+01 G
			340.57	6.133E-01	?(	3.600E+00	1.74E+02	4.69E+01 G
Np-239	T	-1.3614E+00					2.36E+00	
			103.70	0.000E+00	+	4.929E+00	1.00E+03	2.40E+01 X
			106.13	-1.361E+00	?(	5.149E+00	1.13E+02	2.27E+01 G
			99.50	-6.783E-01	+	7.764E+00	3.39E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	3.0193E+00					1.11E+01	
		531.00	3.019E+00	?(	7.326E+00	9.68E+01	1.30E+01 G
		91.10	0.000E+00	-	6.620E+00	1.00E+03	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	177.	-21.	-0.012	110.02	-6.121E+00	
AM-241	59.54	222.	11.	0.006	229.98	5.757E-01	
BA-133	80.99	246.	8.	0.004	336.33	3.317E-01	P
Np-237	86.49	944.	-26.	-0.014	168.05	-2.742E+00	
EU-155	86.54	867.	-13.	-0.007	312.57	-6.011E-01	
Gd-153	97.50	283.	-24.	-0.013	103.03	-1.037E+00	
Np-239	99.50	341.	-8.	-0.004	338.68	-6.783E-01	
EU-155	105.31	277.	9.	0.005	270.33	5.379E-01	P
Np-239	106.13	352.	-24.	-0.013	113.20	-1.361E+00	
EU-152	121.78	289.	-23.	-0.013	106.02	-1.052E+00	
CO-57	122.06	312.	-12.	-0.007	207.00	-1.851E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	123.10	282.	21.	0.012	113.47	6.804E-01	
PA-234	131.29	457.	22.	0.012	137.73	1.628E+00	
HF-181	133.02	480.	5.	0.003	570.53	1.664E-01	
Tc-99m	140.51	394.	11.	0.006	260.95	1.688E-01	
U-235	143.79	410.	-5.	-0.003	508.83	-5.861E-01	P
CE-141	145.44	331.	21.	0.012	125.03	5.934E-01	
Ba-140	162.66	250.	19.	0.011	120.29	4.436E+00	
U-235	163.38	258.	-23.	-0.013	104.46	-6.639E+00	P
Cf-251	176.60	120.	19.	0.010	106.75	1.667E+00	
TH-229	193.51	157.	-8.	-0.004	292.76	-2.807E+00	
U-235	205.33	136.	-2.	-0.001	959.54	-7.212E-01	P
TH-229	210.85	233.	-27.	-0.015	102.47	-1.543E+01	
Cf-251	227.00	123.	-10.	-0.006	193.76	-2.946E+00	
EU-152	244.69	797.	-9.	-0.005	470.48	-2.122E+00	
Cd-113m	263.70	130.	-8.	-0.005	193.13	-2.821E+03	
BI-210M	265.83	138.	4.	0.002	478.52	1.402E-01	
Hg-203	279.20	150.	-4.	-0.002	435.89	-1.017E-01	
I-131	284.30	96.	-5.	-0.003	338.43	-1.622E+00	P
PA-231	300.07	201.	14.	0.008	145.06	1.245E+01	
PA-233	300.18	215.	14.	0.008	149.85	4.941E+00	
PA-231	302.65	229.	14.	0.008	154.18	1.072E+01	
BA-133	302.85	243.	14.	0.008	158.72	1.685E+00	
Ba-140	304.85	257.	4.	0.002	569.15	2.054E+00	
Ir-192	316.49	112.	-16.	-0.009	94.88	-4.246E-01	
La-140	328.76	51.	25.	0.014	57.19	2.863E+00	
Cf-249	333.44	62.	6.	0.003	264.02	8.573E-01	
Cs-136	340.57	214.	12.	0.007	173.69	6.133E-01	
EU-152	344.29	226.	12.	0.007	177.82	1.097E+00	
HF-181	345.83	238.	6.	0.003	378.26	9.274E-01	
BA-133	356.00	366.	-16.	-0.009	169.98	-6.371E-01	
I-131	364.48	55.	4.	0.002	350.45	1.223E-01	
BA-133	383.84	131.	14.	0.008	121.32	3.972E+00	P
Cf-249	387.95	182.	-17.	-0.010	112.44	-6.877E-01	
SN-113	391.69	148.	13.	0.007	136.60	5.282E-01	P
SB-125	427.88	55.	6.	0.003	234.82	5.680E-01	
AG-108M	433.94	66.	-8.	-0.005	207.45	-2.653E-01	P
pm-146	453.88	49.	9.	0.005	153.14	4.101E-01	P
SB-125	463.37	96.	7.	0.004	215.98	1.854E+00	P
Ir-192	468.06	65.	11.	0.006	104.04	6.602E-01	
BE-7	477.59	70.	6.	0.003	201.38	1.730E+00	
HF-181	482.00	69.	7.	0.004	172.02	2.655E-01	
La-140	487.02	36.	12.	0.007	100.93	8.220E-01	P
RU-103	497.05	44.	-3.	-0.002	436.74	-1.030E-01	
RH-106	511.86	53.	115.	0.064	18.73	1.829E+01	
Nd-147	531.00	32.	12.	0.007	96.85	3.019E+00	
Ba-140	537.26	49.	-7.	-0.004	181.02	-9.241E-01	P
CS-134	563.24	41.	-6.	-0.003	218.22	-2.330E+00	P
CS-134	569.32	28.	7.	0.004	113.39	1.569E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	569.47	44.	-6.	-0.004	150.34	-2.733E+00		
SB-125	600.50	388.	-15.	-0.008	102.67	-3.024E+00		P
SB-124	602.73	373.	-15.	-0.008	186.54	-5.406E-01		
CS-134	604.71	358.	-15.	-0.008	182.62	-5.462E-01		
RH-106	621.92	266.	12.	0.007	195.27	4.424E+00		
SB-125	635.89	24.	10.	0.006	75.09	3.368E+00		
AG-110M	657.76	107.	-21.	-0.011	74.00	-8.375E-01		
CS-137	661.66	130.	-19.	-0.010	90.04	-8.377E-01		
PM-144	696.54	52.	-11.	-0.006	141.62	-4.532E-01		P
NB-94	702.63	48.	-3.	-0.002	495.70	-1.322E-01		P
SB-124	722.79	109.	-13.	-0.007	119.25	-4.849E+00		
AG-108M	722.94	96.	-10.	-0.006	136.83	-4.717E-01		
pm-146	735.72	39.	-2.	-0.001	641.29	-3.704E-01		
pm-146	747.16	13.	18.	0.010	47.66	2.214E+00		P
ZR-95	756.73	26.	4.	0.002	264.97	3.125E-01		
AG-110M	763.94	99.	-21.	-0.012	70.59	-4.032E+00		
NB-95	765.79	100.	-4.	-0.002	327.63	-1.880E-01		
PA-234M	766.41	92.	16.	0.009	88.27	2.339E+02		P
EU-152	778.92	22.	11.	0.006	90.34	3.746E+00		
CS-134	795.87	48.	10.	0.006	139.89	5.339E-01		
CS-134	801.95	48.	-14.	-0.008	106.61	-6.990E+00		
CO-58	810.78	62.	-12.	-0.007	115.51	-5.526E-01		P
Cs-136	818.50	19.	10.	0.006	95.11	4.606E-01		
MN-54	834.85	51.	-16.	-0.009	96.29	-7.483E-01		
NB-94	871.10	19.	6.	0.004	104.34	2.999E-01		
EU-154	873.23	43.	-11.	-0.006	87.35	-4.377E+00		
PA-234	880.53	41.	-1.	-0.001	687.39	-1.060E+00		
Sc-46	889.28	33.	9.	0.005	94.08	4.419E-01		
y-88	898.04	19.	2.	0.001	533.31	9.037E-02		P
AG-110M	937.49	28.	-7.	-0.004	164.75	-1.019E+00		
PA-234	946.02	37.	-15.	-0.009	87.47	-5.818E+00		
EU-152	964.11	103.	11.	0.006	133.08	3.866E+00		
EU-154	996.33	61.	-14.	-0.008	84.65	-6.801E+00		
PA-234M	1001.00	78.	-4.	-0.002	310.36	-2.581E+01		P
Co-56	1037.84	16.	4.	0.002	196.95	1.716E+00		P
Cs-136	1048.07	56.	-12.	-0.006	96.24	-7.826E-01		
RH-106	1050.36	72.	-2.	-0.001	801.39	-5.243E+00		
FE-59	1099.25	30.	-6.	-0.003	204.80	-5.996E-01		
EU-152	1112.07	173.	-19.	-0.010	101.53	-7.854E+00		
ZN-65	1115.55	154.	-19.	-0.010	96.00	-2.126E+00		
Sc-46	1120.55	135.	-19.	-0.010	90.10	-1.082E+00		
Ta-182	1121.30	64.	13.	0.007	88.97	2.195E+00		
CO-60	1173.24	30.	-6.	-0.003	159.33	-3.582E-01		P
Ta-182	1221.41	27.	10.	0.006	117.78	2.344E+00		
Co-56	1238.28	21.	23.	0.013	50.86	2.123E+00		
NA-22	1274.53	11.	4.	0.002	116.91	2.744E-01		
FE-59	1291.60	21.	-2.	-0.001	454.68	-3.454E-01		
AG-110M	1384.30	0.	13.	0.007	28.85	3.524E+00		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	1408.00	11.	10.	0.005	84.08	3.114E+00		
La-140	1596.21	17.	-5.	-0.003	390.43	-4.040E-01		P
Co-56	1771.35	20.	8.	0.004	89.28	4.079E+00		
y-88	1836.06	7.	3.	0.002	182.48	2.930E-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	1.7298E+00	1.7299E+00	2.014E+02%	1.20E+01
NA-22	#A	2.7440E-01	2.7440E-01	1.169E+02%	1.14E+00
K-40		2.5252E+02	2.5252E+02	5.208E+00%	1.00E+01
Sc-46	#A	4.4194E-01	4.4195E-01	9.408E+01%	1.41E+00
CR-51	#A	3.0482E+00	3.0482E+00	1.219E+02%	1.25E+01
MN-54	#A	-7.4835E-01	-7.4835E-01	9.629E+01%	1.65E+00
FE-59	#A	-5.9959E-01	-5.9960E-01	2.048E+02%	2.82E+00
Co-56	#A	9.1900E-01	9.1901E-01	5.086E+01%	1.18E+00
CO-57	#A	-1.8510E-01	-1.8510E-01	2.070E+02%	1.29E+00
CO-58	#A	-5.5255E-01	-5.5255E-01	1.155E+02%	1.78E+00
CO-60	#A	-1.8531E-02	-1.8531E-02	3.409E+03%	1.41E+00
ZN-65	#A	-2.1264E+00	-2.1264E+00	9.600E+01%	6.84E+00
NB-94	#A	8.6031E-02	8.6031E-02	1.043E+02%	1.44E+00
ZR-95	#A	3.1254E-01	3.1255E-01	2.650E+02%	2.07E+00
NB-95	#A	-1.8800E-01	-1.8800E-01	3.276E+02%	2.12E+00
RU-103	#A	-1.0304E-01	-1.0304E-01	4.367E+02%	1.15E+00
RH-106	#A	4.4244E+00	4.4244E+00	1.953E+02%	2.92E+01
AG-108M	#A	-2.6528E-01	-2.6528E-01	2.075E+02%	1.27E+00
AG-110M	#A	8.8266E-01	8.8266E-01	2.885E+01%	2.18E+00
SN-113	#A	5.2821E-01	5.2821E-01	1.366E+02%	2.44E+00
SB-124	#A	-5.4060E-01	-5.4061E-01	1.865E+02%	3.39E+00
SB-125	#A	1.4464E+00	1.4464E+00	7.509E+01%	3.53E+00
I-131	#A	1.2234E-01	1.2235E-01	3.504E+02%	1.14E+00
Gd-153	#A	-1.0365E+00	-1.0366E+00	1.030E+02%	3.57E+00
Ga-68	#A	1.9623E+00	1.9784E+00	1.104E+03%	5.15E+01
Tc-99m	#A	1.6849E-01	1.6875E-01	2.609E+02%	1.48E+00
BA-133	#A	-1.0748E-01	-1.0748E-01	1.163E+02%	3.64E+00
CS-134	#A	8.2971E-02	8.2971E-02	8.549E+01%	3.35E+00
CS-137	#A	-8.3766E-01	-8.3766E-01	9.004E+01%	2.52E+00
CE-139	#A	3.5880E-01	3.5880E-01	1.104E+02%	1.33E+00
Ba-140	#A	3.9719E-01	3.9720E-01	1.203E+02%	4.78E+00
La-140	#A	3.5342E-01	3.5343E-01	5.719E+01%	1.74E+00
CE-141	#A	5.9340E-01	5.9341E-01	1.250E+02%	2.48E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.26E+01
PM-144	#A	-4.5320E-01	-4.5320E-01	1.416E+02%	1.47E+00
EU-152	#A	2.4798E+00	2.4798E+00	7.992E+01%	6.59E+00

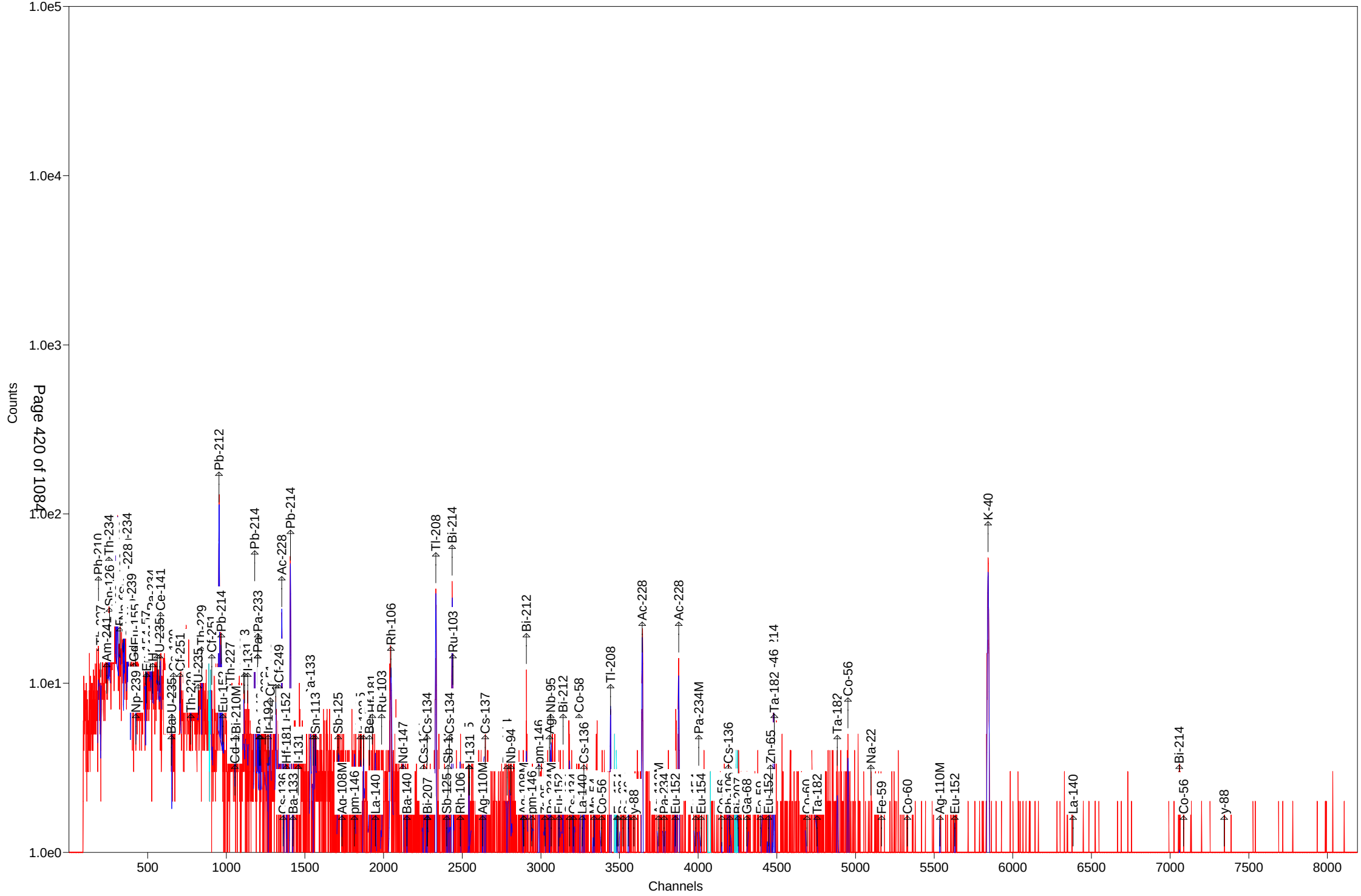
EU-154 #A	-4.3770E+00	-4.3770E+00	8.735E+01%	1.29E+01
EU-155 #A	5.3789E-01	5.3789E-01	2.703E+02%	4.92E+00
HF-181 #A	3.0644E-01	3.0644E-01	1.720E+02%	1.57E+00
Ta-182 #A	2.2595E+00	2.2596E+00	7.380E+01%	6.57E+00
Hg-203 #A	-1.0174E-01	-1.0175E-01	4.359E+02%	1.52E+00
TL-208	7.5449E+00	7.5449E+00	8.490E+00%	8.16E-01
pm-146 #A	2.2140E+00	2.2140E+00	4.766E+01%	2.43E+00
y-88 #A	1.9457E-01	1.9457E-01	1.825E+02%	1.20E+00
Cd-113m#A	-2.8212E+03	-2.8212E+03	1.931E+02%	1.86E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.00E+01
Cf-251 #A	1.6667E+00	1.6667E+00	1.068E+02%	4.79E+00
Cf-249 #A	-3.9369E-01	-3.9369E-01	1.124E+02%	2.60E+00
Sn-126 #A	3.8267E+00	3.8267E+00	1.181E+02%	1.51E+01
PB-210 A	6.1147E+00	6.1147E+00	1.498E+02%	2.95E+01
PB-212	1.9869E+01	1.9869E+01	5.469E+00%	1.99E+00
PB-214	1.4953E+01	1.4953E+01	7.451E+00%	2.01E+00
BI-207 A	1.4494E-01	1.4494E-01	1.794E+02%	1.07E+00
BI-212 #A	7.9300E+00	7.9300E+00	9.580E+01%	2.56E+01
BI-214	1.3688E+01	1.3688E+01	9.108E+00%	1.85E+00
BI-210M#A	1.4018E-01	1.4018E-01	4.785E+02%	2.31E+00
AC-228	2.1450E+01	2.1450E+01	6.990E+00%	2.87E+00
TH-227 #A	-6.1210E+00	-6.1210E+00	1.100E+02%	1.91E+01
TH-229 #A	-2.8073E+00	-2.8073E+00	2.928E+02%	2.24E+01
TH-234 #A	1.2040E+01	1.2040E+01	3.931E+01%	2.90E+01
PA-231 #A	1.1516E+01	1.1516E+01	1.058E+02%	5.57E+01
PA-233 #A	6.9158E-01	6.9158E-01	1.498E+02%	4.86E+00
PA-234 #A	1.6283E+00	1.6283E+00	1.377E+02%	7.50E+00
PA-234M#A	4.1701E+01	4.1701E+01	8.827E+01%	2.75E+02
U-235 #A	-5.8606E-01	-5.8606E-01	5.088E+02%	1.21E+01
AM-241 #A	5.7568E-01	5.7568E-01	2.300E+02%	3.78E+00
Np-237 #A	-2.7421E+00	-2.7421E+00	1.680E+02%	1.54E+01
Ir-192 #A	-2.0096E-02	-2.0096E-02	7.040E+01%	1.35E+00
Cs-136 #A	5.0934E-01	5.0936E-01	9.511E+01%	1.03E+00
Np-239 #A	-1.3611E+00	-1.3614E+00	1.132E+02%	5.15E+00
Nd-147 #A	3.0192E+00	3.0193E+00	9.685E+01%	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) 3.421E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.4206400E+02 Bq/Sample

265170_Gamma_160-18567-A-1-C DU. 17_Gamma_20161174.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20161631

Sample Description: 265170_Gamma_160-18567-A-2-B
Detector: Detector # 9
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-2-B

Decay to Time: 9/7/2016 16:27 Live Time: 1800 sec
Acquisition Time: 9/7/2016 16:27:53 Real Time: 1803 sec
Analysis Time: 9/7/2016 16:59 Dead Time: 0.17 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev11.lib
Bkgd Correction File: 9_2016-09-06_0605.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	-2.677E+00	164.7	4.408E+00	4.410E+00	1.492E+01
NA-22	-3.405E-01	139.1	4.737E-01	4.740E-01	1.637E+00
K-40	2.252E+02	5.1	1.150E+01	1.628E+01	1.054E+01
Sc-46	5.329E-01	70.8	3.775E-01	3.785E-01	2.404E+00
CR-51	4.125E+00	151.5	6.250E+00	6.253E+00	2.088E+01
MN-54	-1.228E-01	355.4	4.366E-01	4.366E-01	1.369E+00
FE-59	-4.323E-01	251.3	1.086E+00	1.086E+00	2.506E+00
Co-56	8.004E-01	73.8	5.909E-01	5.924E-01	1.122E+00
CO-57	-3.063E-01	93.6	2.868E-01	2.872E-01	9.564E-01
CO-58	-1.740E-01	247.0	4.298E-01	4.299E-01	1.490E+00
CO-60	6.879E-01	27.7	1.908E-01	1.939E-01	3.900E-01
ZN-65	-1.058E+00	126.8	1.343E+00	1.344E+00	4.550E+00
NB-94	-6.749E-01	82.3	5.553E-01	5.564E-01	1.852E+00
ZR-95	1.871E-01	437.4	8.185E-01	8.185E-01	1.889E+00
NB-95	5.906E-01	94.1	5.556E-01	5.564E-01	1.863E+00
RU-103	2.552E-01	132.9	3.390E-01	3.393E-01	8.242E-01
RH-106	2.164E+00	169.4	3.667E+00	3.668E+00	8.661E+00
AG-108M	4.061E-01	93.6	3.801E-01	3.806E-01	9.042E-01
AG-110M	-3.922E-01	103.4	4.057E-01	4.062E-01	3.220E+00
SN-113	5.403E-01	109.0	5.888E-01	5.894E-01	1.979E+00
SB-124	-5.947E-01	60.9	3.621E-01	3.634E-01	2.996E+00
SB-125	3.923E+00	26.7	1.047E+00	1.066E+00	2.840E+00
I-131	1.789E-01	118.3	2.118E-01	2.120E-01	1.082E+00
Gd-153	-1.179E+00	172.2	2.029E+00	2.030E+00	6.747E+00
Ga-68	1.269E+01	119.0	1.510E+01	1.512E+01	3.387E+01
Tc-99m	-3.750E-01	138.0	5.175E-01	5.180E-01	1.724E+00
BA-133	3.681E-02	2523.6	9.290E-01	9.290E-01	3.145E+00
CS-134	4.092E-01	82.3	3.367E-01	3.373E-01	2.757E+00
CS-137	3.062E+00	16.0	4.887E-01	5.140E-01	8.098E-01
CE-139	-2.009E-01	175.7	3.531E-01	3.536E-01	1.189E+00
Ba-140	2.896E+00	39.0	1.131E+00	1.141E+00	2.132E+00
La-140	1.842E-01	100.9	1.859E-01	1.862E-01	1.244E+00
CE-141	-7.146E-01	139.8	9.992E-01	9.999E-01	3.328E+00

CE-144	0.000E+00	1.#INF	6.106E-01	6.106E-01	1.266E+01
PM-144	3.760E-01	117.6	4.423E-01	4.427E-01	1.499E+00
EU-152	1.402E+00	90.0	1.262E+00	1.264E+00	7.633E+00
EU-154	2.249E+00	99.1	2.229E+00	2.232E+00	9.191E+00
EU-155	1.645E+00	157.1	2.585E+00	2.586E+00	8.598E+00
HF-181	1.763E-01	178.0	3.138E-01	3.139E-01	2.023E+00
Ta-182	3.476E+00	40.7	1.414E+00	1.424E+00	5.246E+00
Hg-203	-5.364E-01	94.7	5.080E-01	5.089E-01	1.238E+00
TL-208	5.967E+00	8.5	5.080E-01	5.948E-01	6.120E-01
pm-146	-1.171E+00	99.1	1.161E+00	1.162E+00	3.424E+00
y-88	-5.267E-01	82.7	4.357E-01	4.365E-01	1.264E+00
Cd-113m	0.000E+00	1.#INF	2.955E+03	2.955E+03	1.708E+04
Cd-109	0.000E+00	1.#INF	1.592E+01	1.592E+01	5.316E+01
Cf-251	4.790E-02	3685.9	1.765E+00	1.765E+00	4.590E+00
Cf-249	5.758E-01	103.4	5.952E-01	5.959E-01	1.996E+00
Sn-126	4.214E+00	113.1	4.766E+00	4.771E+00	1.588E+01
PB-210	-1.419E+01	100.3	1.423E+01	1.425E+01	4.741E+01
PB-212	2.141E+01	4.5	9.572E-01	1.684E+00	1.483E+00
PB-214	1.621E+01	6.1	9.868E-01	1.297E+00	2.132E+00
BI-207	3.827E-01	103.2	3.948E-01	3.953E-01	1.188E+00
BI-212	3.288E+01	15.5	5.109E+00	5.386E+00	8.431E+00
BI-214	1.337E+01	8.4	1.127E+00	1.324E+00	1.701E+00
BI-210M	6.724E-01	83.4	5.610E-01	5.624E-01	1.871E+00
AC-228	1.860E+01	7.9	1.477E+00	1.755E+00	1.625E+00
TH-227	-3.034E+00	167.6	5.086E+00	5.089E+00	2.332E+01
TH-229	5.485E+00	118.6	6.508E+00	6.522E+00	1.681E+01
TH-234	-2.332E+00	513.5	1.197E+01	1.197E+01	4.034E+01
PA-231	-1.431E+01	165.4	2.367E+01	2.369E+01	7.905E+01
PA-233	0.000E+00	1.#INF	2.807E-01	2.807E-01	5.984E+00
PA-234	2.202E+00	94.6	2.082E+00	2.086E+00	7.600E+00
PA-234M	-9.677E+01	58.6	5.675E+01	5.696E+01	2.655E+02
U-235	-3.003E+00	139.7	4.194E+00	4.197E+00	1.397E+01
AM-241	5.877E-01	214.3	1.259E+00	1.260E+00	4.230E+00
Np-237	0.000E+00	1.#INF	4.992E+00	4.992E+00	1.661E+01
Ir-192	0.000E+00	1.#INF	1.172E-01	1.172E-01	2.500E+00
Cs-136	-1.082E-01	437.4	4.733E-01	4.733E-01	1.092E+00
Np-239	1.518E+00	159.1	2.415E+00	2.417E+00	8.035E+00
Nd-147	7.944E-01	178.4	1.418E+00	1.418E+00	7.285E+00
Total	3.931E+02				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-2-B

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20161631.An1

Acquisition information
Start time: 9/7/2016 4:27:53 PM
Live time: 1800
Real time: 1803
Dead time: 0.17 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-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 (37.59keV)
Stop channel: 8000 (1999.34keV)
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	9/7/2016 4:27:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2016-09-06_0605.PBC 9/6/2016 6:05:43 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.2060

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
59.54	14.	214.25	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
64.28	29.	113.10	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
74.67	240.	10.59	1.02	4.567E-02				
77.21	368.	7.40	1.03	4.680E-02				
87.23	123.	16.65	1.04	5.029E-02	86.49	13.100	1.043E+01	Np237
					86.54	30.700	4.451E+00	EU155
					86.94	9.040	1.508E+01	Sn126
					87.57	37.500	3.623E+00	Sn126
					88.04	3.790	3.576E+01	Cd109
90.13	95.	19.25	1.04	5.103E-02	91.10	28.300	3.630E+00	Nd147
93.31	85.	23.26	1.04	5.171E-02	93.35	5.561	1.639E+01	AC228
105.15	33.	157.12	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
106.98	6.	159.72	0.51	5.325E-02	106.13	22.700	2.683E-01	Np239
121.78	26.	89.99	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.186E-01	CO57
131.29	27.	142.41	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	5.	784.98	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	4.787E-01	CE144
162.66	25.	95.73	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
193.51	8.	287.59	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
210.85	22.	118.65	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
238.51	553.	6.30	1.17	3.733E-02	238.63	43.300	1.902E+01	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.88	94.	19.25	1.18	3.697E-02	242.00	7.430	1.908E+01	PB214
244.69	12.	360.67	1.18	3.670E-02	244.69	7.580	PBC<MDA	EU152
265.83	21.	83.44	1.20	3.470E-02	265.83	50.000	PBC<MDA	BI210M
295.13	192.	10.39	1.02	3.231E-02	295.09	19.300	1.706E+01	PB214
320.08	23.	151.49	1.25	3.056E-02	320.08	9.940	PBC<MDA	CR51
338.37	156.	13.72	1.07	2.940E-02	338.32	12.010	2.449E+01	AC228
345.83	10.	177.95	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181
351.87	313.	8.31	1.41	2.861E-02	351.93	37.600	1.615E+01	PB214
383.84	12.	171.97	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	18.	103.36	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
391.69	17.	108.98	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
428.55	10.	161.72	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
433.94	16.	93.58	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
463.37	57.	26.69	1.38	2.352E-02	463.37	10.470	1.295E+01	SB125
487.02	18.	100.92	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
497.05	9.	132.86	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	94.	31.19	2.67	2.188E-02	511.86	20.000	1.193E+01	RH106
537.26	23.	39.05	1.44	2.112E-02	537.26	24.390	2.437E+00	Ba140
569.70	3.	417.69	1.47	2.023E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.33	180.	8.51	1.17	1.988E-02	583.02	84.500	5.967E+00	TL208
604.71	5.	531.07	1.50	1.936E-02	604.71	97.620	PBC<MDA	CS134
609.31	220.	8.43	1.41	1.925E-02	609.31	46.090	1.381E+01	BI214
					610.30	5.750	1.108E+02	RU103
621.92	7.	169.41	1.51	1.896E-02	621.92	9.930	PBC<MDA	RH106
636.97	9.	118.34	1.53	1.862E-02	635.89	11.310	PBC<MDA	SB125
					636.97	7.170	3.884E+00	I131
662.05	85.	15.96	0.92	1.809E-02	661.66	85.210	3.062E+00	CS137
696.54	12.	117.63	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
727.61	75.	15.54	2.01	1.686E-02	727.17	7.550	3.288E+01	BI212
756.73	3.	437.37	1.62	1.635E-02	756.73	54.460	PBC<MDA	ZR95
765.79	17.	94.07	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.006E+02	PA234M
766.41	17.	73.58	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.987E+02	PA234M
786.86	16.	88.37	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	5.	244.13	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
801.95	13.	82.28	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
846.77	8.	166.38	1.70	1.501E-02	846.77	99.935	PBC<MDA	Co56
860.53	12.	89.38	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
889.28	10.	184.21	1.73	1.445E-02	889.28	99.984	PBC<MDA	Sc46
911.50	128.	9.50	1.56	1.418E-02	911.07	29.000	1.729E+01	AC228
946.02	10.	124.50	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
964.11	15.	112.17	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
969.31	88.	12.73	1.38	1.352E-02	968.97	17.460	2.076E+01	AC228
1004.77	16.	99.10	1.82	1.314E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	11.	103.08	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1063.66	13.	103.15	1.86	1.257E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	119.02	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1120.46	12.	95.19	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	15.	70.84	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.812E-01	Sc46
1121.54	15.	80.28	1.90	1.205E-02	1121.30	34.900	PBC<MDA	Ta182
1189.05	23.	40.67	1.95	1.150E-02	1189.05	16.200	6.757E+00	Ta182
1238.28	14.	103.66	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1332.50	13.	27.74	2.05	1.050E-02	1332.50	99.980	6.879E-01	CO60
1384.30	5.	175.40	2.08	1.018E-02	1384.30	24.290	PBC<MDA	AG110M
1408.00	13.	28.77	2.10	1.004E-02	1408.00	21.005	3.520E+00	EU152
1460.99	430.	4.93	1.86	9.748E-03	1460.83	10.670	2.297E+02	K40
1690.98	3.	208.59	2.27	8.649E-03	1690.98	47.790	PBC<MDA	SB124
1764.63	28.	26.87	2.31	8.350E-03	1764.49	15.400	1.207E+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
298.30	74.67	203.	240.	5.261E+03	10.59	1.025	- D
308.45	77.21	186.	368.	7.853E+03	7.40	1.027	- D
359.97	90.13	139.	102.	2.006E+03	19.06	1.040	- 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	185.80	46.54	379.	-28.	-0.016	100.28	0.998s
TH-227	200.20	50.14	413.	-13.	-0.007	167.65	1.001s
AM-241	237.77	59.54	436.	14.	0.008	214.25	1.010s
TH-234	252.77	63.29	515.	-6.	-0.003	513.48	1.014s
Sn-126	256.74	64.28	536.	29.	0.016	113.10	1.015
BA-133	323.56	80.99	1366.	-34.	-0.019	153.86	1.031
Np-237	345.55	86.49	1723.	0.	0.000	195.64	1.036A
Sn-126	347.35	86.94	1530.	15.	0.008	153.03	1.037D
Sn-126	349.87	87.57	1413.	75.	0.042	29.24	1.037D
Cd-109	351.75	88.04	1499.	0.	0.000	480.98	1.038A

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	363.99	91.10	1443.	30.	0.017	178.44	1.041D
TH-234	369.94	92.59	1664.	-33.	-0.018	174.67	1.042s
AC-228	372.98	93.35	152.	85.	0.047	23.26	1.043D
Gd-153	389.58	97.50	1631.	-33.	-0.019	172.15	1.047s
Np-239	397.58	99.50	1587.	-33.	-0.019	169.52	1.049s
Gd-153	412.37	103.20	1481.	-33.	-0.019	164.30	1.052
Np-239	414.37	103.70	1437.	-33.	-0.019	161.76	1.053
EU-155	420.82	105.31	1359.	33.	0.019	157.12	1.054s
Np-239	424.09	106.13	1363.	33.	0.018	159.15	1.055
EU-152	486.65	121.78	261.	26.	0.014	89.99	1.070s
CO-57	487.80	122.06	262.	-25.	-0.014	93.62	1.070s
EU-154	491.95	123.10	271.	-6.	-0.003	390.16	1.071s
PA-234	524.72	131.29	728.	27.	0.015	142.41	1.079
HF-181	531.64	133.02	755.	5.	0.003	784.98	1.081s
CE-144	533.69	133.54	760.	0.	0.000	1000.00	1.081s
HF-181	544.74	136.30	760.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	859.	-30.	-0.016	140.94	1.084s
Tc-99m	561.57	140.51	829.	-30.	-0.017	138.02	1.088
U-235	574.67	143.79	854.	-30.	-0.017	139.66	1.091s
CE-141	581.29	145.44	928.	-31.	-0.017	139.83	1.092s
Ba-140	650.15	162.66	266.	25.	0.014	95.73	1.108s
U-235	653.03	163.38	302.	-27.	-0.015	93.14	1.109s
CE-139	662.92	165.85	282.	-14.	-0.008	175.75	1.111s
TH-229	773.52	193.51	136.	8.	0.004	287.59	1.137s
TH-229	842.87	210.85	172.	22.	0.012	118.65	1.153s
Cf-251	907.45	227.00	152.	0.	0.000	1000.00	1.168s
PB-212	953.97	238.63	75.	623.	0.346	4.47	1.179D
PB-214	967.43	242.00	118.	94.	0.052	19.25	1.182D
EU-152	978.21	244.69	997.	12.	0.007	360.67	1.185s
TH-227	1024.40	256.24	145.	-20.	-0.011	141.03	1.195s
Cd-113m	1054.23	263.70	175.	0.	0.000	1000.00	1.202
BI-210M	1062.75	265.83	143.	21.	0.012	83.44	1.204s
Hg-203	1116.22	279.20	156.	-26.	-0.015	94.70	1.216s
I-131	1136.61	284.30	116.	-23.	-0.013	94.61	1.221s
PB-214	1179.77	295.09	42.	183.	0.102	8.90	1.231D
PB-212	1199.52	300.03	818.	-24.	-0.013	173.26	1.235
PA-231	1199.68	300.07	795.	-24.	-0.013	170.79	1.235
PA-233	1200.12	300.18	771.	-24.	-0.013	168.28	1.235
PA-231	1210.00	302.65	748.	-24.	-0.013	165.44	1.237s
BA-133	1210.81	302.85	724.	-24.	-0.013	162.82	1.238s
Ba-140	1218.80	304.85	701.	-24.	-0.013	159.96	1.240s
BI-210M	1218.99	304.90	677.	-24.	-0.013	157.29	1.240s
Ir-192	1233.16	308.44	654.	-24.	-0.013	154.96	1.243s
PA-233	1247.44	312.01	640.	0.	0.000	1000.00	1.246s
Ir-192	1265.35	316.49	640.	0.	0.000	1000.00	1.250s
CR-51	1279.73	320.08	572.	23.	0.013	151.49	1.253
La-140	1314.43	328.76	536.	-21.	-0.012	153.95	1.261s
Cf-249	1333.15	333.44	514.	-22.	-0.012	150.39	1.265s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1352.86	338.37	56.	156.	0.086	13.72	1.072
Cs-136	1361.66	340.57	493.	-4.	-0.002	862.34	1.272s
HF-181	1382.70	345.83	80.	10.	0.006	177.95	1.276s
PB-214	1406.84	351.87	68.	313.	0.174	8.31	1.411s
I-131	1457.31	364.48	80.	-6.	-0.003	294.71	1.293s
BA-133	1534.73	383.84	193.	12.	0.006	171.97	1.310s
Cf-249	1551.17	387.95	169.	18.	0.010	103.36	1.314s
SN-113	1566.12	391.69	154.	17.	0.009	108.98	1.317s
SB-125	1710.86	427.88	56.	10.	0.005	161.72	1.349s
AG-108M	1735.10	433.94	52.	16.	0.009	93.58	1.354s
SB-125	1852.82	463.37	89.	57.	0.032	26.69	1.380
Ir-192	1871.59	468.06	193.	-20.	-0.011	98.74	1.384s
BE-7	1909.73	477.60	179.	-12.	-0.006	164.65	1.392s
HF-181	1927.34	482.00	190.	0.	0.000	1000.00	1.396s
La-140	1947.43	487.02	148.	18.	0.010	100.92	1.400s
RU-103	1987.56	497.05	35.	9.	0.005	132.86	1.409s
RH-106	2046.81	511.86	112.	94.	0.052	31.19	2.672s
Nd-147	2123.35	531.00	52.	0.	0.000	1000.00	1.438s
Ba-140	2148.39	537.26	13.	23.	0.013	39.05	1.444s
CS-134	2252.30	563.24	57.	-4.	-0.002	214.97	1.466s
CS-134	2276.64	569.32	70.	-5.	-0.003	240.83	1.471
PA-234	2277.24	569.47	75.	0.	0.000	1000.00	1.471
BI-207	2278.16	569.70	72.	3.	0.002	417.69	1.471
TL-208	2332.69	583.33	12.	180.	0.100	8.51	1.167
SB-125	2401.36	600.50	479.	-19.	-0.011	63.40	1.497s
SB-124	2410.29	602.73	461.	-20.	-0.011	60.88	1.499s
CS-134	2418.21	604.71	382.	5.	0.003	531.07	1.500s
BI-214	2436.63	609.31	28.	220.	0.122	8.43	1.406
RU-103	2440.56	610.30	387.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	387.	0.	0.000	1000.00	1.508s
RH-106	2487.04	621.92	33.	7.	0.004	169.41	1.515s
SB-125	2542.94	635.89	62.	-8.	-0.005	138.39	1.526s
I-131	2547.28	636.97	56.	9.	0.005	118.34	1.527s
AG-110M	2630.43	657.76	160.	-14.	-0.008	130.54	1.544s
CS-137	2647.58	662.05	18.	85.	0.047	15.96	0.921s
PM-144	2785.58	696.54	88.	12.	0.006	117.63	1.576
NB-94	2809.93	702.63	133.	-21.	-0.011	82.29	1.581s
SB-124	2890.57	722.79	144.	-16.	-0.009	110.91	1.598s
AG-108M	2891.17	722.94	128.	-5.	-0.003	306.07	1.598s
EU-154	2892.85	723.36	123.	0.	0.000	1000.00	1.598s
BI-212	2909.85	727.61	13.	75.	0.042	15.54	2.007s
pm-146	2942.31	735.72	47.	-14.	-0.008	109.43	1.608s
pm-146	2988.08	747.16	47.	-12.	-0.007	99.14	1.617s
ZR-95	3026.36	756.73	35.	3.	0.002	437.37	1.625s
AG-110M	3055.23	763.94	138.	-27.	-0.015	64.03	1.631s
NB-95	3062.61	765.79	122.	17.	0.010	94.07	1.632s
PA-234M	3065.10	766.41	70.	17.	0.009	73.58	1.633s
EU-152	3115.14	778.92	60.	-20.	-0.011	59.15	1.643s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3141.15	785.42	94.	16.	0.009	88.37	1.648s
CS-134	3182.95	795.87	72.	5.	0.003	244.13	1.656s
CS-134	3207.29	801.95	50.	13.	0.007	82.28	1.661
CO-58	3242.59	810.78	69.	-5.	-0.003	246.98	1.668s
Cs-136	3273.50	818.50	35.	-3.	-0.002	437.37	1.674s
MN-54	3338.91	834.85	55.	-3.	-0.002	355.42	1.687s
Co-56	3386.61	846.77	35.	8.	0.004	166.38	1.696s
TL-208	3441.80	860.56	20.	12.	0.006	89.38	1.707s
NB-94	3483.94	871.10	25.	-2.	-0.001	360.56	1.715s
PA-234	3521.68	880.53	117.	-20.	-0.011	80.31	1.722
PA-234	3532.53	883.24	137.	-20.	-0.011	86.25	1.724
AG-110M	3538.30	884.68	157.	-17.	-0.009	109.69	1.725s
Sc-46	3556.69	889.28	165.	10.	0.006	184.21	1.729s
y-88	3591.74	898.04	36.	-13.	-0.007	82.71	1.736s
AC-228	3645.58	911.50	4.	128.	0.071	9.50	1.558
AG-110M	3749.60	937.49	35.	-5.	-0.003	200.13	1.766s
PA-234	3783.72	946.02	30.	10.	0.006	124.50	1.772s
EU-152	3856.11	964.11	138.	15.	0.008	112.17	1.786s
AC-228	3876.91	969.31	10.	88.	0.049	12.73	1.381s
EU-154	3985.03	996.33	96.	-19.	-0.010	76.89	1.810s
PA-234M	4003.71	1001.00	115.	-19.	-0.011	58.64	1.814s
EU-154	4018.82	1004.77	115.	16.	0.009	99.10	1.816s
Co-56	4151.13	1037.84	21.	11.	0.006	103.08	1.841s
Cs-136	4192.07	1048.07	53.	-18.	-0.010	61.45	1.848s
RH-106	4201.23	1050.36	73.	-3.	-0.002	350.52	1.850s
BI-207	4254.46	1063.66	34.	13.	0.007	103.15	1.860s
Ga-68	4309.44	1077.40	16.	8.	0.004	119.02	1.870s
FE-59	4396.88	1099.25	37.	-5.	-0.003	251.25	1.886s
ZN-65	4462.09	1115.55	104.	-12.	-0.006	126.85	1.897s
BI-214	4481.06	1120.29	60.	12.	0.007	95.19	1.901
Sc-46	4482.12	1120.55	47.	15.	0.008	70.84	1.901
Ta-182	4485.12	1121.30	63.	15.	0.008	80.28	1.901
CO-60	4692.96	1173.24	59.	-15.	-0.008	78.11	1.938s
Ta-182	4756.25	1189.05	11.	23.	0.013	40.67	1.949
Ta-182	4885.75	1221.41	40.	-6.	-0.003	264.02	1.972
Co-56	4953.27	1238.28	34.	14.	0.008	103.66	1.984s
NA-22	5098.35	1274.53	40.	-7.	-0.004	139.10	2.008s
EU-154	5098.40	1274.54	46.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	40.	-11.	-0.006	141.82	2.020s
CO-60	5330.37	1332.50	0.	13.	0.007	27.74	2.047s
AG-110M	5537.69	1384.30	11.	5.	0.003	175.40	2.082s
EU-152	5632.56	1408.00	1.	13.	0.007	28.77	2.097s
K-40	5844.74	1461.01	13.	422.	0.234	5.11	1.859
La-140	6385.95	1596.21	13.	-3.	-0.002	776.28	2.215s
SB-124	6765.35	1690.98	7.	3.	0.002	208.59	2.272s
BI-214	7059.65	1764.49	14.	28.	0.016	26.87	2.314s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C  -2.6771E+00                                     5.31E+01
                          477.60-2.677E+00 ?(  1.492E+01 1.65E+02 1.05E+01 G

NA-22    C  -3.4051E-01                                     9.50E+02
                         1274.53-3.405E-01 ?(  1.637E+00 1.39E+02 9.99E+01 G

K-40     N   2.2521E+02                                     4.66E+11
                         1460.83 2.252E+02  (P 1.054E+01 5.11E+00 1.07E+01 G

Sc-46    F   5.3285E-01                                     8.38E+01
                          889.28 3.845E-01 ?(  2.404E+00 1.84E+02 1.00E+02 G
                         1120.55 6.812E-01 ?(  1.604E+00 7.08E+01 1.00E+02 G

CR-51    F   4.1253E+00                                     2.77E+01
                          320.08 4.125E+00 ?(P 2.088E+01 1.51E+02 9.94E+00 G

MN-54    C  -1.2284E-01                                     3.12E+02
                          834.85-1.228E-01 ?(P 1.369E+00 3.55E+02 1.00E+02 G

FE-59    F  -4.3232E-01                                     4.45E+01
                         1099.25-4.323E-01 ?(P 2.506E+00 2.51E+02 5.65E+01 G
                         1291.60-1.274E+00 +   3.829E+00 1.42E+02 4.32E+01 G

Co-56    C   8.0043E-01                                     7.73E+01
                          846.77 2.964E-01 &(  1.122E+00 1.66E+02 9.99E+01 G
                         1238.28 1.034E+00 ?(P 2.265E+00 1.04E+02 6.61E+01 G
                         1037.84 3.274E+00 &(  7.438E+00 1.03E+02 1.41E+01 G
                         1771.35-2.156E-01 %   1.427E+01 1.85E+03 1.55E+01  A

CO-57    C  -3.0634E-01                                     2.72E+02
                          122.06-3.063E-01 &(  9.564E-01 9.36E+01 8.56E+01 G
                          136.47-2.996E+00 +   1.407E+01 1.41E+02 1.07E+01 G

CO-58    C  -1.7401E-01                                     7.09E+01
                          810.78-1.740E-01 ?(  1.490E+00 2.47E+02 9.95E+01 G

CO-60    F   6.8788E-01                                     1.93E+03
                         1332.50 6.879E-01 ?(  3.900E-01 2.77E+01 1.00E+02 G
                         1173.24-7.063E-01 - P 1.838E+00 7.81E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.0585E+00					2.44E+02	
			1115.55	-1.058E+00	?(	4.550E+00	1.27E+02	5.06E+01 G
NB-94	I	-6.7486E-01					7.41E+06	
			702.63	-6.749E-01	?(	1.852E+00	8.23E+01	9.79E+01 G
			871.10	-7.576E-02	+	9.853E-01	3.61E+02	9.99E+01 G
ZR-95	I	1.8714E-01					6.40E+01	
			756.73	1.871E-01	?(	1.889E+00	4.37E+02	5.45E+01 G
			724.20	-9.923E-02	%	4.006E+00	1.17E+03	4.42E+01 G
NB-95	I	5.9062E-01					6.40E+01	
			765.79	5.906E-01	?(	1.863E+00	9.41E+01	9.98E+01 G
RU-103	I	2.5515E-01					3.93E+01	
			497.05	2.552E-01	?(	8.242E-01	1.33E+02	9.09E+01 G
			610.30	0.000E+00	-	4.744E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.1643E+00					3.74E+02	
			621.92	2.164E+00	?(	8.661E+00	1.69E+02	9.93E+00 G
			1050.36	-9.779E+00	+	1.192E+02	3.51E+02	1.56E+00 G
			511.86	1.193E+01		6.604E+00	3.12E+01	2.00E+01 GA
AG-108M	C	4.0612E-01					1.53E+05	
			433.94	4.061E-01	?(	9.042E-01	9.36E+01	9.05E+01 G
			722.94	-1.910E-01	-	2.004E+00	3.06E+02	9.08E+01 G
			614.28	0.000E+00	-	3.050E+00	1.00E+03	8.98E+01 G
AG-110M	F	-3.9219E-01					2.50E+02	
			884.68	-8.736E-01	&(	3.220E+00	1.10E+02	7.27E+01 G
			657.76	-4.521E-01	+	1.991E+00	1.31E+02	9.46E+01 G
			937.49	-6.165E-01	+ P	3.543E+00	2.00E+02	3.44E+01 G
			1384.30	1.048E+00	?(	4.132E+00	1.75E+02	2.43E+01 G
			763.94	-4.176E+00	+	8.824E+00	6.40E+01	2.23E+01 G
SN-113	F	5.4027E-01					1.15E+02	
			391.69	5.403E-01	&(	1.979E+00	1.09E+02	6.40E+01 G
SB-124	F	-5.9475E-01					6.02E+01	
			602.73	-5.947E-01	*(P	2.996E+00	6.09E+01	9.83E+01 G
			1690.98	4.244E-01	+ P	2.003E+00	2.09E+02	4.78E+01 G
			722.79	-4.769E+00	+	1.779E+01	1.11E+02	1.08E+01 G
SB-125	I	3.9226E+00					1.01E+03	
			427.88	7.284E-01	&(	2.840E+00	1.62E+02	2.96E+01 G
			600.50	-3.092E+00	+ P	1.674E+01	6.34E+01	1.79E+01 G
			635.89	-2.195E+00	&	1.041E+01	1.38E+02	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	1.295E+01	(P	1.050E+01	2.67E+01	1.05E+01 G
I-131	I	1.7895E-01					8.02E+00	
			364.48	-1.462E-01	?(	1.082E+00	2.95E+02	8.17E+01 G
			284.30	-6.238E+00	+	1.444E+01	9.46E+01	6.14E+00 G
			636.97	3.884E+00	?(	1.568E+01	1.18E+02	7.17E+00 G
Gd-153	F	-1.1785E+00					2.42E+02	
			97.50	-1.179E+00	?(	6.747E+00	1.72E+02	3.00E+01 G
			103.20	-1.601E+00	+	8.749E+00	1.64E+02	2.18E+01 G
Ga-68	C	1.2690E+01					4.71E-02	
			1077.40	1.269E+01	?(	3.387E+01	1.19E+02	3.30E+00 G
Tc-99m	I	-3.7499E-01					2.51E-01	
			140.51	-3.750E-01	?(	1.724E+00	1.38E+02	8.93E+01 G
BA-133	F	3.6814E-02					3.85E+03	
			356.00	3.681E-02	%(	3.145E+00	2.52E+03	6.20E+01 G
			302.85	-2.250E+00	+	1.223E+01	1.63E+02	1.83E+01 G
			383.84	2.682E+00	? P	1.559E+01	1.72E+02	8.94E+00 GA
			80.99	-1.154E+00	+	5.908E+00	1.54E+02	3.41E+01 GA
CS-134	I	4.0916E-01					7.54E+02	
			604.71	1.535E-01	?(	2.757E+00	5.31E+02	9.76E+01 G
			795.87	2.064E-01	?(	1.744E+00	2.44E+02	8.55E+01 G
			569.32	-8.923E-01	+	7.442E+00	2.41E+02	1.54E+01 G
			801.95	5.277E+00	?(	1.457E+01	8.23E+01	8.69E+00 G
			563.24	-1.364E+00	+ P	1.238E+01	2.15E+02	8.35E+00 G
CS-137	I	3.0620E+00					1.10E+04	
			661.66	3.062E+00	(	8.098E-01	1.60E+01	8.52E+01 G
CE-139	F	-2.0089E-01					1.38E+02	
			165.85	-2.009E-01	(	1.189E+00	1.76E+02	7.99E+01 G
Ba-140	I	2.8965E+00					1.28E+01	
			537.26	2.437E+00	(P	2.132E+00	3.90E+01	2.44E+01 G
			162.66	4.698E+00	?(	1.500E+01	9.57E+01	6.22E+00 G
			304.85	-9.671E+00	-	5.166E+01	1.60E+02	4.29E+00 G
La-140	I	1.8423E-01					1.28E+01	
			1596.21	-1.785E-01	?(P	1.244E+00	7.76E+02	9.54E+01 G
			487.02	9.447E-01	?(	3.198E+00	1.01E+02	4.55E+01 G
			328.76	-1.959E+00	+	1.009E+01	1.54E+02	2.03E+01 G
			815.77	-1.779E-01	% P	6.648E+00	1.03E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-7.1462E-01					3.25E+01	
			145.44	-7.146E-01	&(	3.328E+00	1.40E+02	4.82E+01 G
PM-144	C	3.7598E-01					3.63E+02	
			696.54	3.760E-01	&(	1.499E+00	1.18E+02	9.90E+01 G
			618.06	-1.285E-02	% P	2.780E+00	4.27E+03	9.91E+01 G
EU-152	F	1.4022E+00					4.94E+03	
			344.29	1.101E-06	%(	7.633E+00	2.05E+08	2.65E+01 G
			1112.07	-2.238E-01	%	1.691E+01	2.17E+03	1.36E+01 G
			121.78	9.538E-01	?(	2.860E+00	9.00E+01	2.86E+01 G
			778.92	-5.331E+00	+ P	1.042E+01	5.91E+01	1.29E+01 G
			964.11	4.264E+00	&(	1.610E+01	1.12E+02	1.46E+01 G
			244.69	2.480E+00	?(	2.992E+01	3.61E+02	7.58E+00 G
			1408.00	3.520E+00	? P	1.941E+00	2.88E+01	2.10E+01 GA
EU-154	I	2.2489E+00					3.14E+03	
			873.23	1.030E-01	%(	9.191E+00	2.47E+03	1.23E+01 G
			123.10	-1.543E-01	+	2.043E+00	3.90E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.994E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	8.831E+00	1.00E+03	2.02E+01 G
			1004.77	3.711E+00	?(	1.236E+01	9.91E+01	1.80E+01 G
			996.33	-7.483E+00	+	1.917E+01	7.69E+01	1.06E+01 G
EU-155	I	1.6449E+00					1.81E+03	
			105.31	1.645E+00	?(	8.598E+00	1.57E+02	2.12E+01 G
			86.54	0.000E+00	}	6.880E+00	2.34E+03	3.07E+01 G
HF-181	F	1.7635E-01					4.24E+01	
			482.00	0.000E+00	?(	2.023E+00	1.00E+03	8.05E+01 G
			133.02	1.225E-01	?(	3.229E+00	7.85E+02	4.33E+01 G
			345.83	1.273E+00	?(	5.652E+00	1.78E+02	1.51E+01 G
			136.30	0.000E+00	-	2.418E+01	1.00E+03	5.85E+00 G
Ta-182	F	3.4760E+00					1.14E+02	
			1121.30	1.953E+00	(	5.246E+00	8.03E+01	3.49E+01 G
			1221.41	-1.035E+00	-	5.858E+00	2.64E+02	2.70E+01 G
			1189.05	6.757E+00	(	5.484E+00	4.07E+01	1.62E+01 G
Hg-203	F	-5.3642E-01					4.66E+01	
			279.20	-5.364E-01	?(	1.238E+00	9.47E+01	8.15E+01 G
TL-208	N	5.9672E+00					6.98E+02	
			583.02	5.967E+00	(	6.120E-01	8.51E+00	8.45E+01 G
			277.28	-3.291E-01	% P	1.658E+01	1.02E+03	6.31E+00 G
			860.56	3.526E+00	- P	7.138E+00	8.94E+01	1.24E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C -1.1708E+00					2.02E+03	
		747.16	-1.171E+00	?(P	3.424E+00	9.91E+01	3.40E+01 G
		735.72	-2.020E+00	+	5.105E+00	1.09E+02	2.25E+01 G
		453.88	-2.386E-02	%	1.529E+00	2.63E+03	6.50E+01 G
y-88	F -5.2673E-01					1.07E+02	
		898.04	-5.267E-01	?(P	1.264E+00	8.27E+01	9.37E+01 G
		1836.06	-2.311E-02	%	1.001E+00	1.88E+03	9.92E+01 G
Cf-251	T 4.7897E-02					3.28E+05	
		176.60	4.790E-02	%(	4.590E+00	3.69E+03	1.70E+01 G
		227.00	0.000E+00	&	1.375E+01	1.00E+03	6.30E+00 GA
Cf-249	T 5.7582E-01					1.28E+05	
		387.95	5.758E-01	?(	1.996E+00	1.03E+02	6.60E+01 G
		333.44	-2.598E+00	+	1.307E+01	1.50E+02	1.55E+01 G
Sn-126	4.2142E+00					3.65E+07	
		87.57	2.210E+00	}	5.230E+00	2.92E+01	3.75E+01 GA
		64.28	4.214E+00	(	1.588E+01	1.13E+02	9.70E+00 G
		86.94	1.846E+00	}	2.264E+01	1.53E+02	9.04E+00 GA
PB-210	N -1.4186E+01					8.14E+03	
		46.54	-1.419E+01	*(	4.741E+01	1.00E+02	4.25E+00 G
PB-212	N 2.1409E+01					6.98E+02	
		238.63	2.141E+01	(P	1.483E+00	4.47E+00	4.33E+01 G
		300.03	-1.247E+01	-	7.211E+01	1.73E+02	3.28E+00 GA
PB-214	N 1.6211E+01					5.84E+05	
		351.93	1.615E+01	@(P	2.132E+00	8.31E+00	3.76E+01 G
		295.09	1.634E+01	(	2.918E+00	8.90E+00	1.93E+01 G
		242.00	1.908E+01		1.077E+01	1.92E+01	7.43E+00 GA
BI-207	C 3.8270E-01					1.18E+04	
		569.70	8.195E-02	?(P	1.188E+00	4.18E+02	9.77E+01 G
		1063.66	7.773E-01	?(P	1.771E+00	1.03E+02	7.45E+01 G
BI-212	N 3.2875E+01					6.98E+02	
		727.17	3.288E+01	(P	8.431E+00	1.55E+01	7.55E+00 G
		785.42	4.425E+01	&	1.311E+02	8.84E+01	1.28E+00 GA
BI-214	N 1.3371E+01					5.84E+05	
		609.31	1.381E+01	(P	1.701E+00	8.43E+00	4.61E+01 G
		1120.29	3.689E+00	- P	1.184E+01	9.52E+01	1.51E+01 G
		1764.49	1.207E+01	?(P	8.720E+00	2.69E+01	1.54E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T 6.7239E-01					1.10E+09	
		265.83	6.724E-01	?(	1.871E+00	8.34E+01	5.00E+01 G
		304.90	-1.482E+00	+	7.784E+00	1.57E+02	2.80E+01 G
AC-228	N 1.8595E+01					2.10E+03	
		911.07	1.729E+01	(	1.625E+00	9.50E+00	2.90E+01 G
		968.97	2.076E+01	(P	4.071E+00	1.27E+01	1.75E+01 G
		338.32	2.449E+01	+	5.929E+00	1.37E+01	1.20E+01 G
		93.35	1.639E+01		1.163E+01	2.33E+01	5.56E+00 XA
TH-227	N -3.0340E+00					7.95E+03	
		50.14	-3.034E+00	&(P	2.332E+01	1.68E+02	8.00E+00 G
		256.24	-4.411E+00	& P	1.311E+01	1.41E+02	7.00E+00 G
TH-229	N 5.4848E+00					2.68E+06	
		193.51	2.356E+00	&(	1.681E+01	2.88E+02	4.40E+00 G
		210.85	1.009E+01	?(	2.927E+01	1.19E+02	2.99E+00 G
TH-234	N -2.3318E+00					1.63E+12	
		63.29	-2.332E+00	*(	4.034E+01	5.13E+02	3.81E+00 G
		92.59	-6.406E+00	+	3.721E+01	1.75E+02	5.58E+00 G
PA-231	N -1.4310E+01					1.20E+07	
		302.65	-1.431E+01	*(	7.905E+01	1.65E+02	2.88E+00 G
		300.07	-1.662E+01	+	9.479E+01	1.71E+02	2.46E+00 G
PA-234	N 2.2018E+00					1.63E+12	
		131.29	1.600E+00	&(	7.600E+00	1.42E+02	1.80E+01 G
		946.02	3.010E+00	?(	8.499E+00	1.24E+02	1.34E+01 G
		569.47	0.000E+00	-	1.442E+01	1.00E+03	8.20E+00 G
		883.24	-7.924E+00	&	2.283E+01	8.63E+01	9.60E+00 G
		880.53	-1.263E+01	+	3.382E+01	8.03E+01	6.00E+00 GA
PA-234M	N -9.6773E+01					1.63E+12	
		1001.00	-9.677E+01	?(P	2.655E+02	5.86E+01	8.37E-01 G
		766.41	1.987E+02	+	4.865E+02	7.36E+01	2.94E-01 G
U-235	N -3.0028E+00					2.57E+11	
		143.79	-3.003E+00	&(	1.397E+01	1.40E+02	1.10E+01 G
		205.33	-6.452E-01	% P	1.699E+01	1.24E+03	5.01E+00 G
		163.38	-6.312E+00	+	1.959E+01	9.31E+01	5.08E+00 G
AM-241	T 5.8769E-01					1.58E+05	
		59.54	5.877E-01	(P	4.230E+00	2.14E+02	3.59E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F  -1.0821E-01                                      1.30E+01
                          818.50-1.082E-01  (  1.092E+00 4.37E+02 1.00E+02 G
                         1048.07-9.933E-01 +   2.007E+00 6.15E+01 8.00E+01 G
                          340.57-1.476E-01 +   4.296E+00 8.62E+02 4.69E+01 G

Np-239   T   1.5176E+00                                      2.36E+00
                          103.70-1.454E+00 &   7.824E+00 1.62E+02 2.40E+01 X
                          106.13 1.518E+00 &(  8.035E+00 1.59E+02 2.27E+01 G
                           99.50-2.350E+00 +   1.325E+01 1.70E+02 1.50E+01 X

Nd-147       7.9439E-01                                      1.11E+01
                          531.00 0.000E+00 ?(  7.285E+00 1.00E+03 1.30E+01 G
                           91.10 1.159E+00 ?(  6.885E+00 1.78E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	379.	-28.	-0.016	100.28	-1.419E+01	
TH-227	50.14	413.	-13.	-0.007	167.65	-3.034E+00	P
AM-241	59.54	436.	14.	0.008	214.25	5.877E-01	P
TH-234	63.29	515.	-6.	-0.003	513.48	-2.332E+00	
BA-133	80.99	1366.	-34.	-0.019	153.86	-1.154E+00	
Nd-147	91.10	1443.	30.	0.017	178.44	1.159E+00	
TH-234	92.59	1664.	-33.	-0.018	174.67	-6.406E+00	
Gd-153	97.50	1631.	-33.	-0.019	172.15	-1.179E+00	
Gd-153	103.20	1481.	-33.	-0.019	164.30	-1.601E+00	
EU-152	121.78	261.	26.	0.014	89.99	9.538E-01	
CO-57	122.06	262.	-25.	-0.014	93.62	-3.063E-01	
EU-154	123.10	271.	-6.	-0.003	390.16	-1.543E-01	
PA-234	131.29	728.	27.	0.015	142.41	1.600E+00	
HF-181	133.02	755.	5.	0.003	784.98	1.225E-01	
CO-57	136.47	859.	-30.	-0.016	140.94	-2.996E+00	
Tc-99m	140.51	829.	-30.	-0.017	138.02	-3.750E-01	
U-235	143.79	854.	-30.	-0.017	139.66	-3.003E+00	
CE-141	145.44	928.	-31.	-0.017	139.83	-7.146E-01	
U-235	163.38	302.	-27.	-0.015	93.14	-6.312E+00	
CE-139	165.85	282.	-14.	-0.008	175.75	-2.009E-01	
TH-229	193.51	136.	8.	0.004	287.59	2.356E+00	
TH-229	210.85	172.	22.	0.012	118.65	1.009E+01	
EU-152	244.69	997.	12.	0.007	360.67	2.480E+00	
TH-227	256.24	145.	-20.	-0.011	141.03	-4.411E+00	P
BI-210M	265.83	143.	21.	0.012	83.44	6.724E-01	
Hg-203	279.20	156.	-26.	-0.015	94.70	-5.364E-01	
I-131	284.30	116.	-23.	-0.013	94.61	-6.238E+00	
PA-231	300.07	795.	-24.	-0.013	170.79	-1.662E+01	
PA-233	300.18	771.	-24.	-0.013	168.28	-6.598E+00	
PA-231	302.65	748.	-24.	-0.013	165.44	-1.431E+01	
BA-133	302.85	724.	-24.	-0.013	162.82	-2.250E+00	
BI-210M	304.90	677.	-24.	-0.013	157.29	-1.482E+00	
Ir-192	308.44	654.	-24.	-0.013	154.96	-1.314E+00	
CR-51	320.08	572.	23.	0.013	151.49	4.125E+00	P
La-140	328.76	536.	-21.	-0.012	153.95	-1.959E+00	
Cf-249	333.44	514.	-22.	-0.012	150.39	-2.598E+00	
Cs-136	340.57	493.	-4.	-0.002	862.34	-1.476E-01	
HF-181	345.83	80.	10.	0.006	177.95	1.273E+00	
I-131	364.48	80.	-6.	-0.003	294.71	-1.462E-01	
BA-133	383.84	193.	12.	0.006	171.97	2.682E+00	P
Cf-249	387.95	169.	18.	0.010	103.36	5.758E-01	
SN-113	391.69	154.	17.	0.009	108.98	5.403E-01	
AG-108M	433.94	52.	16.	0.009	93.58	4.061E-01	
Ir-192	468.06	193.	-20.	-0.011	98.74	-9.386E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	477.60	179.	-12.	-0.006	164.65	-2.677E+00	
La-140	487.02	148.	18.	0.010	100.92	9.447E-01	
RU-103	497.05	35.	9.	0.005	132.86	2.552E-01	
RH-106	511.86	112.	94.	0.052	31.19	1.193E+01	
CS-134	563.24	57.	-4.	-0.002	214.97	-1.364E+00	P
CS-134	569.32	70.	-5.	-0.003	240.83	-8.923E-01	
BI-207	569.70	72.	3.	0.002	417.69	8.195E-02	P
SB-124	602.73	461.	-20.	-0.011	60.88	-5.947E-01	P
CS-134	604.71	382.	5.	0.003	531.07	1.535E-01	
RH-106	621.92	33.	7.	0.004	169.41	2.164E+00	
I-131	636.97	56.	9.	0.005	118.34	3.884E+00	
AG-110M	657.76	160.	-14.	-0.008	130.54	-4.521E-01	
PM-144	696.54	88.	12.	0.006	117.63	3.760E-01	
NB-94	702.63	133.	-21.	-0.011	82.29	-6.749E-01	
SB-124	722.79	144.	-16.	-0.009	110.91	-4.769E+00	
AG-108M	722.94	128.	-5.	-0.003	306.07	-1.910E-01	
pm-146	735.72	47.	-14.	-0.008	109.43	-2.020E+00	
pm-146	747.16	47.	-12.	-0.007	99.14	-1.171E+00	P
ZR-95	756.73	35.	3.	0.002	437.37	1.871E-01	
AG-110M	763.94	138.	-27.	-0.015	64.03	-4.176E+00	
NB-95	765.79	122.	17.	0.010	94.07	5.906E-01	
PA-234M	766.41	70.	17.	0.009	73.58	1.987E+02	
EU-152	778.92	60.	-20.	-0.011	59.15	-5.331E+00	P
CS-134	795.87	72.	5.	0.003	244.13	2.064E-01	
CS-134	801.95	50.	13.	0.007	82.28	5.277E+00	
CO-58	810.78	69.	-5.	-0.003	246.98	-1.740E-01	
Cs-136	818.50	35.	-3.	-0.002	437.37	-1.082E-01	
MN-54	834.85	55.	-3.	-0.002	355.42	-1.228E-01	P
Co-56	846.77	35.	8.	0.004	166.38	2.964E-01	
NB-94	871.10	25.	-2.	-0.001	360.56	-7.576E-02	
PA-234	880.53	117.	-20.	-0.011	80.31	-1.263E+01	
PA-234	883.24	137.	-20.	-0.011	86.25	-7.924E+00	
AG-110M	884.68	157.	-17.	-0.009	109.69	-8.736E-01	
Sc-46	889.28	165.	10.	0.006	184.21	3.845E-01	
y-88	898.04	36.	-13.	-0.007	82.71	-5.267E-01	P
AG-110M	937.49	35.	-5.	-0.003	200.13	-6.165E-01	P
PA-234	946.02	30.	10.	0.006	124.50	3.010E+00	
EU-152	964.11	138.	15.	0.008	112.17	4.264E+00	
EU-154	996.33	96.	-19.	-0.010	76.89	-7.483E+00	
PA-234M	1001.00	115.	-19.	-0.011	58.64	-9.677E+01	P
EU-154	1004.77	115.	16.	0.009	99.10	3.711E+00	
Co-56	1037.84	21.	11.	0.006	103.08	3.274E+00	
Cs-136	1048.07	53.	-18.	-0.010	61.45	-9.933E-01	
RH-106	1050.36	73.	-3.	-0.002	350.52	-9.779E+00	
BI-207	1063.66	34.	13.	0.007	103.15	7.773E-01	P
Ga-68	1077.40	16.	8.	0.004	119.02	1.269E+01	
FE-59	1099.25	37.	-5.	-0.003	251.25	-4.323E-01	P
ZN-65	1115.55	104.	-12.	-0.006	126.85	-1.058E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Sc-46	1120.55	47.	15.	0.008	70.84	6.812E-01		
Ta-182	1121.30	63.	15.	0.008	80.28	1.953E+00		
Ta-182	1189.05	11.	23.	0.013	40.67	6.757E+00		
Ta-182	1221.41	40.	-6.	-0.003	264.02	-1.035E+00		
Co-56	1238.28	34.	14.	0.008	103.66	1.034E+00		P
NA-22	1274.53	40.	-7.	-0.004	139.10	-3.405E-01		
FE-59	1291.60	40.	-11.	-0.006	141.82	-1.274E+00		
AG-110M	1384.30	11.	5.	0.003	175.40	1.048E+00		
EU-152	1408.00	1.	13.	0.007	28.77	3.520E+00		P
La-140	1596.21	13.	-3.	-0.002	776.28	-1.785E-01		P
SB-124	1690.98	7.	3.	0.002	208.59	4.244E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

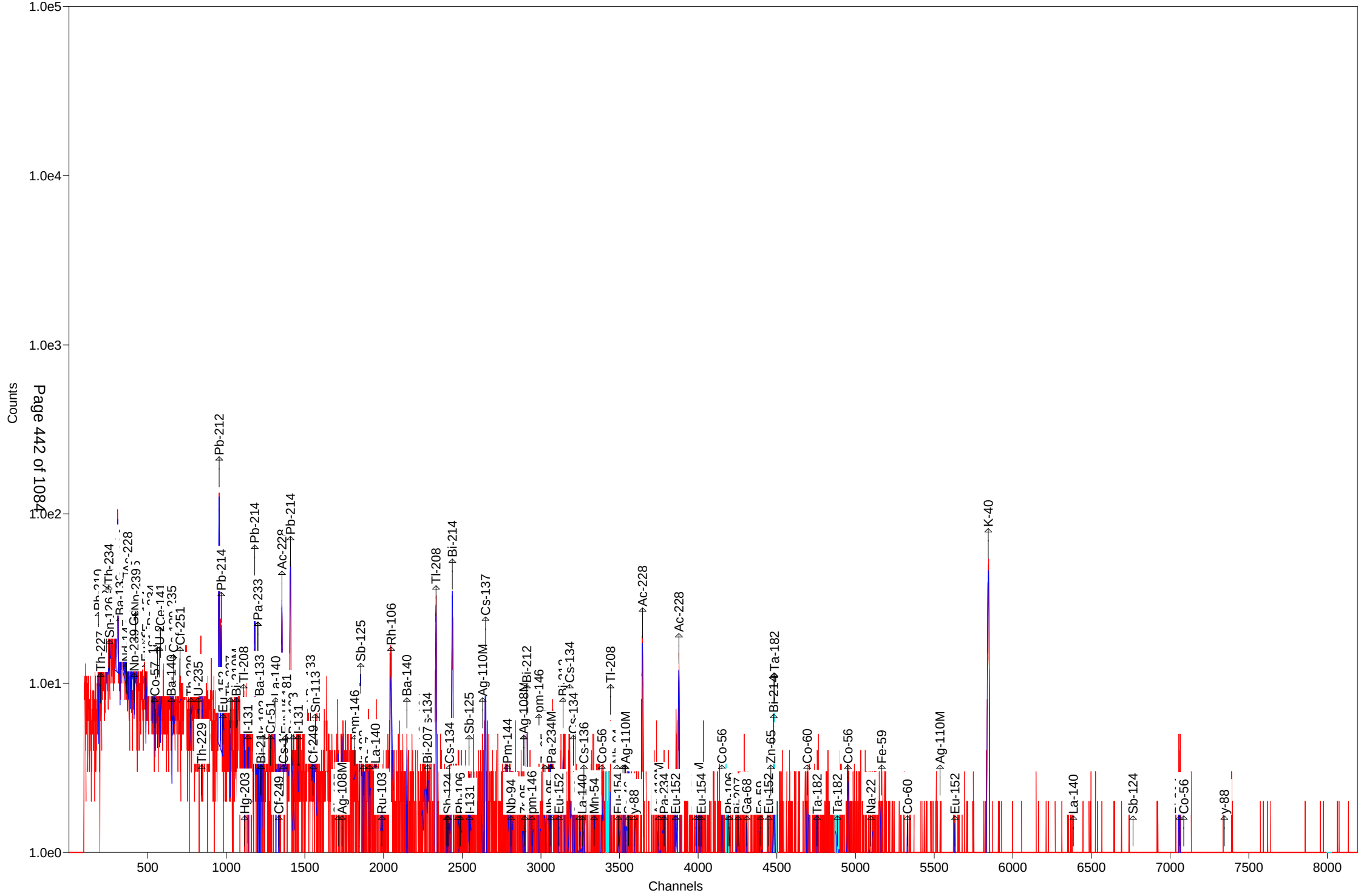
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-2.6771E+00	-2.6771E+00	1.647E+02%	1.49E+01
NA-22	#A	-3.4051E-01	-3.4051E-01	1.391E+02%	1.64E+00
K-40		2.2521E+02	2.2521E+02	5.107E+00%	1.05E+01
Sc-46	#A	5.3285E-01	5.3285E-01	7.084E+01%	2.40E+00
CR-51	#A	4.1252E+00	4.1253E+00	1.515E+02%	2.09E+01
MN-54	#A	-1.2284E-01	-1.2284E-01	3.554E+02%	1.37E+00
FE-59	#A	-4.3231E-01	-4.3232E-01	2.513E+02%	2.51E+00
Co-56	#A	8.0042E-01	8.0043E-01	7.383E+01%	1.12E+00
CO-57	#A	-3.0634E-01	-3.0634E-01	9.362E+01%	9.56E-01
CO-58	#A	-1.7401E-01	-1.7401E-01	2.470E+02%	1.49E+00
CO-60	#	6.8788E-01	6.8788E-01	2.774E+01%	3.90E-01
ZN-65	#A	-1.0585E+00	-1.0585E+00	1.268E+02%	4.55E+00
NB-94	#A	-6.7486E-01	-6.7486E-01	8.229E+01%	1.85E+00
ZR-95	#A	1.8714E-01	1.8714E-01	4.374E+02%	1.89E+00
NB-95	#A	5.9062E-01	5.9062E-01	9.407E+01%	1.86E+00
RU-103	#A	2.5515E-01	2.5515E-01	1.329E+02%	8.24E-01
RH-106	#A	2.1643E+00	2.1643E+00	1.694E+02%	8.66E+00
AG-108M	#A	4.0612E-01	4.0612E-01	9.358E+01%	9.04E-01
AG-110M	#A	-3.9219E-01	-3.9219E-01	1.034E+02%	3.22E+00
SN-113	#A	5.4027E-01	5.4027E-01	1.090E+02%	1.98E+00
SB-124	#A	-5.9475E-01	-5.9475E-01	6.088E+01%	3.00E+00
SB-125	C	3.9226E+00	3.9226E+00	2.669E+01%	2.84E+00
I-131	#A	1.7894E-01	1.7895E-01	1.183E+02%	1.08E+00
Gd-153	#A	-1.1785E+00	-1.1785E+00	1.722E+02%	6.75E+00
Ga-68	#A	1.2576E+01	1.2690E+01	1.190E+02%	3.39E+01
Tc-99m	#A	-3.7436E-01	-3.7499E-01	1.380E+02%	1.72E+00
BA-133	#A	3.6814E-02	3.6814E-02	2.524E+03%	3.14E+00
CS-134	#A	4.0915E-01	4.0916E-01	8.228E+01%	2.76E+00
CS-137		3.0620E+00	3.0620E+00	1.596E+01%	8.10E-01

CE-139 #A	-2.0089E-01	-2.0089E-01	1.757E+02%		1.19E+00
Ba-140 #	2.8964E+00	2.8965E+00	3.905E+01%		2.13E+00
La-140 #A	1.8422E-01	1.8423E-01	1.009E+02%		1.24E+00
CE-141 #A	-7.1461E-01	-7.1462E-01	1.398E+02%		3.33E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.27E+01
PM-144 #A	3.7598E-01	3.7598E-01	1.176E+02%		1.50E+00
EU-152 #A	1.4022E+00	1.4022E+00	8.999E+01%		7.63E+00
EU-154 #A	2.2489E+00	2.2489E+00	9.910E+01%		9.19E+00
EU-155 #A	1.6449E+00	1.6449E+00	1.571E+02%		8.60E+00
HF-181 #A	1.7635E-01	1.7635E-01	1.780E+02%		2.02E+00
Ta-182 #A	3.4760E+00	3.4760E+00	4.067E+01%		5.25E+00
Hg-203 #A	-5.3642E-01	-5.3642E-01	9.470E+01%		1.24E+00
TL-208	5.9672E+00	5.9672E+00	8.512E+00%		6.12E-01
pm-146 #A	-1.1708E+00	-1.1708E+00	9.914E+01%		3.42E+00
y-88 #A	-5.2673E-01	-5.2673E-01	8.271E+01%		1.26E+00
Cd-113m#A	0.0000E+00	0.0000E+00	1.000E+03%		1.71E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.32E+01
Cf-251 #A	4.7897E-02	4.7897E-02	3.686E+03%		4.59E+00
Cf-249 #A	5.7582E-01	5.7582E-01	1.034E+02%		2.00E+00
Sn-126 A	4.2142E+00	4.2142E+00	1.131E+02%		1.59E+01
PB-210 #A	-1.4186E+01	-1.4186E+01	1.003E+02%		4.74E+01
PB-212	2.1409E+01	2.1409E+01	4.471E+00%		1.48E+00
PB-214	1.6211E+01	1.6211E+01	6.088E+00%		2.13E+00
BI-207 #A	3.8270E-01	3.8270E-01	1.032E+02%		1.19E+00
BI-212 #	3.2875E+01	3.2875E+01	1.554E+01%		8.43E+00
BI-214	1.3371E+01	1.3371E+01	8.432E+00%		1.70E+00
BI-210M#A	6.7239E-01	6.7239E-01	8.344E+01%		1.87E+00
AC-228	1.8595E+01	1.8595E+01	7.943E+00%		1.63E+00
TH-227 #A	-3.0340E+00	-3.0340E+00	1.676E+02%		2.33E+01
TH-229 #A	5.4848E+00	5.4848E+00	1.186E+02%		1.68E+01
TH-234 #A	-2.3318E+00	-2.3318E+00	5.135E+02%		4.03E+01
PA-231 #A	-1.4310E+01	-1.4310E+01	1.654E+02%		7.90E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.98E+00
PA-234 #A	2.2018E+00	2.2018E+00	9.458E+01%		7.60E+00
PA-234M#A	-9.6773E+01	-9.6773E+01	5.864E+01%		2.66E+02
U-235 #A	-3.0028E+00	-3.0028E+00	1.397E+02%		1.40E+01
AM-241 #A	5.8769E-01	5.8769E-01	2.143E+02%		4.23E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.66E+01
Ir-192 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.50E+00
Cs-136 #A	-1.0821E-01	-1.0821E-01	4.374E+02%		1.09E+00
Np-239 #A	1.5173E+00	1.5176E+00	1.591E+02%		8.04E+00
Nd-147 #A	7.9436E-01	7.9439E-01	1.784E+02%		7.28E+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  1999.3 keV)     3.367E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.3 keV) 3.3669592E+02  Bq/Sample
```

265170_Gamma_160-18567-A-2-B. 9_Gamma_20161631.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161727

Sample Description: 265170_Gamma_160-18567-A-3-B
Detector: Detector # 5
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-3-B

Decay to Time: 9/7/2016 16:29 Live Time: 1800 sec
Acquisition Time: 9/7/2016 16:29:24 Real Time: 1807 sec
Analysis Time: 9/7/2016 17:00 Dead Time: 0.39 %
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_2016-09-05_1554.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	5.010E+00	96.3	4.827E+00	4.834E+00	1.629E+01
NA-22	-1.745E+00	56.6	9.869E-01	9.908E-01	3.219E+00
K-40	2.615E+02	6.6	1.727E+01	2.185E+01	1.595E+01
Sc-46	5.469E-01	105.7	5.781E-01	5.787E-01	1.984E+00
CR-51	2.923E+00	125.5	3.670E+00	3.673E+00	1.252E+01
MN-54	3.855E-01	185.6	7.156E-01	7.159E-01	1.716E+00
FE-59	-1.365E+00	126.6	1.728E+00	1.729E+00	3.945E+00
Co-56	1.519E+00	34.3	5.207E-01	5.265E-01	1.580E+00
CO-57	-3.800E-01	110.5	4.197E-01	4.202E-01	1.405E+00
CO-58	-6.672E-02	768.1	5.125E-01	5.125E-01	1.855E+00
CO-60	7.866E-01	36.4	2.864E-01	2.891E-01	7.427E-01
ZN-65	-2.510E+00	102.6	2.574E+00	2.577E+00	8.666E+00
NB-94	9.350E-02	728.3	6.810E-01	6.810E-01	1.709E+00
ZR-95	-1.380E+00	110.1	1.519E+00	1.521E+00	3.659E+00
NB-95	-3.698E-01	164.0	6.064E-01	6.067E-01	2.105E+00
RU-103	-3.992E-01	153.0	6.109E-01	6.112E-01	1.492E+00
RH-106	-7.435E+00	176.8	1.314E+01	1.315E+01	4.426E+01
AG-108M	8.701E-01	49.2	4.277E-01	4.300E-01	1.025E+00
AG-110M	4.330E-01	159.3	6.899E-01	6.902E-01	3.793E+00
SN-113	3.346E-01	209.6	7.013E-01	7.015E-01	2.418E+00
SB-124	7.338E-01	104.9	7.696E-01	7.705E-01	3.901E+00
SB-125	1.830E+00	123.6	2.262E+00	2.264E+00	3.838E+00
I-131	7.985E-02	597.8	4.773E-01	4.773E-01	1.295E+00
Gd-153	-1.157E+00	112.5	1.301E+00	1.303E+00	4.352E+00
Ga-68	-2.978E+00	1103.8	3.288E+01	3.288E+01	7.747E+01
Tc-99m	2.465E-01	154.1	3.800E-01	3.802E-01	1.283E+00
BA-133	-7.907E-01	161.7	1.278E+00	1.279E+00	4.303E+00
CS-134	1.136E+00	40.3	4.579E-01	4.617E-01	3.968E+00
CS-137	3.189E+00	21.6	6.881E-01	7.078E-01	1.382E+00
CE-139	3.495E-01	108.2	3.782E-01	3.797E-01	1.272E+00
Ba-140	1.379E+00	102.9	1.419E+00	1.421E+00	3.690E+00
La-140	-8.002E-02	224.9	1.800E-01	1.800E-01	2.282E+00
CE-141	2.263E-01	350.5	7.930E-01	7.931E-01	2.690E+00

CE-144	0.000E+00	1.#INF	1.851E+00	1.851E+00	1.207E+01
PM-144	1.536E-01	373.6	5.738E-01	5.738E-01	1.462E+00
EU-152	6.214E-01	91.7	5.700E-01	5.709E-01	8.056E+00
EU-154	9.047E-01	98.2	8.888E-01	8.900E-01	2.309E+01
EU-155	1.073E+00	202.3	2.171E+00	2.172E+00	7.289E+00
HF-181	6.935E-01	128.3	8.899E-01	8.906E-01	2.312E+00
Ta-182	2.991E+00	88.1	2.636E+00	2.640E+00	8.882E+00
Hg-203	3.349E-01	145.6	4.877E-01	4.880E-01	1.659E+00
TL-208	7.533E+00	9.7	7.304E-01	8.284E-01	7.569E-01
pm-146	5.497E-01	93.7	5.152E-01	5.160E-01	4.834E+00
y-88	2.516E-01	39.7	9.999E-02	1.008E-01	1.763E+00
Cd-113m	6.049E+03	97.4	5.893E+03	5.905E+03	1.984E+04
Cd-109	9.191E+00	165.7	1.523E+01	1.524E+01	5.091E+01
Cf-251	1.785E+00	104.9	1.873E+00	1.880E+00	5.064E+00
Cf-249	5.992E-01	101.2	6.065E-01	6.073E-01	2.055E+00
Sn-126	4.220E+00	104.7	4.416E+00	4.422E+00	1.478E+01
PB-210	1.471E+01	94.0	1.383E+01	1.386E+01	3.974E+01
PB-212	2.007E+01	6.2	1.241E+00	1.796E+00	2.301E+00
PB-214	1.548E+01	9.7	1.495E+00	1.698E+00	2.977E+00
BI-207	2.903E-01	147.7	4.287E-01	4.290E-01	2.195E+00
BI-212	4.787E+00	177.5	8.497E+00	8.501E+00	2.940E+01
BI-214	1.234E+01	11.6	1.427E+00	1.564E+00	2.243E+00
BI-210M	-5.823E-01	138.0	8.037E-01	8.045E-01	2.727E+00
AC-228	1.952E+01	10.4	2.031E+00	2.262E+00	3.049E+00
TH-227	6.053E+00	109.1	6.604E+00	6.613E+00	1.878E+01
TH-229	-1.373E+00	565.7	7.768E+00	7.769E+00	2.148E+01
TH-234	3.170E+00	394.2	1.250E+01	1.250E+01	3.622E+01
PA-231	4.972E+00	208.4	1.036E+01	1.036E+01	6.729E+01
PA-233	8.577E-01	170.2	1.460E+00	1.461E+00	4.955E+00
PA-234	7.004E-02	165.4	1.158E-01	1.159E-01	7.258E+00
PA-234M	-9.785E+01	94.6	9.258E+01	9.271E+01	4.079E+02
U-235	2.173E+00	145.2	3.154E+00	3.156E+00	1.062E+01
AM-241	9.191E-01	139.6	1.283E+00	1.284E+00	3.668E+00
Np-237	-2.210E+00	210.5	4.652E+00	4.653E+00	1.557E+01
Ir-192	5.267E-01	78.4	4.132E-01	4.143E-01	1.334E+00
Cs-136	5.317E-01	76.2	4.049E-01	4.060E-01	1.348E+00
Np-239	1.138E+00	171.9	1.956E+00	1.957E+00	6.564E+00
Nd-147	-5.016E+00	108.0	5.418E+00	5.426E+00	1.347E+01
Total	6.471E+03				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-3-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161727.An1

Acquisition information
Start time: 9/7/2016 4:29:24 PM
Live time: 1800
Real time: 1807
Dead time: 0.39 %
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	9/7/2016 4:29:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-09-05_1554.PBC 9/5/2016 3:54:52 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1820

***** 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	20.	94.04	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	18.	109.12	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.51	15.	139.61	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.29	6.	394.23	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.28	20.	104.65	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.76	194.	10.39	0.81	3.150E-02				
77.12	276.	8.01	0.81	3.220E-02				
87.07	99.	17.60	0.83	3.443E-02	86.49	13.100	1.218E+01	Np237
					86.54	30.700	5.196E+00	EU155
					86.94	9.040	1.761E+01	Sn126
					87.57	37.500	4.232E+00	Sn126
87.91	22.	165.72	0.83	3.462E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	9.191E+00	Cd109
90.10	53.	27.28	0.83	3.492E-02				
93.22	22.	154.39	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
99.50	20.	112.49	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
105.31	15.	202.28	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
106.13	17.	171.88	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
123.10	18.	111.39	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
140.51	13.	154.14	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	14.	145.16	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
145.44	7.	350.48	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	16.	108.21	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
176.60	16.	104.91	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
186.12	55.	34.46	0.66	2.849E-02				
227.00	16.	102.57	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.78	338.	6.79	0.94	2.318E-02	238.63	43.300	1.871E+01	PB212
242.14	49.	28.89	0.98	2.293E-02	242.00	7.430	1.600E+01	PB214
263.70	14.	97.42	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
277.25	35.	35.57	0.99	2.048E-02	277.28	6.310	1.505E+01	TL208
279.20	10.	145.60	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
295.24	117.	15.34	0.95	1.944E-02	295.09	19.300	1.732E+01	PB214
299.87	44.	25.98	1.89	1.918E-02	300.03	3.280	3.885E+01	PB212
					300.07	2.460	5.181E+01	PA231
					300.18	6.200	2.056E+01	PA233
300.07	9.	208.37	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.079E+01	PA231
					300.18	6.200	4.284E+00	PA233
312.01	10.	170.22	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
316.49	11.	102.92	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
320.08	10.	125.55	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	7.	224.92	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.58	73.	22.23	0.33	1.735E-02	338.32	12.010	1.929E+01	AC228
345.83	12.	151.60	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.05	165.	11.72	1.29	1.680E-02	351.93	37.600	1.454E+01	PB214
364.48	2.	597.76	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
387.95	11.	101.22	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
391.69	6.	209.61	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	4.	306.30	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
433.94	20.	49.16	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
453.88	4.	280.36	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.37	8.	123.60	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	9.	118.39	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
477.60	12.	96.35	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
482.00	6.	207.08	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
511.86	25.	96.93	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
537.26	7.	102.87	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
563.24	5.	211.97	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
583.23	126.	9.70	1.36	1.103E-02	583.02	84.500	7.533E+00	TL208
600.50	11.	191.18	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	4.	569.48	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
609.52	110.	11.56	1.06	1.063E-02	609.31	46.090	1.242E+01	BI214
					610.30	5.750	9.970E+01	RU103
661.80	49.	21.58	1.00	9.924E-03	661.66	85.210	3.189E+00	CS137
696.54	3.	373.59	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
702.63	2.	728.34	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	10.	104.88	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.636E-01	AG108M
					723.36	20.220	2.983E+00	EU154
724.20	7.	146.90	1.42	9.202E-03	724.20	44.150	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
728.62	6.	177.50	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	7.	93.72	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
763.94	4.	159.33	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
785.42	10.	110.78	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	23.	40.32	1.48	8.503E-03	795.87	85.530	1.757E+00	CS134
801.95	8.	105.33	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
818.50	2.	403.11	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
834.85	6.	185.64	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
846.77	1.	799.90	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.74	36.	16.92	0.35	7.963E-03	860.56	12.420	2.003E+01	TL208
889.28	8.	105.69	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
911.64	74.	13.12	2.14	7.591E-03	911.07	29.000	1.866E+01	AC228
946.02	3.	250.62	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
964.11	10.	129.53	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.19	48.	17.41	1.14	7.209E-03	968.97	17.460	2.111E+01	AC228
1004.77	10.	111.87	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	354.73	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	10.	76.16	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	6.	147.67	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1120.86	49.	14.42	2.08	6.381E-03	1120.29	15.100	2.810E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.217E+01	Ta182
1121.34	12.	88.13	1.72	6.376E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.043E+00	Sc46
					1121.30	34.900	2.991E+00	Ta182
1173.24	8.	96.09	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	26.	34.27	1.80	5.866E-03	1238.28	66.070	3.775E+00	Co56
1291.60	3.	253.53	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	8.	36.40	1.87	5.514E-03	1332.50	99.980	8.562E-01	CO60
1384.30	2.	324.82	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1461.29	256.	6.60	1.78	5.103E-03	1460.83	10.670	2.615E+02	K40
1764.39	15.	26.92	2.11	4.351E-03	1764.49	15.400	1.211E+01	BI214
1836.06	7.	39.74	2.15	4.208E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.68	74.77	106.	194.	6.155E+03	10.39	0.813	- D
308.13	77.13	106.	276.	8.569E+03	8.01	0.815	- D
346.85	86.93	129.	72.	2.087E+03	25.28	0.825	- sD
358.97	89.95	94.	61.	1.746E+03	25.91	0.828	- D
744.44	186.12	84.	55.	1.932E+03	34.46	0.662	- 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	123.	20.	0.011	94.04	0.783
TH-227	200.11	50.14	123.	18.	0.010	109.12	0.787s
AM-241	237.72	59.54	151.	15.	0.008	139.61	0.797
TH-234	252.74	63.29	193.	6.	0.003	394.23	0.801s
Sn-126	256.71	64.28	216.	20.	0.011	104.65	0.802
BA-133	323.61	80.99	204.	-7.	-0.004	332.05	0.819s
Np-237	345.63	86.49	701.	-18.	-0.010	210.49	0.825
EU-155	345.84	86.54	672.	-12.	-0.007	294.75	0.825s
Sn-126	347.43	86.94	660.	0.	0.000	1000.00	0.825
Sn-126	349.95	87.57	660.	0.	0.000	1000.00	0.826
Cd-109	351.83	88.04	636.	22.	0.012	165.72	0.826s
TH-234	370.05	92.59	747.	-45.	-0.025	54.03	0.831s
AC-228	373.09	93.35	558.	22.	0.012	154.39	0.832s
Gd-153	389.70	97.50	305.	-22.	-0.012	112.51	0.836s
Np-239	397.71	99.50	232.	20.	0.011	112.49	0.838s
Gd-153	412.52	103.20	270.	-8.	-0.004	311.70	0.842s
Np-239	414.52	103.70	277.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	442.	15.	0.008	202.28	0.844s
Np-239	424.25	106.13	410.	17.	0.009	171.88	0.845s
EU-152	486.88	121.78	237.	-21.	-0.012	106.08	0.861
CO-57	488.03	122.06	258.	-21.	-0.012	110.45	0.861
EU-154	492.18	123.10	192.	18.	0.010	111.39	0.862
PA-234	524.99	131.29	293.	-11.	-0.006	215.77	0.871s
HF-181	531.91	133.02	305.	0.	0.000	1000.00	0.872s
CE-144	533.97	133.54	305.	0.	0.000	1000.00	0.873s
HF-181	545.02	136.30	305.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	339.	-21.	-0.012	125.30	0.876s
Tc-99m	561.88	140.51	198.	13.	0.007	154.14	0.880s
U-235	574.99	143.79	213.	14.	0.008	145.16	0.883s
CE-141	581.61	145.44	262.	7.	0.004	350.48	0.885s
Ba-140	650.54	162.66	165.	-4.	-0.002	456.89	0.902s
CE-139	663.32	165.85	137.	16.	0.009	108.21	0.905s
Cf-251	706.34	176.60	87.	16.	0.009	104.91	0.916
TH-229	774.03	193.51	90.	-3.	-0.002	565.69	0.933s
TH-229	843.44	210.85	137.	-14.	-0.008	154.60	0.950s
Cf-251	908.08	227.00	80.	16.	0.009	102.57	0.966s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	954.64	238.63	70.	363.	0.202	6.18	0.978D
PB-214	968.10	242.00	76.	49.	0.027	28.89	0.981D
EU-152	978.89	244.69	636.	-19.	-0.010	191.62	0.984s
TH-227	1025.11	256.24	77.	-7.	-0.004	237.55	0.995s
Cd-113m	1054.97	263.70	85.	14.	0.008	97.42	1.002s
BI-210M	1063.50	265.83	112.	-11.	-0.006	138.03	1.005s
TL-208	1109.21	277.25	30.	35.	0.019	35.57	0.988
Hg-203	1117.00	279.20	101.	10.	0.006	145.60	1.017s
I-131	1137.41	284.30	59.	-2.	-0.001	863.25	1.022s
PB-214	1181.21	295.24	44.	117.	0.065	15.34	0.947
PB-212	1199.73	299.87	20.	44.	0.024	25.98	1.894s
PA-231	1200.53	300.07	178.	9.	0.005	208.37	1.038s
PA-233	1200.97	300.18	187.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	187.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	187.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	187.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	187.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	187.	0.	0.000	1000.00	1.046
PA-233	1248.32	312.01	149.	10.	0.006	170.22	1.049s
Ir-192	1266.25	316.49	58.	11.	0.006	102.92	1.053s
CR-51	1280.63	320.08	66.	10.	0.005	125.55	1.057s
La-140	1315.35	328.76	62.	7.	0.004	224.92	1.065
Cf-249	1334.08	333.44	55.	-5.	-0.003	281.07	1.070s
AC-228	1354.65	338.58	41.	72.	0.040	22.33	0.327s
Cs-136	1362.62	340.57	198.	-15.	-0.008	135.35	1.077s
EU-152	1377.49	344.29	183.	-15.	-0.008	129.94	1.080s
HF-181	1383.66	345.83	169.	12.	0.007	151.60	1.082s
PB-214	1408.57	352.05	45.	165.	0.092	11.72	1.294
BA-133	1424.36	356.00	275.	-15.	-0.008	161.70	1.091s
I-131	1458.32	364.48	37.	2.	0.001	597.76	1.099s
Cf-249	1552.22	387.95	57.	11.	0.006	101.22	1.121
SN-113	1567.19	391.69	74.	6.	0.003	209.61	1.125s
SB-125	1711.99	427.88	32.	4.	0.002	306.30	1.158s
AG-108M	1736.25	433.94	20.	20.	0.011	49.16	1.164s
pm-146	1816.05	453.88	41.	4.	0.002	280.36	1.182
SB-125	1854.01	463.37	47.	8.	0.005	123.60	1.191s
Ir-192	1872.79	468.06	59.	9.	0.005	118.39	1.195s
BE-7	1910.94	477.59	65.	12.	0.007	96.35	1.204s
HF-181	1928.56	482.00	76.	6.	0.003	207.08	1.208s
La-140	1948.65	487.02	48.	-13.	-0.007	107.97	1.212s
RU-103	1988.80	497.05	36.	-8.	-0.005	153.02	1.221s
RH-106	2048.06	511.86	114.	25.	0.014	96.93	2.485s
Nd-147	2124.62	531.00	56.	-14.	-0.008	108.01	1.252s
Ba-140	2149.67	537.26	12.	7.	0.004	102.87	1.258s
CS-134	2253.60	563.24	28.	5.	0.003	211.97	1.280s
CS-134	2277.94	569.32	48.	-15.	-0.009	68.17	1.286s
PA-234	2278.54	569.47	70.	-7.	-0.004	180.92	1.286s
BI-207	2279.47	569.70	76.	0.	0.000	1000.00	1.286s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	2333.59	583.23	5.	126.	0.070	9.70	1.356
SB-125	2402.69	600.50	223.	11.	0.006	191.18	1.313s
SB-124	2411.61	602.73	234.	4.	0.002	569.48	1.315s
CS-134	2419.53	604.71	238.	0.	0.000	1000.00	1.317s
BI-214	2438.76	609.52	13.	110.	0.061	11.56	1.056
RU-103	2441.89	610.30	238.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	238.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	238.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	294.	-14.	-0.008	176.78	1.332s
I-131	2548.61	636.97	39.	-3.	-0.002	387.94	1.345s
AG-110M	2631.76	657.76	108.	-13.	-0.007	112.88	1.362s
CS-137	2647.92	661.80	15.	49.	0.027	21.58	1.004s
PM-144	2786.90	696.54	22.	3.	0.001	373.59	1.395s
NB-94	2811.25	702.63	30.	2.	0.001	728.34	1.400s
SB-124	2891.88	722.79	50.	10.	0.006	104.88	1.417s
AG-108M	2892.48	722.94	60.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	60.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	52.	7.	0.004	146.90	1.418s
BI-212	2909.41	727.17	53.	6.	0.003	177.50	1.421s
pm-146	2943.61	735.72	9.	7.	0.004	93.72	1.428
ZR-95	3027.65	756.73	39.	-12.	-0.007	110.08	1.445s
AG-110M	3056.50	763.94	22.	4.	0.002	159.33	1.451s
NB-95	3063.89	765.79	43.	-6.	-0.003	163.98	1.453s
BI-212	3142.41	785.42	23.	10.	0.005	110.78	1.468
CS-134	3184.19	795.87	14.	23.	0.013	40.32	1.477s
CS-134	3208.53	801.95	14.	8.	0.004	105.33	1.482s
CO-58	3243.82	810.78	29.	-1.	-0.001	768.11	1.489s
Cs-136	3274.72	818.50	14.	2.	0.001	403.11	1.495s
MN-54	3340.10	834.85	23.	6.	0.003	185.64	1.508s
Co-56	3387.78	846.77	19.	1.	0.001	799.90	1.518s
TL-208	3443.64	860.74	0.	36.	0.020	16.92	0.350s
NB-94	3485.08	871.10	47.	-15.	-0.008	68.91	1.537s
EU-154	3493.61	873.23	64.	-7.	-0.004	161.54	1.539s
PA-234	3522.80	880.53	52.	-8.	-0.004	137.42	1.544s
PA-234	3533.64	883.24	59.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	59.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	29.	8.	0.004	105.69	1.551s
y-88	3592.83	898.04	19.	-6.	-0.003	167.10	1.558s
AC-228	3647.23	911.64	4.	74.	0.041	13.12	2.136s
AG-110M	3750.60	937.49	33.	-13.	-0.007	99.76	1.589s
PA-234	3784.70	946.02	9.	3.	0.001	250.62	1.595s
EU-152	3857.05	964.11	74.	10.	0.005	129.53	1.609s
AC-228	3877.38	969.19	4.	48.	0.027	17.41	1.143s
EU-154	3985.88	996.33	61.	-14.	-0.008	68.16	1.633s
PA-234M	4004.55	1001.00	75.	-10.	-0.006	94.62	1.636s
EU-154	4019.65	1004.77	56.	10.	0.005	111.87	1.639s
Co-56	4151.87	1037.84	10.	2.	0.001	354.73	1.664s
Cs-136	4192.77	1048.07	24.	10.	0.006	76.16	1.671s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	4201.93	1050.36	36.	0.	0.000	1000.00	1.673s
BI-207	4255.11	1063.66	15.	6.	0.003	147.67	1.682s
FE-59	4397.41	1099.25	25.	-9.	-0.005	126.60	1.708s
EU-152	4448.68	1112.07	120.	-15.	-0.008	109.17	1.717s
ZN-65	4462.56	1115.55	105.	-15.	-0.008	102.57	1.720s
BI-214	4483.82	1120.86	0.	49.	0.027	14.42	2.084s
Sc-46	4482.57	1120.55	91.	-15.	-0.008	95.48	1.723
Ta-182	4485.56	1121.30	50.	12.	0.007	88.13	1.724
CO-60	4693.21	1173.24	11.	8.	0.004	96.09	1.760s
Ta-182	4756.42	1189.05	25.	-3.	-0.002	236.54	1.771
Ta-182	4885.79	1221.41	22.	-3.	-0.002	266.40	1.793
Co-56	4953.23	1238.28	11.	26.	0.015	34.27	1.804
NA-22	5098.13	1274.53	43.	-18.	-0.010	56.57	1.828s
EU-154	5098.19	1274.54	61.	-10.	-0.005	117.98	1.828s
FE-59	5166.35	1291.60	11.	3.	0.002	253.53	1.840s
CO-60	5329.85	1332.50	1.	8.	0.005	36.40	1.866s
AG-110M	5536.88	1384.30	11.	2.	0.001	324.82	1.899s
EU-152	5631.62	1408.00	32.	-16.	-0.009	82.77	1.914s
K-40	5844.57	1461.29	8.	256.	0.142	6.60	1.785
La-140	6383.73	1596.21	12.	-3.	-0.001	660.58	2.024s
SB-124	6762.39	1690.98	6.	-1.	0.000	846.32	2.076s
BI-214	7056.06	1764.49	0.	15.	0.008	26.92	2.114s
Co-56	7083.46	1771.35	15.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	0.	7.	0.004	39.74	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	5.0099E+00				5.31E+01	
			477.60	5.010E+00	?(P	1.629E+01 9.63E+01 1.05E+01	G
NA-22	C	-1.7446E+00				9.50E+02	
			1274.53	-1.745E+00	?(	3.219E+00 5.66E+01 9.99E+01	G
K-40	N	2.6151E+02				4.66E+11	
			1460.83	2.615E+02	(P	1.595E+01 6.60E+00 1.07E+01	G
Sc-46	F	5.4693E-01				8.38E+01	
			889.28	5.469E-01	?(	1.984E+00 1.06E+02 1.00E+02	G
			1120.55	-1.277E+00	+	4.102E+00 9.55E+01 1.00E+02	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	2.9232E+00					2.77E+01	
			320.08	2.923E+00	(	1.252E+01	1.26E+02	9.94E+00 G
MN-54	C	3.8548E-01					3.12E+02	
			834.85	3.855E-01	&(	1.716E+00	1.86E+02	1.00E+02 G
FE-59	F	-1.3649E+00					4.45E+01	
			1099.25	-1.365E+00	?(	3.945E+00	1.27E+02	5.65E+01 G
			1291.60	6.871E-01	+ P	4.123E+00	2.54E+02	4.32E+01 G
Co-56	C	1.5194E+00					7.73E+01	
			846.77	7.966E-02	?(P	1.580E+00	8.00E+02	9.99E+01 G
			1238.28	3.775E+00	?(	2.570E+00	3.43E+01	6.61E+01 G
			1037.84	1.156E+00	?(	1.008E+01	3.55E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.718E+01	1.00E+03	1.55E+01 A
CO-57	C	-3.8000E-01					2.72E+02	
			122.06	-3.800E-01	&(	1.405E+00	1.10E+02	8.56E+01 G
			136.47	-3.177E+00	&	1.333E+01	1.25E+02	1.07E+01 G
CO-58	C	-6.6725E-02					7.09E+01	
			810.78	-6.672E-02	&(	1.855E+00	7.68E+02	9.95E+01 G
CO-60	F	7.8663E-01					1.93E+03	
			1332.50	8.562E-01	?(P	7.427E-01	3.64E+01	1.00E+02 G
			1173.24	7.170E-01	?(P	1.629E+00	9.61E+01	9.99E+01 G
ZN-65	F	-2.5096E+00					2.44E+02	
			1115.55	-2.510E+00	?(	8.666E+00	1.03E+02	5.06E+01 G
NB-94	I	9.3503E-02					7.41E+06	
			702.63	9.350E-02	?(P	1.709E+00	7.28E+02	9.79E+01 G
			871.10	-1.066E+00	+	2.437E+00	6.89E+01	9.99E+01 G
ZR-95	I	-1.3802E+00					6.40E+01	
			756.73	-1.380E+00	?(	3.659E+00	1.10E+02	5.45E+01 G
			724.20	9.800E-01	+	4.958E+00	1.47E+02	4.42E+01 G
NB-95	I	-3.6982E-01					6.40E+01	
			765.79	-3.698E-01	?(	2.105E+00	1.64E+02	9.98E+01 G
RU-103	I	-3.9921E-01					3.93E+01	
			497.05	-3.992E-01	(P	1.492E+00	1.53E+02	9.09E+01 G
			610.30	0.000E+00	+	6.788E+01	1.00E+03	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-7.4347E+00					3.74E+02	
			621.92	-7.435E+00	?(	4.426E+01	1.77E+02	9.93E+00 G
			1050.36	0.000E+00	+	1.621E+02	1.00E+03	1.56E+00 G
			511.86	5.650E+00	? P	1.185E+01	9.69E+01	2.00E+01 GA
AG-108M	C	8.7008E-01					1.53E+05	
			433.94	8.701E-01	?(	1.025E+00	4.92E+01	9.05E+01 G
			722.94	0.000E+00	-	2.575E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	4.368E+00	1.00E+03	8.98E+01 G
AG-110M	F	4.3299E-01					2.50E+02	
			884.68	0.000E+00	?(	3.793E+00	1.00E+03	7.27E+01 G
			657.76	-7.886E-01	+	3.005E+00	1.13E+02	9.46E+01 G
			937.49	-2.763E+00	+	6.402E+00	9.98E+01	3.44E+01 G
			1384.30	9.994E-01	?(	7.679E+00	3.25E+02	2.43E+01 G
			763.94	1.228E+00	?(	6.915E+00	1.59E+02	2.23E+01 G
SN-113	F	3.3460E-01					1.15E+02	
			391.69	3.346E-01	&(P	2.418E+00	2.10E+02	6.40E+01 G
SB-124	F	7.3377E-01					6.02E+01	
			602.73	2.011E-01	&(	3.901E+00	5.69E+02	9.83E+01 G
			1690.98	-1.718E-01	+	3.557E+00	8.46E+02	4.78E+01 G
			722.79	5.576E+00	?(	1.988E+01	1.05E+02	1.08E+01 G
SB-125	I	1.8300E+00					1.01E+03	
			427.88	4.838E-01	?(P	3.838E+00	3.06E+02	2.96E+01 G
			600.50	3.232E+00	?(	2.090E+01	1.91E+02	1.79E+01 G
			635.89	1.596E-01	%	1.443E+01	2.50E+03	1.13E+01 G
			463.37	3.244E+00	*(P	1.374E+01	1.24E+02	1.05E+01 G
I-131	I	7.9852E-02					8.02E+00	
			364.48	7.985E-02	?(P	1.295E+00	5.98E+02	8.17E+01 G
			284.30	-7.518E-01	+	1.732E+01	8.63E+02	6.14E+00 G
			636.97	-2.521E+00	+	2.415E+01	3.88E+02	7.17E+00 G
Gd-153	F	-1.1567E+00					2.42E+02	
			97.50	-1.157E+00	?(	4.352E+00	1.13E+02	3.00E+01 G
			103.20	-5.292E-01	+	5.589E+00	3.12E+02	2.18E+01 G
Ga-68	C	-2.9784E+00					4.71E-02	
			1077.40	-2.978E+00	%(	7.747E+01	1.10E+03	3.30E+00 G
Tc-99m	I	2.4652E-01					2.51E-01	
			140.51	2.465E-01	&(	1.283E+00	1.54E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-7.9067E-01					3.85E+03	
			356.00	-7.907E-01	?(	4.303E+00	1.62E+02	6.20E+01 G
			302.85	0.000E+00	+	1.058E+01	1.00E+03	1.83E+01 G
			383.84	3.154E-01	%	1.362E+01	1.21E+03	8.94E+00 GA
			80.99	-3.445E-01	+ P	3.403E+00	3.32E+02	3.41E+01 GA
CS-134	I	1.1357E+00					7.54E+02	
			604.71	0.000E+00	?(	3.968E+00	1.00E+03	9.76E+01 G
			795.87	1.757E+00	(	1.539E+00	4.03E+01	8.55E+01 G
			569.32	-4.972E+00	+	1.123E+01	6.82E+01	1.54E+01 G
			801.95	6.054E+00	?(	1.524E+01	1.05E+02	8.69E+00 G
			563.24	2.930E+00	?(	1.604E+01	2.12E+02	8.35E+00 G
CS-137	I	3.1889E+00					1.10E+04	
			661.66	3.189E+00	(P	1.382E+00	2.16E+01	8.52E+01 G
CE-139	F	3.4953E-01					1.38E+02	
			165.85	3.495E-01	(	1.272E+00	1.08E+02	7.99E+01 G
Ba-140	I	1.3793E+00					1.28E+01	
			537.26	1.379E+00	?(P	3.690E+00	1.03E+02	2.44E+01 G
			162.66	-1.148E+00	-	1.795E+01	4.57E+02	6.22E+00 G
			304.85	0.000E+00	-	4.545E+01	1.00E+03	4.29E+00 G
La-140	I	-8.0021E-02					1.28E+01	
			1596.21	-3.154E-01	?(P	2.282E+00	6.61E+02	9.54E+01 G
			487.02	-1.238E+00	+	3.333E+00	1.08E+02	4.55E+01 G
			328.76	1.026E+00	(	6.080E+00	2.25E+02	2.03E+01 G
			815.77	-5.450E-02	% P	8.113E+00	5.52E+03	2.33E+01 G
CE-141	I	2.2625E-01					3.25E+01	
			145.44	2.263E-01	*(	2.690E+00	3.50E+02	4.82E+01 G
PM-144	C	1.5359E-01					3.63E+02	
			696.54	1.536E-01	?(P	1.462E+00	3.74E+02	9.90E+01 G
			618.06	0.000E+00	-	3.981E+00	1.00E+03	9.91E+01 G
EU-152	F	6.2137E-01					4.94E+03	
			344.29	-1.841E+00	?(	8.056E+00	1.30E+02	2.65E+01 G
			1112.07	-9.269E+00	+	3.409E+01	1.09E+02	1.36E+01 G
			121.78	-1.137E+00	&	4.037E+00	1.06E+02	2.86E+01 G
			778.92	-1.653E-01	&	1.251E+01	3.08E+03	1.29E+01 G
			964.11	5.089E+00	&(	2.246E+01	1.30E+02	1.46E+01 G
			244.69	-6.048E+00	+	3.878E+01	1.92E+02	7.58E+00 G
			1408.00	-8.181E+00	+	1.461E+01	8.28E+01	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	9.0469E-01					3.14E+03	
			873.23	-4.157E+00	?(	2.309E+01	1.62E+02	1.23E+01 G
			123.10	6.856E-01	+	2.563E+00	1.11E+02	4.08E+01 G
			1274.54	-2.675E+00	+	1.075E+01	1.18E+02	3.52E+01 G
			723.36	0.000E+00	+	1.158E+01	1.00E+03	2.02E+01 G
			1004.77	4.353E+00	&(	1.658E+01	1.12E+02	1.80E+01 G
			996.33	-1.065E+01	+ P	2.919E+01	6.82E+01	1.06E+01 G
EU-155	I	1.0732E+00					1.81E+03	
			105.31	1.073E+00	*(P	7.289E+00	2.02E+02	2.12E+01 G
			86.54	-6.583E-01	+	6.507E+00	2.95E+02	3.07E+01 G
HF-181	F	6.9350E-01					4.24E+01	
			482.00	3.240E-01	?(P	2.312E+00	2.07E+02	8.05E+01 G
			133.02	0.000E+00	-	3.088E+00	1.00E+03	4.33E+01 G
			345.83	2.667E+00	?(	1.367E+01	1.52E+02	1.51E+01 G
			136.30	0.000E+00	&	2.308E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.9908E+00					1.14E+02	
			1121.30	2.991E+00	(	8.882E+00	8.81E+01	3.49E+01 G
			1221.41	-1.006E+00	- P	8.502E+00	2.66E+02	2.70E+01 G
			1189.05	-1.826E+00	- P	1.476E+01	2.37E+02	1.62E+01 G
Hg-203	F	3.3492E-01					4.66E+01	
			279.20	3.349E-01	?(	1.659E+00	1.46E+02	8.15E+01 G
TL-208	N	7.5333E+00					6.98E+02	
			583.02	7.533E+00	(P	7.569E-01	9.70E+00	8.45E+01 G
			277.28	1.505E+01	+	1.214E+01	3.56E+01	6.31E+00 G
			860.56	2.003E+01	+ P	4.140E+00	1.69E+01	1.24E+01 G
pm-146	C	5.4973E-01					2.02E+03	
			747.16	1.617E-01	%(P	4.834E+00	1.18E+03	3.40E+01 G
			735.72	1.908E+00	(P	4.468E+00	9.37E+01	2.25E+01 G
			453.88	2.827E-01	(P	2.035E+00	2.80E+02	6.50E+01 G
y-88	F	2.5161E-01					1.07E+02	
			898.04	-4.373E-01	&(	1.763E+00	1.67E+02	9.37E+01 G
			1836.06	9.023E-01	?(P	9.809E-01	3.97E+01	9.92E+01 G
Cd-113m		6.0488E+03					5.33E+03	
			263.70	6.049E+03	&(	1.984E+04	9.74E+01	6.00E-03 K
Cd-109	F	9.1910E+00					4.53E+02	
			88.04	9.191E+00	&(	5.091E+01	1.66E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.7854E+00					3.28E+05	
			176.60	1.785E+00	?(	5.064E+00	1.05E+02	1.70E+01 G
			227.00	5.837E+00		1.619E+01	1.03E+02	6.30E+00 GA
Cf-249	T	5.9916E-01					1.28E+05	
			387.95	5.992E-01	?(	2.055E+00	1.01E+02	6.60E+01 G
			333.44	-1.019E+00	+	7.597E+00	2.81E+02	1.55E+01 G
Sn-126		4.2197E+00					3.65E+07	
			87.57	0.000E+00	-	5.251E+00	1.00E+03	3.75E+01 GA
			64.28	4.220E+00	(	1.478E+01	1.05E+02	9.70E+00 G
			86.94	0.000E+00	-	2.185E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.4712E+01					8.14E+03	
			46.54	1.471E+01	(P	3.974E+01	9.40E+01	4.25E+00 G
PB-212	N	2.0070E+01					6.98E+02	
			238.63	2.007E+01	(P	2.301E+00	6.18E+00	4.33E+01 G
			300.03	3.885E+01	+	2.079E+01	2.60E+01	3.28E+00 GA
PB-214	N	1.5482E+01					5.84E+05	
			351.93	1.454E+01	(P	2.977E+00	1.17E+01	3.76E+01 G
			295.09	1.732E+01	(	4.976E+00	1.53E+01	1.93E+01 G
			242.00	1.600E+01		1.413E+01	2.89E+01	7.43E+00 GA
BI-207	C	2.9034E-01					1.18E+04	
			569.70	0.000E+00	?(	2.195E+00	1.00E+03	9.77E+01 G
			1063.66	6.713E-01	?(	2.322E+00	1.48E+02	7.45E+01 G
BI-212	N	4.7870E+00					6.98E+02	
			727.17	4.787E+00	&(P	2.940E+01	1.78E+02	7.55E+00 G
			785.42	4.880E+01		1.273E+02	1.11E+02	1.28E+00 GA
BI-214	N	1.2344E+01					5.84E+05	
			609.31	1.242E+01	(P	2.243E+00	1.16E+01	4.61E+01 G
			1120.29	2.810E+01	+ P	4.249E+00	1.44E+01	1.51E+01 G
			1764.49	1.211E+01	?(P	6.110E+00	2.69E+01	1.54E+01 G
BI-210M	T	-5.8228E-01					1.10E+09	
			265.83	-5.823E-01	*(	2.727E+00	1.38E+02	5.00E+01 G
			304.90	0.000E+00	+	6.964E+00	1.00E+03	2.80E+01 G
AC-228	N	1.9523E+01					2.10E+03	
			911.07	1.866E+01	(P	3.049E+00	1.31E+01	2.90E+01 G
			968.97	2.111E+01	(	5.395E+00	1.74E+01	1.75E+01 G
			338.32	1.929E+01	(P	8.634E+00	2.23E+01	1.20E+01 G
			93.35	6.172E+00	&	3.186E+01	1.54E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	6.0528E+00					7.95E+03	
			50.14	6.053E+00	*(	1.878E+01	1.09E+02	8.00E+00 G
			256.24	-2.541E+00	-	1.583E+01	2.38E+02	7.00E+00 G
TH-229	N	-1.3732E+00					2.68E+06	
			193.51	-1.373E+00	?(	2.148E+01	5.66E+02	4.40E+00 G
			210.85	-9.883E+00	+	4.135E+01	1.55E+02	2.99E+00 G
TH-234	N	3.1702E+00					1.63E+12	
			63.29	3.170E+00	*(P	3.622E+01	3.94E+02	3.81E+00 G
			92.59	-1.264E+01	+ P	3.670E+01	5.40E+01	5.58E+00 G
PA-231	N	4.9721E+00					1.20E+07	
			302.65	0.000E+00	?(	6.729E+01	1.00E+03	2.88E+00 G
			300.07	1.079E+01	*(	7.636E+01	2.08E+02	2.46E+00 G
PA-233	C	8.5773E-01					7.82E+08	
			312.01	8.577E-01	?(	4.955E+00	1.70E+02	3.60E+01 G
			300.18	0.000E+00	-	3.105E+01	1.00E+03	6.20E+00 G
PA-234	N	7.0037E-02					1.63E+12	
			131.29	-9.968E-01	&(	7.258E+00	2.16E+02	1.80E+01 G
			946.02	1.503E+00	?(	9.552E+00	2.51E+02	1.34E+01 G
			569.47	-4.022E+00	+	2.505E+01	1.81E+02	8.20E+00 G
			883.24	0.000E+00	-	2.867E+01	1.00E+03	9.60E+00 G
			880.53	-9.088E+00	+	4.292E+01	1.37E+02	6.00E+00 GA
PA-234M	N	-9.7850E+01					1.63E+12	
			1001.00	-9.785E+01	&(P	4.079E+02	9.46E+01	8.37E-01 G
			766.41	1.436E+01	%	7.112E+02	1.39E+03	2.94E-01 G
U-235	N	2.1726E+00					2.57E+11	
			143.79	2.173E+00	?(P	1.062E+01	1.45E+02	1.10E+01 G
			205.33	4.222E-01	%	2.082E+01	1.78E+03	5.01E+00 G
			163.38	-1.851E-01	% P	2.234E+01	4.00E+03	5.08E+00 G
AM-241	T	9.1911E-01					1.58E+05	
			59.54	9.191E-01	?(P	3.668E+00	1.40E+02	3.59E+01 G
Np-237	F	-2.2100E+00					2.14E+06	
			86.49	-2.210E+00	(	1.557E+01	2.10E+02	1.31E+01 G
Ir-192	F	5.2674E-01					7.40E+01	
			316.49	3.823E-01	?(	1.334E+00	1.03E+02	8.70E+01 G
			468.06	7.696E-01	?(	3.107E+00	1.18E+02	5.18E+01 G
			308.44	0.000E+00	-	6.201E+00	1.00E+03	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   5.3166E-01                                      1.30E+01
                          818.50 1.338E-01 ?(  1.348E+00 4.03E+02 1.00E+02 G
                         1048.07 1.029E+00 &(  2.628E+00 7.62E+01 8.00E+01 G
                          340.57-1.028E+00 +   4.685E+00 1.35E+02 4.69E+01 G

Np-239   T   1.1380E+00                                      2.36E+00
                          103.70 0.000E+00 -   5.142E+00 1.00E+03 2.40E+01 X
                          106.13 1.138E+00 ?(  6.564E+00 1.72E+02 2.27E+01 G
                           99.50 2.017E+00 ?   7.604E+00 1.12E+02 1.50E+01 X

Nd-147      -5.0163E+00                                      1.11E+01
                          531.00-5.016E+00 ?(  1.347E+01 1.08E+02 1.30E+01 G
                           91.10 1.223E-01 %   6.840E+00 1.66E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	123.	20.	0.011	94.04	1.471E+01	P
TH-227	50.14	123.	18.	0.010	109.12	6.053E+00	
TH-234	63.29	193.	6.	0.003	394.23	3.170E+00	P
BA-133	80.99	204.	-7.	-0.004	332.05	-3.445E-01	P
Np-237	86.49	701.	-18.	-0.010	210.49	-2.210E+00	
EU-155	86.54	672.	-12.	-0.007	294.75	-6.583E-01	
TH-234	92.59	747.	-45.	-0.025	54.03	-1.264E+01	P
Gd-153	97.50	305.	-22.	-0.012	112.51	-1.157E+00	
Np-239	99.50	232.	20.	0.011	112.49	2.017E+00	
Gd-153	103.20	270.	-8.	-0.004	311.70	-5.292E-01	
EU-155	105.31	442.	15.	0.008	202.28	1.073E+00	P
Np-239	106.13	410.	17.	0.009	171.88	1.138E+00	
EU-152	121.78	237.	-21.	-0.012	106.08	-1.137E+00	
CO-57	122.06	258.	-21.	-0.012	110.45	-3.800E-01	
EU-154	123.10	192.	18.	0.010	111.39	6.856E-01	
PA-234	131.29	293.	-11.	-0.006	215.77	-9.968E-01	
CO-57	136.47	339.	-21.	-0.012	125.30	-3.177E+00	
Tc-99m	140.51	198.	13.	0.007	154.14	2.465E-01	
U-235	143.79	213.	14.	0.008	145.16	2.173E+00	P
CE-141	145.44	262.	7.	0.004	350.48	2.263E-01	
Ba-140	162.66	165.	-4.	-0.002	456.89	-1.148E+00	
CE-139	165.85	137.	16.	0.009	108.21	3.495E-01	
Cf-251	176.60	87.	16.	0.009	104.91	1.785E+00	
TH-229	193.51	90.	-3.	-0.002	565.69	-1.373E+00	
TH-229	210.85	137.	-14.	-0.008	154.60	-9.883E+00	
Cf-251	227.00	80.	16.	0.009	102.57	5.837E+00	
EU-152	244.69	636.	-19.	-0.010	191.62	-6.048E+00	
TH-227	256.24	77.	-7.	-0.004	237.55	-2.541E+00	
Cd-113m	263.70	85.	14.	0.008	97.42	6.049E+03	
BI-210M	265.83	112.	-11.	-0.006	138.03	-5.823E-01	
Hg-203	279.20	101.	10.	0.006	145.60	3.349E-01	
I-131	284.30	59.	-2.	-0.001	863.25	-7.518E-01	
PA-231	300.07	178.	9.	0.005	208.37	1.079E+01	
PA-233	312.01	149.	10.	0.006	170.22	8.577E-01	
Ir-192	316.49	58.	11.	0.006	102.92	3.823E-01	
CR-51	320.08	66.	10.	0.005	125.55	2.923E+00	
La-140	328.76	62.	7.	0.004	224.92	1.026E+00	
Cf-249	333.44	55.	-5.	-0.003	281.07	-1.019E+00	
Cs-136	340.57	198.	-15.	-0.008	135.35	-1.028E+00	
EU-152	344.29	183.	-15.	-0.008	129.94	-1.841E+00	
HF-181	345.83	169.	12.	0.007	151.60	2.667E+00	
BA-133	356.00	275.	-15.	-0.008	161.70	-7.907E-01	
I-131	364.48	37.	2.	0.001	597.76	7.985E-02	P
Cf-249	387.95	57.	11.	0.006	101.22	5.992E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	74.	6.	0.003	209.61	3.346E-01	P
SB-125	427.88	32.	4.	0.002	306.30	4.838E-01	P
AG-108M	433.94	20.	20.	0.011	49.16	8.701E-01	
pm-146	453.88	41.	4.	0.002	280.36	2.827E-01	P
SB-125	463.37	47.	8.	0.005	123.60	3.244E+00	P
Ir-192	468.06	59.	9.	0.005	118.39	7.696E-01	
BE-7	477.59	65.	12.	0.007	96.35	5.010E+00	P
HF-181	482.00	76.	6.	0.003	207.08	3.240E-01	P
La-140	487.02	48.	-13.	-0.007	107.97	-1.238E+00	
RU-103	497.05	36.	-8.	-0.005	153.02	-3.992E-01	P
RH-106	511.86	114.	25.	0.014	96.93	5.650E+00	P
Nd-147	531.00	56.	-14.	-0.008	108.01	-5.016E+00	
Ba-140	537.26	12.	7.	0.004	102.87	1.379E+00	P
CS-134	563.24	28.	5.	0.003	211.97	2.930E+00	
CS-134	569.32	48.	-15.	-0.009	68.17	-4.972E+00	
PA-234	569.47	70.	-7.	-0.004	180.92	-4.022E+00	
SB-125	600.50	223.	11.	0.006	191.18	3.232E+00	
SB-124	602.73	234.	4.	0.002	569.48	2.011E-01	
RH-106	621.92	294.	-14.	-0.008	176.78	-7.435E+00	
I-131	636.97	39.	-3.	-0.002	387.94	-2.521E+00	
AG-110M	657.76	108.	-13.	-0.007	112.88	-7.886E-01	
PM-144	696.54	22.	3.	0.001	373.59	1.536E-01	P
NB-94	702.63	30.	2.	0.001	728.34	9.350E-02	P
SB-124	722.79	50.	10.	0.006	104.88	5.576E+00	
ZR-95	724.20	52.	7.	0.004	146.90	9.800E-01	
pm-146	735.72	9.	7.	0.004	93.72	1.908E+00	P
ZR-95	756.73	39.	-12.	-0.007	110.08	-1.380E+00	
AG-110M	763.94	22.	4.	0.002	159.33	1.228E+00	
NB-95	765.79	43.	-6.	-0.003	163.98	-3.698E-01	
CS-134	795.87	14.	23.	0.013	40.32	1.757E+00	
CS-134	801.95	14.	8.	0.004	105.33	6.054E+00	
CO-58	810.78	29.	-1.	-0.001	768.11	-6.672E-02	
Cs-136	818.50	14.	2.	0.001	403.11	1.338E-01	
MN-54	834.85	23.	6.	0.003	185.64	3.855E-01	
Co-56	846.77	19.	1.	0.001	799.90	7.966E-02	P
NB-94	871.10	47.	-15.	-0.008	68.91	-1.066E+00	
EU-154	873.23	64.	-7.	-0.004	161.54	-4.157E+00	
PA-234	880.53	52.	-8.	-0.004	137.42	-9.088E+00	
Sc-46	889.28	29.	8.	0.004	105.69	5.469E-01	
y-88	898.04	19.	-6.	-0.003	167.10	-4.373E-01	
AG-110M	937.49	33.	-13.	-0.007	99.76	-2.763E+00	
PA-234	946.02	9.	3.	0.001	250.62	1.503E+00	
EU-152	964.11	74.	10.	0.005	129.53	5.089E+00	
EU-154	996.33	61.	-14.	-0.008	68.16	-1.065E+01	P
PA-234M	1001.00	75.	-10.	-0.006	94.62	-9.785E+01	P
EU-154	1004.77	56.	10.	0.005	111.87	4.353E+00	
Co-56	1037.84	10.	2.	0.001	354.73	1.156E+00	
Cs-136	1048.07	24.	10.	0.006	76.16	1.029E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-207	1063.66	15.	6.	0.003	147.67	6.713E-01		
FE-59	1099.25	25.	-9.	-0.005	126.60	-1.365E+00		
EU-152	1112.07	120.	-15.	-0.008	109.17	-9.269E+00		
ZN-65	1115.55	105.	-15.	-0.008	102.57	-2.510E+00		
Sc-46	1120.55	91.	-15.	-0.008	95.48	-1.277E+00		
Ta-182	1121.30	50.	12.	0.007	88.13	2.991E+00		
Ta-182	1189.05	25.	-3.	-0.002	236.54	-1.826E+00	P	
Ta-182	1221.41	22.	-3.	-0.002	266.40	-1.006E+00	P	
Co-56	1238.28	11.	26.	0.015	34.27	3.775E+00		
NA-22	1274.53	43.	-18.	-0.010	56.57	-1.745E+00		
EU-154	1274.54	61.	-10.	-0.005	117.98	-2.675E+00		
FE-59	1291.60	11.	3.	0.002	253.53	6.871E-01	P	
AG-110M	1384.30	11.	2.	0.001	324.82	9.994E-01		
EU-152	1408.00	32.	-16.	-0.009	82.77	-8.181E+00		
La-140	1596.21	12.	-3.	-0.001	660.58	-3.154E-01	P	
SB-124	1690.98	6.	-1.	0.000	846.32	-1.718E-01		
y-88	1836.06	0.	7.	0.004	39.74	9.023E-01	P	

P - Peakbackground subtraction

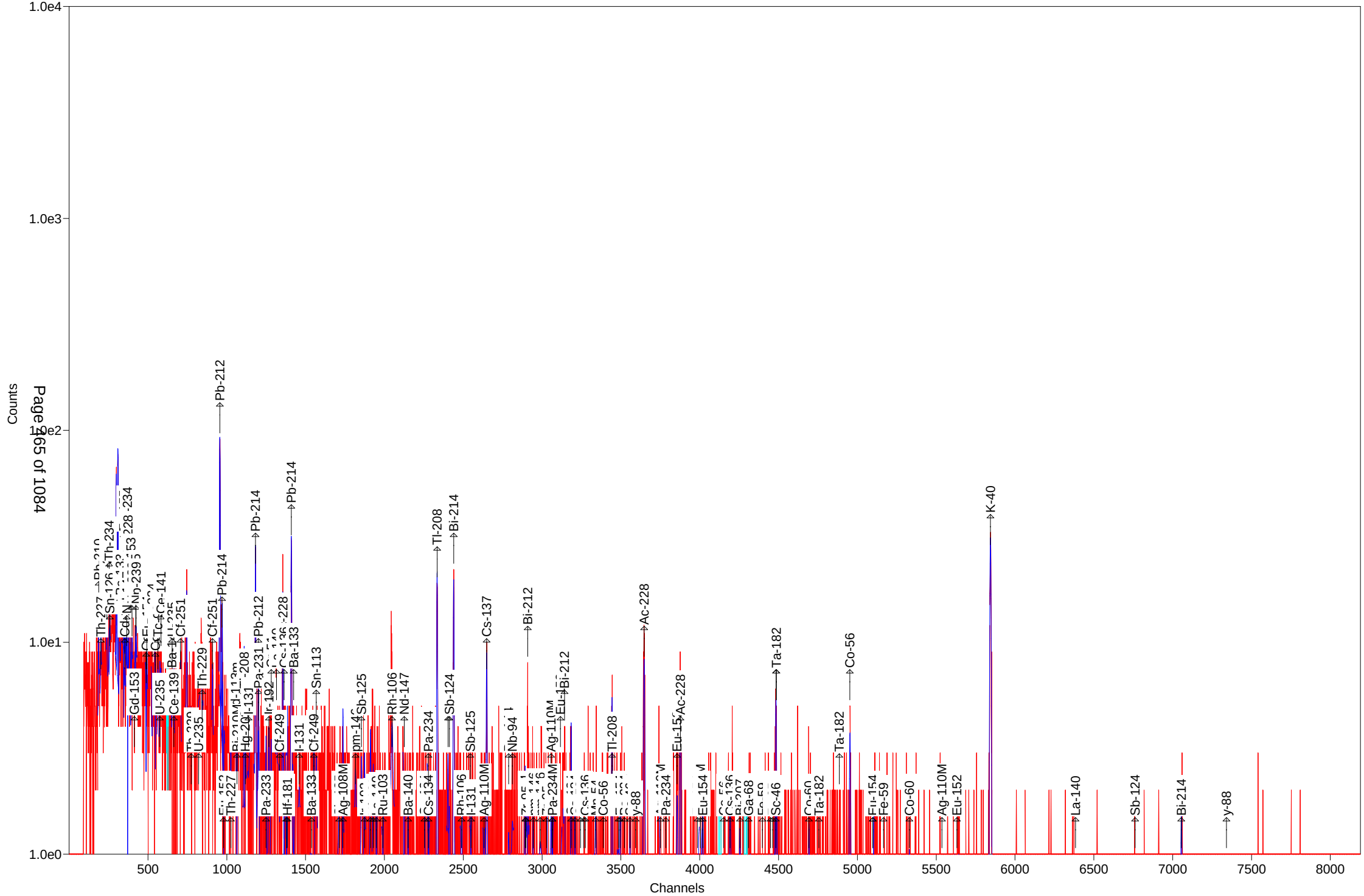
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	5.0099E+00	5.0099E+00	9.635E+01%	1.63E+01
NA-22	#A	-1.7446E+00	-1.7446E+00	5.657E+01%	3.22E+00
K-40		2.6151E+02	2.6151E+02	6.604E+00%	1.60E+01
Sc-46	#A	5.4693E-01	5.4693E-01	1.057E+02%	1.98E+00
CR-51	#A	2.9232E+00	2.9232E+00	1.255E+02%	1.25E+01
MN-54	#A	3.8548E-01	3.8548E-01	1.856E+02%	1.72E+00
FE-59	#A	-1.3649E+00	-1.3649E+00	1.266E+02%	3.94E+00
Co-56	#A	1.5194E+00	1.5194E+00	3.427E+01%	1.58E+00
CO-57	#A	-3.8000E-01	-3.8000E-01	1.105E+02%	1.40E+00
CO-58	#A	-6.6724E-02	-6.6725E-02	7.681E+02%	1.86E+00
CO-60	#	7.8663E-01	7.8663E-01	3.640E+01%	7.43E-01
ZN-65	#A	-2.5096E+00	-2.5096E+00	1.026E+02%	8.67E+00
NB-94	#A	9.3503E-02	9.3503E-02	7.283E+02%	1.71E+00
ZR-95	#A	-1.3802E+00	-1.3802E+00	1.101E+02%	3.66E+00
NB-95	#A	-3.6982E-01	-3.6982E-01	1.640E+02%	2.11E+00
RU-103	#A	-3.9921E-01	-3.9921E-01	1.530E+02%	1.49E+00
RH-106	#A	-7.4347E+00	-7.4347E+00	1.768E+02%	4.43E+01
AG-108M	#A	8.7008E-01	8.7008E-01	4.916E+01%	1.02E+00
AG-110M	#A	4.3299E-01	4.3299E-01	1.593E+02%	3.79E+00
SN-113	#A	3.3460E-01	3.3460E-01	2.096E+02%	2.42E+00
SB-124	#A	7.3377E-01	7.3377E-01	1.049E+02%	3.90E+00
SB-125	#A	1.8300E+00	1.8300E+00	1.236E+02%	3.84E+00
I-131	#A	7.9850E-02	7.9852E-02	5.978E+02%	1.30E+00

Gd-153 #A	-1.1567E+00	-1.1567E+00	1.125E+02%	4.35E+00
Ga-68 #A	-2.9663E+00	-2.9784E+00	1.104E+03%	7.75E+01
Tc-99m #A	2.4633E-01	2.4652E-01	1.541E+02%	1.28E+00
BA-133 #A	-7.9067E-01	-7.9067E-01	1.617E+02%	4.30E+00
CS-134 #A	1.1357E+00	1.1357E+00	4.032E+01%	3.97E+00
CS-137	3.1889E+00	3.1889E+00	2.158E+01%	1.38E+00
CE-139 #A	3.4953E-01	3.4953E-01	1.082E+02%	1.27E+00
Ba-140 #A	1.3793E+00	1.3793E+00	1.029E+02%	3.69E+00
La-140 #A	-8.0020E-02	-8.0021E-02	2.249E+02%	2.28E+00
CE-141 #A	2.2625E-01	2.2625E-01	3.505E+02%	2.69E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.21E+01
PM-144 #A	1.5359E-01	1.5359E-01	3.736E+02%	1.46E+00
EU-152 #A	6.2137E-01	6.2137E-01	9.174E+01%	8.06E+00
EU-154 #A	9.0469E-01	9.0469E-01	9.825E+01%	2.31E+01
EU-155 #A	1.0732E+00	1.0732E+00	2.023E+02%	7.29E+00
HF-181 #A	6.9349E-01	6.9350E-01	1.283E+02%	2.31E+00
Ta-182 #A	2.9908E+00	2.9908E+00	8.813E+01%	8.88E+00
Hg-203 #A	3.3492E-01	3.3492E-01	1.456E+02%	1.66E+00
TL-208	7.5333E+00	7.5333E+00	9.695E+00%	7.57E-01
pm-146 #A	5.4973E-01	5.4973E-01	9.372E+01%	4.83E+00
y-88 #A	2.5161E-01	2.5161E-01	3.974E+01%	1.76E+00
Cd-113m#A	6.0488E+03	6.0488E+03	9.742E+01%	1.98E+04
Cd-109 #A	9.1910E+00	9.1910E+00	1.657E+02%	5.09E+01
Cf-251 #A	1.7854E+00	1.7854E+00	1.049E+02%	5.06E+00
Cf-249 #A	5.9916E-01	5.9916E-01	1.012E+02%	2.06E+00
Sn-126 A	4.2197E+00	4.2197E+00	1.047E+02%	1.48E+01
PB-210 #A	1.4712E+01	1.4712E+01	9.404E+01%	3.97E+01
PB-212	2.0070E+01	2.0070E+01	6.183E+00%	2.30E+00
PB-214	1.5482E+01	1.5482E+01	9.655E+00%	2.98E+00
BI-207 #A	2.9034E-01	2.9034E-01	1.477E+02%	2.19E+00
BI-212 A	4.7870E+00	4.7870E+00	1.775E+02%	2.94E+01
BI-214	1.2344E+01	1.2344E+01	1.156E+01%	2.24E+00
BI-210M#A	-5.8228E-01	-5.8228E-01	1.380E+02%	2.73E+00
AC-228	1.9523E+01	1.9523E+01	1.040E+01%	3.05E+00
TH-227 #A	6.0528E+00	6.0528E+00	1.091E+02%	1.88E+01
TH-229 #A	-1.3732E+00	-1.3732E+00	5.657E+02%	2.15E+01
TH-234 #A	3.1702E+00	3.1702E+00	3.942E+02%	3.62E+01
PA-231 #A	4.9721E+00	4.9721E+00	2.084E+02%	6.73E+01
PA-233 #A	8.5773E-01	8.5773E-01	1.702E+02%	4.96E+00
PA-234 #A	7.0037E-02	7.0037E-02	1.654E+02%	7.26E+00
PA-234M#A	-9.7850E+01	-9.7850E+01	9.462E+01%	4.08E+02
U-235 #A	2.1726E+00	2.1726E+00	1.452E+02%	1.06E+01
AM-241 #A	9.1911E-01	9.1911E-01	1.396E+02%	3.67E+00
Np-237 #A	-2.2100E+00	-2.2100E+00	2.105E+02%	1.56E+01
Ir-192 #A	5.2674E-01	5.2674E-01	7.844E+01%	1.33E+00
Cs-136 #A	5.3166E-01	5.3166E-01	7.616E+01%	1.35E+00
Np-239 #A	1.1380E+00	1.1380E+00	1.719E+02%	6.56E+00
Nd-147 #A	-5.0162E+00	-5.0163E+00	1.080E+02%	1.35E+01

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  2000.8 keV)     3.396E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 3.3964658E+02  Bq/Sample
```

265170_Gamma_160-18567-A-3-B. 5_Gamma_20161727.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161469

Sample Description: 265170_Gamma_160-18567-A-4-B
Detector: Detector # 8
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-4-B

Decay to Time: 9/7/2016 16:30 Live Time: 1800 sec
Acquisition Time: 9/7/2016 16:30:43 Real Time: 1849 sec
Analysis Time: 9/7/2016 17:01 Dead Time: 2.64 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev11.lib
Bkgd Correction File: 8_2016-09-04_0932.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	4.106E+00	90.0	3.695E+00	3.701E+00	1.245E+01
NA-22	-5.073E-01	110.5	5.607E-01	5.613E-01	1.941E+00
K-40	2.388E+02	6.0	1.437E+01	1.886E+01	9.343E+00
Sc-46	4.680E-01	91.4	4.277E-01	4.284E-01	3.000E+00
CR-51	-4.739E+00	175.2	8.305E+00	8.309E+00	2.782E+01
MN-54	-1.861E-02	3079.0	5.729E-01	5.729E-01	1.408E+00
FE-59	2.211E-01	94.2	2.083E-01	2.086E-01	3.245E+00
Co-56	6.094E-01	89.6	5.461E-01	5.470E-01	1.166E+00
CO-57	0.000E+00	1.#INF	2.029E-01	2.029E-01	1.168E+00
CO-58	5.123E-01	87.7	4.493E-01	4.501E-01	1.522E+00
CO-60	2.725E-01	249.6	6.802E-01	6.804E-01	1.714E+00
ZN-65	-1.705E+00	110.0	1.874E+00	1.876E+00	6.344E+00
NB-94	3.216E-01	124.9	4.017E-01	4.020E-01	1.451E+00
ZR-95	1.611E+00	45.5	7.331E-01	7.378E-01	1.641E+00
NB-95	7.298E-01	82.0	5.985E-01	5.997E-01	2.006E+00
RU-103	3.063E-01	151.0	4.626E-01	4.628E-01	1.134E+00
RH-106	3.788E+00	256.5	9.717E+00	9.719E+00	3.293E+01
AG-108M	3.440E-01	91.4	3.145E-01	3.150E-01	1.146E+00
AG-110M	-3.436E-01	342.1	1.175E+00	1.175E+00	4.052E+00
SN-113	-7.245E-01	91.5	6.632E-01	6.642E-01	2.501E+00
SB-124	9.012E-01	81.5	7.343E-01	7.358E-01	3.104E+00
SB-125	1.420E+00	93.4	1.325E+00	1.327E+00	3.802E+00
I-131	6.705E-01	106.0	7.109E-01	7.117E-01	1.212E+00
Gd-153	7.003E-01	312.2	2.186E+00	2.186E+00	7.301E+00
Ga-68	-1.726E+01	161.5	2.788E+01	2.790E+01	6.414E+01
Tc-99m	-4.250E-01	149.3	6.347E-01	6.351E-01	2.117E+00
BA-133	-3.875E-01	264.6	1.025E+00	1.026E+00	3.472E+00
CS-134	4.786E-01	92.3	4.416E-01	4.423E-01	3.198E+00
CS-137	3.569E+00	17.6	6.265E-01	6.534E-01	1.207E+00
CE-139	-4.934E-01	95.4	4.708E-01	4.731E-01	1.570E+00
Ba-140	1.327E+00	145.7	1.934E+00	1.935E+00	4.547E+00
La-140	1.088E-01	177.7	1.933E-01	1.934E-01	2.239E+00
CE-141	7.156E-01	59.4	4.249E-01	4.265E-01	1.396E+00

CE-144	-3.126E+00	156.9	4.904E+00	4.907E+00	1.636E+01
PM-144	1.988E-01	250.3	4.977E-01	4.978E-01	1.429E+00
EU-152	5.310E-01	118.9	6.314E-01	6.320E-01	8.933E+00
EU-154	1.705E+00	65.8	1.122E+00	1.126E+00	1.421E+01
EU-155	0.000E+00	1.#INF	1.029E+00	1.029E+00	1.027E+01
HF-181	5.592E-01	110.6	6.185E-01	6.192E-01	1.810E+00
Ta-182	2.731E+00	76.4	2.088E+00	2.093E+00	7.074E+00
Hg-203	-5.064E-01	105.4	5.336E-01	5.344E-01	1.790E+00
TL-208	7.154E+00	10.5	7.507E-01	8.374E-01	1.153E+00
pm-146	-4.007E-01	75.3	3.018E-01	3.025E-01	5.166E+00
y-88	-1.676E-01	291.5	4.885E-01	4.886E-01	1.607E+00
Cd-113m	3.465E+03	141.4	4.900E+03	4.906E+03	1.671E+04
Cd-109	0.000E+00	1.#INF	1.797E+01	1.797E+01	6.022E+01
Cf-251	1.967E+00	95.2	1.872E+00	1.881E+00	4.795E+00
Cf-249	4.783E-01	168.2	8.042E-01	8.046E-01	2.252E+00
Sn-126	4.682E+00	115.2	5.394E+00	5.400E+00	1.801E+01
PB-210	1.371E+01	112.0	1.535E+01	1.537E+01	5.137E+01
PB-212	1.859E+01	5.8	1.070E+00	1.610E+00	1.847E+00
PB-214	1.291E+01	8.0	1.032E+00	1.231E+00	2.067E+00
BI-207	5.055E-01	87.7	4.433E-01	4.440E-01	1.493E+00
BI-212	-4.720E-01	1697.8	8.014E+00	8.014E+00	2.813E+01
BI-214	1.186E+01	9.7	1.152E+00	1.306E+00	1.528E+00
BI-210M	-9.209E-01	85.2	7.845E-01	7.864E-01	2.618E+00
AC-228	1.867E+01	10.3	1.931E+00	2.153E+00	1.527E+00
TH-227	5.971E+00	73.8	4.405E+00	4.417E+00	2.496E+01
TH-229	4.431E+00	102.9	4.558E+00	4.572E+00	2.085E+01
TH-234	1.380E+01	34.3	4.737E+00	4.792E+00	2.842E+01
PA-231	-8.439E+00	316.0	2.667E+01	2.667E+01	8.973E+01
PA-233	0.000E+00	1.#INF	5.653E-01	5.653E-01	7.281E+00
PA-234	-3.447E-01	140.9	4.857E-01	4.861E-01	1.034E+01
PA-234M	-4.583E-01	13605.5	6.235E+01	6.235E+01	2.262E+02
U-235	6.426E-01	86.4	5.554E-01	5.563E-01	1.718E+01
AM-241	-1.738E-01	880.9	1.531E+00	1.531E+00	5.197E+00
Np-237	0.000E+00	1.#INF	5.569E+00	5.569E+00	1.855E+01
Ir-192	4.756E-01	176.7	8.405E-01	8.410E-01	2.821E+00
Cs-136	4.684E-01	67.9	3.181E-01	3.192E-01	1.777E+00
Np-239	1.595E+00	171.2	2.731E+00	2.733E+00	9.101E+00
Nd-147	-3.342E+00	122.2	4.084E+00	4.089E+00	9.844E+00
Total	3.851E+03				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-4-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161469.An1

Acquisition information
Start time: 9/7/2016 4:30:43 PM
Live time: 1800
Real time: 1849
Dead time: 2.64 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/7/2016 4:30:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-09-04_0932.PBC 9/4/2016 9:32:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 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
46.30	21.	112.01	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
50.14	22.	109.22	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
59.56	-3.	880.87	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.31	36.	50.95	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
64.31	26.	115.21	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
74.72	194.	10.86	1.03	3.614E-02				
77.09	306.	7.99	1.04	3.699E-02				
86.95	8.	255.25	1.04	3.969E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.813E-01	EU155
					86.94	9.040	1.292E+00	Sn126
87.58	75.	26.96	1.04	3.982E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	2.736E+01	Cd109
91.10	20.	241.62	1.05	4.048E-02	91.10	28.300	PBC<MDA	Nd147
92.61	47.	46.00	1.05	4.072E-02	92.59	5.584	PBC<MDA	TH234
93.37	28.	169.76	1.05	4.083E-02	93.35	5.561	PBC<MDA	AC228
97.50	16.	312.17	1.05	4.133E-02	97.50	30.000	PBC<MDA	Gd153
106.13	27.	171.19	1.06	4.187E-02	106.13	22.700	PBC<MDA	Np239
121.78	18.	118.89	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.818E-01	CO57
128.73	82.	25.64	0.85	4.088E-02				
145.38	24.	59.38	1.09	3.874E-02	145.44	48.200	PBC<MDA	CE141
162.66	6.	311.46	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
163.38	16.	123.42	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
176.60	21.	95.18	1.11	3.460E-02	176.60	17.000	PBC<MDA	Cf251
185.96	100.	25.61	0.95	3.326E-02				
210.85	21.	102.88	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	17.	100.78	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.66	381.	6.68	1.09	2.744E-02	238.63	43.300	1.784E+01	PB212
242.04	47.	28.54	1.16	2.714E-02	242.00	7.430	1.285E+01	PB214
256.24	16.	99.21	1.17	2.596E-02	256.24	7.000	PBC<MDA	TH227
263.70	10.	141.42	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
276.93	60.	24.92	0.81	2.440E-02	277.28	6.310	2.183E+01	TL208
284.30	3.	556.78	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.27	116.	15.88	0.89	2.323E-02	295.09	19.300	1.443E+01	PB214
300.17	45.	21.85	1.20	2.294E-02	300.03	3.280	3.328E+01	PB212
					300.07	2.460	4.438E+01	PA231
					300.18	6.200	1.761E+01	PA233
316.49	16.	176.73	1.22	2.199E-02	316.49	87.040	PBC<MDA	Ir192
328.76	14.	177.69	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	15.	168.15	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.36	96.	17.61	0.78	2.085E-02	338.32	12.010	2.122E+01	AC228
340.57	15.	171.42	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
345.83	7.	182.47	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
351.82	177.	10.07	0.78	2.021E-02	351.93	37.600	1.293E+01	PB214
364.48	9.	156.01	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	6.	232.03	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
463.37	13.	93.36	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
477.60	12.	89.99	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	10.	125.05	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
497.05	8.	151.02	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	60.	38.67	2.61	1.494E-02	511.86	20.000	1.116E+01	RH106
537.26	8.	145.73	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
569.70	12.	87.69	1.40	1.368E-02	569.32	15.380	3.211E+00	CS134
					569.47	8.200	6.023E+00	PA234
					569.70	97.740	5.055E-01	BI207
583.22	146.	10.49	0.85	1.342E-02	583.02	84.500	7.151E+00	TL208
600.50	10.	210.02	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	221.14	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
604.71	10.	219.04	1.42	1.303E-02	604.71	97.620	PBC<MDA	CS134
609.37	127.	9.71	1.44	1.294E-02	609.31	46.090	1.186E+01	BI214
					610.30	5.750	9.519E+01	RU103
614.28	10.	226.20	1.43	1.286E-02	614.28	89.850	PBC<MDA	AG108M
618.06	4.	628.73	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
621.92	9.	256.54	1.43	1.273E-02	621.92	9.930	PBC<MDA	RH106
636.97	7.	106.02	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
661.49	66.	17.56	1.80	1.209E-02	661.66	85.210	3.569E+00	CS137
696.54	5.	250.32	1.48	1.158E-02	696.54	99.000	PBC<MDA	PM144
702.63	9.	136.34	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
722.79	12.	81.48	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.339E-01	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	2.849E+00	EU154
722.94	12.	91.41	1.50	1.123E-02	722.79	10.810	5.327E+00	SB124
					722.94	90.840	6.340E-01	AG108M
					723.36	20.220	2.850E+00	EU154
723.36	11.	110.32	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.745E-01	AG108M
					723.36	20.220	2.582E+00	EU154
735.72	9.	103.51	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
756.73	17.	45.51	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
765.79	14.	82.02	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.87	8.	92.26	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
810.78	9.	87.71	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
815.77	2.	538.87	1.56	1.015E-02	815.77	23.280	PBC<MDA	La140
846.77	4.	196.82	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
861.68	16.	48.86	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
871.10	3.	209.28	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
911.06	85.	10.85	1.59	9.247E-03	911.07	29.000	1.761E+01	AC228
946.02	4.	230.56	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
969.07	54.	16.67	0.79	8.773E-03	968.97	17.460	1.946E+01	AC228
996.33	8.	86.40	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1037.84	6.	94.27	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	10.	67.90	1.70	8.209E-03	1048.07	80.000	PBC<MDA	Cs136
1120.22	12.	102.97	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	12.	91.38	1.74	7.752E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.673E-01	Sc46
					1121.30	34.900	2.486E+00	Ta182
1121.42	12.	84.56	1.74	7.748E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.487E+00	Ta182
1189.05	7.	127.38	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	6.	156.94	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	6.	94.22	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	249.60	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	15.	26.18	1.90	6.366E-03	1408.00	21.005	6.183E+00	EU152
1460.86	283.	6.02	1.70	6.165E-03	1460.83	10.670	2.388E+02	K40
1764.80	23.	27.94	2.07	5.226E-03	1764.49	15.400	1.554E+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
298.69	74.73	124.	194.	5.359E+03	10.86	1.034	- sD
308.19	77.11	145.	306.	8.262E+03	7.99	1.036	- D
514.73	128.73	90.	82.	2.006E+03	25.64	0.853	- s
743.69	185.96	115.	100.	3.007E+03	25.61	0.948	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	267.	21.	0.012	112.01	1.012s
TH-227	200.37	50.14	286.	22.	0.012	109.22	1.015s
AM-241	237.95	59.54	407.	-3.	-0.002	880.87	1.022s
TH-234	252.96	63.29	153.	36.	0.020	50.95	1.025D
Sn-126	256.93	64.28	426.	26.	0.014	115.21	1.026s
BA-133	323.77	80.99	1130.	-32.	-0.018	57.44	1.039s
Np-237	345.77	86.49	1338.	0.	0.000	183.54	1.043A
EU-155	345.98	86.54	1269.	-28.	-0.016	178.80	1.043s
Sn-126	347.57	86.94	1172.	8.	0.005	255.25	1.044D
Sn-126	350.09	87.57	1149.	75.	0.041	26.96	1.044D
Nd-147	364.21	91.10	1178.	20.	0.011	241.62	1.047s
TH-234	370.17	92.59	210.	47.	0.026	46.00	1.048D
AC-228	373.21	93.35	1154.	28.	0.016	169.76	1.049s
Gd-153	389.81	97.50	1182.	16.	0.009	312.17	1.052s
Np-239	397.81	99.50	1198.	0.	0.000	1000.00	1.053s
Gd-153	412.62	103.20	1198.	0.	0.000	1000.00	1.056s
Np-239	414.62	103.70	1198.	0.	0.000	1000.00	1.057s
EU-155	421.07	105.31	1198.	0.	0.000	1000.00	1.058s
Np-239	424.34	106.13	1078.	27.	0.015	171.19	1.058s
EU-152	486.92	121.78	220.	18.	0.010	118.89	1.071s
CO-57	488.06	122.06	238.	0.	0.000	1000.00	1.071
EU-154	492.22	123.10	225.	-25.	-0.014	86.28	1.072
PA-234	525.00	131.29	818.	-25.	-0.014	162.11	1.078s
HF-181	531.92	133.02	793.	-25.	-0.014	159.44	1.079s
CE-144	533.98	133.54	768.	-25.	-0.014	156.87	1.080s
HF-181	545.02	136.30	742.	-25.	-0.014	154.02	1.082s
CO-57	545.72	136.47	717.	-7.	-0.004	534.85	1.082s
Tc-99m	561.86	140.51	748.	-26.	-0.015	149.33	1.085
U-235	574.97	143.79	771.	-11.	-0.006	121.03	1.087s
CE-141	581.59	145.44	90.	24.	0.013	59.38	1.089D
Ba-140	650.47	162.66	187.	6.	0.003	311.46	1.102s
U-235	653.35	163.38	197.	16.	0.009	123.42	1.102
CE-139	663.24	165.85	289.	-26.	-0.014	95.41	1.104s
Cf-251	706.23	176.60	106.	21.	0.012	95.18	1.112s
TH-229	773.87	193.51	118.	-4.	-0.002	536.47	1.125s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	821.17	205.33	110.	-10.	-0.005	213.99	1.134
TH-229	843.24	210.85	120.	21.	0.012	102.88	1.138s
Cf-251	907.84	227.00	76.	17.	0.010	100.78	1.151
PB-212	954.37	238.63	62.	398.	0.221	5.75	1.159D
PB-214	967.84	242.00	65.	47.	0.026	28.54	1.162D
EU-152	978.62	244.69	682.	-22.	-0.012	170.89	1.164s
TH-227	1024.81	256.24	64.	16.	0.009	99.21	1.172
Cd-113m	1054.65	263.70	86.	10.	0.005	141.42	1.178s
BI-210M	1063.18	265.83	148.	-21.	-0.012	85.19	1.179
TL-208	1107.57	276.93	34.	60.	0.034	24.92	0.813s
Hg-203	1116.66	279.20	171.	-18.	-0.010	105.37	1.189s
I-131	1137.05	284.30	72.	3.	0.002	556.78	1.193s
PB-214	1180.22	295.09	31.	104.	0.058	12.42	1.201D
PB-212	1199.98	300.03	26.	45.	0.025	21.85	1.205D
PA-231	1200.14	300.07	527.	-18.	-0.010	184.15	1.205s
PA-233	1200.58	300.18	509.	-18.	-0.010	181.04	1.205
PA-231	1210.46	302.65	491.	-10.	-0.006	316.04	1.207s
BA-133	1211.27	302.85	481.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	481.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	481.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	481.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	481.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	411.	16.	0.009	176.73	1.217s
CR-51	1280.20	320.08	515.	-18.	-0.010	175.24	1.219s
La-140	1314.91	328.76	289.	14.	0.008	177.69	1.226s
Cf-249	1333.63	333.44	302.	15.	0.008	168.15	1.229s
AC-228	1353.29	338.36	40.	96.	0.053	17.61	0.785s
Cs-136	1362.15	340.57	317.	15.	0.008	171.42	1.234s
HF-181	1383.19	345.83	42.	7.	0.004	182.47	1.238s
PB-214	1407.17	351.82	30.	177.	0.098	10.07	0.783s
BA-133	1423.87	356.00	259.	-9.	-0.005	264.63	1.245s
I-131	1457.81	364.48	48.	9.	0.005	156.01	1.252s
BA-133	1535.24	383.84	97.	6.	0.003	232.03	1.266s
Cf-249	1551.68	387.95	103.	0.	0.000	1000.00	1.269
SN-113	1566.64	391.69	119.	-15.	-0.009	91.53	1.271s
AG-108M	1735.64	433.94	39.	-2.	-0.001	647.52	1.301s
pm-146	1815.41	453.88	57.	-11.	-0.006	129.72	1.315s
SB-125	1853.36	463.37	64.	13.	0.007	93.36	1.322s
Ir-192	1872.14	468.06	118.	-17.	-0.010	92.31	1.325s
BE-7	1910.28	477.60	55.	12.	0.007	89.99	1.332s
HF-181	1927.89	482.00	68.	10.	0.005	125.05	1.335s
La-140	1947.98	487.02	119.	-14.	-0.008	113.54	1.339s
RU-103	1988.12	497.05	30.	8.	0.004	151.02	1.346s
RH-106	2047.36	511.86	70.	60.	0.033	38.67	2.606s
Nd-147	2123.91	531.00	43.	-11.	-0.006	122.23	1.369s
Ba-140	2148.95	537.26	31.	8.	0.004	145.73	1.373s
CS-134	2277.20	569.32	43.	-9.	-0.005	104.98	1.395s
PA-234	2277.80	569.47	59.	-4.	-0.002	264.91	1.395s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	2278.73	569.70	51.	12.	0.007	87.69	1.396s
TL-208	2332.81	583.22	20.	146.	0.081	10.49	0.846s
SB-125	2401.92	600.50	209.	10.	0.005	210.02	1.416s
SB-124	2410.85	602.73	219.	10.	0.005	221.14	1.418s
CS-134	2418.76	604.71	229.	10.	0.005	219.04	1.419s
BI-214	2437.41	609.37	9.	127.	0.071	9.71	1.436
RU-103	2441.12	610.30	239.	10.	0.005	223.04	1.423s
AG-108M	2457.05	614.28	246.	10.	0.006	226.20	1.426s
PM-144	2472.18	618.06	256.	4.	0.002	628.73	1.428
RH-106	2487.60	621.92	240.	9.	0.005	256.54	1.431s
SB-125	2543.49	635.89	58.	-14.	-0.008	79.85	1.440s
I-131	2547.83	636.97	25.	7.	0.004	106.02	1.441s
AG-110M	2630.98	657.76	136.	-16.	-0.009	106.04	1.455s
CS-137	2645.91	661.49	18.	66.	0.037	17.56	1.797s
PM-144	2786.11	696.54	33.	5.	0.003	250.32	1.480s
NB-94	2810.46	702.63	33.	9.	0.005	136.34	1.484s
SB-124	2891.09	722.79	39.	12.	0.006	81.48	1.497
AG-108M	2891.70	722.94	51.	12.	0.006	91.41	1.498s
EU-154	2893.37	723.36	62.	11.	0.006	110.32	1.498s
ZR-95	2896.74	724.20	88.	-14.	-0.008	99.69	1.498s
pm-146	2942.83	735.72	19.	9.	0.005	103.51	1.506s
pm-146	2988.59	747.16	47.	-14.	-0.008	109.43	1.513s
ZR-95	3026.87	756.73	10.	17.	0.009	45.51	1.519s
AG-110M	3055.73	763.94	64.	-18.	-0.010	65.91	1.524s
NB-95	3063.11	765.79	59.	14.	0.008	82.02	1.525s
EU-152	3115.64	778.92	42.	-12.	-0.007	118.15	1.534s
BI-212	3141.64	785.42	37.	-9.	-0.005	113.76	1.538s
CS-134	3183.43	795.87	26.	8.	0.005	92.26	1.544s
CS-134	3207.77	801.95	62.	-13.	-0.007	88.50	1.548s
CO-58	3243.06	810.78	29.	9.	0.005	87.71	1.554s
La-140	3263.04	815.77	38.	2.	0.001	538.87	1.557s
Co-56	3387.05	846.77	15.	4.	0.002	196.82	1.577s
TL-208	3442.23	860.56	9.	16.	0.009	48.86	1.585s
NB-94	3484.36	871.10	23.	3.	0.002	209.28	1.592s
EU-154	3492.89	873.23	35.	-6.	-0.003	139.19	1.593s
PA-234	3522.10	880.53	75.	-15.	-0.008	87.15	1.598
PA-234	3532.94	883.24	89.	-15.	-0.008	94.54	1.599
AG-110M	3538.71	884.68	104.	-4.	-0.002	342.06	1.600s
y-88	3592.14	898.04	24.	-3.	-0.001	291.46	1.608s
AC-228	3644.24	911.06	0.	85.	0.047	10.85	1.589s
AG-110M	3749.96	937.49	30.	-6.	-0.003	204.80	1.633s
PA-234	3784.07	946.02	15.	4.	0.002	230.56	1.638s
EU-152	3856.43	964.11	132.	-15.	-0.008	109.98	1.649s
AC-228	3877.27	969.32	0.	65.	0.036	12.40	0.800s
EU-154	3985.31	996.33	21.	8.	0.005	86.40	1.668s
EU-154	4019.10	1004.77	18.	-5.	-0.003	198.58	1.673s
Co-56	4151.36	1037.84	5.	6.	0.003	94.27	1.693s
Cs-136	4192.29	1048.07	19.	10.	0.006	67.90	1.698s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	4254.65	1063.66	50.	-19.	-0.010	85.96	1.708s
Ga-68	4309.61	1077.40	25.	-7.	-0.004	161.52	1.716s
FE-59	4397.02	1099.25	25.	-4.	-0.002	279.32	1.728s
EU-152	4448.32	1112.07	82.	-10.	-0.006	126.38	1.736s
ZN-65	4462.20	1115.55	82.	-12.	-0.007	109.97	1.738s
BI-214	4481.17	1120.29	68.	12.	0.007	102.97	1.740s
Sc-46	4482.22	1120.55	55.	12.	0.007	91.38	1.740s
Ta-182	4485.22	1121.30	46.	12.	0.007	84.56	1.741
CO-60	4692.97	1173.24	34.	-12.	-0.007	105.50	1.770s
Ta-182	4756.23	1189.05	15.	7.	0.004	127.38	1.779
Ta-182	4885.67	1221.41	37.	-14.	-0.008	100.43	1.797
Co-56	4953.16	1238.28	16.	6.	0.003	156.94	1.806s
NA-22	5098.16	1274.53	21.	-6.	-0.004	110.53	1.826s
EU-154	5098.22	1274.54	28.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	6.	6.	0.003	94.22	1.835s
CO-60	5330.06	1332.50	15.	3.	0.002	249.60	1.857s
AG-110M	5537.25	1384.30	16.	-8.	-0.004	119.02	1.884
EU-152	5632.07	1408.00	0.	15.	0.008	26.18	1.896s
K-40	5843.52	1460.86	3.	283.	0.157	6.02	1.704
La-140	6384.93	1596.21	17.	-3.	-0.002	561.56	1.990s
SB-124	6764.03	1690.98	6.	-1.	0.000	846.32	2.034s
BI-214	7058.07	1764.49	8.	23.	0.013	27.94	2.067s
Co-56	7085.51	1771.35	33.	-1.	-0.001	704.21	2.070s

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	4.1063E+00				5.31E+01	
			477.60	4.106E+00	?(	1.245E+01 9.00E+01 1.05E+01	G
NA-22	C	-5.0734E-01				9.50E+02	
			1274.53	-5.073E-01	?(	1.941E+00 1.11E+02 9.99E+01	G
K-40	N	2.3883E+02				4.66E+11	
			1460.83	2.388E+02	(P	9.343E+00 6.02E+00 1.07E+01	G
Sc-46	F	4.6802E-01				8.38E+01	
			889.28	6.868E-02	%(	3.000E+00 1.26E+03 1.00E+02	G
			1120.55	8.673E-01	?(	2.673E+00 9.14E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-4.7393E+00					2.77E+01	
			320.08	-4.739E+00	&(	2.782E+01	1.75E+02	9.94E+00 G
MN-54	C	-1.8607E-02					3.12E+02	
			834.85	-1.861E-02	%(	1.408E+00	3.08E+03	1.00E+02 G
FE-59	F	2.2111E-01					4.45E+01	
			1099.25	-4.991E-01	?(	3.245E+00	2.79E+02	5.65E+01 G
			1291.60	1.163E+00	?(P	2.559E+00	9.42E+01	4.32E+01 G
Co-56	C	6.0944E-01					7.73E+01	
			846.77	2.383E-01	?(P	1.166E+00	1.97E+02	9.99E+01 G
			1238.28	7.091E-01	&(	2.523E+00	1.57E+02	6.61E+01 G
			1037.84	2.768E+00	?(P	6.264E+00	9.43E+01	1.41E+01 G
			1771.35	-8.040E-01	+	2.036E+01	7.04E+02	1.55E+01 A
CO-58	C	5.1229E-01					7.09E+01	
			810.78	5.123E-01	?(	1.522E+00	8.77E+01	9.95E+01 G
CO-60	F	2.7253E-01					1.93E+03	
			1332.50	2.725E-01	?(P	1.714E+00	2.50E+02	1.00E+02 G
			1173.24	-8.824E-01	+ P	2.225E+00	1.06E+02	9.99E+01 G
ZN-65	F	-1.7045E+00					2.44E+02	
			1115.55	-1.705E+00	?(	6.344E+00	1.10E+02	5.06E+01 G
NB-94	I	3.2165E-01					7.41E+06	
			702.63	4.529E-01	?(P	1.451E+00	1.36E+02	9.79E+01 G
			871.10	1.930E-01	?(	1.442E+00	2.09E+02	9.99E+01 G
ZR-95	I	1.6109E+00					6.40E+01	
			756.73	1.611E+00	&(P	1.641E+00	4.55E+01	5.45E+01 G
			724.20	-1.547E+00	-	5.195E+00	9.97E+01	4.42E+01 G
NB-95	I	7.2976E-01					6.40E+01	
			765.79	7.298E-01	?(	2.006E+00	8.20E+01	9.98E+01 G
RU-103	I	3.0630E-01					3.93E+01	
			497.05	3.063E-01	?(	1.134E+00	1.51E+02	9.09E+01 G
			610.30	7.396E+00	?	5.582E+01	2.23E+02	5.75E+00 GA
RH-106	I	3.7879E+00					3.74E+02	
			621.92	3.788E+00	?(	3.293E+01	2.57E+02	9.93E+00 G
			1050.36	1.183E+00	%	1.222E+02	2.84E+03	1.56E+00 G
			511.86	1.116E+01	?	7.755E+00	3.87E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	3.4404E-01					1.53E+05	
			433.94	-7.882E-02	?(P	1.146E+00	6.48E+02	9.05E+01 G
			722.94	6.340E-01	?(	1.956E+00	9.14E+01	9.08E+01 G
			614.28	4.767E-01	?(	3.649E+00	2.26E+02	8.98E+01 G
AG-110M	F	-3.4357E-01					2.50E+02	
			884.68	-3.436E-01	?(	4.052E+00	3.42E+02	7.27E+01 G
			657.76	-7.728E-01	+	2.755E+00	1.06E+02	9.46E+01 G
			937.49	-1.075E+00	+	5.058E+00	2.05E+02	3.44E+01 G
			1384.30	-2.832E+00	+	7.559E+00	1.19E+02	2.43E+01 G
			763.94	-4.268E+00	+	9.298E+00	6.59E+01	2.23E+01 G
SN-113	F	-7.2452E-01					1.15E+02	
			391.69	-7.245E-01	?(P	2.501E+00	9.15E+01	6.40E+01 G
SB-124	F	9.0117E-01					6.02E+01	
			602.73	4.144E-01	&(P	3.104E+00	2.21E+02	9.83E+01 G
			1690.98	-1.429E-01	+	2.958E+00	8.46E+02	4.78E+01 G
			722.79	5.326E+00	?(	1.458E+01	8.15E+01	1.08E+01 G
SB-125	I	1.4198E+00					1.01E+03	
			427.88	-1.086E-01	%(	3.802E+00	1.36E+03	2.96E+01 G
			600.50	2.339E+00	?(	1.664E+01	2.10E+02	1.79E+01 G
			635.89	-5.635E+00	+	1.506E+01	7.99E+01	1.13E+01 G
			463.37	4.174E+00	&(P	1.313E+01	9.34E+01	1.05E+01 G
I-131	I	6.7053E-01					8.02E+00	
			364.48	3.084E-01	?(P	1.212E+00	1.56E+02	8.17E+01 G
			284.30	1.134E+00	?(	1.598E+01	5.57E+02	6.14E+00 G
			636.97	4.400E+00	&(	1.606E+01	1.06E+02	7.17E+00 G
Gd-153	F	7.0027E-01					2.42E+02	
			97.50	7.003E-01	?(	7.301E+00	3.12E+02	3.00E+01 G
			103.20	0.000E+00	-	1.001E+01	1.00E+03	2.18E+01 G
Ga-68	C	-1.7261E+01					4.71E-02	
			1077.40	-1.726E+01	?(	6.414E+01	1.62E+02	3.30E+00 G
Tc-99m	I	-4.2499E-01					2.51E-01	
			140.51	-4.250E-01	?(	2.117E+00	1.49E+02	8.93E+01 G
BA-133	F	-3.8750E-01					3.85E+03	
			356.00	-3.875E-01	?(	3.472E+00	2.65E+02	6.20E+01 G
			302.85	0.000E+00	+	1.397E+01	1.00E+03	1.83E+01 G
			383.84	2.009E+00	? P	1.601E+01	2.32E+02	8.94E+00 GA
			80.99	-1.384E+00	+ P	6.802E+00	5.74E+01	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	4.7863E-01					7.54E+02	
			604.71	4.312E-01	?(	3.198E+00	2.19E+02	9.76E+01 G
			795.87	5.328E-01	?(	1.673E+00	9.23E+01	8.55E+01 G
			569.32	-2.463E+00	+	8.810E+00	1.05E+02	1.54E+01 G
			801.95	-8.187E+00	+	2.437E+01	8.85E+01	8.69E+00 G
			563.24	1.606E-01	%	1.452E+01	3.61E+03	8.35E+00 G
CS-137	I	3.5686E+00					1.10E+04	
			661.66	3.569E+00	(P	1.207E+00	1.76E+01	8.52E+01 G
CE-139	F	-4.9344E-01					1.38E+02	
			165.85	-4.934E-01	?(	1.570E+00	9.54E+01	7.99E+01 G
Ba-140	I	1.3272E+00					1.28E+01	
			537.26	1.269E+00	?(P	4.547E+00	1.46E+02	2.44E+01 G
			162.66	1.555E+00	?(	1.650E+01	3.11E+02	6.22E+00 G
			304.85	0.000E+00	-	5.999E+01	1.00E+03	4.29E+00 G
La-140	I	1.0881E-01					1.28E+01	
			1596.21	-3.093E-01	?(P	2.239E+00	5.62E+02	9.54E+01 G
			487.02	-1.096E+00	+	4.198E+00	1.14E+02	4.55E+01 G
			328.76	1.756E+00	?(P	1.051E+01	1.78E+02	2.03E+01 G
			815.77	3.862E-01	?(	7.423E+00	5.39E+02	2.33E+01 G
CE-141	I	7.1557E-01					3.25E+01	
			145.44	7.156E-01	(	1.396E+00	5.94E+01	4.82E+01 G
CE-144	I	-3.1260E+00					2.85E+02	
			133.54	-3.126E+00	?(	1.636E+01	1.57E+02	1.11E+01 G
PM-144	C	1.9881E-01					3.63E+02	
			696.54	2.393E-01	*(P	1.429E+00	2.50E+02	9.90E+01 G
			618.06	1.584E-01	&(	3.389E+00	6.29E+02	9.91E+01 G
EU-152	F	5.3103E-01					4.94E+03	
			344.29	1.939E-01	%(	8.933E+00	1.36E+03	2.65E+01 G
			1112.07	-5.454E+00	+	2.343E+01	1.26E+02	1.36E+01 G
			121.78	8.436E-01	?(	3.366E+00	1.19E+02	2.86E+01 G
			778.92	-4.883E+00	&	1.339E+01	1.18E+02	1.29E+01 G
			964.11	-6.545E+00	+	2.423E+01	1.10E+02	1.46E+01 G
			244.69	-5.934E+00	&	3.389E+01	1.71E+02	7.58E+00 G
			1408.00	6.183E+00	? P	3.062E+00	2.62E+01	2.10E+01 GA
EU-154	I	1.7049E+00					3.14E+03	
			873.23	-2.600E+00	?(P	1.421E+01	1.39E+02	1.23E+01 G
			123.10	-8.317E-01	+	2.390E+00	8.63E+01	4.08E+01 G
			1274.54	0.000E+00	+	6.193E+00	1.00E+03	3.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			723.36	2.582E+00	?(	9.677E+00	1.10E+02	2.02E+01 G
			1004.77	-1.740E+00	+	8.109E+00	1.99E+02	1.80E+01 G
			996.33	5.015E+00	?(	1.472E+01	8.64E+01	1.06E+01 G
HF-181	F	5.5922E-01						4.24E+01
			482.00	4.249E-01	?(P	1.810E+00	1.25E+02	8.05E+01 G
			133.02	-7.992E-01	&	4.252E+00	1.59E+02	4.33E+01 G
			345.83	1.277E+00	?(	5.914E+00	1.82E+02	1.51E+01 G
			136.30	-5.988E+00	+	3.078E+01	1.54E+02	5.85E+00 G
Ta-182	F	2.7315E+00						1.14E+02
			1121.30	2.487E+00	(	7.074E+00	8.46E+01	3.49E+01 G
			1221.41	-4.097E+00	+	8.913E+00	1.00E+02	2.70E+01 G
			1189.05	3.258E+00	(	9.662E+00	1.27E+02	1.62E+01 G
Hg-203	F	-5.0644E-01						4.66E+01
			279.20	-5.064E-01	?(	1.790E+00	1.05E+02	8.15E+01 G
TL-208	N	7.1542E+00						6.98E+02
			583.02	7.151E+00	(P	1.153E+00	1.05E+01	8.45E+01 G
			277.28	2.183E+01	+	1.085E+01	2.49E+01	6.31E+00 G
			860.56	7.177E+00	&(P	7.846E+00	4.89E+01	1.24E+01 G
pm-146	C	-4.0074E-01						2.02E+03
			747.16	-2.044E+00	?(	5.166E+00	1.09E+02	3.40E+01 G
			735.72	2.082E+00	&(	5.096E+00	1.04E+02	2.25E+01 G
			453.88	-5.703E-01	& P	1.966E+00	1.30E+02	6.50E+01 G
y-88	F	-1.6760E-01						1.07E+02
			898.04	-1.676E-01	?(P	1.607E+00	2.91E+02	9.37E+01 G
			1836.06	-1.740E-02	% P	8.180E-01	4.03E+03	9.92E+01 G
Cd-113m		3.4651E+03						5.33E+03
			263.70	3.465E+03	?(	1.671E+04	1.41E+02	6.00E-03 K
Cf-251	T	1.9673E+00						3.28E+05
			176.60	1.967E+00	&(	4.795E+00	9.52E+01	1.70E+01 G
			227.00	5.390E+00	?	1.340E+01	1.01E+02	6.30E+00 GA
Cf-249	T	4.7828E-01						1.28E+05
			387.95	0.000E+00	?(	2.252E+00	1.00E+03	6.60E+01 G
			333.44	2.514E+00	*(	1.422E+01	1.68E+02	1.55E+01 G
Sn-126		4.6824E+00						3.65E+07
			87.57	2.772E+00	}	5.978E+00	2.70E+01	3.75E+01 GA
			64.28	4.682E+00	?(	1.801E+01	1.15E+02	9.70E+00 G
			86.94	1.292E+00	}	2.512E+01	2.55E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.3706E+01					8.14E+03	
			46.54	1.371E+01	?(P	5.137E+01	1.12E+02	4.25E+00 G
PB-212	N	1.8594E+01					6.98E+02	
			238.63	1.859E+01	(P	1.847E+00	5.75E+00	4.33E+01 G
			300.03	3.328E+01	+	1.953E+01	2.18E+01	3.28E+00 GA
PB-214	N	1.2914E+01					5.84E+05	
			351.93	1.293E+01	(P	2.067E+00	1.01E+01	3.76E+01 G
			295.09	1.287E+01	(P	3.554E+00	1.24E+01	1.93E+01 G
			242.00	1.285E+01		1.112E+01	2.85E+01	7.43E+00 GA
BI-207	C	5.0548E-01					1.18E+04	
			569.70	5.055E-01	?(	1.493E+00	8.77E+01	9.77E+01 G
			1063.66	-1.727E+00	+	3.281E+00	8.60E+01	7.45E+01 G
BI-212	N	-4.7199E-01					6.98E+02	
			727.17	-4.720E-01	%(	2.813E+01	1.70E+03	7.55E+00 G
			785.42	-3.921E+01	+ P	1.294E+02	1.14E+02	1.28E+00 GA
BI-214	N	1.1860E+01					5.84E+05	
			609.31	1.186E+01	(P	1.528E+00	9.71E+00	4.61E+01 G
			1120.29	5.585E+00	- P	1.946E+01	1.03E+02	1.51E+01 G
			1764.49	1.554E+01	+ P	1.125E+01	2.79E+01	1.54E+01 G
BI-210M	T	-9.2095E-01					1.10E+09	
			265.83	-9.209E-01	?(	2.618E+00	8.52E+01	5.00E+01 G
			304.90	0.000E+00	+	9.192E+00	1.00E+03	2.80E+01 G
AC-228	N	1.8667E+01					2.10E+03	
			911.07	1.761E+01	@(	1.527E+00	1.08E+01	2.90E+01 G
			968.97	2.357E+01	+	2.672E+00	1.24E+01	1.75E+01 G
			338.32	2.122E+01	*(	7.166E+00	1.76E+01	1.20E+01 G
			93.35	6.967E+00	-	3.940E+01	1.70E+02	5.56E+00 XA
TH-227	N	5.9713E+00					7.95E+03	
			50.14	6.835E+00	?(	2.496E+01	1.09E+02	8.00E+00 G
			256.24	4.984E+00	?(	1.223E+01	9.92E+01	7.00E+00 G
TH-229	N	4.4307E+00					2.68E+06	
			193.51	-1.482E+00	&(P	2.085E+01	5.36E+02	4.40E+00 G
			210.85	1.313E+01	&(P	3.311E+01	1.03E+02	2.99E+00 G
TH-234	N	1.3802E+01					1.63E+12	
			63.29	1.714E+01	(P	2.842E+01	5.09E+01	3.81E+00 G
			92.59	1.152E+01	(P	1.715E+01	4.60E+01	5.58E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-231   N  -8.4390E+00                                     1.20E+07
                         302.65-8.439E+00 ?(  8.973E+01 3.16E+02 2.88E+00 G
                         300.07-1.750E+01 +   1.080E+02 1.84E+02 2.46E+00 G

PA-234   N  -3.4468E-01                                     1.63E+12
                         131.29-1.911E+00 &(  1.034E+01 1.62E+02 1.80E+01 G
                         946.02 1.759E+00 ?(P 9.664E+00 2.31E+02 1.34E+01 G
                         569.47-2.063E+00 +   1.904E+01 2.65E+02 8.20E+00 G
                         883.24-8.968E+00 &   2.851E+01 9.45E+01 9.60E+00 G
                         880.53-1.430E+01 +   4.181E+01 8.72E+01 6.00E+00 GA

PA-234M  N  -4.5829E-01                                     1.63E+12
                        1001.00-4.583E-01 &(P 2.262E+02 1.36E+04 8.37E-01 G
                         766.41 5.023E+00 % P 6.714E+02 3.78E+03 2.94E-01 G

U-235    N   6.4257E-01                                     2.57E+11
                         143.79-1.386E+00 ?(P 1.718E+01 1.21E+02 1.10E+01 G
                         205.33-3.453E+00 + P 1.852E+01 2.14E+02 5.01E+00 G
                         163.38 5.018E+00  (P 2.079E+01 1.23E+02 5.08E+00 G

AM-241   T  -1.7380E-01                                     1.58E+05
                          59.54-1.738E-01 &(P 5.197E+00 8.81E+02 3.59E+01 G

Ir-192   F   4.7561E-01                                     7.40E+01
                         316.49 4.756E-01 ?(  2.821E+00 1.77E+02 8.70E+01 G
                         468.06-1.152E+00 &   3.564E+00 9.23E+01 5.18E+01 G
                         308.44 0.000E+00 -   8.180E+00 1.00E+03 3.18E+01 G

Cs-136   F   4.6844E-01                                     1.30E+01
                         818.50-2.744E-02 %(  1.777E+00 1.81E+03 1.00E+02 G
                        1048.07 8.653E-01 ?(  1.948E+00 6.79E+01 8.00E+01 G
                         340.57 8.489E-01 &(  4.894E+00 1.71E+02 4.69E+01 G

Np-239   T   1.5953E+00                                     2.36E+00
                         103.70 0.000E+00 -   9.087E+00 1.00E+03 2.40E+01 X
                         106.13 1.595E+00 *(  9.101E+00 1.71E+02 2.27E+01 G
                          99.50 0.000E+00 -   1.463E+01 1.00E+03 1.50E+01 X

Nd-147      -3.3417E+00                                     1.11E+01
                         531.00-3.342E+00 ?(  9.844E+00 1.22E+02 1.30E+01 G
                          91.10 9.783E-01 +   7.887E+00 2.42E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
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? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	286.	22.	0.012	109.22	6.835E+00	
AM-241	59.54	407.	-3.	-0.002	880.87	-1.738E-01	P
BA-133	80.99	1130.	-32.	-0.018	57.44	-1.384E+00	P
EU-155	86.54	1269.	-28.	-0.016	178.80	-1.294E+00	
Nd-147	91.10	1178.	20.	0.011	241.62	9.783E-01	
Gd-153	97.50	1182.	16.	0.009	312.17	7.003E-01	
Np-239	106.13	1078.	27.	0.015	171.19	1.595E+00	
EU-152	121.78	220.	18.	0.010	118.89	8.436E-01	
EU-154	123.10	225.	-25.	-0.014	86.28	-8.317E-01	
PA-234	131.29	818.	-25.	-0.014	162.11	-1.911E+00	
HF-181	133.02	793.	-25.	-0.014	159.44	-7.992E-01	
CE-144	133.54	768.	-25.	-0.014	156.87	-3.126E+00	
HF-181	136.30	742.	-25.	-0.014	154.02	-5.988E+00	
CO-57	136.47	717.	-7.	-0.004	534.85	-9.233E-01	
Tc-99m	140.51	748.	-26.	-0.015	149.33	-4.250E-01	
Ba-140	162.66	187.	6.	0.003	311.46	1.555E+00	
CE-139	165.85	289.	-26.	-0.014	95.41	-4.934E-01	
Cf-251	176.60	106.	21.	0.012	95.18	1.967E+00	
TH-229	193.51	118.	-4.	-0.002	536.47	-1.482E+00	P
TH-229	210.85	120.	21.	0.012	102.88	1.313E+01	P
Cf-251	227.00	76.	17.	0.010	100.78	5.390E+00	
EU-152	244.69	682.	-22.	-0.012	170.89	-5.934E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	256.24	64.	16.	0.009	99.21	4.984E+00	
Cd-113m	263.70	86.	10.	0.005	141.42	3.465E+03	
BI-210M	265.83	148.	-21.	-0.012	85.19	-9.209E-01	
Hg-203	279.20	171.	-18.	-0.010	105.37	-5.064E-01	
I-131	284.30	72.	3.	0.002	556.78	1.134E+00	
PA-231	300.07	527.	-18.	-0.010	184.15	-1.750E+01	
PA-233	300.18	509.	-18.	-0.010	181.04	-6.946E+00	
PA-231	302.65	491.	-10.	-0.006	316.04	-8.439E+00	
Ir-192	316.49	411.	16.	0.009	176.73	4.756E-01	
CR-51	320.08	515.	-18.	-0.010	175.24	-4.739E+00	
La-140	328.76	289.	14.	0.008	177.69	1.756E+00	P
Cf-249	333.44	302.	15.	0.008	168.15	2.514E+00	
Cs-136	340.57	317.	15.	0.008	171.42	8.489E-01	
HF-181	345.83	42.	7.	0.004	182.47	1.277E+00	
BA-133	356.00	259.	-9.	-0.005	264.63	-3.875E-01	
I-131	364.48	48.	9.	0.005	156.01	3.084E-01	P
BA-133	383.84	97.	6.	0.003	232.03	2.009E+00	P
SN-113	391.69	119.	-15.	-0.009	91.53	-7.245E-01	P
AG-108M	433.94	39.	-2.	-0.001	647.52	-7.882E-02	P
pm-146	453.88	57.	-11.	-0.006	129.72	-5.703E-01	P
SB-125	463.37	64.	13.	0.007	93.36	4.174E+00	P
Ir-192	468.06	118.	-17.	-0.010	92.31	-1.152E+00	
BE-7	477.60	55.	12.	0.007	89.99	4.106E+00	
HF-181	482.00	68.	10.	0.005	125.05	4.249E-01	P
La-140	487.02	119.	-14.	-0.008	113.54	-1.096E+00	
RU-103	497.05	30.	8.	0.004	151.02	3.063E-01	
RH-106	511.86	70.	60.	0.033	38.67	1.116E+01	
Nd-147	531.00	43.	-11.	-0.006	122.23	-3.342E+00	
Ba-140	537.26	31.	8.	0.004	145.73	1.269E+00	P
CS-134	569.32	43.	-9.	-0.005	104.98	-2.463E+00	
PA-234	569.47	59.	-4.	-0.002	264.91	-2.063E+00	
BI-207	569.70	51.	12.	0.007	87.69	5.055E-01	
SB-125	600.50	209.	10.	0.005	210.02	2.339E+00	
SB-124	602.73	219.	10.	0.005	221.14	4.144E-01	P
CS-134	604.71	229.	10.	0.005	219.04	4.312E-01	
RU-103	610.30	239.	10.	0.005	223.04	7.396E+00	
AG-108M	614.28	246.	10.	0.006	226.20	4.767E-01	
PM-144	618.06	256.	4.	0.002	628.73	1.584E-01	
RH-106	621.92	240.	9.	0.005	256.54	3.788E+00	
SB-125	635.89	58.	-14.	-0.008	79.85	-5.635E+00	
I-131	636.97	25.	7.	0.004	106.02	4.400E+00	
AG-110M	657.76	136.	-16.	-0.009	106.04	-7.728E-01	
PM-144	696.54	33.	5.	0.003	250.32	2.393E-01	P
NB-94	702.63	33.	9.	0.005	136.34	4.529E-01	P
SB-124	722.79	39.	12.	0.006	81.48	5.326E+00	
AG-108M	722.94	51.	12.	0.006	91.41	6.340E-01	
EU-154	723.36	62.	11.	0.006	110.32	2.582E+00	
ZR-95	724.20	88.	-14.	-0.008	99.69	-1.547E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
pm-146	735.72	19.	9.	0.005	103.51	2.082E+00		
pm-146	747.16	47.	-14.	-0.008	109.43	-2.044E+00		
ZR-95	756.73	10.	17.	0.009	45.51	1.611E+00		P
AG-110M	763.94	64.	-18.	-0.010	65.91	-4.268E+00		
NB-95	765.79	59.	14.	0.008	82.02	7.298E-01		
EU-152	778.92	42.	-12.	-0.007	118.15	-4.883E+00		
BI-212	785.42	37.	-9.	-0.005	113.76	-3.921E+01		P
CS-134	795.87	26.	8.	0.005	92.26	5.328E-01		
CS-134	801.95	62.	-13.	-0.007	88.50	-8.187E+00		
CO-58	810.78	29.	9.	0.005	87.71	5.123E-01		
La-140	815.77	38.	2.	0.001	538.87	3.862E-01		
Co-56	846.77	15.	4.	0.002	196.82	2.383E-01		P
NB-94	871.10	23.	3.	0.002	209.28	1.930E-01		
EU-154	873.23	35.	-6.	-0.003	139.19	-2.600E+00		P
PA-234	880.53	75.	-15.	-0.008	87.15	-1.430E+01		
PA-234	883.24	89.	-15.	-0.008	94.54	-8.968E+00		
AG-110M	884.68	104.	-4.	-0.002	342.06	-3.436E-01		
y-88	898.04	24.	-3.	-0.001	291.46	-1.676E-01		P
AG-110M	937.49	30.	-6.	-0.003	204.80	-1.075E+00		
PA-234	946.02	15.	4.	0.002	230.56	1.759E+00		P
EU-152	964.11	132.	-15.	-0.008	109.98	-6.545E+00		
EU-154	996.33	21.	8.	0.005	86.40	5.015E+00		
EU-154	1004.77	18.	-5.	-0.003	198.58	-1.740E+00		
Co-56	1037.84	5.	6.	0.003	94.27	2.768E+00		P
Cs-136	1048.07	19.	10.	0.006	67.90	8.653E-01		
BI-207	1063.66	50.	-19.	-0.010	85.96	-1.727E+00		
Ga-68	1077.40	25.	-7.	-0.004	161.52	-1.726E+01		
FE-59	1099.25	25.	-4.	-0.002	279.32	-4.991E-01		
EU-152	1112.07	82.	-10.	-0.006	126.38	-5.454E+00		
ZN-65	1115.55	82.	-12.	-0.007	109.97	-1.705E+00		
Sc-46	1120.55	55.	12.	0.007	91.38	8.673E-01		
Ta-182	1121.30	46.	12.	0.007	84.56	2.487E+00		
CO-60	1173.24	34.	-12.	-0.007	105.50	-8.824E-01		P
Ta-182	1189.05	15.	7.	0.004	127.38	3.258E+00		
Ta-182	1221.41	37.	-14.	-0.008	100.43	-4.097E+00		
Co-56	1238.28	16.	6.	0.003	156.94	7.091E-01		
NA-22	1274.53	21.	-6.	-0.004	110.53	-5.073E-01		
FE-59	1291.60	6.	6.	0.003	94.22	1.163E+00		P
CO-60	1332.50	15.	3.	0.002	249.60	2.725E-01		P
AG-110M	1384.30	16.	-8.	-0.004	119.02	-2.832E+00		
EU-152	1408.00	0.	15.	0.008	26.18	6.183E+00		P
La-140	1596.21	17.	-3.	-0.002	561.56	-3.093E-01		P
SB-124	1690.98	6.	-1.	0.000	846.32	-1.429E-01		
Co-56	1771.35	33.	-1.	-0.001	704.21	-8.040E-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	4.1063E+00	4.1063E+00	8.999E+01%	1.25E+01
NA-22	#A	-5.0734E-01	-5.0734E-01	1.105E+02%	1.94E+00
K-40		2.3883E+02	2.3883E+02	6.017E+00%	9.34E+00
Sc-46	#A	4.6802E-01	4.6802E-01	9.138E+01%	3.00E+00
CR-51	#A	-4.7393E+00	-4.7393E+00	1.752E+02%	2.78E+01
MN-54	#A	-1.8607E-02	-1.8607E-02	3.079E+03%	1.41E+00
FE-59	#A	2.2111E-01	2.2111E-01	9.422E+01%	3.25E+00
Co-56	#A	6.0943E-01	6.0944E-01	8.960E+01%	1.17E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.17E+00
CO-58	#A	5.1229E-01	5.1229E-01	8.771E+01%	1.52E+00
CO-60	#A	2.7253E-01	2.7253E-01	2.496E+02%	1.71E+00
ZN-65	#A	-1.7045E+00	-1.7045E+00	1.100E+02%	6.34E+00
NB-94	#A	3.2165E-01	3.2165E-01	1.249E+02%	1.45E+00
ZR-95	#A	1.6109E+00	1.6109E+00	4.551E+01%	1.64E+00
NB-95	#A	7.2975E-01	7.2976E-01	8.202E+01%	2.01E+00
RU-103	#A	3.0630E-01	3.0630E-01	1.510E+02%	1.13E+00
RH-106	#A	3.7879E+00	3.7879E+00	2.565E+02%	3.29E+01
AG-108M	#A	3.4404E-01	3.4404E-01	9.141E+01%	1.15E+00
AG-110M	#A	-3.4357E-01	-3.4357E-01	3.421E+02%	4.05E+00
SN-113	#A	-7.2452E-01	-7.2452E-01	9.153E+01%	2.50E+00
SB-124	#A	9.0116E-01	9.0117E-01	8.148E+01%	3.10E+00
SB-125	#A	1.4198E+00	1.4198E+00	9.336E+01%	3.80E+00
I-131	#A	6.7050E-01	6.7053E-01	1.060E+02%	1.21E+00
Gd-153	#A	7.0027E-01	7.0027E-01	3.122E+02%	7.30E+00
Ga-68	#A	-1.7135E+01	-1.7261E+01	1.615E+02%	6.41E+01
Tc-99m	#A	-4.2441E-01	-4.2499E-01	1.493E+02%	2.12E+00
BA-133	#A	-3.8750E-01	-3.8750E-01	2.646E+02%	3.47E+00
CS-134	#A	4.7863E-01	4.7863E-01	9.226E+01%	3.20E+00
CS-137		3.5686E+00	3.5686E+00	1.756E+01%	1.21E+00
CE-139	#A	-4.9344E-01	-4.9344E-01	9.541E+01%	1.57E+00
Ba-140	#A	1.3272E+00	1.3272E+00	1.457E+02%	4.55E+00
La-140	#A	1.0881E-01	1.0881E-01	1.777E+02%	2.24E+00
CE-141	#A	7.1556E-01	7.1557E-01	5.938E+01%	1.40E+00
CE-144	#A	-3.1260E+00	-3.1260E+00	1.569E+02%	1.64E+01
PM-144	#A	1.9881E-01	1.9881E-01	2.503E+02%	1.43E+00
EU-152	#A	5.3103E-01	5.3103E-01	1.189E+02%	8.93E+00
EU-154	#A	1.7049E+00	1.7049E+00	6.584E+01%	1.42E+01
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.03E+01
HF-181	#A	5.5922E-01	5.5922E-01	1.106E+02%	1.81E+00
Ta-182	#A	2.7315E+00	2.7315E+00	7.645E+01%	7.07E+00
Hg-203	#A	-5.0644E-01	-5.0644E-01	1.054E+02%	1.79E+00
TL-208		7.1542E+00	7.1542E+00	1.049E+01%	1.15E+00
pm-146	#A	-4.0074E-01	-4.0074E-01	7.531E+01%	5.17E+00

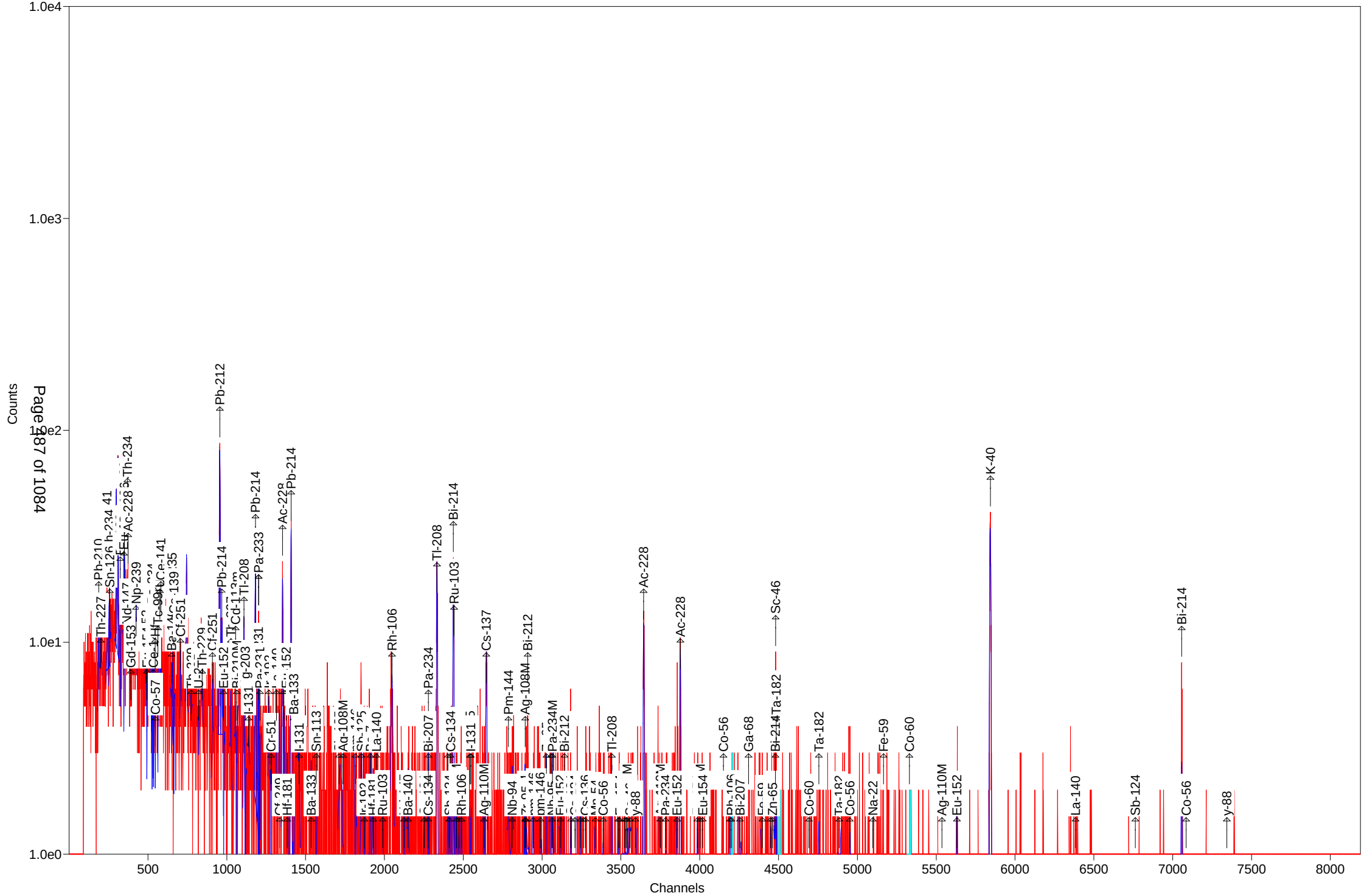
y-88	#A	-1.6760E-01	-1.6760E-01	2.915E+02%	1.61E+00
Cd-113m	#A	3.4651E+03	3.4651E+03	1.414E+02%	1.67E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.02E+01
Cf-251	#A	1.9673E+00	1.9673E+00	9.518E+01%	4.79E+00
Cf-249	#A	4.7828E-01	4.7828E-01	1.682E+02%	2.25E+00
Sn-126	#A	4.6824E+00	4.6824E+00	1.152E+02%	1.80E+01
PB-210	#A	1.3706E+01	1.3706E+01	1.120E+02%	5.14E+01
PB-212		1.8593E+01	1.8594E+01	5.755E+00%	1.85E+00
PB-214		1.2914E+01	1.2914E+01	7.995E+00%	2.07E+00
BI-207	#A	5.0548E-01	5.0548E-01	8.769E+01%	1.49E+00
BI-212	#A	-4.7199E-01	-4.7199E-01	1.698E+03%	2.81E+01
BI-214		1.1860E+01	1.1860E+01	9.710E+00%	1.53E+00
BI-210M	#A	-9.2095E-01	-9.2095E-01	8.519E+01%	2.62E+00
AC-228		1.8667E+01	1.8667E+01	1.034E+01%	1.53E+00
TH-227	#A	5.9713E+00	5.9713E+00	7.378E+01%	2.50E+01
TH-229	#A	4.4307E+00	4.4307E+00	1.029E+02%	2.09E+01
TH-234	A	1.3802E+01	1.3802E+01	3.432E+01%	2.84E+01
PA-231	#A	-8.4390E+00	-8.4390E+00	3.160E+02%	8.97E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.28E+00
PA-234	#A	-3.4468E-01	-3.4468E-01	1.409E+02%	1.03E+01
PA-234M	#A	-4.5829E-01	-4.5829E-01	1.361E+04%	2.26E+02
U-235	A	6.4257E-01	6.4257E-01	8.643E+01%	1.72E+01
AM-241	#A	-1.7380E-01	-1.7380E-01	8.809E+02%	5.20E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.85E+01
Ir-192	#A	4.7561E-01	4.7561E-01	1.767E+02%	2.82E+00
Cs-136	#A	4.6843E-01	4.6844E-01	6.790E+01%	1.78E+00
Np-239	#A	1.5951E+00	1.5953E+00	1.712E+02%	9.10E+00
Nd-147	#A	-3.3416E+00	-3.3417E+00	1.222E+02%	9.84E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 3.261E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 3.2610004E+02 Bq/Sample

265170_Gamma_160-18567-A-4-B. 8_Gamma_20161469.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161175

Sample Description: 265170_Gamma_160-18567-A-5-B
Detector: Detector #17
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-5-B

Decay to Time: 9/7/2016 17:46 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:48:27 Real Time: 1851 sec
Analysis Time: 9/7/2016 18:20 Dead Time: 2.76 %
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_2016-09-04_0724.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	-4.325E+00	100.0	4.325E+00	4.330E+00	1.455E+01
NA-22	-7.599E-01	72.6	5.520E-01	5.533E-01	1.841E+00
K-40	2.216E+02	5.8	1.284E+01	1.713E+01	1.242E+01
Sc-46	2.964E-01	113.3	3.357E-01	3.361E-01	2.436E+00
CR-51	-4.429E+00	87.9	3.892E+00	3.899E+00	1.545E+01
MN-54	1.375E-01	378.6	5.204E-01	5.204E-01	1.254E+00
FE-59	-1.447E+00	87.2	1.262E+00	1.264E+00	2.822E+00
Co-56	3.101E-01	153.6	4.762E-01	4.765E-01	1.277E+00
CO-57	-1.518E-02	2090.5	3.173E-01	3.173E-01	1.086E+00
CO-58	-7.431E-01	89.8	6.672E-01	6.683E-01	2.155E+00
CO-60	2.650E-01	91.2	2.416E-01	2.420E-01	1.188E+00
ZN-65	1.165E+00	92.9	1.082E+00	1.084E+00	3.665E+00
NB-94	3.613E-01	114.0	4.120E-01	4.125E-01	1.015E+00
ZR-95	7.688E-01	92.1	7.078E-01	7.090E-01	1.728E+00
NB-95	-8.875E-01	79.0	7.009E-01	7.024E-01	2.335E+00
RU-103	-5.152E-01	104.3	5.376E-01	5.383E-01	1.333E+00
RH-106	8.287E+00	88.3	7.317E+00	7.330E+00	2.932E+01
AG-108M	-5.155E-01	100.2	5.165E-01	5.171E-01	1.273E+00
AG-110M	5.864E-01	33.3	1.952E-01	1.975E-01	3.338E+00
SN-113	5.690E-01	119.0	6.770E-01	6.776E-01	2.284E+00
SB-124	1.899E-01	156.1	2.965E-01	2.966E-01	3.279E+00
SB-125	4.238E+00	27.2	1.153E+00	1.174E+00	3.183E+00
I-131	6.120E-01	90.0	5.508E-01	5.517E-01	1.175E+00
Gd-153	-9.898E-01	108.9	1.078E+00	1.080E+00	3.604E+00
Ga-68	-6.043E+00	437.4	2.643E+01	2.643E+01	6.099E+01
Tc-99m	-8.596E-02	493.4	4.242E-01	4.242E-01	1.435E+00
BA-133	-4.357E-01	225.1	9.806E-01	9.808E-01	3.309E+00
CS-134	7.338E-01	43.0	3.154E-01	3.177E-01	3.290E+00
CS-137	6.997E+00	10.2	7.109E-01	7.987E-01	1.044E+00
CE-139	3.674E-01	114.7	4.213E-01	4.228E-01	1.411E+00
Ba-140	-6.532E-01	267.6	1.748E+00	1.749E+00	4.401E+00
La-140	-2.847E-01	89.3	2.542E-01	2.546E-01	1.973E+00
CE-141	5.934E-01	128.2	7.608E-01	7.614E-01	2.547E+00

CE-144	-3.040E+00	122.3	3.718E+00	3.721E+00	1.241E+01
PM-144	1.477E-01	173.9	2.568E-01	2.569E-01	6.707E-01
EU-152	1.502E+00	59.0	8.865E-01	8.899E-01	7.601E+00
EU-154	4.184E+00	88.5	3.701E+00	3.707E+00	1.250E+01
EU-155	8.154E-01	181.8	1.483E+00	1.483E+00	4.994E+00
HF-181	6.068E-01	125.6	7.623E-01	7.630E-01	1.923E+00
Ta-182	1.363E+00	85.4	1.164E+00	1.166E+00	7.066E+00
Hg-203	-3.222E-01	132.1	4.256E-01	4.260E-01	1.439E+00
TL-208	6.514E+00	9.0	5.866E-01	6.769E-01	8.120E-01
pm-146	-4.720E-01	263.8	1.245E+00	1.246E+00	3.744E+00
y-88	2.318E-01	47.2	1.094E-01	1.100E-01	1.196E+00
Cd-113m	7.745E+02	682.6	5.286E+03	5.287E+03	1.824E+04
Cd-109	0.000E+00	1.#INF	1.458E+01	1.458E+01	4.903E+01
Cf-251	8.911E-01	197.5	1.760E+00	1.761E+00	4.790E+00
Cf-249	5.794E-01	115.1	6.667E-01	6.673E-01	2.179E+00
Sn-126	4.243E+00	104.6	4.439E+00	4.445E+00	1.483E+01
PB-210	1.172E+01	83.1	9.740E+00	9.764E+00	3.013E+01
PB-212	1.912E+01	5.4	1.034E+00	1.612E+00	1.750E+00
PB-214	1.391E+01	7.7	1.067E+00	1.289E+00	2.013E+00
BI-207	2.674E-01	115.9	3.100E-01	3.103E-01	9.331E-01
BI-212	2.444E+01	18.9	4.612E+00	4.783E+00	7.899E+00
BI-214	1.329E+01	9.5	1.264E+00	1.440E+00	2.077E+00
BI-210M	-9.346E-02	700.3	6.545E-01	6.545E-01	2.256E+00
AC-228	1.849E+01	8.3	1.542E+00	1.808E+00	2.228E+00
TH-227	-4.125E+00	142.2	5.868E+00	5.872E+00	1.675E+01
TH-229	-7.616E+00	104.8	7.978E+00	8.001E+00	2.142E+01
TH-234	-4.206E+00	249.4	1.049E+01	1.049E+01	3.600E+01
PA-231	0.000E+00	1.#INF	5.162E+00	5.162E+00	7.047E+01
PA-233	-1.290E+00	81.7	1.054E+00	1.057E+00	6.091E+00
PA-234	1.295E+00	96.5	1.250E+00	1.252E+00	7.219E+00
PA-234M	4.454E+01	96.9	4.316E+01	4.322E+01	2.358E+02
U-235	-3.435E+00	88.5	3.039E+00	3.044E+00	1.159E+01
AM-241	6.804E-01	188.3	1.281E+00	1.282E+00	3.651E+00
Np-237	0.000E+00	1.#INF	4.476E+00	4.476E+00	1.493E+01
Ir-192	-1.845E-01	101.2	1.867E-01	1.870E-01	1.633E+00
Cs-136	-7.978E-01	100.9	8.049E-01	8.062E-01	2.700E+00
Np-239	0.000E+00	1.#INF	9.568E-01	9.569E-01	4.739E+00
Nd-147	-1.008E+00	313.6	3.161E+00	3.162E+00	8.110E+00
Total	1.191E+03				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-5-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161175.An1

Acquisition information
Start time: 9/7/2016 5:48:27 PM
Live time: 1800
Real time: 1851
Dead time: 2.76 %
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	9/7/2016 5:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2016-09-04_0724.PBC 9/4/2016 7:24:49 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1432

***** 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	55.	26.03	0.70	2.113E-02	46.54	4.250	PBC<MDA	PB210
59.54	13.	188.34	0.79	2.957E-02	59.54	35.900	PBC<MDA	AM241
63.29	-9.	249.41	0.79	3.164E-02	63.29	3.810	PBC<MDA	TH234
63.94	24.	104.63	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
74.90	186.	11.59	0.80	3.682E-02				
77.24	275.	8.64	0.80	3.764E-02				
80.99	20.	106.86	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
87.22	82.	23.12	0.81	4.043E-02	86.49	13.100	8.621E+00	Np237
					86.54	30.700	3.678E+00	EU155
					86.94	9.040	1.246E+01	Sn126
					87.57	37.500	2.994E+00	Sn126
					88.04	3.790	2.955E+01	Cd109
89.93	54.	29.14	0.82	4.098E-02				
92.59	-45.	52.45	0.82	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.28	83.	23.69	0.82	4.156E-02	93.35	5.561	1.991E+01	AC228
103.70	21.	119.87	0.83	4.269E-02	103.70	24.000	PBC<MDA	Np239
105.31	13.	181.81	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155
121.56	22.	59.03	1.09	4.277E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.340E-01	CO57
123.10	3.	621.10	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
136.30	14.	211.42	0.86	4.165E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.762E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	21.	128.21	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
165.85	20.	114.66	0.89	3.825E-02	165.85	79.900	PBC<MDA	CE139
176.60	10.	197.48	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251
238.52	436.	5.99	1.00	2.990E-02	238.63	43.300	1.873E+01	PB212
241.93	55.	25.18	0.96	2.960E-02	242.00	7.430	1.387E+01	PB214
244.62	16.	232.93	0.96	2.938E-02	244.69	7.580	PBC<MDA	EU152
263.70	2.	682.58	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m
277.34	40.	37.80	1.26	2.694E-02	277.28	6.310	1.302E+01	TL208
284.30	6.	317.43	1.00	2.648E-02	284.30	6.140	PBC<MDA	I131
295.01	136.	12.38	0.95	2.580E-02	295.09	19.300	1.523E+01	PB214
308.44	9.	289.96	1.02	2.501E-02	308.44	31.750	PBC<MDA	Ir192
328.76	7.	185.88	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	4.	363.54	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.33	97.	15.09	0.89	2.344E-02	338.32	12.010	1.915E+01	AC228
351.94	204.	9.07	1.34	2.279E-02	351.93	37.600	1.322E+01	PB214
364.48	2.	617.60	1.07	2.223E-02	364.48	81.700	PBC<MDA	I131
387.95	14.	115.07	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
391.69	14.	118.98	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
427.88	10.	128.06	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
463.37	50.	27.22	1.16	1.872E-02	463.37	10.470	1.414E+01	SB125
482.00	11.	135.76	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
487.02	11.	118.17	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
511.86	127.	14.60	2.45	1.742E-02	511.86	20.000	2.025E+01	RH106
569.32	10.	74.83	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.093E+00	PA234
					569.70	97.740	3.435E-01	BI207
569.47	8.	96.54	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.171E+00	PA234
					569.70	97.740	2.661E-01	BI207
569.70	6.	123.70	1.25	1.611E-02	569.32	15.380	1.380E+00	CS134
					569.47	8.200	2.590E+00	PA234
					569.70	97.740	2.173E-01	BI207
583.21	157.	9.00	1.17	1.583E-02	583.02	84.500	6.514E+00	TL208
609.36	169.	9.51	1.24	1.533E-02	609.31	46.090	1.329E+01	BI214
					610.30	5.750	1.067E+02	RU103
621.92	11.	211.90	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
635.89	11.	75.59	1.31	1.486E-02	635.89	11.310	PBC<MDA	SB125
636.97	11.	89.99	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
661.78	155.	10.16	1.49	1.443E-02	661.66	85.210	6.997E+00	CS137
696.54	4.	173.94	1.36	1.389E-02	696.54	99.000	PBC<MDA	PM144
702.63	9.	114.03	1.37	1.380E-02	702.63	97.900	PBC<MDA	NB94
722.79	3.	409.61	1.39	1.351E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.358E-01	AG108M
					723.36	20.220	6.104E-01	EU154
727.55	45.	18.87	0.77	1.345E-02	727.17	7.550	2.444E+01	BI212
756.73	10.	92.07	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
766.41	15.	96.91	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
783.21	24.	36.84	1.44	1.270E-02	785.42	1.280	8.204E+01	BI212
795.87	23.	42.98	1.45	1.257E-02	795.87	85.530	1.171E+00	CS134
801.95	4.	153.72	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
834.85	3.	378.59	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
846.77	8.	153.55	1.49	1.200E-02	846.77	99.935	PBC<MDA	Co56
860.23	7.	164.75	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
873.23	11.	88.46	1.51	1.172E-02	873.23	12.270	PBC<MDA	EU154
911.46	100.	10.55	1.66	1.135E-02	911.07	29.000	1.686E+01	AC228
937.49	2.	398.21	1.57	1.111E-02	937.49	34.360	PBC<MDA	AG110M
946.02	7.	130.32	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	12.	114.25	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.12	71.	16.95	1.59	1.083E-02	968.97	17.460	2.075E+01	AC228
996.33	2.	470.30	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1050.36	10.	88.30	1.66	1.019E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	5.	196.14	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1111.70	10.	86.43	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	10.	92.90	1.71	9.729E-03	1115.55	50.600	PBC<MDA	ZN65
1120.20	7.	167.33	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	10.	113.26	1.72	9.696E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.928E-01	Sc46
1121.42	4.	296.18	1.72	9.691E-03	1121.30	34.900	PBC<MDA	Ta182
1173.24	10.	91.17	1.76	9.359E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	11.	85.41	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	3.	308.52	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	3.	524.40	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1384.30	10.	33.28	1.93	8.233E-03	1384.30	24.290	2.690E+00	AG110M
1407.55	10.	31.62	1.94	8.125E-03	1408.00	21.005	3.255E+00	EU152
1460.95	336.	5.79	1.87	7.894E-03	1460.83	10.670	2.216E+02	K40
1690.98	4.	156.12	2.16	7.037E-03	1690.98	47.790	PBC<MDA	SB124
1764.98	8.	110.05	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	5.	47.20	2.26	6.593E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.02	74.85	139.	186.	5.047E+03	11.59	0.802	-	D
308.36	77.19	144.	275.	7.303E+03	8.64	0.804	-	D
358.96	89.97	136.	42.	1.028E+03	42.05	0.816	-	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	186.31	46.71	96.	19.	0.010	83.13	0.695
TH-227	200.03	50.14	135.	-14.	-0.008	142.23	0.778s
AM-241	237.59	59.54	207.	13.	0.007	188.34	0.787
TH-234	252.59	63.29	262.	-9.	-0.005	249.41	0.791s
Sn-126	256.56	64.28	299.	24.	0.013	104.63	0.792s
BA-133	323.36	80.99	156.	20.	0.011	106.86	0.807s
Np-237	345.35	86.49	890.	0.	0.000	165.18	0.813A
EU-155	345.56	86.54	916.	-27.	-0.015	159.99	0.813D
Sn-126	347.15	86.94	861.	16.	0.009	127.99	0.813D
Sn-126	349.67	87.57	789.	39.	0.022	51.87	0.814D
Cd-109	351.55	88.04	815.	0.	0.000	1000.00	0.814A
TH-234	369.74	92.59	867.	-45.	-0.025	52.45	0.818s
AC-228	372.78	93.35	151.	83.	0.046	23.69	0.819D
Gd-153	389.37	97.50	289.	-23.	-0.013	108.90	0.823s
Np-239	397.37	99.50	312.	-5.	-0.003	520.36	0.825
Gd-153	412.16	103.20	351.	-23.	-0.013	118.83	0.828s
Np-239	414.16	103.70	305.	21.	0.012	119.87	0.829s
EU-155	420.61	105.31	286.	13.	0.007	181.81	0.830s
Np-239	423.88	106.13	296.	0.	0.000	1000.00	0.831s
EU-152	485.57	121.56	55.	22.	0.012	59.03	1.093s
EU-154	491.73	123.10	192.	3.	0.002	621.10	0.847
PA-234	524.49	131.29	423.	-9.	-0.005	330.93	0.855
HF-181	531.41	133.02	432.	0.	0.000	1000.00	0.856
CE-144	533.46	133.54	471.	-25.	-0.014	122.30	0.857s
HF-181	544.50	136.30	437.	14.	0.008	211.42	0.859
Tc-99m	561.34	140.51	366.	-6.	-0.003	493.43	0.863s
U-235	574.43	143.79	378.	-28.	-0.015	88.48	0.866s
CE-141	581.05	145.44	348.	21.	0.012	128.21	0.868s
Ba-140	649.90	162.66	312.	-22.	-0.012	115.53	0.884s
CE-139	662.67	165.85	258.	20.	0.011	114.66	0.887s
Cf-251	705.64	176.60	120.	10.	0.006	197.48	0.897s
TH-229	773.25	193.51	143.	-21.	-0.012	104.76	0.913s
U-235	820.52	205.33	103.	-3.	-0.002	877.31	0.924s
TH-229	842.58	210.85	190.	-24.	-0.014	102.66	0.929s
Cf-251	907.16	227.00	107.	-9.	-0.005	214.77	0.944s
PB-212	953.67	238.63	67.	445.	0.247	5.41	0.954D
PB-214	967.13	242.00	68.	55.	0.030	25.18	0.957D
EU-152	977.91	244.69	713.	16.	0.009	232.93	0.960s
Cd-113m	1053.91	263.70	126.	2.	0.001	682.58	0.978s
BI-210M	1062.44	265.83	132.	-2.	-0.001	700.29	0.979s
TL-208	1108.44	277.34	51.	40.	0.022	37.80	1.257s
Hg-203	1115.89	279.20	134.	-13.	-0.007	132.10	0.992
I-131	1136.28	284.30	88.	6.	0.003	317.43	0.996s
PB-214	1179.13	295.01	43.	136.	0.076	12.38	0.945s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	1199.19	300.03	320.	-18.	-0.010	140.44	1.011
PA-231	1199.35	300.07	338.	-18.	-0.010	144.29	1.011
PA-233	1199.79	300.18	356.	-16.	-0.009	168.73	1.011
PA-231	1209.66	302.65	372.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	372.	0.	0.000	1000.00	1.013s
Ba-140	1218.46	304.85	372.	0.	0.000	1000.00	1.015s
BI-210M	1218.64	304.90	372.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	336.	9.	0.005	289.96	1.019
PA-233	1247.10	312.01	417.	-21.	-0.012	81.74	1.022s
Ir-192	1265.01	316.49	166.	-19.	-0.010	101.20	1.026
CR-51	1279.38	320.08	193.	-19.	-0.011	87.87	1.029s
La-140	1314.07	328.76	51.	7.	0.004	185.88	1.037
Cf-249	1332.79	333.44	70.	4.	0.002	363.54	1.041s
AC-228	1352.34	338.33	32.	97.	0.054	15.09	0.885s
Cs-136	1361.30	340.57	331.	-19.	-0.010	140.56	1.048
EU-152	1376.16	344.29	304.	-19.	-0.010	134.32	1.051
HF-181	1382.33	345.83	285.	-19.	-0.010	130.10	1.053
PB-214	1406.79	351.94	37.	204.	0.113	9.07	1.340s
BA-133	1423.00	356.00	301.	-11.	-0.006	225.08	1.062s
I-131	1456.93	364.48	59.	2.	0.001	617.60	1.070s
BA-133	1534.34	383.84	178.	-17.	-0.009	109.60	1.087s
Cf-249	1550.77	387.95	126.	14.	0.008	115.07	1.091s
SN-113	1565.73	391.69	129.	14.	0.008	118.98	1.094s
SB-125	1710.44	427.88	44.	10.	0.006	128.06	1.127s
AG-108M	1734.69	433.94	66.	-16.	-0.009	100.18	1.132s
pm-146	1814.44	453.88	65.	-11.	-0.006	152.31	1.150s
SB-125	1852.38	463.37	67.	50.	0.028	27.22	1.158
Ir-192	1871.15	468.06	151.	-15.	-0.008	117.89	1.163s
BE-7	1909.29	477.59	105.	-15.	-0.008	100.00	1.171s
HF-181	1926.89	482.00	106.	11.	0.006	135.76	1.175
La-140	1946.98	487.02	40.	11.	0.006	118.17	1.180s
RU-103	1987.11	497.05	60.	-15.	-0.008	104.35	1.188s
RH-106	2046.35	511.86	33.	127.	0.071	14.60	2.452s
Nd-147	2122.88	531.00	40.	-4.	-0.002	313.58	1.219s
Ba-140	2147.92	537.26	41.	-5.	-0.003	267.63	1.224s
CS-134	2251.82	563.24	37.	-2.	-0.001	767.81	1.247s
CS-134	2276.15	569.32	22.	10.	0.005	74.83	1.252
PA-234	2276.75	569.47	23.	8.	0.004	96.54	1.253
BI-207	2277.67	569.70	26.	6.	0.003	123.70	1.253
TL-208	2331.69	583.21	13.	157.	0.087	9.00	1.174s
SB-125	2400.86	600.50	362.	-14.	-0.008	98.54	1.280s
SB-124	2409.78	602.73	348.	-4.	-0.002	672.94	1.282s
CS-134	2417.70	604.71	344.	0.	0.000	1000.00	1.284s
BI-214	2436.31	609.36	26.	169.	0.094	9.51	1.236s
RU-103	2440.05	610.30	344.	0.	0.000	1000.00	1.288s
AG-108M	2455.98	614.28	344.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	344.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	269.	11.	0.006	211.90	1.299s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2542.41	635.89	30.	11.	0.006	75.59	1.311s
I-131	2546.75	636.97	42.	11.	0.006	89.99	1.312s
AG-110M	2629.90	657.76	200.	-9.	-0.005	216.95	1.330s
CS-137	2645.95	661.78	19.	155.	0.086	10.16	1.491
PM-144	2785.03	696.54	9.	4.	0.002	173.94	1.363s
NB-94	2809.38	702.63	22.	9.	0.005	114.03	1.368s
SB-124	2890.01	722.79	74.	3.	0.002	409.61	1.386s
AG-108M	2890.61	722.94	77.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	77.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	77.	0.	0.000	1000.00	1.387
BI-212	2909.05	727.55	6.	45.	0.025	18.87	0.774s
pm-146	2941.74	735.72	48.	-16.	-0.009	93.44	1.397s
pm-146	2987.51	747.16	35.	-4.	-0.002	263.84	1.407s
ZR-95	3025.79	756.73	17.	10.	0.005	92.07	1.415s
AG-110M	3054.64	763.94	94.	-20.	-0.011	70.68	1.421s
NB-95	3062.03	765.79	122.	-21.	-0.011	78.98	1.423s
PA-234M	3064.52	766.41	101.	15.	0.008	96.91	1.423s
EU-152	3114.56	778.92	43.	-13.	-0.007	104.43	1.434s
BI-212	3140.56	785.42	13.	24.	0.013	36.84	1.440s
CS-134	3182.35	795.87	17.	23.	0.013	42.98	1.448s
CS-134	3206.69	801.95	9.	4.	0.002	153.72	1.454s
CO-58	3241.99	810.78	94.	-16.	-0.009	89.77	1.461s
La-140	3261.97	815.77	110.	-16.	-0.009	90.32	1.465s
Cs-136	3272.90	818.50	150.	-18.	-0.010	100.89	1.467s
MN-54	3338.30	834.85	28.	3.	0.002	378.59	1.481s
Co-56	3385.99	846.77	28.	8.	0.004	153.55	1.491s
TL-208	3441.18	860.56	28.	7.	0.004	164.75	1.503s
NB-94	3483.32	871.10	40.	-10.	-0.005	97.59	1.512s
EU-154	3491.85	873.23	40.	11.	0.006	88.46	1.514s
PA-234	3521.06	880.53	84.	-15.	-0.008	90.49	1.520s
PA-234	3531.90	883.24	99.	-7.	-0.004	202.97	1.522s
AG-110M	3537.67	884.68	106.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	106.	0.	0.000	1000.00	1.527s
AC-228	3644.82	911.46	5.	100.	0.056	10.55	1.659
AG-110M	3748.95	937.49	19.	2.	0.001	398.21	1.567s
PA-234	3783.07	946.02	19.	7.	0.004	130.32	1.574s
EU-152	3855.45	964.11	94.	12.	0.007	114.25	1.589
AC-228	3874.90	968.97	36.	71.	0.039	16.95	1.593s
EU-154	3984.36	996.33	51.	2.	0.001	470.30	1.616s
PA-234M	4003.04	1001.00	56.	-3.	-0.002	377.69	1.620s
EU-154	4018.15	1004.77	65.	-11.	-0.006	106.53	1.623s
Cs-136	4191.39	1048.07	35.	-14.	-0.008	65.47	1.658s
RH-106	4200.55	1050.36	34.	10.	0.006	88.30	1.661s
BI-207	4253.77	1063.66	15.	5.	0.003	196.14	1.671s
Ga-68	4308.74	1077.40	35.	-3.	-0.002	437.37	1.683
FE-59	4396.18	1099.25	30.	-14.	-0.008	87.20	1.700s
EU-152	4447.49	1112.07	34.	10.	0.006	86.43	1.711s
ZN-65	4461.38	1115.55	41.	10.	0.006	92.90	1.713s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4480.35	1120.29	57.	7.	0.004	167.33	1.717s
Sc-46	4481.41	1120.55	63.	10.	0.006	113.26	1.717s
Ta-182	4484.41	1121.30	75.	4.	0.002	296.18	1.718
CO-60	4692.24	1173.24	15.	10.	0.006	91.17	1.760s
Ta-182	4755.52	1189.05	15.	11.	0.006	85.41	1.772
Ta-182	4885.02	1221.41	16.	3.	0.002	308.52	1.798
Co-56	4952.53	1238.28	37.	3.	0.001	524.40	1.812s
NA-22	5097.60	1274.53	32.	-12.	-0.007	72.65	1.840s
EU-154	5097.66	1274.54	44.	0.	0.000	1000.00	1.840s
CO-60	5329.61	1332.50	11.	-1.	-0.001	961.56	1.886s
AG-110M	5536.92	1384.30	0.	10.	0.005	33.28	1.926s
EU-152	5631.79	1408.00	0.	10.	0.006	31.62	1.944s
K-40	5843.71	1460.95	12.	336.	0.187	5.79	1.868
La-140	6385.15	1596.21	23.	-13.	-0.007	152.43	2.087s
SB-124	6764.55	1690.98	6.	4.	0.002	156.12	2.157s
BI-214	7058.84	1764.49	32.	8.	0.004	110.05	2.211s
Co-56	7086.31	1771.35	42.	-2.	-0.001	463.68	2.216s
y-88	7345.39	1836.06	1.	5.	0.003	47.20	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.3247E+00				5.31E+01	
			477.60	-4.325E+00	?(	1.455E+01 1.00E+02 1.05E+01	G
NA-22	C	-7.5987E-01				9.50E+02	
			1274.53	-7.599E-01	?(	1.841E+00 7.26E+01 9.99E+01	G
K-40	N	2.2163E+02				4.66E+11	
			1460.83	2.216E+02	(P	1.242E+01 5.79E+00 1.07E+01	G
Sc-46	F	2.9643E-01				8.38E+01	
			889.28	0.000E+00	(	2.436E+00 1.00E+03 1.00E+02	G
			1120.55	5.928E-01	?(	2.283E+00 1.13E+02 1.00E+02	G
CR-51	F	-4.4291E+00				2.77E+01	
			320.08	-4.429E+00	?(P	1.545E+01 8.79E+01 9.94E+00	G
MN-54	C	1.3745E-01				3.12E+02	
			834.85	1.375E-01	?(	1.254E+00 3.79E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	-1.4474E+00					4.45E+01	
			1099.25	-1.447E+00	?(	2.822E+00	8.72E+01	5.65E+01 G
			1291.60	4.934E-02	&	3.963E+00	3.53E+03	4.32E+01 G
Co-56	C	3.1012E-01					7.73E+01	
			846.77	3.500E-01	?(P	1.277E+00	1.54E+02	9.99E+01 G
			1238.28	2.498E-01	?(	2.921E+00	5.24E+02	6.61E+01 G
			1037.84	-1.961E-01	% P	1.004E+01	2.13E+03	1.41E+01 G
			1771.35	-1.058E+00	+	1.741E+01	4.64E+02	1.55E+01 A
CO-57	C	-1.5180E-02					2.72E+02	
			122.06	-1.518E-02	&(	1.086E+00	2.09E+03	8.56E+01 G
			136.47	2.383E-07	%	1.232E+01	1.53E+09	1.07E+01 G
CO-58	C	-7.4315E-01					7.09E+01	
			810.78	-7.431E-01	&(P	2.155E+00	8.98E+01	9.95E+01 G
CO-60	F	2.6501E-01					1.93E+03	
			1332.50	-6.221E-02	?(P	1.188E+00	9.62E+02	1.00E+02 G
			1173.24	5.925E-01	?(P	1.234E+00	9.12E+01	9.99E+01 G
ZN-65	F	1.1647E+00					2.44E+02	
			1115.55	1.165E+00	?(	3.665E+00	9.29E+01	5.06E+01 G
NB-94	I	3.6134E-01					7.41E+06	
			702.63	3.613E-01	(P	1.015E+00	1.14E+02	9.79E+01 G
			871.10	-4.577E-01	+	1.518E+00	9.76E+01	9.99E+01 G
ZR-95	I	7.6881E-01					6.40E+01	
			756.73	7.688E-01	?(	1.728E+00	9.21E+01	5.45E+01 G
			724.20	0.000E+00	-	4.067E+00	1.00E+03	4.42E+01 G
NB-95	I	-8.8747E-01					6.40E+01	
			765.79	-8.875E-01	?(	2.335E+00	7.90E+01	9.98E+01 G
RU-103	I	-5.1521E-01					3.93E+01	
			497.05	-5.152E-01	?(	1.333E+00	1.04E+02	9.09E+01 G
			610.30	0.000E+00	+	5.624E+01	1.00E+03	5.75E+00 GA
RH-106	I	8.2867E+00					3.74E+02	
			621.92	4.096E+00	*(	2.932E+01	2.12E+02	9.93E+00 G
			1050.36	3.496E+01	?(	1.045E+02	8.83E+01	1.56E+00 G
			511.86	2.025E+01	?	4.723E+00	1.46E+01	2.00E+01 GA
AG-108M	C	-5.1554E-01					1.53E+05	
			433.94	-5.155E-01	?(P	1.273E+00	1.00E+02	9.05E+01 G
			722.94	0.000E+00	&	1.974E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	0.000E+00	+	3.616E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.8643E-01					2.50E+02	
			884.68	0.000E+00	?(	3.338E+00	1.00E+03	7.27E+01 G
			657.76	-3.781E-01	+	2.782E+00	2.17E+02	9.46E+01 G
			937.49	3.396E-01	?(	3.324E+00	3.98E+02	3.44E+01 G
			1384.30	2.690E+00	?(P	2.047E+00	3.33E+01	2.43E+01 G
			763.94	-3.919E+00	+	9.189E+00	7.07E+01	2.23E+01 G
SN-113	F	5.6897E-01					1.15E+02	
			391.69	5.690E-01	&(P	2.284E+00	1.19E+02	6.40E+01 G
SB-124	F	1.8989E-01					6.02E+01	
			602.73	-1.438E-01	?(	3.279E+00	6.73E+02	9.83E+01 G
			1690.98	6.608E-01	?(	2.333E+00	1.56E+02	4.78E+01 G
			722.79	1.141E+00	?(	1.628E+01	4.10E+02	1.08E+01 G
SB-125	I	4.2380E+00					1.01E+03	
			427.88	9.466E-01	?(	3.183E+00	1.28E+02	2.96E+01 G
			600.50	-2.887E+00	+ P	1.835E+01	9.85E+01	1.79E+01 G
			635.89	3.690E+00	?(	9.334E+00	7.56E+01	1.13E+01 G
			463.37	1.414E+01	?(P	1.159E+01	2.72E+01	1.05E+01 G
I-131	I	6.1203E-01					8.02E+00	
			364.48	7.138E-02	&(	1.175E+00	6.18E+02	8.17E+01 G
			284.30	1.910E+00	&(P	1.590E+01	3.17E+02	6.14E+00 G
			636.97	5.661E+00	&(	1.722E+01	9.00E+01	7.17E+00 G
Gd-153	F	-9.8977E-01					2.42E+02	
			97.50	-9.898E-01	&(	3.604E+00	1.09E+02	3.00E+01 G
			103.20	-1.354E+00	+	5.381E+00	1.19E+02	2.18E+01 G
Ga-68	C	-6.0429E+00					4.71E-02	
			1077.40	-6.043E+00	?(	6.099E+01	4.37E+02	3.30E+00 G
Tc-99m	I	-8.5964E-02					2.51E-01	
			140.51	-8.596E-02	*(	1.435E+00	4.93E+02	8.93E+01 G
BA-133	F	-4.3565E-01					3.85E+03	
			356.00	-4.357E-01	&(	3.309E+00	2.25E+02	6.20E+01 G
			302.85	0.000E+00	+	1.108E+01	1.00E+03	1.83E+01 G
			383.84	-4.903E+00	+ P	1.880E+01	1.10E+02	8.94E+00 GA
			80.99	8.453E-01	& P	2.559E+00	1.07E+02	3.41E+01 GA
CS-134	I	7.3382E-01					7.54E+02	
			604.71	0.000E+00	@(	3.290E+00	1.00E+03	9.76E+01 G
			795.87	1.171E+00	(	1.142E+00	4.30E+01	8.55E+01 G
			569.32	2.182E+00	&(	5.469E+00	7.48E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	2.110E+00	?(	8.402E+00	1.54E+02	8.69E+00 G
			563.24	-6.917E-01	+ P	1.267E+01	7.68E+02	8.35E+00 G
CS-137	I	6.9970E+00					1.10E+04	
			661.66	6.997E+00	(	1.044E+00	1.02E+01	8.52E+01 G
CE-139	F	3.6745E-01					1.38E+02	
			165.85	3.674E-01	?(	1.411E+00	1.15E+02	7.99E+01 G
Ba-140	I	-6.5321E-01					1.28E+01	
			537.26	-6.532E-01	?(P	4.401E+00	2.68E+02	2.44E+01 G
			162.66	-5.153E+00	+	1.992E+01	1.16E+02	6.22E+00 G
			304.85	0.000E+00	+	4.755E+01	1.00E+03	4.29E+00 G
La-140	I	-2.8470E-01					1.28E+01	
			1596.21	-1.010E+00	?(P	1.973E+00	1.52E+02	9.54E+01 G
			487.02	7.341E-01	(P	2.180E+00	1.18E+02	4.55E+01 G
			328.76	8.421E-01	&(	4.131E+00	1.86E+02	2.03E+01 G
			815.77	-3.177E+00	+ P	9.964E+00	9.03E+01	2.33E+01 G
CE-141	I	5.9342E-01					3.25E+01	
			145.44	5.934E-01	?(	2.547E+00	1.28E+02	4.82E+01 G
CE-144	I	-3.0396E+00					2.85E+02	
			133.54	-3.040E+00	*(	1.241E+01	1.22E+02	1.11E+01 G
PM-144	C	1.4765E-01					3.63E+02	
			696.54	1.477E-01	?(P	6.707E-01	1.74E+02	9.90E+01 G
			618.06	0.000E+00	-	3.294E+00	1.00E+03	9.91E+01 G
EU-152	F	1.5017E+00					4.94E+03	
			344.29	-1.687E+00	?(	7.601E+00	1.34E+02	2.65E+01 G
			1112.07	4.302E+00	?(	1.256E+01	8.64E+01	1.36E+01 G
			121.78	9.999E-01	(	1.694E+00	5.90E+01	2.86E+01 G
			778.92	-4.481E+00	+	1.122E+01	1.04E+02	1.29E+01 G
			964.11	4.322E+00	(	1.671E+01	1.14E+02	1.46E+01 G
			244.69	4.067E+00	?(	3.171E+01	2.33E+02	7.58E+00 G
			1408.00	3.255E+00	?	2.399E+00	3.16E+01	2.10E+01 GA
EU-154	I	4.1839E+00					3.14E+03	
			873.23	4.184E+00	?(	1.250E+01	8.85E+01	1.23E+01 G
			123.10	1.010E-01	-	2.145E+00	6.21E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.046E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	8.872E+00	1.00E+03	2.02E+01 G
			1004.77	-3.268E+00	-	1.180E+01	1.07E+02	1.80E+01 G
			996.33	1.071E+00	-	1.775E+01	4.70E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	8.1543E-01					1.81E+03	
			105.31	8.154E-01	*(P	4.994E+00	1.82E+02	2.12E+01 G
			86.54	-1.211E+00	&	6.458E+00	1.60E+02	3.07E+01 G
HF-181	F	6.0681E-01					4.24E+01	
			482.00	4.172E-01	?(	1.923E+00	1.36E+02	8.05E+01 G
			133.02	0.000E+00	-	3.043E+00	1.00E+03	4.33E+01 G
			345.83	-2.980E+00	+	1.300E+01	1.30E+02	1.51E+01 G
			136.30	3.216E+00	?(	2.284E+01	2.11E+02	5.85E+00 G
Ta-182	F	1.3626E+00					1.14E+02	
			1121.30	6.879E-01	(	7.066E+00	2.96E+02	3.49E+01 G
			1221.41	6.804E-01	(	4.842E+00	3.09E+02	2.70E+01 G
			1189.05	3.953E+00	(	7.685E+00	8.54E+01	1.62E+01 G
Hg-203	F	-3.2220E-01					4.66E+01	
			279.20	-3.222E-01	?(	1.439E+00	1.32E+02	8.15E+01 G
TL-208	N	6.5141E+00					6.98E+02	
			583.02	6.514E+00	(P	8.120E-01	9.00E+00	8.45E+01 G
			277.28	1.302E+01	+ P	1.178E+01	3.78E+01	6.31E+00 G
			860.56	2.641E+00	-	1.033E+01	1.65E+02	1.24E+01 G
pm-146	C	-4.7204E-01					2.02E+03	
			747.16	-4.720E-01	?(P	3.744E+00	2.64E+02	3.40E+01 G
			735.72	-2.901E+00	+	6.460E+00	9.34E+01	2.25E+01 G
			453.88	-4.894E-01	+ P	1.810E+00	1.52E+02	6.50E+01 G
y-88	F	2.3175E-01					1.07E+02	
			898.04	-1.295E-02	%(P	1.196E+00	3.68E+03	9.37E+01 G
			1836.06	4.629E-01	?(P	6.260E-01	4.72E+01	9.92E+01 G
Cd-113m		7.7446E+02					5.33E+03	
			263.70	7.745E+02	?(	1.824E+04	6.83E+02	6.00E-03 K
Cf-251	T	8.9107E-01					3.28E+05	
			176.60	8.911E-01	*(	4.790E+00	1.97E+02	1.70E+01 G
			227.00	-2.471E+00	&	1.449E+01	2.15E+02	6.30E+00 GA
Cf-249	T	5.7938E-01					1.28E+05	
			387.95	5.615E-01	&(	2.179E+00	1.15E+02	6.60E+01 G
			333.44	6.556E-01	&(	6.294E+00	3.64E+02	1.55E+01 G
Sn-126		4.2432E+00					3.65E+07	
			87.57	1.420E+00	}	4.886E+00	5.19E+01	3.75E+01 GA
			64.28	4.243E+00	?(	1.483E+01	1.05E+02	9.70E+00 G
			86.94	2.461E+00	}	2.124E+01	1.28E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.1716E+01					8.14E+03	
			46.54	1.172E+01	(P	3.013E+01	8.31E+01	4.25E+00 G
PB-212	N	1.9116E+01					6.98E+02	
			238.63	1.912E+01	(P	1.750E+00	5.41E+00	4.33E+01 G
			300.03	-1.213E+01	-	5.713E+01	1.40E+02	3.28E+00 GA
PB-214	N	1.3905E+01					5.84E+05	
			351.93	1.322E+01	(P	2.013E+00	9.07E+00	3.76E+01 G
			295.09	1.523E+01	*(P	3.693E+00	1.24E+01	1.93E+01 G
			242.00	1.387E+01		1.040E+01	2.52E+01	7.43E+00 GA
BI-207	C	2.6737E-01					1.18E+04	
			569.70	2.173E-01	&(	9.331E-01	1.24E+02	9.77E+01 G
			1063.66	3.330E-01	?(P	1.556E+00	1.96E+02	7.45E+01 G
BI-212	N	2.4437E+01					6.98E+02	
			727.17	2.444E+01	*(	7.899E+00	1.89E+01	7.55E+00 G
			785.42	8.204E+01	&	6.670E+01	3.68E+01	1.28E+00 GA
BI-214	N	1.3295E+01					5.84E+05	
			609.31	1.329E+01	(P	2.077E+00	9.51E+00	4.61E+01 G
			1120.29	2.492E+00	- P	1.436E+01	1.67E+02	1.51E+01 G
			1764.49	4.102E+00	- P	1.547E+01	1.10E+02	1.54E+01 G
BI-210M	T	-9.3455E-02					1.10E+09	
			265.83	-9.346E-02	&(	2.256E+00	7.00E+02	5.00E+01 G
			304.90	0.000E+00	+	7.286E+00	1.00E+03	2.80E+01 G
AC-228	N	1.8490E+01					2.10E+03	
			911.07	1.686E+01	(P	2.228E+00	1.05E+01	2.90E+01 G
			968.97	2.075E+01	?(	9.048E+00	1.69E+01	1.75E+01 G
			338.32	1.915E+01	*(	5.738E+00	1.51E+01	1.20E+01 G
			93.35	1.991E+01		1.442E+01	2.37E+01	5.56E+00 XA
TH-227	N	-4.1254E+00					7.95E+03	
			50.14	-4.125E+00	&(	1.675E+01	1.42E+02	8.00E+00 G
			256.24	-2.789E-01	%	1.309E+01	1.69E+03	7.00E+00 G
TH-229	N	-7.6155E+00					2.68E+06	
			193.51	-7.616E+00	?(	2.142E+01	1.05E+02	4.40E+00 G
			210.85	-1.392E+01	+	3.824E+01	1.03E+02	2.99E+00 G
TH-234	N	-4.2059E+00					1.63E+12	
			63.29	-4.206E+00	*(P	3.600E+01	2.49E+02	3.81E+00 G
			92.59	-1.083E+01	+ P	3.359E+01	5.25E+01	5.58E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C  -1.2898E+00                                     7.82E+08
                         312.01-1.290E+00 &(P 6.091E+00 8.17E+01 3.60E+01 G
                         300.18-5.621E+00 +   3.186E+01 1.69E+02 6.20E+00 G

PA-234   N   1.2948E+00                                     1.63E+12
                         131.29-6.472E-01 ?(  7.219E+00 3.31E+02 1.80E+01 G
                         946.02 2.755E+00 ?(  8.583E+00 1.30E+02 1.34E+01 G
                         569.47 3.171E+00 &(  1.048E+01 9.65E+01 8.20E+00 G
                         883.24-3.512E+00 +   2.443E+01 2.03E+02 9.60E+00 G
                         880.53-1.188E+01 +   3.610E+01 9.05E+01 6.00E+00 GA

PA-234M  N   4.4538E+01                                     1.63E+12
                        1001.00-1.805E+01 ?(P 2.358E+02 3.78E+02 8.37E-01 G
                         766.41 2.227E+02 ?(P 7.253E+02 9.69E+01 2.94E-01 G

U-235    N  -3.4347E+00                                     2.57E+11
                         143.79-3.435E+00  (P 1.159E+01 8.85E+01 1.10E+01 G
                         205.33-9.444E-01 + P 1.673E+01 8.77E+02 5.01E+00 G
                         163.38-6.417E-01 & P 2.536E+01 1.10E+03 5.08E+00 G

AM-241   T   6.8035E-01                                     1.58E+05
                          59.54 6.804E-01 &(  3.651E+00 1.88E+02 3.59E+01 G

Ir-192   F  -1.8447E-01                                     7.40E+01
                         316.49-4.814E-01 ?(  1.633E+00 1.01E+02 8.70E+01 G
                         468.06-8.734E-01 &   3.468E+00 1.18E+02 5.18E+01 G
                         308.44 6.297E-01  (  6.166E+00 2.90E+02 3.18E+01 G

Cs-136   F  -7.9781E-01                                     1.30E+01
                         818.50-7.978E-01 ?(  2.700E+00 1.01E+02 1.00E+02 G
                        1048.07-9.527E-01 +   2.061E+00 6.55E+01 8.00E+01 G
                         340.57-9.430E-01 &   4.446E+00 1.41E+02 4.69E+01 G

Nd-147      -1.0080E+00                                     1.11E+01
                         531.00-1.008E+00 &(  8.110E+00 3.14E+02 1.30E+01 G
                          91.10-3.637E-07 %   6.498E+00 5.31E+08 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
```

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	135.	-14.	-0.008	142.23	-4.125E+00	
AM-241	59.54	207.	13.	0.007	188.34	6.804E-01	
TH-234	63.29	262.	-9.	-0.005	249.41	-4.206E+00	P
BA-133	80.99	156.	20.	0.011	106.86	8.453E-01	P
EU-155	86.54	916.	-27.	-0.015	159.99	-1.211E+00	
TH-234	92.59	867.	-45.	-0.025	52.45	-1.083E+01	P
Gd-153	97.50	289.	-23.	-0.013	108.90	-9.898E-01	
Np-239	99.50	312.	-5.	-0.003	520.36	-4.216E-01	
Gd-153	103.20	351.	-23.	-0.013	118.83	-1.354E+00	
Np-239	103.70	305.	21.	0.012	119.87	1.138E+00	
EU-155	105.31	286.	13.	0.007	181.81	8.154E-01	P
EU-154	123.10	192.	3.	0.002	621.10	1.010E-01	
PA-234	131.29	423.	-9.	-0.005	330.93	-6.472E-01	
CE-144	133.54	471.	-25.	-0.014	122.30	-3.040E+00	
HF-181	136.30	437.	14.	0.008	211.42	3.216E+00	
Tc-99m	140.51	366.	-6.	-0.003	493.43	-8.596E-02	
U-235	143.79	378.	-28.	-0.015	88.48	-3.435E+00	P
CE-141	145.44	348.	21.	0.012	128.21	5.934E-01	
Ba-140	162.66	312.	-22.	-0.012	115.53	-5.153E+00	
CE-139	165.85	258.	20.	0.011	114.66	3.674E-01	
Cf-251	176.60	120.	10.	0.006	197.48	8.911E-01	
TH-229	193.51	143.	-21.	-0.012	104.76	-7.616E+00	
U-235	205.33	103.	-3.	-0.002	877.31	-9.444E-01	P
TH-229	210.85	190.	-24.	-0.014	102.66	-1.392E+01	
Cf-251	227.00	107.	-9.	-0.005	214.77	-2.471E+00	
Cd-113m	263.70	126.	2.	0.001	682.58	7.745E+02	
BI-210M	265.83	132.	-2.	-0.001	700.29	-9.346E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	279.20	134.	-13.	-0.007	132.10	-3.222E-01	
I-131	284.30	88.	6.	0.003	317.43	1.910E+00	P
PA-231	300.07	338.	-18.	-0.010	144.29	-1.617E+01	
PA-233	300.18	356.	-16.	-0.009	168.73	-5.621E+00	
Ir-192	308.44	336.	9.	0.005	289.96	6.297E-01	
PA-233	312.01	417.	-21.	-0.012	81.74	-1.290E+00	P
Ir-192	316.49	166.	-19.	-0.010	101.20	-4.814E-01	
CR-51	320.08	193.	-19.	-0.011	87.87	-4.429E+00	P
La-140	328.76	51.	7.	0.004	185.88	8.421E-01	
Cf-249	333.44	70.	4.	0.002	363.54	6.556E-01	
Cs-136	340.57	331.	-19.	-0.010	140.56	-9.430E-01	
HF-181	345.83	285.	-19.	-0.010	130.10	-2.980E+00	
BA-133	356.00	301.	-11.	-0.006	225.08	-4.357E-01	
I-131	364.48	59.	2.	0.001	617.60	7.138E-02	
BA-133	383.84	178.	-17.	-0.009	109.60	-4.903E+00	P
Cf-249	387.95	126.	14.	0.008	115.07	5.615E-01	
SN-113	391.69	129.	14.	0.008	118.98	5.690E-01	P
AG-108M	433.94	66.	-16.	-0.009	100.18	-5.155E-01	P
pm-146	453.88	65.	-11.	-0.006	152.31	-4.894E-01	P
Ir-192	468.06	151.	-15.	-0.008	117.89	-8.734E-01	
BE-7	477.59	105.	-15.	-0.008	100.00	-4.325E+00	
HF-181	482.00	106.	11.	0.006	135.76	4.172E-01	
La-140	487.02	40.	11.	0.006	118.17	7.341E-01	P
RU-103	497.05	60.	-15.	-0.008	104.35	-5.152E-01	
RH-106	511.86	33.	127.	0.071	14.60	2.025E+01	
Nd-147	531.00	40.	-4.	-0.002	313.58	-1.008E+00	
Ba-140	537.26	41.	-5.	-0.003	267.63	-6.532E-01	P
CS-134	563.24	37.	-2.	-0.001	767.81	-6.917E-01	P
CS-134	569.32	22.	10.	0.005	74.83	2.182E+00	
PA-234	569.47	23.	8.	0.004	96.54	3.171E+00	
BI-207	569.70	26.	6.	0.003	123.70	2.173E-01	
SB-124	602.73	348.	-4.	-0.002	672.94	-1.438E-01	
RH-106	621.92	269.	11.	0.006	211.90	4.096E+00	
I-131	636.97	42.	11.	0.006	89.99	5.661E+00	
AG-110M	657.76	200.	-9.	-0.005	216.95	-3.781E-01	
PM-144	696.54	9.	4.	0.002	173.94	1.477E-01	P
NB-94	702.63	22.	9.	0.005	114.03	3.613E-01	P
SB-124	722.79	74.	3.	0.002	409.61	1.141E+00	
pm-146	735.72	48.	-16.	-0.009	93.44	-2.901E+00	
pm-146	747.16	35.	-4.	-0.002	263.84	-4.720E-01	P
ZR-95	756.73	17.	10.	0.005	92.07	7.688E-01	
AG-110M	763.94	94.	-20.	-0.011	70.68	-3.919E+00	
NB-95	765.79	122.	-21.	-0.011	78.98	-8.875E-01	
PA-234M	766.41	101.	15.	0.008	96.91	2.227E+02	P
CS-134	795.87	17.	23.	0.013	42.98	1.171E+00	
CS-134	801.95	9.	4.	0.002	153.72	2.110E+00	
CO-58	810.78	94.	-16.	-0.009	89.77	-7.431E-01	P
La-140	815.77	110.	-16.	-0.009	90.32	-3.177E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cs-136	818.50	150.	-18.	-0.010	100.89	-7.978E-01		
MN-54	834.85	28.	3.	0.002	378.59	1.375E-01		
Co-56	846.77	28.	8.	0.004	153.55	3.500E-01		P
NB-94	871.10	40.	-10.	-0.005	97.59	-4.577E-01		
EU-154	873.23	40.	11.	0.006	88.46	4.184E+00		
PA-234	880.53	84.	-15.	-0.008	90.49	-1.188E+01		
PA-234	883.24	99.	-7.	-0.004	202.97	-3.512E+00		
AG-110M	937.49	19.	2.	0.001	398.21	3.396E-01		
PA-234	946.02	19.	7.	0.004	130.32	2.755E+00		
EU-154	996.33	51.	2.	0.001	470.30	1.071E+00		
PA-234M	1001.00	56.	-3.	-0.002	377.69	-1.805E+01		P
EU-154	1004.77	65.	-11.	-0.006	106.53	-3.268E+00		
Cs-136	1048.07	35.	-14.	-0.008	65.47	-9.527E-01		
RH-106	1050.36	34.	10.	0.006	88.30	3.496E+01		
BI-207	1063.66	15.	5.	0.003	196.14	3.330E-01		P
Ga-68	1077.40	35.	-3.	-0.002	437.37	-6.043E+00		
FE-59	1099.25	30.	-14.	-0.008	87.20	-1.447E+00		
ZN-65	1115.55	41.	10.	0.006	92.90	1.165E+00		
Sc-46	1120.55	63.	10.	0.006	113.26	5.928E-01		
Ta-182	1121.30	75.	4.	0.002	296.18	6.879E-01		
CO-60	1173.24	15.	10.	0.006	91.17	5.925E-01		P
Ta-182	1189.05	15.	11.	0.006	85.41	3.953E+00		
Ta-182	1221.41	16.	3.	0.002	308.52	6.804E-01		
Co-56	1238.28	37.	3.	0.001	524.40	2.498E-01		
NA-22	1274.53	32.	-12.	-0.007	72.65	-7.599E-01		
CO-60	1332.50	11.	-1.	-0.001	961.56	-6.221E-02		P
AG-110M	1384.30	0.	10.	0.005	33.28	2.690E+00		P
La-140	1596.21	23.	-13.	-0.007	152.43	-1.010E+00		P
SB-124	1690.98	6.	4.	0.002	156.12	6.608E-01		
Co-56	1771.35	42.	-2.	-0.001	463.68	-1.058E+00		
y-88	1836.06	1.	5.	0.003	47.20	4.629E-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	-4.3246E+00	-4.3247E+00	1.000E+02%	1.45E+01
NA-22	#A	-7.5986E-01	-7.5987E-01	7.265E+01%	1.84E+00
K-40		2.2163E+02	2.2163E+02	5.793E+00%	1.24E+01
Sc-46	#A	2.9642E-01	2.9643E-01	1.133E+02%	2.44E+00
CR-51	#A	-4.4289E+00	-4.4291E+00	8.787E+01%	1.55E+01
MN-54	#A	1.3745E-01	1.3745E-01	3.786E+02%	1.25E+00
FE-59	#A	-1.4473E+00	-1.4474E+00	8.720E+01%	2.82E+00
Co-56	#A	3.1012E-01	3.1012E-01	1.536E+02%	1.28E+00
CO-57	#A	-1.5180E-02	-1.5180E-02	2.090E+03%	1.09E+00

CO-58	#A	-7.4313E-01	-7.4315E-01	8.977E+01%	2.16E+00
CO-60	#A	2.6501E-01	2.6501E-01	9.117E+01%	1.19E+00
ZN-65	#A	1.1647E+00	1.1647E+00	9.290E+01%	3.67E+00
NB-94	#A	3.6134E-01	3.6134E-01	1.140E+02%	1.01E+00
ZR-95	#A	7.6880E-01	7.6881E-01	9.207E+01%	1.73E+00
NB-95	#A	-8.8746E-01	-8.8747E-01	7.898E+01%	2.33E+00
RU-103	#A	-5.1519E-01	-5.1521E-01	1.043E+02%	1.33E+00
RH-106	#A	8.2867E+00	8.2867E+00	8.830E+01%	2.93E+01
AG-108M	#A	-5.1554E-01	-5.1554E-01	1.002E+02%	1.27E+00
AG-110M	#A	5.8643E-01	5.8643E-01	3.328E+01%	3.34E+00
SN-113	#A	5.6897E-01	5.6897E-01	1.190E+02%	2.28E+00
SB-124	#A	1.8989E-01	1.8989E-01	1.561E+02%	3.28E+00
SB-125	#C	4.2380E+00	4.2380E+00	2.722E+01%	3.18E+00
I-131	#A	6.1194E-01	6.1203E-01	8.999E+01%	1.17E+00
Gd-153	#A	-9.8976E-01	-9.8977E-01	1.089E+02%	3.60E+00
Ga-68	#A	-5.8935E+00	-6.0429E+00	4.374E+02%	6.10E+01
Tc-99m	#A	-8.5561E-02	-8.5964E-02	4.934E+02%	1.43E+00
BA-133	#A	-4.3565E-01	-4.3565E-01	2.251E+02%	3.31E+00
CS-134	#A	7.3382E-01	7.3382E-01	4.298E+01%	3.29E+00
CS-137		6.9970E+00	6.9970E+00	1.016E+01%	1.04E+00
CE-139	#A	3.6744E-01	3.6745E-01	1.147E+02%	1.41E+00
Ba-140	#A	-6.5315E-01	-6.5321E-01	2.676E+02%	4.40E+00
La-140	#A	-2.8467E-01	-2.8470E-01	8.929E+01%	1.97E+00
CE-141	#A	5.9340E-01	5.9342E-01	1.282E+02%	2.55E+00
CE-144	#A	-3.0395E+00	-3.0396E+00	1.223E+02%	1.24E+01
PM-144	#A	1.4765E-01	1.4765E-01	1.739E+02%	6.71E-01
EU-152	A	1.5017E+00	1.5017E+00	5.903E+01%	7.60E+00
EU-154	#A	4.1839E+00	4.1839E+00	8.846E+01%	1.25E+01
EU-155	#A	8.1543E-01	8.1543E-01	1.818E+02%	4.99E+00
HF-181	#A	6.0680E-01	6.0681E-01	1.256E+02%	1.92E+00
Ta-182	#A	1.3626E+00	1.3626E+00	8.541E+01%	7.07E+00
Hg-203	#A	-3.2219E-01	-3.2220E-01	1.321E+02%	1.44E+00
TL-208	#	6.5141E+00	6.5141E+00	9.005E+00%	8.12E-01
pm-146	#A	-4.7204E-01	-4.7204E-01	2.638E+02%	3.74E+00
y-88	#A	2.3175E-01	2.3175E-01	4.720E+01%	1.20E+00
Cd-113m	#A	7.7446E+02	7.7446E+02	6.826E+02%	1.82E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.90E+01
Cf-251	#A	8.9107E-01	8.9107E-01	1.975E+02%	4.79E+00
Cf-249	#A	5.7938E-01	5.7938E-01	1.151E+02%	2.18E+00
Sn-126	#A	4.2432E+00	4.2432E+00	1.046E+02%	1.48E+01
PB-210	A	1.1716E+01	1.1716E+01	8.313E+01%	3.01E+01
PB-212		1.9116E+01	1.9116E+01	5.409E+00%	1.75E+00
PB-214		1.3905E+01	1.3905E+01	7.673E+00%	2.01E+00
BI-207	#A	2.6737E-01	2.6737E-01	1.159E+02%	9.33E-01
BI-212	#	2.4437E+01	2.4437E+01	1.887E+01%	7.90E+00
BI-214	#	1.3295E+01	1.3295E+01	9.506E+00%	2.08E+00
BI-210M	#A	-9.3455E-02	-9.3455E-02	7.003E+02%	2.26E+00
AC-228		1.8490E+01	1.8490E+01	8.342E+00%	2.23E+00
TH-227	#A	-4.1254E+00	-4.1254E+00	1.422E+02%	1.68E+01

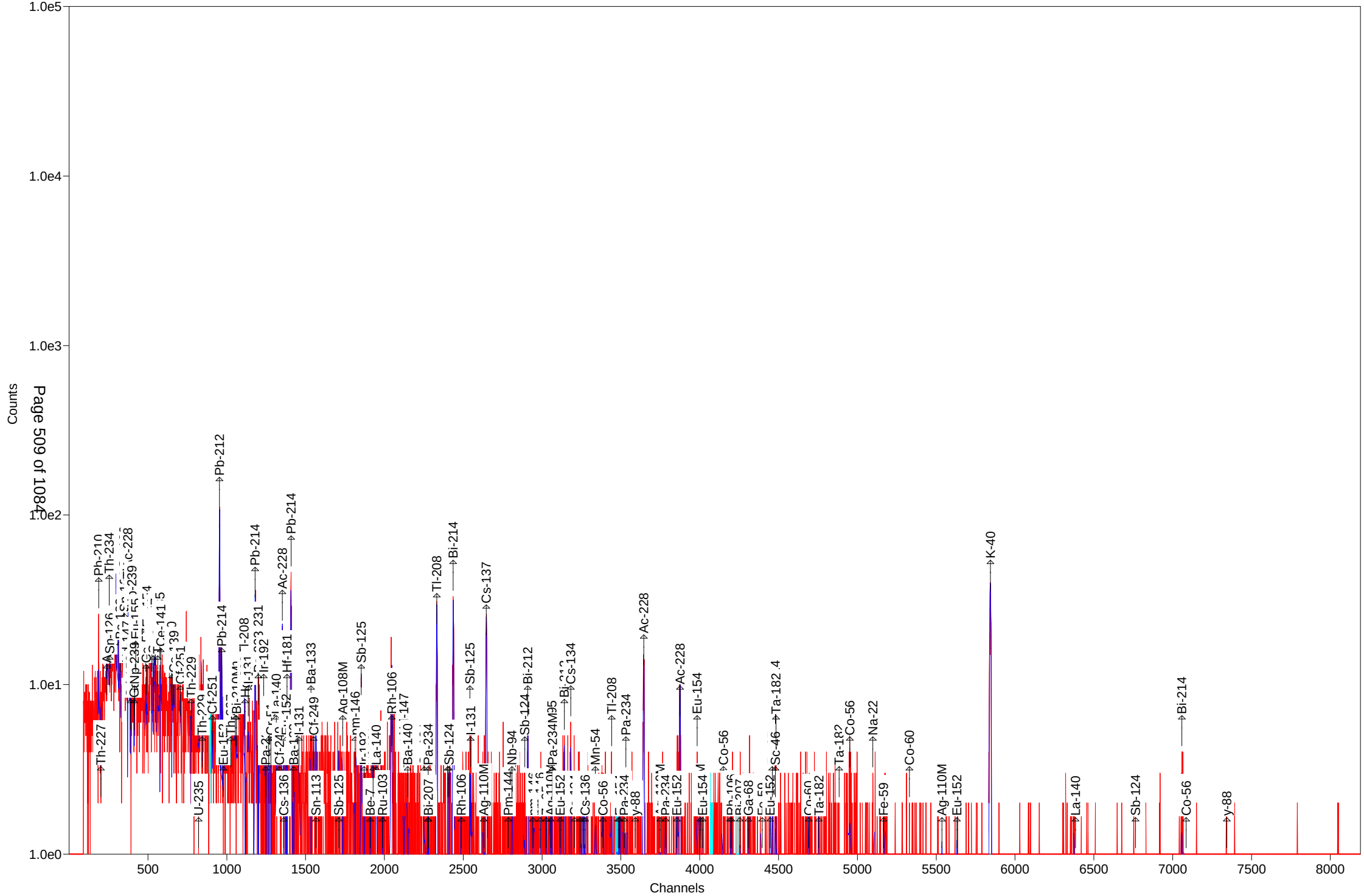
TH-229 #A	-7.6155E+00	-7.6155E+00	1.048E+02%		2.14E+01
TH-234 #A	-4.2059E+00	-4.2059E+00	2.494E+02%		3.60E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.05E+01
PA-233 #A	-1.2898E+00	-1.2898E+00	8.174E+01%		6.09E+00
PA-234 #A	1.2948E+00	1.2948E+00	9.654E+01%		7.22E+00
PA-234M#A	4.4538E+01	4.4538E+01	9.691E+01%		2.36E+02
U-235 #A	-3.4347E+00	-3.4347E+00	8.848E+01%		1.16E+01
AM-241 #A	6.8035E-01	6.8035E-01	1.883E+02%		3.65E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.49E+01
Ir-192 #A	-1.8447E-01	-1.8447E-01	1.012E+02%		1.63E+00
Cs-136 #A	-7.9773E-01	-7.9781E-01	1.009E+02%		2.70E+00
Np-239 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.74E+00
Nd-147 #A	-1.0079E+00	-1.0080E+00	3.136E+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) 3.244E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.2438409E+02 Bq/Sample

265170_Gamma_160-18567-A-5-B. 17_Gamma_20161175.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162153

Sample Description: 265170_Gamma_160-18567-A-6-B
Detector: Detector #16
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-6-B

Decay to Time: 9/7/2016 17:44 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:44:41 Real Time: 1826 sec
Analysis Time: 9/7/2016 18:16 Dead Time: 1.41 %
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_2016-09-03_2304.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	3.246E+00	131.2	4.260E+00	4.263E+00	1.443E+01
NA-22	-9.059E-01	66.5	6.025E-01	6.042E-01	1.993E+00
K-40	2.532E+02	5.1	1.279E+01	1.821E+01	1.093E+01
Sc-46	1.208E-01	276.6	3.341E-01	3.341E-01	1.976E+00
CR-51	-4.767E+00	119.5	5.698E+00	5.703E+00	1.906E+01
MN-54	-3.350E-01	147.8	4.951E-01	4.954E-01	1.472E+00
FE-59	-1.854E-01	79.4	1.471E-01	1.474E-01	3.098E+00
Co-56	4.771E-01	83.7	3.994E-01	4.002E-01	1.549E+00
CO-57	1.693E-01	195.0	3.303E-01	3.304E-01	1.114E+00
CO-58	2.536E-01	187.1	4.744E-01	4.746E-01	1.640E+00
CO-60	4.056E-01	125.3	5.082E-01	5.086E-01	1.125E+00
ZN-65	-8.593E-01	166.8	1.433E+00	1.434E+00	4.902E+00
NB-94	-5.662E-01	101.6	5.752E-01	5.759E-01	1.936E+00
ZR-95	-9.776E-01	117.2	1.146E+00	1.147E+00	2.647E+00
NB-95	-8.159E-01	90.7	7.398E-01	7.410E-01	2.130E+00
RU-103	7.521E-02	684.5	5.148E-01	5.148E-01	1.257E+00
RH-106	-2.628E-01	129.2	3.395E-01	3.398E-01	1.307E+01
AG-108M	-5.050E-01	129.3	6.528E-01	6.533E-01	1.296E+00
AG-110M	4.430E-01	75.4	3.340E-01	3.348E-01	2.708E+00
SN-113	5.905E-01	112.2	6.628E-01	6.635E-01	2.231E+00
SB-124	-6.332E-02	39.2	2.482E-02	2.503E-02	3.506E+00
SB-125	-8.429E-01	233.5	1.968E+00	1.969E+00	3.997E+00
I-131	4.341E-01	107.7	4.675E-01	4.681E-01	1.180E+00
Gd-153	-6.754E-01	331.6	2.240E+00	2.240E+00	7.468E+00
Ga-68	-1.600E+01	174.7	2.795E+01	2.797E+01	6.122E+01
Tc-99m	3.242E-01	184.0	5.966E-01	5.969E-01	1.992E+00
BA-133	-5.188E-01	193.5	1.004E+00	1.004E+00	3.377E+00
CS-134	1.850E-01	77.4	1.433E-01	1.436E-01	3.465E+00
CS-137	-4.903E-01	157.8	7.736E-01	7.740E-01	2.146E+00
CE-139	-4.440E-01	96.3	4.274E-01	4.295E-01	1.425E+00
Ba-140	-1.194E+00	98.2	1.172E+00	1.173E+00	5.459E+00
La-140	1.151E+00	27.7	3.193E-01	3.251E-01	5.414E-01
CE-141	5.798E-01	124.0	7.188E-01	7.194E-01	1.835E+00

CE-144	2.910E+00	154.8	4.504E+00	4.507E+00	1.502E+01
PM-144	-2.494E-01	277.7	6.927E-01	6.928E-01	1.680E+00
EU-152	1.129E+00	87.7	9.898E-01	9.915E-01	8.885E+00
EU-154	2.148E+00	77.1	1.655E+00	1.659E+00	9.856E+00
EU-155	0.000E+00	1.#INF	8.866E-01	8.867E-01	5.907E+00
HF-181	4.438E-01	154.5	6.858E-01	6.862E-01	1.987E+00
Ta-182	2.038E+00	80.9	1.648E+00	1.651E+00	6.471E+00
Hg-203	-5.021E-01	93.1	4.674E-01	4.682E-01	1.562E+00
TL-208	8.077E+00	8.9	7.220E-01	8.347E-01	1.113E+00
pm-146	-2.017E+00	90.9	1.833E+00	1.836E+00	4.200E+00
y-88	-7.650E-01	86.1	6.585E-01	6.596E-01	1.466E+00
Cd-113m	-7.362E+03	87.3	6.425E+03	6.443E+03	2.142E+04
Cd-109	-1.054E+01	182.8	1.926E+01	1.927E+01	6.405E+01
Cf-251	3.479E+00	51.7	1.798E+00	1.824E+00	4.498E+00
Cf-249	9.828E-01	94.7	9.305E-01	9.319E-01	2.091E+00
Sn-126	4.745E+00	15.3	7.273E-01	7.742E-01	2.104E+00
PB-210	3.148E+01	47.4	1.493E+01	1.504E+01	3.609E+01
PB-212	2.257E+01	4.9	1.099E+00	1.828E+00	1.922E+00
PB-214	1.483E+01	9.0	1.342E+00	1.547E+00	2.251E+00
BI-207	3.013E-01	141.6	4.267E-01	4.270E-01	1.498E+00
BI-212	2.876E+01	22.4	6.441E+00	6.612E+00	1.096E+01
BI-214	1.498E+01	9.0	1.340E+00	1.550E+00	2.023E+00
BI-210M	6.460E-01	109.9	7.097E-01	7.107E-01	2.383E+00
AC-228	2.146E+01	6.9	1.471E+00	1.834E+00	1.840E+00
TH-227	-6.515E+00	120.6	7.854E+00	7.862E+00	2.623E+01
TH-229	5.304E+00	158.8	8.422E+00	8.432E+00	2.163E+01
TH-234	4.089E-01	69.3	2.835E-01	2.844E-01	5.103E+01
PA-231	-1.444E+01	153.2	2.213E+01	2.214E+01	7.408E+01
PA-233	9.585E-01	181.0	1.735E+00	1.735E+00	5.820E+00
PA-234	1.779E+00	152.4	2.710E+00	2.712E+00	9.039E+00
PA-234M	1.846E+02	26.6	4.904E+01	4.992E+01	2.419E+02
U-235	7.965E-01	261.0	2.079E+00	2.079E+00	1.614E+01
AM-241	-1.894E+00	67.3	1.275E+00	1.279E+00	5.390E+00
Np-237	-3.068E+00	189.7	5.820E+00	5.822E+00	1.935E+01
Ir-192	3.651E-01	85.4	3.117E-01	3.125E-01	2.447E+00
Cs-136	-6.867E-01	85.2	5.849E-01	5.862E-01	1.958E+00
Np-239	-8.555E-02	1860.0	1.591E+00	1.591E+00	5.378E+00
Nd-147	-4.100E+00	101.0	4.139E+00	4.146E+00	9.819E+00
Total	6.168E+02				

Analyst: Mike Aldridge

TestAmerica Inc Spectrum name: 16_Gamma_20162153.An1

Sample description
265170_Gamma_160-18567-A-6-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162153.An1

Acquisition information
Start time: 9/7/2016 5:44:41 PM
Live time: 1800
Real time: 1826
Dead time: 1.41 %
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	9/7/2016 5:44:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-09-03_2304.PBC 9/3/2016 11:04:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1825

***** 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
46.33	96.	27.18	0.91	2.335E-02	46.54	4.250	PBC<MDA	PB210
63.50	-25.	144.28	0.97	3.561E-02	63.29	3.810	PBC<MDA	TH234
74.80	232.	11.66	0.99	4.136E-02				
77.26	320.	8.89	0.99	4.232E-02				
87.22	143.	19.44	0.80	4.532E-02	86.49	13.100	1.343E+01	Np237
					86.54	30.700	5.731E+00	EU155
					86.94	9.040	1.942E+01	Sn126
					87.57	37.500	4.667E+00	Sn126
					88.04	3.790	4.607E+01	Cd109
92.61	36.	69.34	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
122.06	12.	195.04	1.03	4.729E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.693E-01	CO57
123.10	8.	334.27	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154
131.29	27.	152.35	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	27.	154.55	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
134.88	27.	154.76	1.04	4.612E-02	133.54	11.090	PBC<MDA	CE144
136.30	21.	201.62	1.04	4.576E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.371E+00	CO57
139.56	23.	184.00	1.05	4.516E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	22.	123.98	1.05	4.440E-02	145.44	48.200	PBC<MDA	CE141
154.28	25.	45.73	0.61	4.290E-02				
162.66	16.	154.64	1.07	4.136E-02	162.66	6.220	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	42.	51.68	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
193.51	16.	158.79	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
205.33	9.	260.99	1.11	3.577E-02	205.33	5.010	PBC<MDA	U235
227.00	4.	525.05	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.58	566.	4.87	1.14	3.218E-02	238.63	43.300	2.257E+01	PB212
241.98	109.	15.82	1.14	3.185E-02	242.00	7.430	2.558E+01	PB214
265.83	17.	109.85	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
276.92	43.	29.61	1.40	2.890E-02	277.28	6.310	1.311E+01	TL208
295.21	180.	11.37	1.03	2.764E-02	295.09	19.300	1.871E+01	PB214
300.07	65.	20.20	1.48	2.732E-02	300.03	3.280	4.050E+01	PB212
					300.07	2.460	5.400E+01	PA231
					300.18	6.200	2.143E+01	PA233
312.85	16.	180.96	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
328.76	19.	152.47	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
333.42	19.	154.45	1.22	2.533E-02	333.44	15.510	PBC<MDA	Cf249
338.30	107.	13.76	1.23	2.506E-02	338.32	12.010	1.983E+01	AC228
340.57	20.	156.91	1.23	2.494E-02	340.57	46.900	PBC<MDA	Cs136
351.86	245.	9.05	0.98	2.437E-02	351.93	37.600	1.483E+01	PB214
383.84	15.	107.40	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
387.95	15.	109.53	1.27	2.271E-02	387.95	66.000	PBC<MDA	Cf249
391.69	15.	112.24	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
468.06	18.	85.39	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
477.60	12.	131.23	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
497.05	2.	684.52	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.86	93.	33.21	2.63	1.856E-02	511.86	20.000	1.392E+01	RH106
563.24	7.	195.69	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
569.32	7.	163.86	1.43	1.717E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.632E+00	PA234
					569.70	97.740	2.208E-01	BI207
569.70	4.	340.30	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.513E+00	PA234
					569.70	97.740	1.270E-01	BI207
583.39	216.	8.42	1.29	1.686E-02	583.02	84.500	8.077E+00	TL208
609.41	203.	8.95	1.74	1.633E-02	609.31	46.090	1.498E+01	BI214
636.62	12.	107.70	1.49	1.581E-02	635.89	11.310	PBC<MDA	SB125
					636.97	7.170	6.128E+00	I131
657.76	17.	75.39	1.51	1.543E-02	657.76	94.640	PBC<MDA	AG110M
727.12	56.	22.40	1.59	1.433E-02	727.17	7.550	2.876E+01	BI212
735.72	12.	88.28	1.58	1.421E-02	735.72	22.500	PBC<MDA	pm146
767.09	36.	26.57	4.51	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.869E+02	PA234M
778.92	10.	87.67	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.56	4.	323.15	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
795.87	14.	78.87	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
810.78	6.	187.08	1.64	1.322E-02	810.78	99.460	PBC<MDA	CO58
859.99	56.	20.76	1.11	1.264E-02	860.56	12.420	1.970E+01	TL208
873.23	6.	137.83	1.70	1.251E-02	873.23	12.270	PBC<MDA	EU154
880.53	2.	572.44	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.33	133.	9.20	1.44	1.211E-02	911.07	29.000	2.108E+01	AC228
969.08	84.	12.21	1.63	1.157E-02	968.97	17.460	2.320E+01	AC228
1000.50	13.	91.79	1.81	1.129E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	2.	646.79	1.84	1.099E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	6.	185.86	1.85	1.089E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	141.62	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1119.76	13.	102.30	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	276.56	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.416E-01	Sc46
					1121.30	34.900	6.924E-01	Ta182
1120.77	16.	80.88	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.392E+00	Ta182
1187.17	5.	277.13	1.96	9.916E-03	1189.05	16.200	PBC<MDA	Ta182
1222.04	8.	138.39	1.99	9.717E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	18.	83.71	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1274.54	13.	77.05	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.181E+00	EU154
1291.60	9.	112.49	2.05	9.314E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	7.	125.29	2.08	9.097E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	4.	215.06	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	17.	42.42	2.14	8.723E-03	1408.00	21.005	5.154E+00	EU152
1461.05	412.	5.05	2.02	8.481E-03	1460.83	10.670	2.532E+02	K40
1596.21	13.	27.74	2.29	7.928E-03	1596.21	95.400	9.550E-01	La140
1690.98	7.	39.19	2.37	7.585E-03	1690.98	47.790	1.149E+00	SB124
1764.75	6.	149.36	2.43	7.342E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	10.	83.06	2.43	7.320E-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
298.85	74.76	250.	232.	5.621E+03	11.66	0.985	- D
308.70	77.22	244.	320.	7.564E+03	8.89	0.988	- D
616.62	154.28	47.	25.	5.905E+02	45.73	0.611	- 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	185.03	46.33	178.	57.	0.031	47.42	0.912
TH-227	200.26	50.14	435.	-25.	-0.014	120.56	0.963s
AM-241	237.83	59.54	590.	-41.	-0.023	67.33	0.971s
TH-234	252.82	63.29	684.	-25.	-0.014	144.28	0.975s
Sn-126	256.79	64.28	781.	-36.	-0.020	110.93	0.976
BA-133	323.60	80.99	1373.	-34.	-0.019	82.71	0.991
Np-237	345.59	86.49	1903.	-33.	-0.018	189.67	0.996
EU-155	345.80	86.54	1870.	-33.	-0.018	188.05	0.996s
Sn-126	347.39	86.94	1837.	-33.	-0.018	186.37	0.997
Sn-126	349.91	87.57	176.	145.	0.081	15.33	0.997D
Cd-109	351.79	88.04	1771.	-33.	-0.018	182.80	0.998s
Nd-147	364.02	91.10	1779.	-34.	-0.019	177.79	1.001s
TH-234	369.98	92.59	295.	36.	0.020	69.34	1.002D
AC-228	373.02	93.35	1659.	-34.	-0.019	171.40	1.003s
Gd-153	389.61	97.50	1612.	-17.	-0.010	331.64	1.007s
Gd-153	412.40	103.20	456.	-31.	-0.017	100.19	1.012s
Np-239	414.40	103.70	487.	-18.	-0.010	171.56	1.012s
EU-155	420.85	105.31	505.	0.	0.000	1000.00	1.014s
EU-152	486.67	121.78	384.	-30.	-0.017	93.14	1.029s
CO-57	487.81	122.06	283.	12.	0.007	195.04	1.029s
EU-154	491.96	123.10	310.	8.	0.004	334.27	1.030s
PA-234	524.73	131.29	816.	27.	0.015	152.35	1.038s
HF-181	531.64	133.02	843.	27.	0.015	154.55	1.039s
CE-144	533.70	133.54	846.	27.	0.015	154.76	1.040s
HF-181	544.74	136.30	873.	21.	0.012	201.62	1.042s
Tc-99m	561.57	140.51	871.	23.	0.013	184.00	1.046s
CE-141	581.29	145.44	213.	22.	0.012	123.98	1.050s
Ba-140	650.14	162.66	280.	16.	0.009	154.64	1.066s
CE-139	662.90	165.85	313.	-27.	-0.015	96.26	1.069s
Cf-251	705.88	176.60	125.	42.	0.024	51.68	1.079s
TH-229	773.49	193.51	172.	16.	0.009	158.79	1.094
U-235	820.76	205.33	172.	9.	0.005	260.99	1.105s
TH-229	842.82	210.85	242.	-31.	-0.017	94.53	1.110s
Cf-251	907.40	227.00	147.	4.	0.002	525.05	1.125
PB-212	953.91	238.63	95.	566.	0.314	4.87	1.136D
PB-214	967.37	242.00	85.	110.	0.061	15.19	1.139D
EU-152	978.14	244.69	998.	-19.	-0.010	146.79	1.141s
TH-227	1024.32	256.24	168.	-26.	-0.014	99.79	1.152s
Cd-113m	1054.15	263.70	204.	-24.	-0.013	87.28	1.158s
BI-210M	1062.67	265.83	172.	17.	0.010	109.85	1.160s
TL-208	1107.02	276.92	38.	43.	0.024	29.61	1.403
Hg-203	1116.13	279.20	184.	-21.	-0.012	93.09	1.173s
I-131	1136.52	284.30	116.	-21.	-0.012	102.76	1.177s
PB-214	1180.13	295.21	54.	180.	0.100	11.37	1.034

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	1199.58	300.07	32.	65.	0.036	20.20	1.484s
PA-231	1199.58	300.07	516.	-20.	-0.011	159.82	1.192s
PA-233	1200.02	300.18	495.	-20.	-0.011	156.70	1.192
PA-231	1209.90	302.65	475.	-20.	-0.011	153.24	1.194s
BA-133	1210.70	302.85	455.	-12.	-0.006	261.64	1.194s
Ir-192	1233.05	308.44	448.	-6.	-0.003	546.21	1.199s
PA-233	1247.34	312.01	438.	16.	0.009	180.96	1.202s
Ir-192	1265.24	316.49	443.	0.	0.000	1000.00	1.206s
CR-51	1279.62	320.08	342.	-22.	-0.012	119.52	1.210s
La-140	1314.31	328.76	427.	19.	0.011	152.47	1.217s
Cf-249	1333.02	333.44	442.	19.	0.011	154.45	1.222s
AC-228	1352.54	338.32	56.	107.	0.060	13.76	1.226D
Cs-136	1361.54	340.57	461.	20.	0.011	156.91	1.228s
HF-181	1382.56	345.83	106.	-20.	-0.011	65.58	1.233s
PB-214	1406.68	351.86	54.	245.	0.136	9.05	0.979s
BA-133	1423.24	356.00	360.	-14.	-0.008	193.52	1.242s
I-131	1457.16	364.48	68.	-2.	-0.001	966.46	1.250s
BA-133	1534.57	383.84	127.	15.	0.008	107.40	1.267s
Cf-249	1551.01	387.95	133.	15.	0.008	109.53	1.271s
SN-113	1565.96	391.69	141.	15.	0.009	112.24	1.274s
SB-125	1710.67	427.88	82.	-9.	-0.005	233.54	1.307s
AG-108M	1734.91	433.94	79.	-17.	-0.010	129.26	1.312s
SB-125	1852.61	463.37	138.	0.	0.000	1000.00	1.338s
Ir-192	1871.38	468.06	110.	18.	0.010	85.39	1.342s
BE-7	1909.51	477.60	118.	12.	0.007	131.23	1.351s
HF-181	1927.12	482.00	130.	0.	0.000	1000.00	1.355s
RU-103	1987.33	497.05	61.	2.	0.001	684.52	1.368s
RH-106	2046.57	511.86	126.	93.	0.052	33.21	2.631s
Nd-147	2123.10	531.00	69.	-17.	-0.010	100.96	1.398s
Ba-140	2148.14	537.26	74.	-18.	-0.010	120.98	1.404s
CS-134	2252.03	563.24	48.	7.	0.004	195.69	1.427s
CS-134	2276.36	569.32	56.	7.	0.004	163.86	1.432s
PA-234	2276.96	569.47	83.	-15.	-0.008	88.83	1.432s
BI-207	2277.89	569.70	83.	4.	0.002	340.30	1.432s
TL-208	2332.62	583.39	31.	207.	0.115	8.94	1.288
SB-125	2401.07	600.50	474.	-19.	-0.011	163.74	1.460
SB-124	2409.99	602.73	455.	-19.	-0.011	160.28	1.462s
CS-134	2417.91	604.71	436.	-19.	-0.011	156.77	1.463s
BI-214	2436.70	609.41	28.	203.	0.113	8.95	1.736
RU-103	2440.26	610.30	417.	-19.	-0.011	152.89	1.468s
AG-108M	2456.19	614.28	398.	-15.	-0.008	195.67	1.472
RH-106	2486.73	621.92	56.	-9.	-0.005	179.51	1.479s
I-131	2546.96	636.97	38.	12.	0.007	107.70	1.492s
AG-110M	2630.10	657.76	70.	17.	0.009	75.39	1.510s
CS-137	2645.69	661.66	106.	-12.	-0.006	157.80	1.513
PM-144	2785.22	696.54	80.	-7.	-0.004	277.70	1.544s
NB-94	2809.57	702.63	104.	-15.	-0.008	101.59	1.549s
SB-124	2890.19	722.79	108.	-12.	-0.007	125.83	1.567s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2890.80	722.94	96.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	104.	-8.	-0.004	195.28	1.567s
ZR-95	2895.84	724.20	96.	0.	0.000	1000.00	1.568s
BI-212	2907.52	727.12	16.	56.	0.031	22.40	1.586
pm-146	2941.93	735.72	23.	12.	0.007	88.28	1.578s
pm-146	2987.69	747.16	51.	-17.	-0.010	90.91	1.588s
ZR-95	3025.97	756.73	51.	-13.	-0.007	117.23	1.596s
AG-110M	3054.82	763.94	98.	-16.	-0.009	112.34	1.602s
NB-95	3062.21	765.79	115.	-20.	-0.011	90.68	1.604s
PA-234M	3067.43	767.09	9.	36.	0.020	26.57	4.507s
EU-152	3114.73	778.92	14.	10.	0.005	87.67	1.615s
BI-212	3140.74	785.42	28.	4.	0.002	323.15	1.621s
CS-134	3182.53	795.87	53.	14.	0.008	78.87	1.630s
CS-134	3206.86	801.95	113.	-19.	-0.010	82.95	1.635s
CO-58	3242.16	810.78	60.	6.	0.003	187.08	1.643
La-140	3262.14	815.77	66.	0.	0.000	1000.00	1.647s
Cs-136	3273.06	818.50	87.	-16.	-0.009	85.18	1.649s
MN-54	3338.46	834.85	46.	-8.	-0.004	147.79	1.663s
Co-56	3386.15	846.77	50.	-7.	-0.004	225.27	1.674s
TL-208	3439.02	859.99	12.	56.	0.031	20.76	1.113s
NB-94	3483.47	871.10	32.	-2.	-0.001	483.74	1.695s
EU-154	3492.00	873.23	28.	6.	0.003	137.83	1.696s
PA-234	3521.21	880.53	76.	2.	0.001	572.44	1.703s
PA-234	3532.05	883.24	78.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	78.	0.	0.000	1000.00	1.706
Sc-46	3556.21	889.28	78.	0.	0.000	1000.00	1.710s
y-88	3591.26	898.04	35.	-16.	-0.009	86.07	1.718s
AC-228	3644.44	911.33	4.	133.	0.074	9.20	1.442
AG-110M	3749.09	937.49	70.	-23.	-0.013	50.39	1.751s
PA-234	3783.21	946.02	40.	-3.	-0.002	349.34	1.759s
EU-152	3855.58	964.11	182.	-22.	-0.012	88.32	1.774s
AC-228	3875.46	969.08	6.	84.	0.047	12.21	1.629
EU-154	3984.48	996.33	79.	-14.	-0.008	93.82	1.801s
PA-234M	4003.15	1001.00	68.	13.	0.007	91.79	1.805s
Co-56	4150.56	1037.84	32.	2.	0.001	646.79	1.836s
Cs-136	4191.49	1048.07	46.	-8.	-0.004	132.33	1.845s
RH-106	4200.65	1050.36	50.	6.	0.003	185.86	1.847s
BI-207	4253.86	1063.66	21.	8.	0.004	141.62	1.858s
Ga-68	4308.84	1077.40	43.	-9.	-0.005	174.65	1.870s
FE-59	4396.27	1099.25	43.	-14.	-0.008	111.96	1.888s
EU-152	4447.58	1112.07	104.	-16.	-0.009	92.70	1.899s
ZN-65	4461.46	1115.55	88.	-8.	-0.005	166.76	1.901s
BI-214	4480.43	1120.29	80.	13.	0.007	102.30	1.906s
Sc-46	4481.49	1120.55	75.	5.	0.003	276.56	1.906s
Ta-182	4484.49	1121.30	72.	16.	0.009	80.88	1.906s
CO-60	4692.30	1173.24	47.	-7.	-0.004	202.28	1.950
Ta-182	4755.57	1189.05	34.	5.	0.003	277.13	1.963s
Ta-182	4885.06	1221.41	23.	8.	0.005	138.39	1.990

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4952.57	1238.28	40.	18.	0.010	83.71	2.004s
NA-22	5097.62	1274.53	44.	-15.	-0.009	66.51	2.034s
EU-154	5097.68	1274.54	44.	13.	0.007	77.05	2.034s
FE-59	5165.91	1291.60	17.	9.	0.005	112.49	2.048s
CO-60	5329.61	1332.50	11.	7.	0.004	125.29	2.081s
AG-110M	5536.89	1384.30	12.	4.	0.002	215.06	2.124s
EU-152	5631.75	1408.00	6.	17.	0.009	42.42	2.143s
K-40	5844.06	1461.05	10.	412.	0.229	5.05	2.016
La-140	6385.02	1596.21	0.	13.	0.007	27.74	2.294s
SB-124	6764.37	1690.98	1.	7.	0.004	39.19	2.369
BI-214	7058.61	1764.49	35.	6.	0.003	149.36	2.427s
Co-56	7086.08	1771.35	32.	10.	0.006	83.06	2.433s
y-88	7345.12	1836.06	13.	-7.	-0.004	132.21	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	3.2459E+00				5.31E+01	
			477.60	3.246E+00	&(	1.443E+01 1.31E+02 1.05E+01	G
NA-22	C	-9.0593E-01				9.50E+02	
			1274.53	-9.059E-01	?(	1.993E+00 6.65E+01 9.99E+01	G
K-40	N	2.5321E+02				4.66E+11	
			1460.83	2.532E+02	(P	1.093E+01 5.05E+00 1.07E+01	G
Sc-46	F	1.2079E-01				8.38E+01	
			889.28	0.000E+00	&(	1.976E+00 1.00E+03 1.00E+02	G
			1120.55	2.416E-01	*(	2.314E+00 2.77E+02 1.00E+02	G
CR-51	F	-4.7673E+00				2.77E+01	
			320.08	-4.767E+00	&(	1.906E+01 1.20E+02 9.94E+00	G
MN-54	C	-3.3502E-01				3.12E+02	
			834.85	-3.350E-01	?(P	1.472E+00 1.48E+02 1.00E+02	G
FE-59	F	-1.8536E-01				4.45E+01	
			1099.25	-1.277E+00	?(	3.098E+00 1.12E+02 5.65E+01	G
			1291.60	1.243E+00	?(	3.027E+00 1.12E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 4.7714E-01					7.73E+01	
		846.77	-3.041E-01	&(	1.549E+00	2.25E+02	9.99E+01 G
		1238.28	1.608E+00	&(P	2.805E+00	8.37E+01	6.61E+01 G
		1037.84	7.157E-01	?(	1.040E+01	6.47E+02	1.41E+01 G
		1771.35	5.066E+00	?	1.419E+01	8.31E+01	1.55E+01 A
CO-57	C 1.6933E-01					2.72E+02	
		122.06	1.693E-01	&(	1.114E+00	1.95E+02	8.56E+01 G
		136.47	8.678E-07	%	1.616E+01	5.54E+08	1.07E+01 G
CO-58	C 2.5357E-01					7.09E+01	
		810.78	2.536E-01	?(	1.640E+00	1.87E+02	9.95E+01 G
CO-60	F 4.0564E-01					1.93E+03	
		1332.50	4.056E-01	?(P	1.125E+00	1.25E+02	1.00E+02 G
		1173.24	-3.647E-01	+ P	1.916E+00	2.02E+02	9.99E+01 G
ZN-65	F -8.5930E-01					2.44E+02	
		1115.55	-8.593E-01	&(	4.902E+00	1.67E+02	5.06E+01 G
NB-94	I -5.6620E-01					7.41E+06	
		702.63	-5.662E-01	(	1.936E+00	1.02E+02	9.79E+01 G
		871.10	-7.399E-02	+	1.284E+00	4.84E+02	9.99E+01 G
ZR-95	I -9.7764E-01					6.40E+01	
		756.73	-9.776E-01	?(	2.647E+00	1.17E+02	5.45E+01 G
		724.20	0.000E+00	+	4.234E+00	1.00E+03	4.42E+01 G
NB-95	I -8.1586E-01					6.40E+01	
		765.79	-8.159E-01	?(P	2.130E+00	9.07E+01	9.98E+01 G
RU-103	I 7.5206E-02					3.93E+01	
		497.05	7.521E-02	&(	1.257E+00	6.85E+02	9.09E+01 G
		610.30	-1.131E+01	+	5.795E+01	1.53E+02	5.75E+00 GA
RH-106	I -2.6278E-01					3.74E+02	
		621.92	-3.130E+00	?(	1.307E+01	1.80E+02	9.93E+00 G
		1050.36	1.799E+01	?(	1.161E+02	1.86E+02	1.56E+00 G
		511.86	1.392E+01	?	8.234E+00	3.32E+01	2.00E+01 GA
AG-108M	C -5.0499E-01					1.53E+05	
		433.94	-5.050E-01	?(P	1.296E+00	1.29E+02	9.05E+01 G
		722.94	0.000E+00	+	2.055E+00	1.00E+03	9.08E+01 G
		614.28	-5.539E-01	+	3.642E+00	1.96E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	4.4303E-01					2.50E+02	
			884.68	0.000E+00	?(	2.708E+00	1.00E+03	7.27E+01 G
			657.76	6.313E-01	?(	1.586E+00	7.54E+01	9.46E+01 G
			937.49	-3.139E+00	+ P	5.695E+00	5.04E+01	3.44E+01 G
			1384.30	1.035E+00	?(	4.880E+00	2.15E+02	2.43E+01 G
			763.94	-2.941E+00	+ P	8.796E+00	1.12E+02	2.23E+01 G
SN-113	F	5.9052E-01					1.15E+02	
			391.69	5.905E-01	&(	2.231E+00	1.12E+02	6.40E+01 G
SB-124	F	-6.3323E-02					6.02E+01	
			602.73	-6.529E-01	?(	3.506E+00	1.60E+02	9.83E+01 G
			1690.98	1.149E+00	?(P	1.130E+00	3.92E+01	4.78E+01 G
			722.79	-4.284E+00	+	1.826E+01	1.26E+02	1.08E+01 G
SB-125	I	-8.4287E-01					1.01E+03	
			427.88	-8.429E-01	&(P	3.997E+00	2.34E+02	2.96E+01 G
			600.50	-3.577E+00	+	1.962E+01	1.64E+02	1.79E+01 G
			635.89	5.173E-02	%	1.135E+01	6.17E+03	1.13E+01 G
			463.37	0.000E+00	&	1.527E+01	1.00E+03	1.05E+01 G
I-131	I	4.3411E-01					8.02E+00	
			364.48	-6.561E-02	?(P	1.180E+00	9.66E+02	8.17E+01 G
			284.30	-6.692E+00	+	1.686E+01	1.03E+02	6.14E+00 G
			636.97	6.128E+00	?(	1.532E+01	1.08E+02	7.17E+00 G
Gd-153	F	-6.7543E-01					2.42E+02	
			97.50	-6.754E-01	?(	7.468E+00	3.32E+02	3.00E+01 G
			103.20	-1.642E+00	&	5.478E+00	1.00E+02	2.18E+01 G
Ga-68	C	-1.6005E+01					4.71E-02	
			1077.40	-1.600E+01	?(	6.122E+01	1.75E+02	3.30E+00 G
Tc-99m	I	3.2425E-01					2.51E-01	
			140.51	3.242E-01	&(	1.992E+00	1.84E+02	8.93E+01 G
BA-133	F	-5.1881E-01					3.85E+03	
			356.00	-5.188E-01	?(	3.377E+00	1.94E+02	6.20E+01 G
			302.85	-1.295E+00	+	1.140E+01	2.62E+02	1.83E+01 G
			383.84	4.143E+00	?	1.498E+01	1.07E+02	8.94E+00 GA
			80.99	-1.289E+00	& P	6.559E+00	8.27E+01	3.41E+01 GA
CS-134	I	1.8504E-01					7.54E+02	
			604.71	-6.596E-01	?(	3.465E+00	1.57E+02	9.76E+01 G
			795.87	6.729E-01	?(	1.776E+00	7.89E+01	8.55E+01 G
			569.32	1.403E+00	?(	7.930E+00	1.64E+02	1.54E+01 G
			801.95	-9.047E+00	+	2.505E+01	8.29E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	2.820E+00	?(	1.341E+01	1.96E+02	8.35E+00 G
CS-137	I	-4.9025E-01					1.10E+04	
			661.66	-4.903E-01	(P	2.146E+00	1.58E+02	8.52E+01 G
CE-139	F	-4.4401E-01					1.38E+02	
			165.85	-4.440E-01	&(	1.425E+00	9.63E+01	7.99E+01 G
Ba-140	I	-1.1935E+00					1.28E+01	
			537.26	-2.352E+00	?(P	5.459E+00	1.21E+02	2.44E+01 G
			162.66	3.347E+00	(	1.741E+01	1.55E+02	6.22E+00 G
			304.85	-1.491E-01	% P	4.834E+01	4.26E+03	4.29E+00 G
La-140	I	1.1513E+00					1.28E+01	
			1596.21	9.550E-01	?(	5.414E-01	2.77E+01	9.54E+01 G
			487.02	6.344E-02	&	3.645E+00	1.66E+03	4.55E+01 G
			328.76	2.074E+00	?(	1.059E+01	1.52E+02	2.03E+01 G
			815.77	0.000E+00	-	7.359E+00	1.00E+03	2.33E+01 G
CE-141	I	5.7979E-01					3.25E+01	
			145.44	5.798E-01	&(	1.835E+00	1.24E+02	4.82E+01 G
CE-144	I	2.9104E+00					2.85E+02	
			133.54	2.910E+00	&(	1.502E+01	1.55E+02	1.11E+01 G
PM-144	C	-2.4945E-01					3.63E+02	
			696.54	-2.494E-01	*(P	1.680E+00	2.78E+02	9.90E+01 G
			618.06	-5.293E-07	%	3.258E+00	1.81E+08	9.91E+01 G
EU-152	F	1.1290E+00					4.94E+03	
			344.29	1.827E-01	%(	8.885E+00	1.44E+03	2.65E+01 G
			1112.07	-6.315E+00	+	1.964E+01	9.27E+01	1.36E+01 G
			121.78	-1.247E+00	&	3.863E+00	9.31E+01	2.86E+01 G
			778.92	3.067E+00	?(	6.352E+00	8.77E+01	1.29E+01 G
			964.11	-7.286E+00	&	2.147E+01	8.83E+01	1.46E+01 G
			244.69	-4.359E+00	+ P	3.477E+01	1.47E+02	7.58E+00 G
			1408.00	5.154E+00	?	4.282E+00	4.24E+01	2.10E+01 GA
EU-154	I	2.1478E+00					3.14E+03	
			873.23	2.052E+00	?(	9.856E+00	1.38E+02	1.23E+01 G
			123.10	2.164E-01	-	2.447E+00	3.34E+02	4.08E+01 G
			1274.54	2.181E+00	?(	5.622E+00	7.71E+01	3.52E+01 G
			723.36	-1.432E+00	+	9.572E+00	1.95E+02	2.02E+01 G
			1004.77	2.654E-01	&	1.112E+01	1.19E+03	1.80E+01 G
			996.33	-6.479E+00	&	2.046E+01	9.38E+01	1.06E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F 4.4375E-01					4.24E+01	
		482.00	0.000E+00	&(	1.987E+00	1.00E+03	8.05E+01 G
		133.02	7.441E-01	?(	3.835E+00	1.55E+02	4.33E+01 G
		345.83	-3.061E+00	+ P	7.591E+00	6.56E+01	1.51E+01 G
		136.30	4.327E+00	&(	2.914E+01	2.02E+02	5.85E+00 G
Ta-182	F 2.0378E+00					1.14E+02	
		1121.30	2.392E+00	?(	6.471E+00	8.09E+01	3.49E+01 G
		1221.41	1.765E+00	?(	5.272E+00	1.38E+02	2.70E+01 G
		1189.05	1.729E+00	&(	1.033E+01	2.77E+02	1.62E+01 G
Hg-203	F -5.0208E-01					4.66E+01	
		279.20	-5.021E-01	&(	1.562E+00	9.31E+01	8.15E+01 G
TL-208	N 8.0765E+00					6.98E+02	
		583.02	8.077E+00	(P	1.113E+00	8.94E+00	8.45E+01 G
		277.28	1.311E+01	+ P	9.569E+00	2.96E+01	6.31E+00 G
		860.56	1.970E+01	+ P	6.747E+00	2.08E+01	1.24E+01 G
pm-146	C -2.0166E+00					2.02E+03	
		747.16	-2.017E+00	?(	4.200E+00	9.09E+01	3.40E+01 G
		735.72	2.132E+00	+	4.383E+00	8.83E+01	2.25E+01 G
		453.88	-5.473E-02	% P	1.762E+00	1.72E+03	6.50E+01 G
y-88	F -7.6504E-01					1.07E+02	
		898.04	-7.650E-01	?(	1.466E+00	8.61E+01	9.37E+01 G
		1836.06	-5.767E-01	+	1.551E+00	1.32E+02	9.92E+01 G
Cd-113m	-7.3616E+03					5.33E+03	
		263.70	-7.362E+03	?(	2.142E+04	8.73E+01	6.00E-03 K
Cd-109	F -1.0537E+01					4.53E+02	
		88.04	-1.054E+01	?(	6.405E+01	1.83E+02	3.79E+00 G
Cf-251	T 3.4786E+00					3.28E+05	
		176.60	3.479E+00	?(	4.498E+00	5.17E+01	1.70E+01 G
		227.00	1.147E+00	-	1.565E+01	5.25E+02	6.30E+00 GA
Cf-249	T 9.8285E-01					1.28E+05	
		387.95	5.672E-01	?(	2.091E+00	1.10E+02	6.60E+01 G
		333.44	2.752E+00	?(	1.424E+01	1.54E+02	1.55E+01 G
Sn-126	4.7450E+00					3.65E+07	
		87.57	4.745E+00	+	2.104E+00	1.53E+01	3.75E+01 GA
		64.28	-5.704E+00	(	2.104E+01	1.11E+02	9.70E+00 G
		86.94	-4.437E+00	+	2.750E+01	1.86E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	3.1484E+01					8.14E+03	
			46.54	3.148E+01	(P	3.609E+01	4.74E+01	4.25E+00 G
PB-212	N	2.2570E+01					6.98E+02	
			238.63	2.257E+01	(P	1.922E+00	4.87E+00	4.33E+01 G
			300.03	4.050E+01	+ P	1.794E+01	2.02E+01	3.28E+00 GA
PB-214	N	1.4830E+01					5.84E+05	
			351.93	1.483E+01	@(P	2.251E+00	9.05E+00	3.76E+01 G
			295.09	1.871E+01	+ P	3.858E+00	1.14E+01	1.93E+01 G
			242.00	2.586E+01	+	1.071E+01	1.52E+01	7.43E+00 GA
BI-207	C	3.0133E-01					1.18E+04	
			569.70	1.270E-01	?(	1.498E+00	3.40E+02	9.77E+01 G
			1063.66	5.301E-01	&(	1.675E+00	1.42E+02	7.45E+01 G
BI-212	N	2.8755E+01					6.98E+02	
			727.17	2.876E+01	(	1.096E+01	2.24E+01	7.55E+00 G
			785.42	1.135E+01	- P	8.842E+01	3.23E+02	1.28E+00 GA
BI-214	N	1.4976E+01					5.84E+05	
			609.31	1.498E+01	(P	2.023E+00	8.95E+00	4.61E+01 G
			1120.29	4.568E+00	& P	1.575E+01	1.02E+02	1.51E+01 G
			1764.49	2.880E+00	- P	1.490E+01	1.49E+02	1.54E+01 G
BI-210M	T	6.4602E-01					1.10E+09	
			265.83	6.460E-01	&(	2.383E+00	1.10E+02	5.00E+01 G
			304.90	-4.568E-02	% P	7.410E+00	2.15E+03	2.80E+01 G
AC-228	N	2.1457E+01					2.10E+03	
			911.07	2.108E+01	(	1.840E+00	9.20E+00	2.90E+01 G
			968.97	2.320E+01	(	3.797E+00	1.22E+01	1.75E+01 G
			338.32	1.983E+01	(	6.911E+00	1.38E+01	1.20E+01 G
			93.35	-7.256E+00	-	4.136E+01	1.71E+02	5.56E+00 XA
TH-227	N	-6.5146E+00					7.95E+03	
			50.14	-6.515E+00	?(	2.623E+01	1.21E+02	8.00E+00 G
			256.24	-6.733E+00	+	1.638E+01	9.98E+01	7.00E+00 G
TH-229	N	5.3037E+00					2.68E+06	
			193.51	5.304E+00	?(	2.163E+01	1.59E+02	4.40E+00 G
			210.85	-1.659E+01	+	3.980E+01	9.45E+01	2.99E+00 G
TH-234	N	4.0892E-01					1.63E+12	
			63.29	-1.042E+01	?(P	5.103E+01	1.44E+02	3.81E+00 G
			92.59	7.795E+00	(P	1.775E+01	6.93E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	-1.4442E+01					1.20E+07	
			302.65	-1.444E+01	?(	7.408E+01	1.53E+02	2.88E+00 G
			300.07	-1.677E+01	+	8.971E+01	1.60E+02	2.46E+00 G
PA-233	C	9.5854E-01					7.82E+08	
			312.01	9.585E-01	&(	5.820E+00	1.81E+02	3.60E+01 G
			300.18	-6.656E+00	+	3.491E+01	1.57E+02	6.20E+00 G
PA-234	N	1.7791E+00					1.63E+12	
			131.29	1.779E+00	?(	9.039E+00	1.52E+02	1.80E+01 G
			946.02	-1.174E+00	+ P	1.137E+01	3.49E+02	1.34E+01 G
			569.47	-5.987E+00	+	1.784E+01	8.88E+01	8.20E+00 G
			883.24	0.000E+00	-	2.047E+01	1.00E+03	9.60E+00 G
			880.53	1.614E+00	?	3.225E+01	5.72E+02	6.00E+00 GA
PA-234M	N	1.8457E+02					1.63E+12	
			1001.00	7.839E+01	?(P	2.419E+02	9.18E+01	8.37E-01 G
			766.41	4.869E+02	*(P	2.340E+02	2.66E+01	2.94E-01 G
U-235	N	7.9647E-01					2.57E+11	
			143.79	-1.765E-01	%(P	1.614E+01	1.63E+03	1.10E+01 G
			205.33	2.925E+00	*(P	1.976E+01	2.61E+02	5.01E+00 G
			163.38	-2.678E-01	& P	2.199E+01	2.51E+03	5.08E+00 G
AM-241	T	-1.8943E+00					1.58E+05	
			59.54	-1.894E+00	(P	5.390E+00	6.73E+01	3.59E+01 G
Np-237	F	-3.0684E+00					2.14E+06	
			86.49	-3.068E+00	(	1.935E+01	1.90E+02	1.31E+01 G
Ir-192	F	3.6507E-01					7.40E+01	
			316.49	0.000E+00	&(	2.447E+00	1.00E+03	8.70E+01 G
			468.06	9.791E-01	&(	2.795E+00	8.54E+01	5.18E+01 G
			308.44	-3.593E-01	+	6.624E+00	5.46E+02	3.18E+01 G
Cs-136	F	-6.8665E-01					1.30E+01	
			818.50	-6.867E-01	?(	1.958E+00	8.52E+01	1.00E+02 G
			1048.07	-4.776E-01	+	2.174E+00	1.32E+02	8.00E+01 G
			340.57	9.289E-01	+	4.882E+00	1.57E+02	4.69E+01 G
Np-239	T	-8.5548E-02					2.36E+00	
			103.70	-8.931E-01	+	5.134E+00	1.72E+02	2.40E+01 X
			106.13	-8.555E-02	&(	5.378E+00	1.86E+03	2.27E+01 G
			99.50	2.989E-07	%	1.482E+01	1.48E+09	1.50E+01 X

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147      -4.0999E+00                                       1.11E+01
                          531.00-4.100E+00 ?(  9.819E+00 1.01E+02 1.30E+01 G
                           91.10-1.435E+00 +   8.481E+00 1.78E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      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 ***************
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Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	435.	-25.	-0.014	120.56	-6.515E+00	
AM-241	59.54	590.	-41.	-0.023	67.33	-1.894E+00	P
BA-133	80.99	1373.	-34.	-0.019	82.71	-1.289E+00	P
Np-237	86.49	1903.	-33.	-0.018	189.67	-3.068E+00	
EU-155	86.54	1870.	-33.	-0.018	188.05	-1.309E+00	
Cd-109	88.04	1771.	-33.	-0.018	182.80	-1.054E+01	
Nd-147	91.10	1779.	-34.	-0.019	177.79	-1.435E+00	
Gd-153	97.50	1612.	-17.	-0.010	331.64	-6.754E-01	
Gd-153	103.20	456.	-31.	-0.017	100.19	-1.642E+00	
Np-239	103.70	487.	-18.	-0.010	171.56	-8.931E-01	
EU-152	121.78	384.	-30.	-0.017	93.14	-1.247E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	122.06	283.	12.	0.007	195.04	1.693E-01	
EU-154	123.10	310.	8.	0.004	334.27	2.164E-01	
PA-234	131.29	816.	27.	0.015	152.35	1.779E+00	
HF-181	133.02	843.	27.	0.015	154.55	7.441E-01	
HF-181	136.30	873.	21.	0.012	201.62	4.327E+00	
CE-141	145.44	213.	22.	0.012	123.98	5.798E-01	
Ba-140	162.66	280.	16.	0.009	154.64	3.347E+00	
CE-139	165.85	313.	-27.	-0.015	96.26	-4.440E-01	
Cf-251	176.60	125.	42.	0.024	51.68	3.479E+00	
TH-229	193.51	172.	16.	0.009	158.79	5.304E+00	
U-235	205.33	172.	9.	0.005	260.99	2.925E+00	P
TH-229	210.85	242.	-31.	-0.017	94.53	-1.659E+01	
Cf-251	227.00	147.	4.	0.002	525.05	1.147E+00	
EU-152	244.69	998.	-19.	-0.010	146.79	-4.359E+00	P
TH-227	256.24	168.	-26.	-0.014	99.79	-6.733E+00	
Cd-113m	263.70	204.	-24.	-0.013	87.28	-7.362E+03	
BI-210M	265.83	172.	17.	0.010	109.85	6.460E-01	
Hg-203	279.20	184.	-21.	-0.012	93.09	-5.021E-01	
PA-231	300.07	516.	-20.	-0.011	159.82	-1.677E+01	
PA-231	302.65	475.	-20.	-0.011	153.24	-1.444E+01	
BA-133	302.85	455.	-12.	-0.006	261.64	-1.295E+00	
Ir-192	308.44	448.	-6.	-0.003	546.21	-3.593E-01	
CR-51	320.08	342.	-22.	-0.012	119.52	-4.767E+00	
Cs-136	340.57	461.	20.	0.011	156.91	9.289E-01	
HF-181	345.83	106.	-20.	-0.011	65.58	-3.061E+00	P
BA-133	356.00	360.	-14.	-0.008	193.52	-5.188E-01	
BA-133	383.84	127.	15.	0.008	107.40	4.143E+00	
SB-125	427.88	82.	-9.	-0.005	233.54	-8.429E-01	P
AG-108M	433.94	79.	-17.	-0.010	129.26	-5.050E-01	P
Ir-192	468.06	110.	18.	0.010	85.39	9.791E-01	
BE-7	477.60	118.	12.	0.007	131.23	3.246E+00	
RU-103	497.05	61.	2.	0.001	684.52	7.521E-02	
RH-106	511.86	126.	93.	0.052	33.21	1.392E+01	
Nd-147	531.00	69.	-17.	-0.010	100.96	-4.100E+00	
Ba-140	537.26	74.	-18.	-0.010	120.98	-2.352E+00	P
CS-134	563.24	48.	7.	0.004	195.69	2.820E+00	
CS-134	569.32	56.	7.	0.004	163.86	1.403E+00	
PA-234	569.47	83.	-15.	-0.008	88.83	-5.987E+00	
BI-207	569.70	83.	4.	0.002	340.30	1.270E-01	
SB-125	600.50	474.	-19.	-0.011	163.74	-3.577E+00	
SB-124	602.73	455.	-19.	-0.011	160.28	-6.529E-01	
CS-134	604.71	436.	-19.	-0.011	156.77	-6.596E-01	
RU-103	610.30	417.	-19.	-0.011	152.89	-1.131E+01	
AG-108M	614.28	398.	-15.	-0.008	195.67	-5.539E-01	
RH-106	621.92	56.	-9.	-0.005	179.51	-3.130E+00	
AG-110M	657.76	70.	17.	0.009	75.39	6.313E-01	
CS-137	661.66	106.	-12.	-0.006	157.80	-4.903E-01	P
PM-144	696.54	80.	-7.	-0.004	277.70	-2.494E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	702.63	104.	-15.	-0.008	101.59	-5.662E-01		
SB-124	722.79	108.	-12.	-0.007	125.83	-4.284E+00		
EU-154	723.36	104.	-8.	-0.004	195.28	-1.432E+00		
pm-146	735.72	23.	12.	0.007	88.28	2.132E+00		
pm-146	747.16	51.	-17.	-0.010	90.91	-2.017E+00		
ZR-95	756.73	51.	-13.	-0.007	117.23	-9.776E-01		
AG-110M	763.94	98.	-16.	-0.009	112.34	-2.941E+00		P
NB-95	765.79	115.	-20.	-0.011	90.68	-8.159E-01		P
EU-152	778.92	14.	10.	0.005	87.67	3.067E+00		
CS-134	795.87	53.	14.	0.008	78.87	6.729E-01		
CS-134	801.95	113.	-19.	-0.010	82.95	-9.047E+00		
CO-58	810.78	60.	6.	0.003	187.08	2.536E-01		
Cs-136	818.50	87.	-16.	-0.009	85.18	-6.867E-01		
MN-54	834.85	46.	-8.	-0.004	147.79	-3.350E-01		P
Co-56	846.77	50.	-7.	-0.004	225.27	-3.041E-01		
NB-94	871.10	32.	-2.	-0.001	483.74	-7.399E-02		
EU-154	873.23	28.	6.	0.003	137.83	2.052E+00		
PA-234	880.53	76.	2.	0.001	572.44	1.614E+00		
y-88	898.04	35.	-16.	-0.009	86.07	-7.650E-01		
AG-110M	937.49	70.	-23.	-0.013	50.39	-3.139E+00		P
PA-234	946.02	40.	-3.	-0.002	349.34	-1.174E+00		P
EU-152	964.11	182.	-22.	-0.012	88.32	-7.286E+00		
EU-154	996.33	79.	-14.	-0.008	93.82	-6.479E+00		
Co-56	1037.84	32.	2.	0.001	646.79	7.157E-01		
Cs-136	1048.07	46.	-8.	-0.004	132.33	-4.776E-01		
RH-106	1050.36	50.	6.	0.003	185.86	1.799E+01		
BI-207	1063.66	21.	8.	0.004	141.62	5.301E-01		
Ga-68	1077.40	43.	-9.	-0.005	174.65	-1.600E+01		
FE-59	1099.25	43.	-14.	-0.008	111.96	-1.277E+00		
EU-152	1112.07	104.	-16.	-0.009	92.70	-6.315E+00		
ZN-65	1115.55	88.	-8.	-0.005	166.76	-8.593E-01		
Sc-46	1120.55	75.	5.	0.003	276.56	2.416E-01		
CO-60	1173.24	47.	-7.	-0.004	202.28	-3.647E-01		P
Co-56	1238.28	40.	18.	0.010	83.71	1.608E+00		P
NA-22	1274.53	44.	-15.	-0.009	66.51	-9.059E-01		
EU-154	1274.54	44.	13.	0.007	77.05	2.181E+00		
FE-59	1291.60	17.	9.	0.005	112.49	1.243E+00		
CO-60	1332.50	11.	7.	0.004	125.29	4.056E-01		P
AG-110M	1384.30	12.	4.	0.002	215.06	1.035E+00		
EU-152	1408.00	6.	17.	0.009	42.42	5.154E+00		
SB-124	1690.98	1.	7.	0.004	39.19	1.149E+00		P
Co-56	1771.35	32.	10.	0.006	83.06	5.066E+00		
y-88	1836.06	13.	-7.	-0.004	132.21	-5.767E-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	3.2459E+00	3.2459E+00	1.312E+02%	1.44E+01
NA-22	#A	-9.0593E-01	-9.0593E-01	6.651E+01%	1.99E+00
K-40		2.5321E+02	2.5321E+02	5.052E+00%	1.09E+01
Sc-46	#A	1.2079E-01	1.2079E-01	2.766E+02%	1.98E+00
CR-51	#A	-4.7672E+00	-4.7673E+00	1.195E+02%	1.91E+01
MN-54	#A	-3.3502E-01	-3.3502E-01	1.478E+02%	1.47E+00
FE-59	#A	-1.8536E-01	-1.8536E-01	7.935E+01%	3.10E+00
Co-56	#A	4.7714E-01	4.7714E-01	8.371E+01%	1.55E+00
CO-57	#A	1.6933E-01	1.6933E-01	1.950E+02%	1.11E+00
CO-58	#A	2.5357E-01	2.5357E-01	1.871E+02%	1.64E+00
CO-60	#A	4.0564E-01	4.0564E-01	1.253E+02%	1.12E+00
ZN-65	#A	-8.5930E-01	-8.5930E-01	1.668E+02%	4.90E+00
NB-94	#A	-5.6620E-01	-5.6620E-01	1.016E+02%	1.94E+00
ZR-95	#A	-9.7764E-01	-9.7764E-01	1.172E+02%	2.65E+00
NB-95	#A	-8.1585E-01	-8.1586E-01	9.068E+01%	2.13E+00
RU-103	#A	7.5205E-02	7.5206E-02	6.845E+02%	1.26E+00
RH-106	#A	-2.6278E-01	-2.6278E-01	1.292E+02%	1.31E+01
AG-108M	#A	-5.0499E-01	-5.0499E-01	1.293E+02%	1.30E+00
AG-110M	#A	4.4303E-01	4.4303E-01	7.539E+01%	2.71E+00
SN-113	A	5.9052E-01	5.9052E-01	1.122E+02%	2.23E+00
SB-124	#A	-6.3323E-02	-6.3323E-02	3.919E+01%	3.51E+00
SB-125	#A	-8.4287E-01	-8.4287E-01	2.335E+02%	4.00E+00
I-131	#A	4.3409E-01	4.3411E-01	1.077E+02%	1.18E+00
Gd-153	#A	-6.7543E-01	-6.7543E-01	3.316E+02%	7.47E+00
Ga-68	#A	-1.5893E+01	-1.6005E+01	1.747E+02%	6.12E+01
Tc-99m	A	3.2382E-01	3.2425E-01	1.840E+02%	1.99E+00
BA-133	#A	-5.1881E-01	-5.1881E-01	1.935E+02%	3.38E+00
CS-134	#A	1.8504E-01	1.8504E-01	7.744E+01%	3.46E+00
CS-137	#A	-4.9025E-01	-4.9025E-01	1.578E+02%	2.15E+00
CE-139	#A	-4.4401E-01	-4.4401E-01	9.626E+01%	1.42E+00
Ba-140	#A	-1.1935E+00	-1.1935E+00	9.817E+01%	5.46E+00
La-140	#	1.1513E+00	1.1513E+00	2.774E+01%	5.41E-01
CE-141	#A	5.7979E-01	5.7979E-01	1.240E+02%	1.83E+00
CE-144	#A	2.9104E+00	2.9104E+00	1.548E+02%	1.50E+01
PM-144	#A	-2.4945E-01	-2.4945E-01	2.777E+02%	1.68E+00
EU-152	#A	1.1290E+00	1.1290E+00	8.767E+01%	8.89E+00
EU-154	#A	2.1478E+00	2.1478E+00	7.705E+01%	9.86E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.91E+00
HF-181	#A	4.4375E-01	4.4375E-01	1.545E+02%	1.99E+00
Ta-182	#A	2.0378E+00	2.0378E+00	8.088E+01%	6.47E+00
Hg-203	#A	-5.0207E-01	-5.0208E-01	9.309E+01%	1.56E+00
TL-208		8.0765E+00	8.0765E+00	8.939E+00%	1.11E+00
pm-146	#A	-2.0166E+00	-2.0166E+00	9.091E+01%	4.20E+00

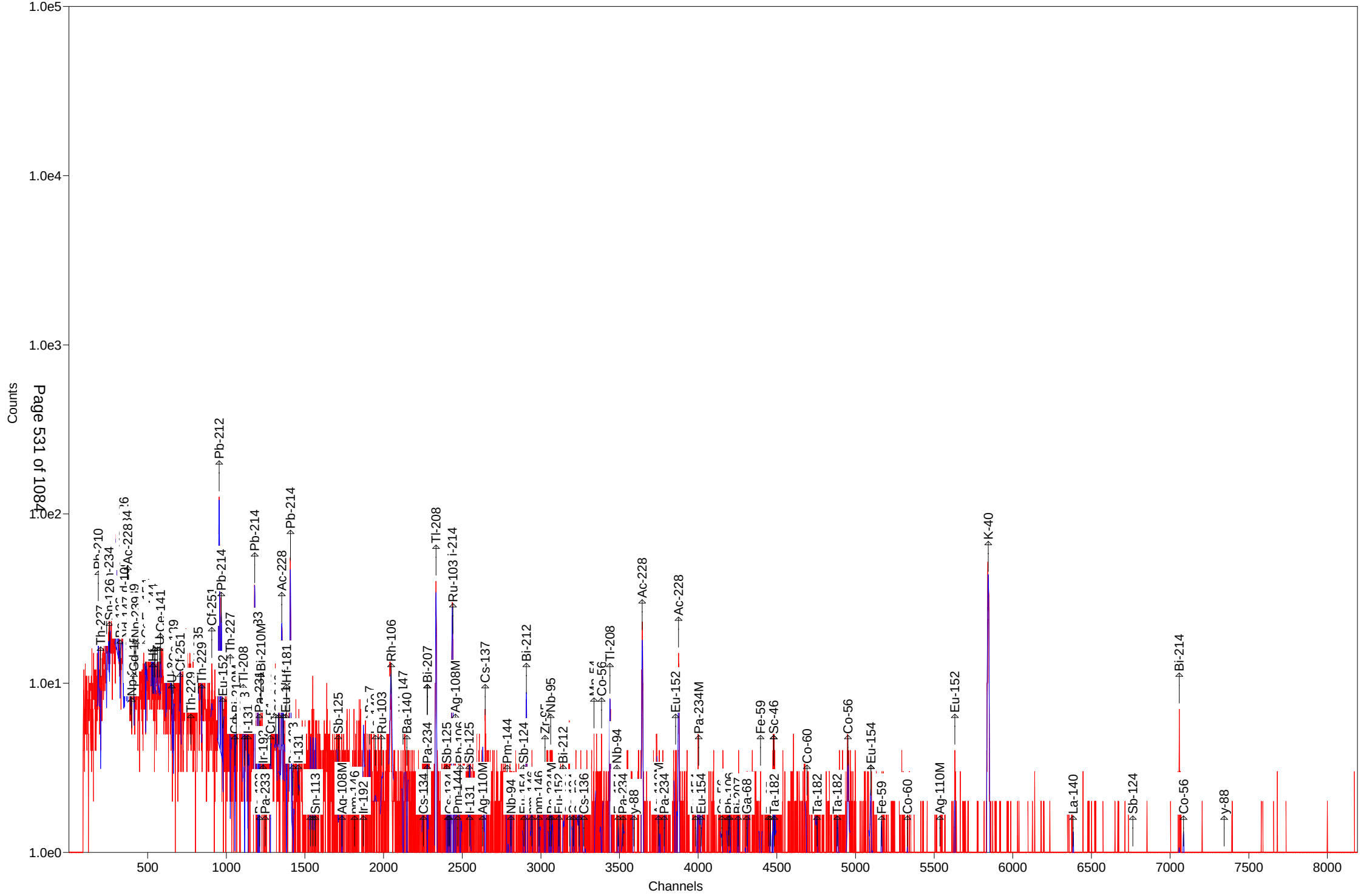
y-88 #A	-7.6504E-01	-7.6504E-01	8.607E+01%		1.47E+00
Cd-113m#A	-7.3616E+03	-7.3616E+03	8.728E+01%		2.14E+04
Cd-109 #A	-1.0537E+01	-1.0537E+01	1.828E+02%		6.40E+01
Cf-251 #A	3.4786E+00	3.4786E+00	5.168E+01%		4.50E+00
Cf-249 #A	9.8285E-01	9.8285E-01	9.467E+01%		2.09E+00
Sn-126 #	4.7450E+00	4.7450E+00	1.533E+01%		2.10E+00
PB-210 A	3.1484E+01	3.1484E+01	4.742E+01%		3.61E+01
PB-212	2.2570E+01	2.2570E+01	4.870E+00%		1.92E+00
PB-214	1.4830E+01	1.4830E+01	9.046E+00%		2.25E+00
BI-207 #A	3.0133E-01	3.0133E-01	1.416E+02%		1.50E+00
BI-212	2.8755E+01	2.8755E+01	2.240E+01%		1.10E+01
BI-214	1.4976E+01	1.4976E+01	8.950E+00%		2.02E+00
BI-210M#A	6.4602E-01	6.4602E-01	1.099E+02%		2.38E+00
AC-228	2.1457E+01	2.1457E+01	6.856E+00%		1.84E+00
TH-227 #A	-6.5146E+00	-6.5146E+00	1.206E+02%		2.62E+01
TH-229 #A	5.3037E+00	5.3037E+00	1.588E+02%		2.16E+01
TH-234 A	4.0892E-01	4.0892E-01	6.934E+01%		5.10E+01
PA-231 #A	-1.4442E+01	-1.4442E+01	1.532E+02%		7.41E+01
PA-233 #A	9.5854E-01	9.5854E-01	1.810E+02%		5.82E+00
PA-234 #A	1.7791E+00	1.7791E+00	1.524E+02%		9.04E+00
PA-234M#A	1.8457E+02	1.8457E+02	2.657E+01%		2.42E+02
U-235 #A	7.9647E-01	7.9647E-01	2.610E+02%		1.61E+01
AM-241 #A	-1.8943E+00	-1.8943E+00	6.733E+01%		5.39E+00
Np-237 #A	-3.0684E+00	-3.0684E+00	1.897E+02%		1.93E+01
Ir-192 #A	3.6507E-01	3.6507E-01	8.539E+01%		2.45E+00
Cs-136 #A	-6.8664E-01	-6.8665E-01	8.518E+01%		1.96E+00
Np-239 #A	-8.5536E-02	-8.5548E-02	1.860E+03%		5.38E+00
Nd-147 #A	-4.0998E+00	-4.0999E+00	1.010E+02%		9.82E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 4.001E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 4.0010187E+02 Bq/Sample

265170_Gamma_160-18567-A-6-B. 16_Gamma_20162153.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161116

Sample Description: 265170_Gamma_160-18567-A-7-B
Detector: Detector #15
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-7-B

Decay to Time: 9/7/2016 17:49 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:50:07 Real Time: 1802 sec
Analysis Time: 9/7/2016 18:20 Dead Time: 0.13 %
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_2016-09-03_2257.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	-6.167E+00	57.5	3.548E+00	3.563E+00	2.091E+01
NA-22	-8.450E-02	574.5	4.854E-01	4.854E-01	1.804E+00
K-40	2.521E+02	6.0	1.523E+01	1.996E+01	1.057E+01
Sc-46	5.619E-01	94.6	5.317E-01	5.325E-01	2.455E+00
CR-51	3.956E+00	166.8	6.597E+00	6.601E+00	2.220E+01
MN-54	5.426E-01	92.3	5.007E-01	5.014E-01	1.193E+00
FE-59	1.298E+00	31.6	4.104E-01	4.156E-01	2.808E+00
Co-56	1.167E+00	44.6	5.208E-01	5.242E-01	1.200E+00
CO-57	-2.025E-01	162.9	3.298E-01	3.300E-01	1.115E+00
CO-58	5.739E-01	94.9	5.445E-01	5.453E-01	1.847E+00
CO-60	-1.464E+00	48.1	7.047E-01	7.085E-01	2.750E+00
ZN-65	1.063E+00	140.2	1.491E+00	1.492E+00	5.137E+00
NB-94	2.054E-01	287.1	5.899E-01	5.900E-01	1.415E+00
ZR-95	2.307E-01	398.2	9.187E-01	9.188E-01	2.259E+00
NB-95	5.835E-01	111.9	6.528E-01	6.535E-01	2.217E+00
RU-103	-1.528E-01	280.1	4.280E-01	4.281E-01	1.402E+00
RH-106	0.000E+00	1.#INF	6.510E-01	6.510E-01	3.590E+01
AG-108M	1.831E-01	90.5	1.656E-01	1.659E-01	1.334E+00
AG-110M	4.103E-01	113.3	4.648E-01	4.653E-01	4.265E+00
SN-113	-8.643E-01	120.8	1.044E+00	1.045E+00	3.505E+00
SB-124	-3.192E-02	66.8	2.133E-02	2.139E-02	3.609E+00
SB-125	1.228E+00	152.1	1.868E+00	1.869E+00	3.830E+00
I-131	1.082E+00	46.6	5.047E-01	5.078E-01	9.284E-01
Gd-153	-1.483E+00	171.6	2.546E+00	2.547E+00	8.473E+00
Ga-68	-5.189E+00	496.7	2.577E+01	2.577E+01	6.110E+01
Tc-99m	-1.331E-07	546849372.4	7.278E-01	7.278E-01	2.445E+00
BA-133	-6.913E-01	155.2	1.073E+00	1.074E+00	3.613E+00
CS-134	1.403E+00	21.1	2.964E-01	3.052E-01	3.568E+00
CS-137	5.647E-02	1005.0	5.675E-01	5.675E-01	2.014E+00
CE-139	4.118E-01	100.9	4.153E-01	4.171E-01	1.390E+00
Ba-140	-7.933E-01	215.6	1.711E+00	1.711E+00	4.746E+00
La-140	-1.038E-01	1778.7	1.846E+00	1.846E+00	1.524E+00
CE-141	7.260E-01	93.0	6.755E-01	6.765E-01	2.255E+00

CE-144	-3.694E+00	84.6	3.124E+00	3.129E+00	1.801E+01
PM-144	5.503E-01	100.0	5.504E-01	5.512E-01	1.299E+00
EU-152	2.680E+00	104.2	2.793E+00	2.796E+00	8.549E+00
EU-154	3.056E+00	56.0	1.710E+00	1.718E+00	1.086E+01
EU-155	-2.089E+00	177.8	3.715E+00	3.716E+00	1.236E+01
HF-181	-7.413E-01	63.2	4.688E-01	4.704E-01	2.549E+00
Ta-182	-9.959E-01	75.7	7.543E-01	7.559E-01	1.010E+01
Hg-203	-4.763E-01	106.9	5.090E-01	5.097E-01	1.711E+00
TL-208	7.847E+00	8.1	6.344E-01	7.537E-01	3.780E-01
pm-146	5.398E-01	53.2	2.873E-01	2.887E-01	4.288E+00
y-88	4.278E-01	116.3	4.976E-01	4.981E-01	1.187E+00
Cd-113m	-1.541E+03	327.9	5.053E+03	5.054E+03	1.750E+04
Cd-109	0.000E+00	1.#INF	2.165E+01	2.165E+01	7.206E+01
Cf-251	3.026E-01	718.8	2.175E+00	2.175E+00	5.673E+00
Cf-249	-9.405E-01	102.6	9.647E-01	9.659E-01	3.230E+00
Sn-126	4.696E+00	117.0	5.496E+00	5.502E+00	1.836E+01
PB-210	3.392E-01	4733.1	1.605E+01	1.605E+01	5.444E+01
PB-212	2.074E+01	5.4	1.128E+00	1.752E+00	1.734E+00
PB-214	1.271E+01	11.0	1.397E+00	1.546E+00	2.475E+00
BI-207	-1.595E-01	245.5	3.915E-01	3.916E-01	1.378E+00
BI-212	3.924E+00	191.2	7.502E+00	7.505E+00	2.599E+01
BI-214	1.228E+01	12.6	1.546E+00	1.672E+00	2.540E+00
BI-210M	7.599E-01	87.8	6.672E-01	6.687E-01	2.235E+00
AC-228	1.773E+01	10.1	1.790E+00	2.006E+00	1.602E+00
TH-227	1.046E+01	50.7	5.302E+00	5.333E+00	1.390E+01
TH-229	-7.917E+00	115.4	9.139E+00	9.161E+00	2.344E+01
TH-234	3.312E+00	396.1	1.312E+01	1.312E+01	4.423E+01
PA-231	0.000E+00	1.#INF	5.353E+00	5.353E+00	8.601E+01
PA-233	0.000E+00	1.#INF	1.790E-01	1.790E-01	7.045E+00
PA-234	4.249E-01	62.0	2.634E-01	2.644E-01	1.067E+01
PA-234M	5.227E+01	81.5	4.259E+01	4.267E+01	3.571E+02
U-235	-4.600E+00	72.1	3.318E+00	3.327E+00	1.825E+01
AM-241	1.446E+00	116.7	1.688E+00	1.689E+00	5.634E+00
Np-237	-5.162E-01	1066.4	5.505E+00	5.505E+00	1.843E+01
Ir-192	1.958E-01	167.9	3.287E-01	3.289E-01	2.946E+00
Cs-136	-1.918E-02	2985.0	5.726E-01	5.726E-01	2.039E+00
Np-239	-1.585E+00	219.8	3.485E+00	3.486E+00	1.161E+01
Nd-147	-5.293E+00	92.6	4.901E+00	4.910E+00	1.164E+01
Total	4.245E+02				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-7-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161116.An1

Acquisition information
Start time: 9/7/2016 5:50:07 PM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
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	9/7/2016 5:49:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2016-09-03_2257.PBC 9/3/2016 10:57:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2169

***** 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
49.89	33.	50.71	1.33	2.192E-02	50.14	8.000	PBC<MDA	TH227
59.54	26.	116.72	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.29	7.	396.14	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
64.28	24.	117.04	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.88	208.	10.50	0.97	3.383E-02				
77.25	254.	9.45	0.97	3.456E-02				
87.50	49.	38.69	0.98	3.698E-02	87.57	37.500	PBC<MDA	Sn126
90.01	51.	31.88	0.74	3.739E-02				
93.28	84.	21.14	0.99	3.785E-02	93.35	5.561	2.212E+01	AC228
121.78	9.	227.44	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.519E-01	CO57
123.10	6.	329.14	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
145.44	23.	93.05	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
163.38	21.	94.71	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	20.	100.86	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
176.60	3.	718.80	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251
210.85	3.	866.47	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229
238.75	399.	6.58	1.10	2.591E-02	238.63	43.300	1.975E+01	PB212
242.13	40.	33.10	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
244.69	15.	235.36	1.13	2.543E-02	244.69	7.580	PBC<MDA	EU152
257.12	4.	471.46	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
265.83	16.	87.80	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
277.69	54.	25.71	1.15	2.313E-02	277.28	6.310	2.044E+01	TL208
284.30	10.	144.68	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.16	94.	18.97	0.92	2.204E-02	295.09	19.300	1.234E+01	PB214
320.08	15.	166.75	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
338.25	73.	16.87	1.21	1.983E-02	338.32	12.010	1.692E+01	AC228
344.29	18.	132.98	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
352.09	168.	11.10	1.15	1.922E-02	351.93	37.600	1.291E+01	PB214
364.48	23.	46.63	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
453.88	9.	106.48	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	8.	152.07	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	167.86	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
510.63	130.	11.11	0.40	1.429E-02	511.86	20.000	2.526E+01	RH106
563.24	7.	166.42	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	129.10	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.110E+00	PA234
					569.70	97.740	2.610E-01	BI207
583.47	153.	8.08	1.22	1.282E-02	583.02	84.500	7.847E+00	TL208
600.50	11.	194.41	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
609.61	132.	11.87	0.75	1.236E-02	609.31	46.090	1.228E+01	BI214
					610.30	5.750	1.030E+02	RU103
636.97	2.	427.20	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	139.24	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
696.54	11.	100.02	1.50	1.106E-02	696.54	99.000	PBC<MDA	PM144
702.63	4.	287.15	1.50	1.098E-02	702.63	97.900	PBC<MDA	NB94
722.79	9.	86.20	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.217E-01	AG108M
					723.36	20.220	2.345E+00	EU154
722.94	9.	90.46	1.52	1.072E-02	722.79	10.810	4.383E+00	SB124
					722.94	90.840	5.217E-01	AG108M
					723.36	20.220	2.345E+00	EU154
723.36	9.	101.81	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.218E-01	AG108M
					723.36	20.220	2.345E+00	EU154
726.84	6.	191.17	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
735.72	14.	53.23	1.53	1.056E-02	735.72	22.500	PBC<MDA	pm146
756.73	2.	398.21	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
765.79	11.	111.88	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.982E+02	PA234M
766.41	12.	81.49	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.283E+02	PA234M
778.92	2.	398.21	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
785.34	11.	89.46	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
795.87	42.	21.13	1.57	9.887E-03	795.87	85.530	2.751E+00	CS134
810.78	10.	94.87	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
834.85	9.	92.27	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
846.77	6.	142.70	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.83	23.	20.85	1.81	9.252E-03	860.56	12.420	1.112E+01	TL208
873.23	8.	80.83	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
889.28	10.	118.00	1.64	8.996E-03	889.28	99.984	PBC<MDA	Sc46
898.04	6.	116.33	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
911.34	83.	11.10	1.27	8.809E-03	911.07	29.000	1.807E+01	AC228
946.02	8.	90.91	1.68	8.531E-03	946.02	13.400	PBC<MDA	PA234
969.42	63.	15.16	1.22	8.357E-03	968.97	17.460	2.411E+01	AC228
1004.77	8.	106.23	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1099.25	6.	159.03	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	9.	104.20	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	7.	140.24	1.80	7.395E-03	1115.55	50.600	PBC<MDA	ZN65
1120.55	7.	147.94	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.129E-01	Sc46
					1121.30	34.900	1.470E+00	Ta182
1121.11	6.	148.11	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1173.24	9.	91.10	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	7.	114.74	1.85	6.994E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	19.	44.63	1.88	6.748E-03	1238.28	66.070	2.409E+00	Co56
1291.60	10.	31.62	1.91	6.502E-03	1291.60	43.200	1.978E+00	FE59
1384.30	5.	113.28	1.97	6.114E-03	1384.30	24.290	PBC<MDA	AG110M
1461.07	282.	6.04	1.80	5.828E-03	1460.83	10.670	2.521E+02	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	
299.13	74.88	134.	208.	6.154E+03	10.50	0.973	-	D
308.58	77.24	161.	254.	7.345E+03	9.45	0.975	-	D
359.32	90.01	100.	63.	1.675E+03	25.83	0.986	-	sD
2041.28	510.63	8.	130.	9.076E+03	11.11	0.396	-	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	199.24	49.89	78.	33.	0.018	50.71	1.329s
AM-241	237.79	59.54	433.	26.	0.014	116.72	0.958s
TH-234	252.78	63.29	340.	7.	0.004	396.14	0.962s
Sn-126	256.75	64.28	394.	24.	0.014	117.04	0.963
BA-133	323.54	80.99	966.	-28.	-0.015	79.30	0.978s
EU-155	345.74	86.54	1544.	-30.	-0.017	183.93	0.983s
Sn-126	347.33	86.94	1514.	-30.	-0.017	182.08	0.984
Sn-126	349.84	87.57	1381.	49.	0.027	38.69	0.984D
Cd-109	351.72	88.04	1483.	0.	0.000	180.06	0.985A
Nd-147	363.95	91.10	1350.	-30.	-0.017	171.39	0.987D
TH-234	369.91	92.59	1364.	-55.	-0.031	42.11	0.989s
AC-228	372.95	93.35	115.	84.	0.047	21.14	0.989D
Gd-153	389.54	97.50	1370.	-31.	-0.017	171.62	0.993s
Np-239	397.53	99.50	1401.	-31.	-0.017	173.19	0.995s
Gd-153	412.32	103.20	1432.	-31.	-0.017	174.50	0.998
Np-239	414.32	103.70	1463.	-31.	-0.017	176.27	0.999s
EU-155	420.77	105.31	1493.	-31.	-0.017	177.81	1.001s
Np-239	424.03	106.13	1511.	-25.	-0.014	219.84	1.001s
EU-152	486.57	121.78	205.	9.	0.005	227.44	1.016s
CO-57	487.72	122.06	185.	-12.	-0.007	162.87	1.016s
EU-154	491.87	123.10	192.	6.	0.003	329.14	1.017
PA-234	524.63	131.29	753.	-28.	-0.015	84.34	1.024
HF-181	531.54	133.02	779.	-28.	-0.015	84.06	1.026s
CE-144	533.60	133.54	806.	-28.	-0.015	84.56	1.026s
HF-181	544.63	136.30	831.	-27.	-0.015	155.01	1.029s
CO-57	545.33	136.47	857.	-13.	-0.007	322.41	1.029s
U-235	574.56	143.79	758.	-33.	-0.018	72.14	1.036
CE-141	581.17	145.44	213.	23.	0.013	93.05	1.037
Ba-140	650.01	162.66	255.	-3.	-0.001	935.97	1.053s
U-235	652.88	163.38	194.	21.	0.012	94.71	1.053s
CE-139	662.77	165.85	195.	20.	0.011	100.86	1.055s
Cf-251	705.73	176.60	132.	3.	0.002	718.80	1.065s
TH-229	773.33	193.51	132.	-19.	-0.011	115.43	1.080
U-235	820.60	205.33	129.	-14.	-0.008	146.73	1.091
TH-229	842.65	210.85	151.	3.	0.001	866.47	1.096s
Cf-251	907.22	227.00	128.	-13.	-0.007	161.29	1.110s
PB-212	953.72	238.63	48.	419.	0.233	5.44	1.120D
PB-214	967.17	242.00	67.	40.	0.022	33.10	1.123D
EU-152	977.95	244.69	615.	15.	0.008	235.36	1.126s
TH-227	1024.12	256.24	84.	4.	0.002	471.46	1.136s
Cd-113m	1053.94	263.70	84.	-4.	-0.002	327.87	1.142s
BI-210M	1062.46	265.83	95.	16.	0.009	87.80	1.144s
TL-208	1108.25	277.28	68.	54.	0.030	25.71	1.154s
Hg-203	1115.91	279.20	139.	-16.	-0.009	106.85	1.156s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.30	284.30	52.	10.	0.006	144.68	1.160s
PB-214	1179.70	295.16	57.	94.	0.052	18.97	0.925
PB-212	1199.19	300.03	358.	-19.	-0.011	53.65	1.174
PA-231	1199.35	300.07	375.	-18.	-0.010	151.91	1.174
PA-233	1199.79	300.18	393.	-11.	-0.006	252.62	1.174
PA-231	1209.66	302.65	404.	0.	0.000	1000.00	1.176s
BA-133	1210.47	302.85	404.	0.	0.000	1000.00	1.176s
Ba-140	1218.46	304.85	404.	0.	0.000	1000.00	1.178s
BI-210M	1218.64	304.90	404.	0.	0.000	1000.00	1.178s
Ir-192	1232.81	308.44	404.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	404.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	404.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	291.	15.	0.008	166.75	1.191s
La-140	1314.06	328.76	408.	-19.	-0.011	151.32	1.199s
Cf-249	1332.77	333.44	379.	-19.	-0.011	145.60	1.203
AC-228	1352.28	338.32	38.	73.	0.040	16.87	1.207D
Cs-136	1361.28	340.57	360.	-19.	-0.011	141.27	1.209
EU-152	1376.13	344.29	273.	18.	0.010	132.98	1.212s
HF-181	1382.30	345.83	325.	-5.	-0.003	548.23	1.213s
PB-214	1407.35	352.09	40.	168.	0.093	11.10	1.148
BA-133	1422.97	356.00	254.	-15.	-0.008	155.25	1.222s
I-131	1456.89	364.48	24.	23.	0.013	46.63	1.229s
BA-133	1534.29	383.84	185.	-21.	-0.012	87.64	1.246s
Cf-249	1550.72	387.95	198.	-20.	-0.011	102.58	1.249s
SN-113	1565.67	391.69	217.	-18.	-0.010	120.78	1.253
SB-125	1710.36	427.88	44.	-2.	-0.001	653.20	1.283
AG-108M	1734.60	433.94	49.	-4.	-0.002	452.02	1.288s
pm-146	1814.35	453.88	22.	9.	0.005	106.48	1.304s
SB-125	1852.29	463.37	70.	8.	0.004	152.07	1.312s
Ir-192	1871.05	468.06	76.	8.	0.004	167.86	1.316
BE-7	1909.18	477.60	150.	-18.	-0.010	57.54	1.324s
HF-181	1926.79	482.00	127.	-16.	-0.009	63.24	1.328s
La-140	1946.87	487.02	161.	-14.	-0.008	132.92	1.332s
RU-103	1987.00	497.05	44.	-4.	-0.002	280.15	1.340s
RH-106	2046.22	511.86	149.	-4.	-0.002	401.70	2.602s
Nd-147	2122.75	531.00	56.	-17.	-0.010	92.58	1.368s
Ba-140	2147.78	537.26	31.	-5.	-0.003	215.62	1.373s
CS-134	2251.67	563.24	31.	7.	0.004	166.42	1.394s
CS-134	2276.00	569.32	27.	6.	0.003	129.10	1.399s
PA-234	2276.59	569.47	33.	0.	0.000	1000.00	1.399s
BI-207	2277.52	569.70	39.	-4.	-0.002	245.45	1.399s
TL-208	2332.57	583.47	0.	153.	0.085	8.08	1.217
SB-125	2400.69	600.50	226.	11.	0.006	194.41	1.424s
SB-124	2409.62	602.73	272.	-11.	-0.006	102.13	1.425s
CS-134	2417.53	604.71	261.	0.	0.000	1000.00	1.427s
BI-214	2437.12	609.61	25.	126.	0.070	12.59	0.754s
RU-103	2439.88	610.30	261.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	261.	0.	0.000	1000.00	1.435

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2470.93	618.06	261.	0.	0.000	1000.00	1.437s
RH-106	2486.35	621.92	261.	0.	0.000	1000.00	1.440s
SB-125	2542.23	635.89	35.	-5.	-0.003	338.85	1.451s
I-131	2546.57	636.97	41.	2.	0.001	427.20	1.452
AG-110M	2629.71	657.76	44.	7.	0.004	139.24	1.469s
PM-144	2784.82	696.54	24.	11.	0.006	100.02	1.499s
NB-94	2809.17	702.63	28.	4.	0.002	287.15	1.503s
SB-124	2889.79	722.79	26.	9.	0.005	86.20	1.519s
AG-108M	2890.40	722.94	30.	9.	0.005	90.46	1.519s
EU-154	2892.07	723.36	39.	9.	0.005	101.81	1.519s
ZR-95	2895.44	724.20	138.	-24.	-0.013	73.21	1.520s
BI-212	2907.33	727.17	56.	6.	0.003	191.17	1.522s
pm-146	2941.53	735.72	10.	14.	0.008	53.23	1.529s
pm-146	2987.29	747.16	28.	-8.	-0.004	144.70	1.537
ZR-95	3025.56	756.73	19.	2.	0.001	398.21	1.544s
AG-110M	3054.42	763.94	60.	-17.	-0.009	68.70	1.550s
NB-95	3061.80	765.79	66.	11.	0.006	111.88	1.551s
PA-234M	3064.30	766.41	44.	12.	0.007	81.49	1.552s
EU-152	3114.33	778.92	19.	2.	0.001	398.21	1.561s
BI-212	3140.33	785.42	19.	11.	0.006	89.46	1.566s
CS-134	3182.12	795.87	18.	42.	0.023	21.13	1.574s
CO-58	3241.75	810.78	40.	10.	0.006	94.87	1.585s
La-140	3261.74	815.77	50.	0.	0.000	1000.00	1.589s
MN-54	3338.05	834.85	14.	9.	0.005	92.27	1.603s
Co-56	3385.75	846.77	14.	6.	0.003	142.70	1.612s
TL-208	3442.00	860.83	0.	23.	0.013	20.85	1.812s
NB-94	3483.06	871.10	20.	-4.	-0.002	165.83	1.629s
EU-154	3491.60	873.23	17.	8.	0.004	80.83	1.631s
PA-234	3520.80	880.53	75.	-15.	-0.008	85.19	1.636s
PA-234	3531.64	883.24	90.	-15.	-0.008	92.55	1.638s
Sc-46	3555.81	889.28	63.	10.	0.005	118.00	1.642s
y-88	3590.85	898.04	11.	6.	0.004	116.33	1.649s
AC-228	3644.07	911.34	1.	83.	0.046	11.10	1.268s
AG-110M	3748.69	937.49	45.	-18.	-0.010	51.73	1.677s
PA-234	3782.81	946.02	10.	8.	0.005	90.91	1.683s
AC-228	3876.43	969.42	7.	63.	0.035	15.16	1.218s
EU-154	3984.09	996.33	62.	-15.	-0.008	80.45	1.718s
PA-234M	4002.77	1001.00	77.	-1.	-0.001	801.93	1.722s
EU-154	4017.88	1004.77	36.	8.	0.005	106.23	1.724s
Co-56	4150.18	1037.84	20.	-6.	-0.003	168.87	1.747s
Cs-136	4191.11	1048.07	25.	-9.	-0.005	85.35	1.754s
RH-106	4200.27	1050.36	42.	-2.	-0.001	612.83	1.755s
BI-207	4253.49	1063.66	25.	-2.	-0.001	554.15	1.765s
Ga-68	4308.47	1077.40	20.	-2.	-0.001	496.66	1.774s
FE-59	4395.90	1099.25	16.	6.	0.003	159.03	1.789s
EU-152	4447.22	1112.07	38.	9.	0.005	104.20	1.797s
ZN-65	4461.11	1115.55	47.	7.	0.004	140.24	1.800s
BI-214	4480.08	1120.29	41.	6.	0.004	148.11	1.803s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	4481.13	1120.55	47.	7.	0.004	147.94	1.803s
Ta-182	4484.13	1121.30	89.	-14.	-0.008	98.89	1.803s
CO-60	4691.97	1173.24	11.	9.	0.005	91.10	1.838s
Ta-182	4755.25	1189.05	11.	7.	0.004	114.74	1.848s
Ta-182	4884.75	1221.41	27.	-12.	-0.007	67.57	1.869s
Co-56	4952.26	1238.28	11.	19.	0.011	44.63	1.879s
NA-22	5097.34	1274.53	16.	-1.	-0.001	574.46	1.902s
EU-154	5097.40	1274.54	17.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	0.	10.	0.006	31.62	1.913s
CO-60	5329.36	1332.50	38.	-17.	-0.009	48.15	1.938s
AG-110M	5536.68	1384.30	6.	5.	0.003	113.28	1.970s
EU-152	5631.56	1408.00	17.	-3.	-0.002	327.45	1.984s
K-40	5844.00	1461.07	4.	282.	0.157	6.04	1.801
SB-124	6764.43	1690.98	0.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	32.	-2.	-0.001	280.62	2.181s
Co-56	7086.23	1771.35	42.	-11.	-0.006	88.61	2.184s
y-88	7345.35	1836.06	12.	-10.	-0.006	47.68	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	-6.1672E+00				5.31E+01	
			477.60	-6.167E+00	?(P	2.091E+01 5.75E+01 1.05E+01	G
NA-22	C	-8.4496E-02				9.50E+02	
			1274.53	-8.450E-02	?(	1.804E+00 5.74E+02 9.99E+01	G
K-40	N	2.5210E+02				4.66E+11	
			1460.83	2.521E+02	(P	1.057E+01 6.04E+00 1.07E+01	G
Sc-46	F	5.6194E-01				8.38E+01	
			889.28	6.110E-01	?(	2.455E+00 1.18E+02 1.00E+02	G
			1120.55	5.129E-01	?(	2.619E+00 1.48E+02 1.00E+02	G
CR-51	F	3.9563E+00				2.77E+01	
			320.08	3.956E+00	&(P	2.220E+01 1.67E+02 9.94E+00	G
MN-54	C	5.4259E-01				3.12E+02	
			834.85	5.426E-01	?(P	1.193E+00 9.23E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	1.2979E+00					4.45E+01	
			1099.25	7.781E-01	?(P	2.808E+00	1.59E+02	5.65E+01 G
			1291.60	1.978E+00	?(	1.458E+00	3.16E+01	4.32E+01 G
Co-56	C	1.1669E+00					7.73E+01	
			846.77	3.458E-01	?(P	1.200E+00	1.43E+02	9.99E+01 G
			1238.28	2.409E+00	?(	2.234E+00	4.46E+01	6.61E+01 G
			1037.84	-2.996E+00	+	1.176E+01	1.69E+02	1.41E+01 G
			1771.35	-8.059E+00	+	2.411E+01	8.86E+01	1.55E+01 A
CO-57	C	-2.0250E-01					2.72E+02	
			122.06	-2.025E-01	?(	1.115E+00	1.63E+02	8.56E+01 G
			136.47	-1.801E+00	+	1.944E+01	3.22E+02	1.07E+01 G
CO-58	C	5.7392E-01					7.09E+01	
			810.78	5.739E-01	?(	1.847E+00	9.49E+01	9.95E+01 G
CO-60	F	-1.4637E+00					1.93E+03	
			1332.50	-1.464E+00	?(P	2.750E+00	4.81E+01	1.00E+02 G
			1173.24	6.930E-01	+ P	1.421E+00	9.11E+01	9.99E+01 G
ZN-65	F	1.0631E+00					2.44E+02	
			1115.55	1.063E+00	?(	5.137E+00	1.40E+02	5.06E+01 G
NB-94	I	2.0542E-01					7.41E+06	
			702.63	2.054E-01	?(P	1.415E+00	2.87E+02	9.79E+01 G
			871.10	-2.430E-01	+	1.431E+00	1.66E+02	9.99E+01 G
ZR-95	I	2.3071E-01					6.40E+01	
			756.73	2.307E-01	&(	2.259E+00	3.98E+02	5.45E+01 G
			724.20	-2.777E+00	+	6.748E+00	7.32E+01	4.42E+01 G
NB-95	I	5.8351E-01					6.40E+01	
			765.79	5.835E-01	?(	2.217E+00	1.12E+02	9.98E+01 G
RU-103	I	-1.5278E-01					3.93E+01	
			497.05	-1.528E-01	?(P	1.402E+00	2.80E+02	9.09E+01 G
			610.30	0.000E+00	+	6.104E+01	1.00E+03	5.75E+00 GA
AG-108M	C	1.8306E-01					1.53E+05	
			433.94	-1.569E-01	?(P	1.334E+00	4.52E+02	9.05E+01 G
			722.94	5.217E-01	?(	1.602E+00	9.05E+01	9.08E+01 G
			614.28	0.000E+00	-	3.927E+00	1.00E+03	8.98E+01 G
AG-110M	F	4.1031E-01					2.50E+02	
			884.68	-4.621E-02	%(	4.265E+00	2.65E+03	7.27E+01 G
			657.76	3.542E-01	?(	1.701E+00	1.39E+02	9.46E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			937.49	-3.378E+00	+ P	6.419E+00	5.17E+01	3.44E+01 G
			1384.30	1.995E+00	?(	5.163E+00	1.13E+02	2.43E+01 G
			763.94	-4.151E+00	+	9.454E+00	6.87E+01	2.23E+01 G
SN-113	F	-8.6427E-01					1.15E+02	
			391.69	-8.643E-01	&(	3.505E+00	1.21E+02	6.40E+01 G
SB-124	F	-3.1918E-02					6.02E+01	
			602.73	-5.176E-01	?(P	3.609E+00	1.02E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.677E+00	1.00E+03	4.78E+01 G
			722.79	4.383E+00	?(	1.280E+01	8.62E+01	1.08E+01 G
SB-125	I	1.2281E+00					1.01E+03	
			427.88	-2.279E-01	?(	3.830E+00	6.53E+02	2.96E+01 G
			600.50	2.751E+00	&(	1.808E+01	1.94E+02	1.79E+01 G
			635.89	-1.928E+00	+ P	1.241E+01	3.39E+02	1.13E+01 G
			463.37	2.747E+00	(	1.432E+01	1.52E+02	1.05E+01 G
I-131	I	1.0824E+00					8.02E+00	
			364.48	8.361E-01	&(	9.284E-01	4.66E+01	8.17E+01 G
			284.30	3.988E+00	&(	1.448E+01	1.45E+02	6.14E+00 G
			636.97	1.401E+00	?(P	2.121E+01	4.27E+02	7.17E+00 G
Gd-153	F	-1.4834E+00					2.42E+02	
			97.50	-1.483E+00	?(	8.473E+00	1.72E+02	3.00E+01 G
			103.20	-2.032E+00	+	1.180E+01	1.74E+02	2.18E+01 G
Ga-68	C	-5.1886E+00					4.71E-02	
			1077.40	-5.189E+00	?(	6.110E+01	4.97E+02	3.30E+00 G
Tc-99m	I	-1.3309E-07					2.51E-01	
			140.51	-1.331E-07	%(	2.445E+00	5.47E+08	8.93E+01 G
BA-133	F	-6.9127E-01					3.85E+03	
			356.00	-6.913E-01	?(	3.613E+00	1.55E+02	6.20E+01 G
			302.85	0.000E+00	+	1.352E+01	1.00E+03	1.83E+01 G
			383.84	-7.397E+00	+ P	2.287E+01	8.76E+01	8.94E+00 GA
			80.99	-1.266E+00	& P	6.766E+00	7.93E+01	3.41E+01 GA
CS-134	I	1.4029E+00					7.54E+02	
			604.71	0.000E+00	?(	3.568E+00	1.00E+03	9.76E+01 G
			795.87	2.751E+00	(P	1.481E+00	2.11E+01	8.55E+01 G
			569.32	1.658E+00	&(	7.439E+00	1.29E+02	1.54E+01 G
			801.95	-4.339E-01	%	2.519E+01	1.64E+03	8.69E+00 G
			563.24	3.522E+00	?(P	1.446E+01	1.66E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	5.6472E-02					1.10E+04	
			661.66	5.647E-02	%(	2.014E+00	1.00E+03	8.52E+01 G
CE-139	F	4.1175E-01					1.38E+02	
			165.85	4.118E-01	?(	1.390E+00	1.01E+02	7.99E+01 G
Ba-140	I	-7.9331E-01					1.28E+01	
			537.26	-7.933E-01	?(P	4.746E+00	2.16E+02	2.44E+01 G
			162.66	-6.749E-01	+ P	2.038E+01	9.36E+02	6.22E+00 G
			304.85	0.000E+00	&	5.807E+01	1.00E+03	4.29E+00 G
La-140	I	-1.0380E-01					1.28E+01	
			1596.21	-1.038E-01	%(P	1.524E+00	1.78E+03	9.54E+01 G
			487.02	-1.135E+00	+	5.089E+00	1.33E+02	4.55E+01 G
			328.76	-2.576E+00	&	1.307E+01	1.51E+02	2.03E+01 G
			815.77	0.000E+00	+	8.790E+00	1.00E+03	2.33E+01 G
CE-141	I	7.2595E-01					3.25E+01	
			145.44	7.260E-01	?(	2.255E+00	9.30E+01	4.82E+01 G
CE-144	I	-3.6939E+00					2.85E+02	
			133.54	-3.694E+00	*(P	1.801E+01	8.46E+01	1.11E+01 G
PM-144	C	5.5032E-01					3.63E+02	
			696.54	5.503E-01	?(P	1.299E+00	1.00E+02	9.90E+01 G
			618.06	0.000E+00	-	3.579E+00	1.00E+03	9.91E+01 G
EU-152	F	2.6802E+00					4.94E+03	
			344.29	1.915E+00	?(	8.549E+00	1.33E+02	2.65E+01 G
			1112.07	4.854E+00	?(	1.726E+01	1.04E+02	1.36E+01 G
			121.78	4.547E-01	&	3.508E+00	2.27E+02	2.86E+01 G
			778.92	9.949E-01	?(	9.741E+00	3.98E+02	1.29E+01 G
			964.11	-4.532E-01	%	2.287E+01	1.45E+03	1.46E+01 G
			244.69	4.320E+00	&(P	3.407E+01	2.35E+02	7.58E+00 G
			1408.00	-1.317E+00	-	9.628E+00	3.27E+02	2.10E+01 GA
EU-154	I	3.0564E+00					3.14E+03	
			873.23	3.974E+00	?(	1.086E+01	8.08E+01	1.23E+01 G
			123.10	2.128E-01	&	2.387E+00	3.29E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.261E+00	1.00E+03	3.52E+01 G
			723.36	2.345E+00	?(	8.136E+00	1.02E+02	2.02E+01 G
			1004.77	3.230E+00	?(	1.173E+01	1.06E+02	1.80E+01 G
			996.33	-9.403E+00	+	2.531E+01	8.04E+01	1.06E+01 G
EU-155	I	-2.0891E+00					1.81E+03	
			105.31	-2.089E+00	(	1.236E+01	1.78E+02	2.12E+01 G
			86.54	-1.494E+00	&	9.141E+00	1.84E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	-7.4131E-01					4.24E+01	
			482.00	-7.413E-01	?(P	2.549E+00	6.32E+01	8.05E+01 G
			133.02	-9.472E-01	+ P	4.533E+00	8.41E+01	4.33E+01 G
			345.83	-8.822E-01	+	1.639E+01	5.48E+02	1.51E+01 G
			136.30	-6.758E+00	+	3.494E+01	1.55E+02	5.85E+00 G
Ta-182	F	-9.9591E-01					1.14E+02	
			1121.30	-3.032E+00	?(	1.010E+01	9.89E+01	3.49E+01 G
			1221.41	-3.552E+00	+ P	8.082E+00	6.76E+01	2.70E+01 G
			1189.05	3.391E+00	?(P	8.937E+00	1.15E+02	1.62E+01 G
Hg-203	F	-4.7630E-01					4.66E+01	
			279.20	-4.763E-01	?(	1.711E+00	1.07E+02	8.15E+01 G
TL-208	N	7.8466E+00					6.98E+02	
			583.02	7.847E+00	(	3.780E-01	8.08E+00	8.45E+01 G
			277.28	2.044E+01	+ P	1.569E+01	2.57E+01	6.31E+00 G
			860.56	1.112E+01	+	3.563E+00	2.09E+01	1.24E+01 G
pm-146	C	5.3978E-01					2.02E+03	
			747.16	-1.253E+00	?(	4.288E+00	1.45E+02	3.40E+01 G
			735.72	3.323E+00	?(P	4.039E+00	5.32E+01	2.25E+01 G
			453.88	5.143E-01	?(P	1.346E+00	1.06E+02	6.50E+01 G
y-88	F	4.2779E-01					1.07E+02	
			898.04	4.278E-01	&(P	1.187E+00	1.16E+02	9.37E+01 G
			1836.06	-1.229E+00	+ P	2.259E+00	4.77E+01	9.92E+01 G
Cd-113m		-1.5413E+03					5.33E+03	
			263.70	-1.541E+03	?(	1.750E+04	3.28E+02	6.00E-03 K
Cf-251	T	3.0256E-01					3.28E+05	
			176.60	3.026E-01	&(	5.673E+00	7.19E+02	1.70E+01 G
			227.00	-4.369E+00	+	1.819E+01	1.61E+02	6.30E+00 GA
Cf-249	T	-9.4046E-01					1.28E+05	
			387.95	-9.405E-01	?(	3.230E+00	1.03E+02	6.60E+01 G
			333.44	-3.421E+00	+	1.669E+01	1.46E+02	1.55E+01 G
Sn-126		4.6959E+00					3.65E+07	
			87.57	1.983E+00	}	7.046E+00	3.87E+01	3.75E+01 GA
			64.28	4.696E+00	(	1.836E+01	1.17E+02	9.70E+00 G
			86.94	-5.063E+00	+	3.068E+01	1.82E+02	9.04E+00 GA
PB-210	N	3.3919E-01					8.14E+03	
			46.54	3.392E-01	%(P	5.444E+01	4.73E+03	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.0735E+01					6.98E+02	
			238.63	2.074E+01	(P	1.734E+00	5.44E+00	4.33E+01 G
			300.03	-1.517E+01	- P	7.071E+01	5.37E+01	3.28E+00 GA
PB-214	N	1.2713E+01					5.84E+05	
			351.93	1.291E+01	(P	2.475E+00	1.11E+01	3.76E+01 G
			295.09	1.234E+01	(P	4.967E+00	1.90E+01	1.93E+01 G
			242.00	1.162E+01		1.192E+01	3.31E+01	7.43E+00 GA
BI-207	C	-1.5951E-01					1.18E+04	
			569.70	-1.595E-01	?(	1.378E+00	2.45E+02	9.77E+01 G
			1063.66	-1.935E-01	+	2.516E+00	5.54E+02	7.45E+01 G
BI-212	N	3.9243E+00					6.98E+02	
			727.17	3.924E+00	?(	2.599E+01	1.91E+02	7.55E+00 G
			785.42	4.727E+01	?	9.917E+01	8.95E+01	1.28E+00 GA
BI-214	N	1.2277E+01					5.84E+05	
			609.31	1.228E+01	(P	2.540E+00	1.26E+01	4.61E+01 G
			1120.29	3.172E+00	- P	1.622E+01	1.48E+02	1.51E+01 G
			1764.49	-1.274E+00	- P	2.125E+01	2.81E+02	1.54E+01 G
BI-210M	T	7.5986E-01					1.10E+09	
			265.83	7.599E-01	&(	2.235E+00	8.78E+01	5.00E+01 G
			304.90	0.000E+00	-	8.898E+00	1.00E+03	2.80E+01 G
AC-228	N	1.7733E+01					2.10E+03	
			911.07	1.807E+01	(P	1.602E+00	1.11E+01	2.90E+01 G
			968.97	2.411E+01	+	5.613E+00	1.52E+01	1.75E+01 G
			338.32	1.692E+01	(P	7.373E+00	1.69E+01	1.20E+01 G
			93.35	2.212E+01		1.391E+01	2.11E+01	5.56E+00 XA
TH-227	N	1.0456E+01					7.95E+03	
			50.14	1.046E+01	(	1.390E+01	5.07E+01	8.00E+00 G
			256.24	1.185E+00	&	1.470E+01	4.71E+02	7.00E+00 G
TH-229	N	-7.9172E+00					2.68E+06	
			193.51	-7.917E+00	?(	2.344E+01	1.15E+02	4.40E+00 G
			210.85	1.738E+00	& P	3.923E+01	8.66E+02	2.99E+00 G
TH-234	N	3.3120E+00					1.63E+12	
			63.29	3.312E+00	@(P	4.423E+01	3.96E+02	3.81E+00 G
			92.59	-1.450E+01	+ P	4.607E+01	4.21E+01	5.58E+00 G
PA-234	N	4.2489E-01					1.63E+12	
			131.29	-2.253E+00	?(P	1.067E+01	8.43E+01	1.80E+01 G
			946.02	4.022E+00	&(	8.479E+00	9.09E+01	1.34E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47 0.000E+00 &   1.528E+01 1.00E+03 8.20E+00 G
                          883.24-9.638E+00 +   2.996E+01 9.25E+01 9.60E+00 G
                          880.53-1.536E+01 +   4.386E+01 8.52E+01 6.00E+00 GA

PA-234M  N   5.2266E+01                                      1.63E+12
                         1001.00-9.575E+00 ?(P 3.571E+02 8.02E+02 8.37E-01 G
                          766.41 2.283E+02 ?(  6.246E+02 8.15E+01 2.94E-01 G

U-235    N  -4.5997E+00                                      2.57E+11
                          143.79-4.600E+00 ?(P 1.825E+01 7.21E+01 1.10E+01 G
                          205.33-5.292E+00 + P 2.126E+01 1.47E+02 5.01E+00 G
                          163.38 6.948E+00 + P 2.198E+01 9.47E+01 5.08E+00 G

AM-241   T   1.4459E+00                                      1.58E+05
                           59.54 1.446E+00 ?(  5.634E+00 1.17E+02 3.59E+01 G

Np-237   F  -5.1622E-01                                      2.14E+06
                           86.49-5.162E-01 &(  1.843E+01 1.07E+03 1.31E+01 G

Ir-192   F   1.9584E-01                                      7.40E+01
                          316.49 0.000E+00 ?(  2.946E+00 1.00E+03 8.70E+01 G
                          468.06 5.252E-01 ?(  3.025E+00 1.68E+02 5.18E+01 G
                          308.44 0.000E+00 -   7.917E+00 1.00E+03 3.18E+01 G

Cs-136   F  -1.9182E-02                                      1.30E+01
                          818.50-1.918E-02 %(  2.039E+00 2.98E+03 1.00E+02 G
                         1048.07-8.005E-01 +   2.313E+00 8.53E+01 8.00E+01 G
                          340.57-1.156E+00 &   5.473E+00 1.41E+02 4.69E+01 G

Np-239   T  -1.5852E+00                                      2.36E+00
                          103.70-1.846E+00 +   1.083E+01 1.76E+02 2.40E+01 X
                          106.13-1.585E+00  (  1.161E+01 2.20E+02 2.27E+01 G
                           99.50-2.961E+00 +   1.706E+01 1.73E+02 1.50E+01 X

Nd-147      -5.2934E+00                                      1.11E+01
                          531.00-5.293E+00 ?(  1.164E+01 9.26E+01 1.30E+01 G
                           91.10-1.594E+00 +   9.094E+00 1.71E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
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+ - 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	433.	26.	0.014	116.72	1.446E+00	
TH-234	63.29	340.	7.	0.004	396.14	3.312E+00	P
BA-133	80.99	966.	-28.	-0.015	79.30	-1.266E+00	P
EU-155	86.54	1544.	-30.	-0.017	183.93	-1.494E+00	
Nd-147	91.10	1350.	-30.	-0.017	171.39	-1.594E+00	
TH-234	92.59	1364.	-55.	-0.031	42.11	-1.450E+01	P
Gd-153	97.50	1370.	-31.	-0.017	171.62	-1.483E+00	
Np-239	99.50	1401.	-31.	-0.017	173.19	-2.961E+00	
Gd-153	103.20	1432.	-31.	-0.017	174.50	-2.032E+00	
Np-239	103.70	1463.	-31.	-0.017	176.27	-1.846E+00	
EU-155	105.31	1493.	-31.	-0.017	177.81	-2.089E+00	
Np-239	106.13	1511.	-25.	-0.014	219.84	-1.585E+00	
EU-152	121.78	205.	9.	0.005	227.44	4.547E-01	
CO-57	122.06	185.	-12.	-0.007	162.87	-2.025E-01	
EU-154	123.10	192.	6.	0.003	329.14	2.128E-01	
PA-234	131.29	753.	-28.	-0.015	84.34	-2.253E+00	P
HF-181	133.02	779.	-28.	-0.015	84.06	-9.472E-01	P
CE-144	133.54	806.	-28.	-0.015	84.56	-3.694E+00	P
HF-181	136.30	831.	-27.	-0.015	155.01	-6.758E+00	
CO-57	136.47	857.	-13.	-0.007	322.41	-1.801E+00	
U-235	143.79	758.	-33.	-0.018	72.14	-4.600E+00	P
CE-141	145.44	213.	23.	0.013	93.05	7.260E-01	
Ba-140	162.66	255.	-3.	-0.001	935.97	-6.749E-01	P
U-235	163.38	194.	21.	0.012	94.71	6.948E+00	P
CE-139	165.85	195.	20.	0.011	100.86	4.118E-01	
Cf-251	176.60	132.	3.	0.002	718.80	3.026E-01	
TH-229	193.51	132.	-19.	-0.011	115.43	-7.917E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	205.33	129.	-14.	-0.008	146.73	-5.292E+00	P
TH-229	210.85	151.	3.	0.001	866.47	1.738E+00	P
Cf-251	227.00	128.	-13.	-0.007	161.29	-4.369E+00	
EU-152	244.69	615.	15.	0.008	235.36	4.320E+00	P
Cd-113m	263.70	84.	-4.	-0.002	327.87	-1.541E+03	
BI-210M	265.83	95.	16.	0.009	87.80	7.599E-01	
Hg-203	279.20	139.	-16.	-0.009	106.85	-4.763E-01	
PA-231	300.07	375.	-18.	-0.010	151.91	-1.893E+01	
PA-233	300.18	393.	-11.	-0.006	252.62	-4.604E+00	
CR-51	320.08	291.	15.	0.008	166.75	3.956E+00	P
La-140	328.76	408.	-19.	-0.011	151.32	-2.576E+00	
Cf-249	333.44	379.	-19.	-0.011	145.60	-3.421E+00	
Cs-136	340.57	360.	-19.	-0.011	141.27	-1.156E+00	
EU-152	344.29	273.	18.	0.010	132.98	1.915E+00	
HF-181	345.83	325.	-5.	-0.003	548.23	-8.822E-01	
BA-133	356.00	254.	-15.	-0.008	155.25	-6.913E-01	
BA-133	383.84	185.	-21.	-0.012	87.64	-7.397E+00	P
Cf-249	387.95	198.	-20.	-0.011	102.58	-9.405E-01	
SN-113	391.69	217.	-18.	-0.010	120.78	-8.643E-01	
SB-125	427.88	44.	-2.	-0.001	653.20	-2.279E-01	
AG-108M	433.94	49.	-4.	-0.002	452.02	-1.569E-01	P
pm-146	453.88	22.	9.	0.005	106.48	5.143E-01	P
SB-125	463.37	70.	8.	0.004	152.07	2.747E+00	
Ir-192	468.06	76.	8.	0.004	167.86	5.252E-01	
BE-7	477.60	150.	-18.	-0.010	57.54	-6.167E+00	P
HF-181	482.00	127.	-16.	-0.009	63.24	-7.413E-01	P
La-140	487.02	161.	-14.	-0.008	132.92	-1.135E+00	
RU-103	497.05	44.	-4.	-0.002	280.15	-1.528E-01	P
RH-106	511.86	149.	-4.	-0.002	401.70	-8.441E-01	
Nd-147	531.00	56.	-17.	-0.010	92.58	-5.293E+00	
Ba-140	537.26	31.	-5.	-0.003	215.62	-7.933E-01	P
CS-134	563.24	31.	7.	0.004	166.42	3.522E+00	P
CS-134	569.32	27.	6.	0.003	129.10	1.658E+00	
BI-207	569.70	39.	-4.	-0.002	245.45	-1.595E-01	
SB-125	600.50	226.	11.	0.006	194.41	2.751E+00	
SB-124	602.73	272.	-11.	-0.006	102.13	-5.176E-01	P
SB-125	635.89	35.	-5.	-0.003	338.85	-1.928E+00	P
AG-110M	657.76	44.	7.	0.004	139.24	3.542E-01	
PM-144	696.54	24.	11.	0.006	100.02	5.503E-01	P
NB-94	702.63	28.	4.	0.002	287.15	2.054E-01	P
SB-124	722.79	26.	9.	0.005	86.20	4.383E+00	
AG-108M	722.94	30.	9.	0.005	90.46	5.217E-01	
EU-154	723.36	39.	9.	0.005	101.81	2.345E+00	
ZR-95	724.20	138.	-24.	-0.013	73.21	-2.777E+00	
pm-146	735.72	10.	14.	0.008	53.23	3.323E+00	P
pm-146	747.16	28.	-8.	-0.004	144.70	-1.253E+00	
ZR-95	756.73	19.	2.	0.001	398.21	2.307E-01	
AG-110M	763.94	60.	-17.	-0.009	68.70	-4.151E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-95	765.79	66.	11.	0.006	111.88	5.835E-01		
PA-234M	766.41	44.	12.	0.007	81.49	2.283E+02		
EU-152	778.92	19.	2.	0.001	398.21	9.949E-01		
CS-134	795.87	18.	42.	0.023	21.13	2.751E+00		P
CO-58	810.78	40.	10.	0.006	94.87	5.739E-01		
MN-54	834.85	14.	9.	0.005	92.27	5.426E-01		P
Co-56	846.77	14.	6.	0.003	142.70	3.458E-01		P
NB-94	871.10	20.	-4.	-0.002	165.83	-2.430E-01		
EU-154	873.23	17.	8.	0.004	80.83	3.974E+00		
PA-234	880.53	75.	-15.	-0.008	85.19	-1.536E+01		
PA-234	883.24	90.	-15.	-0.008	92.55	-9.638E+00		
Sc-46	889.28	63.	10.	0.005	118.00	6.110E-01		
y-88	898.04	11.	6.	0.004	116.33	4.278E-01		P
AG-110M	937.49	45.	-18.	-0.010	51.73	-3.378E+00		P
PA-234	946.02	10.	8.	0.005	90.91	4.022E+00		
EU-154	996.33	62.	-15.	-0.008	80.45	-9.403E+00		
PA-234M	1001.00	77.	-1.	-0.001	801.93	-9.575E+00		P
EU-154	1004.77	36.	8.	0.005	106.23	3.230E+00		
Co-56	1037.84	20.	-6.	-0.003	168.87	-2.996E+00		
Cs-136	1048.07	25.	-9.	-0.005	85.35	-8.005E-01		
RH-106	1050.36	42.	-2.	-0.001	612.83	-6.854E+00		
BI-207	1063.66	25.	-2.	-0.001	554.15	-1.935E-01		
Ga-68	1077.40	20.	-2.	-0.001	496.66	-5.189E+00		
FE-59	1099.25	16.	6.	0.003	159.03	7.781E-01		P
EU-152	1112.07	38.	9.	0.005	104.20	4.854E+00		
ZN-65	1115.55	47.	7.	0.004	140.24	1.063E+00		
Sc-46	1120.55	47.	7.	0.004	147.94	5.129E-01		
Ta-182	1121.30	89.	-14.	-0.008	98.89	-3.032E+00		
CO-60	1173.24	11.	9.	0.005	91.10	6.930E-01		P
Ta-182	1189.05	11.	7.	0.004	114.74	3.391E+00		P
Ta-182	1221.41	27.	-12.	-0.007	67.57	-3.552E+00		P
Co-56	1238.28	11.	19.	0.011	44.63	2.409E+00		
NA-22	1274.53	16.	-1.	-0.001	574.46	-8.450E-02		
FE-59	1291.60	0.	10.	0.006	31.62	1.978E+00		
CO-60	1332.50	38.	-17.	-0.009	48.15	-1.464E+00		P
AG-110M	1384.30	6.	5.	0.003	113.28	1.995E+00		
EU-152	1408.00	17.	-3.	-0.002	327.45	-1.317E+00		
Co-56	1771.35	42.	-11.	-0.006	88.61	-8.059E+00		
y-88	1836.06	12.	-10.	-0.006	47.68	-1.229E+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 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-6.1671E+00	-6.1672E+00	5.754E+01%	2.09E+01
NA-22	#A	-8.4496E-02	-8.4496E-02	5.745E+02%	1.80E+00
K-40		2.5210E+02	2.5210E+02	6.039E+00%	1.06E+01
Sc-46	#A	5.6193E-01	5.6194E-01	9.461E+01%	2.46E+00
CR-51	#A	3.9563E+00	3.9563E+00	1.668E+02%	2.22E+01
MN-54	#A	5.4259E-01	5.4259E-01	9.227E+01%	1.19E+00
FE-59	#A	1.2979E+00	1.2979E+00	3.162E+01%	2.81E+00
Co-56	#A	1.1669E+00	1.1669E+00	4.463E+01%	1.20E+00
CO-57	#A	-2.0250E-01	-2.0250E-01	1.629E+02%	1.12E+00
CO-58	#A	5.7391E-01	5.7392E-01	9.487E+01%	1.85E+00
CO-60	#A	-1.4637E+00	-1.4637E+00	4.815E+01%	2.75E+00
ZN-65	#A	1.0631E+00	1.0631E+00	1.402E+02%	5.14E+00
NB-94	#A	2.0542E-01	2.0542E-01	2.871E+02%	1.41E+00
ZR-95	#A	2.3071E-01	2.3071E-01	3.982E+02%	2.26E+00
NB-95	#A	5.8350E-01	5.8351E-01	1.119E+02%	2.22E+00
RU-103	#A	-1.5278E-01	-1.5278E-01	2.801E+02%	1.40E+00
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.59E+01
AG-108M	#A	1.8306E-01	1.8306E-01	9.046E+01%	1.33E+00
AG-110M	#A	4.1031E-01	4.1031E-01	1.133E+02%	4.26E+00
SN-113	#A	-8.6426E-01	-8.6427E-01	1.208E+02%	3.51E+00
SB-124	#A	-3.1918E-02	-3.1918E-02	6.682E+01%	3.61E+00
SB-125	#A	1.2281E+00	1.2281E+00	1.521E+02%	3.83E+00
I-131	#	1.0824E+00	1.0824E+00	4.663E+01%	9.28E-01
Gd-153	#A	-1.4834E+00	-1.4834E+00	1.716E+02%	8.47E+00
Ga-68	#A	-5.1297E+00	-5.1886E+00	4.967E+02%	6.11E+01
Tc-99m	#A	-1.3280E-07	-1.3309E-07	5.468E+08%	2.45E+00
BA-133	#A	-6.9127E-01	-6.9127E-01	1.552E+02%	3.61E+00
CS-134	#A	1.4029E+00	1.4029E+00	2.113E+01%	3.57E+00
CS-137	#A	5.6472E-02	5.6472E-02	1.005E+03%	2.01E+00
CE-139	#A	4.1175E-01	4.1175E-01	1.009E+02%	1.39E+00
Ba-140	#A	-7.9328E-01	-7.9331E-01	2.156E+02%	4.75E+00
La-140	#A	-1.0379E-01	-1.0380E-01	1.779E+03%	1.52E+00
CE-141	#A	7.2594E-01	7.2595E-01	9.305E+01%	2.25E+00
CE-144	#A	-3.6939E+00	-3.6939E+00	8.456E+01%	1.80E+01
PM-144	#A	5.5032E-01	5.5032E-01	1.000E+02%	1.30E+00
EU-152	#A	2.6802E+00	2.6802E+00	1.042E+02%	8.55E+00
EU-154	#A	3.0564E+00	3.0564E+00	5.596E+01%	1.09E+01
EU-155	#A	-2.0891E+00	-2.0891E+00	1.778E+02%	1.24E+01
HF-181	#A	-7.4130E-01	-7.4131E-01	6.324E+01%	2.55E+00
Ta-182	#A	-9.9590E-01	-9.9591E-01	7.574E+01%	1.01E+01
Hg-203	#A	-4.7630E-01	-4.7630E-01	1.069E+02%	1.71E+00
TL-208		7.8466E+00	7.8466E+00	8.085E+00%	3.78E-01
pm-146	#A	5.3978E-01	5.3978E-01	5.323E+01%	4.29E+00

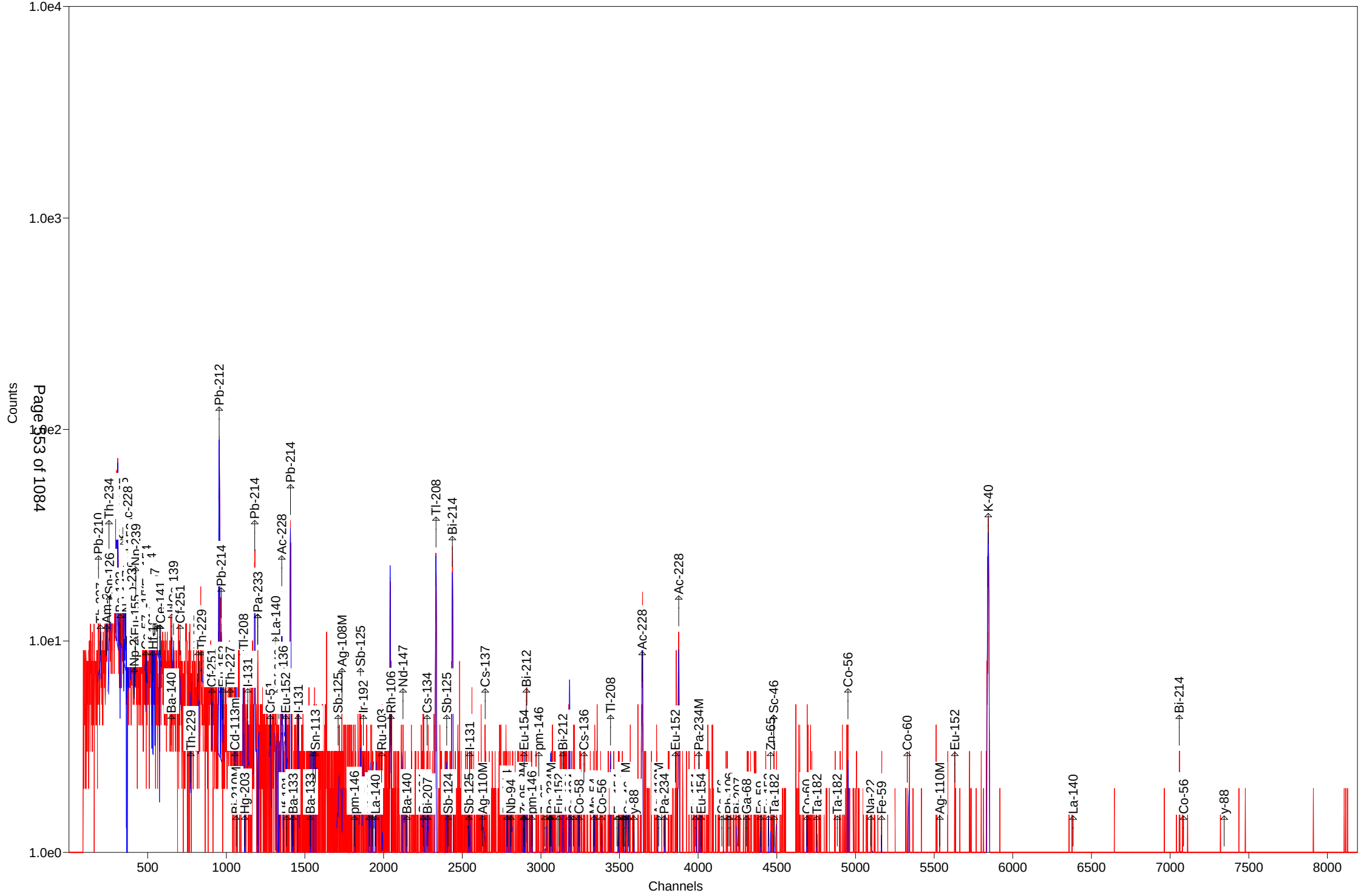
y-88	#A	4.2779E-01	4.2779E-01	1.163E+02%	1.19E+00
Cd-113m	#A	-1.5413E+03	-1.5413E+03	3.279E+02%	1.75E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.21E+01
Cf-251	#A	3.0256E-01	3.0256E-01	7.188E+02%	5.67E+00
Cf-249	#A	-9.4046E-01	-9.4046E-01	1.026E+02%	3.23E+00
Sn-126	A	4.6959E+00	4.6959E+00	1.170E+02%	1.84E+01
PB-210	#A	3.3919E-01	3.3919E-01	4.733E+03%	5.44E+01
PB-212		2.0735E+01	2.0735E+01	5.438E+00%	1.73E+00
PB-214		1.2713E+01	1.2713E+01	1.099E+01%	2.47E+00
BI-207	#A	-1.5951E-01	-1.5951E-01	2.455E+02%	1.38E+00
BI-212	#A	3.9243E+00	3.9243E+00	1.912E+02%	2.60E+01
BI-214		1.2277E+01	1.2277E+01	1.259E+01%	2.54E+00
BI-210M	#A	7.5986E-01	7.5986E-01	8.780E+01%	2.24E+00
AC-228		1.7733E+01	1.7733E+01	1.010E+01%	1.60E+00
TH-227	A	1.0456E+01	1.0456E+01	5.071E+01%	1.39E+01
TH-229	#A	-7.9172E+00	-7.9172E+00	1.154E+02%	2.34E+01
TH-234	#A	3.3120E+00	3.3120E+00	3.961E+02%	4.42E+01
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.60E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.05E+00
PA-234	#A	4.2489E-01	4.2489E-01	6.200E+01%	1.07E+01
PA-234M	#A	5.2266E+01	5.2266E+01	8.149E+01%	3.57E+02
U-235	#A	-4.5997E+00	-4.5997E+00	7.214E+01%	1.83E+01
AM-241	#A	1.4459E+00	1.4459E+00	1.167E+02%	5.63E+00
Np-237	#A	-5.1622E-01	-5.1622E-01	1.066E+03%	1.84E+01
Ir-192	#A	1.9583E-01	1.9584E-01	1.679E+02%	2.95E+00
Cs-136	#A	-1.9181E-02	-1.9182E-02	2.985E+03%	2.04E+00
Np-239	#A	-1.5848E+00	-1.5852E+00	2.198E+02%	1.16E+01
Nd-147	#A	-5.2931E+00	-5.2934E+00	9.258E+01%	1.16E+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) 3.339E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.3385663E+02 Bq/Sample

265170_Gamma_160-18567-A-7-B. 15_Gamma_20161116.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20161632

Sample Description: 265170_Gamma_160-18567-A-8-B
Detector: Detector # 9
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-8-B

Decay to Time: 9/7/2016 17:48 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:50:06 Real Time: 1803 sec
Analysis Time: 9/7/2016 18:20 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev11.lib
Bkgd Correction File: 9_2016-09-06_0605.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	2.486E+00	145.7	3.622E+00	3.624E+00	1.230E+01
NA-22	-2.724E-01	147.6	4.022E-01	4.024E-01	1.405E+00
K-40	2.318E+02	4.9	1.137E+01	1.643E+01	8.917E+00
Sc-46	-4.102E-01	123.7	5.072E-01	5.077E-01	1.724E+00
CR-51	-1.553E-02	20528.6	3.188E+00	3.188E+00	2.241E+01
MN-54	-4.525E-01	82.1	3.716E-01	3.723E-01	1.310E+00
FE-59	7.794E-01	92.9	7.243E-01	7.254E-01	1.948E+00
Co-56	1.232E+00	33.6	4.142E-01	4.190E-01	1.122E+00
CO-57	2.879E-01	89.0	2.563E-01	2.568E-01	8.548E-01
CO-58	3.960E-01	104.1	4.121E-01	4.126E-01	1.397E+00
CO-60	4.953E-01	71.2	3.525E-01	3.534E-01	9.735E-01
ZN-65	1.466E+00	78.9	1.158E+00	1.160E+00	3.866E+00
NB-94	-6.749E-01	80.8	5.455E-01	5.467E-01	1.818E+00
ZR-95	1.248E-01	740.8	9.242E-01	9.242E-01	2.119E+00
NB-95	6.166E-01	75.9	4.679E-01	4.690E-01	1.558E+00
RU-103	-4.556E-02	849.1	3.869E-01	3.869E-01	9.536E-01
RH-106	1.633E+00	220.3	3.596E+00	3.597E+00	1.243E+01
AG-108M	1.222E-01	271.8	3.321E-01	3.321E-01	9.384E-01
AG-110M	4.074E-01	27.7	1.130E-01	1.149E-01	2.197E+00
SN-113	-3.054E-01	210.0	6.413E-01	6.415E-01	2.176E+00
SB-124	3.822E-01	211.6	8.088E-01	8.090E-01	2.721E+00
SB-125	1.624E+00	89.5	1.453E+00	1.455E+00	3.035E+00
I-131	6.082E-02	941.6	5.727E-01	5.728E-01	1.082E+00
Gd-153	-1.213E+00	161.6	1.960E+00	1.961E+00	6.518E+00
Ga-68	1.809E+01	86.0	1.557E+01	1.560E+01	3.429E+01
Tc-99m	2.988E-01	166.3	4.970E-01	4.973E-01	1.659E+00
BA-133	4.267E-01	265.5	1.133E+00	1.133E+00	2.856E+00
CS-134	1.537E+00	20.5	3.154E-01	3.254E-01	2.791E+00
CS-137	4.011E+00	11.0	4.415E-01	4.883E-01	6.710E-01
CE-139	-4.244E-01	93.7	3.976E-01	3.996E-01	1.324E+00
Ba-140	1.119E+00	92.6	1.036E+00	1.038E+00	2.875E+00
La-140	7.192E-01	62.5	4.493E-01	4.509E-01	9.532E-01
CE-141	-7.510E-01	136.6	1.026E+00	1.027E+00	3.416E+00

CE-144	0.000E+00	1.#INF	1.575E+00	1.575E+00	1.277E+01
PM-144	-5.060E-02	194.4	9.838E-02	9.842E-02	1.436E+00
EU-152	1.394E+00	117.8	1.642E+00	1.643E+00	7.171E+00
EU-154	7.751E-01	84.1	6.515E-01	6.527E-01	1.074E+01
EU-155	1.605E+00	162.1	2.602E+00	2.603E+00	8.657E+00
HF-181	8.472E-02	262.3	2.222E-01	2.222E-01	1.686E+00
Ta-182	1.747E+00	105.6	1.845E+00	1.847E+00	6.229E+00
Hg-203	-3.116E-01	124.8	3.887E-01	3.891E-01	1.309E+00
TL-208	6.188E+00	9.2	5.676E-01	6.521E-01	7.928E-01
pm-146	-1.336E+00	70.3	9.386E-01	9.412E-01	3.577E+00
y-88	2.447E-02	382.9	9.369E-02	9.370E-02	1.180E+00
Cd-113m	1.371E+03	333.5	4.572E+03	4.573E+03	1.565E+04
Cd-109	0.000E+00	1.#INF	1.734E+01	1.735E+01	5.767E+01
Cf-251	-1.557E+00	117.7	1.832E+00	1.838E+00	4.682E+00
Cf-249	8.423E-01	98.7	8.318E-01	8.329E-01	1.973E+00
Sn-126	1.283E+00	373.0	4.784E+00	4.785E+00	1.609E+01
PB-210	1.113E+01	97.9	1.090E+01	1.092E+01	3.641E+01
PB-212	1.989E+01	4.7	9.285E-01	1.587E+00	1.476E+00
PB-214	1.356E+01	6.3	8.570E-01	1.110E+00	1.761E+00
BI-207	-3.629E-01	114.0	4.138E-01	4.143E-01	1.163E+00
BI-212	2.748E+01	15.0	4.126E+00	4.365E+00	8.535E+00
BI-214	1.235E+01	8.6	1.056E+00	1.236E+00	2.079E+00
BI-210M	2.028E-01	269.7	5.468E-01	5.469E-01	1.869E+00
AC-228	2.114E+01	7.3	1.544E+00	1.883E+00	9.956E-01
TH-227	5.250E+00	109.1	5.725E+00	5.733E+00	1.914E+01
TH-229	5.563E+00	102.2	5.687E+00	5.704E+00	1.794E+01
TH-234	1.112E+01	102.2	1.136E+01	1.137E+01	3.783E+01
PA-231	1.224E+01	132.9	1.626E+01	1.628E+01	7.265E+01
PA-233	7.714E-01	188.1	1.451E+00	1.452E+00	6.079E+00
PA-234	1.964E-01	346.4	6.804E-01	6.804E-01	7.859E+00
PA-234M	3.741E+01	72.4	2.707E+01	2.713E+01	2.104E+02
U-235	0.000E+00	1.#INF	1.707E+00	1.707E+00	1.331E+01
AM-241	2.449E-01	607.4	1.487E+00	1.488E+00	5.003E+00
Np-237	0.000E+00	1.#INF	5.253E+00	5.253E+00	1.746E+01
Ir-192	2.736E-01	92.5	2.532E-01	2.537E-01	2.539E+00
Cs-136	1.657E-01	169.6	2.810E-01	2.812E-01	1.530E+00
Np-239	-1.618E+00	161.8	2.618E+00	2.619E+00	8.703E+00
Nd-147	-2.006E-01	1278.7	2.565E+00	2.565E+00	6.382E+00
Total	1.834E+03				

Analyst: Mike Aldridge

TestAmerica Inc Spectrum name: 9_Gamma_20161632.An1

Sample description
265170_Gamma_160-18567-A-8-B

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20161632.An1

Acquisition information
Start time: 9/7/2016 5:50:06 PM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-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 (37.59keV)
Stop channel: 8000 (1999.34keV)
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	9/7/2016 5:48:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2016-09-06_0605.PBC 9/6/2016 6:05:43 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1060

***** 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	22.	97.91	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
49.84	22.	109.05	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
59.54	6.	607.36	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.29	30.	102.15	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
64.28	9.	373.03	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
74.88	234.	10.53	1.03	4.578E-02				
77.21	331.	8.06	1.03	4.681E-02				
87.19	121.	15.97	1.04	5.030E-02	86.49	13.100	1.027E+01	Np237
					86.54	30.700	4.379E+00	EU155
					86.94	9.040	1.484E+01	Sn126
					87.57	37.500	3.565E+00	Sn126
					88.04	3.790	3.519E+01	Cd109
89.87	107.	17.99	1.04	5.098E-02				
93.32	101.	18.47	1.04	5.172E-02	92.59	5.584	1.951E+01	TH234
					93.35	5.561	1.954E+01	AC228
103.70	33.	162.09	1.05	5.307E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.419E+00	Np239
105.61	33.	162.13	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	1.498E+00	Np239
122.06	24.	89.03	1.07	5.303E-02	121.78	28.580	8.620E-01	EU152
					122.06	85.600	2.879E-01	CO57
123.10	24.	84.05	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
139.45	24.	166.30	1.09	5.091E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	2.	969.54	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
193.51	17.	145.88	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
210.85	14.	143.27	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
227.00	15.	145.30	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
238.50	540.	5.65	1.21	3.733E-02	238.63	43.300	1.856E+01	PB212
241.88	88.	19.10	1.18	3.697E-02	242.00	7.430	1.789E+01	PB214
263.70	5.	333.46	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	6.	269.66	1.20	3.470E-02	265.83	50.000	PBC<MDA	BI210M
277.03	63.	27.42	1.23	3.372E-02	277.28	6.310	1.655E+01	TL208
284.30	2.	941.63	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.06	175.	12.29	1.28	3.232E-02	295.09	19.300	1.562E+01	PB214
300.07	19.	185.28	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.323E+01	PA231
					300.18	6.200	5.251E+00	PA233
300.11	19.	182.37	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.323E+01	PA231
					300.18	6.200	5.251E+00	PA233
300.18	19.	188.14	1.24	3.194E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.323E+01	PA231
					300.18	6.200	5.251E+00	PA233
302.65	19.	190.61	1.24	3.176E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.790E+00	BA133
302.85	13.	278.89	1.24	3.175E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.239E+00	BA133
328.76	17.	163.98	1.26	2.999E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	166.98	1.27	2.970E-02	333.44	15.510	PBC<MDA	Cf249
338.20	142.	14.38	0.95	2.941E-02	338.32	12.010	2.226E+01	AC228
340.57	17.	169.59	1.27	2.927E-02	340.57	46.900	PBC<MDA	Cs136
345.83	6.	262.27	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181
351.88	269.	7.70	1.01	2.861E-02	351.93	37.600	1.388E+01	PB214
355.87	6.	451.82	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
383.84	17.	101.60	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	18.	105.45	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
427.88	5.	332.16	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
432.57	4.	421.09	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
463.37	18.	89.48	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	16.	92.53	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	145.71	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
487.02	13.	104.60	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
511.86	111.	21.87	2.67	2.188E-02	511.86	20.000	1.409E+01	RH106
537.26	12.	92.63	1.44	2.112E-02	537.26	24.390	PBC<MDA	Ba140
563.24	14.	101.70	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.32	26.	34.83	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	8.705E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.22	187.	9.17	1.37	1.988E-02	583.02	84.500	6.188E+00	TL208
600.50	14.	192.31	1.50	1.946E-02	600.50	17.860	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
602.73	13.	211.59	1.50	1.940E-02	602.73	98.260	PBC<MDA	SB124
604.71	15.	191.43	1.50	1.936E-02	604.71	97.620	PBC<MDA	CS134
609.44	197.	8.55	1.50	1.925E-02	609.31	46.090	1.235E+01	BI214
610.30	9.	329.82	1.51	1.922E-02	610.30	5.750	PBC<MDA	RU103
618.06	4.	461.86	1.51	1.904E-02	618.06	99.100	PBC<MDA	PM144
621.92	6.	220.26	1.51	1.896E-02	621.92	9.930	PBC<MDA	RH106
657.76	2.	780.50	1.54	1.818E-02	657.76	94.640	PBC<MDA	AG110M
661.80	111.	11.01	1.82	1.810E-02	661.66	85.210	4.011E+00	CS137
723.16	4.	343.69	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.529E-01	AG108M
					723.36	20.220	6.874E-01	EU154
727.21	66.	17.06	0.67	1.685E-02	727.17	7.550	2.895E+01	BI212
735.72	18.	43.72	1.61	1.671E-02	735.72	22.500	2.611E+00	pm146
756.73	2.	740.78	1.62	1.635E-02	756.73	54.460	PBC<MDA	ZR95
765.79	18.	75.89	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.094E+02	PA234M
766.41	13.	72.35	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.481E+02	PA234M
785.63	6.	247.48	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	47.	20.52	1.66	1.574E-02	795.87	85.530	1.940E+00	CS134
810.78	11.	104.05	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
815.77	10.	96.27	1.67	1.544E-02	815.77	23.280	PBC<MDA	La140
846.77	4.	328.98	1.70	1.501E-02	846.77	99.935	PBC<MDA	Co56
860.36	11.	139.97	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
873.23	4.	229.61	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
880.53	13.	81.81	1.72	1.456E-02	880.53	6.000	PBC<MDA	PA234
883.24	3.	357.15	1.72	1.453E-02	883.24	9.600	PBC<MDA	PA234
911.39	154.	8.06	1.50	1.418E-02	911.07	29.000	2.080E+01	AC228
964.11	6.	229.51	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
969.18	89.	14.45	1.40	1.352E-02	968.97	17.460	2.092E+01	AC228
1048.07	3.	225.83	1.85	1.271E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	4.	232.65	1.86	1.257E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	11.	86.05	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1099.36	5.	232.35	1.89	1.224E-02	1099.25	56.500	PBC<MDA	FE59
1112.07	10.	117.78	1.89	1.213E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	16.	78.94	1.90	1.210E-02	1115.55	50.600	PBC<MDA	ZN65
1120.52	14.	106.86	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	2.	647.47	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.064E-01	Sc46
					1121.30	34.900	3.051E-01	Ta182
1121.30	13.	105.64	1.90	1.205E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.094E-01	Sc46
					1121.30	34.900	1.747E+00	Ta182
1173.24	10.	114.59	1.94	1.163E-02	1173.24	99.900	PBC<MDA	CO60
1221.41	2.	752.99	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	38.	33.63	1.98	1.114E-02	1238.28	66.070	2.871E+00	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1291.60	11.	92.93	2.02	1.077E-02	1291.60	43.200	PBC<MDA	FE59
1332.50	10.	84.48	2.05	1.050E-02	1332.50	99.980	PBC<MDA	CO60
1384.30	13.	27.74	2.08	1.018E-02	1384.30	24.290	2.920E+00	AG110M
1408.00	7.	94.03	2.10	1.004E-02	1408.00	21.005	PBC<MDA	EU152
1461.03	434.	4.90	1.84	9.748E-03	1460.83	10.670	2.318E+02	K40
1596.21	5.	123.93	2.22	9.069E-03	1596.21	95.400	PBC<MDA	La140
1764.75	8.	98.35	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	10.	57.85	2.32	8.323E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	2.	382.88	2.35	8.079E-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
299.14	74.90	189.	232.	5.063E+03	10.65	1.025	- D
308.43	77.22	190.	331.	7.066E+03	8.06	1.027	- D
359.02	89.95	131.	106.	2.088E+03	18.01	1.039	- 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	185.80	46.54	220.	22.	0.012	97.91	0.998s
TH-227	200.20	50.14	275.	22.	0.012	109.05	1.001s
AM-241	237.77	59.54	615.	6.	0.003	607.36	1.010s
TH-234	252.77	63.29	452.	30.	0.017	102.15	1.014
Sn-126	256.74	64.28	550.	9.	0.005	373.03	1.015
BA-133	323.56	80.99	1395.	-38.	-0.021	140.84	1.031s
Np-237	345.55	86.49	1907.	0.	0.000	182.56	1.036A
EU-155	345.76	86.54	1837.	41.	0.023	52.71	1.036D
Sn-126	347.35	86.94	1803.	-34.	-0.019	177.50	1.037
Sn-126	349.87	87.57	1623.	44.	0.024	51.18	1.037D
Cd-109	351.75	88.04	1769.	0.	0.000	175.63	1.038A
Nd-147	363.99	91.10	1589.	-34.	-0.019	166.10	1.041D
TH-234	369.94	92.59	1555.	-34.	-0.019	164.10	1.042s
AC-228	372.98	93.35	123.	102.	0.057	18.32	1.043D
Gd-153	389.58	97.50	1521.	-34.	-0.019	161.57	1.047s
Np-239	397.58	99.50	1540.	-34.	-0.019	162.27	1.049s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	412.37	103.20	1574.	-34.	-0.019	163.53	1.052s
Np-239	414.37	103.70	1373.	33.	0.018	162.09	1.053s
EU-155	420.82	105.31	1378.	33.	0.018	162.13	1.054s
Np-239	424.09	106.13	1601.	-35.	-0.020	161.80	1.055s
EU-152	486.65	121.78	293.	-28.	-0.015	89.87	1.070s
CO-57	487.80	122.06	208.	24.	0.013	89.03	1.070s
EU-154	491.95	123.10	184.	24.	0.013	84.05	1.071s
PA-234	524.72	131.29	780.	-7.	-0.004	593.59	1.079s
HF-181	531.64	133.02	773.	0.	0.000	1000.00	1.081s
CE-144	533.69	133.54	773.	0.	0.000	1000.00	1.081s
HF-181	544.74	136.30	773.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	773.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	763.	24.	0.013	166.30	1.088s
U-235	574.67	143.79	773.	0.	0.000	1000.00	1.091s
CE-141	581.29	145.44	979.	-33.	-0.018	136.63	1.092s
Ba-140	650.15	162.66	292.	2.	0.001	969.54	1.108
U-235	653.03	163.38	294.	-28.	-0.016	88.44	1.109
CE-139	662.92	165.85	352.	-29.	-0.016	93.68	1.111s
Cf-251	705.90	176.60	180.	-22.	-0.012	117.71	1.122s
TH-229	773.52	193.51	156.	17.	0.009	145.88	1.137s
U-235	820.80	205.33	180.	-20.	-0.011	172.51	1.148
TH-229	842.87	210.85	100.	14.	0.008	143.27	1.153s
Cf-251	907.45	227.00	120.	15.	0.008	145.30	1.168s
PB-212	953.97	238.63	74.	579.	0.321	4.67	1.179D
PB-214	967.43	242.00	99.	88.	0.049	19.10	1.182D
EU-152	978.21	244.69	993.	-26.	-0.014	172.23	1.185s
TH-227	1024.40	256.24	137.	-22.	-0.012	124.24	1.195
Cd-113m	1054.23	263.70	146.	5.	0.003	333.46	1.202s
BI-210M	1062.75	265.83	143.	6.	0.004	269.66	1.204s
TL-208	1107.54	277.03	54.	63.	0.035	27.42	1.232s
Hg-203	1116.22	279.20	175.	-15.	-0.009	124.77	1.216s
I-131	1136.61	284.30	92.	2.	0.001	941.63	1.221s
PB-214	1179.77	295.09	60.	165.	0.091	10.26	1.231D
PB-212	1199.52	300.03	573.	19.	0.010	182.37	1.235
PA-231	1199.68	300.07	592.	19.	0.010	185.28	1.235
PA-233	1200.12	300.18	611.	19.	0.010	188.14	1.235
PA-231	1210.00	302.65	629.	19.	0.010	190.61	1.237
BA-133	1210.81	302.85	648.	13.	0.007	278.89	1.238
Ba-140	1218.80	304.85	661.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	661.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	661.	0.	0.000	1000.00	1.243
PA-233	1247.44	312.01	661.	0.	0.000	1000.00	1.246s
Ir-192	1265.35	316.49	661.	0.	0.000	1000.00	1.250s
La-140	1314.43	328.76	379.	17.	0.009	163.98	1.261s
Cf-249	1333.15	333.44	396.	17.	0.009	166.98	1.265s
AC-228	1352.18	338.20	50.	142.	0.079	14.38	0.945s
Cs-136	1361.66	340.57	413.	17.	0.010	169.59	1.272
HF-181	1382.70	345.83	66.	6.	0.003	262.27	1.276

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1407.11	351.93	45.	252.	0.140	7.38	1.282D
BA-133	1423.37	356.00	355.	6.	0.003	451.82	1.285
BA-133	1534.73	383.84	148.	17.	0.010	101.60	1.310
Cf-249	1551.17	387.95	165.	18.	0.010	105.45	1.314s
SN-113	1566.12	391.69	187.	-9.	-0.005	210.00	1.317s
SB-125	1710.86	427.88	65.	5.	0.003	332.16	1.349s
AG-108M	1735.10	433.94	56.	4.	0.002	421.09	1.354s
pm-146	1814.87	453.88	87.	-17.	-0.009	116.62	1.372
SB-125	1852.82	463.37	121.	18.	0.010	89.48	1.380s
Ir-192	1871.59	468.06	101.	16.	0.009	92.53	1.384s
BE-7	1909.73	477.60	119.	11.	0.006	145.71	1.392s
HF-181	1927.34	482.00	130.	0.	0.000	1000.00	1.396s
La-140	1947.43	487.02	84.	13.	0.007	104.60	1.400s
RU-103	1987.56	497.05	48.	-2.	-0.001	849.12	1.409s
RH-106	2046.81	511.86	70.	111.	0.062	21.87	2.672s
Ba-140	2148.39	537.26	26.	12.	0.007	92.63	1.444s
CS-134	2252.30	563.24	43.	14.	0.008	101.70	1.466s
CS-134	2276.64	569.32	28.	26.	0.014	34.83	1.471s
PA-234	2277.24	569.47	54.	0.	0.000	1000.00	1.471s
BI-207	2278.16	569.70	69.	-13.	-0.007	114.03	1.471s
TL-208	2332.23	583.22	21.	187.	0.104	9.17	1.375
SB-125	2401.36	600.50	363.	14.	0.008	192.31	1.497s
SB-124	2410.29	602.73	378.	13.	0.007	211.59	1.499
CS-134	2418.21	604.71	392.	15.	0.008	191.43	1.500s
BI-214	2436.61	609.31	43.	197.	0.110	8.55	1.505D
RU-103	2440.56	610.30	406.	9.	0.005	329.82	1.505s
PM-144	2471.62	618.06	156.	4.	0.002	461.86	1.512s
RH-106	2487.04	621.92	71.	6.	0.003	220.26	1.515s
AG-110M	2630.43	657.76	165.	2.	0.001	780.50	1.544s
CS-137	2646.57	661.80	12.	111.	0.062	11.01	1.821
PM-144	2785.58	696.54	81.	-7.	-0.004	194.42	1.576s
NB-94	2809.93	702.63	128.	-21.	-0.011	80.84	1.581s
SB-124	2890.57	722.79	132.	-15.	-0.008	113.39	1.598
AG-108M	2891.17	722.94	104.	4.	0.002	343.69	1.598
EU-154	2892.85	723.36	108.	0.	0.000	1000.00	1.598
ZR-95	2896.22	724.20	112.	-7.	-0.004	222.18	1.599s
BI-212	2908.11	727.17	13.	63.	0.035	15.02	1.601D
pm-146	2942.31	735.72	9.	18.	0.010	43.72	1.608s
pm-146	2988.08	747.16	51.	-13.	-0.007	70.27	1.617s
ZR-95	3026.36	756.73	45.	2.	0.001	740.78	1.625
AG-110M	3055.23	763.94	78.	-20.	-0.011	64.97	1.631s
NB-95	3062.61	765.79	84.	18.	0.010	75.89	1.632s
PA-234M	3065.10	766.41	36.	13.	0.007	72.35	1.633s
EU-152	3115.14	778.92	60.	-17.	-0.009	55.68	1.643s
BI-212	3141.15	785.42	120.	6.	0.004	247.48	1.648s
CS-134	3182.95	795.87	23.	47.	0.026	20.52	1.656s
CS-134	3207.29	801.95	92.	-13.	-0.007	108.66	1.661s
CO-58	3242.59	810.78	60.	11.	0.006	104.05	1.668s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	3262.58	815.77	45.	10.	0.006	96.27	1.672s
Cs-136	3273.50	818.50	73.	-3.	-0.001	462.85	1.674s
MN-54	3338.91	834.85	50.	-12.	-0.007	82.11	1.687s
Co-56	3386.61	846.77	35.	4.	0.002	328.98	1.696s
TL-208	3441.80	860.56	45.	11.	0.006	139.97	1.707s
NB-94	3483.94	871.10	44.	-9.	-0.005	106.07	1.715s
EU-154	3492.47	873.23	47.	4.	0.002	229.61	1.717s
PA-234	3521.68	880.53	53.	13.	0.007	81.81	1.722s
PA-234	3532.53	883.24	67.	3.	0.002	357.15	1.724s
AG-110M	3538.30	884.68	70.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	82.	-11.	-0.006	123.66	1.729s
y-88	3591.74	898.04	31.	-2.	-0.001	873.56	1.736s
AC-228	3645.16	911.39	0.	154.	0.086	8.06	1.503s
AG-110M	3749.60	937.49	35.	-7.	-0.004	208.97	1.766
PA-234	3783.72	946.02	20.	0.	0.000	1000.00	1.772s
EU-152	3856.11	964.11	98.	6.	0.003	229.51	1.786s
AC-228	3876.39	969.18	16.	89.	0.049	14.45	1.403
EU-154	3985.03	996.33	64.	-6.	-0.003	192.93	1.810s
EU-154	4018.82	1004.77	37.	-2.	-0.001	598.81	1.816s
Co-56	4151.13	1037.84	53.	-20.	-0.011	84.95	1.841s
Cs-136	4192.07	1048.07	27.	3.	0.002	225.83	1.848s
RH-106	4201.23	1050.36	58.	-18.	-0.010	63.66	1.850s
BI-207	4254.46	1063.66	18.	4.	0.002	232.65	1.860s
Ga-68	4309.44	1077.40	16.	11.	0.006	86.05	1.870
FE-59	4396.88	1099.25	21.	5.	0.003	232.35	1.886s
EU-152	4448.20	1112.07	27.	10.	0.006	117.78	1.895s
ZN-65	4462.09	1115.55	73.	16.	0.009	78.94	1.897
BI-214	4481.06	1120.29	97.	14.	0.008	106.86	1.901s
Sc-46	4482.12	1120.55	111.	2.	0.001	647.47	1.901s
Ta-182	4485.12	1121.30	91.	13.	0.007	105.64	1.901s
CO-60	4692.96	1173.24	21.	10.	0.005	114.59	1.938s
Ta-182	4756.25	1189.05	51.	-20.	-0.011	86.67	1.949s
Ta-182	4885.75	1221.41	28.	2.	0.001	752.99	1.972s
Co-56	4953.27	1238.28	23.	38.	0.021	33.63	1.984s
NA-22	5098.35	1274.53	28.	-5.	-0.003	147.64	2.008s
EU-154	5098.40	1274.54	34.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	17.	11.	0.006	92.93	2.020
CO-60	5330.37	1332.50	11.	10.	0.006	84.48	2.047s
AG-110M	5537.69	1384.30	0.	13.	0.007	27.74	2.082s
EU-152	5632.56	1408.00	6.	7.	0.004	94.03	2.097s
K-40	5844.82	1461.03	9.	434.	0.241	4.90	1.840
La-140	6385.95	1596.21	7.	5.	0.003	123.93	2.215
SB-124	6765.35	1690.98	7.	-1.	0.000	779.92	2.272s
BI-214	7059.65	1764.49	24.	8.	0.004	98.35	2.314s
Co-56	7087.11	1771.35	11.	10.	0.005	57.85	2.318s
y-88	7346.20	1836.06	6.	2.	0.001	382.88	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   2.4859E+00                                        5.31E+01
                           477.60 2.486E+00 &(  1.230E+01 1.46E+02 1.05E+01 G

NA-22    C  -2.7241E-01                                        9.50E+02
                          1274.53-2.724E-01 ?(  1.405E+00 1.48E+02 9.99E+01 G

K-40     N   2.3179E+02                                        4.66E+11
                          1460.83 2.318E+02  (P 8.917E+00 4.90E+00 1.07E+01 G

Sc-46    F  -4.1018E-01                                        8.38E+01
                           889.28-4.102E-01 ?(  1.724E+00 1.24E+02 1.00E+02 G
                          1120.55 1.064E-01 +   2.384E+00 6.47E+02 1.00E+02 G

CR-51    F  -1.5528E-02                                        2.77E+01
                           320.08-1.553E-02 &(P 2.241E+01 2.05E+04 9.94E+00 G

MN-54    C  -4.5249E-01                                        3.12E+02
                           834.85-4.525E-01 ?(P 1.310E+00 8.21E+01 1.00E+02 G

FE-59    F   7.7939E-01                                        4.45E+01
                          1099.25 3.708E-01 ?(P 1.948E+00 2.32E+02 5.65E+01 G
                          1291.60 1.314E+00  (  2.618E+00 9.29E+01 4.32E+01 G

Co-56    C   1.2319E+00                                        7.73E+01
                           846.77 1.482E-01 ?(  1.122E+00 3.29E+02 9.99E+01 G
                          1238.28 2.871E+00 ?(P 1.891E+00 3.36E+01 6.61E+01 G
                          1037.84-6.214E+00 +   1.128E+01 8.50E+01 1.41E+01 G
                          1771.35 4.259E+00 ?   7.949E+00 5.78E+01 1.55E+01  A

CO-57    C   2.8790E-01                                        2.72E+02
                           122.06 2.879E-01 ?(  8.548E-01 8.90E+01 8.56E+01 G
                           136.47 0.000E+00 &   1.336E+01 1.00E+03 1.07E+01 G

CO-58    C   3.9603E-01                                        7.09E+01
                           810.78 3.960E-01 &(  1.397E+00 1.04E+02 9.95E+01 G

CO-60    F   4.9526E-01                                        1.93E+03
                          1332.50 5.330E-01 ?(  9.735E-01 8.45E+01 1.00E+02 G
                          1173.24 4.575E-01 ?(P 1.161E+00 1.15E+02 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	1.4665E+00					2.44E+02	
			1115.55	1.466E+00	(	3.866E+00	7.89E+01	5.06E+01 G
NB-94	I	-6.7486E-01					7.41E+06	
			702.63	-6.749E-01	?(	1.818E+00	8.08E+01	9.79E+01 G
			871.10	-3.536E-01	+	1.278E+00	1.06E+02	9.99E+01 G
ZR-95	I	1.2476E-01					6.40E+01	
			756.73	1.248E-01	?(	2.119E+00	7.41E+02	5.45E+01 G
			724.20	-5.086E-01	+	3.869E+00	2.22E+02	4.42E+01 G
NB-95	I	6.1657E-01					6.40E+01	
			765.79	6.166E-01	?(	1.558E+00	7.59E+01	9.98E+01 G
RU-103	I	-4.5564E-02					3.93E+01	
			497.05	-4.556E-02	&(	9.536E-01	8.49E+02	9.09E+01 G
			610.30	4.367E+00	?	4.857E+01	3.30E+02	5.75E+00 GA
RH-106	I	1.6327E+00					3.74E+02	
			621.92	1.633E+00	?(	1.243E+01	2.20E+02	9.93E+00 G
			1050.36	-5.107E+01	+	1.072E+02	6.37E+01	1.56E+00 G
			511.86	1.409E+01	?	5.293E+00	2.19E+01	2.00E+01 GA
AG-108M	C	1.2218E-01					1.53E+05	
			433.94	9.130E-02	&(	9.384E-01	4.21E+02	9.05E+01 G
			722.94	1.529E-01	?(	1.813E+00	3.44E+02	9.08E+01 G
			614.28	8.650E-02	%	3.146E+00	1.07E+03	8.98E+01 G
AG-110M	F	4.0736E-01					2.50E+02	
			884.68	0.000E+00	?(	2.197E+00	1.00E+03	7.27E+01 G
			657.76	7.535E-02	?(	2.018E+00	7.81E+02	9.46E+01 G
			937.49	-8.496E-01	+ P	3.543E+00	2.09E+02	3.44E+01 G
			1384.30	2.920E+00	?(	1.655E+00	2.77E+01	2.43E+01 G
			763.94	-3.140E+00	+	6.737E+00	6.50E+01	2.23E+01 G
SN-113	F	-3.0536E-01					1.15E+02	
			391.69	-3.054E-01	?(	2.176E+00	2.10E+02	6.40E+01 G
SB-124	F	3.8224E-01					6.02E+01	
			602.73	3.822E-01	&(P	2.721E+00	2.12E+02	9.83E+01 G
			1690.98	-1.132E-01	- P	2.003E+00	7.80E+02	4.78E+01 G
			722.79	-4.461E+00	+	1.704E+01	1.13E+02	1.08E+01 G
SB-125	I	1.6237E+00					1.01E+03	
			427.88	3.767E-01	&(	3.035E+00	3.32E+02	2.96E+01 G
			600.50	2.261E+00	?(P	1.462E+01	1.92E+02	1.79E+01 G
			635.89	2.635E-01	%	9.482E+00	1.01E+03	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	4.061E+00	(P	1.215E+01	8.95E+01	1.05E+01 G
I-131	I	6.0825E-02						8.02E+00
			364.48	2.437E-02	%(	1.082E+00	1.75E+03	8.17E+01 G
			284.30	5.459E-01	?(	1.294E+01	9.42E+02	6.14E+00 G
			636.97	-4.162E-01	%	1.384E+01	1.39E+03	7.17E+00 G
Gd-153	F	-1.2131E+00						2.42E+02
			97.50	-1.213E+00	&(	6.518E+00	1.62E+02	3.00E+01 G
			103.20	-1.658E+00	+	9.015E+00	1.64E+02	2.18E+01 G
Ga-68	C	1.8089E+01						4.71E-02
			1077.40	1.809E+01	(	3.429E+01	8.60E+01	3.30E+00 G
Tc-99m	I	2.9884E-01						2.51E-01
			140.51	2.988E-01	&(	1.659E+00	1.66E+02	8.93E+01 G
BA-133	F	4.2672E-01						3.85E+03
			356.00	1.869E-01	?(	2.856E+00	4.52E+02	6.20E+01 G
			302.85	1.239E+00	(	1.158E+01	2.79E+02	1.83E+01 G
			383.84	4.023E+00	P	1.371E+01	1.02E+02	8.94E+00 GA
			80.99	-1.275E+00	+	5.969E+00	1.41E+02	3.41E+01 GA
CS-134	I	1.5374E+00						7.54E+02
			604.71	4.338E-01	?(	2.791E+00	1.91E+02	9.76E+01 G
			795.87	1.940E+00	?(	1.034E+00	2.05E+01	8.55E+01 G
			569.32	4.640E+00	?(	4.884E+00	3.48E+01	1.54E+01 G
			801.95	-5.277E+00	+	1.937E+01	1.09E+02	8.69E+00 G
			563.24	4.600E+00	&(P	1.087E+01	1.02E+02	8.35E+00 G
CS-137	I	4.0107E+00						1.10E+04
			661.66	4.011E+00	(	6.710E-01	1.10E+01	8.52E+01 G
CE-139	F	-4.2441E-01						1.38E+02
			165.85	-4.244E-01	&(	1.324E+00	9.37E+01	7.99E+01 G
Ba-140	I	1.1186E+00						1.28E+01
			537.26	1.282E+00	&(P	2.875E+00	9.26E+01	2.44E+01 G
			162.66	4.761E-01	(	1.570E+01	9.70E+02	6.22E+00 G
			304.85	0.000E+00	-	5.021E+01	1.00E+03	4.29E+00 G
La-140	I	7.1915E-01						1.28E+01
			1596.21	3.353E-01	?(P	9.532E-01	1.24E+02	9.54E+01 G
			487.02	6.932E-01	&(	2.449E+00	1.05E+02	4.55E+01 G
			328.76	1.549E+00	?(	8.525E+00	1.64E+02	2.03E+01 G
			815.77	1.619E+00	?(P	5.276E+00	9.63E+01	2.33E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
CE-141	I	-7.5103E-01						3.25E+01	
			145.44	-7.510E-01	?(	3.416E+00	1.37E+02	4.82E+01	G
PM-144	C	-5.0602E-02						3.63E+02	
			696.54	-2.148E-01	?(	1.436E+00	1.94E+02	9.90E+01	G
			618.06	1.135E-01	?(P	1.796E+00	4.62E+02	9.91E+01	G
EU-152	F	1.3940E+00						4.94E+03	
			344.29	1.348E-01	%(	7.171E+00	1.57E+03	2.65E+01	G
			1112.07	3.468E+00	?(	8.986E+00	1.18E+02	1.36E+01	G
			121.78	-1.011E+00	+	3.024E+00	8.99E+01	2.86E+01	G
			778.92	-4.584E+00	+ P	1.042E+01	5.57E+01	1.29E+01	G
			964.11	1.741E+00	?(	1.372E+01	2.30E+02	1.46E+01	G
			244.69	-5.201E+00	+	2.986E+01	1.72E+02	7.58E+00	G
			1408.00	1.754E+00	& P	3.794E+00	9.40E+01	2.10E+01	GA
EU-154	I	7.7514E-01						3.14E+03	
			873.23	1.339E+00	?(	1.074E+01	2.30E+02	1.23E+01	G
			123.10	6.056E-01	&(	1.696E+00	8.41E+01	4.08E+01	G
			1274.54	0.000E+00	-	4.315E+00	1.00E+03	3.52E+01	G
			723.36	0.000E+00	-	8.303E+00	1.00E+03	2.02E+01	G
			1004.77	-5.478E-01	+	7.320E+00	5.99E+02	1.80E+01	G
			996.33	-2.377E+00	+	1.585E+01	1.93E+02	1.06E+01	G
EU-155	I	1.6048E+00						1.81E+03	
			105.31	1.605E+00	?(	8.657E+00	1.62E+02	2.12E+01	G
			86.54	1.475E+00	}	7.312E+00	5.27E+01	3.07E+01	G
HF-181	F	8.4722E-02						4.24E+01	
			482.00	0.000E+00	?(	1.686E+00	1.00E+03	8.05E+01	G
			133.02	0.000E+00	&(	3.267E+00	1.00E+03	4.33E+01	G
			345.83	7.807E-01	&(	5.160E+00	2.62E+02	1.51E+01	G
			136.30	0.000E+00	-	2.438E+01	1.00E+03	5.85E+00	G
Ta-182	F	1.7469E+00						1.14E+02	
			1121.30	1.747E+00	(	6.229E+00	1.06E+02	3.49E+01	G
			1221.41	3.046E-01	-	5.028E+00	7.53E+02	2.70E+01	G
			1189.05	-5.962E+00	+	1.073E+01	8.67E+01	1.62E+01	G
Hg-203	F	-3.1157E-01						4.66E+01	
			279.20	-3.116E-01	?(	1.309E+00	1.25E+02	8.15E+01	G
TL-208	N	6.1876E+00						6.98E+02	
			583.02	6.188E+00	(	7.928E-01	9.17E+00	8.45E+01	G
			277.28	1.655E+01	+ P	9.615E+00	2.74E+01	6.31E+00	G
			860.56	3.263E+00	- P	1.027E+01	1.40E+02	1.24E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	-1.3358E+00				2.02E+03		
			747.16	-1.336E+00	?(P	3.577E+00	7.03E+01	3.40E+01 G
			735.72	2.611E+00	+	2.505E+00	4.37E+01	2.25E+01 G
			453.88	-5.966E-01	+	1.650E+00	1.17E+02	6.50E+01 G
y-88	F	2.4469E-02				1.07E+02		
			898.04	-7.193E-02	?(P	1.180E+00	8.74E+02	9.37E+01 G
			1836.06	1.155E-01	?(	1.001E+00	3.83E+02	9.92E+01 G
Cd-113m		1.3711E+03				5.33E+03		
			263.70	1.371E+03	&(	1.565E+04	3.33E+02	6.00E-03 K
Cf-251	T	-1.5566E+00				3.28E+05		
			176.60	-1.557E+00	&(	4.682E+00	1.18E+02	1.70E+01 G
			227.00	3.428E+00	*	1.229E+01	1.45E+02	6.30E+00 GA
Cf-249	T	8.4234E-01				1.28E+05		
			387.95	5.575E-01	?(	1.973E+00	1.05E+02	6.60E+01 G
			333.44	2.054E+00	?(	1.151E+01	1.67E+02	1.55E+01 G
Sn-126		1.2826E+00				3.65E+07		
			87.57	1.283E+00	}	5.600E+00	5.12E+01	3.75E+01 GA
			64.28	1.283E+00	(	1.609E+01	3.73E+02	9.70E+00 G
			86.94	-4.160E+00	+	2.455E+01	1.77E+02	9.04E+00 GA
PB-210	N	1.1128E+01				8.14E+03		
			46.54	1.113E+01	(	3.641E+01	9.79E+01	4.25E+00 G
PB-212	N	1.9890E+01				6.98E+02		
			238.63	1.989E+01	(P	1.476E+00	4.67E+00	4.33E+01 G
			300.03	9.922E+00	-	6.058E+01	1.82E+02	3.28E+00 GA
PB-214	N	1.3563E+01				5.84E+05		
			351.93	1.300E+01	(P	1.761E+00	7.38E+00	3.76E+01 G
			295.09	1.466E+01	(	3.466E+00	1.03E+01	1.93E+01 G
			242.00	1.789E+01	+	9.904E+00	1.91E+01	7.43E+00 GA
BI-207	C	-3.6292E-01				1.18E+04		
			569.70	-3.629E-01	?(P	1.163E+00	1.14E+02	9.77E+01 G
			1063.66	2.432E-01	+ P	1.331E+00	2.33E+02	7.45E+01 G
BI-212	N	2.7476E+01				6.98E+02		
			727.17	2.748E+01	(P	8.535E+00	1.50E+01	7.55E+00 G
			785.42	1.729E+01	-	1.466E+02	2.47E+02	1.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	1.2350E+01					5.84E+05	
			609.31	1.235E+01	(P	2.079E+00	8.55E+00	4.61E+01 G
			1120.29	4.120E+00	- P	1.484E+01	1.07E+02	1.51E+01 G
			1764.49	3.309E+00	- P	1.111E+01	9.83E+01	1.54E+01 G
BI-210M	T	2.0278E-01					1.10E+09	
			265.83	2.028E-01	&(	1.869E+00	2.70E+02	5.00E+01 G
			304.90	0.000E+00	-	7.693E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1137E+01					2.10E+03	
			911.07	2.080E+01	*(	9.956E-01	8.06E+00	2.90E+01 G
			968.97	2.092E+01	(P	5.043E+00	1.44E+01	1.75E+01 G
			338.32	2.226E+01	@(	5.585E+00	1.44E+01	1.20E+01 G
			93.35	1.968E+01		1.051E+01	1.83E+01	5.56E+00 XA
TH-227	N	5.2500E+00					7.95E+03	
			50.14	5.250E+00	?(P	1.914E+01	1.09E+02	8.00E+00 G
			256.24	-4.857E+00	- P	1.276E+01	1.24E+02	7.00E+00 G
TH-229	N	5.5626E+00					2.68E+06	
			193.51	5.007E+00	?(	1.794E+01	1.46E+02	4.40E+00 G
			210.85	6.379E+00	&(	2.261E+01	1.43E+02	2.99E+00 G
TH-234	N	1.1121E+01					1.63E+12	
			63.29	1.112E+01	?(	3.783E+01	1.02E+02	3.81E+00 G
			92.59	-6.593E+00	-	3.598E+01	1.64E+02	5.58E+00 G
PA-231	N	1.2237E+01					1.20E+07	
			302.65	1.139E+01	?(	7.265E+01	1.91E+02	2.88E+00 G
			300.07	1.323E+01	?(	8.205E+01	1.85E+02	2.46E+00 G
PA-233	C	7.7142E-01					7.82E+08	
			312.01	0.000E+00	?(	6.079E+00	1.00E+03	3.60E+01 G
			300.18	5.251E+00	?(	3.306E+01	1.88E+02	6.20E+00 G
PA-234	N	1.9642E-01					1.63E+12	
			131.29	-3.945E-01	?(	7.859E+00	5.94E+02	1.80E+01 G
			946.02	0.000E+00	+	7.089E+00	1.00E+03	1.34E+01 G
			569.47	0.000E+00	+	1.237E+01	1.00E+03	8.20E+00 G
			883.24	1.304E+00	?(	1.624E+01	3.57E+02	9.60E+00 G
			880.53	8.517E+00	&	2.336E+01	8.18E+01	6.00E+00 GA
PA-234M	N	3.7411E+01					1.63E+12	
			1001.00	-1.471E+00	%(P	2.104E+02	4.41E+03	8.37E-01 G
			766.41	1.481E+02	?(	3.571E+02	7.24E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   2.4491E-01                                      1.58E+05
                            59.54 2.449E-01 ?(P 5.003E+00 6.07E+02 3.59E+01 G

Ir-192   F   2.7359E-01                                      7.40E+01
                           316.49 0.000E+00 ?(  2.539E+00 1.00E+03 8.70E+01 G
                           468.06 7.337E-01 ?(  2.278E+00 9.25E+01 5.18E+01 G
                           308.44 0.000E+00 -   6.839E+00 1.00E+03 3.18E+01 G

Cs-136   F   1.6569E-01                                      1.30E+01
                           818.50-9.477E-02 &(  1.530E+00 4.63E+02 1.00E+02 G
                          1048.07 1.821E-01 ?(  1.463E+00 2.26E+02 8.00E+01 G
                           340.57 6.930E-01 ?(  3.943E+00 1.70E+02 4.69E+01 G

Np-239   T  -1.6178E+00                                      2.36E+00
                           103.70 1.419E+00 ?   7.652E+00 1.62E+02 2.40E+01 X
                           106.13-1.618E+00 &(  8.703E+00 1.62E+02 2.27E+01 G
                            99.50-2.420E+00 +   1.306E+01 1.62E+02 1.50E+01 X

Nd-147      -2.0061E-01                                      1.11E+01
                           531.00-2.006E-01 &(  6.382E+00 1.28E+03 1.30E+01 G
                            91.10-1.307E+00 +   7.221E+00 1.66E+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
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M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	220.	22.	0.012	97.91	1.113E+01	
AM-241	59.54	615.	6.	0.003	607.36	2.449E-01	P
TH-234	63.29	452.	30.	0.017	102.15	1.112E+01	
Nd-147	91.10	1589.	-34.	-0.019	166.10	-1.307E+00	
TH-234	92.59	1555.	-34.	-0.019	164.10	-6.593E+00	
Gd-153	97.50	1521.	-34.	-0.019	161.57	-1.213E+00	
Np-239	99.50	1540.	-34.	-0.019	162.27	-2.420E+00	
Gd-153	103.20	1574.	-34.	-0.019	163.53	-1.658E+00	
Np-239	103.70	1373.	33.	0.018	162.09	1.419E+00	
Np-239	106.13	1601.	-35.	-0.020	161.80	-1.618E+00	
EU-152	121.78	293.	-28.	-0.015	89.87	-1.011E+00	
CO-57	122.06	208.	24.	0.013	89.03	2.879E-01	
EU-154	123.10	184.	24.	0.013	84.05	6.056E-01	
PA-234	131.29	780.	-7.	-0.004	593.59	-3.945E-01	
CE-141	145.44	979.	-33.	-0.018	136.63	-7.510E-01	
Ba-140	162.66	292.	2.	0.001	969.54	4.761E-01	
U-235	163.38	294.	-28.	-0.016	88.44	-6.564E+00	
CE-139	165.85	352.	-29.	-0.016	93.68	-4.244E-01	
Cf-251	176.60	180.	-22.	-0.012	117.71	-1.557E+00	
TH-229	193.51	156.	17.	0.009	145.88	5.007E+00	
U-235	205.33	180.	-20.	-0.011	172.51	-5.486E+00	P
TH-229	210.85	100.	14.	0.008	143.27	6.379E+00	
Cf-251	227.00	120.	15.	0.008	145.30	3.428E+00	
EU-152	244.69	993.	-26.	-0.014	172.23	-5.201E+00	
Cd-113m	263.70	146.	5.	0.003	333.46	1.371E+03	
BI-210M	265.83	143.	6.	0.004	269.66	2.028E-01	
Hg-203	279.20	175.	-15.	-0.009	124.77	-3.116E-01	
I-131	284.30	92.	2.	0.001	941.63	5.459E-01	
PA-231	300.07	592.	19.	0.010	185.28	1.323E+01	
PA-233	300.18	611.	19.	0.010	188.14	5.251E+00	
PA-231	302.65	629.	19.	0.010	190.61	1.139E+01	
La-140	328.76	379.	17.	0.009	163.98	1.549E+00	
Cf-249	333.44	396.	17.	0.009	166.98	2.054E+00	
Cs-136	340.57	413.	17.	0.010	169.59	6.930E-01	
HF-181	345.83	66.	6.	0.003	262.27	7.807E-01	
Cf-249	387.95	165.	18.	0.010	105.45	5.575E-01	
SN-113	391.69	187.	-9.	-0.005	210.00	-3.054E-01	
SB-125	427.88	65.	5.	0.003	332.16	3.767E-01	
pm-146	453.88	87.	-17.	-0.009	116.62	-5.966E-01	
SB-125	463.37	121.	18.	0.010	89.48	4.061E+00	P
Ir-192	468.06	101.	16.	0.009	92.53	7.337E-01	
BE-7	477.60	119.	11.	0.006	145.71	2.486E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	487.02	84.	13.	0.007	104.60	6.932E-01	
RU-103	497.05	48.	-2.	-0.001	849.12	-4.556E-02	
RH-106	511.86	70.	111.	0.062	21.87	1.409E+01	
Ba-140	537.26	26.	12.	0.007	92.63	1.282E+00	P
CS-134	563.24	43.	14.	0.008	101.70	4.600E+00	P
CS-134	569.32	28.	26.	0.014	34.83	4.640E+00	
BI-207	569.70	69.	-13.	-0.007	114.03	-3.629E-01	P
SB-125	600.50	363.	14.	0.008	192.31	2.261E+00	P
SB-124	602.73	378.	13.	0.007	211.59	3.822E-01	P
CS-134	604.71	392.	15.	0.008	191.43	4.338E-01	
RU-103	610.30	406.	9.	0.005	329.82	4.367E+00	
PM-144	618.06	156.	4.	0.002	461.86	1.135E-01	P
RH-106	621.92	71.	6.	0.003	220.26	1.633E+00	
AG-110M	657.76	165.	2.	0.001	780.50	7.535E-02	
PM-144	696.54	81.	-7.	-0.004	194.42	-2.148E-01	
NB-94	702.63	128.	-21.	-0.011	80.84	-6.749E-01	
SB-124	722.79	132.	-15.	-0.008	113.39	-4.461E+00	
ZR-95	724.20	112.	-7.	-0.004	222.18	-5.086E-01	
pm-146	735.72	9.	18.	0.010	43.72	2.611E+00	
pm-146	747.16	51.	-13.	-0.007	70.27	-1.336E+00	P
ZR-95	756.73	45.	2.	0.001	740.78	1.248E-01	
AG-110M	763.94	78.	-20.	-0.011	64.97	-3.140E+00	
NB-95	765.79	84.	18.	0.010	75.89	6.166E-01	
PA-234M	766.41	36.	13.	0.007	72.35	1.481E+02	
EU-152	778.92	60.	-17.	-0.009	55.68	-4.584E+00	P
CS-134	795.87	23.	47.	0.026	20.52	1.940E+00	
CS-134	801.95	92.	-13.	-0.007	108.66	-5.277E+00	
CO-58	810.78	60.	11.	0.006	104.05	3.960E-01	
La-140	815.77	45.	10.	0.006	96.27	1.619E+00	P
Cs-136	818.50	73.	-3.	-0.001	462.85	-9.477E-02	
MN-54	834.85	50.	-12.	-0.007	82.11	-4.525E-01	P
NB-94	871.10	44.	-9.	-0.005	106.07	-3.536E-01	
EU-154	873.23	47.	4.	0.002	229.61	1.339E+00	
PA-234	880.53	53.	13.	0.007	81.81	8.517E+00	
PA-234	883.24	67.	3.	0.002	357.15	1.304E+00	
Sc-46	889.28	82.	-11.	-0.006	123.66	-4.102E-01	
y-88	898.04	31.	-2.	-0.001	873.56	-7.193E-02	P
AG-110M	937.49	35.	-7.	-0.004	208.97	-8.496E-01	P
EU-152	964.11	98.	6.	0.003	229.51	1.741E+00	
EU-154	996.33	64.	-6.	-0.003	192.93	-2.377E+00	
EU-154	1004.77	37.	-2.	-0.001	598.81	-5.478E-01	
Cs-136	1048.07	27.	3.	0.002	225.83	1.821E-01	
RH-106	1050.36	58.	-18.	-0.010	63.66	-5.107E+01	
BI-207	1063.66	18.	4.	0.002	232.65	2.432E-01	P
EU-152	1112.07	27.	10.	0.006	117.78	3.468E+00	
Sc-46	1120.55	111.	2.	0.001	647.47	1.064E-01	
Ta-182	1121.30	91.	13.	0.007	105.64	1.747E+00	
CO-60	1173.24	21.	10.	0.005	114.59	4.575E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1189.05	51.	-20.	-0.011	86.67	-5.962E+00		
Ta-182	1221.41	28.	2.	0.001	752.99	3.046E-01		
NA-22	1274.53	28.	-5.	-0.003	147.64	-2.724E-01		
CO-60	1332.50	11.	10.	0.006	84.48	5.330E-01		
AG-110M	1384.30	0.	13.	0.007	27.74	2.920E+00		
EU-152	1408.00	6.	7.	0.004	94.03	1.754E+00		P
La-140	1596.21	7.	5.	0.003	123.93	3.353E-01		P
SB-124	1690.98	7.	-1.	0.000	779.92	-1.132E-01		P
y-88	1836.06	6.	2.	0.001	382.88	1.155E-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	2.4859E+00	2.4859E+00	1.457E+02%	1.23E+01
NA-22	#A	-2.7241E-01	-2.7241E-01	1.476E+02%	1.41E+00
K-40		2.3179E+02	2.3179E+02	4.903E+00%	8.92E+00
Sc-46	#A	-4.1017E-01	-4.1018E-01	1.237E+02%	1.72E+00
CR-51	#A	-1.5527E-02	-1.5528E-02	2.053E+04%	2.24E+01
MN-54	#A	-4.5249E-01	-4.5249E-01	8.211E+01%	1.31E+00
FE-59	A	7.7937E-01	7.7939E-01	9.293E+01%	1.95E+00
Co-56	#C	1.2318E+00	1.2319E+00	3.363E+01%	1.12E+00
CO-57	#A	2.8790E-01	2.8790E-01	8.903E+01%	8.55E-01
CO-58	#A	3.9603E-01	3.9603E-01	1.041E+02%	1.40E+00
CO-60	#A	4.9526E-01	4.9526E-01	7.118E+01%	9.74E-01
ZN-65	A	1.4665E+00	1.4665E+00	7.894E+01%	3.87E+00
NB-94	#A	-6.7486E-01	-6.7486E-01	8.084E+01%	1.82E+00
ZR-95	#A	1.2476E-01	1.2476E-01	7.408E+02%	2.12E+00
NB-95	#A	6.1656E-01	6.1657E-01	7.589E+01%	1.56E+00
RU-103	#A	-4.5563E-02	-4.5564E-02	8.491E+02%	9.54E-01
RH-106	#A	1.6327E+00	1.6327E+00	2.203E+02%	1.24E+01
AG-108M	#A	1.2218E-01	1.2218E-01	2.718E+02%	9.38E-01
AG-110M	#A	4.0736E-01	4.0736E-01	2.774E+01%	2.20E+00
SN-113	#A	-3.0535E-01	-3.0536E-01	2.100E+02%	2.18E+00
SB-124	#A	3.8223E-01	3.8224E-01	2.116E+02%	2.72E+00
SB-125	#A	1.6237E+00	1.6237E+00	8.948E+01%	3.04E+00
I-131	#A	6.0817E-02	6.0825E-02	9.416E+02%	1.08E+00
Gd-153	#A	-1.2131E+00	-1.2131E+00	1.616E+02%	6.52E+00
Ga-68	A	1.7704E+01	1.8089E+01	8.605E+01%	3.43E+01
Tc-99m	#A	2.9764E-01	2.9884E-01	1.663E+02%	1.66E+00
BA-133	A	4.2672E-01	4.2672E-01	2.655E+02%	2.86E+00
CS-134	#A	1.5374E+00	1.5374E+00	2.052E+01%	2.79E+00
CS-137		4.0107E+00	4.0107E+00	1.101E+01%	6.71E-01
CE-139	#A	-4.2440E-01	-4.2441E-01	9.368E+01%	1.32E+00
Ba-140	#A	1.1185E+00	1.1186E+00	9.263E+01%	2.87E+00

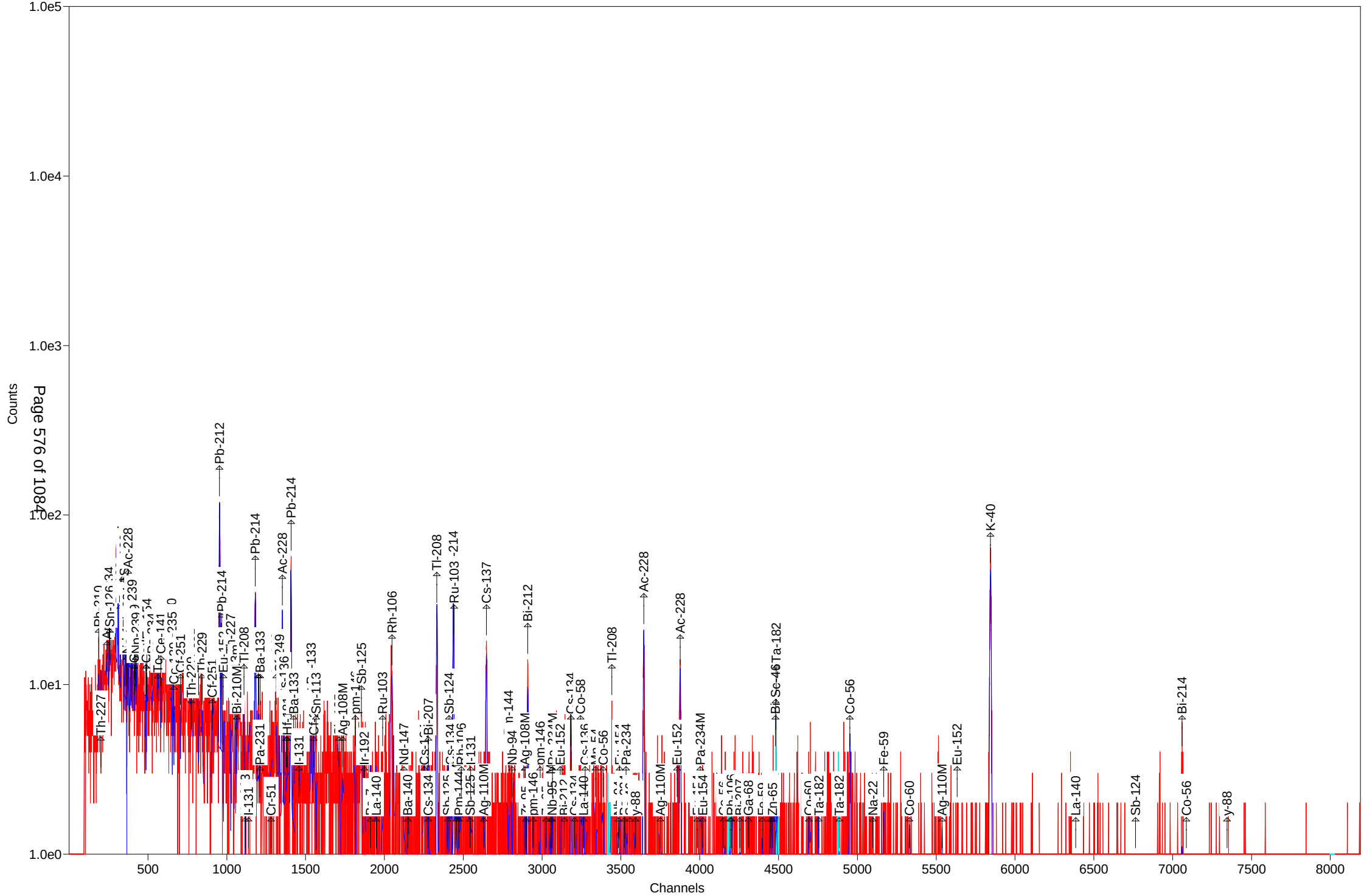
La-140 #A	7.1909E-01	7.1915E-01	6.248E+01%	9.53E-01
CE-141 #A	-7.5101E-01	-7.5103E-01	1.366E+02%	3.42E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.28E+01
PM-144 #A	-5.0602E-02	-5.0602E-02	1.944E+02%	1.44E+00
EU-152 #A	1.3940E+00	1.3940E+00	1.178E+02%	7.17E+00
EU-154 #A	7.7513E-01	7.7514E-01	8.405E+01%	1.07E+01
EU-155 #A	1.6048E+00	1.6048E+00	1.621E+02%	8.66E+00
HF-181 #A	8.4720E-02	8.4722E-02	2.623E+02%	1.69E+00
Ta-182 #A	1.7469E+00	1.7469E+00	1.056E+02%	6.23E+00
Hg-203 #A	-3.1156E-01	-3.1157E-01	1.248E+02%	1.31E+00
TL-208	6.1876E+00	6.1876E+00	9.174E+00%	7.93E-01
pm-146 #A	-1.3358E+00	-1.3358E+00	7.027E+01%	3.58E+00
y-88 #A	2.4469E-02	2.4469E-02	3.829E+02%	1.18E+00
Cd-113m#A	1.3711E+03	1.3711E+03	3.335E+02%	1.57E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.77E+01
Cf-251 #A	-1.5566E+00	-1.5566E+00	1.177E+02%	4.68E+00
Cf-249 #A	8.4234E-01	8.4234E-01	9.874E+01%	1.97E+00
Sn-126 A	1.2826E+00	1.2826E+00	3.730E+02%	1.61E+01
PB-210 #A	1.1128E+01	1.1128E+01	9.791E+01%	3.64E+01
PB-212	1.9890E+01	1.9890E+01	4.668E+00%	1.48E+00
PB-214	1.3563E+01	1.3563E+01	6.318E+00%	1.76E+00
BI-207 #A	-3.6292E-01	-3.6292E-01	1.140E+02%	1.16E+00
BI-212	2.7475E+01	2.7476E+01	1.502E+01%	8.54E+00
BI-214	1.2350E+01	1.2350E+01	8.551E+00%	2.08E+00
BI-210M#A	2.0278E-01	2.0278E-01	2.697E+02%	1.87E+00
AC-228	2.1137E+01	2.1137E+01	7.305E+00%	9.96E-01
TH-227 #A	5.2500E+00	5.2500E+00	1.091E+02%	1.91E+01
TH-229 #A	5.5626E+00	5.5626E+00	1.022E+02%	1.79E+01
TH-234 #A	1.1121E+01	1.1121E+01	1.022E+02%	3.78E+01
PA-231 #A	1.2237E+01	1.2237E+01	1.329E+02%	7.26E+01
PA-233 #A	7.7142E-01	7.7142E-01	1.881E+02%	6.08E+00
PA-234 #A	1.9642E-01	1.9642E-01	3.464E+02%	7.86E+00
PA-234M#A	3.7411E+01	3.7411E+01	7.235E+01%	2.10E+02
U-235 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.33E+01
AM-241 #A	2.4491E-01	2.4491E-01	6.074E+02%	5.00E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.75E+01
Ir-192 #A	2.7358E-01	2.7359E-01	9.253E+01%	2.54E+00
Cs-136 #A	1.6568E-01	1.6569E-01	1.696E+02%	1.53E+00
Np-239 #A	-1.6171E+00	-1.6178E+00	1.618E+02%	8.70E+00
Nd-147 #A	-2.0060E-01	-2.0061E-01	1.279E+03%	6.38E+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 1999.3 keV) 3.541E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 3.5449591E+02 Bq/Sample

265170_Gamma_160-18567-A-8-B. 9_Gamma_20161632.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161470

Sample Description: 265170_Gamma_160-18567-A-9-B
Detector: Detector # 8
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-9-B

Decay to Time: 9/7/2016 17:50 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:51:13 Real Time: 1849 sec
Analysis Time: 9/7/2016 18:22 Dead Time: 2.65 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev11.lib
Bkgd Correction File: 8_2016-09-04_0932.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	-3.342E+00	165.5	5.531E+00	5.534E+00	1.880E+01
NA-22	7.192E-01	61.3	4.410E-01	4.425E-01	1.436E+00
K-40	2.633E+02	5.7	1.507E+01	2.022E+01	9.343E+00
Sc-46	4.640E-01	109.1	5.060E-01	5.066E-01	1.736E+00
CR-51	-4.381E+00	121.8	5.337E+00	5.342E+00	1.793E+01
MN-54	6.090E-01	89.3	5.438E-01	5.447E-01	1.275E+00
FE-59	2.944E-01	90.7	2.670E-01	2.674E-01	3.245E+00
Co-56	5.198E-01	128.3	6.668E-01	6.673E-01	1.166E+00
CO-57	-1.513E-01	214.8	3.250E-01	3.251E-01	1.101E+00
CO-58	2.007E-01	247.5	4.968E-01	4.969E-01	1.748E+00
CO-60	1.893E-01	356.6	6.751E-01	6.752E-01	1.714E+00
ZN-65	-2.557E+00	93.8	2.398E+00	2.401E+00	8.032E+00
NB-94	1.585E-01	81.1	1.286E-01	1.288E-01	1.784E+00
ZR-95	1.105E+00	68.0	7.513E-01	7.535E-01	2.186E+00
NB-95	0.000E+00	1.#INF	1.946E-01	1.946E-01	1.635E+00
RU-103	-1.065E-01	454.8	4.846E-01	4.846E-01	1.204E+00
RH-106	3.934E+00	134.2	5.278E+00	5.282E+00	3.679E+01
AG-108M	8.893E-02	547.7	4.871E-01	4.871E-01	1.203E+00
AG-110M	6.478E-01	115.8	7.500E-01	7.507E-01	2.711E+00
SN-113	-2.565E-01	222.0	5.696E-01	5.697E-01	2.388E+00
SB-124	6.939E-01	44.7	3.103E-01	3.124E-01	3.483E+00
SB-125	1.775E+00	93.9	1.666E+00	1.669E+00	3.332E+00
I-131	4.038E-01	86.3	3.483E-01	3.489E-01	1.301E+00
Gd-153	-1.679E+00	162.4	2.727E+00	2.729E+00	9.061E+00
Ga-68	7.436E+00	238.8	1.776E+01	1.776E+01	4.324E+01
Tc-99m	-5.174E-01	151.3	7.828E-01	7.833E-01	2.606E+00
BA-133	-1.938E-01	586.1	1.136E+00	1.136E+00	3.850E+00
CS-134	6.599E-01	97.6	6.438E-01	6.447E-01	3.586E+00
CS-137	2.238E+00	19.9	4.444E-01	4.594E-01	9.204E-01
CE-139	-3.481E-01	126.3	4.396E-01	4.409E-01	1.475E+00
Ba-140	2.924E+00	42.9	1.254E+00	1.263E+00	3.164E+00
La-140	7.220E-01	89.0	6.422E-01	6.434E-01	1.412E+00
CE-141	-9.946E-01	150.5	1.497E+00	1.498E+00	4.980E+00

CE-144	-3.927E+00	145.7	5.720E+00	5.723E+00	1.904E+01
PM-144	-1.047E+00	38.4	4.024E-01	4.061E-01	2.147E+00
EU-152	1.149E+00	146.1	1.679E+00	1.680E+00	9.145E+00
EU-154	-7.082E+00	69.8	4.940E+00	4.953E+00	1.713E+01
EU-155	2.161E+00	165.9	3.585E+00	3.586E+00	1.192E+01
HF-181	-3.176E-02	1768.4	5.617E-01	5.617E-01	2.569E+00
Ta-182	3.046E+00	83.9	2.554E+00	2.559E+00	8.560E+00
Hg-203	-2.986E-01	148.1	4.424E-01	4.427E-01	1.502E+00
TL-208	7.650E+00	10.1	7.725E-01	8.685E-01	1.114E+00
pm-146	7.091E-01	42.8	3.037E-01	3.059E-01	4.663E+00
y-88	-6.203E-02	1071.7	6.648E-01	6.648E-01	1.867E+00
Cd-113m	4.742E+03	128.0	6.071E+03	6.078E+03	2.052E+04
Cd-109	0.000E+00	1.#INF	2.326E+01	2.326E+01	7.729E+01
Cf-251	-9.760E-01	224.2	2.188E+00	2.190E+00	5.653E+00
Cf-249	9.233E-01	99.9	9.223E-01	9.235E-01	1.991E+00
Sn-126	3.111E+00	191.7	5.965E+00	5.967E+00	1.523E+01
PB-210	3.411E+01	45.6	1.556E+01	1.569E+01	3.635E+01
PB-212	2.497E+01	4.9	1.214E+00	2.020E+00	1.939E+00
PB-214	1.630E+01	7.2	1.167E+00	1.442E+00	2.540E+00
BI-207	-2.077E-02	1954.5	4.060E-01	4.060E-01	1.447E+00
BI-212	9.714E+00	100.3	9.746E+00	9.759E+00	3.280E+01
BI-214	1.437E+01	11.1	1.590E+00	1.757E+00	2.575E+00
BI-210M	3.589E-01	155.1	5.568E-01	5.572E-01	2.510E+00
AC-228	2.185E+01	8.9	1.947E+00	2.244E+00	2.138E+00
TH-227	-7.943E+00	110.2	8.751E+00	8.762E+00	2.921E+01
TH-229	4.916E+00	137.6	6.764E+00	6.776E+00	2.023E+01
TH-234	2.177E-01	6429.1	1.400E+01	1.400E+01	4.735E+01
PA-231	-1.704E+01	176.7	3.010E+01	3.012E+01	1.007E+02
PA-233	4.858E-01	266.1	1.293E+00	1.293E+00	4.405E+00
PA-234	4.739E-01	95.8	4.543E-01	4.549E-01	1.131E+01
PA-234M	7.089E+00	162.5	1.152E+01	1.153E+01	2.845E+02
U-235	-5.124E+00	127.2	6.518E+00	6.524E+00	2.116E+01
AM-241	-2.215E+00	59.1	1.310E+00	1.315E+00	6.338E+00
Np-237	0.000E+00	1.#INF	6.510E+00	6.511E+00	2.165E+01
Ir-192	-4.066E-02	70.3	2.860E-02	2.870E-02	1.844E+00
Cs-136	4.101E-01	168.7	6.921E-01	6.925E-01	2.110E+00
Np-239	-2.130E+00	165.4	3.523E+00	3.525E+00	1.171E+01
Nd-147	-1.376E+00	261.7	3.601E+00	3.601E+00	8.889E+00
Total	5.185E+03				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-9-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161470.An1

Acquisition information
Start time: 9/7/2016 5:51:13 PM
Live time: 1800
Real time: 1849
Dead time: 2.65 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/7/2016 5:50:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-09-04_0932.PBC 9/4/2016 9:32:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1591

***** 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	52.	45.62	1.10	2.005E-02	46.54	4.250	PBC<MDA	PB210
63.47	17.	191.74	1.03	3.146E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	3.111E+00	Sn126
74.68	235.	10.29	1.03	3.611E-02				
77.16	351.	7.27	1.04	3.700E-02				
80.99	28.	171.50	1.04	3.821E-02	80.99	34.060	PBC<MDA	BA133
87.22	138.	13.62	1.04	3.974E-02	86.49	13.100	1.473E+01	Np237
					86.54	30.700	6.283E+00	EU155
					86.94	9.040	2.129E+01	Sn126
					87.57	37.500	5.115E+00	Sn126
					88.04	3.790	5.049E+01	Cd109
89.97	105.	16.69	1.05	4.028E-02				
93.18	114.	17.46	1.05	4.083E-02	93.35	5.561	2.789E+01	AC228
105.31	35.	165.91	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
121.78	11.	169.88	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.774E-01	CO57
162.66	7.	327.95	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
193.51	15.	137.61	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
205.30	22.	51.56	0.60	3.083E-02	205.33	5.010	PBC<MDA	U235
210.85	6.	340.71	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	5.	452.11	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.66	480.	5.59	1.00	2.744E-02	238.63	43.300	2.246E+01	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
242.03	80.	18.76	1.16	2.714E-02	242.00	7.430	2.215E+01	PB214
263.70	13.	128.03	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	21.	43.73	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
295.28	132.	13.20	0.80	2.323E-02	295.09	19.300	1.641E+01	PB214
300.15	35.	29.98	1.20	2.294E-02	300.03	3.280	2.594E+01	PB212
					300.07	2.460	3.458E+01	PA231
					300.18	6.200	1.373E+01	PA233
304.90	17.	183.65	1.21	2.265E-02	304.85	4.290	9.947E+00	Ba140
					304.90	28.000	1.524E+00	BI210M
312.01	7.	266.11	1.21	2.224E-02	312.01	36.000	PBC<MDA	PA233
328.76	14.	174.45	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	15.	165.57	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.47	94.	14.69	1.07	2.085E-02	338.32	12.010	2.092E+01	AC228
340.57	15.	168.75	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	6.	413.07	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.93	218.	9.56	1.18	2.021E-02	351.93	37.600	1.592E+01	PB214
383.84	11.	106.46	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	12.	111.83	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
427.88	7.	172.02	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	547.68	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
453.88	27.	42.83	1.32	1.647E-02	453.88	65.000	1.419E+00	pm146
463.37	14.	93.86	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
468.06	12.	98.70	1.33	1.606E-02	468.06	51.750	PBC<MDA	Ir192
487.02	13.	95.38	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
511.86	53.	47.25	2.61	1.494E-02	511.86	20.000	9.857E+00	RH106
537.26	20.	42.87	1.37	1.436E-02	537.26	24.390	3.226E+00	Ba140
569.32	5.	182.21	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.475E+00	PA234
					569.70	97.740	2.077E-01	BI207
583.15	156.	10.10	0.81	1.342E-02	583.02	84.500	7.665E+00	TL208
600.50	8.	305.16	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.41	12.	202.28	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
604.71	12.	204.06	1.42	1.303E-02	604.71	97.620	PBC<MDA	CS134
609.39	154.	11.06	1.37	1.294E-02	609.31	46.090	1.437E+01	BI214
					610.30	5.750	1.154E+02	RU103
636.97	10.	86.25	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
661.63	42.	19.85	2.01	1.209E-02	661.66	85.210	2.238E+00	CS137
724.20	12.	94.42	1.50	1.121E-02	724.20	44.150	PBC<MDA	ZR95
727.30	15.	100.33	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
756.73	10.	97.90	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	7.	115.77	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
766.41	5.	169.37	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	7.	158.51	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152
786.71	22.	37.12	1.54	1.048E-02	785.42	1.280	8.920E+01	BI212
795.87	11.	103.99	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
810.78	4.	247.47	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
818.50	3.	320.93	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
834.85	11.	89.29	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
846.77	4.	196.82	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.01	24.	42.98	1.59	9.703E-03	860.56	12.420	1.117E+01	TL208
871.10	8.	81.09	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
880.53	10.	89.19	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234
883.24	2.	388.82	1.60	9.493E-03	883.24	9.600	PBC<MDA	PA234
889.28	8.	109.06	1.60	9.438E-03	889.28	99.984	PBC<MDA	Sc46
911.32	107.	10.08	1.13	9.247E-03	911.07	29.000	2.224E+01	AC228
946.02	8.	95.85	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
964.11	4.	342.03	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.22	14.	78.77	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
996.33	8.	119.90	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1050.36	7.	134.16	1.70	8.193E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	3.	238.82	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1119.80	51.	22.83	1.08	7.754E-03	1120.29	15.100	2.428E+01	BI214
1121.24	15.	83.86	1.74	7.748E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.046E+00	Ta182
1238.28	8.	164.57	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	9.	61.32	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.043E+00	EU154
1274.54	1.	470.40	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.083E-01	EU154
1291.60	9.	90.69	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	2.	356.61	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	121.64	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1460.91	312.	5.72	1.67	6.165E-03	1460.83	10.670	2.633E+02	K40
1596.21	3.	178.02	1.99	5.706E-03	1596.21	95.400	PBC<MDA	La140
1690.72	5.	44.72	2.03	5.425E-03	1690.98	47.790	PBC<MDA	SB124
1764.31	7.	76.09	2.07	5.226E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	7.	90.30	2.07	5.208E-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	
298.51	74.65	174.	235.	6.497E+03	10.29	1.034	-	D
308.44	77.13	150.	351.	9.488E+03	7.27	1.036	-	D
358.89	89.94	120.	94.	2.328E+03	19.49	1.046	-	D
821.04	205.30	40.	26.	8.271E+02	44.15	0.603	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	130.	52.	0.029	45.62	1.103
TH-227	200.37	50.14	395.	-26.	-0.014	110.17	1.015s
AM-241	237.95	59.54	612.	-41.	-0.023	59.15	1.022
Sn-126	256.93	64.28	302.	17.	0.009	191.74	1.026s
BA-133	323.77	80.99	1176.	28.	0.016	171.50	1.039
Np-237	345.77	86.49	1831.	0.	0.000	187.36	1.043A
EU-155	345.98	86.54	2170.	-37.	-0.021	178.02	1.043s
Sn-126	347.57	86.94	2025.	20.	0.011	108.11	1.044D
Sn-126	350.09	87.57	1849.	40.	0.022	55.08	1.044D
Cd-109	351.97	88.04	1988.	0.	0.000	170.24	1.044A
Nd-147	364.21	91.10	1812.	-37.	-0.021	162.23	1.047D
TH-234	370.17	92.59	1848.	-90.	-0.050	55.78	1.048s
AC-228	373.21	93.35	141.	114.	0.063	17.46	1.048D
Gd-153	389.81	97.50	1833.	-37.	-0.021	162.40	1.052s
Np-239	397.81	99.50	1871.	-38.	-0.021	163.80	1.053
Gd-153	412.62	103.20	1908.	-38.	-0.021	164.97	1.056s
Np-239	414.62	103.70	1946.	-38.	-0.021	166.51	1.057s
EU-155	421.07	105.31	1621.	35.	0.019	165.91	1.058
Np-239	424.34	106.13	1797.	-36.	-0.020	165.41	1.058s
EU-152	486.92	121.78	180.	11.	0.006	169.88	1.071s
CO-57	488.06	122.06	211.	-10.	-0.005	214.76	1.071s
EU-154	492.22	123.10	245.	-7.	-0.004	334.07	1.072
PA-234	525.00	131.29	982.	-32.	-0.018	141.48	1.078s
HF-181	531.92	133.02	1014.	-32.	-0.018	143.53	1.079s
CE-144	533.98	133.54	1045.	-32.	-0.018	145.66	1.080s
HF-181	545.02	136.30	1077.	-32.	-0.018	147.53	1.082
CO-57	545.72	136.47	1109.	-32.	-0.018	149.63	1.082s
Tc-99m	561.86	140.51	1140.	-32.	-0.018	151.30	1.085s
U-235	574.97	143.79	1180.	-39.	-0.022	127.21	1.087s
CE-141	581.59	145.44	1249.	-33.	-0.019	150.48	1.089s
Ba-140	650.47	162.66	260.	7.	0.004	327.95	1.102s
U-235	653.35	163.38	184.	-8.	-0.004	668.34	1.102s
CE-139	663.24	165.85	254.	-18.	-0.010	126.31	1.104s
Cf-251	706.23	176.60	150.	-10.	-0.006	224.15	1.112s
TH-229	773.87	193.51	110.	15.	0.008	137.61	1.125s
U-235	821.17	205.33	172.	-23.	-0.013	88.95	1.134s
TH-229	843.24	210.85	112.	6.	0.003	340.71	1.138s
Cf-251	907.84	227.00	132.	5.	0.003	452.11	1.151s
PB-212	954.37	238.63	69.	534.	0.297	4.86	1.159D
PB-214	967.84	242.00	74.	80.	0.045	18.76	1.162D
EU-152	978.62	244.69	871.	-23.	-0.013	183.55	1.164s
Cd-113m	1054.65	263.70	132.	13.	0.007	128.03	1.178s
BI-210M	1063.18	265.83	136.	-7.	-0.004	250.10	1.179s
TL-208	1108.99	277.28	30.	21.	0.011	43.73	1.188D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1116.66	279.20	119.	-11.	-0.006	148.13	1.189s
I-131	1137.05	284.30	108.	-22.	-0.012	96.83	1.193s
PB-214	1180.22	295.09	39.	138.	0.076	10.66	1.201D
PB-212	1199.98	300.03	38.	35.	0.020	29.98	1.205D
PA-231	1200.14	300.07	662.	-20.	-0.011	182.52	1.205s
PA-233	1200.58	300.18	642.	-20.	-0.011	179.74	1.205s
PA-231	1210.46	302.65	622.	-20.	-0.011	176.71	1.207s
BA-133	1211.27	302.85	602.	-20.	-0.011	173.85	1.207s
Ba-140	1219.26	304.85	582.	-20.	-0.011	170.76	1.208s
BI-210M	1219.45	304.90	502.	17.	0.010	183.65	1.208s
PA-233	1247.91	312.01	170.	7.	0.004	266.11	1.214s
Ir-192	1265.82	316.49	170.	-19.	-0.011	100.23	1.217s
CR-51	1280.20	320.08	208.	-17.	-0.009	121.81	1.219s
La-140	1314.91	328.76	303.	14.	0.008	174.45	1.226s
Cf-249	1333.63	333.44	318.	15.	0.009	165.57	1.229s
AC-228	1353.73	338.47	27.	94.	0.052	14.69	1.072
Cs-136	1362.15	340.57	333.	15.	0.009	168.75	1.234s
EU-152	1377.01	344.29	349.	6.	0.004	413.07	1.237s
HF-181	1383.19	345.83	500.	-21.	-0.011	154.71	1.238s
PB-214	1407.60	351.93	47.	218.	0.121	9.56	1.180
BA-133	1423.87	356.00	320.	-4.	-0.002	586.08	1.245
I-131	1457.81	364.48	56.	-3.	-0.002	674.33	1.252s
BA-133	1535.24	383.84	68.	11.	0.006	106.46	1.266s
Cf-249	1551.68	387.95	79.	12.	0.006	111.83	1.269s
SN-113	1566.64	391.69	107.	-5.	-0.003	222.04	1.271s
SB-125	1711.39	427.88	36.	7.	0.004	172.02	1.297s
AG-108M	1735.64	433.94	44.	2.	0.001	547.68	1.301s
pm-146	1815.41	453.88	27.	27.	0.015	42.83	1.315s
SB-125	1853.36	463.37	74.	14.	0.008	93.86	1.322s
Ir-192	1872.14	468.06	66.	12.	0.007	98.70	1.325s
BE-7	1910.28	477.60	132.	-10.	-0.006	165.53	1.332s
La-140	1947.98	487.02	35.	13.	0.007	95.38	1.339s
RU-103	1988.12	497.05	35.	-3.	-0.001	454.83	1.346s
RH-106	2047.36	511.86	84.	53.	0.029	47.25	2.606s
Nd-147	2123.91	531.00	35.	-5.	-0.003	261.67	1.369s
Ba-140	2148.95	537.26	14.	20.	0.011	42.87	1.373s
CS-134	2252.86	563.24	52.	-6.	-0.003	248.70	1.391s
CS-134	2277.20	569.32	39.	5.	0.003	182.21	1.395s
TL-208	2332.52	583.15	18.	156.	0.087	10.10	0.811s
SB-125	2401.92	600.50	294.	8.	0.004	305.16	1.416
SB-124	2410.85	602.73	278.	12.	0.007	202.28	1.418
CS-134	2418.76	604.71	290.	12.	0.007	204.06	1.419s
BI-214	2437.48	609.39	29.	154.	0.086	11.06	1.371
RU-103	2441.12	610.30	302.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	302.	0.	0.000	1000.00	1.426s
PM-144	2472.18	618.06	302.	0.	0.000	1000.00	1.428s
RH-106	2487.60	621.92	302.	0.	0.000	1000.00	1.431s
SB-125	2543.49	635.89	48.	-12.	-0.006	88.66	1.440

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2547.83	636.97	32.	10.	0.006	86.25	1.441s
AG-110M	2630.98	657.76	100.	-14.	-0.008	102.25	1.455s
CS-137	2646.47	661.63	9.	42.	0.023	19.85	2.009s
PM-144	2786.11	696.54	80.	-22.	-0.012	38.44	1.480s
NB-94	2810.46	702.63	51.	-3.	-0.002	239.10	1.484s
SB-124	2891.09	722.79	126.	-18.	-0.010	91.29	1.497s
AG-108M	2891.70	722.94	108.	-18.	-0.010	84.99	1.498s
EU-154	2893.37	723.36	94.	-16.	-0.009	86.85	1.498s
ZR-95	2896.74	724.20	55.	12.	0.006	94.42	1.498s
BI-212	2908.63	727.17	102.	15.	0.008	100.33	1.500
pm-146	2942.83	735.72	37.	-8.	-0.005	159.35	1.506s
pm-146	2988.59	747.16	37.	-4.	-0.002	302.94	1.513s
ZR-95	3026.87	756.73	19.	10.	0.006	97.90	1.519s
AG-110M	3055.73	763.94	31.	7.	0.004	115.77	1.524s
NB-95	3063.11	765.79	38.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	35.	5.	0.003	169.37	1.526s
EU-152	3115.64	778.92	23.	7.	0.004	158.51	1.534s
BI-212	3141.64	785.42	9.	22.	0.012	37.12	1.538s
CS-134	3183.43	795.87	62.	11.	0.006	103.99	1.544s
CS-134	3207.77	801.95	82.	-8.	-0.004	167.18	1.548s
CO-58	3243.06	810.78	39.	4.	0.002	247.47	1.554s
La-140	3263.04	815.77	53.	-13.	-0.007	82.13	1.557s
Cs-136	3273.97	818.50	59.	3.	0.002	320.93	1.559s
MN-54	3339.36	834.85	19.	11.	0.006	89.29	1.569s
Co-56	3387.05	846.77	15.	4.	0.002	196.82	1.577s
TL-208	3442.23	860.56	19.	24.	0.013	42.98	1.585s
NB-94	3484.36	871.10	19.	8.	0.005	81.09	1.592s
EU-154	3492.89	873.23	52.	-15.	-0.008	69.76	1.593s
PA-234	3522.10	880.53	32.	10.	0.005	89.19	1.598s
PA-234	3532.94	883.24	42.	2.	0.001	388.82	1.599s
AG-110M	3538.71	884.68	44.	0.	0.000	1000.00	1.600s
Sc-46	3557.10	889.28	33.	8.	0.004	109.06	1.603s
AC-228	3645.24	911.32	3.	107.	0.060	10.08	1.127s
AG-110M	3749.96	937.49	40.	-12.	-0.007	119.41	1.633
PA-234	3784.07	946.02	10.	8.	0.004	95.85	1.638s
EU-152	3856.43	964.11	108.	4.	0.002	342.03	1.649
AC-228	3875.88	968.97	54.	14.	0.008	78.77	1.652s
EU-154	3985.31	996.33	42.	8.	0.004	119.90	1.668s
PA-234M	4003.99	1001.00	53.	-3.	-0.002	277.39	1.671s
EU-154	4019.10	1004.77	61.	-10.	-0.006	111.61	1.673s
Co-56	4151.36	1037.84	25.	-3.	-0.002	259.92	1.693s
Cs-136	4192.29	1048.07	32.	-11.	-0.006	80.65	1.698s
RH-106	4201.45	1050.36	37.	7.	0.004	134.16	1.700s
BI-207	4254.65	1063.66	25.	-3.	-0.002	370.93	1.708s
Ga-68	4309.61	1077.40	10.	3.	0.002	238.82	1.716s
FE-59	4397.02	1099.25	25.	-6.	-0.003	187.70	1.728
EU-152	4448.32	1112.07	154.	-18.	-0.010	99.61	1.736s
ZN-65	4462.20	1115.55	135.	-18.	-0.010	93.79	1.738s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4479.22	1119.80	15.	51.	0.028	22.83	1.082s
Sc-46	4482.22	1120.55	117.	-18.	-0.010	87.57	1.740s
Ta-182	4485.22	1121.30	70.	15.	0.008	83.86	1.741
CO-60	4692.97	1173.24	39.	-15.	-0.008	81.29	1.770s
Ta-182	4756.23	1189.05	35.	-13.	-0.007	103.82	1.779
Ta-182	4885.67	1221.41	43.	-11.	-0.006	142.52	1.797
Co-56	4953.16	1238.28	32.	8.	0.004	164.57	1.806s
NA-22	5098.16	1274.53	11.	9.	0.005	61.32	1.826s
EU-154	5098.22	1274.54	20.	1.	0.001	470.40	1.826s
FE-59	5166.43	1291.60	11.	9.	0.005	90.69	1.835
CO-60	5330.06	1332.50	15.	2.	0.001	356.61	1.857s
AG-110M	5537.25	1384.30	5.	5.	0.003	121.64	1.884s
EU-152	5632.07	1408.00	16.	-6.	-0.003	132.93	1.896s
K-40	5843.72	1460.91	3.	312.	0.173	5.72	1.667
La-140	6384.93	1596.21	6.	3.	0.002	178.02	1.990s
SB-124	6764.03	1690.98	0.	5.	0.003	44.72	2.034s
BI-214	7058.07	1764.49	10.	7.	0.004	76.09	2.067s
Co-56	7085.51	1771.35	18.	7.	0.004	90.30	2.070s

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	-3.3417E+00				5.31E+01	
			477.60	-3.342E+00	&(	1.880E+01 1.66E+02 1.05E+01	G
NA-22	C	7.1919E-01				9.50E+02	
			1274.53	7.192E-01	?(	1.436E+00 6.13E+01 9.99E+01	G
K-40	N	2.6332E+02				4.66E+11	
			1460.83	2.633E+02	(P	9.343E+00 5.72E+00 1.07E+01	G
Sc-46	F	4.6400E-01				8.38E+01	
			889.28	4.640E-01	?(	1.736E+00 1.09E+02 1.00E+02	G
			1120.55	-1.301E+00	+	3.811E+00 8.76E+01 1.00E+02	G
CR-51	F	-4.3810E+00				2.77E+01	
			320.08	-4.381E+00	?(	1.793E+01 1.22E+02 9.94E+00	G
MN-54	C	6.0900E-01				3.12E+02	
			834.85	6.090E-01	&(	1.275E+00 8.93E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	2.9437E-01					4.45E+01	
			1099.25	-7.486E-01	?(	3.245E+00	1.88E+02	5.65E+01 G
			1291.60	1.658E+00	&(P	3.385E+00	9.07E+01	4.32E+01 G
Co-56	C	5.1979E-01					7.73E+01	
			846.77	2.383E-01	?(P	1.166E+00	1.97E+02	9.99E+01 G
			1238.28	9.455E-01	?(	3.436E+00	1.65E+02	6.61E+01 G
			1037.84	-1.452E+00	+ P	1.237E+01	2.60E+02	1.41E+01 G
			1771.35	4.960E+00	?	1.531E+01	9.03E+01	1.55E+01 A
CO-57	C	-1.5133E-01					2.72E+02	
			122.06	-1.513E-01	&(	1.101E+00	2.15E+02	8.56E+01 G
			136.47	-4.123E+00	+	2.054E+01	1.50E+02	1.07E+01 G
CO-58	C	2.0074E-01					7.09E+01	
			810.78	2.007E-01	?(	1.748E+00	2.47E+02	9.95E+01 G
CO-60	F	1.8931E-01					1.93E+03	
			1332.50	1.893E-01	?(P	1.714E+00	3.57E+02	1.00E+02 G
			1173.24	-1.106E+00	+ P	2.369E+00	8.13E+01	9.99E+01 G
ZN-65	F	-2.5568E+00					2.44E+02	
			1115.55	-2.557E+00	?(	8.032E+00	9.38E+01	5.06E+01 G
NB-94	I	1.5853E-01					7.41E+06	
			702.63	-1.721E-01	(P	1.784E+00	2.39E+02	9.79E+01 G
			871.10	4.826E-01	(	1.323E+00	8.11E+01	9.99E+01 G
ZR-95	I	1.1048E+00					6.40E+01	
			756.73	9.407E-01	&(P	2.186E+00	9.79E+01	5.45E+01 G
			724.20	1.307E+00	?(	4.170E+00	9.44E+01	4.42E+01 G
RU-103	I	-1.0654E-01					3.93E+01	
			497.05	-1.065E-01	?(	1.204E+00	4.55E+02	9.09E+01 G
			610.30	0.000E+00	+	6.256E+01	1.00E+03	5.75E+00 GA
RH-106	I	3.9341E+00					3.74E+02	
			621.92	0.000E+00	?(	3.679E+01	1.00E+03	9.93E+00 G
			1050.36	2.898E+01	?(	1.344E+02	1.34E+02	1.56E+00 G
			511.86	9.857E+00	?	8.447E+00	4.72E+01	2.00E+01 GA
AG-108M	C	8.8934E-02					1.53E+05	
			433.94	8.893E-02	?(P	1.203E+00	5.48E+02	9.05E+01 G
			722.94	-9.822E-01	+	2.790E+00	8.50E+01	9.08E+01 G
			614.28	0.000E+00	-	4.025E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	6.4784E-01					2.50E+02	
			884.68	0.000E+00	?(	2.711E+00	1.00E+03	7.27E+01 G
			657.76	-6.912E-01	+	2.381E+00	1.02E+02	9.46E+01 G
			937.49	-2.150E+00	+	5.765E+00	1.19E+02	3.44E+01 G
			1384.30	1.652E+00	?(	4.769E+00	1.22E+02	2.43E+01 G
			763.94	1.666E+00	?(	6.646E+00	1.16E+02	2.23E+01 G
SN-113	F	-2.5652E-01					1.15E+02	
			391.69	-2.565E-01	?(P	2.388E+00	2.22E+02	6.40E+01 G
SB-124	F	6.9392E-01					6.02E+01	
			602.73	5.103E-01	?(P	3.483E+00	2.02E+02	9.83E+01 G
			1690.98	1.071E+00	?(	1.579E+00	4.47E+01	4.78E+01 G
			722.79	-8.251E+00	+	2.522E+01	9.13E+01	1.08E+01 G
SB-125	I	1.7752E+00					1.01E+03	
			427.88	7.605E-01	&(	3.332E+00	1.72E+02	2.96E+01 G
			600.50	1.900E+00	?(	1.962E+01	3.05E+02	1.79E+01 G
			635.89	-4.586E+00	+	1.371E+01	8.87E+01	1.13E+01 G
			463.37	4.432E+00	?(P	1.400E+01	9.39E+01	1.05E+01 G
I-131	I	4.0378E-01					8.02E+00	
			364.48	-1.069E-01	(P	1.301E+00	6.74E+02	8.17E+01 G
			284.30	-8.150E+00	+	1.934E+01	9.68E+01	6.14E+00 G
			636.97	6.222E+00	?(	1.814E+01	8.63E+01	7.17E+00 G
Gd-153	F	-1.6790E+00					2.42E+02	
			97.50	-1.679E+00	?(	9.061E+00	1.62E+02	3.00E+01 G
			103.20	-2.297E+00	+	1.259E+01	1.65E+02	2.18E+01 G
Ga-68	C	7.4356E+00					4.71E-02	
			1077.40	7.436E+00	?(	4.324E+01	2.39E+02	3.30E+00 G
Tc-99m	I	-5.1738E-01					2.51E-01	
			140.51	-5.174E-01	(	2.606E+00	1.51E+02	8.93E+01 G
BA-133	F	-1.9375E-01					3.85E+03	
			356.00	-1.938E-01	?(	3.850E+00	5.86E+02	6.20E+01 G
			302.85	-2.678E+00	+	1.558E+01	1.74E+02	1.83E+01 G
			383.84	3.759E+00	* P	1.355E+01	1.06E+02	8.94E+00 GA
			80.99	1.215E+00	& P	6.939E+00	1.72E+02	3.41E+01 GA
CS-134	I	6.5994E-01					7.54E+02	
			604.71	5.210E-01	(	3.586E+00	2.04E+02	9.76E+01 G
			795.87	6.999E-01	&(	2.467E+00	1.04E+02	8.55E+01 G
			569.32	1.319E+00	?(	8.395E+00	1.82E+02	1.54E+01 G
			801.95	-4.863E+00	&	2.786E+01	1.67E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-2.891E+00	+	1.750E+01	2.49E+02	8.35E+00 G
CS-137	I	2.2384E+00					1.10E+04	
			661.66	2.238E+00	(P	9.204E-01	1.99E+01	8.52E+01 G
CE-139	F	-3.4807E-01					1.38E+02	
			165.85	-3.481E-01	&(	1.475E+00	1.26E+02	7.99E+01 G
Ba-140	I	2.9242E+00					1.28E+01	
			537.26	3.226E+00	&(P	3.164E+00	4.29E+01	2.44E+01 G
			162.66	1.740E+00	(	1.935E+01	3.28E+02	6.22E+00 G
			304.85	-1.152E+01	-	6.581E+01	1.71E+02	4.29E+00 G
La-140	I	7.2198E-01					1.28E+01	
			1596.21	3.371E-01	?(P	1.412E+00	1.78E+02	9.54E+01 G
			487.02	1.033E+00	&(	2.367E+00	9.54E+01	4.55E+01 G
			328.76	1.833E+00	&(P	1.076E+01	1.74E+02	2.03E+01 G
			815.77	-3.118E+00	&	8.589E+00	8.21E+01	2.33E+01 G
CE-141	I	-9.9465E-01					3.25E+01	
			145.44	-9.946E-01	&(	4.980E+00	1.50E+02	4.82E+01 G
CE-144	I	-3.9266E+00					2.85E+02	
			133.54	-3.927E+00	?(	1.904E+01	1.46E+02	1.11E+01 G
PM-144	C	-1.0470E+00					3.63E+02	
			696.54	-1.047E+00	(P	2.147E+00	3.84E+01	9.90E+01 G
			618.06	0.000E+00	+	3.668E+00	1.00E+03	9.91E+01 G
EU-152	F	1.1491E+00					4.94E+03	
			344.29	6.546E-01	?(	9.145E+00	4.13E+02	2.65E+01 G
			1112.07	-9.446E+00	+	3.154E+01	9.96E+01	1.36E+01 G
			121.78	5.312E-01	&(	3.054E+00	1.70E+02	2.86E+01 G
			778.92	2.713E+00	?(	1.026E+01	1.59E+02	1.29E+01 G
			964.11	1.870E+00	?(	2.204E+01	3.42E+02	1.46E+01 G
			244.69	-6.233E+00	+	3.819E+01	1.84E+02	7.58E+00 G
			1408.00	-2.542E+00	+ P	8.899E+00	1.33E+02	2.10E+01 GA
EU-154	I	-7.0817E+00					3.14E+03	
			873.23	-7.082E+00	?(P	1.713E+01	6.98E+01	1.23E+01 G
			123.10	-2.194E-01	+	2.488E+00	3.34E+02	4.08E+01 G
			1274.54	3.083E-01	+	5.315E+00	4.70E+02	3.52E+01 G
			723.36	-4.021E+00	+	1.170E+01	8.68E+01	2.02E+01 G
			1004.77	-3.746E+00	+	1.421E+01	1.12E+02	1.80E+01 G
			996.33	4.892E+00	+	2.012E+01	1.20E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	2.1605E+00					1.81E+03	
			105.31	2.161E+00	?(	1.192E+01	1.66E+02	2.12E+01 G
			86.54	-1.698E+00	+	1.004E+01	1.78E+02	3.07E+01 G
HF-181	F	-3.1765E-02					4.24E+01	
			482.00	-3.176E-02	%(P	2.569E+00	1.77E+03	8.05E+01 G
			133.02	-1.004E+00	&	4.797E+00	1.44E+02	4.33E+01 G
			345.83	-3.714E+00	+	1.923E+01	1.55E+02	1.51E+01 G
			136.30	-7.521E+00	&	3.694E+01	1.48E+02	5.85E+00 G
Ta-182	F	3.0459E+00					1.14E+02	
			1121.30	3.046E+00	(	8.560E+00	8.39E+01	3.49E+01 G
			1221.41	-3.049E+00	-	9.475E+00	1.43E+02	2.70E+01 G
			1189.05	-6.051E+00	+	1.409E+01	1.04E+02	1.62E+01 G
Hg-203	F	-2.9864E-01					4.66E+01	
			279.20	-2.986E-01	?(	1.502E+00	1.48E+02	8.15E+01 G
TL-208	N	7.6497E+00					6.98E+02	
			583.02	7.665E+00	(P	1.114E+00	1.01E+01	8.45E+01 G
			277.28	7.442E+00	(	1.024E+01	4.37E+01	6.31E+00 G
			860.56	1.117E+01	+ P	1.055E+01	4.30E+01	1.24E+01 G
pm-146	C	7.0907E-01					2.02E+03	
			747.16	-6.480E-01	?(	4.663E+00	3.03E+02	3.40E+01 G
			735.72	-1.859E+00	+	6.957E+00	1.59E+02	2.25E+01 G
			453.88	1.419E+00	(P	1.389E+00	4.28E+01	6.50E+01 G
y-88	F	-6.2029E-02					1.07E+02	
			898.04	-6.203E-02	%(P	1.867E+00	1.07E+03	9.37E+01 G
			1836.06	-1.740E-02	% P	8.180E-01	3.35E+03	9.92E+01 G
Cd-113m		4.7418E+03					5.33E+03	
			263.70	4.742E+03	?(	2.052E+04	1.28E+02	6.00E-03 K
Cf-251	T	-9.7603E-01					3.28E+05	
			176.60	-9.760E-01	?(	5.653E+00	2.24E+02	1.70E+01 G
			227.00	1.546E+00	*	1.739E+01	4.52E+02	6.30E+00 GA
Cf-249	T	9.2327E-01					1.28E+05	
			387.95	5.254E-01	?(	1.991E+00	1.12E+02	6.60E+01 G
			333.44	2.616E+00	(	1.456E+01	1.66E+02	1.55E+01 G
Sn-126		3.1111E+00					3.65E+07	
			87.57	1.477E+00	}	7.555E+00	5.51E+01	3.75E+01 GA
			64.28	3.111E+00	&(	1.523E+01	1.92E+02	9.70E+00 G
			86.94	3.111E+00	}	3.289E+01	1.08E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	3.4114E+01					8.14E+03	
			46.54	3.411E+01	(P	3.635E+01	4.56E+01	4.25E+00 G
PB-212	N	2.4966E+01					6.98E+02	
			238.63	2.497E+01	(P	1.939E+00	4.86E+00	4.33E+01 G
			300.03	2.594E+01		2.318E+01	3.00E+01	3.28E+00 GA
PB-214	N	1.6298E+01					5.84E+05	
			351.93	1.592E+01	(P	2.540E+00	9.56E+00	3.76E+01 G
			295.09	1.703E+01	(P	3.919E+00	1.07E+01	1.93E+01 G
			242.00	2.215E+01 +		1.176E+01	1.88E+01	7.43E+00 GA
BI-207	C	-2.0773E-02					1.18E+04	
			569.70	-2.077E-02 %(		1.447E+00	1.95E+03	9.77E+01 G
			1063.66	-2.760E-01 &		2.393E+00	3.71E+02	7.45E+01 G
BI-212	N	9.7137E+00					6.98E+02	
			727.17	9.714E+00 ?(		3.280E+01	1.00E+02	7.55E+00 G
			785.42	8.920E+01 & P		7.061E+01	3.71E+01	1.28E+00 GA
BI-214	N	1.4374E+01					5.84E+05	
			609.31	1.437E+01	(P	2.575E+00	1.11E+01	4.61E+01 G
			1120.29	2.428E+01 + P		9.801E+00	2.28E+01	1.51E+01 G
			1764.49	4.735E+00 - P		1.213E+01	7.61E+01	1.54E+01 G
BI-210M	T	3.5887E-01					1.10E+09	
			265.83	-2.936E-01 &(		2.510E+00	2.50E+02	5.00E+01 G
			304.90	1.524E+00 ?(		9.381E+00	1.84E+02	2.80E+01 G
AC-228	N	2.1853E+01					2.10E+03	
			911.07	2.224E+01	(	2.138E+00	1.01E+01	2.90E+01 G
			968.97	5.099E+00 -		1.344E+01	7.88E+01	1.75E+01 G
			338.32	2.092E+01	(	5.939E+00	1.47E+01	1.20E+01 G
			93.35	2.789E+01 +		1.420E+01	1.75E+01	5.56E+00 XA
TH-227	N	-7.9433E+00					7.95E+03	
			50.14	-7.943E+00 &(		2.921E+01	1.10E+02	8.00E+00 G
			256.24	3.057E-01 %		1.507E+01	1.96E+03	7.00E+00 G
TH-229	N	4.9157E+00					2.68E+06	
			193.51	5.693E+00 ?(P		2.023E+01	1.38E+02	4.40E+00 G
			210.85	3.772E+00 &(P		3.205E+01	3.41E+02	2.99E+00 G
TH-234	N	2.1774E-01					1.63E+12	
			63.29	2.177E-01 %(P		4.735E+01	6.43E+03	3.81E+00 G
			92.59	-2.188E+01 + P		4.961E+01	5.58E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	-1.7036E+01					1.20E+07	
			302.65	-1.704E+01	?(	1.007E+02	1.77E+02	2.88E+00 G
			300.07	-1.978E+01	+	1.207E+02	1.83E+02	2.46E+00 G
PA-233	C	4.8578E-01					7.82E+08	
			312.01	4.858E-01	?(	4.405E+00	2.66E+02	3.60E+01 G
			300.18	-7.852E+00	+	4.720E+01	1.80E+02	6.20E+00 G
PA-234	N	4.7393E-01					1.63E+12	
			131.29	-2.400E+00	&(	1.131E+01	1.41E+02	1.80E+01 G
			946.02	3.635E+00	?(P	8.144E+00	9.58E+01	1.34E+01 G
			569.47	2.475E-01	%	1.690E+01	1.91E+03	8.20E+00 G
			883.24	1.451E+00	?(	1.998E+01	3.89E+02	9.60E+00 G
			880.53	9.359E+00	?	2.828E+01	8.92E+01	6.00E+00 GA
PA-234M	N	7.0895E+00					1.63E+12	
			1001.00	-2.222E+01	?(P	2.845E+02	2.77E+02	8.37E-01 G
			766.41	9.054E+01	&(P	5.341E+02	1.69E+02	2.94E-01 G
U-235	N	-5.1242E+00					2.57E+11	
			143.79	-5.124E+00	?(P	2.116E+01	1.27E+02	1.10E+01 G
			205.33	-8.190E+00	+ P	2.294E+01	8.89E+01	5.01E+00 G
			163.38	-2.296E+00	& P	2.011E+01	6.68E+02	5.08E+00 G
AM-241	T	-2.2149E+00					1.58E+05	
			59.54	-2.215E+00	&(P	6.338E+00	5.91E+01	3.59E+01 G
Ir-192	F	-4.0659E-02					7.40E+01	
			316.49	-5.492E-01	&(	1.844E+00	1.00E+02	8.70E+01 G
			468.06	8.147E-01	&(	2.717E+00	9.87E+01	5.18E+01 G
			308.44	1.190E-06	&	8.489E+00	2.11E+08	3.18E+01 G
Cs-136	F	4.1013E-01					1.30E+01	
			818.50	1.881E-01	?(	2.110E+00	3.21E+02	1.00E+02 G
			1048.07	-9.024E-01	+	2.448E+00	8.06E+01	8.00E+01 G
			340.57	8.835E-01	?(	5.012E+00	1.69E+02	4.69E+01 G
Np-239	T	-2.1298E+00					2.36E+00	
			103.70	-2.086E+00	+	1.154E+01	1.67E+02	2.40E+01 X
			106.13	-2.130E+00	&(	1.171E+01	1.65E+02	2.27E+01 G
			99.50	-3.349E+00	+	1.823E+01	1.64E+02	1.50E+01 X
Nd-147		-1.3760E+00					1.11E+01	
			531.00	-1.376E+00	?(	8.889E+00	2.62E+02	1.30E+01 G
			91.10	-1.809E+00	+	9.751E+00	1.62E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	395.	-26.	-0.014	110.17	-7.943E+00	
AM-241	59.54	612.	-41.	-0.023	59.15	-2.215E+00	P
BA-133	80.99	1176.	28.	0.016	171.50	1.215E+00	P
EU-155	86.54	2170.	-37.	-0.021	178.02	-1.698E+00	
Nd-147	91.10	1812.	-37.	-0.021	162.23	-1.809E+00	
TH-234	92.59	1848.	-90.	-0.050	55.78	-2.188E+01	P
Gd-153	97.50	1833.	-37.	-0.021	162.40	-1.679E+00	
Np-239	99.50	1871.	-38.	-0.021	163.80	-3.349E+00	
Gd-153	103.20	1908.	-38.	-0.021	164.97	-2.297E+00	
Np-239	103.70	1946.	-38.	-0.021	166.51	-2.086E+00	
EU-155	105.31	1621.	35.	0.019	165.91	2.161E+00	
Np-239	106.13	1797.	-36.	-0.020	165.41	-2.130E+00	
EU-152	121.78	180.	11.	0.006	169.88	5.312E-01	
CO-57	122.06	211.	-10.	-0.005	214.76	-1.513E-01	
EU-154	123.10	245.	-7.	-0.004	334.07	-2.194E-01	
PA-234	131.29	982.	-32.	-0.018	141.48	-2.400E+00	
HF-181	133.02	1014.	-32.	-0.018	143.53	-1.004E+00	
CE-144	133.54	1045.	-32.	-0.018	145.66	-3.927E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	136.30	1077.	-32.	-0.018	147.53	-7.521E+00	
CO-57	136.47	1109.	-32.	-0.018	149.63	-4.123E+00	
Tc-99m	140.51	1140.	-32.	-0.018	151.30	-5.174E-01	
U-235	143.79	1180.	-39.	-0.022	127.21	-5.124E+00	P
CE-141	145.44	1249.	-33.	-0.019	150.48	-9.946E-01	
Ba-140	162.66	260.	7.	0.004	327.95	1.740E+00	
U-235	163.38	184.	-8.	-0.004	668.34	-2.296E+00	P
CE-139	165.85	254.	-18.	-0.010	126.31	-3.481E-01	
Cf-251	176.60	150.	-10.	-0.006	224.15	-9.760E-01	
TH-229	193.51	110.	15.	0.008	137.61	5.693E+00	P
U-235	205.33	172.	-23.	-0.013	88.95	-8.190E+00	P
TH-229	210.85	112.	6.	0.003	340.71	3.772E+00	P
Cf-251	227.00	132.	5.	0.003	452.11	1.546E+00	
EU-152	244.69	871.	-23.	-0.013	183.55	-6.233E+00	
Cd-113m	263.70	132.	13.	0.007	128.03	4.742E+03	
BI-210M	265.83	136.	-7.	-0.004	250.10	-2.936E-01	
Hg-203	279.20	119.	-11.	-0.006	148.13	-2.986E-01	
I-131	284.30	108.	-22.	-0.012	96.83	-8.150E+00	
PA-231	300.07	662.	-20.	-0.011	182.52	-1.978E+01	
PA-233	300.18	642.	-20.	-0.011	179.74	-7.852E+00	
PA-231	302.65	622.	-20.	-0.011	176.71	-1.704E+01	
BA-133	302.85	602.	-20.	-0.011	173.85	-2.678E+00	
Ba-140	304.85	582.	-20.	-0.011	170.76	-1.152E+01	
BI-210M	304.90	502.	17.	0.010	183.65	1.524E+00	
PA-233	312.01	170.	7.	0.004	266.11	4.858E-01	
Ir-192	316.49	170.	-19.	-0.011	100.23	-5.492E-01	
CR-51	320.08	208.	-17.	-0.009	121.81	-4.381E+00	
La-140	328.76	303.	14.	0.008	174.45	1.833E+00	P
Cf-249	333.44	318.	15.	0.009	165.57	2.616E+00	
Cs-136	340.57	333.	15.	0.009	168.75	8.835E-01	
EU-152	344.29	349.	6.	0.004	413.07	6.546E-01	
HF-181	345.83	500.	-21.	-0.011	154.71	-3.714E+00	
BA-133	356.00	320.	-4.	-0.002	586.08	-1.938E-01	
I-131	364.48	56.	-3.	-0.002	674.33	-1.069E-01	P
BA-133	383.84	68.	11.	0.006	106.46	3.759E+00	P
Cf-249	387.95	79.	12.	0.006	111.83	5.254E-01	
SN-113	391.69	107.	-5.	-0.003	222.04	-2.565E-01	P
SB-125	427.88	36.	7.	0.004	172.02	7.605E-01	
AG-108M	433.94	44.	2.	0.001	547.68	8.893E-02	P
pm-146	453.88	27.	27.	0.015	42.83	1.419E+00	P
SB-125	463.37	74.	14.	0.008	93.86	4.432E+00	P
Ir-192	468.06	66.	12.	0.007	98.70	8.147E-01	
BE-7	477.60	132.	-10.	-0.006	165.53	-3.342E+00	
La-140	487.02	35.	13.	0.007	95.38	1.033E+00	
RU-103	497.05	35.	-3.	-0.001	454.83	-1.065E-01	
RH-106	511.86	84.	53.	0.029	47.25	9.857E+00	
Nd-147	531.00	35.	-5.	-0.003	261.67	-1.376E+00	
Ba-140	537.26	14.	20.	0.011	42.87	3.226E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	563.24	52.	-6.	-0.003	248.70	-2.891E+00		
CS-134	569.32	39.	5.	0.003	182.21	1.319E+00		
SB-125	600.50	294.	8.	0.004	305.16	1.900E+00		
CS-134	604.71	290.	12.	0.007	204.06	5.210E-01		
SB-125	635.89	48.	-12.	-0.006	88.66	-4.586E+00		
I-131	636.97	32.	10.	0.006	86.25	6.222E+00		
AG-110M	657.76	100.	-14.	-0.008	102.25	-6.912E-01		
PM-144	696.54	80.	-22.	-0.012	38.44	-1.047E+00		P
NB-94	702.63	51.	-3.	-0.002	239.10	-1.721E-01		P
AG-108M	722.94	108.	-18.	-0.010	84.99	-9.822E-01		
EU-154	723.36	94.	-16.	-0.009	86.85	-4.021E+00		
ZR-95	724.20	55.	12.	0.006	94.42	1.307E+00		
pm-146	735.72	37.	-8.	-0.005	159.35	-1.859E+00		
pm-146	747.16	37.	-4.	-0.002	302.94	-6.480E-01		
ZR-95	756.73	19.	10.	0.006	97.90	9.407E-01		P
AG-110M	763.94	31.	7.	0.004	115.77	1.666E+00		
PA-234M	766.41	35.	5.	0.003	169.37	9.054E+01		P
EU-152	778.92	23.	7.	0.004	158.51	2.713E+00		
CS-134	795.87	62.	11.	0.006	103.99	6.999E-01		
CS-134	801.95	82.	-8.	-0.004	167.18	-4.863E+00		
CO-58	810.78	39.	4.	0.002	247.47	2.007E-01		
La-140	815.77	53.	-13.	-0.007	82.13	-3.118E+00		
Cs-136	818.50	59.	3.	0.002	320.93	1.881E-01		
MN-54	834.85	19.	11.	0.006	89.29	6.090E-01		
Co-56	846.77	15.	4.	0.002	196.82	2.383E-01		P
NB-94	871.10	19.	8.	0.005	81.09	4.826E-01		
EU-154	873.23	52.	-15.	-0.008	69.76	-7.082E+00		P
PA-234	880.53	32.	10.	0.005	89.19	9.359E+00		
PA-234	883.24	42.	2.	0.001	388.82	1.451E+00		
Sc-46	889.28	33.	8.	0.004	109.06	4.640E-01		
AG-110M	937.49	40.	-12.	-0.007	119.41	-2.150E+00		
PA-234	946.02	10.	8.	0.004	95.85	3.635E+00		P
EU-152	964.11	108.	4.	0.002	342.03	1.870E+00		
EU-154	996.33	42.	8.	0.004	119.90	4.892E+00		
PA-234M	1001.00	53.	-3.	-0.002	277.39	-2.222E+01		P
EU-154	1004.77	61.	-10.	-0.006	111.61	-3.746E+00		
Co-56	1037.84	25.	-3.	-0.002	259.92	-1.452E+00		P
Cs-136	1048.07	32.	-11.	-0.006	80.65	-9.024E-01		
RH-106	1050.36	37.	7.	0.004	134.16	2.898E+01		
BI-207	1063.66	25.	-3.	-0.002	370.93	-2.760E-01		
Ga-68	1077.40	10.	3.	0.002	238.82	7.436E+00		
FE-59	1099.25	25.	-6.	-0.003	187.70	-7.486E-01		
EU-152	1112.07	154.	-18.	-0.010	99.61	-9.446E+00		
ZN-65	1115.55	135.	-18.	-0.010	93.79	-2.557E+00		
Sc-46	1120.55	117.	-18.	-0.010	87.57	-1.301E+00		
Ta-182	1121.30	70.	15.	0.008	83.86	3.046E+00		
CO-60	1173.24	39.	-15.	-0.008	81.29	-1.106E+00		P
Ta-182	1189.05	35.	-13.	-0.007	103.82	-6.051E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1221.41	43.	-11.	-0.006	142.52	-3.049E+00		
Co-56	1238.28	32.	8.	0.004	164.57	9.455E-01		
NA-22	1274.53	11.	9.	0.005	61.32	7.192E-01		
EU-154	1274.54	20.	1.	0.001	470.40	3.083E-01		
FE-59	1291.60	11.	9.	0.005	90.69	1.658E+00		P
CO-60	1332.50	15.	2.	0.001	356.61	1.893E-01		P
AG-110M	1384.30	5.	5.	0.003	121.64	1.652E+00		
EU-152	1408.00	16.	-6.	-0.003	132.93	-2.542E+00		P
La-140	1596.21	6.	3.	0.002	178.02	3.371E-01		P
Co-56	1771.35	18.	7.	0.004	90.30	4.960E+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 *****

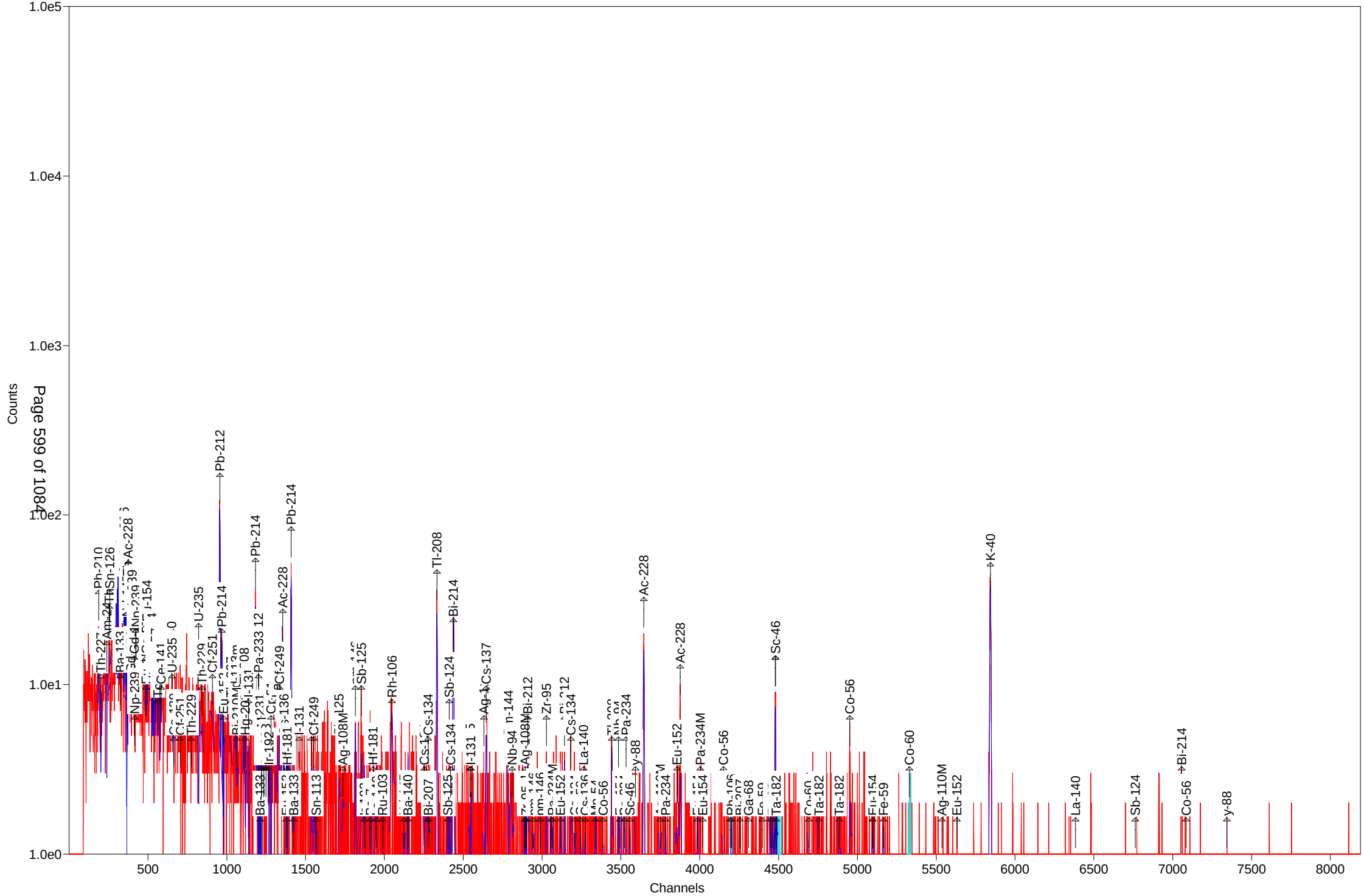
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.3416E+00	-3.3417E+00	1.655E+02%	1.88E+01
NA-22	#A	7.1919E-01	7.1919E-01	6.132E+01%	1.44E+00
K-40		2.6332E+02	2.6332E+02	5.724E+00%	9.34E+00
Sc-46	#A	4.6400E-01	4.6400E-01	1.091E+02%	1.74E+00
CR-51	#A	-4.3809E+00	-4.3810E+00	1.218E+02%	1.79E+01
MN-54	#A	6.0900E-01	6.0900E-01	8.929E+01%	1.28E+00
FE-59	#A	2.9436E-01	2.9437E-01	9.069E+01%	3.25E+00
Co-56	#A	5.1979E-01	5.1979E-01	1.283E+02%	1.17E+00
CO-57	#A	-1.5133E-01	-1.5133E-01	2.148E+02%	1.10E+00
CO-58	#A	2.0074E-01	2.0074E-01	2.475E+02%	1.75E+00
CO-60	#A	1.8931E-01	1.8931E-01	3.566E+02%	1.71E+00
ZN-65	#A	-2.5568E+00	-2.5568E+00	9.379E+01%	8.03E+00
NB-94	#A	1.5853E-01	1.5853E-01	8.109E+01%	1.78E+00
ZR-95	#A	1.1047E+00	1.1048E+00	6.801E+01%	2.19E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.64E+00
RU-103	#A	-1.0654E-01	-1.0654E-01	4.548E+02%	1.20E+00
RH-106	#A	3.9341E+00	3.9341E+00	1.342E+02%	3.68E+01
AG-108M	#A	8.8934E-02	8.8934E-02	5.477E+02%	1.20E+00
AG-110M	#A	6.4784E-01	6.4784E-01	1.158E+02%	2.71E+00
SN-113	#A	-2.5652E-01	-2.5652E-01	2.220E+02%	2.39E+00
SB-124	#A	6.9392E-01	6.9392E-01	4.472E+01%	3.48E+00
SB-125	#A	1.7752E+00	1.7752E+00	9.386E+01%	3.33E+00
I-131	#A	4.0375E-01	4.0378E-01	8.625E+01%	1.30E+00
Gd-153	#A	-1.6790E+00	-1.6790E+00	1.624E+02%	9.06E+00
Ga-68	#A	7.3437E+00	7.4356E+00	2.388E+02%	4.32E+01
Tc-99m	#A	-5.1617E-01	-5.1738E-01	1.513E+02%	2.61E+00
BA-133	#A	-1.9375E-01	-1.9375E-01	5.861E+02%	3.85E+00
CS-134	#A	6.5994E-01	6.5994E-01	9.755E+01%	3.59E+00
CS-137	#	2.2384E+00	2.2384E+00	1.985E+01%	9.20E-01
CE-139	#A	-3.4807E-01	-3.4807E-01	1.263E+02%	1.48E+00

Ba-140 #A	2.9241E+00	2.9242E+00	4.287E+01%		3.16E+00
La-140 #A	7.2195E-01	7.2198E-01	8.896E+01%		1.41E+00
CE-141 #A	-9.9463E-01	-9.9465E-01	1.505E+02%		4.98E+00
CE-144 #A	-3.9266E+00	-3.9266E+00	1.457E+02%		1.90E+01
PM-144 #A	-1.0470E+00	-1.0470E+00	3.844E+01%		2.15E+00
EU-152 #A	1.1491E+00	1.1491E+00	1.461E+02%		9.15E+00
EU-154 #A	-7.0817E+00	-7.0817E+00	6.976E+01%		1.71E+01
EU-155 #A	2.1605E+00	2.1605E+00	1.659E+02%		1.19E+01
HF-181 #A	-3.1764E-02	-3.1765E-02	1.768E+03%		2.57E+00
Ta-182 #A	3.0459E+00	3.0459E+00	8.386E+01%		8.56E+00
Hg-203 #A	-2.9864E-01	-2.9864E-01	1.481E+02%		1.50E+00
TL-208	7.6497E+00	7.6497E+00	1.010E+01%		1.11E+00
pm-146 #A	7.0907E-01	7.0907E-01	4.283E+01%		4.66E+00
y-88 #A	-6.2028E-02	-6.2029E-02	1.072E+03%		1.87E+00
Cd-113m#A	4.7418E+03	4.7418E+03	1.280E+02%		2.05E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.73E+01
Cf-251 #A	-9.7603E-01	-9.7603E-01	2.242E+02%		5.65E+00
Cf-249 #A	9.2327E-01	9.2327E-01	9.990E+01%		1.99E+00
Sn-126 A	3.1111E+00	3.1111E+00	1.917E+02%		1.52E+01
PB-210 A	3.4114E+01	3.4114E+01	4.562E+01%		3.64E+01
PB-212	2.4966E+01	2.4966E+01	4.861E+00%		1.94E+00
PB-214	1.6298E+01	1.6298E+01	7.160E+00%		2.54E+00
BI-207 #A	-2.0773E-02	-2.0773E-02	1.954E+03%		1.45E+00
BI-212 #A	9.7137E+00	9.7137E+00	1.003E+02%		3.28E+01
BI-214	1.4374E+01	1.4374E+01	1.106E+01%		2.57E+00
BI-210M#A	3.5887E-01	3.5887E-01	1.551E+02%		2.51E+00
AC-228	2.1853E+01	2.1853E+01	8.910E+00%		2.14E+00
TH-227 #A	-7.9433E+00	-7.9433E+00	1.102E+02%		2.92E+01
TH-229 #A	4.9157E+00	4.9157E+00	1.376E+02%		2.02E+01
TH-234 #A	2.1774E-01	2.1774E-01	6.429E+03%		4.74E+01
PA-231 #A	-1.7036E+01	-1.7036E+01	1.767E+02%		1.01E+02
PA-233 #A	4.8578E-01	4.8578E-01	2.661E+02%		4.40E+00
PA-234 #A	4.7393E-01	4.7393E-01	9.585E+01%		1.13E+01
PA-234M#A	7.0895E+00	7.0895E+00	1.625E+02%		2.84E+02
U-235 #A	-5.1242E+00	-5.1242E+00	1.272E+02%		2.12E+01
AM-241 #A	-2.2149E+00	-2.2149E+00	5.915E+01%		6.34E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.16E+01
Ir-192 #A	-4.0659E-02	-4.0659E-02	7.033E+01%		1.84E+00
Cs-136 #A	4.1011E-01	4.1013E-01	1.687E+02%		2.11E+00
Np-239 #A	-2.1292E+00	-2.1298E+00	1.654E+02%		1.17E+01
Nd-147 #A	-1.3759E+00	-1.3760E+00	2.617E+02%		8.89E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.5 to  2000.0 keV)     3.848E+02  Bq/Sample
Total Decayed Activity (   37.5 to  2000.0 keV) 3.8481073E+02  Bq/Sample
```

265170_Gamma_160-18567-A-9-B. 8_Gamma_20161470.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20162202

Sample Description: 265170_Gamma_160-18567-A-10-B
Detector: Detector # 7
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-10-B

Decay to Time: 9/7/2016 17:51 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:52:09 Real Time: 1850 sec
Analysis Time: 9/7/2016 18:23 Dead Time: 2.71 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-09-04_0919.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	-4.586E+00	104.8	4.808E+00	4.813E+00	1.614E+01
NA-22	6.266E-01	79.2	4.964E-01	4.974E-01	1.671E+00
K-40	2.536E+02	5.3	1.356E+01	1.877E+01	7.657E+00
Sc-46	-8.372E-01	86.2	7.213E-01	7.226E-01	2.414E+00
CR-51	4.033E+00	174.9	7.054E+00	7.057E+00	2.359E+01
MN-54	8.936E-01	40.3	3.602E-01	3.632E-01	7.813E-01
FE-59	1.156E-01	1060.4	1.226E+00	1.226E+00	2.790E+00
Co-56	1.476E+00	34.3	5.057E-01	5.113E-01	1.272E+00
CO-57	2.937E-01	133.7	3.928E-01	3.931E-01	8.188E-01
CO-58	-7.007E-01	83.5	5.852E-01	5.863E-01	1.959E+00
CO-60	3.831E-01	150.7	5.773E-01	5.776E-01	1.295E+00
ZN-65	0.000E+00	1.#INF	4.395E-01	4.395E-01	5.820E+00
NB-94	1.008E+00	32.9	3.315E-01	3.356E-01	6.958E-01
ZR-95	4.225E-01	209.9	8.867E-01	8.870E-01	2.125E+00
NB-95	-2.690E-01	235.1	6.324E-01	6.325E-01	2.169E+00
RU-103	3.285E-01	113.7	3.735E-01	3.739E-01	9.084E-01
RH-106	2.227E-02	171.8	3.824E-02	3.826E-02	1.293E+01
AG-108M	3.318E-01	91.1	3.024E-01	3.029E-01	9.558E-01
AG-110M	2.667E-01	195.3	5.208E-01	5.210E-01	2.277E+00
SN-113	4.330E-01	128.5	5.565E-01	5.569E-01	1.886E+00
SB-124	-5.827E-02	67.7	3.942E-02	3.954E-02	3.494E+00
SB-125	4.671E+00	20.5	9.555E-01	9.848E-01	3.433E+00
I-131	1.253E+00	46.6	5.841E-01	5.877E-01	1.018E+00
Gd-153	-8.839E-01	147.5	1.304E+00	1.305E+00	4.348E+00
Ga-68	-2.127E+01	138.0	2.935E+01	2.937E+01	6.420E+01
Tc-99m	2.719E-01	120.6	3.279E-01	3.283E-01	1.097E+00
BA-133	-5.818E-01	173.6	1.010E+00	1.010E+00	3.389E+00
CS-134	9.252E-01	36.0	3.331E-01	3.365E-01	3.455E+00
CS-137	3.349E+00	15.1	5.066E-01	5.357E-01	8.618E-01
CE-139	2.946E-01	101.9	3.003E-01	3.016E-01	1.005E+00
Ba-140	-3.562E-01	421.1	1.500E+00	1.500E+00	4.647E+00
La-140	1.696E-01	90.2	1.529E-01	1.532E-01	2.210E+00
CE-141	5.495E-01	169.8	9.332E-01	9.336E-01	3.113E+00

CE-144	-2.541E+00	134.9	3.428E+00	3.431E+00	1.143E+01
PM-144	-2.230E-01	259.2	5.779E-01	5.780E-01	1.359E+00
EU-152	1.454E+00	95.8	1.393E+00	1.395E+00	5.934E+00
EU-154	1.885E+00	66.5	1.253E+00	1.257E+00	1.346E+01
EU-155	1.438E+00	50.8	7.300E-01	7.342E-01	2.076E+00
HF-181	-2.282E-01	118.5	2.704E-01	2.707E-01	2.236E+00
Ta-182	-1.078E+00	67.5	7.274E-01	7.294E-01	1.160E+01
Hg-203	-4.461E-01	108.8	4.853E-01	4.860E-01	1.625E+00
TL-208	7.210E+00	8.5	6.142E-01	7.191E-01	7.428E-01
pm-146	3.706E-01	175.1	6.491E-01	6.494E-01	3.579E+00
y-88	-3.660E-01	193.6	7.086E-01	7.089E-01	1.473E+00
Cd-113m	-5.962E+03	92.0	5.483E+03	5.497E+03	1.832E+04
Cd-109	8.086E+00	153.0	1.238E+01	1.238E+01	4.123E+01
Cf-251	-9.874E-01	189.9	1.875E+00	1.877E+00	4.816E+00
Cf-249	7.547E-01	80.2	6.053E-01	6.066E-01	1.823E+00
Sn-126	-4.238E+00	100.7	4.268E+00	4.274E+00	1.421E+01
PB-210	3.338E+00	382.8	1.278E+01	1.278E+01	4.323E+01
PB-212	1.948E+01	5.0	9.703E-01	1.591E+00	1.732E+00
PB-214	1.677E+01	7.1	1.188E+00	1.473E+00	1.662E+00
BI-207	4.476E-01	83.3	3.727E-01	3.734E-01	1.051E+00
BI-212	7.359E+00	87.7	6.451E+00	6.462E+00	2.167E+01
BI-214	1.506E+01	7.8	1.181E+00	1.416E+00	1.151E+00
BI-210M	6.479E-01	97.9	6.343E-01	6.355E-01	2.124E+00
AC-228	1.571E+01	12.1	1.897E+00	2.060E+00	2.568E+00
TH-227	5.530E+00	120.8	6.679E+00	6.686E+00	2.234E+01
TH-229	5.650E+00	123.9	6.999E+00	7.014E+00	1.742E+01
TH-234	1.478E+01	24.8	3.660E+00	3.741E+00	2.180E+01
PA-231	9.396E+00	55.6	5.227E+00	5.252E+00	1.693E+01
PA-233	-1.187E+00	50.0	5.932E-01	5.966E-01	6.770E+00
PA-234	1.203E+00	67.4	8.107E-01	8.131E-01	7.153E+00
PA-234M	-1.441E+02	55.3	7.973E+01	8.006E+01	3.650E+02
U-235	3.209E+00	99.3	3.185E+00	3.189E+00	1.411E+01
AM-241	-1.254E-01	1062.7	1.333E+00	1.333E+00	3.599E+00
Np-237	0.000E+00	1.#INF	3.867E+00	3.867E+00	1.287E+01
Ir-192	4.302E-01	174.2	7.493E-01	7.497E-01	2.509E+00
Cs-136	-5.902E-01	102.1	6.027E-01	6.037E-01	2.034E+00
Np-239	1.070E+00	144.2	1.543E+00	1.544E+00	5.151E+00
Nd-147	-4.509E+00	94.5	4.260E+00	4.268E+00	1.008E+01
Total	4.170E+02				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-10-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20162202.An1

Acquisition information
Start time: 9/7/2016 5:52:09 PM
Live time: 1800
Real time: 1850
Dead time: 2.71 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/7/2016 5:51:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-09-04_0919.PBC 9/4/2016 9:19:07 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 32 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1932

***** 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	6.	382.81	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
49.65	23.	120.78	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
63.34	51.	36.97	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
74.82	239.	11.01	0.87	4.765E-02				
77.24	393.	6.99	0.87	4.892E-02				
87.22	150.	18.47	0.85	5.303E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.140E+00	EU155
					86.94	9.040	1.741E+01	Sn126
					87.57	37.500	4.182E+00	Sn126
					88.04	3.790	4.126E+01	Cd109
91.10	28.	152.80	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.68	67.	32.93	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
93.44	28.	148.82	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
105.61	31.	50.75	0.35	5.638E-02	105.31	21.200	PBC<MDA	EU155
106.13	25.	144.17	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
121.78	11.	179.68	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.312E-01	CO57
123.10	20.	105.44	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
128.74	44.	49.60	0.67	5.530E-02				
136.47	28.	133.74	0.93	5.410E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.648E+00	CO57
141.54	23.	120.61	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
143.79	26.	169.35	0.94	5.271E-02	143.79	10.960	PBC<MDA	U235
145.44	25.	169.81	0.94	5.237E-02	145.44	48.200	PBC<MDA	CE141
163.38	21.	103.59	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
165.85	21.	101.93	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
193.51	10.	231.33	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
209.40	74.	28.57	0.61	4.020E-02				
210.85	21.	123.89	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229
227.00	13.	160.71	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.70	531.	6.37	0.94	3.601E-02	238.63	43.300	1.892E+01	PB212
242.09	87.	19.23	1.04	3.560E-02	242.00	7.430	1.820E+01	PB214
244.69	20.	215.37	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
256.24	7.	295.85	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
265.83	19.	97.91	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.67	86.	19.73	1.74	3.172E-02	277.28	6.310	2.401E+01	TL208
284.30	35.	46.60	1.09	3.106E-02	284.30	6.140	PBC<MDA	I131
295.41	177.	14.00	1.61	3.009E-02	295.09	19.300	1.698E+01	PB214
300.33	21.	52.77	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
302.95	14.	55.63	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.477E+00	BA133
316.49	19.	174.18	1.12	2.834E-02	316.49	87.040	PBC<MDA	Ir192
320.08	20.	174.89	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	18.	100.46	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	16.	103.73	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.56	122.	11.36	1.08	2.675E-02	338.32	12.010	2.108E+01	AC228
340.57	8.	282.27	1.15	2.662E-02	340.57	46.900	PBC<MDA	Cs136
345.83	8.	192.84	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.16	296.	6.94	1.16	2.586E-02	351.93	37.600	1.667E+01	PB214
364.48	15.	99.61	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
383.84	23.	61.55	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
387.95	12.	122.38	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	12.	128.53	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
433.94	5.	263.57	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
453.88	7.	205.20	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
463.37	68.	20.45	1.27	2.040E-02	463.37	10.470	1.764E+01	SB125
487.02	7.	258.25	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
497.05	10.	113.71	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	61.	39.51	2.56	1.870E-02	511.86	20.000	9.059E+00	RH106
563.24	30.	44.38	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
568.36	10.	97.52	1.37	1.703E-02	569.70	97.740	PBC<MDA	BI207
569.47	12.	79.03	1.37	1.704E-02				
583.46	183.	8.52	1.29	1.669E-02	583.02	84.500	7.210E+00	TL208
609.48	192.	7.84	1.40	1.605E-02	609.31	46.090	1.439E+01	BI214
					610.30	5.750	1.155E+02	RU103
636.97	6.	187.55	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
661.83	77.	15.12	1.09	1.492E-02	661.66	85.210	3.349E+00	CS137
702.63	25.	32.89	1.49	1.415E-02	702.63	97.900	1.008E+00	NB94

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
722.79	14.	67.65	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.179E-01	AG108M
					723.36	20.220	2.777E+00	EU154
722.94	12.	91.15	1.51	1.380E-02	722.79	10.810	4.375E+00	SB124
					722.94	90.840	5.207E-01	AG108M
					723.36	20.220	2.340E+00	EU154
723.36	12.	100.02	1.51	1.379E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.208E-01	AG108M
					723.36	20.220	2.341E+00	EU154
727.17	14.	87.66	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
747.16	4.	283.89	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
756.73	5.	209.90	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
766.41	18.	81.92	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	11.	95.84	1.56	1.291E-02	778.92	12.940	PBC<MDA	EU152
785.42	2.	691.01	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
795.87	23.	36.00	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
801.95	11.	103.15	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
815.77	11.	95.64	1.59	1.239E-02	815.77	23.280	PBC<MDA	La140
834.85	20.	40.31	1.61	1.213E-02	834.85	99.980	8.936E-01	MN54
857.82	15.	91.22	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
873.23	5.	199.00	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
880.53	5.	200.25	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
911.50	92.	12.08	1.07	1.122E-02	911.07	29.000	1.571E+01	AC228
937.49	3.	470.72	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
946.02	7.	127.38	1.70	1.085E-02	946.02	13.400	PBC<MDA	PA234
964.11	8.	160.51	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.53	70.	13.69	2.40	1.062E-02	968.97	17.460	2.093E+01	AC228
1004.77	15.	100.16	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	3.	238.82	1.78	9.978E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	4.	271.91	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1063.57	8.	134.99	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	3.	529.45	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1120.39	54.	19.37	0.39	9.311E-03	1120.29	15.100	2.147E+01	BI214
					1120.55	99.987	3.243E+00	Sc46
1189.05	12.	99.34	1.90	8.821E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	39.	34.26	1.94	8.501E-03	1238.28	66.070	3.847E+00	Co56
1274.53	9.	79.22	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.780E+00	EU154
1332.50	5.	150.67	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	3.	195.30	2.04	7.678E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	86.50	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.14	356.	5.35	2.12	7.309E-03	1460.83	10.670	2.536E+02	K40
1764.52	29.	24.14	2.29	6.141E-03	1764.49	15.400	1.704E+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
298.83	74.77	228.	239.	5.025E+03	11.01	0.867	- D
308.53	77.19	181.	393.	8.035E+03	6.99	0.870	- D
514.56	128.74	134.	44.	7.897E+02	49.60	0.672	- s
837.21	209.40	96.	74.	1.833E+03	28.57	0.608	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	290.	6.	0.004	382.81	0.836s
TH-227	200.12	50.14	362.	23.	0.013	120.78	0.840s
TH-234	252.71	63.29	150.	51.	0.028	36.97	0.854D
Sn-126	256.68	64.28	447.	-30.	-0.017	100.71	0.856
BA-133	323.52	80.99	1546.	-33.	-0.018	170.82	0.874s
Np-237	345.53	86.49	1142.	0.	0.000	145.36	0.880A
EU-155	345.74	86.54	1066.	42.	0.023	59.81	0.880D
Sn-126	347.33	86.94	1058.	29.	0.016	84.89	0.880D
Sn-126	349.85	87.57	968.	29.	0.016	85.76	0.881D
Cd-109	351.73	88.04	997.	29.	0.016	153.05	0.881A
Nd-147	363.97	91.10	925.	28.	0.016	152.80	0.885s
TH-234	369.93	92.59	209.	67.	0.037	32.93	0.886D
AC-228	372.97	93.35	860.	28.	0.016	148.82	0.887s
Gd-153	389.57	97.50	750.	-26.	-0.015	147.48	0.892s
Np-239	397.57	99.50	723.	-27.	-0.015	144.55	0.894
Gd-153	412.38	103.20	739.	-27.	-0.015	145.46	0.898s
Np-239	414.38	103.70	766.	-14.	-0.008	278.28	0.898
EU-155	422.03	105.61	81.	31.	0.017	50.75	0.354s
Np-239	424.10	106.13	620.	25.	0.014	144.17	0.901s
EU-152	486.69	121.78	202.	11.	0.006	179.68	0.918s
CO-57	487.83	122.06	213.	0.	0.000	1000.00	0.918s
EU-154	491.98	123.10	220.	20.	0.011	105.44	0.919s
PA-234	524.77	131.29	715.	-28.	-0.016	135.75	0.928s
HF-181	531.68	133.02	687.	-28.	-0.016	132.84	0.930
CE-144	533.74	133.54	684.	-28.	-0.015	134.94	0.930
CO-57	545.48	136.47	664.	28.	0.015	133.74	0.933s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Tc-99m	561.63	140.51	360.	23.	0.013	120.61	0.938
U-235	574.73	143.79	955.	26.	0.014	169.35	0.941s
CE-141	581.35	145.44	886.	25.	0.014	169.81	0.943s
Ba-140	650.24	162.66	355.	-25.	-0.014	108.34	0.961
U-235	653.11	163.38	224.	21.	0.012	103.59	0.962s
CE-139	663.01	165.85	212.	21.	0.011	101.93	0.965s
Cf-251	706.00	176.60	198.	-14.	-0.008	189.92	0.976s
TH-229	773.64	193.51	147.	10.	0.005	231.33	0.994s
U-235	820.94	205.33	348.	-9.	-0.005	268.49	1.007s
TH-229	843.01	210.85	322.	21.	0.012	123.89	1.012
Cf-251	907.62	227.00	121.	13.	0.007	160.71	1.029s
PB-212	954.15	238.63	97.	547.	0.304	4.98	1.041D
PB-214	967.61	242.00	95.	87.	0.048	19.23	1.045D
EU-152	978.39	244.69	934.	20.	0.011	215.37	1.048
TH-227	1024.59	256.24	114.	7.	0.004	295.85	1.060
Cd-113m	1054.43	263.70	182.	-21.	-0.012	91.97	1.067
BI-210M	1062.96	265.83	166.	19.	0.011	97.91	1.070s
TL-208	1110.30	277.67	46.	86.	0.048	19.73	1.741s
Hg-203	1116.44	279.20	242.	-21.	-0.011	108.80	1.083s
I-131	1136.83	284.30	66.	35.	0.019	46.60	1.089s
PB-214	1181.27	295.41	88.	177.	0.099	14.00	1.611s
PB-212	1199.76	300.03	575.	21.	0.012	52.77	1.105D
PA-231	1199.92	300.07	567.	-22.	-0.012	156.52	1.105
PA-233	1200.36	300.18	589.	-22.	-0.012	159.43	1.105
PA-231	1210.24	302.65	25.	14.	0.008	55.63	1.108D
BA-133	1211.05	302.85	611.	-22.	-0.012	161.88	1.108s
Ba-140	1219.04	304.85	633.	-22.	-0.012	164.39	1.110s
BI-210M	1219.23	304.90	654.	-22.	-0.012	167.16	1.110s
Ir-192	1233.41	308.44	676.	-22.	-0.012	169.34	1.113
PA-233	1247.69	312.01	698.	-22.	-0.012	49.96	1.117
Ir-192	1265.61	316.49	544.	19.	0.011	174.18	1.122
CR-51	1279.99	320.08	617.	20.	0.011	174.89	1.125s
La-140	1314.69	328.76	147.	18.	0.010	100.46	1.134s
Cf-249	1333.41	333.44	127.	16.	0.009	103.73	1.139s
AC-228	1353.91	338.56	21.	122.	0.068	11.36	1.082
Cs-136	1361.93	340.57	230.	8.	0.004	282.27	1.146
HF-181	1382.97	345.83	60.	8.	0.004	192.84	1.151
PB-214	1408.32	352.16	32.	292.	0.162	7.08	1.159s
BA-133	1423.66	356.00	409.	-17.	-0.009	173.58	1.162s
I-131	1457.59	364.48	56.	15.	0.008	99.61	1.170s
BA-133	1535.03	383.84	87.	23.	0.013	61.55	1.189
Cf-249	1551.47	387.95	110.	12.	0.007	122.38	1.193s
SN-113	1566.43	391.69	109.	12.	0.007	128.53	1.197s
AG-108M	1735.43	433.94	44.	5.	0.003	263.57	1.239
pm-146	1815.20	453.88	52.	7.	0.004	205.20	1.258s
SB-125	1853.15	463.37	62.	68.	0.038	20.45	1.268
BE-7	1910.07	477.60	155.	-17.	-0.010	104.82	1.282s
HF-181	1927.68	482.00	172.	-14.	-0.008	137.73	1.286

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1947.77	487.02	176.	7.	0.004	258.25	1.291s
RU-103	1987.91	497.05	31.	10.	0.006	113.71	1.301s
RH-106	2047.15	511.86	80.	61.	0.034	39.51	2.565s
Nd-147	2123.70	531.00	74.	-19.	-0.011	94.49	1.333s
Ba-140	2148.74	537.26	53.	-3.	-0.002	421.12	1.339s
CS-134	2252.65	563.24	35.	30.	0.017	44.38	1.364s
CS-134	2276.99	569.32	59.	-13.	-0.007	87.09	1.369s
PA-234	2277.59	569.47	41.	12.	0.007	79.03	1.370s
BI-207	2278.51	569.70	38.	10.	0.005	97.52	1.370s
TL-208	2333.57	583.46	12.	183.	0.102	8.52	1.289
SB-125	2401.71	600.50	455.	-18.	-0.010	167.49	1.399
SB-124	2410.64	602.73	437.	-18.	-0.010	163.93	1.401s
CS-134	2418.55	604.71	419.	-18.	-0.010	160.33	1.403s
BI-214	2437.63	609.48	7.	192.	0.106	7.84	1.396
RU-103	2440.91	610.30	401.	-18.	-0.010	156.31	1.408s
AG-108M	2456.84	614.28	383.	-18.	-0.010	74.44	1.412s
RH-106	2487.38	621.92	52.	-6.	-0.004	209.92	1.419s
SB-125	2543.28	635.89	56.	-10.	-0.006	107.33	1.432s
I-131	2547.62	636.97	67.	6.	0.004	187.55	1.433s
CS-137	2647.03	661.83	13.	77.	0.043	15.12	1.088s
PM-144	2785.90	696.54	47.	-6.	-0.003	259.16	1.487s
NB-94	2810.25	702.63	10.	25.	0.014	32.89	1.493s
SB-124	2890.87	722.79	38.	14.	0.008	67.65	1.511s
AG-108M	2891.48	722.94	51.	12.	0.007	91.15	1.511s
EU-154	2893.15	723.36	63.	12.	0.007	100.02	1.511s
ZR-95	2896.52	724.20	162.	-25.	-0.014	33.54	1.512s
BI-212	2908.41	727.17	65.	14.	0.008	87.66	1.515
pm-146	2942.61	735.72	37.	-5.	-0.003	220.89	1.523s
pm-146	2988.37	747.16	33.	4.	0.002	283.89	1.533s
ZR-95	3026.65	756.73	29.	5.	0.003	209.90	1.541s
AG-110M	3055.51	763.94	74.	-18.	-0.010	72.71	1.548s
NB-95	3062.89	765.79	108.	-6.	-0.004	235.08	1.549s
PA-234M	3065.38	766.41	99.	18.	0.010	81.92	1.550s
EU-152	3115.41	778.92	24.	11.	0.006	95.84	1.561s
BI-212	3141.41	785.42	42.	2.	0.001	691.01	1.567
CS-134	3183.20	795.87	24.	23.	0.013	36.00	1.576s
CS-134	3207.54	801.95	59.	11.	0.006	103.15	1.581
CO-58	3242.84	810.78	77.	-16.	-0.009	83.52	1.589s
La-140	3262.82	815.77	50.	11.	0.006	95.64	1.593s
Cs-136	3273.74	818.50	83.	-13.	-0.007	102.13	1.596s
MN-54	3339.13	834.85	9.	20.	0.011	40.31	1.610s
Co-56	3386.82	846.77	28.	-1.	-0.001	724.42	1.620s
TL-208	3442.00	860.56	35.	15.	0.008	91.22	1.632
NB-94	3484.13	871.10	40.	-8.	-0.004	117.26	1.641s
EU-154	3492.66	873.23	47.	5.	0.003	199.00	1.643s
PA-234	3521.86	880.53	41.	5.	0.003	200.25	1.649
PA-234	3532.70	883.24	46.	0.	0.000	1000.00	1.652
AG-110M	3538.47	884.68	46.	0.	0.000	1000.00	1.653

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	3556.86	889.28	102.	-17.	-0.010	86.16	1.657s
y-88	3591.90	898.04	30.	-7.	-0.004	193.63	1.664s
AC-228	3645.74	911.50	7.	92.	0.051	12.08	1.071s
AG-110M	3749.71	937.49	30.	3.	0.001	470.72	1.697s
PA-234	3783.82	946.02	15.	7.	0.004	127.38	1.704s
EU-152	3856.18	964.11	88.	8.	0.005	160.51	1.719s
AC-228	3877.87	969.53	4.	70.	0.039	13.69	2.405s
EU-154	3985.06	996.33	112.	-20.	-0.011	77.56	1.746s
PA-234M	4003.73	1001.00	134.	-22.	-0.012	55.34	1.750s
EU-154	4018.84	1004.77	104.	15.	0.008	100.16	1.753s
Co-56	4151.10	1037.84	10.	3.	0.002	238.82	1.780s
Cs-136	4192.02	1048.07	46.	-16.	-0.009	63.03	1.788s
RH-106	4201.18	1050.36	58.	4.	0.002	271.91	1.790s
BI-207	4254.38	1063.66	22.	8.	0.004	134.99	1.801s
Ga-68	4309.34	1077.40	37.	-10.	-0.006	137.96	1.812s
EU-152	4448.04	1112.07	98.	3.	0.001	529.45	1.839s
ZN-65	4461.92	1115.55	101.	0.	0.000	1000.00	1.842s
BI-214	4481.28	1120.39	10.	54.	0.030	19.37	0.395s
Sc-46	4481.94	1120.55	101.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	195.	-22.	-0.012	91.32	1.846
CO-60	4692.68	1173.24	32.	-2.	-0.001	557.88	1.886s
Ta-182	4755.93	1189.05	27.	12.	0.007	99.34	1.899
Ta-182	4885.37	1221.41	32.	-6.	-0.003	218.16	1.923
Co-56	4952.84	1238.28	27.	39.	0.022	34.26	1.936s
NA-22	5097.84	1274.53	23.	9.	0.005	79.22	1.963s
EU-154	5097.89	1274.54	32.	0.	0.000	1000.00	1.963s
CO-60	5329.71	1332.50	12.	5.	0.003	150.67	2.005s
AG-110M	5536.89	1384.30	6.	3.	0.002	195.30	2.042s
EU-152	5631.70	1408.00	6.	7.	0.004	86.50	2.059s
K-40	5844.23	1461.14	3.	356.	0.198	5.35	2.124
La-140	6384.49	1596.21	24.	-9.	-0.005	210.26	2.185s
SB-124	6763.55	1690.98	0.	0.	0.000	1000.00	2.245s
BI-214	7057.56	1764.49	10.	29.	0.016	24.14	2.290s
y-88	7343.81	1836.06	0.	0.	0.000	1000.00	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.5864E+00				5.31E+01	
			477.60	-4.586E+00	&(	1.614E+01 1.05E+02 1.05E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NA-22	C	6.2658E-01					9.50E+02	
			1274.53	6.266E-01	?(	1.671E+00	7.92E+01	9.99E+01 G
K-40	N	2.5363E+02					4.66E+11	
			1460.83	2.536E+02	(P	7.657E+00	5.35E+00	1.07E+01 G
Sc-46	F	-8.3724E-01					8.38E+01	
			889.28	-8.372E-01	?(	2.414E+00	8.62E+01	1.00E+02 G
			1120.55	0.000E+00	+	2.957E+00	1.00E+03	1.00E+02 G
CR-51	F	4.0333E+00					2.77E+01	
			320.08	4.033E+00	?(P	2.359E+01	1.75E+02	9.94E+00 G
MN-54	C	8.9364E-01					3.12E+02	
			834.85	8.936E-01	?(P	7.813E-01	4.03E+01	1.00E+02 G
FE-59	F	1.1558E-01					4.45E+01	
			1099.25	1.156E-01	&(P	2.790E+00	1.06E+03	5.65E+01 G
			1291.60	-1.572E-01	&	4.698E+00	1.37E+03	4.32E+01 G
Co-56	C	1.4758E+00					7.73E+01	
			846.77	-5.052E-02	?(P	1.272E+00	7.24E+02	9.99E+01 G
			1238.28	3.847E+00	(P	2.668E+00	3.43E+01	6.61E+01 G
			1037.84	1.182E+00	?(	6.875E+00	2.39E+02	1.41E+01 G
			1771.35	-4.888E-01	%	1.884E+01	1.08E+03	1.55E+01 A
CO-57	C	2.9373E-01					2.72E+02	
			122.06	0.000E+00	*(	8.188E-01	1.00E+03	8.56E+01 G
			136.47	2.648E+00	*(	1.181E+01	1.34E+02	1.07E+01 G
CO-58	C	-7.0066E-01					7.09E+01	
			810.78	-7.007E-01	?(	1.959E+00	8.35E+01	9.95E+01 G
CO-60	F	3.8315E-01					1.93E+03	
			1332.50	3.831E-01	?(P	1.295E+00	1.51E+02	1.00E+02 G
			1173.24	-1.320E-01	- P	1.814E+00	5.58E+02	9.99E+01 G
NB-94	I	1.0079E+00					7.41E+06	
			702.63	1.008E+00	?(P	6.958E-01	3.29E+01	9.79E+01 G
			871.10	-3.809E-01	-	1.532E+00	1.17E+02	9.99E+01 G
ZR-95	I	4.2247E-01					6.40E+01	
			756.73	4.225E-01	?(P	2.125E+00	2.10E+02	5.45E+01 G
			724.20	-2.255E+00	+ P	5.668E+00	3.35E+01	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-95	I	-2.6901E-01					6.40E+01	
			765.79	-2.690E-01	&(	2.169E+00	2.35E+02	9.98E+01 G
RU-103	I	3.2849E-01					3.93E+01	
			497.05	3.285E-01	?(P	9.084E-01	1.14E+02	9.09E+01 G
			610.30	-1.104E+01	+	5.786E+01	1.56E+02	5.75E+00 GA
RH-106	I	2.2266E-02					3.74E+02	
			621.92	-2.256E+00	?(P	1.293E+01	2.10E+02	9.93E+00 G
			1050.36	1.452E+01	?(P	1.377E+02	2.72E+02	1.56E+00 G
			511.86	9.059E+00	&	6.592E+00	3.95E+01	2.00E+01 GA
AG-108M	C	3.3179E-01					1.53E+05	
			433.94	1.421E-01	&(	9.558E-01	2.64E+02	9.05E+01 G
			722.94	5.207E-01	&(	1.602E+00	9.11E+01	9.08E+01 G
			614.28	-6.928E-01	+ P	3.643E+00	7.44E+01	8.98E+01 G
AG-110M	F	2.6668E-01					2.50E+02	
			884.68	0.000E+00	?(	2.277E+00	1.00E+03	7.27E+01 G
			657.76	-4.565E-02	%	2.121E+00	1.34E+03	9.46E+01 G
			937.49	3.827E-01	&(P	4.200E+00	4.71E+02	3.44E+01 G
			1384.30	9.005E-01	?(P	4.201E+00	1.95E+02	2.43E+01 G
			763.94	-3.354E+00	+	8.107E+00	7.27E+01	2.23E+01 G
SN-113	F	4.3298E-01					1.15E+02	
			391.69	4.330E-01	&(	1.886E+00	1.29E+02	6.40E+01 G
SB-124	F	-5.8272E-02					6.02E+01	
			602.73	-6.358E-01	?(	3.494E+00	1.64E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.341E+00	1.00E+03	4.78E+01 G
			722.79	5.192E+00	&(	1.164E+01	6.77E+01	1.08E+01 G
SB-125	I	4.6715E+00					1.01E+03	
			427.88	8.584E-02	&(	3.433E+00	1.57E+03	2.96E+01 G
			600.50	-3.482E+00	&	1.954E+01	1.67E+02	1.79E+01 G
			635.89	-3.284E+00	+	1.198E+01	1.07E+02	1.13E+01 G
			463.37	1.764E+01	?(P	1.026E+01	2.05E+01	1.05E+01 G
I-131	I	1.2535E+00					8.02E+00	
			364.48	4.122E-01	?(	1.018E+00	9.96E+01	8.17E+01 G
			284.30	1.020E+01	&(	1.182E+01	4.66E+01	6.14E+00 G
			636.97	3.180E+00	?(P	2.056E+01	1.88E+02	7.17E+00 G
Gd-153	F	-8.8390E-01					2.42E+02	
			97.50	-8.839E-01	(	4.348E+00	1.47E+02	3.00E+01 G
			103.20	-1.209E+00	+	5.865E+00	1.45E+02	2.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	-2.1275E+01					4.71E-02	
			1077.40	-2.127E+01	?(	6.420E+01	1.38E+02	3.30E+00 G
Tc-99m	I	2.7190E-01					2.51E-01	
			140.51	2.719E-01	&(	1.097E+00	1.21E+02	8.93E+01 G
BA-133	F	-5.8177E-01					3.85E+03	
			356.00	-5.818E-01	&(	3.389E+00	1.74E+02	6.20E+01 G
			302.85	-2.243E+00	+	1.214E+01	1.62E+02	1.83E+01 G
			383.84	5.897E+00	?	1.195E+01	6.16E+01	8.94E+00 GA
			80.99	-1.053E+00	+	5.983E+00	1.71E+02	3.41E+01 GA
CS-134	I	9.2520E-01					7.54E+02	
			604.71	-6.427E-01	?(	3.455E+00	1.60E+02	9.76E+01 G
			795.87	1.204E+00	?(	1.310E+00	3.60E+01	8.55E+01 G
			569.32	-2.791E+00	&	8.173E+00	8.71E+01	1.54E+01 G
			801.95	5.588E+00	(	1.954E+01	1.03E+02	8.69E+00 G
			563.24	1.154E+01	&(P	1.174E+01	4.44E+01	8.35E+00 G
CS-137	I	3.3494E+00					1.10E+04	
			661.66	3.349E+00	@(	8.618E-01	1.51E+01	8.52E+01 G
CE-139	F	2.9458E-01					1.38E+02	
			165.85	2.946E-01	?(	1.005E+00	1.02E+02	7.99E+01 G
Ba-140	I	-3.5623E-01					1.28E+01	
			537.26	-3.562E-01	?(P	4.647E+00	4.21E+02	2.44E+01 G
			162.66	-4.613E+00	&	1.668E+01	1.08E+02	6.22E+00 G
			304.85	-9.657E+00	+	5.307E+01	1.64E+02	4.29E+00 G
La-140	I	1.6957E-01					1.28E+01	
			1596.21	-7.830E-01	?(P	2.210E+00	2.10E+02	9.54E+01 G
			487.02	4.584E-01	?(	4.030E+00	2.58E+02	4.55E+01 G
			328.76	1.752E+00	&(P	5.901E+00	1.00E+02	2.03E+01 G
			815.77	2.129E+00	?(P	6.890E+00	9.56E+01	2.33E+01 G
CE-141	I	5.4954E-01					3.25E+01	
			145.44	5.495E-01	?(	3.113E+00	1.70E+02	4.82E+01 G
CE-144	I	-2.5407E+00					2.85E+02	
			133.54	-2.541E+00	&(	1.143E+01	1.35E+02	1.11E+01 G
PM-144	C	-2.2300E-01					3.63E+02	
			696.54	-2.230E-01	?(	1.359E+00	2.59E+02	9.90E+01 G
			618.06	-2.587E-03	& P	3.245E+00	1.82E+04	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	1.4538E+00					4.94E+03	
			344.29	-2.486E-02	%(P	5.934E+00	5.65E+03	2.65E+01 G
			1112.07	1.158E+00	?(	2.125E+01	5.29E+02	1.36E+01 G
			121.78	3.928E-01	(	2.388E+00	1.80E+02	2.86E+01 G
			778.92	3.769E+00	&(P	8.514E+00	9.58E+01	1.29E+01 G
			964.11	3.016E+00	?(	1.655E+01	1.61E+02	1.46E+01 G
			244.69	4.193E+00	?(P	3.016E+01	2.15E+02	7.58E+00 G
			1408.00	2.504E+00	?	4.829E+00	8.65E+01	2.10E+01 GA
EU-154	I	1.8849E+00					3.14E+03	
			873.23	1.942E+00	?(	1.346E+01	1.99E+02	1.23E+01 G
			123.10	4.949E-01	&(	1.747E+00	1.05E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.543E+00	1.00E+03	3.52E+01 G
			723.36	2.341E+00	?(	7.921E+00	1.00E+02	2.02E+01 G
			1004.77	4.482E+00	?(	1.510E+01	1.00E+02	1.80E+01 G
			996.33	-1.019E+01	&	2.632E+01	7.76E+01	1.06E+01 G
EU-155	I	1.4382E+00					1.81E+03	
			105.31	1.438E+00	(P	2.076E+00	5.08E+01	2.12E+01 G
			86.54	1.438E+00	}	5.306E+00	5.98E+01	3.07E+01 G
HF-181	F	-2.2823E-01					4.24E+01	
			482.00	-4.811E-01	?(	2.236E+00	1.38E+02	8.05E+01 G
			133.02	-6.615E-01	&	2.930E+00	1.33E+02	4.33E+01 G
			345.83	1.123E+00	?(	5.446E+00	1.93E+02	1.51E+01 G
			136.30	-6.693E-07	%	2.229E+01	9.89E+08	5.85E+00 G
Ta-182	F	-1.0781E+00					1.14E+02	
			1121.30	-3.804E+00	(	1.160E+01	9.13E+01	3.49E+01 G
			1221.41	-1.434E+00	+	6.949E+00	2.18E+02	2.70E+01 G
			1189.05	4.795E+00	(	1.041E+01	9.93E+01	1.62E+01 G
Hg-203	F	-4.4607E-01					4.66E+01	
			279.20	-4.461E-01	?(	1.625E+00	1.09E+02	8.15E+01 G
TL-208	N	7.2103E+00					6.98E+02	
			583.02	7.210E+00	(	7.428E-01	8.52E+00	8.45E+01 G
			277.28	2.401E+01	+	9.476E+00	1.97E+01	6.31E+00 G
			860.56	5.638E+00	& P	1.149E+01	9.12E+01	1.24E+01 G
pm-146	C	3.7061E-01					2.02E+03	
			747.16	5.285E-01	?(	3.579E+00	2.84E+02	3.40E+01 G
			735.72	-9.916E-01	+ P	5.677E+00	2.21E+02	2.25E+01 G
			453.88	2.880E-01	*(	1.494E+00	2.05E+02	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	-3.6596E-01					1.07E+02	
			898.04	-3.660E-01	?(P	1.473E+00	1.94E+02	9.37E+01 G
			1836.06	0.000E+00	+	6.973E-01	1.00E+03	9.92E+01 G
Cd-113m		-5.9621E+03					5.33E+03	
			263.70	-5.962E+03	&(	1.832E+04	9.20E+01	6.00E-03 K
Cd-109	F	8.0857E+00					4.53E+02	
								Derived Ave Activity
			88.04	8.086E+00	}(	4.123E+01	1.53E+02	3.79E+00 G
Cf-251	T	-9.8742E-01					3.28E+05	
			176.60	-9.874E-01	?(	4.816E+00	1.90E+02	1.70E+01 G
			227.00	3.052E+00	?	1.267E+01	1.61E+02	6.30E+00 GA
Cf-249	T	7.5465E-01					1.28E+05	
			387.95	4.403E-01	&(	1.823E+00	1.22E+02	6.60E+01 G
			333.44	2.092E+00	?(	7.297E+00	1.04E+02	1.55E+01 G
Sn-126		-4.2377E+00					3.65E+07	
			87.57	8.189E-01	}	4.117E+00	8.58E+01	3.75E+01 GA
			64.28	-4.238E+00	?(	1.421E+01	1.01E+02	9.70E+00 G
			86.94	3.407E+00	}	1.791E+01	8.49E+01	9.04E+00 GA
PB-210	N	3.3384E+00					8.14E+03	
			46.54	3.338E+00	(P	4.323E+01	3.83E+02	4.25E+00 G
PB-212	N	1.9485E+01					6.98E+02	
			238.63	1.948E+01	(P	1.732E+00	4.98E+00	4.33E+01 G
			300.03	1.200E+01	} P	6.534E+01	5.28E+01	3.28E+00 GA
PB-214	N	1.6772E+01					5.84E+05	
			351.93	1.667E+01	(P	1.662E+00	7.08E+00	3.76E+01 G
			295.09	1.698E+01	(P	4.431E+00	1.40E+01	1.93E+01 G
			242.00	1.820E+01		1.013E+01	1.92E+01	7.43E+00 GA
BI-207	C	4.4763E-01					1.18E+04	
			569.70	3.171E-01	&(	1.051E+00	9.75E+01	9.77E+01 G
			1063.66	6.189E-01	?(P	1.874E+00	1.35E+02	7.45E+01 G
BI-212	N	7.3592E+00					6.98E+02	
			727.17	7.359E+00	(P	2.167E+01	8.77E+01	7.55E+00 G
			785.42	6.774E+00		1.115E+02	6.91E+02	1.28E+00 GA
BI-214	N	1.5055E+01					5.84E+05	
			609.31	1.439E+01	(	1.151E+00	7.84E+00	4.61E+01 G
			1120.29	2.147E+01	+	6.796E+00	1.94E+01	1.51E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1764.49	1.704E+01	?(	1.025E+01	2.41E+01	1.54E+01 G
BI-210M	T	6.4787E-01						1.10E+09
			265.83	6.479E-01	?(P	2.124E+00	9.79E+01	5.00E+01 G
			304.90	-1.480E+00	+	8.267E+00	1.67E+02	2.80E+01 G
AC-228	N	1.5707E+01						2.10E+03
			911.07	1.571E+01	(	2.568E+00	1.21E+01	2.90E+01 G
			968.97	2.093E+01	+	3.663E+00	1.37E+01	1.75E+01 G
			338.32	2.108E+01	+	4.158E+00	1.14E+01	1.20E+01 G
			93.35	5.132E+00	-	2.546E+01	1.49E+02	5.56E+00 XA
TH-227	N	5.5302E+00						7.95E+03
			50.14	5.530E+00	?(	2.234E+01	1.21E+02	8.00E+00 G
			256.24	1.593E+00	- P	1.229E+01	2.96E+02	7.00E+00 G
TH-229	N	5.6496E+00						2.68E+06
			193.51	2.910E+00	*(P	1.742E+01	2.31E+02	4.40E+00 G
			210.85	9.680E+00	?(	4.016E+01	1.24E+02	2.99E+00 G
TH-234	N	1.4785E+01						1.63E+12
			63.29	1.851E+01	(P	2.180E+01	3.70E+01	3.81E+00 G
			92.59	1.224E+01	(P	1.280E+01	3.29E+01	5.58E+00 G
PA-231	N	9.3956E+00						1.20E+07
			302.65	9.396E+00	(	1.693E+01	5.56E+01	2.88E+00 G
			300.07	-1.654E+01	-	8.658E+01	1.57E+02	2.46E+00 G
PA-233	C	-1.1873E+00						7.82E+08
			312.01	-1.187E+00	?(P	6.770E+00	5.00E+01	3.60E+01 G
			300.18	-6.566E+00	+	3.500E+01	1.59E+02	6.20E+00 G
PA-234	N	1.2027E+00						1.63E+12
			131.29	-1.580E+00	(	7.153E+00	1.36E+02	1.80E+01 G
			946.02	2.675E+00	?(	7.934E+00	1.27E+02	1.34E+01 G
			569.47	4.905E+00	&(	1.299E+01	7.90E+01	8.20E+00 G
			883.24	0.000E+00	&	1.721E+01	1.00E+03	9.60E+00 G
			880.53	3.735E+00	?	2.615E+01	2.00E+02	6.00E+00 GA
PA-234M	N	-1.4407E+02						1.63E+12
			1001.00	-1.441E+02	?(P	3.650E+02	5.53E+01	8.37E-01 G
			766.41	2.585E+02	+ P	7.072E+02	8.19E+01	2.94E-01 G
U-235	N	3.2086E+00						2.57E+11
			143.79	2.498E+00	*(	1.411E+01	1.69E+02	1.10E+01 G
			205.33	-2.318E+00	& P	2.431E+01	2.68E+02	5.01E+00 G
			163.38	4.741E+00	?(P	1.643E+01	1.04E+02	5.08E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -1.2543E-01                                      1.58E+05
                           59.54-1.254E-01 &(  3.599E+00 1.06E+03 3.59E+01 G

Ir-192   F   4.3020E-01                                      7.40E+01
                          316.49 4.302E-01 ?(  2.509E+00 1.74E+02 8.70E+01 G
                          468.06-5.308E-02 &   2.921E+00 1.59E+03 5.18E+01 G
                          308.44-1.322E+00 +   7.482E+00 1.69E+02 3.18E+01 G

Cs-136   F  -5.9018E-01                                      1.30E+01
                          818.50-5.902E-01 ?(  2.034E+00 1.02E+02 1.00E+02 G
                         1048.07-1.155E+00 &   2.398E+00 6.30E+01 8.00E+01 G
                          340.57 3.412E-01 &   3.268E+00 2.82E+02 4.69E+01 G

Np-239   T   1.0700E+00                                      2.36E+00
                          103.70-5.813E-01 +   5.418E+00 2.78E+02 2.40E+01 X
                          106.13 1.070E+00 &(  5.151E+00 1.44E+02 2.27E+01 G
                           99.50-1.763E+00 +   8.501E+00 1.45E+02 1.50E+01 X

Nd-147      -4.5090E+00                                      1.11E+01
                          531.00-4.509E+00 ?(  1.008E+01 9.45E+01 1.30E+01 G
                           91.10 1.028E+00 +   5.235E+00 1.53E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      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
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M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	290.	6.	0.004	382.81	3.338E+00	P
BA-133	80.99	1546.	-33.	-0.018	170.82	-1.053E+00	
Nd-147	91.10	925.	28.	0.016	152.80	1.028E+00	
Gd-153	97.50	750.	-26.	-0.015	147.48	-8.839E-01	
Np-239	99.50	723.	-27.	-0.015	144.55	-1.763E+00	
Gd-153	103.20	739.	-27.	-0.015	145.46	-1.209E+00	
Np-239	103.70	766.	-14.	-0.008	278.28	-5.813E-01	
Np-239	106.13	620.	25.	0.014	144.17	1.070E+00	
EU-152	121.78	202.	11.	0.006	179.68	3.928E-01	
EU-154	123.10	220.	20.	0.011	105.44	4.949E-01	
PA-234	131.29	715.	-28.	-0.016	135.75	-1.580E+00	
HF-181	133.02	687.	-28.	-0.016	132.84	-6.615E-01	
CE-144	133.54	684.	-28.	-0.015	134.94	-2.541E+00	
CO-57	136.47	664.	28.	0.015	133.74	2.648E+00	
U-235	143.79	955.	26.	0.014	169.35	2.498E+00	
CE-141	145.44	886.	25.	0.014	169.81	5.495E-01	
Ba-140	162.66	355.	-25.	-0.014	108.34	-4.613E+00	
U-235	163.38	224.	21.	0.012	103.59	4.741E+00	P
CE-139	165.85	212.	21.	0.011	101.93	2.946E-01	
Cf-251	176.60	198.	-14.	-0.008	189.92	-9.874E-01	
TH-229	193.51	147.	10.	0.005	231.33	2.910E+00	P
U-235	205.33	348.	-9.	-0.005	268.49	-2.318E+00	P
TH-229	210.85	322.	21.	0.012	123.89	9.680E+00	
Cf-251	227.00	121.	13.	0.007	160.71	3.052E+00	
EU-152	244.69	934.	20.	0.011	215.37	4.193E+00	P
Cd-113m	263.70	182.	-21.	-0.012	91.97	-5.962E+03	
BI-210M	265.83	166.	19.	0.011	97.91	6.479E-01	P
Hg-203	279.20	242.	-21.	-0.011	108.80	-4.461E-01	
PA-233	300.18	589.	-22.	-0.012	159.43	-6.566E+00	
BA-133	302.85	611.	-22.	-0.012	161.88	-2.243E+00	
Ba-140	304.85	633.	-22.	-0.012	164.39	-9.657E+00	
BI-210M	304.90	654.	-22.	-0.012	167.16	-1.480E+00	
Ir-192	308.44	676.	-22.	-0.012	169.34	-1.322E+00	
PA-233	312.01	698.	-22.	-0.012	49.96	-1.187E+00	P
Ir-192	316.49	544.	19.	0.011	174.18	4.302E-01	
CR-51	320.08	617.	20.	0.011	174.89	4.033E+00	P
La-140	328.76	147.	18.	0.010	100.46	1.752E+00	P
Cf-249	333.44	127.	16.	0.009	103.73	2.092E+00	
Cs-136	340.57	230.	8.	0.004	282.27	3.412E-01	
HF-181	345.83	60.	8.	0.004	192.84	1.123E+00	
BA-133	356.00	409.	-17.	-0.009	173.58	-5.818E-01	
BA-133	383.84	87.	23.	0.013	61.55	5.897E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	387.95	110.	12.	0.007	122.38	4.403E-01	
SN-113	391.69	109.	12.	0.007	128.53	4.330E-01	
AG-108M	433.94	44.	5.	0.003	263.57	1.421E-01	
pm-146	453.88	52.	7.	0.004	205.20	2.880E-01	
BE-7	477.60	155.	-17.	-0.010	104.82	-4.586E+00	
HF-181	482.00	172.	-14.	-0.008	137.73	-4.811E-01	
La-140	487.02	176.	7.	0.004	258.25	4.584E-01	
RU-103	497.05	31.	10.	0.006	113.71	3.285E-01	P
RH-106	511.86	80.	61.	0.034	39.51	9.059E+00	
Nd-147	531.00	74.	-19.	-0.011	94.49	-4.509E+00	
Ba-140	537.26	53.	-3.	-0.002	421.12	-3.562E-01	P
CS-134	563.24	35.	30.	0.017	44.38	1.154E+01	P
CS-134	569.32	59.	-13.	-0.007	87.09	-2.791E+00	
PA-234	569.47	41.	12.	0.007	79.03	4.905E+00	
SB-124	602.73	437.	-18.	-0.010	163.93	-6.358E-01	
CS-134	604.71	419.	-18.	-0.010	160.33	-6.427E-01	
RU-103	610.30	401.	-18.	-0.010	156.31	-1.104E+01	
AG-108M	614.28	383.	-18.	-0.010	74.44	-6.928E-01	P
RH-106	621.92	52.	-6.	-0.004	209.92	-2.256E+00	P
PM-144	696.54	47.	-6.	-0.003	259.16	-2.230E-01	
SB-124	722.79	38.	14.	0.008	67.65	5.192E+00	
AG-108M	722.94	51.	12.	0.007	91.15	5.207E-01	
EU-154	723.36	63.	12.	0.007	100.02	2.341E+00	
ZR-95	724.20	162.	-25.	-0.014	33.54	-2.255E+00	P
pm-146	735.72	37.	-5.	-0.003	220.89	-9.916E-01	P
pm-146	747.16	33.	4.	0.002	283.89	5.285E-01	
ZR-95	756.73	29.	5.	0.003	209.90	4.225E-01	P
AG-110M	763.94	74.	-18.	-0.010	72.71	-3.354E+00	
NB-95	765.79	108.	-6.	-0.004	235.08	-2.690E-01	
PA-234M	766.41	99.	18.	0.010	81.92	2.585E+02	P
EU-152	778.92	24.	11.	0.006	95.84	3.769E+00	P
CS-134	795.87	24.	23.	0.013	36.00	1.204E+00	
CS-134	801.95	59.	11.	0.006	103.15	5.588E+00	
CO-58	810.78	77.	-16.	-0.009	83.52	-7.007E-01	
La-140	815.77	50.	11.	0.006	95.64	2.129E+00	P
Cs-136	818.50	83.	-13.	-0.007	102.13	-5.902E-01	
EU-154	873.23	47.	5.	0.003	199.00	1.942E+00	
PA-234	880.53	41.	5.	0.003	200.25	3.735E+00	
Sc-46	889.28	102.	-17.	-0.010	86.16	-8.372E-01	
y-88	898.04	30.	-7.	-0.004	193.63	-3.660E-01	P
AG-110M	937.49	30.	3.	0.001	470.72	3.827E-01	P
PA-234	946.02	15.	7.	0.004	127.38	2.675E+00	
EU-152	964.11	88.	8.	0.005	160.51	3.016E+00	
EU-154	996.33	112.	-20.	-0.011	77.56	-1.019E+01	
PA-234M	1001.00	134.	-22.	-0.012	55.34	-1.441E+02	P
EU-154	1004.77	104.	15.	0.008	100.16	4.482E+00	
Cs-136	1048.07	46.	-16.	-0.009	63.03	-1.155E+00	
RH-106	1050.36	58.	4.	0.002	271.91	1.452E+01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ga-68	1077.40	37.	-10.	-0.006	137.96	-2.127E+01		
EU-152	1112.07	98.	3.	0.001	529.45	1.158E+00		
Ta-182	1121.30	195.	-22.	-0.012	91.32	-3.804E+00		
CO-60	1173.24	32.	-2.	-0.001	557.88	-1.320E-01		P
Ta-182	1189.05	27.	12.	0.007	99.34	4.795E+00		
Ta-182	1221.41	32.	-6.	-0.003	218.16	-1.434E+00		
NA-22	1274.53	23.	9.	0.005	79.22	6.266E-01		
CO-60	1332.50	12.	5.	0.003	150.67	3.831E-01		P
AG-110M	1384.30	6.	3.	0.002	195.30	9.005E-01		P
EU-152	1408.00	6.	7.	0.004	86.50	2.504E+00		
La-140	1596.21	24.	-9.	-0.005	210.26	-7.830E-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 *****

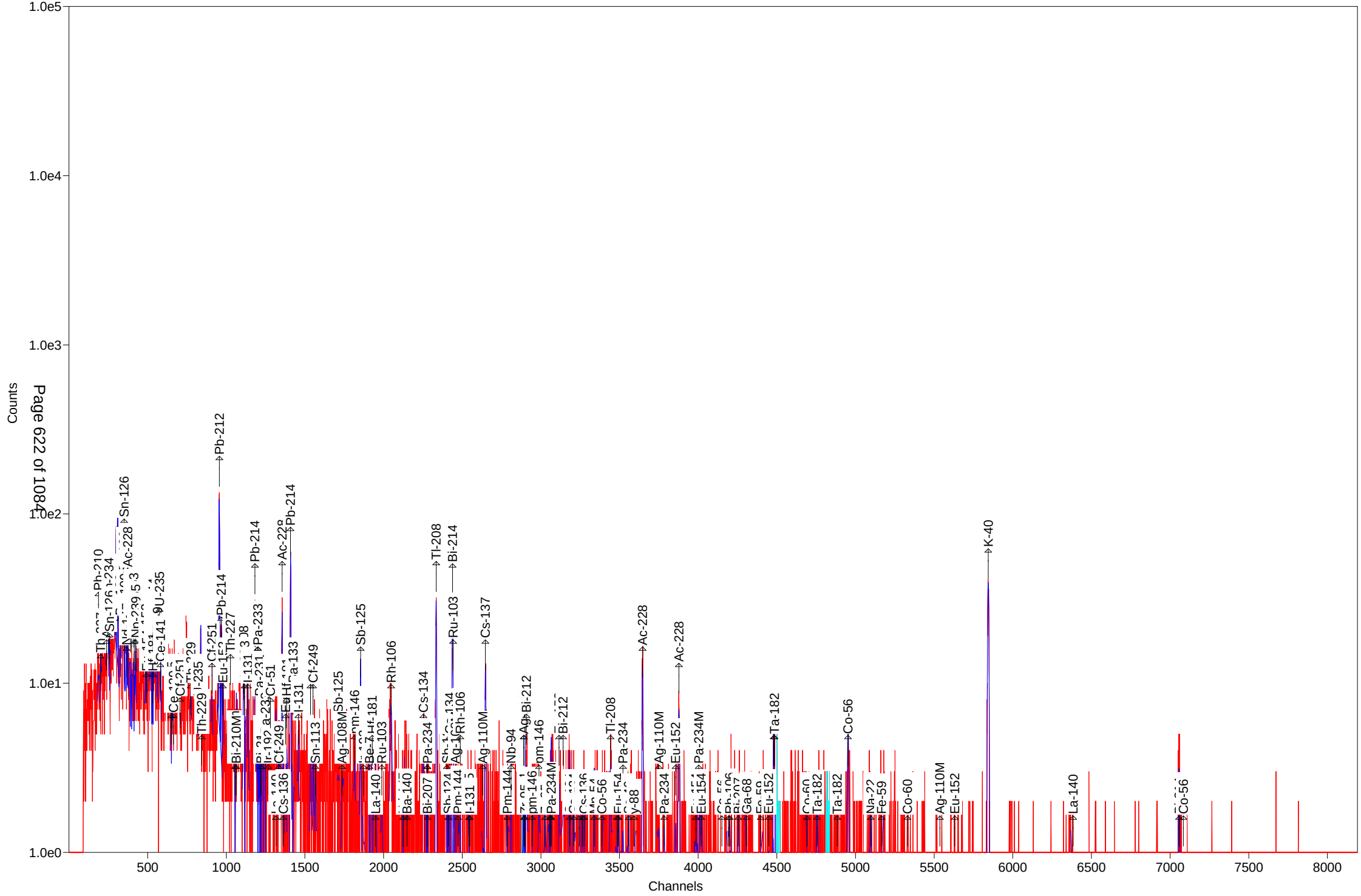
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-4.5864E+00	-4.5864E+00	1.048E+02%	1.61E+01
NA-22	#A	6.2658E-01	6.2658E-01	7.922E+01%	1.67E+00
K-40		2.5363E+02	2.5363E+02	5.348E+00%	7.66E+00
Sc-46	#A	-8.3723E-01	-8.3724E-01	8.616E+01%	2.41E+00
CR-51	#A	4.0332E+00	4.0333E+00	1.749E+02%	2.36E+01
MN-54	#	8.9364E-01	8.9364E-01	4.031E+01%	7.81E-01
FE-59	#A	1.1558E-01	1.1558E-01	1.060E+03%	2.79E+00
Co-56	#C	1.4758E+00	1.4758E+00	3.426E+01%	1.27E+00
CO-57	#A	2.9373E-01	2.9373E-01	1.337E+02%	8.19E-01
CO-58	#A	-7.0065E-01	-7.0066E-01	8.352E+01%	1.96E+00
CO-60	#A	3.8315E-01	3.8315E-01	1.507E+02%	1.29E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.82E+00
NB-94	#	1.0079E+00	1.0079E+00	3.289E+01%	6.96E-01
ZR-95	#A	4.2246E-01	4.2247E-01	2.099E+02%	2.12E+00
NB-95	#A	-2.6901E-01	-2.6901E-01	2.351E+02%	2.17E+00
RU-103	#A	3.2848E-01	3.2849E-01	1.137E+02%	9.08E-01
RH-106	#A	2.2266E-02	2.2266E-02	1.718E+02%	1.29E+01
AG-108M	#A	3.3179E-01	3.3179E-01	9.115E+01%	9.56E-01
AG-110M	#A	2.6668E-01	2.6668E-01	1.953E+02%	2.28E+00
SN-113	#A	4.3298E-01	4.3298E-01	1.285E+02%	1.89E+00
SB-124	#A	-5.8272E-02	-5.8272E-02	6.765E+01%	3.49E+00
SB-125	#C	4.6715E+00	4.6715E+00	2.045E+01%	3.43E+00
I-131	#C	1.2534E+00	1.2535E+00	4.660E+01%	1.02E+00
Gd-153	#A	-8.8389E-01	-8.8390E-01	1.475E+02%	4.35E+00
Ga-68	#A	-2.1026E+01	-2.1275E+01	1.380E+02%	6.42E+01
Tc-99m	#A	2.7130E-01	2.7190E-01	1.206E+02%	1.10E+00
BA-133	#A	-5.8177E-01	-5.8177E-01	1.736E+02%	3.39E+00
CS-134	#A	9.2520E-01	9.2520E-01	3.600E+01%	3.45E+00
CS-137	#	3.3494E+00	3.3494E+00	1.512E+01%	8.62E-01

CE-139 #A	2.9457E-01	2.9458E-01	1.019E+02%	1.00E+00
Ba-140 #A	-3.5622E-01	-3.5623E-01	4.211E+02%	4.65E+00
La-140 #A	1.6956E-01	1.6957E-01	9.019E+01%	2.21E+00
CE-141 #A	5.4953E-01	5.4954E-01	1.698E+02%	3.11E+00
CE-144 #A	-2.5407E+00	-2.5407E+00	1.349E+02%	1.14E+01
PM-144 #A	-2.2300E-01	-2.2300E-01	2.592E+02%	1.36E+00
EU-152 #A	1.4538E+00	1.4538E+00	9.584E+01%	5.93E+00
EU-154 #A	1.8849E+00	1.8849E+00	6.650E+01%	1.35E+01
EU-155 A	1.4382E+00	1.4382E+00	5.075E+01%	2.08E+00
HF-181 #A	-2.2823E-01	-2.2823E-01	1.185E+02%	2.24E+00
Ta-182 #A	-1.0781E+00	-1.0781E+00	6.747E+01%	1.16E+01
Hg-203 #A	-4.4607E-01	-4.4607E-01	1.088E+02%	1.62E+00
TL-208	7.2103E+00	7.2103E+00	8.518E+00%	7.43E-01
pm-146 #A	3.7061E-01	3.7061E-01	1.751E+02%	3.58E+00
y-88 #A	-3.6596E-01	-3.6596E-01	1.936E+02%	1.47E+00
Cd-113m#A	-5.9621E+03	-5.9621E+03	9.197E+01%	1.83E+04
Cd-109 #A	8.0857E+00	8.0857E+00	1.530E+02%	4.12E+01
Cf-251 #A	-9.8742E-01	-9.8742E-01	1.899E+02%	4.82E+00
Cf-249 #A	7.5465E-01	7.5465E-01	8.021E+01%	1.82E+00
Sn-126 #A	-4.2377E+00	-4.2377E+00	1.007E+02%	1.42E+01
PB-210 #A	3.3384E+00	3.3384E+00	3.828E+02%	4.32E+01
PB-212	1.9485E+01	1.9485E+01	4.980E+00%	1.73E+00
PB-214	1.6772E+01	1.6772E+01	7.081E+00%	1.66E+00
BI-207 #A	4.4763E-01	4.4763E-01	8.327E+01%	1.05E+00
BI-212 A	7.3592E+00	7.3592E+00	8.766E+01%	2.17E+01
BI-214	1.5055E+01	1.5055E+01	7.842E+00%	1.15E+00
BI-210M#A	6.4787E-01	6.4787E-01	9.791E+01%	2.12E+00
AC-228	1.5707E+01	1.5707E+01	1.208E+01%	2.57E+00
TH-227 A	5.5302E+00	5.5302E+00	1.208E+02%	2.23E+01
TH-229 #A	5.6496E+00	5.6496E+00	1.239E+02%	1.74E+01
TH-234 A	1.4785E+01	1.4785E+01	2.476E+01%	2.18E+01
PA-231 A	9.3956E+00	9.3956E+00	5.563E+01%	1.69E+01
PA-233 #A	-1.1873E+00	-1.1873E+00	4.996E+01%	6.77E+00
PA-234 #A	1.2027E+00	1.2027E+00	6.741E+01%	7.15E+00
PA-234M#A	-1.4407E+02	-1.4407E+02	5.534E+01%	3.65E+02
U-235 #A	3.2086E+00	3.2086E+00	9.926E+01%	1.41E+01
AM-241 #A	-1.2543E-01	-1.2543E-01	1.063E+03%	3.60E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.29E+01
Ir-192 #A	4.3020E-01	4.3020E-01	1.742E+02%	2.51E+00
Cs-136 #A	-5.9016E-01	-5.9018E-01	1.021E+02%	2.03E+00
Np-239 #A	1.0697E+00	1.0700E+00	1.442E+02%	5.15E+00
Nd-147 #A	-4.5088E+00	-4.5090E+00	9.449E+01%	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  2000.1 keV)     3.568E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.1 keV) 3.5682959E+02  Bq/Sample
```

265170_Gamma_160-18567-A-10-B. 7_Gamma_20162202.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161728

Sample Description: 265170_Gamma_160-18567-A-11-B
Detector: Detector # 5
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-11-B

Decay to Time: 9/7/2016 17:52 Live Time: 1800 sec
Acquisition Time: 9/7/2016 17:53:16 Real Time: 1807 sec
Analysis Time: 9/7/2016 18:23 Dead Time: 0.38 %
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_2016-09-05_1554.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	4.076E+00	97.7	3.982E+00	3.988E+00	1.351E+01
NA-22	8.723E-01	61.3	5.346E-01	5.364E-01	1.741E+00
K-40	3.108E+02	5.8	1.801E+01	2.403E+01	1.148E+01
Sc-46	-9.473E-01	97.5	9.238E-01	9.250E-01	3.115E+00
CR-51	-5.302E+00	103.7	5.497E+00	5.504E+00	1.845E+01
MN-54	7.280E-01	67.8	4.938E-01	4.953E-01	1.153E+00
FE-59	6.066E-01	218.7	1.326E+00	1.327E+00	3.148E+00
Co-56	-3.106E-01	175.2	5.443E-01	5.445E-01	1.743E+00
CO-57	7.153E-02	505.4	3.615E-01	3.615E-01	1.234E+00
CO-58	-8.461E-01	89.5	7.569E-01	7.582E-01	2.549E+00
CO-60	1.818E-01	96.1	1.747E-01	1.749E-01	2.181E+00
ZN-65	6.540E-07	291911199.2	1.909E+00	1.909E+00	6.756E+00
NB-94	7.103E-01	92.9	6.600E-01	6.610E-01	1.595E+00
ZR-95	9.968E-01	103.8	1.034E+00	1.036E+00	2.543E+00
NB-95	-1.057E-01	681.5	7.201E-01	7.201E-01	2.529E+00
RU-103	-3.022E-01	159.0	4.804E-01	4.806E-01	1.492E+00
RH-106	-3.384E-01	87.8	2.971E-01	2.976E-01	4.081E+01
AG-108M	0.000E+00	1.#INF	2.041E-01	2.041E-01	1.463E+00
AG-110M	0.000E+00	1.#INF	9.824E-02	9.824E-02	2.936E+00
SN-113	-1.021E+00	50.6	5.166E-01	5.193E-01	3.969E+00
SB-124	1.080E+00	30.1	3.247E-01	3.295E-01	4.459E+00
SB-125	-5.677E-01	44.1	2.502E-01	2.519E-01	4.434E+00
I-131	5.537E-01	104.7	5.797E-01	5.804E-01	1.032E+00
Gd-153	3.106E-01	326.6	1.014E+00	1.015E+00	3.457E+00
Ga-68	2.404E+01	93.8	2.255E+01	2.259E+01	5.242E+01
Tc-99m	3.259E-01	132.5	4.318E-01	4.322E-01	1.450E+00
BA-133	5.401E-01	211.5	1.142E+00	1.143E+00	3.867E+00
CS-134	1.260E+00	28.5	3.596E-01	3.655E-01	4.403E+00
CS-137	1.590E+00	30.2	4.810E-01	4.880E-01	1.136E+00
CE-139	-2.441E-01	179.8	4.388E-01	4.395E-01	1.486E+00
Ba-140	1.076E+00	191.3	2.058E+00	2.059E+00	5.314E+00
La-140	1.531E-01	100.2	1.535E-01	1.537E-01	2.282E+00
CE-141	5.801E-01	131.5	7.626E-01	7.632E-01	2.563E+00

CE-144	-3.235E+00	130.7	4.229E+00	4.232E+00	1.414E+01
PM-144	4.815E+00	10.7	5.149E-01	5.725E-01	1.693E+00
EU-152	9.971E-01	106.4	1.061E+00	1.062E+00	8.467E+00
EU-154	4.470E+00	86.8	3.878E+00	3.885E+00	1.351E+01
EU-155	-1.623E+00	92.0	1.493E+00	1.495E+00	8.104E+00
HF-181	-7.633E-01	69.0	5.269E-01	5.284E-01	2.473E+00
Ta-182	1.396E+00	163.4	2.282E+00	2.283E+00	8.317E+00
Hg-203	-5.301E-01	101.1	5.361E-01	5.369E-01	1.802E+00
TL-208	6.540E+00	14.1	9.225E-01	9.829E-01	1.557E+00
pm-146	8.903E-01	77.2	6.874E-01	6.889E-01	3.570E+00
y-88	-1.029E-01	773.4	7.957E-01	7.957E-01	1.946E+00
Cd-113m	3.704E+03	136.8	5.068E+03	5.073E+03	1.734E+04
Cd-109	2.779E+00	568.3	1.579E+01	1.580E+01	5.307E+01
Cf-251	1.575E+00	130.9	2.061E+00	2.066E+00	5.585E+00
Cf-249	-5.079E-01	119.6	6.075E-01	6.081E-01	3.614E+00
Sn-126	4.414E+00	104.5	4.611E+00	4.617E+00	1.543E+01
PB-210	5.589E+01	23.1	1.289E+01	1.330E+01	3.159E+01
PB-212	2.183E+01	5.6	1.231E+00	1.874E+00	1.971E+00
PB-214	1.532E+01	9.3	1.419E+00	1.627E+00	2.702E+00
BI-207	1.936E-01	218.7	4.232E-01	4.234E-01	1.448E+00
BI-212	-9.121E+00	96.7	8.818E+00	8.830E+00	3.442E+01
BI-214	1.780E+01	8.9	1.583E+00	1.833E+00	1.958E+00
BI-210M	-1.003E+00	97.2	9.748E-01	9.766E-01	3.264E+00
AC-228	2.446E+01	8.2	2.015E+00	2.370E+00	1.860E+00
TH-227	-6.214E+00	112.4	6.981E+00	6.990E+00	1.983E+01
TH-229	7.294E+00	101.2	7.385E+00	7.408E+00	2.292E+01
TH-234	6.485E+00	71.1	4.610E+00	4.623E+00	3.883E+01
PA-231	5.708E+00	190.9	1.090E+01	1.090E+01	7.065E+01
PA-233	-1.486E+00	136.5	2.027E+00	2.029E+00	6.805E+00
PA-234	1.592E+00	78.4	1.249E+00	1.252E+00	8.691E+00
PA-234M	-1.447E+02	62.3	9.013E+01	9.043E+01	4.356E+02
U-235	2.841E+00	59.1	1.678E+00	1.685E+00	4.867E+00
AM-241	5.887E-01	234.9	1.383E+00	1.383E+00	3.967E+00
Np-237	-3.109E+00	168.4	5.234E+00	5.237E+00	1.746E+01
Ir-192	-6.887E-03	73.3	5.046E-03	5.062E-03	1.847E+00
Cs-136	6.690E-02	1276.7	8.541E-01	8.541E-01	2.987E+00
Np-239	1.391E+00	156.3	2.175E+00	2.176E+00	7.278E+00
Nd-147	2.150E+00	151.5	3.258E+00	3.260E+00	8.438E+00
Total	4.246E+03				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-11-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161728.An1

Acquisition information
Start time: 9/7/2016 5:53:16 PM
Live time: 1800
Real time: 1807
Dead time: 0.38 %
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	9/7/2016 5:52:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-09-05_1554.PBC 9/5/2016 3:54:52 PM
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
46.85	91.	18.76	0.60	1.808E-02	46.54	4.250	5.589E+01	PB210
59.54	10.	234.86	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.57	7.	334.06	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.28	21.	104.46	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.79	170.	12.65	0.81	3.151E-02				
77.11	288.	7.89	0.81	3.219E-02				
87.10	102.	16.83	0.83	3.446E-02	86.49	13.100	1.258E+01	Np237
					86.54	30.700	5.367E+00	EU155
					86.94	9.040	1.819E+01	Sn126
					87.57	37.500	4.371E+00	Sn126
88.04	7.	568.27	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
89.84	83.	18.62	0.83	3.490E-02				
92.59	29.	71.09	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.35	23.	155.87	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
97.50	6.	326.60	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
106.13	21.	156.33	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
121.78	18.	106.42	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.301E-01	CO57
122.06	4.	505.36	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	7.153E-02	CO57
140.51	17.	132.52	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
143.99	18.	59.09	0.63	3.371E-02	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	17.	131.46	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
162.91	10.	196.06	0.90	3.102E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
176.60	14.	130.92	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
186.00	62.	32.45	1.07	2.850E-02				
193.51	9.	211.47	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
205.33	5.	340.59	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	17.	101.25	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	9.	201.25	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.75	370.	6.61	0.91	2.318E-02	238.63	43.300	2.045E+01	PB212
242.13	70.	19.58	0.98	2.293E-02	242.00	7.430	2.284E+01	PB214
256.24	11.	140.95	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
263.70	9.	136.81	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
277.52	24.	58.10	1.60	2.048E-02	277.28	6.310	PBC<MDA	TL208
284.30	12.	104.69	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.28	111.	15.16	0.64	1.944E-02	295.09	19.300	1.640E+01	PB214
299.54	14.	139.28	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
300.07	11.	190.89	1.04	1.918E-02	300.07	2.460	PBC<MDA	PA231
					300.18	6.200	4.917E+00	PA233
328.76	14.	100.24	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
333.44	6.	213.84	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.40	93.	17.47	0.97	1.736E-02	338.32	12.010	2.488E+01	AC228
351.97	168.	10.66	0.99	1.680E-02	351.93	37.600	1.476E+01	PB214
356.00	10.	211.46	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
364.48	4.	212.64	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
453.88	11.	104.40	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.37	12.	99.48	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	105.56	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
477.60	10.	97.70	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
487.02	5.	211.97	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
511.86	61.	27.16	2.48	1.230E-02	511.86	20.000	1.386E+01	RH106
531.00	6.	151.54	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
537.26	6.	191.32	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
563.24	18.	54.05	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.47	8.	112.87	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.717E+00	PA234
					569.70	97.740	3.959E-01	BI207
583.45	110.	14.10	1.53	1.103E-02	583.02	84.500	6.540E+00	TL208
609.63	158.	8.60	1.16	1.063E-02	609.31	46.090	1.749E+01	BI214
					610.30	5.750	1.435E+02	RU103
618.06	167.	10.69	1.33	1.051E-02	618.06	99.100	8.911E+00	PM144
636.07	1.	841.43	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
661.54	24.	30.24	2.15	9.924E-03	661.66	85.210	1.590E+00	CS137
696.54	12.	97.80	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
702.63	12.	92.92	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	31.	30.05	1.42	9.217E-03	722.79	10.810	1.747E+01	SB124
					722.94	90.840	2.079E+00	AG108M
					723.36	20.220	9.347E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
747.16	7.	113.76	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
756.73	9.	103.77	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
766.41	12.	80.70	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.664E+02	PA234M
778.92	5.	224.40	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	30.	28.54	1.48	8.503E-03	795.87	85.530	2.266E+00	CS134
801.95	6.	150.07	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
834.85	11.	67.83	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
860.73	23.	25.17	0.65	7.963E-03	860.56	12.420	1.292E+01	TL208
873.23	5.	138.02	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
880.53	8.	92.13	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
883.24	6.	137.43	1.55	7.791E-03	883.24	9.600	PBC<MDA	PA234
911.49	89.	10.61	1.48	7.591E-03	911.07	29.000	2.245E+01	AC228
946.02	5.	224.40	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
969.17	63.	12.60	1.43	7.209E-03	968.97	17.460	2.781E+01	AC228
1004.77	13.	105.18	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1050.36	10.	104.16	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	4.	218.66	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	93.82	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	4.	218.66	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	3.	410.06	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1120.21	12.	74.86	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	3.	338.77	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.455E-01	Sc46
					1121.30	34.900	7.037E-01	Ta182
1121.22	6.	163.43	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.466E+00	Ta182
1173.24	8.	96.09	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1220.68	4.	317.17	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	9.	61.29	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.477E+00	EU154
1274.54	1.	472.30	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.723E-01	EU154
1408.00	1.	563.47	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.28	305.	5.80	1.91	5.103E-03	1460.83	10.670	3.108E+02	K40
1764.98	23.	21.43	2.11	4.351E-03	1764.49	15.400	1.874E+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	
298.81	74.80	147.	170.	5.402E+03	12.65	0.813	-	D
308.07	77.12	113.	288.	8.934E+03	7.89	0.815	-	D
348.10	87.11	123.	93.	2.703E+03	19.75	0.825	-	sD
359.05	89.85	95.	80.	2.294E+03	20.52	0.828	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
743.98	186.00	92.	62.	2.159E+03	32.45	1.065	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.95	46.85	76.	76.	0.042	23.05	0.599s
TH-227	200.11	50.14	138.	-18.	-0.010	112.35	0.787s
AM-241	237.72	59.54	178.	10.	0.005	234.86	0.797s
TH-234	252.74	63.29	223.	7.	0.004	334.06	0.801
Sn-126	256.71	64.28	236.	21.	0.012	104.46	0.802
BA-133	323.61	80.99	241.	-19.	-0.010	134.24	0.819
Np-237	345.63	86.49	886.	-25.	-0.014	168.35	0.825s
EU-155	345.84	86.54	778.	-24.	-0.013	164.43	0.825s
Sn-126	347.43	86.94	754.	-24.	-0.013	161.84	0.825
Sn-126	349.95	87.57	730.	-24.	-0.013	159.12	0.826
Cd-109	351.83	88.04	692.	7.	0.004	568.27	0.826s
TH-234	370.05	92.59	196.	29.	0.016	71.09	0.831D
AC-228	373.09	93.35	609.	23.	0.013	155.87	0.832s
Gd-153	389.70	97.50	189.	6.	0.003	326.60	0.836s
Np-239	397.71	99.50	211.	-6.	-0.004	327.04	0.838s
Gd-153	412.52	103.20	327.	-22.	-0.012	118.54	0.842s
Np-239	414.52	103.70	349.	-22.	-0.012	122.25	0.842s
EU-155	420.98	105.31	549.	-22.	-0.012	91.97	0.844s
Np-239	424.25	106.13	507.	21.	0.011	156.33	0.845s
EU-152	486.88	121.78	179.	18.	0.010	106.42	0.861s
CO-57	488.03	122.06	197.	4.	0.002	505.36	0.861s
EU-154	492.18	123.10	185.	-8.	-0.004	253.26	0.862s
PA-234	524.99	131.29	425.	-23.	-0.013	128.15	0.871s
HF-181	531.91	133.02	448.	-23.	-0.013	131.22	0.872
CE-144	533.97	133.54	422.	-23.	-0.013	130.71	0.873
HF-181	545.02	136.30	445.	-9.	-0.005	328.13	0.876s
CO-57	545.72	136.47	454.	0.	0.000	1000.00	0.876s
Tc-99m	561.88	140.51	255.	17.	0.010	132.52	0.880s
U-235	575.80	143.99	41.	18.	0.010	59.09	0.627s
CE-141	581.61	145.44	237.	17.	0.009	131.46	0.885s
U-235	653.42	163.38	206.	10.	0.006	196.06	0.903s
CE-139	663.32	165.85	190.	-11.	-0.006	179.76	0.905s
Cf-251	706.34	176.60	107.	14.	0.008	130.92	0.916s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	774.03	193.51	103.	9.	0.005	211.47	0.933
U-235	821.35	205.33	90.	5.	0.003	340.59	0.945
TH-229	843.44	210.85	87.	17.	0.009	101.25	0.950s
Cf-251	908.08	227.00	93.	9.	0.005	201.25	0.966s
PB-212	954.64	238.63	50.	395.	0.219	5.64	0.978D
PB-214	968.10	242.00	59.	70.	0.039	19.58	0.981D
EU-152	978.89	244.69	664.	-17.	-0.010	214.37	0.984s
TH-227	1025.11	256.24	70.	11.	0.006	140.95	0.995s
Cd-113m	1054.97	263.70	64.	9.	0.005	136.81	1.002s
BI-210M	1063.50	265.83	164.	-19.	-0.011	97.21	1.005s
TL-208	1110.30	277.52	42.	24.	0.013	58.10	1.599s
Hg-203	1117.00	279.20	120.	-16.	-0.009	101.12	1.017s
I-131	1137.41	284.30	44.	12.	0.007	104.69	1.022
PB-214	1181.34	295.28	41.	111.	0.062	15.16	0.636s
PB-212	1200.37	300.03	182.	14.	0.008	139.28	1.038s
PA-231	1200.53	300.07	196.	11.	0.006	190.89	1.038s
PA-233	1200.97	300.18	207.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	207.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	207.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	207.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	207.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	224.	-16.	-0.009	135.84	1.046s
PA-233	1248.32	312.01	289.	-18.	-0.010	136.47	1.049
Ir-192	1266.25	316.49	117.	-16.	-0.009	101.62	1.053s
CR-51	1280.63	320.08	151.	-17.	-0.010	103.68	1.057s
La-140	1315.35	328.76	55.	14.	0.008	100.24	1.065s
Cf-249	1334.08	333.44	40.	6.	0.003	213.84	1.070
AC-228	1353.61	338.32	83.	120.	0.067	14.06	1.074
Cs-136	1362.62	340.57	203.	0.	0.000	1000.00	1.077s
EU-152	1377.49	344.29	203.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	250.	-15.	-0.008	155.85	1.082s
PB-214	1408.24	351.97	36.	168.	0.093	10.66	0.990s
BA-133	1424.36	356.00	220.	10.	0.006	211.46	1.091s
I-131	1458.32	364.48	22.	4.	0.002	212.64	1.099s
BA-133	1535.78	383.84	171.	-16.	-0.009	114.84	1.117s
Cf-249	1552.22	387.95	187.	-17.	-0.009	119.61	1.121s
SN-113	1567.19	391.69	210.	-18.	-0.010	50.60	1.125s
SB-125	1711.99	427.88	44.	-4.	-0.002	44.07	1.158s
AG-108M	1736.25	433.94	44.	0.	0.000	1000.00	1.164s
pm-146	1816.05	453.88	33.	11.	0.006	104.40	1.182
SB-125	1854.01	463.37	60.	12.	0.006	99.48	1.191
Ir-192	1872.79	468.06	62.	11.	0.006	105.56	1.195s
BE-7	1910.94	477.59	43.	10.	0.006	97.70	1.204s
HF-181	1928.56	482.00	88.	-14.	-0.008	69.03	1.208s
La-140	1948.65	487.02	28.	5.	0.003	211.97	1.212s
RU-103	1988.80	497.05	36.	-6.	-0.003	158.95	1.221s
RH-106	2048.06	511.86	61.	61.	0.034	27.16	2.485s
Nd-147	2124.62	531.00	20.	6.	0.003	151.54	1.252s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	2149.67	537.26	28.	6.	0.003	191.32	1.258s
CS-134	2253.60	563.24	20.	18.	0.010	54.05	1.280s
CS-134	2277.94	569.32	36.	-6.	-0.003	147.20	1.286s
PA-234	2278.54	569.47	35.	8.	0.004	112.87	1.286s
TL-208	2334.47	583.45	25.	110.	0.061	14.10	1.530
SB-125	2402.69	600.50	323.	-14.	-0.008	187.41	1.313
SB-124	2411.61	602.73	309.	-14.	-0.008	183.21	1.315s
CS-134	2419.53	604.71	295.	-14.	-0.008	178.95	1.317s
BI-214	2439.22	609.63	10.	154.	0.086	8.89	1.157
RU-103	2441.89	610.30	282.	-4.	-0.002	677.31	1.322s
PM-144	2472.94	618.06	76.	167.	0.093	10.69	1.328s
RH-106	2488.37	621.92	249.	-16.	-0.009	141.36	1.332s
SB-125	2544.26	635.89	24.	1.	0.000	841.43	1.344s
I-131	2548.61	636.97	32.	-4.	-0.002	214.33	1.345s
AG-110M	2631.76	657.76	60.	-3.	-0.002	334.07	1.362s
CS-137	2646.88	661.54	10.	24.	0.013	30.24	2.153s
PM-144	2786.90	696.54	31.	12.	0.007	97.80	1.395s
NB-94	2811.25	702.63	26.	12.	0.007	92.92	1.400
SB-124	2891.88	722.79	29.	31.	0.017	30.05	1.417
AG-108M	2892.48	722.94	60.	0.	0.000	1000.00	1.417
EU-154	2894.16	723.36	60.	0.	0.000	1000.00	1.418
ZR-95	2897.53	724.20	60.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	74.	-11.	-0.006	96.67	1.421s
pm-146	2943.61	735.72	48.	-16.	-0.009	66.78	1.428s
pm-146	2989.37	747.16	13.	7.	0.004	113.76	1.437s
ZR-95	3027.65	756.73	17.	9.	0.005	103.77	1.445
AG-110M	3056.50	763.94	48.	-7.	-0.004	144.98	1.451s
NB-95	3063.89	765.79	64.	-2.	-0.001	681.47	1.453
PA-234M	3066.38	766.41	44.	12.	0.007	80.70	1.453
EU-152	3116.41	778.92	23.	5.	0.003	224.40	1.463s
BI-212	3142.41	785.42	37.	-8.	-0.005	159.35	1.468
CS-134	3184.19	795.87	9.	30.	0.016	28.54	1.477s
CS-134	3208.53	801.95	19.	6.	0.004	150.07	1.482s
CO-58	3243.82	810.78	58.	-13.	-0.007	89.46	1.489s
La-140	3263.80	815.77	71.	-10.	-0.005	82.74	1.493
MN-54	3340.10	834.85	9.	11.	0.006	67.83	1.508s
Co-56	3387.78	846.77	24.	-5.	-0.003	175.22	1.518s
TL-208	3443.61	860.73	3.	23.	0.013	25.17	0.652s
NB-94	3485.08	871.10	23.	-1.	-0.001	519.62	1.537
EU-154	3493.61	873.23	20.	5.	0.003	138.02	1.539s
PA-234	3522.80	880.53	21.	8.	0.004	92.13	1.544s
PA-234	3533.64	883.24	28.	6.	0.003	137.43	1.547s
AG-110M	3539.41	884.68	34.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	76.	-13.	-0.007	97.51	1.551s
y-88	3592.83	898.04	23.	-1.	-0.001	773.39	1.558s
AC-228	3646.61	911.49	0.	89.	0.049	10.61	1.479
AG-110M	3750.60	937.49	28.	-7.	-0.004	164.75	1.589s
PA-234	3784.70	946.02	23.	5.	0.003	224.40	1.595s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	3857.05	964.11	103.	-13.	-0.007	118.23	1.609s
AC-228	3877.27	969.17	0.	63.	0.035	12.60	1.425
EU-154	3985.88	996.33	72.	-15.	-0.009	61.55	1.633s
PA-234M	4004.55	1001.00	86.	-15.	-0.008	62.30	1.636s
EU-154	4019.65	1004.77	83.	13.	0.007	105.18	1.639s
Cs-136	4192.77	1048.07	42.	-15.	-0.009	64.87	1.671s
RH-106	4201.93	1050.36	48.	10.	0.005	104.16	1.673s
BI-207	4255.11	1063.66	15.	4.	0.002	218.66	1.682s
Ga-68	4310.04	1077.40	10.	8.	0.004	93.82	1.692s
FE-59	4397.41	1099.25	15.	4.	0.002	218.66	1.708s
EU-152	4448.68	1112.07	59.	3.	0.001	410.06	1.717s
BI-214	4481.51	1120.29	32.	12.	0.007	74.86	1.723
Sc-46	4482.57	1120.55	44.	3.	0.002	338.77	1.723
Ta-182	4485.56	1121.30	43.	6.	0.003	163.43	1.724s
CO-60	4693.21	1173.24	11.	8.	0.004	96.09	1.760
Ta-182	4756.42	1189.05	30.	-13.	-0.007	10.77	1.771s
Ta-182	4885.79	1221.41	27.	4.	0.002	317.17	1.793s
NA-22	5098.13	1274.53	11.	9.	0.005	61.29	1.828s
EU-154	5098.19	1274.54	20.	1.	0.001	472.30	1.828s
FE-59	5166.35	1291.60	27.	-9.	-0.005	133.45	1.840s
CO-60	5329.85	1332.50	17.	-4.	-0.002	343.25	1.866s
AG-110M	5536.88	1384.30	16.	-9.	-0.005	106.38	1.899s
EU-152	5631.62	1408.00	11.	1.	0.001	563.47	1.914s
K-40	5844.53	1461.28	3.	305.	0.169	5.80	1.914
La-140	6383.73	1596.21	12.	-4.	-0.002	495.71	2.024s
SB-124	6762.39	1690.98	11.	-5.	-0.003	154.24	2.076s
BI-214	7056.06	1764.49	0.	23.	0.013	21.43	2.114s
Co-56	7083.46	1771.35	23.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	12.	-6.	-0.003	78.74	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.0759E+00				5.31E+01	
			477.60	4.076E+00	&(P	1.351E+01 9.77E+01 1.05E+01 G	
NA-22	C	8.7230E-01				9.50E+02	
			1274.53	8.723E-01	?(	1.741E+00 6.13E+01 9.99E+01 G	
K-40	N	3.1082E+02				4.66E+11	
			1460.83	3.108E+02	(P	1.148E+01 5.80E+00 1.07E+01 G	

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Sc-46    F  -9.4732E-01                                     8.38E+01
                          889.28-9.473E-01 ?(  3.115E+00 9.75E+01 1.00E+02 G
                         1120.55 2.455E-01 +   2.934E+00 3.39E+02 1.00E+02 G

CR-51    F  -5.3016E+00                                     2.77E+01
                          320.08-5.302E+00 ?(  1.845E+01 1.04E+02 9.94E+00 G

MN-54    C   7.2804E-01                                     3.12E+02
                          834.85 7.280E-01 ?(  1.153E+00 6.78E+01 1.00E+02 G

FE-59    F   6.0663E-01                                     4.45E+01
                         1099.25 6.066E-01 ?(  3.148E+00 2.19E+02 5.65E+01 G
                         1291.60-2.039E+00 + P 6.114E+00 1.33E+02 4.32E+01 G

Co-56    C  -3.1061E-01                                     7.73E+01
                          846.77-3.106E-01 ?(P 1.743E+00 1.75E+02 9.99E+01 G
                         1238.28-4.779E-02 %   4.470E+00 4.17E+03 6.61E+01 G
                         1037.84 5.778E-01 %   1.503E+01 1.10E+03 1.41E+01 G
                         1771.35 0.000E+00 +   2.074E+01 1.00E+03 1.55E+01  A

CO-57    C   7.1533E-02                                     2.72E+02
                          122.06 7.153E-02 ?(  1.234E+00 5.05E+02 8.56E+01 G
                          136.47 0.000E+00 -   1.534E+01 1.00E+03 1.07E+01 G

CO-58    C  -8.4606E-01                                     7.09E+01
                          810.78-8.461E-01 ?(  2.549E+00 8.95E+01 9.95E+01 G

CO-60    F   1.8179E-01                                     1.93E+03
                         1332.50-3.530E-01 ?(P 2.181E+00 3.43E+02 1.00E+02 G
                         1173.24 7.170E-01 ?(P 1.629E+00 9.61E+01 9.99E+01 G

ZN-65    F   6.5402E-07                                     2.44E+02
                         1115.55 6.540E-07 %(  6.756E+00 2.92E+08 5.06E+01 G

NB-94    I   7.1028E-01                                     7.41E+06
                          702.63 7.103E-01 ?(P 1.595E+00 9.29E+01 9.79E+01 G
                          871.10-9.408E-02 -   1.779E+00 5.20E+02 9.99E+01 G

ZR-95    I   9.9680E-01                                     6.40E+01
                          756.73 9.968E-01 ?(  2.543E+00 1.04E+02 5.45E+01 G
                          724.20 0.000E+00 -   5.307E+00 1.00E+03 4.42E+01 G

NB-95    I  -1.0566E-01                                     6.40E+01
                          765.79-1.057E-01 ?(  2.529E+00 6.81E+02 9.98E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	-3.0222E-01					3.93E+01	
			497.05	-3.022E-01	?(P	1.492E+00	1.59E+02	9.09E+01 G
			610.30	-3.198E+00	+	7.361E+01	6.77E+02	5.75E+00 GA
RH-106	I	-3.3836E-01					3.74E+02	
			621.92	-8.585E+00	&(	4.081E+01	1.41E+02	9.93E+00 G
			1050.36	5.215E+01	?(	1.848E+02	1.04E+02	1.56E+00 G
			511.86	1.386E+01	? P	8.809E+00	2.72E+01	2.00E+01 GA
SN-113	F	-1.0210E+00					1.15E+02	
			391.69	-1.021E+00	?(P	3.969E+00	5.06E+01	6.40E+01 G
SB-124	F	1.0803E+00					6.02E+01	
			602.73	-7.229E-01	?(	4.459E+00	1.83E+02	9.83E+01 G
			1690.98	-1.375E+00	+	4.742E+00	1.54E+02	4.78E+01 G
			722.79	1.747E+01	(	1.542E+01	3.01E+01	1.08E+01 G
SB-125	I	-5.6770E-01					1.01E+03	
			427.88	-5.677E-01	?(P	4.434E+00	4.41E+01	2.96E+01 G
			600.50	-3.959E+00	+	2.498E+01	1.87E+02	1.79E+01 G
			635.89	3.990E-01	+	1.227E+01	8.41E+02	1.13E+01 G
			463.37	4.586E+00	+ P	1.543E+01	9.95E+01	1.05E+01 G
I-131	I	5.5372E-01					8.02E+00	
			364.48	1.777E-01	(P	1.032E+00	2.13E+02	8.17E+01 G
			284.30	5.557E+00	&(	1.517E+01	1.05E+02	6.14E+00 G
			636.97	-2.899E+00	+	2.194E+01	2.14E+02	7.17E+00 G
Gd-153	F	3.1060E-01					2.42E+02	
			97.50	3.106E-01	?(	3.457E+00	3.27E+02	3.00E+01 G
			103.20	-1.547E+00	+	6.134E+00	1.19E+02	2.18E+01 G
Ga-68	C	2.4039E+01					4.71E-02	
			1077.40	2.404E+01	?(	5.242E+01	9.38E+01	3.30E+00 G
Tc-99m	I	3.2586E-01					2.51E-01	
			140.51	3.259E-01	&(	1.450E+00	1.33E+02	8.93E+01 G
BA-133	F	5.4013E-01					3.85E+03	
			356.00	5.401E-01	?(	3.867E+00	2.11E+02	6.20E+01 G
			302.85	0.000E+00	-	1.111E+01	1.00E+03	1.83E+01 G
			383.84	-6.555E+00	&	2.530E+01	1.15E+02	8.94E+00 GA
			80.99	-9.176E-01	+ P	3.685E+00	1.34E+02	3.41E+01 GA
CS-134	I	1.2600E+00					7.54E+02	
			604.71	-7.306E-01	&(	4.403E+00	1.79E+02	9.76E+01 G
			795.87	2.266E+00	&(	1.295E+00	2.85E+01	8.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			569.32	-1.926E+00	+	9.845E+00	1.47E+02	1.54E+01 G
			801.95	4.793E+00	?(	1.729E+01	1.50E+02	8.69E+00 G
			563.24	1.055E+01	?(	1.380E+01	5.41E+01	8.35E+00 G
CS-137	I	1.5904E+00					1.10E+04	
			661.66	1.590E+00	(P	1.136E+00	3.02E+01	8.52E+01 G
CE-139	F	-2.4413E-01					1.38E+02	
			165.85	-2.441E-01	*(	1.486E+00	1.80E+02	7.99E+01 G
Ba-140	I	1.0758E+00					1.28E+01	
			537.26	1.076E+00	?(P	5.314E+00	1.91E+02	2.44E+01 G
			162.66	-2.869E-01	%	2.038E+01	2.08E+03	6.22E+00 G
			304.85	0.000E+00	-	4.772E+01	1.00E+03	4.29E+00 G
La-140	I	1.5311E-01					1.28E+01	
			1596.21	-4.384E-01	?(P	2.282E+00	4.96E+02	9.54E+01 G
			487.02	4.763E-01	?(	2.607E+00	2.12E+02	4.55E+01 G
			328.76	2.209E+00	?(	5.737E+00	1.00E+02	2.03E+01 G
			815.77	-2.725E+00	+ P	1.202E+01	8.27E+01	2.33E+01 G
CE-141	I	5.8011E-01					3.25E+01	
			145.44	5.801E-01	&(	2.563E+00	1.31E+02	4.82E+01 G
CE-144	I	-3.2352E+00					2.85E+02	
			133.54	-3.235E+00	?(	1.414E+01	1.31E+02	1.11E+01 G
PM-144	C	4.8146E+00					3.63E+02	
			696.54	7.144E-01	?(P	1.693E+00	9.78E+01	9.90E+01 G
			618.06	8.911E+00	?(	2.312E+00	1.07E+01	9.91E+01 G
EU-152	F	9.9715E-01					4.94E+03	
			344.29	0.000E+00	?(	8.467E+00	1.00E+03	2.65E+01 G
			1112.07	1.703E+00	?(	2.448E+01	4.10E+02	1.36E+01 G
			121.78	9.882E-01	?(	3.527E+00	1.06E+02	2.86E+01 G
			778.92	2.314E+00	?(	1.251E+01	2.24E+02	1.29E+01 G
			964.11	-6.569E+00	+	2.628E+01	1.18E+02	1.46E+01 G
			244.69	-5.521E+00	&	3.963E+01	2.14E+02	7.58E+00 G
			1408.00	6.699E-01	?	9.008E+00	5.63E+02	2.10E+01 GA
EU-154	I	4.4700E+00					3.14E+03	
			873.23	2.782E+00	&(	1.351E+01	1.38E+02	1.23E+01 G
			123.10	-2.921E-01	-	2.516E+00	2.53E+02	4.08E+01 G
			1274.54	3.723E-01	-	6.444E+00	4.72E+02	3.52E+01 G
			723.36	0.000E+00	-	1.158E+01	1.00E+03	2.02E+01 G
			1004.77	5.620E+00	?(	1.997E+01	1.05E+02	1.80E+01 G
			996.33	-1.148E+01	+ P	3.136E+01	6.16E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-1.6229E+00					1.81E+03	
			105.31	-1.623E+00	(P	8.104E+00	9.20E+01	2.12E+01 G
			86.54	-1.274E+00	+	6.990E+00	1.64E+02	3.07E+01 G
HF-181	F	-7.6333E-01					4.24E+01	
			482.00	-7.633E-01	?(P	2.473E+00	6.90E+01	8.05E+01 G
			133.02	-8.492E-01	+	3.725E+00	1.31E+02	4.33E+01 G
			345.83	-3.151E+00	&	1.654E+01	1.56E+02	1.51E+01 G
			136.30	-2.508E+00	+	2.772E+01	3.28E+02	5.85E+00 G
Ta-182	F	1.3964E+00					1.14E+02	
			1121.30	1.466E+00	?(	8.317E+00	1.63E+02	3.49E+01 G
			1221.41	1.306E+00	?(P	9.373E+00	3.17E+02	2.70E+01 G
			1189.05	-7.476E+00	+ P	1.601E+01	1.08E+01	1.62E+01 G
Hg-203	F	-5.3012E-01					4.66E+01	
			279.20	-5.301E-01	&(	1.802E+00	1.01E+02	8.15E+01 G
TL-208	N	6.5400E+00					6.98E+02	
			583.02	6.540E+00	(P	1.557E+00	1.41E+01	8.45E+01 G
			277.28	1.010E+01	+	1.423E+01	5.81E+01	6.31E+00 G
			860.56	1.292E+01	+ P	6.057E+00	2.52E+01	1.24E+01 G
pm-146	C	8.9034E-01					2.02E+03	
			747.16	1.255E+00	?(P	3.570E+00	1.14E+02	3.40E+01 G
			735.72	-4.478E+00	+ P	9.485E+00	6.68E+01	2.25E+01 G
			453.88	6.994E-01	&(P	1.841E+00	1.04E+02	6.50E+01 G
y-88	F	-1.0289E-01					1.07E+02	
			898.04	-1.029E-01	?(	1.946E+00	7.73E+02	9.37E+01 G
			1836.06	-8.280E-01	+ P	2.529E+00	7.87E+01	9.92E+01 G
Cd-113m		3.7041E+03					5.33E+03	
			263.70	3.704E+03	(	1.734E+04	1.37E+02	6.00E-03 K
Cd-109	F	2.7794E+00					4.53E+02	
			88.04	2.779E+00	?(	5.307E+01	5.68E+02	3.79E+00 G
Cf-251	T	1.5746E+00					3.28E+05	
			176.60	1.575E+00	*(	5.585E+00	1.31E+02	1.70E+01 G
			227.00	3.162E+00		1.741E+01	2.01E+02	6.30E+00 GA
Cf-249	T	-5.0794E-01					1.28E+05	
			387.95	-8.987E-01	?(	3.614E+00	1.20E+02	6.60E+01 G
			333.44	1.155E+00	(	6.585E+00	2.14E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		4.4142E+00					3.65E+07	
			87.57	-1.038E+00	-	5.516E+00	1.59E+02	3.75E+01 GA
			64.28	4.414E+00	(	1.543E+01	1.04E+02	9.70E+00 G
			86.94	-4.317E+00	+	2.333E+01	1.62E+02	9.04E+00 GA
PB-210	N	5.5894E+01					8.14E+03	
			46.54	5.589E+01	*(P	3.159E+01	2.31E+01	4.25E+00 G
PB-212	N	2.1828E+01					6.98E+02	
			238.63	2.183E+01	(P	1.971E+00	5.64E+00	4.33E+01 G
			300.03	1.234E+01	-	5.798E+01	1.39E+02	3.28E+00 GA
PB-214	N	1.5318E+01					5.84E+05	
			351.93	1.476E+01	@(P	2.702E+00	1.07E+01	3.76E+01 G
			295.09	1.640E+01	(	4.826E+00	1.52E+01	1.93E+01 G
			242.00	2.284E+01	+	1.256E+01	1.96E+01	7.43E+00 GA
BI-207	C	1.9356E-01					1.18E+04	
			569.70	-6.025E-09	%(	1.448E+00	6.61E+09	9.77E+01 G
			1063.66	4.475E-01	?(	2.322E+00	2.19E+02	7.45E+01 G
BI-212	N	-9.1213E+00					6.98E+02	
			727.17	-9.121E+00	?(P	3.442E+01	9.67E+01	7.55E+00 G
			785.42	-4.207E+01	+	1.574E+02	1.59E+02	1.28E+00 GA
BI-214	N	1.7801E+01					5.84E+05	
			609.31	1.749E+01	(P	1.958E+00	8.89E+00	4.61E+01 G
			1120.29	6.748E+00	- P	1.687E+01	7.49E+01	1.51E+01 G
			1764.49	1.874E+01	?(P	6.110E+00	2.14E+01	1.54E+01 G
BI-210M	T	-1.0028E+00					1.10E+09	
			265.83	-1.003E+00	&(	3.264E+00	9.72E+01	5.00E+01 G
			304.90	0.000E+00	+	7.312E+00	1.00E+03	2.80E+01 G
AC-228	N	2.4462E+01					2.10E+03	
			911.07	2.245E+01	(P	1.860E+00	1.06E+01	2.90E+01 G
			968.97	2.781E+01	(	3.253E+00	1.26E+01	1.75E+01 G
			338.32	3.203E+01	+ P	1.202E+01	1.41E+01	1.20E+01 G
			93.35	6.385E+00	-	3.326E+01	1.56E+02	5.56E+00 XA
TH-227	N	-6.2137E+00					7.95E+03	
			50.14	-6.214E+00	?(	1.983E+01	1.12E+02	8.00E+00 G
			256.24	4.114E+00	+	1.510E+01	1.41E+02	7.00E+00 G
TH-229	N	7.2940E+00					2.68E+06	
			193.51	3.967E+00	?(	2.292E+01	2.11E+02	4.40E+00 G
			210.85	1.219E+01	&(	3.333E+01	1.01E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	6.4854E+00					1.63E+12	
			63.29	4.030E+00	?(P	3.883E+01	3.34E+02	3.81E+00 G
			92.59	8.161E+00	(P	1.918E+01	7.11E+01	5.58E+00 G
PA-231	N	5.7076E+00					1.20E+07	
			302.65	0.000E+00	&(	7.065E+01	1.00E+03	2.88E+00 G
			300.07	1.239E+01	&(	8.010E+01	1.91E+02	2.46E+00 G
PA-233	C	-1.4856E+00					7.82E+08	
			312.01	-1.486E+00	&(	6.805E+00	1.36E+02	3.60E+01 G
			300.18	0.000E+00	&	3.260E+01	1.00E+03	6.20E+00 G
PA-234	N	1.5925E+00					1.63E+12	
			131.29	-2.029E+00	?(	8.691E+00	1.28E+02	1.80E+01 G
			946.02	2.630E+00	?(	1.422E+01	2.24E+02	1.34E+01 G
			569.47	4.717E+00	?(	1.827E+01	1.13E+02	8.20E+00 G
			883.24	4.264E+00	?(	2.041E+01	1.37E+02	9.60E+00 G
			880.53	8.999E+00	?	2.832E+01	9.21E+01	6.00E+00 GA
PA-234M	N	-1.4468E+02					1.63E+12	
			1001.00	-1.447E+02	?(P	4.356E+02	6.23E+01	8.37E-01 G
			766.41	2.664E+02	+	7.214E+02	8.07E+01	2.94E-01 G
U-235	N	2.8405E+00					2.57E+11	
			143.79	2.779E+00	(P	4.867E+00	5.91E+01	1.10E+01 G
			205.33	2.111E+00	(	1.981E+01	3.41E+02	5.01E+00 G
			163.38	3.693E+00	?(P	2.451E+01	1.96E+02	5.08E+00 G
AM-241	T	5.8872E-01					1.58E+05	
			59.54	5.887E-01	(P	3.967E+00	2.35E+02	3.59E+01 G
Np-237	F	-3.1089E+00					2.14E+06	
			86.49	-3.109E+00	&(	1.746E+01	1.68E+02	1.31E+01 G
Ir-192	F	-6.8873E-03					7.40E+01	
			316.49	-5.407E-01	?(	1.847E+00	1.02E+02	8.70E+01 G
			468.06	8.909E-01	&(	3.189E+00	1.06E+02	5.18E+01 G
			308.44	-1.480E+00	&	6.763E+00	1.36E+02	3.18E+01 G
Cs-136	F	6.6897E-02					1.30E+01	
			818.50	6.690E-02	%(	2.987E+00	1.28E+03	1.00E+02 G
			1048.07	-1.581E+00	+	3.387E+00	6.49E+01	8.00E+01 G
			340.57	0.000E+00	-	4.741E+00	1.00E+03	4.69E+01 G
Np-239	T	1.3912E+00					2.36E+00	
			103.70	-1.406E+00	+	5.749E+00	1.22E+02	2.40E+01 X
			106.13	1.391E+00	(	7.278E+00	1.56E+02	2.27E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                            99.50-6.532E-01 &   7.266E+00 3.27E+02 1.50E+01 X

Nd-147       2.1499E+00                                        1.11E+01
                           531.00 2.150E+00 ?(  8.438E+00 1.52E+02 1.30E+01 G
                            91.10 1.708E-06 %   7.047E+00 1.23E+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

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	138.	-18.	-0.010	112.35	-6.214E+00	
AM-241	59.54	178.	10.	0.005	234.86	5.887E-01	P
BA-133	80.99	241.	-19.	-0.010	134.24	-9.176E-01	P
Np-237	86.49	886.	-25.	-0.014	168.35	-3.109E+00	
EU-155	86.54	778.	-24.	-0.013	164.43	-1.274E+00	
Gd-153	97.50	189.	6.	0.003	326.60	3.106E-01	
Np-239	99.50	211.	-6.	-0.004	327.04	-6.532E-01	
Gd-153	103.20	327.	-22.	-0.012	118.54	-1.547E+00	
Np-239	103.70	349.	-22.	-0.012	122.25	-1.406E+00	
EU-155	105.31	549.	-22.	-0.012	91.97	-1.623E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	106.13	507.	21.	0.011	156.33	1.391E+00	
EU-152	121.78	179.	18.	0.010	106.42	9.882E-01	
CO-57	122.06	197.	4.	0.002	505.36	7.153E-02	
EU-154	123.10	185.	-8.	-0.004	253.26	-2.921E-01	
PA-234	131.29	425.	-23.	-0.013	128.15	-2.029E+00	
HF-181	133.02	448.	-23.	-0.013	131.22	-8.492E-01	
CE-144	133.54	422.	-23.	-0.013	130.71	-3.235E+00	
HF-181	136.30	445.	-9.	-0.005	328.13	-2.508E+00	
Tc-99m	140.51	255.	17.	0.010	132.52	3.259E-01	
CE-141	145.44	237.	17.	0.009	131.46	5.801E-01	
CE-139	165.85	190.	-11.	-0.006	179.76	-2.441E-01	
Cf-251	176.60	107.	14.	0.008	130.92	1.575E+00	
TH-229	193.51	103.	9.	0.005	211.47	3.967E+00	
TH-229	210.85	87.	17.	0.009	101.25	1.219E+01	
Cf-251	227.00	93.	9.	0.005	201.25	3.162E+00	
EU-152	244.69	664.	-17.	-0.010	214.37	-5.521E+00	
TH-227	256.24	70.	11.	0.006	140.95	4.114E+00	
Cd-113m	263.70	64.	9.	0.005	136.81	3.704E+03	
BI-210M	265.83	164.	-19.	-0.011	97.21	-1.003E+00	
Hg-203	279.20	120.	-16.	-0.009	101.12	-5.301E-01	
I-131	284.30	44.	12.	0.007	104.69	5.557E+00	
PA-231	300.07	196.	11.	0.006	190.89	1.239E+01	
Ir-192	308.44	224.	-16.	-0.009	135.84	-1.480E+00	
PA-233	312.01	289.	-18.	-0.010	136.47	-1.486E+00	
Ir-192	316.49	117.	-16.	-0.009	101.62	-5.407E-01	
CR-51	320.08	151.	-17.	-0.010	103.68	-5.302E+00	
La-140	328.76	55.	14.	0.008	100.24	2.209E+00	
HF-181	345.83	250.	-15.	-0.008	155.85	-3.151E+00	
BA-133	356.00	220.	10.	0.006	211.46	5.401E-01	
I-131	364.48	22.	4.	0.002	212.64	1.777E-01	P
BA-133	383.84	171.	-16.	-0.009	114.84	-6.555E+00	
SN-113	391.69	210.	-18.	-0.010	50.60	-1.021E+00	P
pm-146	453.88	33.	11.	0.006	104.40	6.994E-01	P
Ir-192	468.06	62.	11.	0.006	105.56	8.909E-01	
BE-7	477.59	43.	10.	0.006	97.70	4.076E+00	P
HF-181	482.00	88.	-14.	-0.008	69.03	-7.633E-01	P
La-140	487.02	28.	5.	0.003	211.97	4.763E-01	
RU-103	497.05	36.	-6.	-0.003	158.95	-3.022E-01	P
RH-106	511.86	61.	61.	0.034	27.16	1.386E+01	P
Nd-147	531.00	20.	6.	0.003	151.54	2.150E+00	
Ba-140	537.26	28.	6.	0.003	191.32	1.076E+00	P
CS-134	563.24	20.	18.	0.010	54.05	1.055E+01	
CS-134	569.32	36.	-6.	-0.003	147.20	-1.926E+00	
PA-234	569.47	35.	8.	0.004	112.87	4.717E+00	
SB-124	602.73	309.	-14.	-0.008	183.21	-7.229E-01	
CS-134	604.71	295.	-14.	-0.008	178.95	-7.306E-01	
RU-103	610.30	282.	-4.	-0.002	677.31	-3.198E+00	
RH-106	621.92	249.	-16.	-0.009	141.36	-8.585E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	636.97	32.	-4.	-0.002	214.33	-2.899E+00	
AG-110M	657.76	60.	-3.	-0.002	334.07	-1.962E-01	
NB-94	702.63	26.	12.	0.007	92.92	7.103E-01	P
SB-124	722.79	29.	31.	0.017	30.05	1.747E+01	
BI-212	727.17	74.	-11.	-0.006	96.67	-9.121E+00	P
pm-146	735.72	48.	-16.	-0.009	66.78	-4.478E+00	P
pm-146	747.16	13.	7.	0.004	113.76	1.255E+00	P
ZR-95	756.73	17.	9.	0.005	103.77	9.968E-01	
AG-110M	763.94	48.	-7.	-0.004	144.98	-1.984E+00	
NB-95	765.79	64.	-2.	-0.001	681.47	-1.057E-01	
PA-234M	766.41	44.	12.	0.007	80.70	2.664E+02	
EU-152	778.92	23.	5.	0.003	224.40	2.314E+00	
BI-212	785.42	37.	-8.	-0.005	159.35	-4.207E+01	
CS-134	795.87	9.	30.	0.016	28.54	2.266E+00	
CS-134	801.95	19.	6.	0.004	150.07	4.793E+00	
CO-58	810.78	58.	-13.	-0.007	89.46	-8.461E-01	
La-140	815.77	71.	-10.	-0.005	82.74	-2.725E+00	P
MN-54	834.85	9.	11.	0.006	67.83	7.280E-01	
Co-56	846.77	24.	-5.	-0.003	175.22	-3.106E-01	P
NB-94	871.10	23.	-1.	-0.001	519.62	-9.408E-02	
EU-154	873.23	20.	5.	0.003	138.02	2.782E+00	
PA-234	880.53	21.	8.	0.004	92.13	8.999E+00	
PA-234	883.24	28.	6.	0.003	137.43	4.264E+00	
Sc-46	889.28	76.	-13.	-0.007	97.51	-9.473E-01	
y-88	898.04	23.	-1.	-0.001	773.39	-1.029E-01	
AG-110M	937.49	28.	-7.	-0.004	164.75	-1.527E+00	
PA-234	946.02	23.	5.	0.003	224.40	2.630E+00	
EU-152	964.11	103.	-13.	-0.007	118.23	-6.569E+00	
EU-154	996.33	72.	-15.	-0.009	61.55	-1.148E+01	P
PA-234M	1001.00	86.	-15.	-0.008	62.30	-1.447E+02	P
EU-154	1004.77	83.	13.	0.007	105.18	5.620E+00	
Cs-136	1048.07	42.	-15.	-0.009	64.87	-1.581E+00	
RH-106	1050.36	48.	10.	0.005	104.16	5.215E+01	
BI-207	1063.66	15.	4.	0.002	218.66	4.475E-01	
Ga-68	1077.40	10.	8.	0.004	93.82	2.404E+01	
FE-59	1099.25	15.	4.	0.002	218.66	6.066E-01	
EU-152	1112.07	59.	3.	0.001	410.06	1.703E+00	
Sc-46	1120.55	44.	3.	0.002	338.77	2.455E-01	
CO-60	1173.24	11.	8.	0.004	96.09	7.170E-01	P
NA-22	1274.53	11.	9.	0.005	61.29	8.723E-01	
EU-154	1274.54	20.	1.	0.001	472.30	3.723E-01	
FE-59	1291.60	27.	-9.	-0.005	133.45	-2.039E+00	P
CO-60	1332.50	17.	-4.	-0.002	343.25	-3.530E-01	P
AG-110M	1384.30	16.	-9.	-0.005	106.38	-3.855E+00	
EU-152	1408.00	11.	1.	0.001	563.47	6.699E-01	
La-140	1596.21	12.	-4.	-0.002	495.71	-4.384E-01	P
SB-124	1690.98	11.	-5.	-0.003	154.24	-1.375E+00	
y-88	1836.06	12.	-6.	-0.003	78.74	-8.280E-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 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	4.0758E+00	4.0759E+00	9.770E+01%	1.35E+01
NA-22	#A	8.7230E-01	8.7230E-01	6.129E+01%	1.74E+00
K-40		3.1082E+02	3.1082E+02	5.796E+00%	1.15E+01
Sc-46	#A	-9.4731E-01	-9.4732E-01	9.751E+01%	3.11E+00
CR-51	#A	-5.3015E+00	-5.3016E+00	1.037E+02%	1.85E+01
MN-54	#A	7.2804E-01	7.2804E-01	6.783E+01%	1.15E+00
FE-59	#A	6.0662E-01	6.0663E-01	2.187E+02%	3.15E+00
Co-56	#A	-3.1061E-01	-3.1061E-01	1.752E+02%	1.74E+00
CO-57	#A	7.1533E-02	7.1533E-02	5.054E+02%	1.23E+00
CO-58	#A	-8.4605E-01	-8.4606E-01	8.946E+01%	2.55E+00
CO-60	#A	1.8179E-01	1.8179E-01	9.609E+01%	2.18E+00
ZN-65	#A	6.5402E-07	6.5402E-07	2.919E+08%	6.76E+00
NB-94	#A	7.1028E-01	7.1028E-01	9.292E+01%	1.59E+00
ZR-95	#A	9.9679E-01	9.9680E-01	1.038E+02%	2.54E+00
NB-95	#A	-1.0566E-01	-1.0566E-01	6.815E+02%	2.53E+00
RU-103	#A	-3.0222E-01	-3.0222E-01	1.590E+02%	1.49E+00
RH-106	#A	-3.3836E-01	-3.3836E-01	8.780E+01%	4.08E+01
AG-108M	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.46E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.94E+00
SN-113	#A	-1.0210E+00	-1.0210E+00	5.060E+01%	3.97E+00
SB-124	#A	1.0803E+00	1.0803E+00	3.005E+01%	4.46E+00
SB-125	A	-5.6770E-01	-5.6770E-01	4.407E+01%	4.43E+00
I-131	#A	5.5367E-01	5.5372E-01	1.047E+02%	1.03E+00
Gd-153	#A	3.1060E-01	3.1060E-01	3.266E+02%	3.46E+00
Ga-68	#A	2.3730E+01	2.4039E+01	9.382E+01%	5.24E+01
Tc-99m	#A	3.2507E-01	3.2586E-01	1.325E+02%	1.45E+00
BA-133	#A	5.4013E-01	5.4013E-01	2.115E+02%	3.87E+00
CS-134	#A	1.2600E+00	1.2600E+00	2.854E+01%	4.40E+00
CS-137	#	1.5904E+00	1.5904E+00	3.024E+01%	1.14E+00
CE-139	#A	-2.4412E-01	-2.4413E-01	1.798E+02%	1.49E+00
Ba-140	#A	1.0757E+00	1.0758E+00	1.913E+02%	5.31E+00
La-140	#A	1.5310E-01	1.5311E-01	1.002E+02%	2.28E+00
CE-141	#A	5.8010E-01	5.8011E-01	1.315E+02%	2.56E+00
CE-144	#A	-3.2352E+00	-3.2352E+00	1.307E+02%	1.41E+01
PM-144	#C	4.8146E+00	4.8146E+00	1.069E+01%	1.69E+00
EU-152	#A	9.9715E-01	9.9715E-01	1.064E+02%	8.47E+00
EU-154	#A	4.4700E+00	4.4700E+00	8.676E+01%	1.35E+01
EU-155	#A	-1.6229E+00	-1.6229E+00	9.197E+01%	8.10E+00
HF-181	#A	-7.6332E-01	-7.6333E-01	6.903E+01%	2.47E+00
Ta-182	#A	1.3964E+00	1.3964E+00	1.634E+02%	8.32E+00
Hg-203	#A	-5.3012E-01	-5.3012E-01	1.011E+02%	1.80E+00

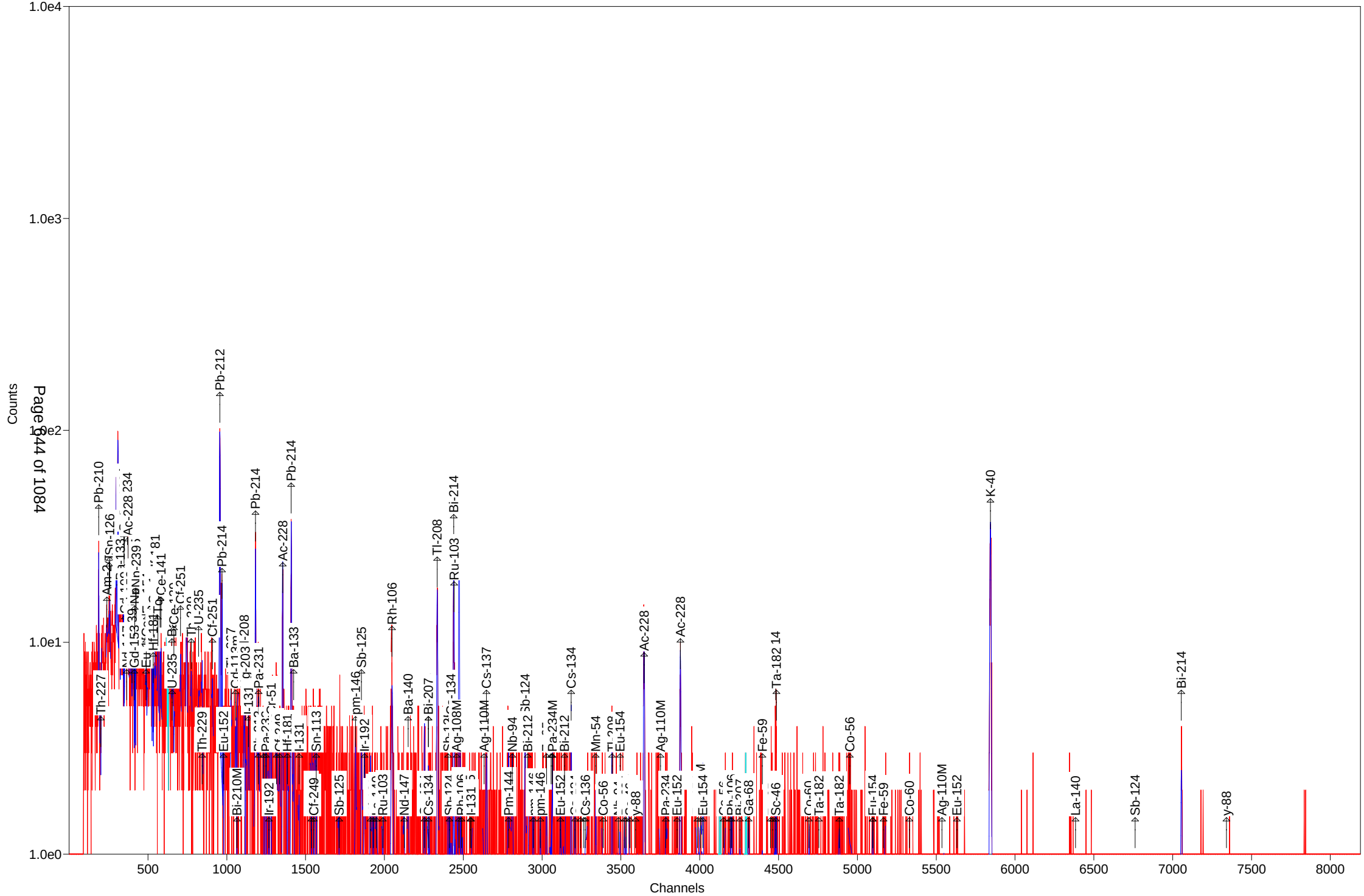
TL-208	6.5400E+00	6.5400E+00	1.410E+01%	1.56E+00
pm-146 #A	8.9034E-01	8.9034E-01	7.720E+01%	3.57E+00
y-88 #A	-1.0289E-01	-1.0289E-01	7.734E+02%	1.95E+00
Cd-113m#A	3.7041E+03	3.7041E+03	1.368E+02%	1.73E+04
Cd-109 #A	2.7794E+00	2.7794E+00	5.683E+02%	5.31E+01
Cf-251 #A	1.5746E+00	1.5746E+00	1.309E+02%	5.58E+00
Cf-249 A	-5.0794E-01	-5.0794E-01	1.196E+02%	3.61E+00
Sn-126 A	4.4142E+00	4.4142E+00	1.045E+02%	1.54E+01
PB-210 #	5.5894E+01	5.5894E+01	2.305E+01%	3.16E+01
PB-212	2.1828E+01	2.1828E+01	5.641E+00%	1.97E+00
PB-214	1.5318E+01	1.5318E+01	9.266E+00%	2.70E+00
BI-207 #A	1.9356E-01	1.9356E-01	2.187E+02%	1.45E+00
BI-212 #A	-9.1213E+00	-9.1213E+00	9.667E+01%	3.44E+01
BI-214	1.7801E+01	1.7801E+01	8.892E+00%	1.96E+00
BI-210M#A	-1.0028E+00	-1.0028E+00	9.721E+01%	3.26E+00
AC-228	2.4462E+01	2.4462E+01	8.237E+00%	1.86E+00
TH-227 #A	-6.2137E+00	-6.2137E+00	1.124E+02%	1.98E+01
TH-229 #A	7.2940E+00	7.2940E+00	1.012E+02%	2.29E+01
TH-234 #A	6.4854E+00	6.4854E+00	7.109E+01%	3.88E+01
PA-231 #A	5.7076E+00	5.7076E+00	1.909E+02%	7.07E+01
PA-233 #A	-1.4856E+00	-1.4856E+00	1.365E+02%	6.80E+00
PA-234 #A	1.5925E+00	1.5925E+00	7.842E+01%	8.69E+00
PA-234M#A	-1.4468E+02	-1.4468E+02	6.230E+01%	4.36E+02
U-235 A	2.8405E+00	2.8405E+00	5.909E+01%	4.87E+00
AM-241 #A	5.8872E-01	5.8872E-01	2.349E+02%	3.97E+00
Np-237 #A	-3.1089E+00	-3.1089E+00	1.684E+02%	1.75E+01
Ir-192 #A	-6.8873E-03	-6.8873E-03	7.326E+01%	1.85E+00
Cs-136 #A	6.6894E-02	6.6897E-02	1.277E+03%	2.99E+00
Np-239 #A	1.3909E+00	1.3912E+00	1.563E+02%	7.28E+00
Nd-147 #A	2.1498E+00	2.1499E+00	1.515E+02%	8.44E+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 2000.8 keV) 4.571E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 4.5709213E+02 Bq/Sample

265170_Gamma_160-18567-A-11-B. 5_Gamma_20161728.spc.



Test America St. Louis Spectrum ID: 3_Gamma_20161394

Sample Description: 265170_Gamma_160-18567-A-12-B
Detector: Detector # 3
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-12-B

Decay to Time: 9/7/2016 18:30 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:30:19 Real Time: 1803 sec
Analysis Time: 9/7/2016 19:00 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 3_Soil_TunaCan.Clb
Efficiency Cal Desc: 3_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 11:26
Energy Cal Date: 2/28/2012 19:25
Library: Client_Long_Rev11.lib
Bkgd Correction File: 3_2016-09-04_0702.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	-5.785E+00	101.5	5.871E+00	5.879E+00	1.964E+01
NA-22	5.913E-01	58.5	3.461E-01	3.473E-01	1.119E+00
K-40	3.210E+02	4.5	1.456E+01	2.195E+01	1.128E+01
Sc-46	4.439E-01	83.3	3.699E-01	3.706E-01	1.942E+00
CR-51	-4.989E+00	60.0	2.992E+00	3.003E+00	2.502E+01
MN-54	2.051E-01	281.6	5.776E-01	5.777E-01	1.371E+00
FE-59	-2.223E+00	35.1	7.793E-01	7.872E-01	3.989E+00
Co-56	-9.435E-01	46.2	4.364E-01	4.391E-01	1.800E+00
CO-57	1.412E-01	334.9	4.729E-01	4.730E-01	1.225E+00
CO-58	-1.638E-01	257.5	4.219E-01	4.220E-01	1.776E+00
CO-60	-6.600E-01	146.6	9.673E-01	9.678E-01	1.736E+00
ZN-65	-1.301E+00	136.8	1.780E+00	1.781E+00	6.027E+00
NB-94	3.814E-01	137.9	5.259E-01	5.263E-01	1.230E+00
ZR-95	7.874E-01	92.7	7.298E-01	7.309E-01	1.715E+00
NB-95	2.687E-01	233.7	6.280E-01	6.282E-01	2.152E+00
RU-103	-4.463E-02	1051.5	4.693E-01	4.693E-01	1.201E+00
RH-106	-3.219E+00	115.9	3.731E+00	3.735E+00	3.546E+01
AG-108M	1.153E-01	342.6	3.950E-01	3.950E-01	1.011E+00
AG-110M	0.000E+00	1.#INF	1.264E-01	1.264E-01	2.617E+00
SN-113	6.089E-01	120.0	7.305E-01	7.312E-01	2.459E+00
SB-124	-5.762E-01	110.7	6.379E-01	6.386E-01	3.561E+00
SB-125	4.474E+00	27.0	1.207E+00	1.229E+00	3.302E+00
I-131	3.070E-01	162.3	4.984E-01	4.986E-01	1.246E+00
Gd-153	9.700E-01	146.5	1.421E+00	1.422E+00	4.746E+00
Ga-68	-1.005E+01	264.0	2.653E+01	2.654E+01	5.876E+01
Tc-99m	3.226E-01	120.7	3.895E-01	3.900E-01	1.303E+00
BA-133	2.536E-02	4330.2	1.098E+00	1.098E+00	3.721E+00
CS-134	-5.939E-02	110.5	6.561E-02	6.568E-02	3.529E+00
CS-137	4.850E-02	1443.2	7.000E-01	7.000E-01	2.419E+00
CE-139	1.462E-01	310.1	4.534E-01	4.536E-01	1.532E+00
Ba-140	-9.099E-01	238.1	2.167E+00	2.167E+00	5.236E+00
La-140	4.696E-01	38.3	1.798E-01	1.815E-01	1.941E+00
CE-141	-6.374E-01	122.5	7.805E-01	7.812E-01	2.608E+00

CE-144	-3.328E+00	126.6	4.215E+00	4.218E+00	1.405E+01
PM-144	5.578E-01	93.9	5.235E-01	5.243E-01	1.209E+00
EU-152	0.000E+00	1.#INF	7.975E-01	7.975E-01	7.105E+00
EU-154	2.100E+00	80.8	1.697E+00	1.700E+00	1.233E+01
EU-155	-7.085E-02	3889.8	2.756E+00	2.756E+00	6.896E+00
HF-181	-7.637E-01	105.7	8.075E-01	8.085E-01	2.702E+00
Ta-182	2.407E+00	80.8	1.944E+00	1.948E+00	6.696E+00
Hg-203	-2.693E-01	180.5	4.862E-01	4.864E-01	1.646E+00
TL-208	8.353E+00	8.6	7.211E-01	8.413E-01	1.022E+00
pm-146	6.739E-01	232.6	1.567E+00	1.568E+00	3.709E+00
y-88	3.349E-01	40.8	1.367E-01	1.378E-01	1.302E+00
Cd-113m	-3.832E+03	163.7	6.274E+03	6.278E+03	2.121E+04
Cd-109	8.754E+00	183.5	1.607E+01	1.607E+01	5.354E+01
Cf-251	1.003E+00	191.1	1.917E+00	1.919E+00	5.193E+00
Cf-249	0.000E+00	1.#INF	3.763E-01	3.763E-01	2.645E+00
Sn-126	-4.670E+00	120.9	5.644E+00	5.650E+00	1.505E+01
PB-210	-1.706E+01	77.9	1.329E+01	1.333E+01	5.357E+01
PB-212	2.174E+01	5.0	1.077E+00	1.772E+00	1.794E+00
PB-214	1.720E+01	8.1	1.385E+00	1.649E+00	2.539E+00
BI-207	1.349E-01	104.9	1.415E-01	1.417E-01	1.405E+00
BI-212	3.004E+01	21.4	6.443E+00	6.629E+00	1.173E+01
BI-214	1.842E+01	8.6	1.581E+00	1.848E+00	2.475E+00
BI-210M	6.486E-01	112.9	7.322E-01	7.333E-01	2.460E+00
AC-228	2.451E+01	7.7	1.889E+00	2.265E+00	3.519E+00
TH-227	5.497E+00	121.5	6.676E+00	6.683E+00	2.237E+01
TH-229	5.713E+00	129.6	7.402E+00	7.416E+00	1.999E+01
TH-234	-1.085E-01	10912.6	1.184E+01	1.184E+01	4.009E+01
PA-231	0.000E+00	1.#INF	4.390E+00	4.390E+00	7.479E+01
PA-233	0.000E+00	1.#INF	1.465E-01	1.465E-01	6.112E+00
PA-234	-5.544E-01	121.5	6.736E-01	6.742E-01	8.227E+00
PA-234M	4.929E+01	82.6	4.070E+01	4.077E+01	2.056E+02
U-235	2.442E+00	131.9	3.220E+00	3.223E+00	1.078E+01
AM-241	-8.267E-01	185.9	1.537E+00	1.537E+00	4.122E+00
Np-237	0.000E+00	1.#INF	5.021E+00	5.021E+00	1.673E+01
Ir-192	-5.543E-01	151.8	8.417E-01	8.424E-01	2.814E+00
Cs-136	2.195E-01	66.1	1.450E-01	1.455E-01	1.803E+00
Np-239	1.226E+00	146.3	1.794E+00	1.796E+00	5.996E+00
Nd-147	-2.499E+00	151.5	3.785E+00	3.788E+00	9.112E+00
Total	5.325E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-12-B

Spectrum Filename: C:\User\SPC\Det3\3_Gamma_20161394.An1

Acquisition information
Start time: 9/7/2016 6:30:19 PM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 3

Detector system
Ge 3 SN/131

Calibration
Filename: 3_Soil_TunaCan.Clb
3_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 7:25:37 PM
Zero offset: 0.122 keV
Gain: 0.250 keV/channel
Quadratic: 3.421E-08 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 11:26:55 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.64 %
Log(Eff): -6.102019E-01 + (-3.642282E-01*Log(E)) + (-2.895398E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.29 %
Log(Eff): -2.525141E+01 + (9.446449E+00*Log(E)) + (-1.005974E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (2000.59keV)
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	9/7/2016 6:30:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	3_2016-09-04_0702.PBC 9/4/2016 7:02:58 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1157

***** 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	20.	121.46	0.82	2.503E-02	50.14	8.000	PBC<MDA	TH227
74.77	224.	11.48	0.85	3.992E-02				
77.05	348.	7.76	0.85	4.081E-02				
84.25	96.	19.44	0.86	4.309E-02				
87.30	162.	13.32	0.86	4.386E-02	86.49	13.100	1.575E+01	Np237
					86.54	30.700	6.718E+00	EU155
					86.94	9.040	2.277E+01	Sn126
					87.57	37.500	5.470E+00	Sn126
					88.04	3.790	5.400E+01	Cd109
90.06	80.	22.56	0.86	4.444E-02				
91.10	26.	184.94	0.86	4.465E-02	91.10	28.300	PBC<MDA	Nd147
93.11	116.	16.61	0.87	4.498E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.576E+01	AC228
97.50	24.	146.48	0.87	4.557E-02	97.50	30.000	PBC<MDA	Gd153
99.50	24.	149.77	0.87	4.577E-02	99.50	15.000	PBC<MDA	Np239
106.13	23.	146.33	0.88	4.614E-02	106.13	22.700	PBC<MDA	Np239
136.47	11.	334.86	0.91	4.397E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.273E+00	CO57
140.51	22.	120.75	0.92	4.337E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	21.	131.89	0.92	4.285E-02	143.79	10.960	PBC<MDA	U235
165.85	8.	310.07	0.94	3.963E-02	165.85	79.900	PBC<MDA	CE139
176.60	12.	191.13	0.95	3.802E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.76	83.	27.74	0.61	3.676E-02				
193.51	16.	129.58	0.97	3.577E-02	193.51	4.400	PBC<MDA	TH229
209.38	76.	24.81	0.34	3.392E-02				
227.00	18.	105.16	1.00	3.212E-02	227.00	6.300	PBC<MDA	Cf251
238.64	508.	6.05	0.88	3.105E-02	238.63	43.300	2.100E+01	PB212
242.01	93.	18.51	1.02	3.075E-02	242.00	7.430	2.267E+01	PB214
265.83	17.	112.90	1.04	2.884E-02	265.83	50.000	PBC<MDA	BI210M
295.15	159.	13.83	0.79	2.683E-02	295.09	19.300	1.708E+01	PB214
300.38	30.	44.62	0.62	2.652E-02	300.03	3.280	PBC<MDA	PB212
					300.18	6.200	PBC<MDA	PA233
328.76	44.	38.29	1.11	2.489E-02	328.76	20.300	4.876E+00	La140
338.64	121.	16.57	1.30	2.439E-02	338.32	12.010	2.292E+01	AC228
351.96	277.	8.24	0.94	2.372E-02	351.93	37.600	1.727E+01	PB214
364.48	10.	162.34	1.14	2.315E-02	364.48	81.700	PBC<MDA	I131
391.69	15.	119.97	1.17	2.200E-02	391.69	64.000	PBC<MDA	SN113
427.88	11.	132.76	1.20	2.065E-02	427.88	29.600	PBC<MDA	SB125
433.94	4.	342.63	1.21	2.045E-02	433.94	90.480	PBC<MDA	AG108M
463.37	53.	26.98	1.24	1.951E-02	463.37	10.470	1.431E+01	SB125
487.02	14.	163.30	1.26	1.882E-02	487.02	45.500	PBC<MDA	La140
510.82	114.	24.97	1.02	1.818E-02	511.86	20.000	1.738E+01	RH106
569.32	5.	188.12	1.34	1.680E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.151E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.28	210.	8.63	1.67	1.651E-02	583.02	84.500	8.353E+00	TL208
609.30	249.	8.59	1.48	1.598E-02	609.31	46.090	1.880E+01	BI214
					610.30	5.750	1.509E+02	RU103
696.54	14.	93.86	1.46	1.448E-02	696.54	99.000	PBC<MDA	PM144
702.63	10.	137.89	1.47	1.438E-02	702.63	97.900	PBC<MDA	NB94
727.45	57.	21.45	1.16	1.402E-02	727.17	7.550	3.004E+01	BI212
747.16	6.	232.56	1.51	1.374E-02	747.16	34.000	PBC<MDA	pm146
756.73	11.	92.68	1.52	1.361E-02	756.73	54.460	PBC<MDA	ZR95
765.79	7.	233.71	1.53	1.349E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	9.127E+01	PA234M
766.41	14.	82.56	1.53	1.348E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.971E+02	PA234M
781.86	4.	337.85	1.55	1.323E-02	785.42	1.280	PBC<MDA	BI212
795.87	6.	198.61	1.56	1.310E-02	795.87	85.530	PBC<MDA	CS134
815.77	5.	228.79	1.57	1.286E-02	815.77	23.280	PBC<MDA	La140
834.85	5.	281.58	1.59	1.264E-02	834.85	99.980	PBC<MDA	MN54
860.79	35.	17.12	1.15	1.236E-02	860.56	12.420	1.282E+01	TL208
880.53	13.	84.85	1.63	1.214E-02	880.53	6.000	PBC<MDA	PA234
883.24	5.	248.96	1.64	1.211E-02	883.24	9.600	PBC<MDA	PA234
898.04	3.	325.74	1.65	1.196E-02	898.04	93.700	PBC<MDA	y88
911.24	160.	9.79	0.95	1.183E-02	911.07	29.000	2.596E+01	AC228
969.09	82.	12.81	1.89	1.129E-02	968.97	17.460	2.320E+01	AC228
996.33	10.	80.82	1.74	1.105E-02	996.33	10.600	PBC<MDA	EU154
1037.84	2.	496.66	1.77	1.071E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	12.	66.07	1.78	1.063E-02	1048.07	80.000	PBC<MDA	Cs136

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1050.36	5.	195.94	1.79	1.062E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	104.93	1.80	1.051E-02	1063.66	74.500	PBC<MDA	BI207
1120.36	11.	133.64	1.85	1.010E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	16.	83.33	1.85	1.010E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.648E-01	Sc46
1121.94	16.	80.75	1.85	1.010E-02	1121.30	34.900	PBC<MDA	Ta182
1173.24	2.	646.79	1.89	9.749E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	6.	189.55	1.91	9.648E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	12.	123.48	1.95	9.349E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	10.	58.53	1.98	9.142E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.679E+00	EU154
1408.00	10.	82.97	2.09	8.458E-03	1408.00	21.005	PBC<MDA	EU152
1460.75	507.	4.54	2.24	8.216E-03	1460.83	10.670	3.210E+02	K40
1690.98	1.	945.38	2.32	7.319E-03	1690.98	47.790	PBC<MDA	SB124
1764.53	34.	24.19	2.37	7.075E-03	1764.49	15.400	1.727E+01	BI214
1836.06	6.	40.82	2.43	6.854E-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
298.82	74.77	218.	224.	5.603E+03	11.48	0.848	- D
307.96	77.06	190.	348.	8.524E+03	7.76	0.850	- D
336.34	84.16	139.	85.	1.967E+03	22.48	0.857	- sD
359.60	89.97	114.	76.	1.707E+03	22.94	0.863	- D
743.12	185.76	116.	83.	2.253E+03	27.74	0.614	- s
837.67	209.38	74.	76.	2.250E+03	24.81	0.338	- s
2043.99	510.82	127.	114.	6.246E+03	24.97	1.022	- 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	185.82	46.54	357.	-29.	-0.016	77.92	0.818s
TH-227	200.24	50.14	280.	20.	0.011	121.46	0.822s
AM-241	237.85	59.54	310.	-17.	-0.009	185.89	0.832s
Sn-126	256.84	64.28	361.	-28.	-0.016	120.86	0.837s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	323.73	80.99	1351.	-26.	-0.014	200.26	0.854s
Np-237	345.75	86.49	1325.	0.	0.000	197.03	0.860A
Sn-126	347.55	86.94	1204.	26.	0.015	91.65	0.860D
Sn-126	350.08	87.57	1126.	26.	0.015	93.16	0.861D
Cd-109	351.96	88.04	1152.	26.	0.015	183.54	0.862A
Nd-147	364.21	91.10	1178.	26.	0.015	184.94	0.865s
AC-228	373.21	93.35	157.	97.	0.054	20.80	0.867D
Gd-153	389.83	97.50	599.	24.	0.013	146.48	0.871s
Np-239	397.83	99.50	623.	24.	0.013	149.77	0.873s
Gd-153	412.64	103.20	647.	0.	0.000	1000.00	0.877s
Np-239	414.64	103.70	647.	0.	0.000	1000.00	0.878s
Np-239	424.37	106.13	561.	23.	0.013	146.33	0.880s
EU-152	487.00	121.78	303.	-17.	-0.010	144.12	0.896s
CO-57	488.14	122.06	321.	0.	0.000	1000.00	0.897s
EU-154	492.30	123.10	334.	-27.	-0.015	96.84	0.898s
PA-234	525.11	131.29	624.	-29.	-0.016	121.49	0.906
HF-181	532.03	133.02	653.	-29.	-0.016	124.01	0.908
CE-144	534.09	133.54	682.	-29.	-0.016	126.65	0.909s
HF-181	545.14	136.30	712.	-30.	-0.016	128.90	0.911
CO-57	545.83	136.47	644.	11.	0.006	334.86	0.912
Tc-99m	561.99	140.51	337.	22.	0.012	120.75	0.916s
U-235	575.10	143.79	360.	21.	0.011	131.89	0.919s
CE-141	581.73	145.44	404.	-24.	-0.013	122.45	0.921s
Ba-140	650.65	162.66	361.	-25.	-0.014	110.84	0.939s
U-235	653.53	163.38	273.	-8.	-0.004	346.89	0.939s
CE-139	663.43	165.85	330.	8.	0.005	310.07	0.942s
Cf-251	706.45	176.60	153.	12.	0.006	191.13	0.953s
TH-229	774.13	193.51	134.	16.	0.009	129.58	0.970s
U-235	821.46	205.33	375.	-24.	-0.013	87.07	0.982s
TH-229	843.54	210.85	450.	-25.	-0.014	121.62	0.988s
Cf-251	908.18	227.00	103.	18.	0.010	105.16	1.004s
PB-212	954.74	238.63	76.	526.	0.292	4.96	1.016D
PB-214	968.20	242.00	102.	93.	0.052	18.51	1.019D
EU-152	978.99	244.69	929.	-8.	-0.004	544.25	1.022s
TH-227	1025.21	256.24	114.	-3.	-0.002	588.46	1.034s
Cd-113m	1055.07	263.70	187.	-12.	-0.007	163.72	1.041s
BI-210M	1063.60	265.83	172.	17.	0.009	112.90	1.044s
TL-208	1109.43	277.28	163.	-12.	-0.007	153.31	1.055s
Hg-203	1117.10	279.20	192.	-11.	-0.006	180.53	1.057s
I-131	1137.51	284.30	84.	-2.	-0.001	739.21	1.062s
PB-214	1180.93	295.15	83.	159.	0.088	13.83	0.794s
PB-212	1201.86	300.38	54.	30.	0.017	44.62	0.616s
PA-231	1200.63	300.07	468.	-12.	-0.007	249.78	1.078s
PA-233	1201.07	300.18	456.	0.	0.000	1000.00	1.078s
PA-231	1210.95	302.65	456.	0.	0.000	1000.00	1.081s
BA-133	1211.76	302.85	456.	0.	0.000	1000.00	1.081s
Ba-140	1219.75	304.85	456.	0.	0.000	1000.00	1.083s
BI-210M	1219.94	304.90	456.	0.	0.000	1000.00	1.083s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1234.12	308.44	456.	0.	0.000	1000.00	1.086s
PA-233	1248.42	312.01	456.	0.	0.000	1000.00	1.090s
Ir-192	1266.34	316.49	557.	-22.	-0.012	151.84	1.094s
CR-51	1280.73	320.08	565.	-23.	-0.013	59.96	1.098s
La-140	1315.45	328.76	70.	44.	0.025	38.29	1.107s
Cf-249	1334.18	333.44	84.	-6.	-0.004	274.16	1.111s
AC-228	1354.99	338.64	54.	121.	0.067	16.57	1.295s
Cs-136	1362.71	340.57	298.	-11.	-0.006	220.72	1.119s
EU-152	1377.58	344.29	287.	0.	0.000	1000.00	1.122s
HF-181	1383.75	345.83	287.	0.	0.000	1000.00	1.124s
PB-214	1408.31	351.96	67.	277.	0.154	8.24	0.939s
I-131	1458.41	364.48	73.	10.	0.006	162.34	1.142s
BA-133	1535.87	383.84	190.	-16.	-0.009	124.37	1.162
Cf-249	1552.32	387.95	206.	0.	0.000	1000.00	1.165s
SN-113	1567.28	391.69	164.	15.	0.009	119.97	1.169
SB-125	1712.08	427.88	52.	11.	0.006	132.76	1.205s
AG-108M	1736.34	433.94	44.	4.	0.002	342.63	1.211
pm-146	1816.14	453.88	64.	-3.	-0.002	525.29	1.230
SB-125	1854.10	463.37	74.	53.	0.029	26.98	1.240
Ir-192	1872.88	468.06	161.	-17.	-0.009	109.87	1.244
BE-7	1911.04	477.60	215.	-21.	-0.012	101.49	1.254s
HF-181	1928.65	482.00	236.	-21.	-0.012	105.73	1.258s
La-140	1948.75	487.02	238.	14.	0.008	163.30	1.263s
RH-106	2048.16	511.86	273.	-12.	-0.007	191.70	2.537s
Nd-147	2124.72	531.00	56.	-10.	-0.006	151.49	1.306s
Ba-140	2149.77	537.26	65.	-7.	-0.004	238.12	1.312s
CS-134	2253.70	563.24	48.	-3.	-0.001	532.02	1.337s
CS-134	2278.04	569.32	48.	5.	0.003	188.12	1.342s
PA-234	2278.64	569.47	64.	-9.	-0.005	132.26	1.343
BI-207	2279.57	569.70	69.	-5.	-0.003	538.25	1.343
TL-208	2333.91	583.28	24.	210.	0.117	8.63	1.672s
SB-125	2402.79	600.50	486.	-17.	-0.009	109.25	1.372s
SB-124	2411.71	602.73	449.	-16.	-0.009	110.70	1.374s
CS-134	2419.63	604.71	433.	-16.	-0.009	187.05	1.376s
BI-214	2437.99	609.30	42.	249.	0.138	8.59	1.483s
RU-103	2441.99	610.30	417.	-4.	-0.002	739.27	1.382s
AG-108M	2457.92	614.28	413.	0.	0.000	1000.00	1.385s
PM-144	2473.05	618.06	413.	0.	0.000	1000.00	1.389s
RH-106	2488.47	621.92	434.	-17.	-0.010	123.84	1.392s
I-131	2548.71	636.97	48.	-11.	-0.006	130.35	1.407
AG-110M	2631.87	657.76	122.	-20.	-0.011	79.46	1.427s
PM-144	2787.02	696.54	37.	14.	0.008	93.86	1.463s
NB-94	2811.37	702.63	37.	10.	0.005	137.89	1.469s
SB-124	2892.00	722.79	112.	-8.	-0.004	203.31	1.488s
AG-108M	2892.61	722.94	105.	0.	0.000	1000.00	1.488s
EU-154	2894.28	723.36	105.	0.	0.000	1000.00	1.488
ZR-95	2897.65	724.20	105.	0.	0.000	1000.00	1.489
BI-212	2910.65	727.45	18.	57.	0.032	21.45	1.158

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2989.50	747.16	37.	6.	0.003	232.56	1.510s
ZR-95	3027.78	756.73	19.	11.	0.006	92.68	1.519s
AG-110M	3056.63	763.94	105.	-23.	-0.013	67.74	1.526s
NB-95	3064.02	765.79	113.	7.	0.004	233.71	1.528s
PA-234M	3066.51	766.41	60.	14.	0.008	82.56	1.528s
EU-152	3116.54	778.92	61.	-19.	-0.011	88.56	1.540s
BI-212	3142.54	785.42	47.	4.	0.002	337.85	1.546s
CS-134	3184.33	795.87	68.	6.	0.003	198.61	1.556s
CS-134	3208.67	801.95	103.	-18.	-0.010	83.20	1.561s
CO-58	3243.96	810.78	68.	-4.	-0.002	257.55	1.569s
La-140	3263.94	815.77	55.	5.	0.003	228.79	1.574s
Cs-136	3274.86	818.50	70.	-6.	-0.003	206.78	1.576s
MN-54	3340.25	834.85	37.	5.	0.003	281.58	1.591s
Co-56	3387.93	846.77	66.	-21.	-0.012	46.25	1.602s
TL-208	3444.00	860.79	1.	35.	0.020	17.12	1.150s
NB-94	3485.23	871.10	36.	-4.	-0.002	217.94	1.625s
EU-154	3493.77	873.23	43.	-1.	-0.001	932.74	1.627s
PA-234	3522.96	880.53	52.	13.	0.007	84.85	1.633
PA-234	3533.80	883.24	64.	5.	0.003	248.96	1.636s
AG-110M	3539.58	884.68	69.	0.	0.000	1000.00	1.637s
y-88	3593.00	898.04	26.	3.	0.002	325.74	1.649s
AC-228	3645.80	911.24	17.	160.	0.089	9.79	0.946s
AG-110M	3750.78	937.49	41.	-11.	-0.006	107.18	1.685s
PA-234	3784.89	946.02	70.	-22.	-0.012	86.24	1.692s
AC-228	3877.15	969.09	7.	82.	0.046	12.81	1.890
EU-154	3986.08	996.33	30.	10.	0.006	80.82	1.737s
EU-154	4019.86	1004.77	49.	-18.	-0.010	87.80	1.745s
Co-56	4152.08	1037.84	20.	2.	0.001	496.66	1.774s
Cs-136	4192.99	1048.07	27.	12.	0.007	66.07	1.783s
RH-106	4202.15	1050.36	38.	5.	0.003	195.94	1.785s
BI-207	4255.33	1063.66	12.	8.	0.004	104.93	1.797s
Ga-68	4310.28	1077.40	37.	-5.	-0.003	263.98	1.809s
FE-59	4397.65	1099.25	70.	-23.	-0.013	35.06	1.828s
EU-152	4448.93	1112.07	145.	-16.	-0.009	111.53	1.839s
ZN-65	4462.81	1115.55	129.	-12.	-0.007	136.84	1.842s
BI-214	4481.77	1120.29	99.	11.	0.006	133.64	1.847s
Sc-46	4482.82	1120.55	78.	16.	0.009	83.33	1.847s
Ta-182	4485.82	1121.30	73.	16.	0.009	80.75	1.847s
CO-60	4693.48	1173.24	32.	2.	0.001	646.79	1.892
Ta-182	4756.71	1189.05	27.	6.	0.004	189.55	1.906
Co-56	4953.53	1238.28	44.	12.	0.007	123.48	1.948s
NA-22	5098.46	1274.53	11.	10.	0.005	58.53	1.979s
FE-59	5166.69	1291.60	34.	-3.	-0.002	458.02	1.993s
CO-60	5330.21	1332.50	28.	-10.	-0.006	146.56	2.028s
AG-110M	5537.27	1384.30	17.	-7.	-0.004	143.21	2.071s
EU-152	5632.02	1408.00	11.	10.	0.006	82.97	2.090s
K-40	5842.86	1460.75	10.	507.	0.281	4.54	2.240
La-140	6384.26	1596.21	24.	-10.	-0.006	122.47	2.242s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6763.00	1690.98	6.	1.	0.000	945.38	2.317s
BI-214	7056.73	1764.49	16.	34.	0.019	24.19	2.373s
y-88	7342.69	1836.06	0.	6.	0.003	40.82	2.428s

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	-5.7853E+00				5.31E+01	
			477.60	-5.785E+00	(	1.964E+01 1.01E+02 1.05E+01	G
NA-22	C	5.9125E-01				9.50E+02	
			1274.53	5.913E-01	?(	1.119E+00 5.85E+01 9.99E+01	G
K-40	N	3.2097E+02				4.66E+11	
			1460.83	3.210E+02	(P	1.128E+01 4.54E+00 1.07E+01	G
Sc-46	F	4.4394E-01				8.38E+01	
			889.28	2.305E-02	%(	1.942E+00 2.40E+03 1.00E+02	G
			1120.55	8.648E-01	?(	2.412E+00 8.33E+01 1.00E+02	G
CR-51	F	-4.9890E+00				2.77E+01	
			320.08	-4.989E+00	?(P	2.502E+01 6.00E+01 9.94E+00	G
MN-54	C	2.0513E-01				3.12E+02	
			834.85	2.051E-01	&(	1.371E+00 2.82E+02 1.00E+02	G
FE-59	F	-2.2228E+00				4.45E+01	
			1099.25	-2.223E+00	?(P	3.989E+00 3.51E+01 5.65E+01	G
			1291.60	-4.765E-01	+ P	4.267E+00 4.58E+02 4.32E+01	G
Co-56	C	-9.4355E-01				7.73E+01	
			846.77	-9.435E-01	?(P	1.800E+00 4.62E+01 9.99E+01	G
			1238.28	1.116E+00	+ P	3.011E+00 1.23E+02 6.61E+01	G
			1037.84	7.340E-01	+	8.642E+00 4.97E+02 1.41E+01	G
			1771.35	-3.392E-01	%	1.826E+01 1.51E+03 1.55E+01	A
CO-57	C	1.4123E-01				2.72E+02	
			122.06	0.000E+00	?(	1.225E+00 1.00E+03 8.56E+01	G
			136.47	1.273E+00	?(	1.431E+01 3.35E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.6382E-01					7.09E+01	
			810.78	-1.638E-01	?(P	1.776E+00	2.58E+02	9.95E+01 G
CO-60	F	-6.5997E-01					1.93E+03	
			1332.50	-6.600E-01	?(P	1.736E+00	1.47E+02	1.00E+02 G
			1173.24	1.141E-01	+	1.658E+00	6.47E+02	9.99E+01 G
ZN-65	F	-1.3008E+00					2.44E+02	
			1115.55	-1.301E+00	?(	6.027E+00	1.37E+02	5.06E+01 G
NB-94	I	3.8138E-01					7.41E+06	
			702.63	3.814E-01	&(	1.230E+00	1.38E+02	9.79E+01 G
			871.10	-1.817E-01	-	1.393E+00	2.18E+02	9.99E+01 G
ZR-95	I	7.8739E-01					6.40E+01	
			756.73	7.874E-01	?(P	1.715E+00	9.27E+01	5.45E+01 G
			724.20	0.000E+00	&	4.515E+00	1.00E+03	4.42E+01 G
NB-95	I	2.6873E-01					6.40E+01	
			765.79	2.687E-01	?(	2.152E+00	2.34E+02	9.98E+01 G
RU-103	I	-4.4630E-02					3.93E+01	
			497.05	-4.463E-02	%(P	1.201E+00	1.05E+03	9.09E+01 G
			610.30	-2.370E+00	+	5.923E+01	7.39E+02	5.75E+00 GA
RH-106	I	-3.2191E+00					3.74E+02	
			621.92	-6.152E+00	&(P	3.546E+01	1.24E+02	9.93E+00 G
			1050.36	1.545E+01	&(	1.060E+02	1.96E+02	1.56E+00 G
			511.86	-1.887E+00	+	1.220E+01	1.92E+02	2.00E+01 GA
AG-108M	C	1.1528E-01					1.53E+05	
			433.94	1.153E-01	?(P	1.011E+00	3.43E+02	9.05E+01 G
			722.94	0.000E+00	-	2.192E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.791E+00	1.00E+03	8.98E+01 G
SN-113	F	6.0891E-01					1.15E+02	
			391.69	6.089E-01	&(P	2.459E+00	1.20E+02	6.40E+01 G
SB-124	F	-5.7619E-01					6.02E+01	
			602.73	-5.762E-01	?(P	3.561E+00	1.11E+02	9.83E+01 G
			1690.98	1.059E-01	+	2.293E+00	9.45E+02	4.78E+01 G
			722.79	-2.737E+00	&	1.903E+01	2.03E+02	1.08E+01 G
SB-125	I	4.4736E+00					1.01E+03	
			427.88	9.933E-01	?(P	3.302E+00	1.33E+02	2.96E+01 G
			600.50	-3.195E+00	+ P	2.029E+01	1.09E+02	1.79E+01 G
			635.89	-1.586E-01	&	9.155E+00	1.59E+03	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	1.431E+01	(P	1.167E+01	2.70E+01	1.05E+01 G
I-131	I	3.0700E-01					8.02E+00	
			364.48	3.070E-01	?(P	1.246E+00	1.62E+02	8.17E+01 G
			284.30	-7.668E-01	+	1.495E+01	7.39E+02	6.14E+00 G
			636.97	-5.594E+00	+	1.756E+01	1.30E+02	7.17E+00 G
Gd-153	F	9.6997E-01					2.42E+02	
			97.50	9.700E-01	(	4.746E+00	1.46E+02	3.00E+01 G
			103.20	0.000E+00	-	6.713E+00	1.00E+03	2.18E+01 G
Ga-68	C	-1.0049E+01					4.71E-02	
			1077.40	-1.005E+01	?(	5.876E+01	2.64E+02	3.30E+00 G
Tc-99m	I	3.2262E-01					2.51E-01	
			140.51	3.226E-01	?(	1.303E+00	1.21E+02	8.93E+01 G
BA-133	F	2.5364E-02					3.85E+03	
			356.00	2.536E-02	%(	3.721E+00	4.33E+03	6.20E+01 G
			302.85	0.000E+00	-	1.176E+01	1.00E+03	1.83E+01 G
			383.84	-4.456E+00	+	1.864E+01	1.24E+02	8.94E+00 GA
			80.99	-1.009E+00	+	6.730E+00	2.00E+02	3.41E+01 GA
CS-134	I	-5.9391E-02					7.54E+02	
			604.71	-5.620E-01	?(	3.529E+00	1.87E+02	9.76E+01 G
			795.87	2.974E-01	?(	2.039E+00	1.99E+02	8.55E+01 G
			569.32	1.147E+00	?(	7.501E+00	1.88E+02	1.54E+01 G
			801.95	-8.833E+00	+	2.455E+01	8.32E+01	8.69E+00 G
			563.24	-1.048E+00	&	1.371E+01	5.32E+02	8.35E+00 G
CS-137	I	4.8502E-02					1.10E+04	
			661.66	4.850E-02	&(	2.419E+00	1.44E+03	8.52E+01 G
CE-139	F	1.4621E-01					1.38E+02	
			165.85	1.462E-01	?(	1.532E+00	3.10E+02	7.99E+01 G
Ba-140	I	-9.0987E-01					1.28E+01	
			537.26	-9.099E-01	?(	5.236E+00	2.38E+02	2.44E+01 G
			162.66	-5.584E+00	&	2.067E+01	1.11E+02	6.22E+00 G
			304.85	0.000E+00	&	5.046E+01	1.00E+03	4.29E+00 G
La-140	I	4.6963E-01					1.28E+01	
			1596.21	-7.601E-01	?(	1.941E+00	1.22E+02	9.54E+01 G
			487.02	8.796E-01	?(	4.843E+00	1.63E+02	4.55E+01 G
			328.76	4.876E+00	&(	4.576E+00	3.83E+01	2.03E+01 G
			815.77	8.658E-01	?(	6.895E+00	2.29E+02	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-6.3738E-01					3.25E+01	
			145.44	-6.374E-01	?(	2.608E+00	1.22E+02	4.82E+01 G
CE-144	I	-3.3279E+00					2.85E+02	
			133.54	-3.328E+00	(	1.405E+01	1.27E+02	1.11E+01 G
PM-144	C	5.5775E-01					3.63E+02	
			696.54	5.578E-01	?(	1.209E+00	9.39E+01	9.90E+01 G
			618.06	0.000E+00	-	3.453E+00	1.00E+03	9.91E+01 G
EU-154	I	2.0998E+00					3.14E+03	
			873.23	-3.705E-01	?(	1.233E+01	9.33E+02	1.23E+01 G
			123.10	-8.142E-01	&	2.628E+00	9.68E+01	4.08E+01 G
			1274.54	1.053E-01	%	4.190E+00	1.08E+03	3.52E+01 G
			723.36	0.000E+00	&	9.850E+00	1.00E+03	2.02E+01 G
			1004.77	-5.110E+00	+	9.927E+00	8.78E+01	1.80E+01 G
			996.33	4.959E+00	?(	1.349E+01	8.08E+01	1.06E+01 G
EU-155	I	-7.0853E-02					1.81E+03	
			105.31	-7.085E-02	%(P	6.896E+00	3.89E+03	2.12E+01 G
			86.54	-1.888E-01	%	7.066E+00	1.12E+03	3.07E+01 G
HF-181	F	-7.6372E-01					4.24E+01	
			482.00	-7.637E-01	&(	2.702E+00	1.06E+02	8.05E+01 G
			133.02	-8.506E-01	&	3.515E+00	1.24E+02	4.33E+01 G
			345.83	0.000E+00	&	1.253E+01	1.00E+03	1.51E+01 G
			136.30	-6.383E+00	+	2.742E+01	1.29E+02	5.85E+00 G
Ta-182	F	2.4073E+00					1.14E+02	
			1121.30	2.480E+00	?(	6.696E+00	8.08E+01	3.49E+01 G
			1221.41	-1.452E-01	%	7.218E+00	2.23E+03	2.70E+01 G
			1189.05	2.251E+00	(	9.517E+00	1.90E+02	1.62E+01 G
Hg-203	F	-2.6931E-01					4.66E+01	
			279.20	-2.693E-01	&(	1.646E+00	1.81E+02	8.15E+01 G
TL-208	N	8.3529E+00					6.98E+02	
			583.02	8.353E+00	@(P	1.022E+00	8.63E+00	8.45E+01 G
			277.28	-3.769E+00	-	1.955E+01	1.53E+02	6.31E+00 G
			860.56	1.282E+01	+ P	2.668E+00	1.71E+01	1.24E+01 G
pm-146	C	6.7393E-01					2.02E+03	
			747.16	6.739E-01	&(	3.709E+00	2.33E+02	3.40E+01 G
			735.72	1.777E-01	%	4.862E+00	1.13E+03	2.25E+01 G
			453.88	-1.295E-01	-	1.726E+00	5.25E+02	6.50E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

y-88     F   3.3492E-01                                     1.07E+02
                          898.04 1.705E-01 ?(P 1.302E+00 3.26E+02 9.37E+01 G
                         1836.06 4.902E-01 ?(  6.022E-01 4.08E+01 9.92E+01 G

Cd-113m     -3.8318E+03                                     5.33E+03
                          263.70-3.832E+03 ?(  2.121E+04 1.64E+02 6.00E-03   K

Cd-109   F   8.7538E+00                                     4.53E+02
                                                          Derived Ave Activity
                           88.04 8.754E+00 }(  5.354E+01 1.84E+02 3.79E+00 G

Cf-251   T   1.0029E+00                                     3.28E+05
                          176.60 1.003E+00 &(  5.193E+00 1.91E+02 1.70E+01 G
                          227.00 5.074E+00 &   1.371E+01 1.05E+02 6.30E+00 GA

Sn-126      -4.6703E+00                                     3.65E+07
                           87.57 8.863E-01 }   5.363E+00 9.32E+01 3.75E+01 GA
                           64.28-4.670E+00 ?(  1.505E+01 1.21E+02 9.70E+00 G
                           86.94 3.686E+00 }   2.307E+01 9.17E+01 9.04E+00 GA

PB-210   N  -1.7061E+01                                     8.14E+03
                           46.54-1.706E+01 *(P 5.357E+01 7.79E+01 4.25E+00 G

PB-212   N   2.1743E+01                                     6.98E+02
                          238.63 2.174E+01  (P 1.794E+00 4.96E+00 4.33E+01 G
                          300.03 1.932E+01 - P 2.355E+01 4.46E+01 3.28E+00 GA

PB-214   N   1.7204E+01                                     5.84E+05
                          351.93 1.727E+01 @(P 2.539E+00 8.24E+00 3.76E+01 G
                          295.09 1.708E+01  (P 4.841E+00 1.38E+01 1.93E+01 G
                          242.00 2.267E+01 + P 1.209E+01 1.85E+01 7.43E+00 GA

BI-207   C   1.3489E-01                                     1.18E+04
                          569.70-1.785E-01 ?(P 1.405E+00 5.38E+02 9.77E+01 G
                         1063.66 5.460E-01 ?(P 1.328E+00 1.05E+02 7.45E+01 G

BI-212   N   3.0040E+01                                     6.98E+02
                          727.17 3.004E+01  (P 1.173E+01 2.14E+01 7.55E+00 G
                          785.42 1.421E+01 &   1.133E+02 3.38E+02 1.28E+00 GA

BI-214   N   1.8415E+01                                     5.84E+05
                          609.31 1.880E+01 @(P 2.475E+00 8.59E+00 4.61E+01 G
                         1120.29 3.939E+00 - P 1.784E+01 1.34E+02 1.51E+01 G
                         1764.49 1.727E+01 ?(P 1.092E+01 2.42E+01 1.54E+01 G
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Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	6.4860E-01						1.10E+09	
			265.83	6.486E-01	&(	2.460E+00	1.13E+02	5.00E+01	G
			304.90	0.000E+00	&	7.733E+00	1.00E+03	2.80E+01	G
AC-228	N	2.4510E+01						2.10E+03	
			911.07	2.596E+01	(	3.519E+00	9.79E+00	2.90E+01	G
			968.97	2.320E+01	(	4.154E+00	1.28E+01	1.75E+01	G
			338.32	2.292E+01	*(	7.018E+00	1.66E+01	1.20E+01	G
			93.35	2.161E+01		1.354E+01	2.08E+01	5.56E+00	XA
TH-227	N	5.4970E+00						7.95E+03	
			50.14	5.497E+00	(	2.237E+01	1.21E+02	8.00E+00	G
			256.24	-7.884E-01	- P	1.408E+01	5.88E+02	7.00E+00	G
TH-229	N	5.7127E+00						2.68E+06	
			193.51	5.713E+00	?(P	1.999E+01	1.30E+02	4.40E+00	G
			210.85	-1.377E+01	+	5.591E+01	1.22E+02	2.99E+00	G
TH-234	N	-1.0848E-01						1.63E+12	
			63.29	-1.085E-01	%(P	4.009E+01	1.09E+04	3.81E+00	G
			92.59	-7.453E-01	% P	3.599E+01	1.44E+03	5.58E+00	G
PA-234	N	-5.5442E-01						1.63E+12	
			131.29	-2.032E+00	&(	8.227E+00	1.21E+02	1.80E+01	G
			946.02	-7.936E+00	+	1.503E+01	8.62E+01	1.34E+01	G
			569.47	-3.563E+00	+	1.611E+01	1.32E+02	8.20E+00	G
			883.24	2.216E+00	?(	1.915E+01	2.49E+02	9.60E+00	G
			880.53	9.680E+00		2.761E+01	8.49E+01	6.00E+00	GA
PA-234M	N	4.9294E+01						1.63E+12	
			1001.00	-2.617E+00	%(P	2.056E+02	2.21E+03	8.37E-01	G
			766.41	1.971E+02	?(	5.454E+02	8.26E+01	2.94E-01	G
U-235	N	2.4416E+00						2.57E+11	
			143.79	2.442E+00	(P	1.078E+01	1.32E+02	1.10E+01	G
			205.33	-7.788E+00	+ P	2.998E+01	8.71E+01	5.01E+00	G
			163.38	-2.190E+00	+ P	2.219E+01	3.47E+02	5.08E+00	G
AM-241	T	-8.2675E-01						1.58E+05	
			59.54	-8.267E-01	?(	4.122E+00	1.86E+02	3.59E+01	G
Ir-192	F	-5.5435E-01						7.40E+01	
			316.49	-5.543E-01	?(	2.814E+00	1.52E+02	8.70E+01	G
			468.06	-9.291E-01	+	3.430E+00	1.10E+02	5.18E+01	G
			308.44	0.000E+00	&	6.874E+00	1.00E+03	3.18E+01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   2.1947E-01                                      1.30E+01
                          818.50-2.526E-01 &(  1.803E+00 2.07E+02 1.00E+02 G
                         1048.07 8.095E-01 ?(  1.768E+00 6.61E+01 8.00E+01 G
                          340.57-5.449E-01 +   4.058E+00 2.21E+02 4.69E+01 G

Np-239   T   1.2263E+00                                      2.36E+00
                          103.70 0.000E+00 -   6.094E+00 1.00E+03 2.40E+01 X
                          106.13 1.226E+00 *(  5.996E+00 1.46E+02 2.27E+01 G
                           99.50 1.926E+00     9.634E+00 1.50E+02 1.50E+01 X

Nd-147      -2.4985E+00                                      1.11E+01
                          531.00-2.499E+00 ?(  9.112E+00 1.51E+02 1.30E+01 G
                           91.10 1.160E+00 +   7.152E+00 1.85E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	357.	-29.	-0.016	77.92	-1.706E+01	P
TH-227	50.14	280.	20.	0.011	121.46	5.497E+00	
AM-241	59.54	310.	-17.	-0.009	185.89	-8.267E-01	
BA-133	80.99	1351.	-26.	-0.014	200.26	-1.009E+00	
Nd-147	91.10	1178.	26.	0.015	184.94	1.160E+00	
Gd-153	97.50	599.	24.	0.013	146.48	9.700E-01	
Np-239	99.50	623.	24.	0.013	149.77	1.926E+00	
Np-239	106.13	561.	23.	0.013	146.33	1.226E+00	
EU-152	121.78	303.	-17.	-0.010	144.12	-7.379E-01	
EU-154	123.10	334.	-27.	-0.015	96.84	-8.142E-01	
PA-234	131.29	624.	-29.	-0.016	121.49	-2.032E+00	
HF-181	133.02	653.	-29.	-0.016	124.01	-8.506E-01	
CE-144	133.54	682.	-29.	-0.016	126.65	-3.328E+00	
HF-181	136.30	712.	-30.	-0.016	128.90	-6.383E+00	
CO-57	136.47	644.	11.	0.006	334.86	1.273E+00	
Tc-99m	140.51	337.	22.	0.012	120.75	3.226E-01	
U-235	143.79	360.	21.	0.011	131.89	2.442E+00	P
CE-141	145.44	404.	-24.	-0.013	122.45	-6.374E-01	
Ba-140	162.66	361.	-25.	-0.014	110.84	-5.584E+00	
U-235	163.38	273.	-8.	-0.004	346.89	-2.190E+00	P
CE-139	165.85	330.	8.	0.005	310.07	1.462E-01	
Cf-251	176.60	153.	12.	0.006	191.13	1.003E+00	
TH-229	193.51	134.	16.	0.009	129.58	5.713E+00	P
U-235	205.33	375.	-24.	-0.013	87.07	-7.788E+00	P
TH-229	210.85	450.	-25.	-0.014	121.62	-1.377E+01	
Cf-251	227.00	103.	18.	0.010	105.16	5.074E+00	
EU-152	244.69	929.	-8.	-0.004	544.25	-1.906E+00	
TH-227	256.24	114.	-3.	-0.002	588.46	-7.884E-01	P
Cd-113m	263.70	187.	-12.	-0.007	163.72	-3.832E+03	
BI-210M	265.83	172.	17.	0.009	112.90	6.486E-01	
Hg-203	279.20	192.	-11.	-0.006	180.53	-2.693E-01	
I-131	284.30	84.	-2.	-0.001	739.21	-7.668E-01	
PA-231	300.07	468.	-12.	-0.007	249.78	-1.050E+01	
Ir-192	316.49	557.	-22.	-0.012	151.84	-5.543E-01	
CR-51	320.08	565.	-23.	-0.013	59.96	-4.989E+00	P
La-140	328.76	70.	44.	0.025	38.29	4.876E+00	
Cf-249	333.44	84.	-6.	-0.004	274.16	-9.207E-01	
Cs-136	340.57	298.	-11.	-0.006	220.72	-5.449E-01	
I-131	364.48	73.	10.	0.006	162.34	3.070E-01	P
BA-133	383.84	190.	-16.	-0.009	124.37	-4.456E+00	
SN-113	391.69	164.	15.	0.009	119.97	6.089E-01	P
AG-108M	433.94	44.	4.	0.002	342.63	1.153E-01	P
pm-146	453.88	64.	-3.	-0.002	525.29	-1.295E-01	
Ir-192	468.06	161.	-17.	-0.009	109.87	-9.291E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	477.60	215.	-21.	-0.012	101.49	-5.785E+00	
HF-181	482.00	236.	-21.	-0.012	105.73	-7.637E-01	
La-140	487.02	238.	14.	0.008	163.30	8.796E-01	
RH-106	511.86	273.	-12.	-0.007	191.70	-1.887E+00	
Nd-147	531.00	56.	-10.	-0.006	151.49	-2.499E+00	
Ba-140	537.26	65.	-7.	-0.004	238.12	-9.099E-01	
CS-134	563.24	48.	-3.	-0.001	532.02	-1.048E+00	
CS-134	569.32	48.	5.	0.003	188.12	1.147E+00	
PA-234	569.47	64.	-9.	-0.005	132.26	-3.563E+00	
BI-207	569.70	69.	-5.	-0.003	538.25	-1.785E-01	P
SB-124	602.73	449.	-16.	-0.009	110.70	-5.762E-01	P
CS-134	604.71	433.	-16.	-0.009	187.05	-5.620E-01	
RU-103	610.30	417.	-4.	-0.002	739.27	-2.370E+00	
RH-106	621.92	434.	-17.	-0.010	123.84	-6.152E+00	P
I-131	636.97	48.	-11.	-0.006	130.35	-5.594E+00	
AG-110M	657.76	122.	-20.	-0.011	79.46	-7.948E-01	
PM-144	696.54	37.	14.	0.008	93.86	5.578E-01	
NB-94	702.63	37.	10.	0.005	137.89	3.814E-01	
SB-124	722.79	112.	-8.	-0.004	203.31	-2.737E+00	
pm-146	747.16	37.	6.	0.003	232.56	6.739E-01	
ZR-95	756.73	19.	11.	0.006	92.68	7.874E-01	P
AG-110M	763.94	105.	-23.	-0.013	67.74	-4.154E+00	
NB-95	765.79	113.	7.	0.004	233.71	2.687E-01	
PA-234M	766.41	60.	14.	0.008	82.56	1.971E+02	
EU-152	778.92	61.	-19.	-0.011	88.56	-6.223E+00	
CS-134	795.87	68.	6.	0.003	198.61	2.974E-01	
CS-134	801.95	103.	-18.	-0.010	83.20	-8.833E+00	
CO-58	810.78	68.	-4.	-0.002	257.55	-1.638E-01	P
La-140	815.77	55.	5.	0.003	228.79	8.658E-01	
Cs-136	818.50	70.	-6.	-0.003	206.78	-2.526E-01	
MN-54	834.85	37.	5.	0.003	281.58	2.051E-01	
Co-56	846.77	66.	-21.	-0.012	46.25	-9.435E-01	P
NB-94	871.10	36.	-4.	-0.002	217.94	-1.817E-01	
EU-154	873.23	43.	-1.	-0.001	932.74	-3.705E-01	
PA-234	880.53	52.	13.	0.007	84.85	9.680E+00	
PA-234	883.24	64.	5.	0.003	248.96	2.216E+00	
y-88	898.04	26.	3.	0.002	325.74	1.705E-01	P
AG-110M	937.49	41.	-11.	-0.006	107.18	-1.467E+00	P
PA-234	946.02	70.	-22.	-0.012	86.24	-7.936E+00	
EU-154	996.33	30.	10.	0.006	80.82	4.959E+00	
EU-154	1004.77	49.	-18.	-0.010	87.80	-5.110E+00	
Co-56	1037.84	20.	2.	0.001	496.66	7.340E-01	
Cs-136	1048.07	27.	12.	0.007	66.07	8.095E-01	
RH-106	1050.36	38.	5.	0.003	195.94	1.545E+01	
BI-207	1063.66	12.	8.	0.004	104.93	5.460E-01	P
Ga-68	1077.40	37.	-5.	-0.003	263.98	-1.005E+01	
FE-59	1099.25	70.	-23.	-0.013	35.06	-2.223E+00	P
EU-152	1112.07	145.	-16.	-0.009	111.53	-6.275E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZN-65	1115.55	129.	-12.	-0.007	136.84	-1.301E+00		
Sc-46	1120.55	78.	16.	0.009	83.33	8.648E-01		
Ta-182	1121.30	73.	16.	0.009	80.75	2.480E+00		
CO-60	1173.24	32.	2.	0.001	646.79	1.141E-01		
Ta-182	1189.05	27.	6.	0.004	189.55	2.251E+00		
Co-56	1238.28	44.	12.	0.007	123.48	1.116E+00	P	
NA-22	1274.53	11.	10.	0.005	58.53	5.913E-01		
FE-59	1291.60	34.	-3.	-0.002	458.02	-4.765E-01	P	
CO-60	1332.50	28.	-10.	-0.006	146.56	-6.600E-01	P	
AG-110M	1384.30	17.	-7.	-0.004	143.21	-1.868E+00		
EU-152	1408.00	11.	10.	0.006	82.97	3.212E+00		
La-140	1596.21	24.	-10.	-0.006	122.47	-7.601E-01		
SB-124	1690.98	6.	1.	0.000	945.38	1.059E-01		
y-88	1836.06	0.	6.	0.003	40.82	4.902E-01		

P - Peakbackground subtraction

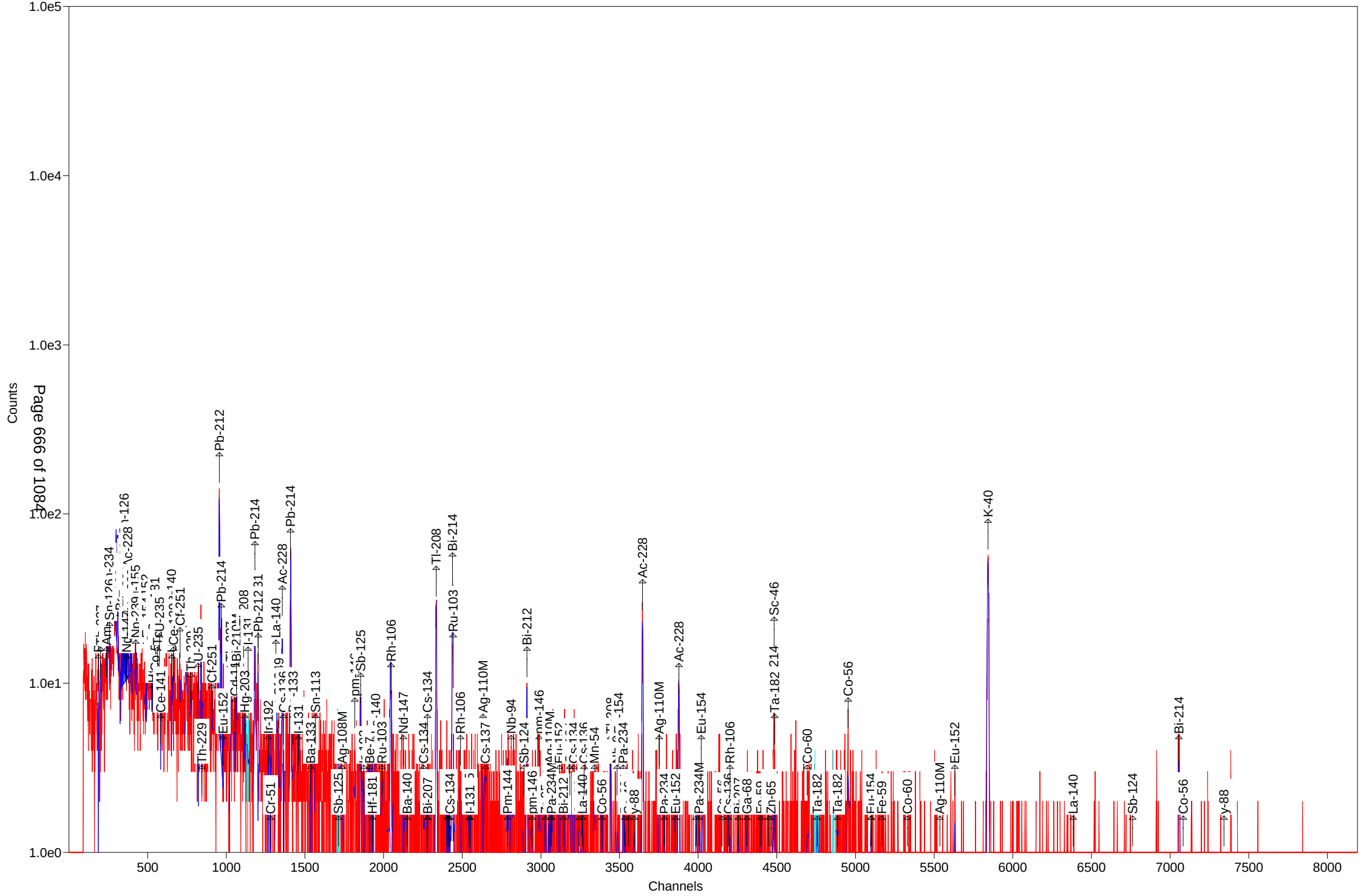
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-5.7853E+00	-5.7853E+00	1.015E+02%	1.96E+01
NA-22	#A	5.9125E-01	5.9125E-01	5.853E+01%	1.12E+00
K-40		3.2097E+02	3.2097E+02	4.538E+00%	1.13E+01
Sc-46	#A	4.4394E-01	4.4394E-01	8.333E+01%	1.94E+00
CR-51	#A	-4.9890E+00	-4.9890E+00	5.996E+01%	2.50E+01
MN-54	#A	2.0513E-01	2.0513E-01	2.816E+02%	1.37E+00
FE-59	#A	-2.2228E+00	-2.2228E+00	3.506E+01%	3.99E+00
Co-56	#A	-9.4355E-01	-9.4355E-01	4.625E+01%	1.80E+00
CO-57	#A	1.4123E-01	1.4123E-01	3.349E+02%	1.23E+00
CO-58	#A	-1.6382E-01	-1.6382E-01	2.575E+02%	1.78E+00
CO-60	#A	-6.5997E-01	-6.5997E-01	1.466E+02%	1.74E+00
ZN-65	#A	-1.3008E+00	-1.3008E+00	1.368E+02%	6.03E+00
NB-94	#A	3.8138E-01	3.8138E-01	1.379E+02%	1.23E+00
ZR-95	#A	7.8739E-01	7.8739E-01	9.268E+01%	1.71E+00
NB-95	#A	2.6873E-01	2.6873E-01	2.337E+02%	2.15E+00
RU-103	#A	-4.4630E-02	-4.4630E-02	1.052E+03%	1.20E+00
RH-106	#A	-3.2191E+00	-3.2191E+00	1.159E+02%	3.55E+01
AG-108M	#A	1.1528E-01	1.1528E-01	3.426E+02%	1.01E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.62E+00
SN-113	#A	6.0891E-01	6.0891E-01	1.200E+02%	2.46E+00
SB-124	#A	-5.7619E-01	-5.7619E-01	1.107E+02%	3.56E+00
SB-125	#C	4.4736E+00	4.4736E+00	2.698E+01%	3.30E+00
I-131	#A	3.0700E-01	3.0700E-01	1.623E+02%	1.25E+00
Gd-153	#A	9.6997E-01	9.6997E-01	1.465E+02%	4.75E+00
Ga-68	#A	-1.0017E+01	-1.0049E+01	2.640E+02%	5.88E+01
Tc-99m	#A	3.2242E-01	3.2262E-01	1.207E+02%	1.30E+00

BA-133 #A	2.5364E-02	2.5364E-02	4.330E+03%	3.72E+00
CS-134 #A	-5.9391E-02	-5.9391E-02	1.105E+02%	3.53E+00
CS-137 #A	4.8502E-02	4.8502E-02	1.443E+03%	2.42E+00
CE-139 #A	1.4621E-01	1.4621E-01	3.101E+02%	1.53E+00
Ba-140 #A	-9.0986E-01	-9.0987E-01	2.381E+02%	5.24E+00
La-140 #A	4.6962E-01	4.6963E-01	3.829E+01%	1.94E+00
CE-141 #A	-6.3738E-01	-6.3738E-01	1.225E+02%	2.61E+00
CE-144 #A	-3.3279E+00	-3.3279E+00	1.266E+02%	1.40E+01
PM-144 #A	5.5775E-01	5.5775E-01	9.386E+01%	1.21E+00
EU-152 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.11E+00
EU-154 #A	2.0998E+00	2.0998E+00	8.082E+01%	1.23E+01
EU-155 #A	-7.0853E-02	-7.0853E-02	3.890E+03%	6.90E+00
HF-181 #A	-7.6372E-01	-7.6372E-01	1.057E+02%	2.70E+00
Ta-182 #A	2.4073E+00	2.4073E+00	8.075E+01%	6.70E+00
Hg-203 #A	-2.6931E-01	-2.6931E-01	1.805E+02%	1.65E+00
TL-208	8.3529E+00	8.3529E+00	8.633E+00%	1.02E+00
pm-146 #A	6.7393E-01	6.7393E-01	2.326E+02%	3.71E+00
y-88 #A	3.3492E-01	3.3492E-01	4.082E+01%	1.30E+00
Cd-113m#A	-3.8318E+03	-3.8318E+03	1.637E+02%	2.12E+04
Cd-109 #A	8.7538E+00	8.7538E+00	1.835E+02%	5.35E+01
Cf-251 #A	1.0029E+00	1.0029E+00	1.911E+02%	5.19E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.65E+00
Sn-126 #A	-4.6703E+00	-4.6703E+00	1.209E+02%	1.50E+01
PB-210 #A	-1.7061E+01	-1.7061E+01	7.792E+01%	5.36E+01
PB-212	2.1743E+01	2.1743E+01	4.955E+00%	1.79E+00
PB-214	1.7204E+01	1.7204E+01	8.051E+00%	2.54E+00
BI-207 #A	1.3489E-01	1.3489E-01	1.049E+02%	1.40E+00
BI-212	3.0040E+01	3.0040E+01	2.145E+01%	1.17E+01
BI-214 #	1.8415E+01	1.8415E+01	8.586E+00%	2.48E+00
BI-210M#A	6.4860E-01	6.4860E-01	1.129E+02%	2.46E+00
AC-228	2.4510E+01	2.4510E+01	7.706E+00%	3.52E+00
TH-227 #A	5.4970E+00	5.4970E+00	1.215E+02%	2.24E+01
TH-229 #A	5.7127E+00	5.7127E+00	1.296E+02%	2.00E+01
TH-234 #A	-1.0848E-01	-1.0848E-01	1.091E+04%	4.01E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.48E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.11E+00
PA-234 #A	-5.5442E-01	-5.5442E-01	1.215E+02%	8.23E+00
PA-234M#A	4.9294E+01	4.9294E+01	8.256E+01%	2.06E+02
U-235 #A	2.4416E+00	2.4416E+00	1.319E+02%	1.08E+01
AM-241 #A	-8.2675E-01	-8.2675E-01	1.859E+02%	4.12E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.67E+01
Ir-192 #A	-5.5435E-01	-5.5435E-01	1.518E+02%	2.81E+00
Cs-136 #A	2.1947E-01	2.1947E-01	6.607E+01%	1.80E+00
Np-239 #A	1.2262E+00	1.2263E+00	1.463E+02%	6.00E+00
Nd-147 #A	-2.4985E+00	-2.4985E+00	1.515E+02%	9.11E+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  2000.6 keV)     4.412E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.6 keV) 4.4123801E+02  Bq/Sample
```

265170_Gamma_160-18567-A-12-B. 3_Gamma_20161394.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161729

Sample Description: 265170_Gamma_160-18567-A-13-B
Detector: Detector # 5
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-13-B

Decay to Time: 9/7/2016 18:30 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:30:52 Real Time: 1807 sec
Analysis Time: 9/7/2016 19:01 Dead Time: 0.41 %
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_2016-09-05_1554.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	-3.323E+00	137.6	4.572E+00	4.575E+00	1.863E+01
NA-22	6.168E-01	64.9	4.006E-01	4.018E-01	1.308E+00
K-40	2.894E+02	6.0	1.740E+01	2.285E+01	1.148E+01
Sc-46	-1.023E+00	92.0	9.414E-01	9.429E-01	3.165E+00
CR-51	3.915E+00	107.1	4.194E+00	4.200E+00	1.417E+01
MN-54	6.803E-02	1126.9	7.666E-01	7.666E-01	1.862E+00
FE-59	9.001E-01	92.4	8.321E-01	8.333E-01	1.991E+00
Co-56	1.006E+00	90.8	9.135E-01	9.149E-01	1.580E+00
CO-57	0.000E+00	1.#INF	1.621E-01	1.621E-01	1.413E+00
CO-58	-2.335E-01	283.6	6.622E-01	6.623E-01	2.324E+00
CO-60	-1.226E+00	89.4	1.096E+00	1.098E+00	2.721E+00
ZN-65	1.391E+00	151.9	2.113E+00	2.114E+00	7.239E+00
NB-94	-5.078E-01	107.0	5.434E-01	5.441E-01	1.709E+00
ZR-95	1.764E+00	46.8	8.249E-01	8.300E-01	1.890E+00
NB-95	-1.281E+00	75.6	9.686E-01	9.709E-01	3.222E+00
RU-103	-3.992E-01	137.9	5.504E-01	5.508E-01	1.634E+00
RH-106	6.102E+00	76.5	4.668E+00	4.679E+00	4.140E+01
AG-108M	4.659E-01	101.5	4.727E-01	4.733E-01	1.191E+00
AG-110M	-4.695E-01	75.5	3.543E-01	3.551E-01	3.890E+00
SN-113	2.586E-01	351.8	9.099E-01	9.100E-01	3.124E+00
SB-124	2.065E-01	633.3	1.308E+00	1.308E+00	4.439E+00
SB-125	2.085E+00	97.4	2.032E+00	2.035E+00	5.268E+00
I-131	7.264E-01	89.1	6.471E-01	6.482E-01	1.353E+00
Gd-153	1.075E+00	112.7	1.212E+00	1.213E+00	4.056E+00
Ga-68	5.088E+01	24.3	1.234E+01	1.266E+01	2.206E+01
Tc-99m	-2.162E-01	215.6	4.661E-01	4.663E-01	1.572E+00
BA-133	-6.815E-01	195.3	1.331E+00	1.331E+00	4.486E+00
CS-134	7.258E-01	75.1	5.448E-01	5.461E-01	4.500E+00
CS-137	1.974E+00	29.7	5.856E-01	5.945E-01	1.322E+00
CE-139	5.178E-02	898.6	4.654E-01	4.654E-01	1.589E+00
Ba-140	-1.817E+00	232.8	4.230E+00	4.231E+00	5.946E+00
La-140	-4.036E-02	342.8	1.383E-01	1.383E-01	2.282E+00
CE-141	1.433E-01	595.6	8.536E-01	8.537E-01	2.897E+00

CE-144	-6.620E-01	668.1	4.423E+00	4.423E+00	1.493E+01
PM-144	-7.712E-01	69.0	5.320E-01	5.335E-01	1.986E+00
EU-152	2.395E+00	97.5	2.335E+00	2.338E+00	9.122E+00
EU-154	-8.954E+00	83.6	7.485E+00	7.499E+00	2.506E+01
EU-155	-1.838E+00	149.8	2.752E+00	2.754E+00	9.150E+00
HF-181	1.429E-01	162.2	2.318E-01	2.319E-01	2.624E+00
Ta-182	1.964E+00	123.0	2.415E+00	2.417E+00	9.074E+00
Hg-203	-3.014E-01	188.9	5.694E-01	5.696E-01	1.937E+00
TL-208	9.897E+00	8.8	8.697E-01	1.010E+00	9.914E-01
pm-146	1.557E+00	93.0	1.447E+00	1.449E+00	3.570E+00
y-88	-1.157E+00	95.2	1.102E+00	1.104E+00	2.540E+00
Cd-113m	5.658E+03	97.7	5.526E+03	5.538E+03	1.864E+04
Cd-109	0.000E+00	1.#INF	1.732E+01	1.732E+01	5.783E+01
Cf-251	1.904E+00	113.5	2.160E+00	2.167E+00	5.827E+00
Cf-249	0.000E+00	1.#INF	5.487E-01	5.487E-01	3.196E+00
Sn-126	1.662E+00	348.8	5.798E+00	5.798E+00	1.653E+01
PB-210	3.074E+00	506.1	1.555E+01	1.556E+01	4.532E+01
PB-212	2.765E+01	5.0	1.380E+00	2.259E+00	2.155E+00
PB-214	1.579E+01	8.9	1.408E+00	1.630E+00	3.136E+00
BI-207	4.178E-01	92.0	3.844E-01	3.850E-01	1.560E+00
BI-212	4.330E+01	13.6	5.904E+00	6.318E+00	5.914E+00
BI-214	1.820E+01	9.4	1.712E+00	1.956E+00	2.575E+00
BI-210M	4.516E-01	155.4	7.017E-01	7.022E-01	2.398E+00
AC-228	2.662E+01	8.2	2.190E+00	2.577E+00	3.000E+00
TH-227	-6.422E-01	83.0	5.331E-01	5.343E-01	2.122E+01
TH-229	1.081E+01	76.9	8.312E+00	8.357E+00	2.395E+01
TH-234	1.122E+00	800.3	8.979E+00	8.979E+00	4.334E+01
PA-231	-1.321E+01	171.6	2.267E+01	2.269E+01	7.648E+01
PA-233	-2.493E-01	474.9	1.184E+00	1.184E+00	4.098E+00
PA-234	-1.958E+00	145.9	2.856E+00	2.858E+00	9.550E+00
PA-234M	9.496E+01	92.7	8.803E+01	8.816E+01	2.031E+02
U-235	4.822E+00	53.7	2.588E+00	2.600E+00	6.122E+00
AM-241	3.444E-01	422.7	1.456E+00	1.456E+00	4.185E+00
Np-237	-3.208E+00	172.4	5.530E+00	5.533E+00	1.844E+01
Ir-192	6.494E-01	74.2	4.820E-01	4.835E-01	1.350E+00
Cs-136	-2.721E-01	105.7	2.875E-01	2.879E-01	1.963E+00
Np-239	-4.579E-01	549.5	2.516E+00	2.517E+00	8.455E+00
Nd-147	2.508E+00	152.8	3.831E+00	3.834E+00	9.806E+00
Total	6.292E+03				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-13-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161729.An1

Acquisition information
Start time: 9/7/2016 6:30:52 PM
Live time: 1800
Real time: 1807
Dead time: 0.41 %
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	9/7/2016 6:30:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-09-05_1554.PBC 9/5/2016 3:54:52 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2700

***** 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.	506.06	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
59.54	6.	422.69	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
64.28	8.	348.81	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.76	228.	9.70	0.81	3.150E-02				
77.04	324.	7.73	0.81	3.217E-02				
80.99	9.	325.01	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
87.22	117.	14.91	0.83	3.447E-02	86.49	13.100	1.445E+01	Np237
					86.54	30.700	6.162E+00	EU155
					86.94	9.040	2.088E+01	Sn126
					87.57	37.500	5.019E+00	Sn126
					88.04	3.790	4.954E+01	Cd109
89.85	83.	20.76	0.83	3.490E-02				
92.88	96.	19.15	0.83	3.530E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.726E+01	AC228
97.50	21.	112.66	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
123.10	20.	102.35	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
128.74	57.	27.62	1.15	3.532E-02				
144.04	22.	62.76	1.44	3.371E-02	143.79	10.960	PBC<MDA	U235
145.44	4.	595.58	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
162.33	18.	120.27	0.90	3.102E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
165.85	2.	898.64	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	17.	113.46	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
193.51	17.	116.28	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
205.83	15.	86.72	0.30	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	21.	100.62	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	3.	647.59	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.75	462.	5.66	0.84	2.318E-02	238.63	43.300	2.556E+01	PB212
242.14	65.	23.38	0.98	2.293E-02	242.00	7.430	2.104E+01	PB214
256.59	15.	106.73	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
263.70	13.	97.67	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	9.	155.38	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
276.82	49.	23.66	1.41	2.048E-02	277.28	6.310	2.121E+01	TL208
284.30	12.	118.56	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.31	108.	14.27	0.92	1.944E-02	295.09	19.300	1.606E+01	PB214
300.46	43.	29.45	1.05	1.918E-02	300.03	3.280	3.797E+01	PB212
					300.07	2.460	5.063E+01	PA231
					300.18	6.200	2.009E+01	PA233
308.44	10.	172.63	1.05	1.875E-02	308.44	31.750	PBC<MDA	Ir192
316.49	13.	90.76	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
320.08	13.	107.12	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	2.	880.34	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.43	112.	12.34	0.88	1.736E-02	338.32	12.010	2.990E+01	AC228
340.57	12.	181.67	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	195.25	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.14	178.	10.69	0.96	1.679E-02	351.93	37.600	1.565E+01	PB214
364.48	9.	133.02	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
383.84	12.	138.94	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
391.69	5.	351.79	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	3.	588.37	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
433.94	11.	101.46	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
453.88	3.	392.74	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.37	12.	97.45	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	10.	107.42	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
487.02	4.	342.78	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
511.86	47.	46.60	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
531.00	7.	152.75	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
563.24	6.	189.05	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	12.	75.06	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.925E+00	PA234
					569.70	97.740	5.812E-01	BI207
569.70	4.	195.63	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.710E+00	PA234
					569.70	97.740	2.274E-01	BI207
583.33	166.	8.77	1.13	1.103E-02	583.02	84.500	9.897E+00	TL208
600.50	12.	202.78	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	4.	633.25	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
609.52	161.	9.40	1.29	1.063E-02	609.31	46.090	1.820E+01	BI214
661.89	30.	29.67	0.59	9.924E-03	661.66	85.210	1.974E+00	CS137
727.71	54.	13.63	1.50	9.170E-03	727.17	7.550	4.330E+01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
747.16	9.	92.95	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
756.73	15.	46.78	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
766.41	10.	146.91	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.186E+02	PA234M
778.92	7.	97.50	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
784.77	7.	169.41	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	10.	137.89	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
846.77	1.	799.90	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
859.06	22.	36.12	1.53	7.963E-03	860.56	12.420	1.254E+01	TL208
880.53	8.	123.97	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
911.50	100.	10.88	0.55	7.588E-03	911.07	29.000	2.527E+01	AC228
964.11	6.	234.97	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.11	76.	11.47	1.37	7.209E-03	968.97	17.460	3.355E+01	AC228
996.33	5.	95.71	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	5.	113.10	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	10.	90.83	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	3.	246.86	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1050.54	8.	76.50	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	91.99	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	17.	24.25	1.69	6.594E-03	1077.40	3.300	5.088E+01	Ga68
1099.25	6.	92.44	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	8.	137.85	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	8.	151.91	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1120.22	8.	145.60	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	262.68	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.131E-01	Sc46
					1121.30	34.900	1.184E+00	Ta182
1121.23	8.	125.30	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.115E+00	Ta182
1173.24	5.	141.07	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1221.14	5.	211.64	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	113.27	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	64.94	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.752E+00	EU154
1274.54	5.	100.78	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.466E+00	EU154
1384.30	5.	121.64	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	2.	324.82	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.28	284.	6.01	1.63	5.103E-03	1460.83	10.670	2.894E+02	K40
1765.11	10.	70.92	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	6.	147.14	2.12	4.337E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	9.	34.66	2.15	4.208E-03	1836.06	99.200	1.169E+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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.68	74.77	131.	228.	7.237E+03	9.70	0.813	- D
307.80	77.05	152.	324.	1.008E+04	7.73	0.815	- D
358.49	89.82	108.	77.	2.199E+03	22.31	0.828	- D
514.75	128.74	68.	57.	1.618E+03	27.62	1.151	- 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	162.	4.	0.002	506.06	0.783s
TH-227	200.11	50.14	159.	-17.	-0.009	127.19	0.787s
AM-241	237.72	59.54	199.	6.	0.003	422.69	0.797s
Sn-126	256.71	64.28	272.	8.	0.004	348.81	0.802
BA-133	323.61	80.99	247.	9.	0.005	325.01	0.819s
Np-237	345.63	86.49	990.	-26.	-0.014	172.37	0.825
EU-155	345.84	86.54	955.	-27.	-0.015	165.38	0.825s
Sn-126	347.43	86.94	158.	57.	0.032	33.62	0.825D
Sn-126	349.95	87.57	852.	39.	0.022	51.43	0.826D
Cd-109	351.83	88.04	825.	0.	0.000	184.07	0.826A
Nd-147	364.08	91.10	803.	0.	0.000	1000.00	0.829s
TH-234	370.05	92.59	718.	5.	0.003	800.34	0.831s
AC-228	373.09	93.35	139.	82.	0.046	23.07	0.832D
Gd-153	389.70	97.50	264.	21.	0.012	112.66	0.836s
Np-239	397.71	99.50	343.	-24.	-0.013	109.98	0.838s
Gd-153	412.52	103.20	408.	-25.	-0.014	118.33	0.842s
Np-239	414.52	103.70	433.	-25.	-0.014	121.66	0.842s
EU-155	420.98	105.31	704.	-25.	-0.014	149.78	0.844s
Np-239	424.25	106.13	689.	-7.	-0.004	549.51	0.845s
EU-152	486.88	121.78	246.	-14.	-0.008	155.36	0.861s
CO-57	488.03	122.06	261.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	202.	20.	0.011	102.35	0.862s
PA-234	524.99	131.29	516.	-22.	-0.012	145.91	0.871
HF-181	531.91	133.02	494.	-22.	-0.012	142.51	0.872
CE-144	533.97	133.54	472.	-5.	-0.003	668.08	0.873
HF-181	545.02	136.30	467.	0.	0.000	1000.00	0.876s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	545.72	136.47	467.	0.	0.000	1000.00	0.876s
Tc-99m	561.88	140.51	302.	-12.	-0.006	215.56	0.880
U-235	576.02	144.04	67.	22.	0.012	62.76	1.443s
CE-141	581.61	145.44	306.	4.	0.002	595.58	0.885s
Ba-140	650.54	162.66	253.	-3.	-0.002	752.03	0.902s
U-235	653.42	163.38	238.	18.	0.010	120.27	0.903s
CE-139	663.32	165.85	219.	2.	0.001	898.64	0.905s
Cf-251	706.34	176.60	117.	17.	0.010	113.46	0.916
TH-229	774.03	193.51	113.	17.	0.009	116.28	0.933s
U-235	823.34	205.83	53.	15.	0.008	86.72	0.295s
TH-229	843.44	210.85	140.	21.	0.012	100.62	0.950s
Cf-251	908.08	227.00	93.	3.	0.001	647.59	0.966s
PB-212	954.64	238.63	60.	500.	0.278	4.99	0.978D
PB-214	968.10	242.00	81.	65.	0.036	23.38	0.981D
TH-227	1025.11	256.24	66.	15.	0.008	106.73	0.995s
Cd-113m	1054.97	263.70	75.	13.	0.007	97.67	1.002s
BI-210M	1063.50	265.83	85.	9.	0.005	155.38	1.005s
TL-208	1107.48	276.82	23.	49.	0.027	23.66	1.413s
Hg-203	1117.00	279.20	140.	-9.	-0.005	188.89	1.017
I-131	1137.41	284.30	51.	12.	0.006	118.56	1.022s
PB-214	1181.49	295.31	38.	108.	0.060	14.27	0.923s
PB-212	1202.07	300.46	32.	43.	0.024	29.45	1.054
PA-231	1200.53	300.07	276.	-16.	-0.009	147.74	1.038
PA-233	1200.97	300.18	260.	-16.	-0.009	143.48	1.038
PA-231	1210.86	302.65	244.	-13.	-0.007	171.58	1.040s
Ir-192	1234.03	308.44	144.	10.	0.006	172.63	1.046
PA-233	1248.32	312.01	100.	-3.	-0.002	474.93	1.049s
Ir-192	1266.25	316.49	60.	13.	0.007	90.76	1.053
CR-51	1280.63	320.08	87.	13.	0.007	107.12	1.057s
La-140	1315.35	328.76	88.	2.	0.001	880.34	1.065s
AC-228	1354.03	338.43	23.	112.	0.062	12.34	0.878
Cs-136	1362.62	340.57	225.	12.	0.007	181.67	1.077s
EU-152	1377.49	344.29	237.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	184.	10.	0.006	195.25	1.082s
PB-214	1408.91	352.14	50.	178.	0.099	10.69	0.959
BA-133	1424.36	356.00	300.	-13.	-0.007	195.30	1.091
I-131	1458.32	364.48	41.	9.	0.005	133.02	1.099s
BA-133	1535.78	383.84	133.	12.	0.007	138.94	1.117s
Cf-249	1552.22	387.95	145.	0.	0.000	1000.00	1.121s
SN-113	1567.19	391.69	127.	5.	0.003	351.79	1.125s
SB-125	1711.99	427.88	64.	3.	0.001	588.37	1.158s
AG-108M	1736.25	433.94	28.	11.	0.006	101.46	1.164
pm-146	1816.05	453.88	49.	3.	0.002	392.74	1.182s
SB-125	1854.01	463.37	57.	12.	0.006	97.45	1.191s
Ir-192	1872.79	468.06	55.	10.	0.006	107.42	1.195
BE-7	1910.94	477.59	86.	-8.	-0.005	137.59	1.204s
HF-181	1928.56	482.00	99.	-4.	-0.002	259.04	1.208s
La-140	1948.65	487.02	48.	4.	0.002	342.78	1.212s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	1988.80	497.05	44.	-8.	-0.005	137.87	1.221s
RH-106	2048.06	511.86	94.	47.	0.026	46.60	2.485
Nd-147	2124.62	531.00	28.	7.	0.004	152.75	1.252s
Ba-140	2149.67	537.26	36.	-9.	-0.005	232.81	1.258s
CS-134	2253.60	563.24	32.	6.	0.003	189.05	1.280s
CS-134	2277.94	569.32	32.	12.	0.006	75.06	1.286s
PA-234	2278.54	569.47	43.	0.	0.000	1000.00	1.286s
BI-207	2279.47	569.70	36.	4.	0.002	195.63	1.286s
TL-208	2333.98	583.33	9.	166.	0.092	8.79	1.129
SB-125	2402.69	600.50	294.	12.	0.007	202.78	1.313s
SB-124	2411.61	602.73	306.	4.	0.002	633.25	1.315s
BI-214	2438.77	609.52	18.	161.	0.089	9.40	1.285s
RU-103	2441.89	610.30	288.	-15.	-0.008	167.23	1.322s
AG-108M	2457.82	614.28	273.	-15.	-0.008	162.64	1.325
PM-144	2472.94	618.06	268.	-16.	-0.009	146.73	1.328s
SB-125	2544.26	635.89	48.	-12.	-0.007	84.65	1.344s
I-131	2548.61	636.97	69.	-4.	-0.002	265.58	1.345s
AG-110M	2631.76	657.76	132.	-18.	-0.010	94.87	1.362s
CS-137	2648.29	661.89	14.	30.	0.017	29.67	0.589s
PM-144	2786.90	696.54	44.	-13.	-0.007	68.98	1.395s
NB-94	2811.25	702.63	30.	-8.	-0.005	107.02	1.400s
SB-124	2891.88	722.79	108.	-13.	-0.007	115.93	1.417s
AG-108M	2892.48	722.94	95.	-11.	-0.006	132.99	1.417s
ZR-95	2897.53	724.20	90.	-7.	-0.004	186.97	1.418s
BI-212	2911.56	727.71	0.	54.	0.030	13.63	1.500
pm-146	2943.61	735.72	48.	-12.	-0.006	63.15	1.428s
pm-146	2989.37	747.16	13.	9.	0.005	92.95	1.437s
ZR-95	3027.65	756.73	9.	15.	0.009	46.78	1.445s
AG-110M	3056.50	763.94	53.	-16.	-0.009	69.41	1.451s
NB-95	3063.89	765.79	107.	-20.	-0.011	75.64	1.453s
PA-234M	3066.38	766.41	106.	10.	0.006	146.91	1.453s
EU-152	3116.41	778.92	9.	7.	0.004	97.50	1.463s
BI-212	3142.41	785.42	33.	7.	0.004	169.41	1.468s
CS-134	3184.19	795.87	37.	10.	0.005	137.89	1.477s
CS-134	3208.53	801.95	47.	-16.	-0.009	95.89	1.482s
CO-58	3243.82	810.78	48.	-4.	-0.002	283.56	1.489s
Cs-136	3274.72	818.50	33.	-12.	-0.006	107.97	1.495s
Co-56	3387.78	846.77	19.	1.	0.001	799.90	1.518s
TL-208	3442.95	860.56	10.	22.	0.012	36.12	1.529s
NB-94	3485.08	871.10	47.	-15.	-0.008	68.91	1.537s
EU-154	3493.61	873.23	77.	-16.	-0.009	83.60	1.539s
PA-234	3522.80	880.53	41.	8.	0.004	123.97	1.544s
PA-234	3533.64	883.24	49.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	63.	-13.	-0.007	89.32	1.547s
Sc-46	3557.79	889.28	79.	-14.	-0.008	92.01	1.551s
y-88	3592.83	898.04	42.	-15.	-0.008	95.22	1.558s
AC-228	3646.68	911.50	4.	100.	0.056	10.89	0.551s
AG-110M	3750.60	937.49	14.	-1.	-0.001	800.00	1.589s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3784.70	946.02	23.	-4.	-0.002	241.30	1.595s
EU-152	3857.05	964.11	84.	6.	0.003	234.97	1.609s
AC-228	3877.04	969.11	0.	76.	0.042	11.47	1.370
EU-154	3985.88	996.33	11.	5.	0.003	95.71	1.633s
PA-234M	4004.55	1001.00	16.	5.	0.003	113.10	1.636s
EU-154	4019.65	1004.77	43.	-3.	-0.002	273.31	1.639
Co-56	4151.87	1037.84	15.	10.	0.006	90.83	1.664s
Cs-136	4192.77	1048.07	20.	3.	0.001	246.86	1.671s
RH-106	4201.93	1050.36	16.	8.	0.005	76.50	1.673s
BI-207	4255.11	1063.66	5.	6.	0.003	91.99	1.682s
Ga-68	4310.04	1077.40	0.	17.	0.009	24.25	1.692s
FE-59	4397.41	1099.25	5.	6.	0.003	92.44	1.708s
EU-152	4448.68	1112.07	63.	8.	0.005	137.85	1.717s
ZN-65	4462.56	1115.55	72.	8.	0.005	151.91	1.720s
BI-214	4481.51	1120.29	67.	8.	0.005	145.60	1.723s
Sc-46	4482.57	1120.55	75.	5.	0.003	262.68	1.723s
Ta-182	4485.56	1121.30	52.	8.	0.005	125.30	1.724s
CO-60	4693.21	1173.24	11.	5.	0.003	141.07	1.760s
Ta-182	4756.42	1189.05	25.	-2.	-0.001	83.55	1.771s
Ta-182	4885.79	1221.41	22.	5.	0.003	211.64	1.793s
Co-56	4953.23	1238.28	21.	10.	0.005	113.27	1.804s
NA-22	5098.13	1274.53	5.	6.	0.004	64.94	1.828s
EU-154	5098.19	1274.54	12.	5.	0.003	100.78	1.828s
FE-59	5166.35	1291.60	27.	-11.	-0.006	98.66	1.840s
CO-60	5329.85	1332.50	27.	-12.	-0.007	89.40	1.866s
AG-110M	5536.88	1384.30	5.	5.	0.003	121.64	1.899s
EU-152	5631.62	1408.00	11.	2.	0.001	324.82	1.914s
K-40	5844.55	1461.28	3.	284.	0.158	6.01	1.629
La-140	6383.73	1596.21	12.	-3.	-0.001	665.42	2.024s
SB-124	6762.39	1690.98	6.	-1.	0.000	846.32	2.076s
BI-214	7056.06	1764.49	20.	10.	0.006	70.92	2.114s
Co-56	7083.46	1771.35	31.	6.	0.003	147.14	2.117s
y-88	7341.96	1836.06	0.	9.	0.005	34.66	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	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.3226E+00				5.31E+01	
			477.60	-3.323E+00	?(P	1.863E+01 1.38E+02 1.05E+01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

NA-22    C   6.1681E-01                                     9.50E+02
                         1274.53 6.168E-01 ?(  1.308E+00 6.49E+01 9.99E+01 G

K-40     N   2.8939E+02                                     4.66E+11
                         1460.83 2.894E+02  (P 1.148E+01 6.01E+00 1.07E+01 G

Sc-46    F  -1.0232E+00                                     8.38E+01
                          889.28-1.023E+00 ?(  3.165E+00 9.20E+01 1.00E+02 G
                         1120.55 4.131E-01 +   3.757E+00 2.63E+02 1.00E+02 G

CR-51    F   3.9155E+00                                     2.77E+01
                          320.08 3.915E+00 &(  1.417E+01 1.07E+02 9.94E+00 G

MN-54    C   6.8026E-02                                     3.12E+02
                          834.85 6.803E-02 %(  1.862E+00 1.13E+03 1.00E+02 G

FE-59    F   9.0011E-01                                     4.45E+01
                         1099.25 9.001E-01 ?(  1.991E+00 9.24E+01 5.65E+01 G
                         1291.60-2.493E+00 + P 6.114E+00 9.87E+01 4.32E+01 G

Co-56    C   1.0057E+00                                     7.73E+01
                          846.77 7.966E-02 ?(P 1.580E+00 8.00E+02 9.99E+01 G
                         1238.28 1.386E+00 ?(  3.474E+00 1.13E+02 6.61E+01 G
                         1037.84 5.778E+00 ?(  1.199E+01 9.08E+01 1.41E+01 G
                         1771.35 4.650E+00 ?   2.384E+01 1.47E+02 1.55E+01  A

CO-58    C  -2.3354E-01                                     7.09E+01
                          810.78-2.335E-01 ?(  2.324E+00 2.84E+02 9.95E+01 G

CO-60    F  -1.2263E+00                                     1.93E+03
                         1332.50-1.226E+00 ?(P 2.721E+00 8.94E+01 1.00E+02 G
                         1173.24 4.771E-01 + P 1.629E+00 1.41E+02 9.99E+01 G

ZN-65    F   1.3909E+00                                     2.44E+02
                         1115.55 1.391E+00 ?(  7.239E+00 1.52E+02 5.06E+01 G

NB-94    I  -5.0777E-01                                     7.41E+06
                          702.63-5.078E-01 ?(P 1.709E+00 1.07E+02 9.79E+01 G
                          871.10-1.066E+00 +   2.437E+00 6.89E+01 9.99E+01 G

ZR-95    I   1.7636E+00                                     6.40E+01
                          756.73 1.764E+00 ?(  1.890E+00 4.68E+01 5.45E+01 G
                          724.20-1.003E+00 -   6.427E+00 1.87E+02 4.42E+01 G

NB-95    I  -1.2806E+00                                     6.40E+01
                          765.79-1.281E+00 ?(  3.222E+00 7.56E+01 9.98E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	-3.9921E-01					3.93E+01	
			497.05	-3.992E-01	?(P	1.634E+00	1.38E+02	9.09E+01 G
			610.30	-1.322E+01	+	7.443E+01	1.67E+02	5.75E+00 GA
RH-106	I	6.1017E+00					3.74E+02	
			621.92	2.324E-01	%(	4.140E+01	5.22E+03	9.93E+00 G
			1050.36	4.346E+01	?(	1.118E+02	7.65E+01	1.56E+00 G
			511.86	1.062E+01	P	1.082E+01	4.66E+01	2.00E+01 GA
AG-108M	C	4.6587E-01					1.53E+05	
			433.94	4.659E-01	?(	1.191E+00	1.01E+02	9.05E+01 G
			722.94	-7.056E-01	+	3.188E+00	1.33E+02	9.08E+01 G
			614.28	-8.530E-01	+	4.671E+00	1.63E+02	8.98E+01 G
AG-110M	F	-4.6953E-01					2.50E+02	
			884.68	-1.294E+00	?(	3.890E+00	8.93E+01	7.27E+01 G
			657.76	-1.043E+00	+	3.317E+00	9.49E+01	9.46E+01 G
			937.49	-2.182E-01	+	4.395E+00	8.00E+02	3.44E+01 G
			1384.30	1.999E+00	&(	5.770E+00	1.22E+02	2.43E+01 G
			763.94	-4.521E+00	+	1.041E+01	6.94E+01	2.23E+01 G
SN-113	F	2.5864E-01					1.15E+02	
			391.69	2.586E-01	?(P	3.124E+00	3.52E+02	6.40E+01 G
SB-124	F	2.0655E-01					6.02E+01	
			602.73	2.065E-01	?(	4.439E+00	6.33E+02	9.83E+01 G
			1690.98	-1.718E-01	+	3.557E+00	8.46E+02	4.78E+01 G
			722.79	-7.268E+00	+	2.847E+01	1.16E+02	1.08E+01 G
SB-125	I	2.0853E+00					1.01E+03	
			427.88	3.523E-01	?(P	5.268E+00	5.88E+02	2.96E+01 G
			600.50	3.491E+00	?(	2.388E+01	2.03E+02	1.79E+01 G
			635.89	-5.905E+00	+	1.681E+01	8.47E+01	1.13E+01 G
			463.37	4.586E+00	?(P	1.511E+01	9.74E+01	1.05E+01 G
I-131	I	7.2636E-01					8.02E+00	
			364.48	3.854E-01	?(P	1.353E+00	1.33E+02	8.17E+01 G
			284.30	5.263E+00	?(	1.628E+01	1.19E+02	6.14E+00 G
			636.97	-3.404E+00	+	3.136E+01	2.66E+02	7.17E+00 G
Gd-153	F	1.0754E+00					2.42E+02	
			97.50	1.075E+00	(	4.056E+00	1.13E+02	3.00E+01 G
			103.20	-1.729E+00	&	6.836E+00	1.18E+02	2.18E+01 G
Ga-68	C	5.0877E+01					4.71E-02	
			1077.40	5.088E+01	?(	2.206E+01	2.43E+01	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	-2.1623E-01					2.51E-01	
			140.51	-2.162E-01	&(	1.572E+00	2.16E+02	8.93E+01 G
BA-133	F	-6.8147E-01					3.85E+03	
			356.00	-6.815E-01	&(	4.486E+00	1.95E+02	6.20E+01 G
			302.85	1.519E-07	%	1.182E+01	2.28E+09	1.83E+01 G
			383.84	4.771E+00	?	2.244E+01	1.39E+02	8.94E+00 GA
			80.99	4.252E-01	? P	3.734E+00	3.25E+02	3.41E+01 GA
CS-134	I	7.2583E-01					7.54E+02	
			604.71	8.865E-03	%(	4.500E+00	1.49E+04	9.76E+01 G
			795.87	7.385E-01	&(	2.382E+00	1.38E+02	8.55E+01 G
			569.32	3.691E+00	&(	9.265E+00	7.51E+01	1.54E+01 G
			801.95	-1.186E+01	+	2.614E+01	9.59E+01	8.69E+00 G
			563.24	3.516E+00	?(	1.703E+01	1.89E+02	8.35E+00 G
CS-137	I	1.9736E+00					1.10E+04	
			661.66	1.974E+00	(P	1.322E+00	2.97E+01	8.52E+01 G
CE-139	F	5.1784E-02					1.38E+02	
			165.85	5.178E-02	?(	1.589E+00	8.99E+02	7.99E+01 G
Ba-140	I	-1.8171E+00					1.28E+01	
			537.26	-1.817E+00	?(P	5.946E+00	2.33E+02	2.44E+01 G
			162.66	-8.608E-01	+	2.205E+01	7.52E+02	6.22E+00 G
			304.85	6.524E-07	%	5.079E+01	2.28E+09	4.29E+00 G
La-140	I	-4.0355E-02					1.28E+01	
			1596.21	-3.154E-01	?(P	2.282E+00	6.65E+02	9.54E+01 G
			487.02	3.810E-01	?(	3.333E+00	3.43E+02	4.55E+01 G
			328.76	3.079E-01	*(	7.146E+00	8.80E+02	2.03E+01 G
			815.77	-5.450E-02	% P	1.033E+01	4.19E+03	2.33E+01 G
CE-141	I	1.4333E-01					3.25E+01	
			145.44	1.433E-01	&(	2.897E+00	5.96E+02	4.82E+01 G
CE-144	I	-6.6199E-01					2.85E+02	
			133.54	-6.620E-01	(	1.493E+01	6.68E+02	1.11E+01 G
PM-144	C	-7.7118E-01					3.63E+02	
			696.54	-7.712E-01	?(P	1.986E+00	6.90E+01	9.90E+01 G
			618.06	-8.537E-01	+	4.212E+00	1.47E+02	9.91E+01 G
EU-152	F	2.3946E+00					4.94E+03	
			344.29	0.000E+00	?(	9.122E+00	1.00E+03	2.65E+01 G
			1112.07	5.352E+00	?(	2.526E+01	1.38E+02	1.36E+01 G
			121.78	-7.865E-01	+	4.116E+00	1.55E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	3.567E+00	?(	8.404E+00	9.75E+01	1.29E+01 G
			964.11	2.938E+00	?(	2.380E+01	2.35E+02	1.46E+01 G
			244.69	1.048E-01	%	4.179E+01	1.19E+04	7.58E+00 G
			1408.00	1.172E+00	?	9.008E+00	3.25E+02	2.10E+01 GA
EU-154	I	-8.9536E+00					3.14E+03	
			873.23	-8.954E+00	?(	2.506E+01	8.36E+01	1.23E+01 G
			123.10	7.665E-01	+	2.626E+00	1.02E+02	4.08E+01 G
			1274.54	1.466E+00	+	5.140E+00	1.01E+02	3.52E+01 G
			723.36	5.690E-07	%	1.355E+01	6.80E+08	2.02E+01 G
			1004.77	-1.535E+00	+	1.475E+01	2.73E+02	1.80E+01 G
			996.33	4.010E+00	+ P	1.329E+01	9.57E+01	1.06E+01 G
EU-155	I	-1.8377E+00					1.81E+03	
			105.31	-1.838E+00	?(P	9.150E+00	1.50E+02	2.12E+01 G
			86.54	-1.402E+00	+	7.728E+00	1.65E+02	3.07E+01 G
HF-181	F	1.4291E-01					4.24E+01	
			482.00	-2.332E-01	?(P	2.624E+00	2.59E+02	8.05E+01 G
			133.02	-8.193E-01	+	3.904E+00	1.43E+02	4.33E+01 G
			345.83	2.152E+00	?(	1.425E+01	1.95E+02	1.51E+01 G
			136.30	0.000E+00	&	2.840E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.9638E+00					1.14E+02	
			1121.30	2.115E+00	?(	9.074E+00	1.25E+02	3.49E+01 G
			1221.41	1.769E+00	?(P	8.502E+00	2.12E+02	2.70E+01 G
			1189.05	-1.261E+00	- P	1.476E+01	8.36E+01	1.62E+01 G
Hg-203	F	-3.0143E-01					4.66E+01	
			279.20	-3.014E-01	(	1.937E+00	1.89E+02	8.15E+01 G
TL-208	N	9.8974E+00					6.98E+02	
			583.02	9.897E+00	(P	9.914E-01	8.79E+00	8.45E+01 G
			277.28	2.121E+01	+	1.070E+01	2.37E+01	6.31E+00 G
			860.56	1.254E+01	& P	9.661E+00	3.61E+01	1.24E+01 G
pm-146	C	1.5568E+00					2.02E+03	
			747.16	1.557E+00	?(P	3.570E+00	9.30E+01	3.40E+01 G
			735.72	-3.173E+00	+ P	9.485E+00	6.32E+01	2.25E+01 G
			453.88	2.198E-01	- P	2.211E+00	3.93E+02	6.50E+01 G
y-88	F	-1.1575E+00					1.07E+02	
			898.04	-1.157E+00	?(	2.540E+00	9.52E+01	9.37E+01 G
			1836.06	1.169E+00	+ P	9.809E-01	3.47E+01	9.92E+01 G
Cd-113m		5.6581E+03					5.33E+03	
			263.70	5.658E+03	?(	1.864E+04	9.77E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.9042E+00					3.28E+05	
			176.60	1.904E+00	(	5.827E+00	1.13E+02	1.70E+01 G
			227.00	9.728E-01	?	1.741E+01	6.48E+02	6.30E+00 GA
Sn-126		1.6621E+00					3.65E+07	
			87.57	1.662E+00	}	5.950E+00	5.14E+01	3.75E+01 GA
			64.28	1.662E+00	(	1.653E+01	3.49E+02	9.70E+00 G
			86.94	1.026E+01		1.094E+01	3.36E+01	9.04E+00 GA
PB-210	N	3.0736E+00					8.14E+03	
			46.54	3.074E+00	(P	4.532E+01	5.06E+02	4.25E+00 G
PB-212	N	2.7651E+01					6.98E+02	
			238.63	2.765E+01	(P	2.155E+00	4.99E+00	4.33E+01 G
			300.03	3.797E+01	+	2.567E+01	2.94E+01	3.28E+00 GA
PB-214	N	1.5792E+01					5.84E+05	
			351.93	1.565E+01	(P	3.136E+00	1.07E+01	3.76E+01 G
			295.09	1.606E+01	@(	4.625E+00	1.43E+01	1.93E+01 G
			242.00	2.104E+01	+	1.461E+01	2.34E+01	7.43E+00 GA
BI-207	C	4.1781E-01					1.18E+04	
			569.70	2.274E-01	&(	1.560E+00	1.96E+02	9.77E+01 G
			1063.66	6.676E-01	?(	1.469E+00	9.20E+01	7.45E+01 G
BI-212	N	4.3302E+01					6.98E+02	
			727.17	4.330E+01	(P	5.914E+00	1.36E+01	7.55E+00 G
			785.42	3.702E+01	?	1.481E+02	1.69E+02	1.28E+00 GA
BI-214	N	1.8203E+01					5.84E+05	
			609.31	1.820E+01	(P	2.575E+00	9.40E+00	4.61E+01 G
			1120.29	4.726E+00	- P	2.356E+01	1.46E+02	1.51E+01 G
			1764.49	8.282E+00	- P	1.955E+01	7.09E+01	1.54E+01 G
BI-210M	T	4.5160E-01					1.10E+09	
			265.83	4.516E-01	*(	2.398E+00	1.55E+02	5.00E+01 G
			304.90	-2.999E-07	%	7.783E+00	7.59E+08	2.80E+01 G
AC-228	N	2.6624E+01					2.10E+03	
			911.07	2.527E+01	(P	3.000E+00	1.09E+01	2.90E+01 G
			968.97	3.355E+01	+	3.253E+00	1.15E+01	1.75E+01 G
			338.32	2.990E+01	(P	6.647E+00	1.23E+01	1.20E+01 G
			93.35	2.323E+01		1.627E+01	2.31E+01	5.56E+00 XA
TH-227	N	-6.4217E-01					7.95E+03	
			50.14	-5.869E+00	?(	2.122E+01	1.27E+02	8.00E+00 G
			256.24	5.331E+00	?(	1.473E+01	1.07E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	1.0811E+01					2.68E+06	
			193.51	7.629E+00	(	2.395E+01	1.16E+02	4.40E+00 G
			210.85	1.549E+01	&(	4.183E+01	1.01E+02	2.99E+00 G
TH-234	N	1.1219E+00					1.63E+12	
			63.29	8.042E-01	%(P	4.334E+01	1.87E+03	3.81E+00 G
			92.59	1.339E+00	*(P	3.599E+01	8.00E+02	5.58E+00 G
PA-231	N	-1.3215E+01					1.20E+07	
			302.65	-1.321E+01	?(	7.648E+01	1.72E+02	2.88E+00 G
			300.07	-1.901E+01	+	9.440E+01	1.48E+02	2.46E+00 G
PA-233	C	-2.4932E-01					7.82E+08	
			312.01	-2.493E-01	?(	4.098E+00	4.75E+02	3.60E+01 G
			300.18	-7.544E+00	+	3.639E+01	1.43E+02	6.20E+00 G
PA-234	N	-1.9576E+00					1.63E+12	
			131.29	-1.958E+00	(	9.550E+00	1.46E+02	1.80E+01 G
			946.02	-2.443E+00	+	1.422E+01	2.41E+02	1.34E+01 G
			569.47	0.000E+00	&	2.003E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	&	2.624E+01	1.00E+03	9.60E+00 G
			880.53	9.088E+00	?	3.872E+01	1.24E+02	6.00E+00 GA
PA-234M	N	9.4964E+01					1.63E+12	
			1001.00	5.153E+01	?(P	2.031E+02	1.13E+02	8.37E-01 G
			766.41	2.186E+02	?(	1.092E+03	1.47E+02	2.94E-01 G
U-235	N	4.8224E+00					2.57E+11	
			143.79	3.380E+00	(P	6.122E+00	6.28E+01	1.10E+01 G
			205.33	6.263E+00	(	1.549E+01	8.67E+01	5.01E+00 G
			163.38	6.513E+00	&(P	2.627E+01	1.20E+02	5.08E+00 G
AM-241	T	3.4438E-01					1.58E+05	
			59.54	3.444E-01	*(P	4.185E+00	4.23E+02	3.59E+01 G
Np-237	F	-3.2082E+00					2.14E+06	
			86.49	-3.208E+00	(	1.844E+01	1.72E+02	1.31E+01 G
Ir-192	F	6.4938E-01					7.40E+01	
			316.49	4.415E-01	(	1.350E+00	9.08E+01	8.70E+01 G
			468.06	8.248E-01	&(	3.012E+00	1.07E+02	5.18E+01 G
			308.44	9.333E-01	?(	5.472E+00	1.73E+02	3.18E+01 G
Cs-136	F	-2.7208E-01					1.30E+01	
			818.50	-7.805E-01	&(	1.963E+00	1.08E+02	1.00E+02 G
			1048.07	2.744E-01	+	2.441E+00	2.47E+02	8.00E+01 G
			340.57	8.119E-01	?(	4.983E+00	1.82E+02	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -4.5795E-01                                      2.36E+00
                          103.70-1.571E+00 +   6.385E+00 1.22E+02 2.40E+01 X
                          106.13-4.579E-01 ?(  8.455E+00 5.50E+02 2.27E+01 G
                           99.50-2.498E+00 +   9.177E+00 1.10E+02 1.50E+01 X

Nd-147       2.5082E+00                                      1.11E+01
                          531.00 2.508E+00 ?(  9.806E+00 1.53E+02 1.30E+01 G
                           91.10 0.000E+00 -   7.542E+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 ***************
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Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	162.	4.	0.002	506.06	3.074E+00	P
AM-241	59.54	199.	6.	0.003	422.69	3.444E-01	P
BA-133	80.99	247.	9.	0.005	325.01	4.252E-01	P
Np-237	86.49	990.	-26.	-0.014	172.37	-3.208E+00	
EU-155	86.54	955.	-27.	-0.015	165.38	-1.402E+00	
TH-234	92.59	718.	5.	0.003	800.34	1.339E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	97.50	264.	21.	0.012	112.66	1.075E+00	
Np-239	99.50	343.	-24.	-0.013	109.98	-2.498E+00	
Gd-153	103.20	408.	-25.	-0.014	118.33	-1.729E+00	
Np-239	103.70	433.	-25.	-0.014	121.66	-1.571E+00	
EU-155	105.31	704.	-25.	-0.014	149.78	-1.838E+00	P
Np-239	106.13	689.	-7.	-0.004	549.51	-4.579E-01	
EU-152	121.78	246.	-14.	-0.008	155.36	-7.865E-01	
EU-154	123.10	202.	20.	0.011	102.35	7.665E-01	
PA-234	131.29	516.	-22.	-0.012	145.91	-1.958E+00	
HF-181	133.02	494.	-22.	-0.012	142.51	-8.193E-01	
CE-144	133.54	472.	-5.	-0.003	668.08	-6.620E-01	
Tc-99m	140.51	302.	-12.	-0.006	215.56	-2.162E-01	
CE-141	145.44	306.	4.	0.002	595.58	1.433E-01	
Ba-140	162.66	253.	-3.	-0.002	752.03	-8.608E-01	
CE-139	165.85	219.	2.	0.001	898.64	5.178E-02	
Cf-251	176.60	117.	17.	0.010	113.46	1.904E+00	
TH-229	193.51	113.	17.	0.009	116.28	7.629E+00	
TH-229	210.85	140.	21.	0.012	100.62	1.549E+01	
Cf-251	227.00	93.	3.	0.001	647.59	9.728E-01	
Cd-113m	263.70	75.	13.	0.007	97.67	5.658E+03	
BI-210M	265.83	85.	9.	0.005	155.38	4.516E-01	
Hg-203	279.20	140.	-9.	-0.005	188.89	-3.014E-01	
I-131	284.30	51.	12.	0.006	118.56	5.263E+00	
PA-231	300.07	276.	-16.	-0.009	147.74	-1.901E+01	
PA-233	300.18	260.	-16.	-0.009	143.48	-7.544E+00	
PA-231	302.65	244.	-13.	-0.007	171.58	-1.321E+01	
Ir-192	308.44	144.	10.	0.006	172.63	9.333E-01	
PA-233	312.01	100.	-3.	-0.002	474.93	-2.493E-01	
Ir-192	316.49	60.	13.	0.007	90.76	4.415E-01	
CR-51	320.08	87.	13.	0.007	107.12	3.915E+00	
La-140	328.76	88.	2.	0.001	880.34	3.079E-01	
Cs-136	340.57	225.	12.	0.007	181.67	8.119E-01	
HF-181	345.83	184.	10.	0.006	195.25	2.152E+00	
BA-133	356.00	300.	-13.	-0.007	195.30	-6.815E-01	
I-131	364.48	41.	9.	0.005	133.02	3.854E-01	P
BA-133	383.84	133.	12.	0.007	138.94	4.771E+00	
SN-113	391.69	127.	5.	0.003	351.79	2.586E-01	P
SB-125	427.88	64.	3.	0.001	588.37	3.523E-01	P
AG-108M	433.94	28.	11.	0.006	101.46	4.659E-01	
pm-146	453.88	49.	3.	0.002	392.74	2.198E-01	P
SB-125	463.37	57.	12.	0.006	97.45	4.586E+00	P
Ir-192	468.06	55.	10.	0.006	107.42	8.248E-01	
BE-7	477.59	86.	-8.	-0.005	137.59	-3.323E+00	P
HF-181	482.00	99.	-4.	-0.002	259.04	-2.332E-01	P
La-140	487.02	48.	4.	0.002	342.78	3.810E-01	
RU-103	497.05	44.	-8.	-0.005	137.87	-3.992E-01	P
Nd-147	531.00	28.	7.	0.004	152.75	2.508E+00	
Ba-140	537.26	36.	-9.	-0.005	232.81	-1.817E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	32.	6.	0.003	189.05	3.516E+00	
CS-134	569.32	32.	12.	0.006	75.06	3.691E+00	
BI-207	569.70	36.	4.	0.002	195.63	2.274E-01	
SB-125	600.50	294.	12.	0.007	202.78	3.491E+00	
SB-124	602.73	306.	4.	0.002	633.25	2.065E-01	
RU-103	610.30	288.	-15.	-0.008	167.23	-1.322E+01	
AG-108M	614.28	273.	-15.	-0.008	162.64	-8.530E-01	
PM-144	618.06	268.	-16.	-0.009	146.73	-8.537E-01	
SB-125	635.89	48.	-12.	-0.007	84.65	-5.905E+00	
I-131	636.97	69.	-4.	-0.002	265.58	-3.404E+00	
AG-110M	657.76	132.	-18.	-0.010	94.87	-1.043E+00	
PM-144	696.54	44.	-13.	-0.007	68.98	-7.712E-01	P
NB-94	702.63	30.	-8.	-0.005	107.02	-5.078E-01	P
SB-124	722.79	108.	-13.	-0.007	115.93	-7.268E+00	
AG-108M	722.94	95.	-11.	-0.006	132.99	-7.056E-01	
ZR-95	724.20	90.	-7.	-0.004	186.97	-1.003E+00	
pm-146	735.72	48.	-12.	-0.006	63.15	-3.173E+00	P
pm-146	747.16	13.	9.	0.005	92.95	1.557E+00	P
ZR-95	756.73	9.	15.	0.009	46.78	1.764E+00	
AG-110M	763.94	53.	-16.	-0.009	69.41	-4.521E+00	
NB-95	765.79	107.	-20.	-0.011	75.64	-1.281E+00	
PA-234M	766.41	106.	10.	0.006	146.91	2.186E+02	
EU-152	778.92	9.	7.	0.004	97.50	3.567E+00	
CS-134	795.87	37.	10.	0.005	137.89	7.385E-01	
CS-134	801.95	47.	-16.	-0.009	95.89	-1.186E+01	
CO-58	810.78	48.	-4.	-0.002	283.56	-2.335E-01	
Cs-136	818.50	33.	-12.	-0.006	107.97	-7.805E-01	
Co-56	846.77	19.	1.	0.001	799.90	7.966E-02	P
NB-94	871.10	47.	-15.	-0.008	68.91	-1.066E+00	
EU-154	873.23	77.	-16.	-0.009	83.60	-8.954E+00	
PA-234	880.53	41.	8.	0.004	123.97	9.088E+00	
AG-110M	884.68	63.	-13.	-0.007	89.32	-1.294E+00	
Sc-46	889.28	79.	-14.	-0.008	92.01	-1.023E+00	
y-88	898.04	42.	-15.	-0.008	95.22	-1.157E+00	
AG-110M	937.49	14.	-1.	-0.001	800.00	-2.182E-01	
PA-234	946.02	23.	-4.	-0.002	241.30	-2.443E+00	
EU-152	964.11	84.	6.	0.003	234.97	2.938E+00	
EU-154	996.33	11.	5.	0.003	95.71	4.010E+00	P
PA-234M	1001.00	16.	5.	0.003	113.10	5.153E+01	P
EU-154	1004.77	43.	-3.	-0.002	273.31	-1.535E+00	
Co-56	1037.84	15.	10.	0.006	90.83	5.778E+00	
Cs-136	1048.07	20.	3.	0.001	246.86	2.744E-01	
BI-207	1063.66	5.	6.	0.003	91.99	6.676E-01	
FE-59	1099.25	5.	6.	0.003	92.44	9.001E-01	
EU-152	1112.07	63.	8.	0.005	137.85	5.352E+00	
ZN-65	1115.55	72.	8.	0.005	151.91	1.391E+00	
Sc-46	1120.55	75.	5.	0.003	262.68	4.131E-01	
CO-60	1173.24	11.	5.	0.003	141.07	4.771E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1238.28	21.	10.	0.005	113.27	1.386E+00		
NA-22	1274.53	5.	6.	0.004	64.94	6.168E-01		
EU-154	1274.54	12.	5.	0.003	100.78	1.466E+00		
FE-59	1291.60	27.	-11.	-0.006	98.66	-2.493E+00		P
CO-60	1332.50	27.	-12.	-0.007	89.40	-1.226E+00		P
AG-110M	1384.30	5.	5.	0.003	121.64	1.999E+00		
EU-152	1408.00	11.	2.	0.001	324.82	1.172E+00		
La-140	1596.21	12.	-3.	-0.001	665.42	-3.154E-01		P
SB-124	1690.98	6.	-1.	0.000	846.32	-1.718E-01		
Co-56	1771.35	31.	6.	0.003	147.14	4.650E+00		
y-88	1836.06	0.	9.	0.005	34.66	1.169E+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	-3.3226E+00	-3.3226E+00	1.376E+02%	1.86E+01
NA-22	#A	6.1681E-01	6.1681E-01	6.494E+01%	1.31E+00
K-40		2.8939E+02	2.8939E+02	6.011E+00%	1.15E+01
Sc-46	#A	-1.0232E+00	-1.0232E+00	9.201E+01%	3.17E+00
CR-51	#A	3.9154E+00	3.9155E+00	1.071E+02%	1.42E+01
MN-54	#A	6.8026E-02	6.8026E-02	1.127E+03%	1.86E+00
FE-59	#A	9.0011E-01	9.0011E-01	9.244E+01%	1.99E+00
Co-56	#A	1.0057E+00	1.0057E+00	9.083E+01%	1.58E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.41E+00
CO-58	#A	-2.3354E-01	-2.3354E-01	2.836E+02%	2.32E+00
CO-60	#A	-1.2263E+00	-1.2263E+00	8.940E+01%	2.72E+00
ZN-65	#A	1.3909E+00	1.3909E+00	1.519E+02%	7.24E+00
NB-94	#A	-5.0777E-01	-5.0777E-01	1.070E+02%	1.71E+00
ZR-95	#A	1.7636E+00	1.7636E+00	4.678E+01%	1.89E+00
NB-95	#A	-1.2806E+00	-1.2806E+00	7.564E+01%	3.22E+00
RU-103	#A	-3.9921E-01	-3.9921E-01	1.379E+02%	1.63E+00
RH-106	A	6.1017E+00	6.1017E+00	7.650E+01%	4.14E+01
AG-108M	#A	4.6587E-01	4.6587E-01	1.015E+02%	1.19E+00
AG-110M	#A	-4.6953E-01	-4.6953E-01	7.546E+01%	3.89E+00
SN-113	#A	2.5864E-01	2.5864E-01	3.518E+02%	3.12E+00
SB-124	#A	2.0655E-01	2.0655E-01	6.333E+02%	4.44E+00
SB-125	#A	2.0853E+00	2.0853E+00	9.745E+01%	5.27E+00
I-131	#A	7.2632E-01	7.2636E-01	8.909E+01%	1.35E+00
Gd-153	#A	1.0754E+00	1.0754E+00	1.127E+02%	4.06E+00
Ga-68	#	5.0428E+01	5.0877E+01	2.425E+01%	2.21E+01
Tc-99m	#A	-2.1587E-01	-2.1623E-01	2.156E+02%	1.57E+00
BA-133	#A	-6.8147E-01	-6.8147E-01	1.953E+02%	4.49E+00
CS-134	#A	7.2583E-01	7.2583E-01	7.506E+01%	4.50E+00
CS-137		1.9736E+00	1.9736E+00	2.967E+01%	1.32E+00

CE-139 #A	5.1784E-02	5.1784E-02	8.986E+02%	1.59E+00
Ba-140 #A	-1.8170E+00	-1.8171E+00	2.328E+02%	5.95E+00
La-140 #A	-4.0354E-02	-4.0355E-02	3.428E+02%	2.28E+00
CE-141 #A	1.4333E-01	1.4333E-01	5.956E+02%	2.90E+00
CE-144 #A	-6.6199E-01	-6.6199E-01	6.681E+02%	1.49E+01
PM-144 #A	-7.7118E-01	-7.7118E-01	6.898E+01%	1.99E+00
EU-152 #A	2.3946E+00	2.3946E+00	9.750E+01%	9.12E+00
EU-154 #A	-8.9536E+00	-8.9536E+00	8.360E+01%	2.51E+01
EU-155 #A	-1.8377E+00	-1.8377E+00	1.498E+02%	9.15E+00
HF-181 #A	1.4291E-01	1.4291E-01	1.622E+02%	2.62E+00
Ta-182 #A	1.9638E+00	1.9638E+00	1.230E+02%	9.07E+00
Hg-203 #A	-3.0143E-01	-3.0143E-01	1.889E+02%	1.94E+00
TL-208	9.8974E+00	9.8974E+00	8.787E+00%	9.91E-01
pm-146 #A	1.5568E+00	1.5568E+00	9.295E+01%	3.57E+00
y-88 #A	-1.1575E+00	-1.1575E+00	9.522E+01%	2.54E+00
Cd-113m#A	5.6581E+03	5.6581E+03	9.767E+01%	1.86E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.78E+01
Cf-251 #A	1.9042E+00	1.9042E+00	1.135E+02%	5.83E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.20E+00
Sn-126 A	1.6621E+00	1.6621E+00	3.488E+02%	1.65E+01
PB-210 #A	3.0736E+00	3.0736E+00	5.061E+02%	4.53E+01
PB-212	2.7651E+01	2.7651E+01	4.989E+00%	2.15E+00
PB-214	1.5792E+01	1.5792E+01	8.915E+00%	3.14E+00
BI-207 #A	4.1781E-01	4.1781E-01	9.199E+01%	1.56E+00
BI-212	4.3302E+01	4.3302E+01	1.363E+01%	5.91E+00
BI-214 #	1.8203E+01	1.8203E+01	9.405E+00%	2.58E+00
BI-210M#A	4.5160E-01	4.5160E-01	1.554E+02%	2.40E+00
AC-228	2.6624E+01	2.6624E+01	8.227E+00%	3.00E+00
TH-227 #A	-6.4217E-01	-6.4217E-01	8.302E+01%	2.12E+01
TH-229 #A	1.0811E+01	1.0811E+01	7.688E+01%	2.39E+01
TH-234 #A	1.1219E+00	1.1219E+00	8.003E+02%	4.33E+01
PA-231 #A	-1.3215E+01	-1.3215E+01	1.716E+02%	7.65E+01
PA-233 #A	-2.4932E-01	-2.4932E-01	4.749E+02%	4.10E+00
PA-234 #A	-1.9576E+00	-1.9576E+00	1.459E+02%	9.55E+00
PA-234M#A	9.4964E+01	9.4964E+01	9.270E+01%	2.03E+02
U-235 A	4.8224E+00	4.8224E+00	5.367E+01%	6.12E+00
AM-241 #A	3.4438E-01	3.4438E-01	4.227E+02%	4.18E+00
Np-237 #A	-3.2082E+00	-3.2082E+00	1.724E+02%	1.84E+01
Ir-192 #A	6.4937E-01	6.4938E-01	7.422E+01%	1.35E+00
Cs-136 #A	-2.7207E-01	-2.7208E-01	1.057E+02%	1.96E+00
Np-239 #A	-4.5787E-01	-4.5795E-01	5.495E+02%	8.46E+00
Nd-147 #A	2.5081E+00	2.5082E+00	1.528E+02%	9.81E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  2000.8 keV)     4.377E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 4.3765759E+02  Bq/Sample
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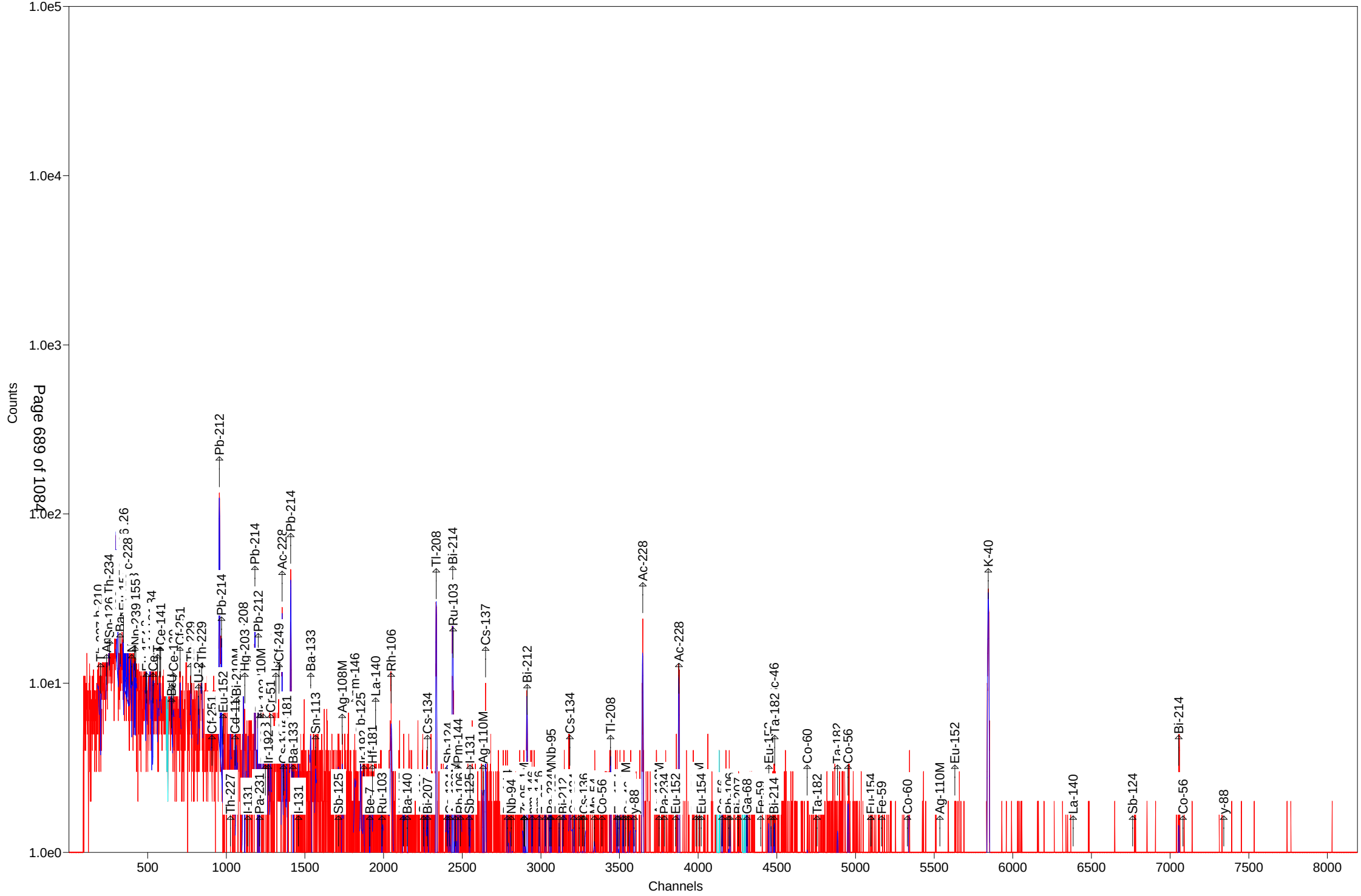
265170_Gamma_160-18567-A-13-B. 5_Gamma_20161729.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20162203

Sample Description: 265170_Gamma_160-18567-A-14-B
Detector: Detector # 7
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-14-B

Decay to Time: 9/7/2016 18:31 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:31:45 Real Time: 1850 sec
Analysis Time: 9/7/2016 19:03 Dead Time: 2.70 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-09-04_0919.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	-3.928E+00	101.2	3.976E+00	3.981E+00	1.338E+01
NA-22	2.909E-01	121.4	3.531E-01	3.534E-01	1.250E+00
K-40	1.817E+02	6.3	1.152E+01	1.480E+01	7.657E+00
Sc-46	-5.007E-01	105.9	5.301E-01	5.307E-01	1.801E+00
CR-51	3.027E+00	135.6	4.104E+00	4.107E+00	1.382E+01
MN-54	6.494E-01	42.0	2.730E-01	2.751E-01	5.925E-01
FE-59	-1.026E+00	80.1	8.216E-01	8.232E-01	2.790E+00
Co-56	-7.433E-01	37.4	2.780E-01	2.806E-01	1.448E+00
CO-57	-2.398E-02	1003.5	2.406E-01	2.406E-01	8.223E-01
CO-58	-2.691E-01	171.6	4.617E-01	4.619E-01	1.599E+00
CO-60	2.904E-01	117.7	3.419E-01	3.422E-01	9.772E-01
ZN-65	-2.256E+00	80.4	1.813E+00	1.817E+00	6.047E+00
NB-94	-5.963E-01	68.1	4.062E-01	4.073E-01	1.455E+00
ZR-95	1.176E-02	6752.9	7.938E-01	7.938E-01	1.961E+00
NB-95	-8.249E-01	68.9	5.684E-01	5.700E-01	1.884E+00
RU-103	1.692E-01	216.6	3.667E-01	3.668E-01	9.084E-01
RH-106	2.284E-01	1518.2	3.468E+00	3.468E+00	1.234E+01
AG-108M	-5.195E-01	93.9	4.877E-01	4.884E-01	1.201E+00
AG-110M	4.656E-01	93.0	4.329E-01	4.336E-01	2.417E+00
SN-113	5.303E-01	107.7	5.712E-01	5.719E-01	1.925E+00
SB-124	6.530E-01	85.9	5.611E-01	5.621E-01	2.604E+00
SB-125	1.295E+00	95.5	1.237E+00	1.239E+00	2.633E+00
I-131	3.392E-01	92.9	3.151E-01	3.156E-01	1.018E+00
Gd-153	6.120E-01	144.9	8.870E-01	8.878E-01	2.975E+00
Ga-68	-4.101E+00	646.8	2.652E+01	2.652E+01	5.961E+01
Tc-99m	2.287E-01	121.0	2.766E-01	2.769E-01	9.274E-01
BA-133	-5.066E-01	171.4	8.682E-01	8.686E-01	2.922E+00
CS-134	6.765E-01	72.2	4.881E-01	4.894E-01	2.673E+00
CS-137	4.631E+00	12.2	5.629E-01	6.123E-01	8.236E-01
CE-139	2.661E-01	109.1	2.903E-01	2.914E-01	9.735E-01
Ba-140	-7.374E-01	199.8	1.473E+00	1.473E+00	4.080E+00
La-140	8.321E-01	35.9	2.985E-01	3.017E-01	6.371E-01
CE-141	-4.840E-01	164.3	7.954E-01	7.958E-01	2.659E+00

CE-144	-2.891E-01	868.5	2.511E+00	2.511E+00	8.506E+00
PM-144	-9.182E-02	559.3	5.136E-01	5.136E-01	1.227E+00
EU-152	1.734E+00	136.4	2.365E+00	2.367E+00	5.020E+00
EU-154	1.198E+00	90.6	1.085E+00	1.087E+00	1.056E+01
EU-155	7.779E-01	111.8	8.693E-01	8.704E-01	4.269E+00
HF-181	1.072E-01	190.8	2.046E-01	2.046E-01	1.877E+00
Ta-182	2.426E+00	88.6	2.149E+00	2.152E+00	1.059E+01
Hg-203	2.701E-01	97.1	2.622E-01	2.626E-01	8.849E-01
TL-208	5.621E+00	9.6	5.370E-01	6.110E-01	6.368E-01
pm-146	6.104E-01	50.9	3.105E-01	3.121E-01	3.076E+00
y-88	8.703E-01	24.8	2.154E-01	2.199E-01	6.858E-01
Cd-113m	-4.475E+03	94.0	4.205E+03	4.215E+03	1.411E+04
Cd-109	0.000E+00	1.#INF	9.573E+00	9.573E+00	3.229E+01
Cf-251	1.148E+00	108.4	1.245E+00	1.249E+00	3.209E+00
Cf-249	-1.044E-01	73.3	7.656E-02	7.674E-02	2.113E+00
Sn-126	1.002E+00	361.8	3.625E+00	3.625E+00	1.226E+01
PB-210	2.785E+01	35.8	9.957E+00	1.009E+01	2.510E+01
PB-212	1.372E+01	5.7	7.885E-01	1.187E+00	1.293E+00
PB-214	1.208E+01	7.6	9.199E-01	1.114E+00	1.347E+00
BI-207	1.716E-01	136.7	2.346E-01	2.347E-01	1.086E+00
BI-212	4.779E+00	93.9	4.486E+00	4.493E+00	1.525E+01
BI-214	1.317E+01	7.9	1.036E+00	1.242E+00	8.263E-01
BI-210M	1.068E-01	493.3	5.268E-01	5.268E-01	1.816E+00
AC-228	1.299E+01	11.2	1.450E+00	1.594E+00	2.242E+00
TH-227	-1.589E+00	372.3	5.915E+00	5.916E+00	2.005E+01
TH-229	2.866E+00	126.2	3.618E+00	3.626E+00	1.471E+01
TH-234	5.165E+00	66.9	3.455E+00	3.466E+00	2.169E+01
PA-231	-1.099E+01	155.0	1.704E+01	1.705E+01	5.723E+01
PA-233	-9.232E-01	28.9	2.666E-01	2.712E-01	4.387E+00
PA-234	-1.202E+00	122.0	1.467E+00	1.468E+00	4.908E+00
PA-234M	4.019E+01	90.1	3.622E+01	3.628E+01	1.796E+02
U-235	-8.458E-01	144.6	1.223E+00	1.224E+00	1.178E+01
AM-241	-9.477E-01	122.6	1.162E+00	1.163E+00	3.111E+00
Np-237	1.502E+00	189.1	2.841E+00	2.842E+00	9.505E+00
Ir-192	3.042E-01	134.3	4.085E-01	4.089E-01	1.379E+00
Cs-136	3.909E-01	79.4	3.105E-01	3.114E-01	1.028E+00
Np-239	-8.593E-01	112.6	9.675E-01	9.689E-01	3.242E+00
Nd-147	-2.202E+00	147.6	3.251E+00	3.254E+00	7.877E+00
Total	3.479E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-14-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20162203.An1

Acquisition information
Start time: 9/7/2016 6:31:45 PM
Live time: 1800
Real time: 1850
Dead time: 2.70 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/7/2016 6:31:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-09-04_0919.PBC 9/4/2016 9:19:07 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1666

***** 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
46.64	53.	35.76	0.59	2.493E-02	46.54	4.250	2.785E+01	PB210
63.22	21.	85.53	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.21	7.	361.83	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
74.84	181.	12.03	0.87	4.769E-02				
77.17	263.	8.75	0.87	4.891E-02				
86.48	19.	189.10	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	PBC<MDA	EU155
86.54	22.	156.93	0.88	5.281E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.631E-01	EU155
					86.94	9.040	2.585E+00	Sn126
86.94	22.	159.71	0.88	5.294E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	2.586E+00	Sn126
87.56	34.	54.01	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
91.10	22.	159.66	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.48	19.	102.86	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
93.24	23.	154.20	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
97.50	18.	144.93	0.89	5.550E-02	97.50	30.000	PBC<MDA	Gd153
99.50	18.	148.29	0.89	5.580E-02	99.50	15.000	PBC<MDA	Np239
103.70	18.	144.33	0.90	5.626E-02	103.70	24.000	PBC<MDA	Np239
105.31	17.	159.17	0.90	5.638E-02	105.31	21.200	PBC<MDA	EU155
123.10	17.	101.77	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
140.51	19.	120.96	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.48	19.	109.12	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
176.60	16.	108.42	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
205.33	7.	238.57	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
210.85	15.	126.24	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229
227.00	2.	672.42	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.75	369.	6.50	0.95	3.600E-02	238.63	43.300	1.316E+01	PB212
242.13	68.	20.07	1.04	3.560E-02	242.00	7.430	1.428E+01	PB214
244.69	6.	629.31	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
265.83	3.	493.25	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.97	14.	79.81	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208
279.20	12.	97.05	1.08	3.154E-02	279.20	81.460	PBC<MDA	Hg203
295.35	129.	12.48	1.22	3.006E-02	295.09	19.300	1.194E+01	PB214
300.30	29.	47.31	0.61	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.197E+01	PA231
					300.18	6.200	PBC<MDA	PA233
316.49	14.	134.30	1.12	2.834E-02	316.49	87.040	PBC<MDA	Ir192
320.08	15.	135.56	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	100.97	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	15.	103.31	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.33	92.	17.05	0.65	2.677E-02	338.32	12.010	1.590E+01	AC228
340.57	11.	171.08	1.15	2.662E-02	340.57	46.900	PBC<MDA	Cs136
344.29	10.	181.45	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
345.83	10.	190.83	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.08	213.	7.87	1.24	2.587E-02	351.93	37.600	1.216E+01	PB214
383.84	14.	107.92	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
391.69	14.	107.72	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	13.	95.51	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
453.88	8.	125.00	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
497.05	5.	216.65	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	53.	35.41	2.56	1.870E-02	511.86	20.000	7.920E+00	RH106
563.24	4.	303.11	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.32	11.	72.16	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.375E+00	PA234
					569.70	97.740	3.672E-01	BI207
569.47	2.	441.59	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.954E-01	PA234
					569.70	97.740	6.676E-02	BI207
583.20	143.	9.55	1.27	1.669E-02	583.02	84.500	5.621E+00	TL208
600.50	8.	257.39	1.40	1.626E-02	600.50	17.860	PBC<MDA	SB125
602.73	8.	261.04	1.40	1.621E-02	602.73	98.260	PBC<MDA	SB124
604.71	8.	265.19	1.40	1.616E-02	604.71	97.620	PBC<MDA	CS134
609.51	174.	7.87	1.56	1.605E-02	609.31	46.090	1.305E+01	BI214
					610.30	5.750	1.048E+02	RU103
636.97	11.	92.89	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
661.63	106.	12.15	1.53	1.492E-02	661.66	85.210	4.631E+00	CS137
722.79	11.	85.93	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.657E-01	AG108M
					723.36	20.220	2.093E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
722.94	11.	96.37	1.51	1.380E-02	722.79	10.810	3.913E+00	SB124
					722.94	90.840	4.657E-01	AG108M
					723.36	20.220	2.093E+00	EU154
723.36	9.	113.19	1.51	1.379E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.034E-01	AG108M
					723.36	20.220	1.813E+00	EU154
725.25	9.	93.87	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
735.72	11.	50.87	1.52	1.358E-02	735.72	22.500	PBC<MDA	pm146
747.16	2.	619.68	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
766.41	14.	90.13	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	6.	150.07	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
795.87	11.	81.10	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
801.95	5.	220.04	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
818.50	7.	130.32	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
834.85	14.	42.05	1.61	1.213E-02	834.85	99.980	6.494E-01	MN54
871.10	8.	65.66	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
873.23	2.	312.06	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
898.04	19.	34.65	1.66	1.137E-02	898.04	93.700	9.902E-01	y88
911.18	69.	14.42	1.16	1.122E-02	911.07	29.000	1.178E+01	AC228
937.49	10.	92.99	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
946.02	2.	496.66	1.70	1.085E-02	946.02	13.400	PBC<MDA	PA234
964.11	10.	136.37	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.30	68.	17.23	1.13	1.062E-02	968.97	17.460	2.038E+01	AC228
996.33	7.	103.20	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1048.07	6.	102.74	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	6.	136.67	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1121.27	19.	96.05	1.85	9.303E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.295E+00	Ta182
1173.24	4.	301.06	1.89	8.929E-03	1173.24	99.900	PBC<MDA	CO60
1189.53	5.	187.26	1.90	8.821E-03	1189.05	16.200	PBC<MDA	Ta182
1221.98	7.	162.17	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	20.	34.51	1.94	8.501E-03	1238.28	66.070	2.001E+00	Co56
1274.53	4.	121.38	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	8.262E-01	EU154
1291.60	6.	145.52	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	5.	117.71	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	4.	137.50	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.05	255.	6.34	2.40	7.309E-03	1460.83	10.670	1.817E+02	K40
1596.21	8.	35.88	2.19	6.737E-03	1596.21	95.400	6.866E-01	La140
1764.56	23.	20.85	2.29	6.141E-03	1764.49	15.400	1.351E+01	BI214
1836.06	8.	35.36	2.33	5.919E-03	1836.06	99.200	7.569E-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
298.94	74.85	146.	181.	3.792E+03	12.03	0.867	- sD
308.25	77.18	133.	263.	5.379E+03	8.75	0.870	- 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	186.13	46.64	93.	53.	0.029	35.76	0.587s
TH-227	200.12	50.14	290.	-6.	-0.004	372.26	0.840
AM-241	237.70	59.54	237.	-23.	-0.013	122.59	0.850s
TH-234	252.71	63.29	149.	21.	0.012	85.53	0.854D
Sn-126	256.68	64.28	330.	7.	0.004	361.83	0.856s
BA-133	323.52	80.99	227.	-25.	-0.014	108.79	0.874s
Np-237	345.53	86.49	615.	19.	0.010	189.10	0.880s
EU-155	345.74	86.54	599.	22.	0.012	156.93	0.880s
Sn-126	347.33	86.94	622.	22.	0.012	159.71	0.880
Sn-126	349.85	87.57	583.	34.	0.019	54.01	0.881D
Cd-109	351.73	88.04	606.	0.	0.000	1000.00	0.881A
Nd-147	363.97	91.10	628.	22.	0.012	159.66	0.885s
TH-234	369.93	92.59	183.	19.	0.011	102.86	0.886D
AC-228	372.97	93.35	611.	23.	0.013	154.20	0.887s
Gd-153	389.57	97.50	344.	18.	0.010	144.93	0.892s
Np-239	397.57	99.50	363.	18.	0.010	148.29	0.894
Np-239	414.38	103.70	346.	18.	0.010	144.33	0.898s
EU-155	420.83	105.31	366.	17.	0.010	159.17	0.900s
Np-239	424.10	106.13	239.	-20.	-0.011	112.59	0.901s
EU-152	486.69	121.78	195.	-20.	-0.011	101.59	0.918
EU-154	491.98	123.10	134.	17.	0.009	101.77	0.919
PA-234	524.77	131.29	330.	-21.	-0.012	121.96	0.928s
HF-181	531.68	133.02	351.	-21.	-0.012	125.49	0.930s
CE-144	533.74	133.54	373.	-3.	-0.002	868.53	0.930s
HF-181	544.79	136.30	376.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	373.	-23.	-0.013	122.00	0.933s
Tc-99m	561.63	140.51	255.	19.	0.011	120.96	0.938
U-235	574.73	143.79	661.	-22.	-0.012	163.37	0.941s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	581.35	145.44	642.	-22.	-0.012	164.33	0.943s
Ba-140	650.24	162.66	235.	-19.	-0.011	116.94	0.961s
U-235	653.11	163.38	185.	-10.	-0.006	269.03	0.962s
CE-139	663.01	165.85	198.	19.	0.010	109.12	0.965s
Cf-251	706.00	176.60	84.	16.	0.009	108.42	0.976
U-235	820.94	205.33	89.	7.	0.004	238.57	1.007s
TH-229	843.01	210.85	103.	15.	0.009	126.24	1.012
Cf-251	907.62	227.00	70.	2.	0.001	672.42	1.029s
PB-212	954.15	238.63	52.	385.	0.214	5.75	1.041D
PB-214	967.61	242.00	59.	68.	0.038	20.07	1.045D
EU-152	978.39	244.69	626.	6.	0.003	629.31	1.048
TH-227	1024.59	256.24	100.	-20.	-0.011	180.47	1.060s
Cd-113m	1054.43	263.70	105.	-16.	-0.009	93.96	1.067s
BI-210M	1062.96	265.83	120.	3.	0.002	493.25	1.070s
TL-208	1108.77	277.28	56.	14.	0.008	79.81	1.081
Hg-203	1116.44	279.20	67.	12.	0.007	97.05	1.083s
I-131	1136.83	284.30	51.	-2.	-0.001	578.17	1.089s
PB-214	1181.05	295.35	38.	125.	0.069	13.03	1.222
PB-212	1200.86	300.30	43.	29.	0.016	47.31	0.611s
PA-231	1199.92	300.07	364.	-17.	-0.009	162.89	1.105s
PA-233	1200.36	300.18	347.	-17.	-0.009	159.18	1.105
PA-231	1210.24	302.65	330.	-17.	-0.009	155.03	1.107s
BA-133	1211.05	302.85	333.	-4.	-0.002	611.12	1.108s
Ir-192	1233.41	308.44	280.	-17.	-0.009	142.46	1.113s
PA-233	1247.69	312.01	286.	-17.	-0.010	28.87	1.117s
Ir-192	1265.61	316.49	158.	14.	0.008	134.30	1.122
CR-51	1279.99	320.08	205.	15.	0.008	135.56	1.125s
La-140	1314.69	328.76	110.	15.	0.008	100.97	1.134
Cf-249	1333.41	333.44	118.	15.	0.009	103.31	1.139s
AC-228	1352.97	338.33	33.	92.	0.051	17.05	0.645s
Cs-136	1361.93	340.57	157.	11.	0.006	171.08	1.146s
EU-152	1376.80	344.29	168.	10.	0.006	181.45	1.150
HF-181	1382.97	345.83	170.	10.	0.005	190.83	1.151s
PB-214	1407.97	352.08	20.	213.	0.118	7.87	1.236
BA-133	1423.66	356.00	302.	-14.	-0.008	171.38	1.162s
I-131	1457.59	364.48	56.	-4.	-0.002	369.68	1.170s
BA-133	1535.03	383.84	103.	14.	0.008	107.92	1.189s
Cf-249	1551.47	387.95	150.	-17.	-0.010	104.00	1.193s
SN-113	1566.43	391.69	113.	14.	0.008	107.72	1.197s
SB-125	1711.18	427.88	36.	13.	0.007	95.51	1.233s
AG-108M	1735.43	433.94	72.	-18.	-0.010	93.87	1.239s
pm-146	1815.20	453.88	24.	8.	0.004	125.00	1.258s
Ir-192	1871.93	468.06	33.	-1.	-0.001	852.20	1.272s
BE-7	1910.07	477.60	104.	-15.	-0.008	101.22	1.282s
HF-181	1927.68	482.00	119.	-4.	-0.002	418.26	1.286s
La-140	1947.77	487.02	142.	-12.	-0.006	149.73	1.291s
RU-103	1987.91	497.05	31.	5.	0.003	216.65	1.301s
RH-106	2047.15	511.86	47.	53.	0.030	35.41	2.565s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	2123.70	531.00	43.	-9.	-0.005	147.64	1.333s
Ba-140	2148.74	537.26	40.	-6.	-0.003	199.76	1.339s
CS-134	2252.65	563.24	26.	4.	0.002	303.11	1.364s
CS-134	2276.99	569.32	26.	11.	0.006	72.16	1.369s
PA-234	2277.59	569.47	38.	2.	0.001	441.59	1.370s
BI-207	2278.51	569.70	41.	-1.	-0.001	911.04	1.370s
TL-208	2332.51	583.20	8.	143.	0.079	9.55	1.265s
SB-125	2401.71	600.50	231.	8.	0.005	257.39	1.399s
SB-124	2410.64	602.73	238.	8.	0.005	261.04	1.401s
CS-134	2418.55	604.71	247.	8.	0.005	265.19	1.403s
BI-214	2437.76	609.51	3.	174.	0.097	7.87	1.561
RU-103	2440.91	610.30	255.	4.	0.002	587.49	1.408s
PM-144	2471.96	618.06	42.	-6.	-0.003	176.27	1.415s
SB-125	2543.28	635.89	39.	-14.	-0.008	68.51	1.432s
I-131	2547.62	636.97	45.	11.	0.006	92.89	1.433s
AG-110M	2630.77	657.76	179.	-17.	-0.009	115.73	1.452s
CS-137	2646.23	661.63	12.	106.	0.059	12.15	1.526
PM-144	2785.90	696.54	37.	-2.	-0.001	559.34	1.487s
NB-94	2810.25	702.63	52.	-15.	-0.008	68.11	1.493s
SB-124	2890.87	722.79	36.	11.	0.006	85.93	1.511s
AG-108M	2891.48	722.94	46.	11.	0.006	96.37	1.511s
EU-154	2893.15	723.36	49.	9.	0.005	113.19	1.511s
ZR-95	2896.52	724.20	138.	-22.	-0.012	45.40	1.512s
BI-212	2908.41	727.17	31.	9.	0.005	93.87	1.515s
pm-146	2942.61	735.72	5.	11.	0.006	50.87	1.523s
pm-146	2988.37	747.16	23.	2.	0.001	619.68	1.533s
AG-110M	3055.51	763.94	28.	-4.	-0.002	193.65	1.548
NB-95	3062.89	765.79	80.	-19.	-0.011	68.91	1.549s
PA-234M	3065.38	766.41	67.	14.	0.008	90.13	1.550s
EU-152	3115.41	778.92	29.	-5.	-0.003	255.20	1.561s
BI-212	3141.41	785.42	19.	6.	0.004	150.07	1.567
CS-134	3183.20	795.87	34.	11.	0.006	81.10	1.576s
CS-134	3207.54	801.95	55.	5.	0.003	220.04	1.581s
CO-58	3242.84	810.78	50.	-6.	-0.003	171.59	1.589s
Cs-136	3273.74	818.50	19.	7.	0.004	130.32	1.596
MN-54	3339.13	834.85	5.	14.	0.008	42.05	1.610s
Co-56	3386.82	846.77	37.	-16.	-0.009	37.39	1.620s
TL-208	3442.00	860.56	25.	-2.	-0.001	191.28	1.632s
NB-94	3484.13	871.10	10.	8.	0.004	65.66	1.641s
EU-154	3492.66	873.23	28.	2.	0.001	312.06	1.643s
PA-234	3532.70	883.24	52.	0.	0.000	1000.00	1.652s
AG-110M	3538.47	884.68	52.	0.	0.000	1000.00	1.653s
Sc-46	3556.86	889.28	55.	-10.	-0.006	105.86	1.657s
y-88	3591.90	898.04	5.	19.	0.011	34.65	1.664s
AC-228	3644.46	911.18	5.	69.	0.038	14.42	1.161s
AG-110M	3749.71	937.49	15.	10.	0.005	92.99	1.697s
PA-234	3783.82	946.02	20.	2.	0.001	496.66	1.704
EU-152	3856.18	964.11	94.	10.	0.006	136.37	1.719s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3876.93	969.30	13.	68.	0.038	17.23	1.131s
EU-154	3985.06	996.33	20.	7.	0.004	103.20	1.746s
PA-234M	4003.73	1001.00	29.	-2.	-0.001	426.57	1.750s
EU-154	4018.84	1004.77	28.	0.	0.000	1000.00	1.753s
Co-56	4151.10	1037.84	25.	-3.	-0.002	370.93	1.780s
Cs-136	4192.02	1048.07	16.	6.	0.003	102.74	1.788s
RH-106	4201.18	1050.36	41.	-12.	-0.006	81.42	1.790s
BI-207	4254.38	1063.66	11.	6.	0.003	136.67	1.801s
Ga-68	4309.34	1077.40	32.	-2.	-0.001	646.79	1.812s
FE-59	4396.74	1099.25	27.	-10.	-0.005	80.06	1.829s
EU-152	4448.04	1112.07	129.	-19.	-0.011	86.72	1.839s
ZN-65	4461.92	1115.55	110.	-19.	-0.011	80.36	1.842s
BI-214	4480.88	1120.29	114.	-19.	-0.011	81.86	1.845s
Ta-182	4484.94	1121.30	161.	19.	0.011	96.05	1.846s
CO-60	4692.68	1173.24	21.	4.	0.002	301.06	1.886s
Ta-182	4755.93	1189.05	16.	5.	0.003	187.26	1.899s
Ta-182	4885.37	1221.41	21.	7.	0.004	162.17	1.923s
Co-56	4952.84	1238.28	6.	20.	0.011	34.51	1.936s
NA-22	5097.84	1274.53	12.	4.	0.002	121.38	1.963s
FE-59	5166.10	1291.60	11.	6.	0.003	145.52	1.975s
CO-60	5329.71	1332.50	6.	5.	0.003	117.71	2.005s
EU-152	5631.70	1408.00	6.	4.	0.002	137.50	2.059s
K-40	5843.89	1461.05	3.	255.	0.142	6.34	2.395
La-140	6384.49	1596.21	0.	8.	0.004	35.88	2.185s
SB-124	6763.55	1690.98	0.	0.	0.000	1000.00	2.245s
BI-214	7057.56	1764.49	0.	23.	0.013	20.85	2.290s
Co-56	7084.99	1771.35	23.	0.	0.000	1000.00	2.294s
y-88	7343.81	1836.06	0.	8.	0.004	35.36	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.9276E+00				5.31E+01	
			477.60	-3.928E+00	(	1.338E+01 1.01E+02 1.05E+01	G
NA-22	C	2.9091E-01				9.50E+02	
			1274.53	2.909E-01	?(	1.250E+00 1.21E+02 9.99E+01	G
K-40	N	1.8168E+02				4.66E+11	
			1460.83	1.817E+02	(P	7.657E+00 6.34E+00 1.07E+01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Sc-46    F  -5.0071E-01                                     8.38E+01
                          889.28-5.007E-01 ?(  1.801E+00 1.06E+02 1.00E+02 G
                         1120.55-1.639E-02 %   3.378E+00 5.96E+03 1.00E+02 G

CR-51    F   3.0273E+00                                     2.77E+01
                          320.08 3.027E+00 ?(P 1.382E+01 1.36E+02 9.94E+00 G

MN-54    C   6.4942E-01                                     3.12E+02
                          834.85 6.494E-01 ?(P 5.925E-01 4.20E+01 1.00E+02 G

FE-59    F  -1.0263E+00                                     4.45E+01
                         1099.25-1.026E+00 ?(P 2.790E+00 8.01E+01 5.65E+01 G
                         1291.60 8.908E-01 &   2.892E+00 1.46E+02 4.32E+01 G

Co-56    C  -7.4333E-01                                     7.73E+01
                          846.77-7.433E-01 ?(P 1.448E+00 3.74E+01 9.99E+01 G
                         1238.28 2.001E+00 + P 1.375E+00 3.45E+01 6.61E+01 G
                         1037.84-1.182E+00 +   1.025E+01 3.71E+02 1.41E+01 G
                         1771.35 0.000E+00 +   1.470E+01 1.00E+03 1.55E+01  A

CO-57    C  -2.3978E-02                                     2.72E+02
                          122.06-2.398E-02 &(  8.223E-01 1.00E+03 8.56E+01 G
                          136.47-2.184E+00 &   8.911E+00 1.22E+02 1.07E+01 G

CO-58    C  -2.6905E-01                                     7.09E+01
                          810.78-2.691E-01 ?(  1.599E+00 1.72E+02 9.95E+01 G

CO-60    F   2.9043E-01                                     1.93E+03
                         1332.50 3.599E-01 ?(P 9.772E-01 1.18E+02 1.00E+02 G
                         1173.24 2.210E-01 ?(P 1.513E+00 3.01E+02 9.99E+01 G

ZN-65    F  -2.2563E+00                                     2.44E+02
                         1115.55-2.256E+00 ?(  6.047E+00 8.04E+01 5.06E+01 G

NB-94    I  -5.9630E-01                                     7.41E+06
                          702.63-5.963E-01 ?(P 1.455E+00 6.81E+01 9.79E+01 G
                          871.10 3.841E-01 +   8.306E-01 6.57E+01 9.99E+01 G

ZR-95    I   1.1755E-02                                     6.40E+01
                          756.73 1.176E-02 &(P 1.961E+00 6.75E+03 5.45E+01 G
                          724.20-2.040E+00 + P 5.242E+00 4.54E+01 4.42E+01 G

NB-95    I  -8.2492E-01                                     6.40E+01
                          765.79-8.249E-01 ?(  1.884E+00 6.89E+01 9.98E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	1.6925E-01					3.93E+01	
			497.05	1.692E-01	&(P	9.084E-01	2.17E+02	9.09E+01 G
			610.30	2.327E+00	?	4.650E+01	5.87E+02	5.75E+00 GA
RH-106	I	2.2844E-01					3.74E+02	
			621.92	2.284E-01	%(P	1.234E+01	1.52E+03	9.93E+00 G
			1050.36	-4.181E+01	+ P	1.169E+02	8.14E+01	1.56E+00 G
			511.86	7.920E+00	?	5.130E+00	3.54E+01	2.00E+01 GA
AG-108M	C	-5.1951E-01					1.53E+05	
			433.94	-5.195E-01	?(	1.201E+00	9.39E+01	9.05E+01 G
			722.94	4.657E-01	+	1.521E+00	9.64E+01	9.08E+01 G
			614.28	-1.965E-02	% P	3.018E+00	2.11E+03	8.98E+01 G
AG-110M	F	4.6556E-01					2.50E+02	
			884.68	0.000E+00	?(	2.417E+00	1.00E+03	7.27E+01 G
			657.76	-6.551E-01	+	2.548E+00	1.16E+02	9.46E+01 G
			937.49	1.450E+00	(P	3.105E+00	9.30E+01	3.44E+01 G
			1384.30	-9.245E-02	% P	2.195E+00	1.97E+03	2.43E+01 G
			763.94	-7.593E-01	+	5.195E+00	1.94E+02	2.23E+01 G
SN-113	F	5.3029E-01					1.15E+02	
			391.69	5.303E-01	&(	1.925E+00	1.08E+02	6.40E+01 G
SB-124	F	6.5298E-01					6.02E+01	
			602.73	2.943E-01	?(	2.604E+00	2.61E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.341E+00	1.00E+03	4.78E+01 G
			722.79	3.913E+00	?(	1.135E+01	8.59E+01	1.08E+01 G
SB-125	I	1.2950E+00					1.01E+03	
			427.88	1.104E+00	&(	2.633E+00	9.55E+01	2.96E+01 G
			600.50	1.612E+00	?(	1.406E+01	2.57E+02	1.79E+01 G
			635.89	-4.449E+00	+	1.011E+01	6.85E+01	1.13E+01 G
			463.37	1.230E-01	% P	1.103E+01	2.55E+03	1.05E+01 G
I-131	I	3.3922E-01					8.02E+00	
			364.48	-1.083E-01	?(	1.018E+00	3.70E+02	8.17E+01 G
			284.30	-6.798E-01	+	1.052E+01	5.78E+02	6.14E+00 G
			636.97	5.439E+00	?(P	1.708E+01	9.29E+01	7.17E+00 G
Gd-153	F	6.1203E-01					2.42E+02	
			97.50	6.120E-01	?(	2.975E+00	1.45E+02	3.00E+01 G
			103.20	9.545E-02	%	4.246E+00	1.31E+03	2.18E+01 G
Ga-68	C	-4.1008E+00					4.71E-02	
			1077.40	-4.101E+00	?(	5.961E+01	6.47E+02	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	2.2866E-01					2.51E-01	
			140.51	2.287E-01	?(	9.274E-01	1.21E+02	8.93E+01 G
BA-133	F	-5.0663E-01					3.85E+03	
			356.00	-5.066E-01	?(	2.922E+00	1.71E+02	6.20E+01 G
			302.85	-4.361E-01	+	9.034E+00	6.11E+02	1.83E+01 G
			383.84	3.549E+00	?	1.292E+01	1.08E+02	8.94E+00 GA
			80.99	-8.062E-01	+	2.345E+00	1.09E+02	3.41E+01 GA
CS-134	I	6.7651E-01					7.54E+02	
			604.71	2.975E-01	?(	2.673E+00	2.65E+02	9.76E+01 G
			795.87	5.620E-01	*(	1.533E+00	8.11E+01	8.55E+01 G
			569.32	2.332E+00	&(	5.612E+00	7.22E+01	1.54E+01 G
			801.95	2.478E+00	?(	1.896E+01	2.20E+02	8.69E+00 G
			563.24	1.356E+00	?(P	1.033E+01	3.03E+02	8.35E+00 G
CS-137	I	4.6309E+00					1.10E+04	
			661.66	4.631E+00	(	8.236E-01	1.22E+01	8.52E+01 G
CE-139	F	2.6606E-01					1.38E+02	
			165.85	2.661E-01	?(	9.735E-01	1.09E+02	7.99E+01 G
Ba-140	I	-7.3739E-01					1.28E+01	
			537.26	-7.374E-01	?(P	4.080E+00	2.00E+02	2.44E+01 G
			162.66	-3.487E+00	+	1.367E+01	1.17E+02	6.22E+00 G
			304.85	8.441E-07	%	3.906E+01	1.36E+09	4.29E+00 G
La-140	I	8.3208E-01					1.28E+01	
			1596.21	6.866E-01	?(P	6.371E-01	3.59E+01	9.54E+01 G
			487.02	-7.188E-01	-	3.646E+00	1.50E+02	4.55E+01 G
			328.76	1.516E+00	?(P	5.147E+00	1.01E+02	2.03E+01 G
			815.77	-4.991E-03	% P	7.241E+00	4.73E+04	2.33E+01 G
CE-141	I	-4.8405E-01					3.25E+01	
			145.44	-4.840E-01	?(	2.659E+00	1.64E+02	4.82E+01 G
CE-144	I	-2.8915E-01					2.85E+02	
			133.54	-2.891E-01	?(	8.506E+00	8.69E+02	1.11E+01 G
PM-144	C	-9.1825E-02					3.63E+02	
			696.54	-9.182E-02	?(	1.227E+00	5.59E+02	9.90E+01 G
			618.06	-2.148E-01	+ P	1.165E+00	1.76E+02	9.91E+01 G
EU-152	F	1.7344E+00					4.94E+03	
			344.29	8.159E-01	&(P	5.020E+00	1.81E+02	2.65E+01 G
			1112.07	-8.332E+00	&	2.414E+01	8.67E+01	1.36E+01 G
			121.78	-6.908E-01	+	2.349E+00	1.02E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	-1.596E+00	+ P	9.218E+00	2.55E+02	1.29E+01 G
			964.11	3.693E+00	?(	1.713E+01	1.36E+02	1.46E+01 G
			244.69	1.172E+00	?(P	2.480E+01	6.29E+02	7.58E+00 G
			1408.00	1.516E+00	?	4.829E+00	1.37E+02	2.10E+01 GA
EU-154	I	1.1984E+00					3.14E+03	
			873.23	9.445E-01	&(	1.056E+01	3.12E+02	1.23E+01 G
			123.10	4.042E-01	?(	1.381E+00	1.02E+02	4.08E+01 G
			1274.54	6.355E-02	%	4.033E+00	1.69E+03	3.52E+01 G
			723.36	1.813E+00	?(	7.007E+00	1.13E+02	2.02E+01 G
			1004.77	0.000E+00	-	8.217E+00	1.00E+03	1.80E+01 G
			996.33	3.375E+00	?(	1.201E+01	1.03E+02	1.06E+01 G
EU-155	I	7.7787E-01					1.81E+03	
			105.31	7.992E-01	?(P	4.269E+00	1.59E+02	2.12E+01 G
			86.54	7.631E-01	&(	4.003E+00	1.57E+02	3.07E+01 G
HF-181	F	1.0720E-01					4.24E+01	
			482.00	-1.303E-01	?(	1.877E+00	4.18E+02	8.05E+01 G
			133.02	-5.033E-01	+	2.114E+00	1.25E+02	4.33E+01 G
			345.83	1.376E+00	?(	8.909E+00	1.91E+02	1.51E+01 G
			136.30	0.000E+00	-	1.633E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.4264E+00					1.14E+02	
			1121.30	3.295E+00	?(	1.059E+01	9.61E+01	3.49E+01 G
			1221.41	1.594E+00	?(	5.793E+00	1.62E+02	2.70E+01 G
			1189.05	1.944E+00	?(	8.301E+00	1.87E+02	1.62E+01 G
Hg-203	F	2.7011E-01					4.66E+01	
			279.20	2.701E-01	?(	8.849E-01	9.71E+01	8.15E+01 G
TL-208	N	5.6212E+00					6.98E+02	
			583.02	5.621E+00	*(	6.368E-01	9.55E+00	8.45E+01 G
			277.28	3.904E+00	&	1.043E+01	7.98E+01	6.31E+00 G
			860.56	-8.013E-01	- P	9.872E+00	1.91E+02	1.24E+01 G
pm-146	C	6.1041E-01					2.02E+03	
			747.16	2.033E-01	?(	3.076E+00	6.20E+02	3.40E+01 G
			735.72	2.038E+00	?(P	2.346E+00	5.09E+01	2.25E+01 G
			453.88	3.292E-01	?(	1.051E+00	1.25E+02	6.50E+01 G
y-88	F	8.7026E-01					1.07E+02	
			898.04	9.902E-01	?(P	6.858E-01	3.46E+01	9.37E+01 G
			1836.06	7.569E-01	?(	6.973E-01	3.54E+01	9.92E+01 G
Cd-113m		-4.4754E+03					5.33E+03	
			263.70	-4.475E+03	?(	1.411E+04	9.40E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.1481E+00					3.28E+05	
			176.60	1.148E+00	?(	3.209E+00	1.08E+02	1.70E+01 G
			227.00	5.477E-01	?	9.767E+00	6.72E+02	6.30E+00 GA
Cf-249	T	-1.0444E-01					1.28E+05	
			387.95	-6.051E-01	(	2.113E+00	1.04E+02	6.60E+01 G
			333.44	2.026E+00	?(	7.041E+00	1.03E+02	1.55E+01 G
Sn-126		1.0018E+00					3.65E+07	
			87.57	9.596E-01	}	3.213E+00	5.40E+01	3.75E+01 GA
			64.28	1.002E+00	?(	1.226E+01	3.62E+02	9.70E+00 G
			86.94	2.586E+00		1.380E+01	1.60E+02	9.04E+00 GA
PB-210	N	2.7847E+01					8.14E+03	
			46.54	2.785E+01	@(P	2.510E+01	3.58E+01	4.25E+00 G
PB-212	N	1.3717E+01					6.98E+02	
			238.63	1.372E+01	(P	1.293E+00	5.75E+00	4.33E+01 G
			300.03	1.648E+01	+ P	1.902E+01	4.73E+01	3.28E+00 GA
PB-214	N	1.2083E+01					5.84E+05	
			351.93	1.216E+01	(P	1.347E+00	7.87E+00	3.76E+01 G
			295.09	1.194E+01	(P	3.015E+00	1.30E+01	1.93E+01 G
			242.00	1.428E+01		8.090E+00	2.01E+01	7.43E+00 GA
BI-207	C	1.7163E-01					1.18E+04	
			569.70	-3.338E-02	&(	1.086E+00	9.11E+02	9.77E+01 G
			1063.66	4.406E-01	&(P	1.401E+00	1.37E+02	7.45E+01 G
BI-212	N	4.7795E+00					6.98E+02	
			727.17	4.779E+00	&(P	1.525E+01	9.39E+01	7.55E+00 G
			785.42	2.145E+01		7.737E+01	1.50E+02	1.28E+00 GA
BI-214	N	1.3169E+01					5.84E+05	
			609.31	1.305E+01	(	8.263E-01	7.87E+00	4.61E+01 G
			1120.29	-7.605E+00	-	2.077E+01	8.19E+01	1.51E+01 G
			1764.49	1.351E+01	?(	4.329E+00	2.09E+01	1.54E+01 G
BI-210M	T	1.0680E-01					1.10E+09	
			265.83	1.068E-01	&(P	1.816E+00	4.93E+02	5.00E+01 G
			304.90	1.293E-07	%	5.985E+00	1.36E+09	2.80E+01 G
AC-228	N	1.2986E+01					2.10E+03	
			911.07	1.178E+01	@(	2.242E+00	1.44E+01	2.90E+01 G
			968.97	2.038E+01	+	5.848E+00	1.72E+01	1.75E+01 G
			338.32	1.590E+01	(	5.094E+00	1.70E+01	1.20E+01 G
			93.35	4.178E+00	-	2.153E+01	1.54E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-1.5890E+00					7.95E+03	
			50.14	-1.589E+00	&(	2.005E+01	3.72E+02	8.00E+00 G
			256.24	-4.602E+00	+ P	1.151E+01	1.80E+02	7.00E+00 G
TH-229	N	2.8663E+00					2.68E+06	
			193.51	-3.002E-02	%(P	1.471E+01	1.86E+04	4.40E+00 G
			210.85	7.129E+00	&(	2.321E+01	1.26E+02	2.99E+00 G
TH-234	N	5.1654E+00					1.63E+12	
			63.29	7.618E+00	(P	2.169E+01	8.55E+01	3.81E+00 G
			92.59	3.492E+00	(P	1.200E+01	1.03E+02	5.58E+00 G
PA-231	N	-1.0993E+01					1.20E+07	
			302.65	-1.099E+01	?(	5.723E+01	1.55E+02	2.88E+00 G
			300.07	-1.275E+01	+	6.971E+01	1.63E+02	2.46E+00 G
PA-233	C	-9.2322E-01					7.82E+08	
			312.01	-9.232E-01	?(P	4.387E+00	2.89E+01	3.60E+01 G
			300.18	-5.059E+00	-	2.704E+01	1.59E+02	6.20E+00 G
PA-234	N	-1.2025E+00					1.63E+12	
			131.29	-1.202E+00	?(	4.908E+00	1.22E+02	1.80E+01 G
			946.02	7.644E-01	+	9.001E+00	4.97E+02	1.34E+01 G
			569.47	7.954E-01	&	1.250E+01	4.42E+02	8.20E+00 G
			883.24	0.000E+00	+	1.827E+01	1.00E+03	9.60E+00 G
			880.53	-5.336E-01	%	2.898E+01	1.53E+03	6.00E+00 GA
PA-234M	N	4.0185E+01					1.63E+12	
			1001.00	-1.416E+01	&(P	1.796E+02	4.27E+02	8.37E-01 G
			766.41	1.949E+02	?(P	5.908E+02	9.01E+01	2.94E-01 G
U-235	N	-8.4582E-01					2.57E+11	
			143.79	-2.158E+00	(	1.178E+01	1.63E+02	1.10E+01 G
			205.33	2.024E+00	?(P	1.263E+01	2.39E+02	5.01E+00 G
			163.38	-2.310E+00	& P	1.499E+01	2.69E+02	5.08E+00 G
AM-241	T	-9.4770E-01					1.58E+05	
			59.54	-9.477E-01	?(	3.111E+00	1.23E+02	3.59E+01 G
Np-237	F	1.5022E+00					2.14E+06	
			86.49	1.502E+00	&(P	9.505E+00	1.89E+02	1.31E+01 G
Ir-192	F	3.0420E-01					7.40E+01	
			316.49	3.042E-01	?(	1.379E+00	1.34E+02	8.70E+01 G
			468.06	-7.078E-02	-	1.572E+00	8.52E+02	5.18E+01 G
			308.44	-1.019E+00	+	4.876E+00	1.42E+02	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   3.9088E-01                                      1.30E+01
                          818.50 3.299E-01 ?(  1.028E+00 1.30E+02 1.00E+02 G
                         1048.07 4.213E-01 ?(  1.499E+00 1.03E+02 8.00E+01 G
                          340.57 4.691E-01 &(  2.722E+00 1.71E+02 4.69E+01 G

Np-239   T  -8.5934E-01                                      2.36E+00
                          103.70 7.603E-01 ?   3.680E+00 1.44E+02 2.40E+01 X
                          106.13-8.593E-01 ?(  3.242E+00 1.13E+02 2.27E+01 G
                           99.50 1.221E+00     6.070E+00 1.48E+02 1.50E+01 X

Nd-147      -2.2021E+00                                      1.11E+01
                          531.00-2.202E+00 ?(  7.877E+00 1.48E+02 1.30E+01 G
                           91.10 8.118E-01 +   4.331E+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

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	290.	-6.	-0.004	372.26	-1.589E+00	
AM-241	59.54	237.	-23.	-0.013	122.59	-9.477E-01	
BA-133	80.99	227.	-25.	-0.014	108.79	-8.062E-01	
EU-155	86.54	599.	22.	0.012	156.93	7.631E-01	
Nd-147	91.10	628.	22.	0.012	159.66	8.118E-01	
Gd-153	97.50	344.	18.	0.010	144.93	6.120E-01	
Np-239	99.50	363.	18.	0.010	148.29	1.221E+00	
Np-239	103.70	346.	18.	0.010	144.33	7.603E-01	
EU-155	105.31	366.	17.	0.010	159.17	7.992E-01	P
Np-239	106.13	239.	-20.	-0.011	112.59	-8.593E-01	
EU-152	121.78	195.	-20.	-0.011	101.59	-6.908E-01	
EU-154	123.10	134.	17.	0.009	101.77	4.042E-01	
PA-234	131.29	330.	-21.	-0.012	121.96	-1.202E+00	
HF-181	133.02	351.	-21.	-0.012	125.49	-5.033E-01	
CE-144	133.54	373.	-3.	-0.002	868.53	-2.891E-01	
CO-57	136.47	373.	-23.	-0.013	122.00	-2.184E+00	
Tc-99m	140.51	255.	19.	0.011	120.96	2.287E-01	
U-235	143.79	661.	-22.	-0.012	163.37	-2.158E+00	
CE-141	145.44	642.	-22.	-0.012	164.33	-4.840E-01	
Ba-140	162.66	235.	-19.	-0.011	116.94	-3.487E+00	
U-235	163.38	185.	-10.	-0.006	269.03	-2.310E+00	P
Cf-251	176.60	84.	16.	0.009	108.42	1.148E+00	
U-235	205.33	89.	7.	0.004	238.57	2.024E+00	P
TH-229	210.85	103.	15.	0.009	126.24	7.129E+00	
Cf-251	227.00	70.	2.	0.001	672.42	5.477E-01	
EU-152	244.69	626.	6.	0.003	629.31	1.172E+00	P
TH-227	256.24	100.	-20.	-0.011	180.47	-4.602E+00	P
Cd-113m	263.70	105.	-16.	-0.009	93.96	-4.475E+03	
BI-210M	265.83	120.	3.	0.002	493.25	1.068E-01	P
Hg-203	279.20	67.	12.	0.007	97.05	2.701E-01	
I-131	284.30	51.	-2.	-0.001	578.17	-6.798E-01	
PA-231	300.07	364.	-17.	-0.009	162.89	-1.275E+01	
PA-233	300.18	347.	-17.	-0.009	159.18	-5.059E+00	
PA-231	302.65	330.	-17.	-0.009	155.03	-1.099E+01	
BA-133	302.85	333.	-4.	-0.002	611.12	-4.361E-01	
Ir-192	308.44	280.	-17.	-0.009	142.46	-1.019E+00	
PA-233	312.01	286.	-17.	-0.010	28.87	-9.232E-01	P
Ir-192	316.49	158.	14.	0.008	134.30	3.042E-01	
CR-51	320.08	205.	15.	0.008	135.56	3.027E+00	P
Cf-249	333.44	118.	15.	0.009	103.31	2.026E+00	
Cs-136	340.57	157.	11.	0.006	171.08	4.691E-01	
EU-152	344.29	168.	10.	0.006	181.45	8.159E-01	P
HF-181	345.83	170.	10.	0.005	190.83	1.376E+00	
BA-133	356.00	302.	-14.	-0.008	171.38	-5.066E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	364.48	56.	-4.	-0.002	369.68	-1.083E-01	
BA-133	383.84	103.	14.	0.008	107.92	3.549E+00	
Cf-249	387.95	150.	-17.	-0.010	104.00	-6.051E-01	
SN-113	391.69	113.	14.	0.008	107.72	5.303E-01	
SB-125	427.88	36.	13.	0.007	95.51	1.104E+00	
AG-108M	433.94	72.	-18.	-0.010	93.87	-5.195E-01	
pm-146	453.88	24.	8.	0.004	125.00	3.292E-01	
Ir-192	468.06	33.	-1.	-0.001	852.20	-7.078E-02	
BE-7	477.60	104.	-15.	-0.008	101.22	-3.928E+00	
HF-181	482.00	119.	-4.	-0.002	418.26	-1.303E-01	
RU-103	497.05	31.	5.	0.003	216.65	1.692E-01	P
RH-106	511.86	47.	53.	0.030	35.41	7.920E+00	
Nd-147	531.00	43.	-9.	-0.005	147.64	-2.202E+00	
Ba-140	537.26	40.	-6.	-0.003	199.76	-7.374E-01	P
CS-134	563.24	26.	4.	0.002	303.11	1.356E+00	P
CS-134	569.32	26.	11.	0.006	72.16	2.332E+00	
PA-234	569.47	38.	2.	0.001	441.59	7.954E-01	
BI-207	569.70	41.	-1.	-0.001	911.04	-3.338E-02	
SB-125	600.50	231.	8.	0.005	257.39	1.612E+00	
SB-124	602.73	238.	8.	0.005	261.04	2.943E-01	
CS-134	604.71	247.	8.	0.005	265.19	2.975E-01	
RU-103	610.30	255.	4.	0.002	587.49	2.327E+00	
PM-144	618.06	42.	-6.	-0.003	176.27	-2.148E-01	P
SB-125	635.89	39.	-14.	-0.008	68.51	-4.449E+00	
I-131	636.97	45.	11.	0.006	92.89	5.439E+00	P
AG-110M	657.76	179.	-17.	-0.009	115.73	-6.551E-01	
PM-144	696.54	37.	-2.	-0.001	559.34	-9.182E-02	
NB-94	702.63	52.	-15.	-0.008	68.11	-5.963E-01	P
SB-124	722.79	36.	11.	0.006	85.93	3.913E+00	
AG-108M	722.94	46.	11.	0.006	96.37	4.657E-01	
EU-154	723.36	49.	9.	0.005	113.19	1.813E+00	
ZR-95	724.20	138.	-22.	-0.012	45.40	-2.040E+00	P
pm-146	735.72	5.	11.	0.006	50.87	2.038E+00	P
pm-146	747.16	23.	2.	0.001	619.68	2.033E-01	
AG-110M	763.94	28.	-4.	-0.002	193.65	-7.593E-01	
NB-95	765.79	80.	-19.	-0.011	68.91	-8.249E-01	
PA-234M	766.41	67.	14.	0.008	90.13	1.949E+02	P
EU-152	778.92	29.	-5.	-0.003	255.20	-1.596E+00	P
CS-134	795.87	34.	11.	0.006	81.10	5.620E-01	
CS-134	801.95	55.	5.	0.003	220.04	2.478E+00	
CO-58	810.78	50.	-6.	-0.003	171.59	-2.691E-01	
Cs-136	818.50	19.	7.	0.004	130.32	3.299E-01	
Co-56	846.77	37.	-16.	-0.009	37.39	-7.433E-01	P
NB-94	871.10	10.	8.	0.004	65.66	3.841E-01	
EU-154	873.23	28.	2.	0.001	312.06	9.445E-01	
Sc-46	889.28	55.	-10.	-0.006	105.86	-5.007E-01	
AG-110M	937.49	15.	10.	0.005	92.99	1.450E+00	P
PA-234	946.02	20.	2.	0.001	496.66	7.644E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	964.11	94.	10.	0.006	136.37	3.693E+00		
EU-154	996.33	20.	7.	0.004	103.20	3.375E+00		
PA-234M	1001.00	29.	-2.	-0.001	426.57	-1.416E+01		P
Co-56	1037.84	25.	-3.	-0.002	370.93	-1.182E+00		
Cs-136	1048.07	16.	6.	0.003	102.74	4.213E-01		
RH-106	1050.36	41.	-12.	-0.006	81.42	-4.181E+01		P
BI-207	1063.66	11.	6.	0.003	136.67	4.406E-01		P
Ga-68	1077.40	32.	-2.	-0.001	646.79	-4.101E+00		
FE-59	1099.25	27.	-10.	-0.005	80.06	-1.026E+00		P
EU-152	1112.07	129.	-19.	-0.011	86.72	-8.332E+00		
ZN-65	1115.55	110.	-19.	-0.011	80.36	-2.256E+00		
CO-60	1173.24	21.	4.	0.002	301.06	2.210E-01		P
Co-56	1238.28	6.	20.	0.011	34.51	2.001E+00		P
NA-22	1274.53	12.	4.	0.002	121.38	2.909E-01		
FE-59	1291.60	11.	6.	0.003	145.52	8.908E-01		
CO-60	1332.50	6.	5.	0.003	117.71	3.599E-01		P
EU-152	1408.00	6.	4.	0.002	137.50	1.516E+00		

P - Peakbackground subtraction

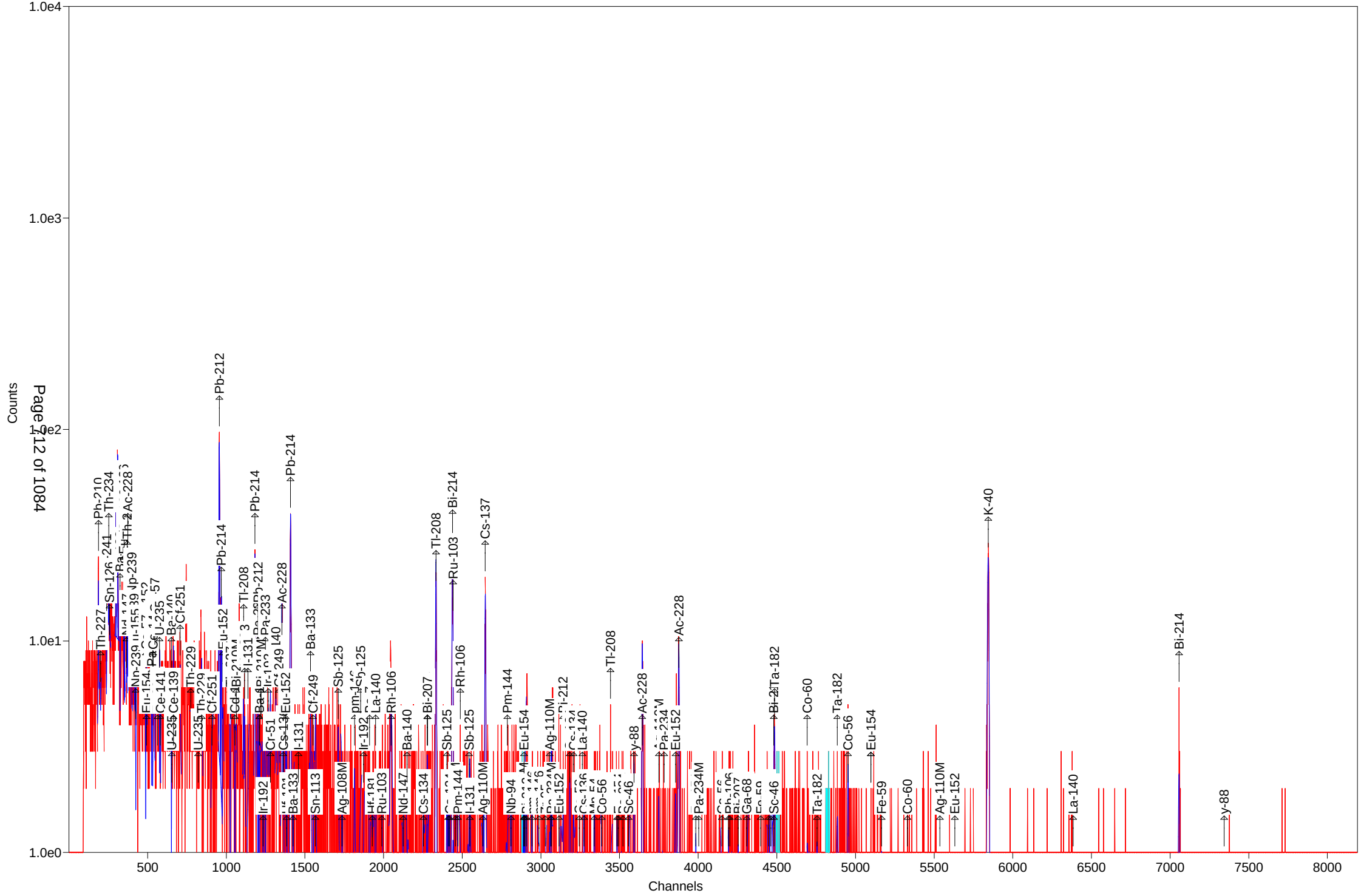
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-3.9276E+00	-3.9276E+00	1.012E+02%	1.34E+01
NA-22	#A	2.9091E-01	2.9091E-01	1.214E+02%	1.25E+00
K-40		1.8168E+02	1.8168E+02	6.341E+00%	7.66E+00
Sc-46	#A	-5.0070E-01	-5.0071E-01	1.059E+02%	1.80E+00
CR-51	#A	3.0273E+00	3.0273E+00	1.356E+02%	1.38E+01
MN-54	#	6.4942E-01	6.4942E-01	4.205E+01%	5.92E-01
FE-59	#A	-1.0263E+00	-1.0263E+00	8.006E+01%	2.79E+00
Co-56	#A	-7.4333E-01	-7.4333E-01	3.739E+01%	1.45E+00
CO-57	#A	-2.3978E-02	-2.3978E-02	1.003E+03%	8.22E-01
CO-58	#A	-2.6905E-01	-2.6905E-01	1.716E+02%	1.60E+00
CO-60	#A	2.9043E-01	2.9043E-01	1.177E+02%	9.77E-01
ZN-65	#A	-2.2563E+00	-2.2563E+00	8.036E+01%	6.05E+00
NB-94	#A	-5.9630E-01	-5.9630E-01	6.811E+01%	1.45E+00
ZR-95	#A	1.1755E-02	1.1755E-02	6.753E+03%	1.96E+00
NB-95	#A	-8.2492E-01	-8.2492E-01	6.891E+01%	1.88E+00
RU-103	#A	1.6925E-01	1.6925E-01	2.166E+02%	9.08E-01
RH-106	#A	2.2844E-01	2.2844E-01	1.518E+03%	1.23E+01
AG-108M	#A	-5.1951E-01	-5.1951E-01	9.387E+01%	1.20E+00
AG-110M	#A	4.6556E-01	4.6556E-01	9.299E+01%	2.42E+00
SN-113	#A	5.3028E-01	5.3029E-01	1.077E+02%	1.92E+00
SB-124	#A	6.5297E-01	6.5298E-01	8.593E+01%	2.60E+00
SB-125	#A	1.2950E+00	1.2950E+00	9.551E+01%	2.63E+00
I-131	#A	3.3921E-01	3.3922E-01	9.289E+01%	1.02E+00

Gd-153	#A	6.1203E-01	6.1203E-01	1.449E+02%	2.98E+00
Ga-68	#A	-4.0695E+00	-4.1008E+00	6.468E+02%	5.96E+01
Tc-99m	#A	2.2833E-01	2.2866E-01	1.210E+02%	9.27E-01
BA-133	#A	-5.0663E-01	-5.0663E-01	1.714E+02%	2.92E+00
CS-134	#A	6.7651E-01	6.7651E-01	7.216E+01%	2.67E+00
CS-137		4.6309E+00	4.6309E+00	1.215E+01%	8.24E-01
CE-139	#A	2.6606E-01	2.6606E-01	1.091E+02%	9.73E-01
Ba-140	#A	-7.3737E-01	-7.3739E-01	1.998E+02%	4.08E+00
La-140	#	8.3206E-01	8.3208E-01	3.588E+01%	6.37E-01
CE-141	#A	-4.8404E-01	-4.8405E-01	1.643E+02%	2.66E+00
CE-144	#A	-2.8915E-01	-2.8915E-01	8.685E+02%	8.51E+00
PM-144	#A	-9.1825E-02	-9.1825E-02	5.593E+02%	1.23E+00
EU-152	#A	1.7344E+00	1.7344E+00	1.364E+02%	5.02E+00
EU-154	#A	1.1984E+00	1.1984E+00	9.055E+01%	1.06E+01
EU-155	#A	7.7787E-01	7.7787E-01	1.118E+02%	4.27E+00
HF-181	#A	1.0720E-01	1.0720E-01	1.908E+02%	1.88E+00
Ta-182	#A	2.4264E+00	2.4264E+00	8.856E+01%	1.06E+01
Hg-203	#A	2.7011E-01	2.7011E-01	9.705E+01%	8.85E-01
TL-208		5.6212E+00	5.6212E+00	9.552E+00%	6.37E-01
pm-146	#A	6.1041E-01	6.1041E-01	5.087E+01%	3.08E+00
y-88	#	8.7026E-01	8.7026E-01	2.475E+01%	6.86E-01
Cd-113m	#A	-4.4754E+03	-4.4754E+03	9.396E+01%	1.41E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.23E+01
Cf-251	#A	1.1481E+00	1.1481E+00	1.084E+02%	3.21E+00
Cf-249	#A	-1.0444E-01	-1.0444E-01	7.330E+01%	2.11E+00
Sn-126	A	1.0018E+00	1.0018E+00	3.618E+02%	1.23E+01
PB-210	#	2.7847E+01	2.7847E+01	3.576E+01%	2.51E+01
PB-212		1.3717E+01	1.3717E+01	5.748E+00%	1.29E+00
PB-214		1.2083E+01	1.2083E+01	7.613E+00%	1.35E+00
BI-207	#A	1.7163E-01	1.7163E-01	1.367E+02%	1.09E+00
BI-212	A	4.7795E+00	4.7795E+00	9.387E+01%	1.53E+01
BI-214		1.3169E+01	1.3169E+01	7.867E+00%	8.26E-01
BI-210M	#A	1.0680E-01	1.0680E-01	4.933E+02%	1.82E+00
AC-228		1.2986E+01	1.2986E+01	1.116E+01%	2.24E+00
TH-227	#A	-1.5890E+00	-1.5890E+00	3.723E+02%	2.00E+01
TH-229	#A	2.8663E+00	2.8663E+00	1.262E+02%	1.47E+01
TH-234	A	5.1654E+00	5.1654E+00	6.689E+01%	2.17E+01
PA-231	#A	-1.0993E+01	-1.0993E+01	1.550E+02%	5.72E+01
PA-233	#A	-9.2322E-01	-9.2322E-01	2.887E+01%	4.39E+00
PA-234	#A	-1.2025E+00	-1.2025E+00	1.220E+02%	4.91E+00
PA-234M	#A	4.0185E+01	4.0185E+01	9.013E+01%	1.80E+02
U-235	#A	-8.4582E-01	-8.4582E-01	1.446E+02%	1.18E+01
AM-241	#A	-9.4770E-01	-9.4770E-01	1.226E+02%	3.11E+00
Np-237	#A	1.5022E+00	1.5022E+00	1.891E+02%	9.50E+00
Ir-192	#A	3.0420E-01	3.0420E-01	1.343E+02%	1.38E+00
Cs-136	#A	3.9087E-01	3.9088E-01	7.945E+01%	1.03E+00
Np-239	#A	-8.5921E-01	-8.5934E-01	1.126E+02%	3.24E+00
Nd-147	#A	-2.2020E+00	-2.2021E+00	1.476E+02%	7.88E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  2000.1 keV)     2.717E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.1 keV) 2.7173325E+02  Bq/Sample
```

265170_Gamma_160-18567-A-14-B. 7_Gamma_20162203.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161471

Sample Description: 265170_Gamma_160-18567-A-15-B
Detector: Detector # 8
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-15-B

Decay to Time: 9/7/2016 18:32 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:32:53 Real Time: 1849 sec
Analysis Time: 9/7/2016 19:03 Dead Time: 2.65 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev11.lib
Bkgd Correction File: 8_2016-09-04_0932.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	5.132E+00	104.5	5.361E+00	5.367E+00	1.803E+01
NA-22	-6.141E-01	101.9	6.256E-01	6.264E-01	2.145E+00
K-40	2.692E+02	5.7	1.524E+01	2.054E+01	9.343E+00
Sc-46	-6.770E-01	110.2	7.458E-01	7.467E-01	2.528E+00
CR-51	4.068E+00	164.7	6.701E+00	6.704E+00	2.252E+01
MN-54	4.838E-01	123.0	5.951E-01	5.956E-01	1.408E+00
FE-59	-6.398E-02	313.4	2.005E-01	2.005E-01	3.245E+00
Co-56	6.549E-01	88.2	5.778E-01	5.788E-01	1.779E+00
CO-57	0.000E+00	1.#INF	2.844E-01	2.844E-01	1.444E+00
CO-58	5.915E-01	87.5	5.179E-01	5.188E-01	1.748E+00
CO-60	-6.033E-02	1093.2	6.595E-01	6.595E-01	1.714E+00
ZN-65	0.000E+00	1.#INF	6.617E-01	6.617E-01	6.263E+00
NB-94	5.053E-01	69.7	3.522E-01	3.532E-01	1.248E+00
ZR-95	8.245E-01	143.4	1.182E+00	1.183E+00	2.792E+00
NB-95	0.000E+00	1.#INF	1.471E-01	1.471E-01	2.154E+00
RU-103	-5.194E-01	129.6	6.731E-01	6.736E-01	1.609E+00
RH-106	5.786E+00	177.1	1.025E+01	1.025E+01	3.454E+01
AG-108M	6.497E-02	818.9	5.320E-01	5.320E-01	1.308E+00
AG-110M	1.120E+00	93.3	1.045E+00	1.046E+00	3.264E+00
SN-113	7.658E-01	112.8	8.640E-01	8.649E-01	2.904E+00
SB-124	-6.873E-01	123.8	8.507E-01	8.514E-01	3.998E+00
SB-125	2.253E+00	91.0	2.050E+00	2.053E+00	3.332E+00
I-131	1.187E-01	212.2	2.518E-01	2.519E-01	1.537E+00
Gd-153	-1.647E+00	207.7	3.421E+00	3.422E+00	1.136E+01
Ga-68	-2.470E+01	114.4	2.825E+01	2.829E+01	6.425E+01
Tc-99m	3.178E-01	209.0	6.641E-01	6.643E-01	2.219E+00
BA-133	-8.873E-01	141.4	1.254E+00	1.255E+00	4.202E+00
CS-134	-2.285E-01	118.8	2.715E-01	2.718E-01	3.950E+00
CS-137	3.811E+00	19.2	7.313E-01	7.577E-01	1.435E+00
CE-139	4.594E-01	94.0	4.317E-01	4.339E-01	1.440E+00
Ba-140	-6.411E-01	218.1	1.398E+00	1.398E+00	5.335E+00
La-140	4.569E-01	178.8	8.170E-01	8.173E-01	1.412E+00
CE-141	-9.355E-01	144.7	1.354E+00	1.355E+00	4.508E+00

CE-144	-3.728E+00	152.2	5.673E+00	5.676E+00	1.889E+01
PM-144	4.795E-01	98.4	4.718E-01	4.724E-01	1.117E+00
EU-152	2.617E+00	122.0	3.192E+00	3.195E+00	1.058E+01
EU-154	3.200E+00	88.9	2.845E+00	2.850E+00	1.296E+01
EU-155	2.123E+00	226.2	4.802E+00	4.803E+00	1.595E+01
HF-181	5.809E-01	115.2	6.695E-01	6.701E-01	2.261E+00
Ta-182	6.070E-01	224.3	1.362E+00	1.362E+00	9.093E+00
Hg-203	9.366E-02	574.5	5.380E-01	5.380E-01	1.841E+00
TL-208	1.117E+01	8.6	9.613E-01	1.122E+00	1.404E+00
pm-146	3.294E-01	89.4	2.945E-01	2.950E-01	4.922E+00
y-88	4.236E-01	125.5	5.315E-01	5.319E-01	1.288E+00
Cd-113m	-8.837E+03	72.0	6.362E+03	6.388E+03	2.110E+04
Cd-109	0.000E+00	1.#INF	2.639E+01	2.639E+01	8.794E+01
Cf-251	-4.723E-01	513.6	2.426E+00	2.426E+00	6.275E+00
Cf-249	1.035E+00	109.5	1.134E+00	1.135E+00	2.876E+00
Sn-126	6.057E+00	107.7	6.520E+00	6.528E+00	2.170E+01
PB-210	3.183E+01	48.0	1.528E+01	1.539E+01	3.811E+01
PB-212	3.229E+01	4.3	1.375E+00	2.501E+00	2.153E+00
PB-214	1.637E+01	7.2	1.183E+00	1.457E+00	2.757E+00
BI-207	3.293E-02	257.2	8.471E-02	8.473E-02	2.065E+00
BI-212	2.875E+01	23.1	6.631E+00	6.797E+00	1.299E+01
BI-214	1.770E+01	10.0	1.761E+00	1.986E+00	2.506E+00
BI-210M	2.009E-01	417.3	8.385E-01	8.385E-01	2.865E+00
AC-228	2.922E+01	8.0	2.327E+00	2.764E+00	3.404E+00
TH-227	-9.299E+00	102.5	9.532E+00	9.546E+00	3.174E+01
TH-229	3.812E+00	124.5	4.746E+00	4.756E+00	2.426E+01
TH-234	5.544E+00	90.5	5.017E+00	5.026E+00	5.353E+01
PA-231	-1.811E+01	177.7	3.218E+01	3.220E+01	1.076E+02
PA-233	0.000E+00	1.#INF	4.907E-01	4.907E-01	8.162E+00
PA-234	8.188E-01	94.6	7.743E-01	7.755E-01	1.189E+01
PA-234M	3.235E+01	108.1	3.496E+01	3.500E+01	3.239E+02
U-235	9.014E+00	30.7	2.769E+00	2.807E+00	6.150E+00
AM-241	-7.524E-01	171.1	1.287E+00	1.288E+00	6.478E+00
Np-237	1.133E-01	6791.6	7.696E+00	7.696E+00	2.565E+01
Ir-192	3.808E-01	95.6	3.640E-01	3.647E-01	3.414E+00
Cs-136	1.128E+00	29.0	3.266E-01	3.329E-01	1.797E+00
Np-239	-2.075E+00	226.0	4.688E+00	4.689E+00	1.556E+01
Nd-147	1.896E+00	131.1	2.485E+00	2.487E+00	9.380E+00
Total	5.368E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-15-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161471.An1

Acquisition information
Start time: 9/7/2016 6:32:53 PM
Live time: 1800
Real time: 1849
Dead time: 2.65 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/7/2016 6:32:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-09-04_0932.PBC 9/4/2016 9:32:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 31 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1488

***** 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
46.90	49.	47.99	0.76	2.005E-02	46.54	4.250	PBC<MDA	PB210
63.46	73.	34.95	0.70	3.103E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	1.327E+01	Sn126
74.74	285.	9.53	1.03	3.614E-02				
77.11	443.	6.28	1.04	3.698E-02				
84.38	95.	20.32	1.04	3.909E-02				
87.14	117.	20.12	1.04	3.972E-02	86.49	13.100	1.248E+01	Np237
					86.54	30.700	5.324E+00	EU155
					86.94	9.040	1.804E+01	Sn126
					87.57	37.500	4.335E+00	Sn126
					88.04	3.790	4.279E+01	Cd109
91.10	35.	205.09	1.05	4.048E-02	91.10	28.300	PBC<MDA	Nd147
92.60	29.	90.50	1.05	4.072E-02	92.59	5.584	PBC<MDA	TH234
93.36	36.	198.80	1.05	4.083E-02	93.35	5.561	PBC<MDA	AC228
105.31	34.	226.15	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
129.45	98.	25.75	0.86	4.080E-02				
140.51	20.	208.96	1.08	3.945E-02	140.51	89.300	PBC<MDA	Tc99m
143.71	44.	39.85	0.47	3.899E-02	143.79	10.960	PBC<MDA	U235
162.64	6.	446.92	1.10	3.580E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
162.66	5.	522.25	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	24.	93.97	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
205.33	45.	46.77	1.13	3.083E-02	205.33	5.010	PBC<MDA	U235
210.85	22.	124.51	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
238.70	596.	5.81	0.99	2.744E-02	238.63	43.300	2.786E+01	PB212
242.05	80.	21.82	1.16	2.714E-02	242.00	7.430	2.208E+01	PB214
265.83	5.	417.32	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
277.17	57.	26.78	0.74	2.441E-02	277.28	6.310	2.056E+01	TL208
279.20	3.	574.46	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203
284.30	3.	571.87	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.36	130.	13.01	1.21	2.322E-02	295.09	19.300	1.579E+01	PB214
300.29	65.	18.48	1.20	2.294E-02	300.03	3.280	4.836E+01	PB212
					300.07	2.460	6.448E+01	PA231
					300.18	6.200	2.559E+01	PA233
320.08	16.	164.71	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	178.82	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	170.13	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.42	132.	12.15	0.98	2.085E-02	338.32	12.010	2.921E+01	AC228
340.57	17.	182.99	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	17.	185.84	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
352.02	225.	9.71	1.13	2.020E-02	351.93	37.600	1.642E+01	PB214
383.84	17.	104.21	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	14.	137.82	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
391.69	16.	112.83	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
427.88	14.	91.00	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	818.88	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	180.36	1.32	1.647E-02	453.88	65.000	PBC<MDA	pm146
463.37	16.	91.97	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
468.06	15.	95.60	1.33	1.606E-02	468.06	51.750	PBC<MDA	Ir192
477.60	15.	104.45	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	13.	115.25	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
511.86	106.	21.85	2.61	1.494E-02	511.86	20.000	1.971E+01	RH106
531.00	8.	163.22	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
569.47	9.	159.12	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.569E+00	PA234
					569.70	97.740	3.835E-01	BI207
583.09	228.	8.61	1.18	1.342E-02	583.02	84.500	1.117E+01	TL208
609.24	190.	9.95	1.14	1.295E-02	609.31	46.090	1.770E+01	BI214
					610.30	5.750	1.420E+02	RU103
621.92	13.	177.07	1.43	1.273E-02	621.92	9.930	PBC<MDA	RH106
635.89	4.	259.21	1.44	1.250E-02	635.89	11.310	PBC<MDA	SB125
636.97	5.	212.17	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
661.52	71.	19.19	1.05	1.209E-02	661.66	85.210	3.811E+00	CS137
696.54	10.	98.38	1.48	1.158E-02	696.54	99.000	PBC<MDA	PM144
702.63	10.	112.71	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
727.32	44.	23.07	0.50	1.118E-02	727.17	7.550	2.875E+01	BI212
735.72	10.	92.82	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
756.73	9.	143.41	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	7.	155.88	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	11.	108.07	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.39	4.	370.94	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212
801.95	8.	163.57	1.55	1.030E-02	801.95	8.690	PBC<MDA	CS134
810.78	11.	87.54	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
818.50	8.	112.54	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
834.59	9.	123.02	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
846.77	2.	695.37	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.73	24.	36.28	2.20	9.703E-03	860.56	12.420	1.117E+01	TL208
871.10	9.	82.07	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
873.23	6.	135.33	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
884.68	12.	102.50	1.60	9.480E-03	884.68	72.680	PBC<MDA	AG110M
898.04	7.	125.46	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.36	128.	10.30	1.28	9.244E-03	911.07	29.000	2.659E+01	AC228
946.02	6.	174.92	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
964.11	10.	158.08	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.18	93.	12.16	1.54	8.776E-03	968.97	17.460	3.360E+01	AC228
1004.77	10.	115.35	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1048.07	24.	28.96	1.70	8.209E-03	1048.07	80.000	2.059E+00	Cs136
1063.66	3.	332.78	1.71	8.106E-03	1063.66	74.500	PBC<MDA	BI207
1120.39	51.	14.15	1.08	7.754E-03	1120.29	15.100	2.404E+01	BI214
					1120.55	99.987	3.632E+00	Sc46
1221.41	5.	224.30	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	13.	88.22	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	2.	505.24	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	6.	90.50	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1460.91	319.	5.66	1.84	6.165E-03	1460.83	10.670	2.692E+02	K40
1596.21	1.	438.07	1.99	5.706E-03	1596.21	95.400	PBC<MDA	La140
1764.67	7.	76.09	2.07	5.226E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.76	74.72	227.	285.	7.890E+03	9.53	1.034	- sD
308.25	77.09	165.	443.	1.199E+04	6.28	1.036	- sD
336.71	84.33	144.	95.	2.435E+03	20.58	1.041	- D
517.63	129.45	130.	98.	2.406E+03	25.75	0.860	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	187.39	46.90	143.	49.	0.027	47.99	0.763s
TH-227	200.37	50.14	469.	-30.	-0.017	102.51	1.015s
AM-241	237.95	59.54	640.	-14.	-0.008	171.05	1.022s
TH-234	252.96	63.29	566.	7.	0.004	511.07	1.025s
Sn-126	256.93	64.28	625.	33.	0.018	107.66	1.026s
BA-133	323.77	80.99	2662.	-36.	-0.020	94.46	1.039s
EU-155	345.98	86.54	2582.	0.	0.000	1000.00	1.043s
Sn-126	347.57	86.94	2582.	0.	0.000	1000.00	1.044D
Sn-126	350.09	87.57	2483.	112.	0.062	21.39	1.044D
Cd-109	351.97	88.04	2582.	0.	0.000	1000.00	1.044A
Nd-147	364.21	91.10	2518.	35.	0.019	205.09	1.047s
TH-234	370.17	92.59	339.	29.	0.016	90.50	1.048D
AC-228	373.21	93.35	2477.	36.	0.020	198.80	1.049s
Gd-153	389.81	97.50	2896.	-37.	-0.020	207.73	1.052
Np-239	397.81	99.50	3216.	-35.	-0.019	230.17	1.053
Gd-153	412.62	103.20	3181.	-35.	-0.019	228.30	1.056
EU-155	421.07	105.31	2923.	34.	0.019	226.15	1.058s
Np-239	424.34	106.13	3197.	-35.	-0.020	225.95	1.058
EU-152	486.92	121.78	358.	-12.	-0.006	234.38	1.071s
CO-57	488.06	122.06	369.	0.	0.000	1000.00	1.071s
PA-234	525.00	131.29	1089.	-30.	-0.017	156.72	1.078s
HF-181	531.92	133.02	1059.	-30.	-0.017	154.39	1.079
CE-144	533.98	133.54	1029.	-30.	-0.017	152.16	1.080
HF-181	545.02	136.30	999.	-30.	-0.017	149.67	1.082s
CO-57	545.72	136.47	969.	-30.	-0.017	147.40	1.082s
Tc-99m	561.86	140.51	824.	20.	0.011	208.96	1.085s
U-235	574.66	143.71	92.	44.	0.025	39.85	0.471s
CE-141	581.59	145.44	1020.	-31.	-0.017	144.74	1.089s
Ba-140	650.47	162.66	316.	5.	0.003	522.25	1.102s
U-235	653.35	163.38	315.	6.	0.003	446.92	1.102s
CE-139	663.24	165.85	242.	24.	0.013	93.97	1.104s
Cf-251	706.23	176.60	187.	-5.	-0.003	513.61	1.112s
TH-229	773.87	193.51	162.	-7.	-0.004	372.48	1.125s
U-235	821.17	205.33	113.	45.	0.025	46.77	1.134
TH-229	843.24	210.85	184.	22.	0.012	124.51	1.138s
Cf-251	907.84	227.00	148.	-7.	-0.004	342.36	1.151
PB-212	954.37	238.63	87.	691.	0.384	4.26	1.159D
PB-214	967.84	242.00	113.	80.	0.045	21.82	1.162D
EU-152	978.62	244.69	1106.	-25.	-0.014	189.63	1.164s
TH-227	1024.81	256.24	156.	-25.	-0.014	98.09	1.172s
Cd-113m	1054.65	263.70	140.	-24.	-0.013	71.99	1.178s
BI-210M	1063.18	265.83	179.	5.	0.003	417.32	1.179s
TL-208	1108.54	277.17	48.	57.	0.032	26.78	0.743s
Hg-203	1116.66	279.20	182.	3.	0.002	574.46	1.189

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1137.05	284.30	76.	3.	0.002	571.87	1.193s
PB-214	1180.22	295.09	33.	131.	0.073	10.69	1.201D
PB-212	1199.98	300.03	41.	65.	0.036	18.48	1.205D
PA-231	1200.14	300.07	754.	-21.	-0.012	183.13	1.205
PA-233	1200.58	300.18	733.	-21.	-0.012	180.53	1.205
PA-231	1210.46	302.65	711.	-21.	-0.012	177.68	1.207s
BA-133	1211.27	302.85	690.	-21.	-0.012	175.00	1.207s
Ba-140	1219.26	304.85	669.	-21.	-0.012	172.10	1.208s
BI-210M	1219.45	304.90	647.	-21.	-0.012	169.36	1.208s
Ir-192	1233.62	308.44	626.	-18.	-0.010	200.18	1.211
PA-233	1247.91	312.01	608.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	608.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	333.	16.	0.009	164.71	1.219s
La-140	1314.91	328.76	373.	15.	0.009	178.82	1.226
Cf-249	1333.63	333.44	388.	17.	0.009	170.13	1.229s
AC-228	1353.15	338.32	273.	181.	0.101	14.89	1.233
Cs-136	1362.15	340.57	454.	17.	0.009	182.99	1.234
EU-152	1377.01	344.29	471.	17.	0.009	185.84	1.237s
HF-181	1383.19	345.83	569.	-20.	-0.011	172.56	1.238s
PB-214	1407.95	352.02	56.	225.	0.125	9.71	1.125
BA-133	1423.87	356.00	384.	-20.	-0.011	141.39	1.245s
I-131	1457.81	364.48	80.	-6.	-0.003	358.44	1.252s
BA-133	1535.24	383.84	155.	17.	0.010	104.21	1.266s
Cf-249	1551.68	387.95	172.	14.	0.008	137.82	1.269s
SN-113	1566.64	391.69	162.	16.	0.009	112.83	1.271s
SB-125	1711.39	427.88	36.	14.	0.008	91.00	1.297s
AG-108M	1735.64	433.94	52.	2.	0.001	818.88	1.301s
pm-146	1815.41	453.88	53.	8.	0.005	180.36	1.315s
SB-125	1853.36	463.37	104.	16.	0.009	91.97	1.322s
Ir-192	1872.14	468.06	99.	15.	0.008	95.60	1.325s
BE-7	1910.28	477.60	121.	15.	0.009	104.45	1.332s
HF-181	1927.89	482.00	109.	13.	0.007	115.25	1.335s
La-140	1947.98	487.02	136.	-6.	-0.003	280.15	1.339
RU-103	1988.12	497.05	65.	-13.	-0.007	129.60	1.346
RH-106	2047.36	511.86	63.	106.	0.059	21.85	2.606s
Nd-147	2123.91	531.00	39.	8.	0.004	163.22	1.369s
Ba-140	2148.95	537.26	44.	-7.	-0.004	218.07	1.373s
CS-134	2252.86	563.24	78.	-11.	-0.006	166.64	1.391s
CS-134	2277.20	569.32	91.	-22.	-0.012	64.29	1.395s
PA-234	2277.80	569.47	103.	9.	0.005	159.12	1.395s
BI-207	2278.73	569.70	102.	-4.	-0.002	392.39	1.396s
TL-208	2332.30	583.09	31.	228.	0.127	8.61	1.180
SB-125	2401.92	600.50	385.	-16.	-0.009	180.06	1.416s
SB-124	2410.85	602.73	370.	-16.	-0.009	123.77	1.418s
CS-134	2418.76	604.71	354.	-16.	-0.009	172.43	1.419s
BI-214	2436.89	609.24	27.	190.	0.106	9.95	1.144
RU-103	2441.12	610.30	339.	-13.	-0.007	208.98	1.423s
AG-108M	2457.05	614.28	326.	0.	0.000	1000.00	1.426s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2472.18	618.06	326.	0.	0.000	1000.00	1.428s
RH-106	2487.60	621.92	265.	13.	0.007	177.07	1.431
SB-125	2543.49	635.89	43.	4.	0.002	259.21	1.440s
I-131	2547.83	636.97	50.	5.	0.003	212.17	1.441s
AG-110M	2630.98	657.76	149.	-16.	-0.009	110.67	1.455s
CS-137	2646.03	661.52	26.	71.	0.039	19.19	1.054s
PM-144	2786.11	696.54	19.	10.	0.005	98.38	1.480s
NB-94	2810.46	702.63	23.	10.	0.005	112.71	1.484s
SB-124	2891.09	722.79	100.	-5.	-0.003	306.06	1.497s
AG-108M	2891.70	722.94	95.	0.	0.000	1000.00	1.498s
EU-154	2893.37	723.36	95.	0.	0.000	1000.00	1.498s
BI-212	2909.23	727.32	13.	44.	0.024	23.07	0.504s
pm-146	2942.83	735.72	19.	10.	0.006	92.82	1.506s
pm-146	2988.59	747.16	42.	-8.	-0.004	175.45	1.513s
ZR-95	3026.87	756.73	33.	9.	0.005	143.41	1.519s
AG-110M	3055.73	763.94	62.	7.	0.004	155.88	1.524s
NB-95	3063.11	765.79	69.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	60.	11.	0.006	108.07	1.526s
EU-152	3115.64	778.92	42.	-3.	-0.002	461.88	1.534s
BI-212	3141.64	785.42	37.	4.	0.002	370.94	1.538s
CS-134	3183.43	795.87	80.	-8.	-0.004	172.05	1.544s
CS-134	3207.77	801.95	78.	8.	0.004	163.57	1.548s
CO-58	3243.06	810.78	39.	11.	0.006	87.54	1.554s
La-140	3263.04	815.77	52.	-9.	-0.005	122.47	1.557s
Cs-136	3273.97	818.50	42.	8.	0.005	112.54	1.559s
MN-54	3339.36	834.85	23.	9.	0.005	123.02	1.569s
Co-56	3387.05	846.77	38.	2.	0.001	695.37	1.577s
TL-208	3442.89	860.73	13.	24.	0.013	36.28	2.201s
NB-94	3484.36	871.10	25.	9.	0.005	82.07	1.592s
EU-154	3492.89	873.23	28.	6.	0.003	135.33	1.593s
PA-234	3522.10	880.53	75.	-13.	-0.007	100.48	1.598s
PA-234	3532.94	883.24	87.	0.	0.000	1000.00	1.599s
AG-110M	3538.71	884.68	66.	12.	0.006	102.50	1.600s
Sc-46	3557.10	889.28	74.	-12.	-0.006	110.16	1.603s
y-88	3592.14	898.04	14.	7.	0.004	125.46	1.608s
AC-228	3645.43	911.36	9.	128.	0.071	10.30	1.281
AG-110M	3749.96	937.49	40.	-10.	-0.006	142.59	1.633s
PA-234	3784.07	946.02	20.	6.	0.003	174.92	1.638s
EU-152	3856.43	964.11	118.	10.	0.006	158.08	1.649s
AC-228	3876.73	969.18	7.	93.	0.051	12.16	1.539
EU-154	3985.31	996.33	63.	-4.	-0.002	285.04	1.668s
PA-234M	4003.99	1001.00	70.	-3.	-0.002	365.50	1.671s
EU-154	4019.10	1004.77	57.	10.	0.005	115.35	1.673s
Cs-136	4192.29	1048.07	13.	24.	0.014	28.96	1.698s
RH-106	4201.45	1050.36	44.	-6.	-0.003	165.76	1.700s
BI-207	4254.65	1063.66	20.	3.	0.002	332.78	1.708s
Ga-68	4309.61	1077.40	25.	-10.	-0.006	114.38	1.716s
FE-59	4397.02	1099.25	25.	-3.	-0.002	370.93	1.728s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4448.32	1112.07	85.	-5.	-0.003	264.58	1.736s
ZN-65	4462.20	1115.55	80.	0.	0.000	1000.00	1.738s
BI-214	4481.57	1120.39	0.	51.	0.028	14.15	1.083s
Sc-46	4482.22	1120.55	80.	0.	0.000	1000.00	1.740s
CO-60	4692.97	1173.24	49.	-20.	-0.011	39.12	1.770s
Ta-182	4756.23	1189.05	15.	-1.	-0.001	857.32	1.779
Ta-182	4885.67	1221.41	27.	5.	0.003	224.30	1.797
Co-56	4953.16	1238.28	21.	13.	0.007	88.22	1.806s
NA-22	5098.16	1274.53	27.	-8.	-0.004	101.87	1.826s
EU-154	5098.22	1274.54	34.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	16.	2.	0.001	505.24	1.835s
AG-110M	5537.25	1384.30	0.	0.	0.000	1000.00	1.884s
EU-152	5632.07	1408.00	5.	6.	0.004	90.50	1.896s
K-40	5843.70	1460.91	3.	319.	0.177	5.66	1.845
La-140	6384.93	1596.21	6.	1.	0.001	438.07	1.990s
SB-124	6764.03	1690.98	17.	-9.	-0.005	112.49	2.034s
BI-214	7058.07	1764.49	10.	7.	0.004	76.09	2.067s
Co-56	7085.51	1771.35	38.	-6.	-0.003	146.88	2.070s

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	5.1323E+00				5.31E+01	
			477.60	5.132E+00	?(	1.803E+01 1.04E+02 1.05E+01	G
NA-22	C	-6.1414E-01				9.50E+02	
			1274.53	-6.141E-01	?(	2.145E+00 1.02E+02 9.99E+01	G
K-40	N	2.6923E+02				4.66E+11	
			1460.83	2.692E+02	(P	9.343E+00 5.66E+00 1.07E+01	G
Sc-46	F	-6.7704E-01				8.38E+01	
			889.28	-6.770E-01	?(	2.528E+00 1.10E+02 1.00E+02	G
			1120.55	0.000E+00	+	3.182E+00 1.00E+03 1.00E+02	G
CR-51	F	4.0682E+00				2.77E+01	
			320.08	4.068E+00	?(	2.252E+01 1.65E+02 9.94E+00	G
MN-54	C	4.8377E-01				3.12E+02	
			834.85	4.838E-01	?(	1.408E+00 1.23E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	-6.3981E-02					4.45E+01	
			1099.25	-3.743E-01	?(	3.245E+00	3.71E+02	5.65E+01 G
			1291.60	3.419E-01	?(P	4.022E+00	5.05E+02	4.32E+01 G
Co-56	C	6.5489E-01					7.73E+01	
			846.77	1.065E-01	?(P	1.779E+00	6.95E+02	9.99E+01 G
			1238.28	1.484E+00	?(	2.864E+00	8.82E+01	6.61E+01 G
			1037.84	-2.691E-02	% P	1.237E+01	1.85E+04	1.41E+01 G
			1771.35	-4.263E+00	+	2.171E+01	1.47E+02	1.55E+01 A
CO-58	C	5.9154E-01					7.09E+01	
			810.78	5.915E-01	?(	1.748E+00	8.75E+01	9.95E+01 G
CO-60	F	-6.0330E-02					1.93E+03	
			1332.50	-6.033E-02	%(P	1.714E+00	1.09E+03	1.00E+02 G
			1173.24	-1.479E+00	+ P	2.632E+00	3.91E+01	9.99E+01 G
NB-94	I	5.0526E-01					7.41E+06	
			702.63	4.693E-01	(P	1.248E+00	1.13E+02	9.79E+01 G
			871.10	5.405E-01	&(	1.497E+00	8.21E+01	9.99E+01 G
ZR-95	I	8.2450E-01					6.40E+01	
			756.73	8.245E-01	?(P	2.792E+00	1.43E+02	5.45E+01 G
			724.20	1.870E-02	%	5.369E+00	8.22E+03	4.42E+01 G
RU-103	I	-5.1938E-01					3.93E+01	
			497.05	-5.194E-01	?(	1.609E+00	1.30E+02	9.09E+01 G
			610.30	-9.393E+00	+	6.611E+01	2.09E+02	5.75E+00 GA
RH-106	I	5.7861E+00					3.74E+02	
			621.92	5.786E+00	?(	3.454E+01	1.77E+02	9.93E+00 G
			1050.36	-2.535E+01	+	1.459E+02	1.66E+02	1.56E+00 G
			511.86	1.971E+01	?	7.383E+00	2.19E+01	2.00E+01 GA
AG-108M	C	6.4969E-02					1.53E+05	
			433.94	6.497E-02	?(P	1.308E+00	8.19E+02	9.05E+01 G
			722.94	0.000E+00	-	2.621E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	4.177E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.1201E+00					2.50E+02	
			884.68	9.407E-01	?(	3.264E+00	1.02E+02	7.27E+01 G
			657.76	-7.728E-01	-	2.876E+00	1.11E+02	9.46E+01 G
			937.49	-1.791E+00	+	5.765E+00	1.43E+02	3.44E+01 G
			1384.30	0.000E+00	-	2.609E+00	1.00E+03	2.43E+01 G
			763.94	1.705E+00	?(	9.138E+00	1.56E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	7.6580E-01					1.15E+02	
			391.69	7.658E-01	?(P	2.904E+00	1.13E+02	6.40E+01 G
SB-124	F	-6.8734E-01					6.02E+01	
			602.73	-6.873E-01	?(P	3.998E+00	1.24E+02	9.83E+01 G
			1690.98	-1.929E+00	+	4.698E+00	1.12E+02	4.78E+01 G
			722.79	-2.135E+00	+	2.252E+01	3.06E+02	1.08E+01 G
SB-125	I	2.2528E+00					1.01E+03	
			427.88	1.470E+00	&(	3.332E+00	9.10E+01	2.96E+01 G
			600.50	-3.698E+00	+	2.236E+01	1.80E+02	1.79E+01 G
			635.89	1.441E+00	&(	1.312E+01	2.59E+02	1.13E+01 G
			463.37	5.344E+00	@(P	1.648E+01	9.20E+01	1.05E+01 G
I-131	I	1.1867E-01					8.02E+00	
			364.48	-2.107E-01	?(P	1.537E+00	3.58E+02	8.17E+01 G
			284.30	1.134E+00	?(	1.639E+01	5.72E+02	6.14E+00 G
			636.97	3.002E+00	?(	2.218E+01	2.12E+02	7.17E+00 G
Gd-153	F	-1.6467E+00					2.42E+02	
			97.50	-1.647E+00	(	1.136E+01	2.08E+02	3.00E+01 G
			103.20	-2.138E+00	+	1.620E+01	2.28E+02	2.18E+01 G
Ga-68	C	-2.4701E+01					4.71E-02	
			1077.40	-2.470E+01	?(	6.425E+01	1.14E+02	3.30E+00 G
Tc-99m	I	3.1781E-01					2.51E-01	
			140.51	3.178E-01	?(	2.219E+00	2.09E+02	8.93E+01 G
BA-133	F	-8.8725E-01					3.85E+03	
			356.00	-8.873E-01	?(	4.202E+00	1.41E+02	6.20E+01 G
			302.85	-2.848E+00	+	1.666E+01	1.75E+02	1.83E+01 G
			383.84	5.723E+00	? P	2.001E+01	1.04E+02	8.94E+00 GA
			80.99	-1.528E+00	+ P	1.038E+01	9.45E+01	3.41E+01 GA
CS-134	I	-2.2850E-01					7.54E+02	
			604.71	-6.818E-01	?(	3.950E+00	1.72E+02	9.76E+01 G
			795.87	-4.701E-01	&	2.774E+00	1.72E+02	8.55E+01 G
			569.32	-5.866E+00	+	1.245E+01	6.43E+01	1.54E+01 G
			801.95	4.863E+00	?(	2.726E+01	1.64E+02	8.69E+00 G
			563.24	-5.300E+00	+	2.113E+01	1.67E+02	8.35E+00 G
CS-137	I	3.8113E+00					1.10E+04	
			661.66	3.811E+00	(P	1.435E+00	1.92E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	4.5937E-01					1.38E+02	
			165.85	4.594E-01	&(	1.440E+00	9.40E+01	7.99E+01 G
Ba-140	I	-6.4109E-01					1.28E+01	
			537.26	-1.111E+00	?(P	5.335E+00	2.18E+02	2.44E+01 G
			162.66	1.202E+00	?(	2.127E+01	5.22E+02	6.22E+00 G
			304.85	-1.225E+01	+	7.045E+01	1.72E+02	4.29E+00 G
La-140	I	4.5687E-01					1.28E+01	
			1596.21	1.330E-01	?(P	1.412E+00	4.38E+02	9.54E+01 G
			487.02	-4.671E-01	+	4.478E+00	2.80E+02	4.55E+01 G
			328.76	1.979E+00	?(P	1.189E+01	1.79E+02	2.03E+01 G
			815.77	-2.031E+00	+	8.510E+00	1.22E+02	2.33E+01 G
CE-141	I	-9.3550E-01					3.25E+01	
			145.44	-9.355E-01	?(	4.508E+00	1.45E+02	4.82E+01 G
CE-144	I	-3.7280E+00					2.85E+02	
			133.54	-3.728E+00	?(	1.889E+01	1.52E+02	1.11E+01 G
PM-144	C	4.7953E-01					3.63E+02	
			696.54	4.795E-01	?(P	1.117E+00	9.84E+01	9.90E+01 G
			618.06	0.000E+00	-	3.806E+00	1.00E+03	9.91E+01 G
EU-152	F	2.6170E+00					4.94E+03	
			344.29	1.698E+00	?(	1.058E+01	1.86E+02	2.65E+01 G
			1112.07	-2.609E+00	+	2.383E+01	2.65E+02	1.36E+01 G
			121.78	-5.390E-01	-	4.256E+00	2.34E+02	2.86E+01 G
			778.92	-1.221E+00	+	1.339E+01	4.62E+02	1.29E+01 G
			964.11	4.285E+00	(	2.303E+01	1.58E+02	1.46E+01 G
			244.69	-6.793E+00	&	4.295E+01	1.90E+02	7.58E+00 G
			1408.00	2.690E+00	& P	5.647E+00	9.05E+01	2.10E+01 GA
EU-154	I	3.2002E+00					3.14E+03	
			873.23	2.754E+00	?(P	1.296E+01	1.35E+02	1.23E+01 G
			123.10	-1.646E-02	&	2.783E+00	4.97E+03	4.08E+01 G
			1274.54	0.000E+00	-	6.829E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	1.178E+01	1.00E+03	2.02E+01 G
			1004.77	3.504E+00	?(	1.377E+01	1.15E+02	1.80E+01 G
			996.33	-2.446E+00	+	2.428E+01	2.85E+02	1.06E+01 G
EU-155	I	2.1234E+00					1.81E+03	
			105.31	2.123E+00	(	1.595E+01	2.26E+02	2.12E+01 G
			86.54	0.000E+00	-	1.094E+01	1.00E+03	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	5.8090E-01					4.24E+01	
			482.00	5.809E-01	?(P	2.261E+00	1.15E+02	8.05E+01 G
			133.02	-9.531E-01	+	4.901E+00	1.54E+02	4.33E+01 G
			345.83	-3.549E+00	+	2.049E+01	1.73E+02	1.51E+01 G
			136.30	-7.141E+00	+	3.560E+01	1.50E+02	5.85E+00 G
Ta-182	F	6.0699E-01					1.14E+02	
			1121.30	-1.027E-01	%(	9.093E+00	2.53E+03	3.49E+01 G
			1221.41	1.524E+00	(	7.653E+00	2.24E+02	2.70E+01 G
			1189.05	-4.655E-01	+	9.662E+00	8.57E+02	1.62E+01 G
Hg-203	F	9.3656E-02					4.66E+01	
			279.20	9.366E-02	&(	1.841E+00	5.74E+02	8.15E+01 G
TL-208	N	1.1168E+01					6.98E+02	
			583.02	1.117E+01	(P	1.404E+00	8.61E+00	8.45E+01 G
			277.28	2.056E+01	+	1.263E+01	2.68E+01	6.31E+00 G
			860.56	1.117E+01	@(P	8.924E+00	3.63E+01	1.24E+01 G
pm-146	C	3.2943E-01					2.02E+03	
			747.16	-1.196E+00	?(	4.922E+00	1.75E+02	3.40E+01 G
			735.72	2.336E+00	(	5.096E+00	9.28E+01	2.25E+01 G
			453.88	4.330E-01	?(P	1.895E+00	1.80E+02	6.50E+01 G
y-88	F	4.2361E-01					1.07E+02	
			898.04	4.236E-01	?(P	1.288E+00	1.25E+02	9.37E+01 G
			1836.06	-1.740E-02	% P	8.180E-01	3.35E+03	9.92E+01 G
Cd-113m		-8.8372E+03					5.33E+03	
			263.70	-8.837E+03	?(	2.110E+04	7.20E+01	6.00E-03 K
Cf-251	T	-4.7227E-01					3.28E+05	
			176.60	-4.723E-01	?(	6.275E+00	5.14E+02	1.70E+01 G
			227.00	-2.164E+00	&	1.836E+01	3.42E+02	6.30E+00 GA
Cf-249	T	1.0355E+00					1.28E+05	
			387.95	6.184E-01	&(	2.876E+00	1.38E+02	6.60E+01 G
			333.44	2.810E+00	?(	1.605E+01	1.70E+02	1.55E+01 G
Sn-126		6.0566E+00					3.65E+07	
			87.57	4.181E+00	}	8.739E+00	2.14E+01	3.75E+01 GA
			64.28	6.057E+00	?(	2.170E+01	1.08E+02	9.70E+00 G
			86.94	0.000E+00	-	3.708E+01	1.00E+03	9.04E+00 GA
PB-210	N	3.1833E+01					8.14E+03	
			46.54	3.183E+01	*(P	3.811E+01	4.80E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	3.2287E+01					6.98E+02	
			238.63	3.229E+01	(P	2.153E+00	4.26E+00	4.33E+01 G
			300.03	4.836E+01	+	2.391E+01	1.85E+01	3.28E+00 GA
PB-214	N	1.6374E+01					5.84E+05	
			351.93	1.642E+01	(P	2.757E+00	9.71E+00	3.76E+01 G
			295.09	1.628E+01	(P	3.644E+00	1.07E+01	1.93E+01 G
			242.00	2.208E+01	+	1.438E+01	2.18E+01	7.43E+00 GA
BI-207	C	3.2929E-02					1.18E+04	
			569.70	-1.523E-01	?(	2.065E+00	3.92E+02	9.77E+01 G
			1063.66	2.760E-01	?(	2.167E+00	3.33E+02	7.45E+01 G
BI-212	N	2.8749E+01					6.98E+02	
			727.17	2.875E+01	(	1.299E+01	2.31E+01	7.55E+00 G
			785.42	1.464E+01	- P	1.294E+02	3.71E+02	1.28E+00 GA
BI-214	N	1.7696E+01					5.84E+05	
			609.31	1.770E+01	(P	2.506E+00	9.95E+00	4.61E+01 G
			1120.29	2.404E+01	+ P	3.497E+00	1.42E+01	1.51E+01 G
			1764.49	4.735E+00	- P	1.213E+01	7.61E+01	1.54E+01 G
BI-210M	T	2.0091E-01					1.10E+09	
			265.83	2.009E-01	?(	2.865E+00	4.17E+02	5.00E+01 G
			304.90	-1.876E+00	+	1.062E+01	1.69E+02	2.80E+01 G
AC-228	N	2.9222E+01					2.10E+03	
			911.07	2.659E+01	(	3.404E+00	1.03E+01	2.90E+01 G
			968.97	3.360E+01	(	5.558E+00	1.22E+01	1.75E+01 G
			338.32	4.017E+01	+	1.768E+01	1.49E+01	1.20E+01 G
			93.35	8.695E+00	-	5.742E+01	1.99E+02	5.56E+00 XA
TH-227	N	-9.2986E+00					7.95E+03	
			50.14	-9.299E+00	&(	3.174E+01	1.03E+02	8.00E+00 G
			256.24	-7.782E+00	+	1.862E+01	9.81E+01	7.00E+00 G
TH-229	N	3.8121E+00					2.68E+06	
			193.51	-2.656E+00	?(P	2.426E+01	3.72E+02	4.40E+00 G
			210.85	1.333E+01	?(P	4.059E+01	1.25E+02	2.99E+00 G
TH-234	N	5.5439E+00					1.63E+12	
			63.29	3.114E+00	?(P	5.353E+01	5.11E+02	3.81E+00 G
			92.59	7.202E+00	(P	2.163E+01	9.05E+01	5.58E+00 G
PA-231	N	-1.8113E+01					1.20E+07	
			302.65	-1.811E+01	?(	1.076E+02	1.78E+02	2.88E+00 G
			300.07	-2.103E+01	+	1.287E+02	1.83E+02	2.46E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   8.1883E-01                                     1.63E+12
                          131.29-2.279E+00 ?(  1.189E+01 1.57E+02 1.80E+01 G
                          946.02 2.685E+00 &(P 1.095E+01 1.75E+02 1.34E+01 G
                          569.47 4.569E+00 ?(  2.478E+01 1.59E+02 8.20E+00 G
                          883.24 0.000E+00 -   2.820E+01 1.00E+03 9.60E+00 G
                          880.53-1.232E+01 &   4.181E+01 1.00E+02 6.00E+00 GA

PA-234M  N   3.2348E+01                                     1.63E+12
                         1001.00-2.222E+01  (P 3.239E+02 3.66E+02 8.37E-01 G
                          766.41 1.877E+02 ?(P 6.876E+02 1.08E+02 2.94E-01 G

U-235    N   9.0140E+00                                     2.57E+11
                          143.79 5.779E+00  (P 6.150E+00 3.99E+01 1.10E+01 G
                          205.33 1.609E+01  (P 1.882E+01 4.68E+01 5.01E+00 G
                          163.38 1.726E+00 & P 2.610E+01 4.47E+02 5.08E+00 G

AM-241   T  -7.5239E-01                                     1.58E+05
                           59.54-7.524E-01 ?(P 6.478E+00 1.71E+02 3.59E+01 G

Np-237   F   1.1332E-01                                     2.14E+06
                           86.49 1.133E-01 %(  2.565E+01 6.79E+03 1.31E+01 G

Ir-192   F   3.8078E-01                                     7.40E+01
                          316.49 0.000E+00 &(  3.414E+00 1.00E+03 8.70E+01 G
                          468.06 1.021E+00  (  3.281E+00 9.56E+01 5.18E+01 G
                          308.44-1.388E+00 &   9.301E+00 2.00E+02 3.18E+01 G

Cs-136   F   1.1276E+00                                     1.30E+01
                          818.50 4.666E-01 ?(  1.797E+00 1.13E+02 1.00E+02 G
                         1048.07 2.059E+00 ?(  1.632E+00 2.90E+01 8.00E+01 G
                          340.57 9.491E-01 ?(  5.826E+00 1.83E+02 4.69E+01 G

Np-239   T  -2.0746E+00                                     2.36E+00
                          103.70-5.816E-02 %   1.463E+01 7.56E+03 2.40E+01 X
                          106.13-2.075E+00  (  1.556E+01 2.26E+02 2.27E+01 G
                           99.50-3.117E+00 +   2.382E+01 2.30E+02 1.50E+01 X

Nd-147       1.8962E+00                                     1.11E+01
                          531.00 2.359E+00 ?(  9.380E+00 1.63E+02 1.30E+01 G
                           91.10 1.684E+00 ?(  1.147E+01 2.05E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	469.	-30.	-0.017	102.51	-9.299E+00	
AM-241	59.54	640.	-14.	-0.008	171.05	-7.524E-01	P
BA-133	80.99	2662.	-36.	-0.020	94.46	-1.528E+00	P
Nd-147	91.10	2518.	35.	0.019	205.09	1.684E+00	
Gd-153	97.50	2896.	-37.	-0.020	207.73	-1.647E+00	
Np-239	99.50	3216.	-35.	-0.019	230.17	-3.117E+00	
Gd-153	103.20	3181.	-35.	-0.019	228.30	-2.138E+00	
EU-155	105.31	2923.	34.	0.019	226.15	2.123E+00	
Np-239	106.13	3197.	-35.	-0.020	225.95	-2.075E+00	
EU-152	121.78	358.	-12.	-0.006	234.38	-5.390E-01	
PA-234	131.29	1089.	-30.	-0.017	156.72	-2.279E+00	
HF-181	133.02	1059.	-30.	-0.017	154.39	-9.531E-01	
CE-144	133.54	1029.	-30.	-0.017	152.16	-3.728E+00	
HF-181	136.30	999.	-30.	-0.017	149.67	-7.141E+00	
CO-57	136.47	969.	-30.	-0.017	147.40	-3.914E+00	
Tc-99m	140.51	824.	20.	0.011	208.96	3.178E-01	
CE-141	145.44	1020.	-31.	-0.017	144.74	-9.355E-01	
Ba-140	162.66	316.	5.	0.003	522.25	1.202E+00	
CE-139	165.85	242.	24.	0.013	93.97	4.594E-01	
Cf-251	176.60	187.	-5.	-0.003	513.61	-4.723E-01	
TH-229	193.51	162.	-7.	-0.004	372.48	-2.656E+00	P
TH-229	210.85	184.	22.	0.012	124.51	1.333E+01	P
Cf-251	227.00	148.	-7.	-0.004	342.36	-2.164E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	244.69	1106.	-25.	-0.014	189.63	-6.793E+00		
TH-227	256.24	156.	-25.	-0.014	98.09	-7.782E+00		
Cd-113m	263.70	140.	-24.	-0.013	71.99	-8.837E+03		
BI-210M	265.83	179.	5.	0.003	417.32	2.009E-01		
Hg-203	279.20	182.	3.	0.002	574.46	9.366E-02		
I-131	284.30	76.	3.	0.002	571.87	1.134E+00		
PA-231	300.07	754.	-21.	-0.012	183.13	-2.103E+01		
PA-233	300.18	733.	-21.	-0.012	180.53	-8.348E+00		
PA-231	302.65	711.	-21.	-0.012	177.68	-1.811E+01		
BA-133	302.85	690.	-21.	-0.012	175.00	-2.848E+00		
Ba-140	304.85	669.	-21.	-0.012	172.10	-1.225E+01		
BI-210M	304.90	647.	-21.	-0.012	169.36	-1.876E+00		
Ir-192	308.44	626.	-18.	-0.010	200.18	-1.388E+00		
CR-51	320.08	333.	16.	0.009	164.71	4.068E+00		
La-140	328.76	373.	15.	0.009	178.82	1.979E+00		P
Cf-249	333.44	388.	17.	0.009	170.13	2.810E+00		
Cs-136	340.57	454.	17.	0.009	182.99	9.491E-01		
EU-152	344.29	471.	17.	0.009	185.84	1.698E+00		
HF-181	345.83	569.	-20.	-0.011	172.56	-3.549E+00		
BA-133	356.00	384.	-20.	-0.011	141.39	-8.873E-01		
I-131	364.48	80.	-6.	-0.003	358.44	-2.107E-01		P
BA-133	383.84	155.	17.	0.010	104.21	5.723E+00		P
Cf-249	387.95	172.	14.	0.008	137.82	6.184E-01		
SN-113	391.69	162.	16.	0.009	112.83	7.658E-01		P
SB-125	427.88	36.	14.	0.008	91.00	1.470E+00		
AG-108M	433.94	52.	2.	0.001	818.88	6.497E-02		P
pm-146	453.88	53.	8.	0.005	180.36	4.330E-01		P
SB-125	463.37	104.	16.	0.009	91.97	5.344E+00		P
Ir-192	468.06	99.	15.	0.008	95.60	1.021E+00		
BE-7	477.60	121.	15.	0.009	104.45	5.132E+00		
HF-181	482.00	109.	13.	0.007	115.25	5.809E-01		P
La-140	487.02	136.	-6.	-0.003	280.15	-4.671E-01		
RU-103	497.05	65.	-13.	-0.007	129.60	-5.194E-01		
RH-106	511.86	63.	106.	0.059	21.85	1.971E+01		
Nd-147	531.00	39.	8.	0.004	163.22	2.359E+00		
Ba-140	537.26	44.	-7.	-0.004	218.07	-1.111E+00		P
CS-134	563.24	78.	-11.	-0.006	166.64	-5.300E+00		
CS-134	569.32	91.	-22.	-0.012	64.29	-5.866E+00		
PA-234	569.47	103.	9.	0.005	159.12	4.569E+00		
BI-207	569.70	102.	-4.	-0.002	392.39	-1.523E-01		
SB-125	600.50	385.	-16.	-0.009	180.06	-3.698E+00		
SB-124	602.73	370.	-16.	-0.009	123.77	-6.873E-01		P
CS-134	604.71	354.	-16.	-0.009	172.43	-6.818E-01		
RU-103	610.30	339.	-13.	-0.007	208.98	-9.393E+00		
RH-106	621.92	265.	13.	0.007	177.07	5.786E+00		
SB-125	635.89	43.	4.	0.002	259.21	1.441E+00		
I-131	636.97	50.	5.	0.003	212.17	3.002E+00		
AG-110M	657.76	149.	-16.	-0.009	110.67	-7.728E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	696.54	19.	10.	0.005	98.38	4.795E-01	P
NB-94	702.63	23.	10.	0.005	112.71	4.693E-01	P
SB-124	722.79	100.	-5.	-0.003	306.06	-2.135E+00	
pm-146	735.72	19.	10.	0.006	92.82	2.336E+00	
pm-146	747.16	42.	-8.	-0.004	175.45	-1.196E+00	
ZR-95	756.73	33.	9.	0.005	143.41	8.245E-01	P
AG-110M	763.94	62.	7.	0.004	155.88	1.705E+00	
PA-234M	766.41	60.	11.	0.006	108.07	1.877E+02	P
EU-152	778.92	42.	-3.	-0.002	461.88	-1.221E+00	
CS-134	795.87	80.	-8.	-0.004	172.05	-4.701E-01	
CS-134	801.95	78.	8.	0.004	163.57	4.863E+00	
CO-58	810.78	39.	11.	0.006	87.54	5.915E-01	
La-140	815.77	52.	-9.	-0.005	122.47	-2.031E+00	
Cs-136	818.50	42.	8.	0.005	112.54	4.666E-01	
Co-56	846.77	38.	2.	0.001	695.37	1.065E-01	P
NB-94	871.10	25.	9.	0.005	82.07	5.405E-01	
EU-154	873.23	28.	6.	0.003	135.33	2.754E+00	P
PA-234	880.53	75.	-13.	-0.007	100.48	-1.232E+01	
AG-110M	884.68	66.	12.	0.006	102.50	9.407E-01	
Sc-46	889.28	74.	-12.	-0.006	110.16	-6.770E-01	
y-88	898.04	14.	7.	0.004	125.46	4.236E-01	P
AG-110M	937.49	40.	-10.	-0.006	142.59	-1.791E+00	
PA-234	946.02	20.	6.	0.003	174.92	2.685E+00	P
EU-152	964.11	118.	10.	0.006	158.08	4.285E+00	
EU-154	996.33	63.	-4.	-0.002	285.04	-2.446E+00	
PA-234M	1001.00	70.	-3.	-0.002	365.50	-2.222E+01	P
EU-154	1004.77	57.	10.	0.005	115.35	3.504E+00	
Cs-136	1048.07	13.	24.	0.014	28.96	2.059E+00	
RH-106	1050.36	44.	-6.	-0.003	165.76	-2.535E+01	
BI-207	1063.66	20.	3.	0.002	332.78	2.760E-01	
Ga-68	1077.40	25.	-10.	-0.006	114.38	-2.470E+01	
FE-59	1099.25	25.	-3.	-0.002	370.93	-3.743E-01	
EU-152	1112.07	85.	-5.	-0.003	264.58	-2.609E+00	
CO-60	1173.24	49.	-20.	-0.011	39.12	-1.479E+00	P
Ta-182	1189.05	15.	-1.	-0.001	857.32	-4.655E-01	
Ta-182	1221.41	27.	5.	0.003	224.30	1.524E+00	
Co-56	1238.28	21.	13.	0.007	88.22	1.484E+00	
NA-22	1274.53	27.	-8.	-0.004	101.87	-6.141E-01	
FE-59	1291.60	16.	2.	0.001	505.24	3.419E-01	P
EU-152	1408.00	5.	6.	0.004	90.50	2.690E+00	P
La-140	1596.21	6.	1.	0.001	438.07	1.330E-01	P
SB-124	1690.98	17.	-9.	-0.005	112.49	-1.929E+00	
Co-56	1771.35	38.	-6.	-0.003	146.88	-4.263E+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 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	5.1322E+00	5.1323E+00	1.045E+02%	1.80E+01
NA-22	#A	-6.1414E-01	-6.1414E-01	1.019E+02%	2.14E+00
K-40		2.6923E+02	2.6923E+02	5.659E+00%	9.34E+00
Sc-46	#A	-6.7703E-01	-6.7704E-01	1.102E+02%	2.53E+00
CR-51	#A	4.0682E+00	4.0682E+00	1.647E+02%	2.25E+01
MN-54	#A	4.8377E-01	4.8377E-01	1.230E+02%	1.41E+00
FE-59	#A	-6.3980E-02	-6.3981E-02	3.134E+02%	3.25E+00
Co-56	#A	6.5489E-01	6.5489E-01	8.822E+01%	1.78E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.44E+00
CO-58	#A	5.9154E-01	5.9154E-01	8.754E+01%	1.75E+00
CO-60	#A	-6.0330E-02	-6.0330E-02	1.093E+03%	1.71E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.26E+00
NB-94	#A	5.0526E-01	5.0526E-01	6.971E+01%	1.25E+00
ZR-95	#A	8.2449E-01	8.2450E-01	1.434E+02%	2.79E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.15E+00
RU-103	#A	-5.1937E-01	-5.1938E-01	1.296E+02%	1.61E+00
RH-106	#A	5.7860E+00	5.7861E+00	1.771E+02%	3.45E+01
AG-108M	#A	6.4969E-02	6.4969E-02	8.189E+02%	1.31E+00
AG-110M	#A	1.1201E+00	1.1201E+00	9.328E+01%	3.26E+00
SN-113	#A	7.6580E-01	7.6580E-01	1.128E+02%	2.90E+00
SB-124	#A	-6.8733E-01	-6.8734E-01	1.238E+02%	4.00E+00
SB-125	#A	2.2528E+00	2.2528E+00	9.100E+01%	3.33E+00
I-131	#A	1.1866E-01	1.1867E-01	2.122E+02%	1.54E+00
Gd-153	#A	-1.6467E+00	-1.6467E+00	2.077E+02%	1.14E+01
Ga-68	#A	-2.4479E+01	-2.4701E+01	1.144E+02%	6.42E+01
Tc-99m	#A	3.1727E-01	3.1781E-01	2.090E+02%	2.22E+00
BA-133	#A	-8.8725E-01	-8.8725E-01	1.414E+02%	4.20E+00
CS-134	#A	-2.2850E-01	-2.2850E-01	1.188E+02%	3.95E+00
CS-137		3.8113E+00	3.8113E+00	1.919E+01%	1.44E+00
CE-139	#A	4.5937E-01	4.5937E-01	9.397E+01%	1.44E+00
Ba-140	#A	-6.4107E-01	-6.4109E-01	2.181E+02%	5.33E+00
La-140	#A	4.5686E-01	4.5687E-01	1.788E+02%	1.41E+00
CE-141	#A	-9.3549E-01	-9.3550E-01	1.447E+02%	4.51E+00
CE-144	#A	-3.7280E+00	-3.7280E+00	1.522E+02%	1.89E+01
PM-144	#A	4.7953E-01	4.7953E-01	9.838E+01%	1.12E+00
EU-152	#A	2.6170E+00	2.6170E+00	1.220E+02%	1.06E+01
EU-154	#A	3.2002E+00	3.2002E+00	8.891E+01%	1.30E+01
EU-155	#A	2.1234E+00	2.1234E+00	2.262E+02%	1.59E+01
HF-181	#A	5.8089E-01	5.8090E-01	1.152E+02%	2.26E+00
Ta-182	#A	6.0699E-01	6.0699E-01	2.243E+02%	9.09E+00
Hg-203	#A	9.3656E-02	9.3656E-02	5.745E+02%	1.84E+00
TL-208		1.1168E+01	1.1168E+01	8.608E+00%	1.40E+00
pm-146	#A	3.2943E-01	3.2943E-01	8.940E+01%	4.92E+00

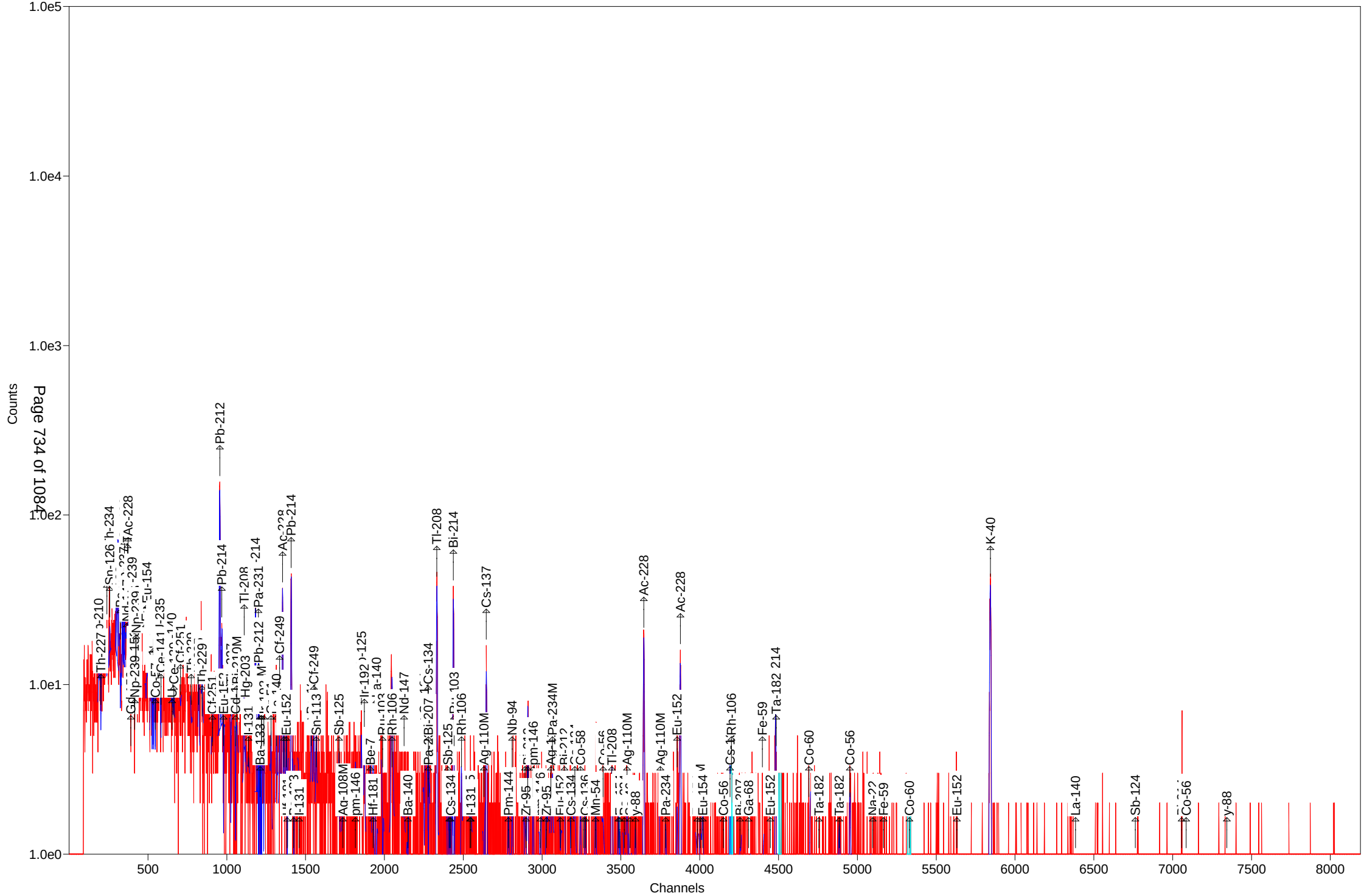
y-88 #A	4.2360E-01	4.2361E-01	1.255E+02%		1.29E+00
Cd-113m#A	-8.8372E+03	-8.8372E+03	7.199E+01%		2.11E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		8.79E+01
Cf-251 #A	-4.7227E-01	-4.7227E-01	5.136E+02%		6.28E+00
Cf-249 #A	1.0355E+00	1.0355E+00	1.095E+02%		2.88E+00
Sn-126 #A	6.0566E+00	6.0566E+00	1.077E+02%		2.17E+01
PB-210 #A	3.1833E+01	3.1833E+01	4.799E+01%		3.81E+01
PB-212	3.2287E+01	3.2287E+01	4.259E+00%		2.15E+00
PB-214	1.6374E+01	1.6374E+01	7.222E+00%		2.76E+00
BI-207 #A	3.2929E-02	3.2929E-02	2.572E+02%		2.06E+00
BI-212	2.8749E+01	2.8749E+01	2.307E+01%		1.30E+01
BI-214	1.7696E+01	1.7696E+01	9.951E+00%		2.51E+00
BI-210M#A	2.0091E-01	2.0091E-01	4.173E+02%		2.86E+00
AC-228	2.9222E+01	2.9222E+01	7.965E+00%		3.40E+00
TH-227 #A	-9.2986E+00	-9.2986E+00	1.025E+02%		3.17E+01
TH-229 #A	3.8121E+00	3.8121E+00	1.245E+02%		2.43E+01
TH-234 A	5.5439E+00	5.5439E+00	9.050E+01%		5.35E+01
PA-231 #A	-1.8113E+01	-1.8113E+01	1.777E+02%		1.08E+02
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		8.16E+00
PA-234 #A	8.1883E-01	8.1883E-01	9.456E+01%		1.19E+01
PA-234M#A	3.2348E+01	3.2348E+01	1.081E+02%		3.24E+02
U-235	9.0140E+00	9.0140E+00	3.072E+01%		6.15E+00
AM-241 #A	-7.5239E-01	-7.5239E-01	1.711E+02%		6.48E+00
Np-237 #A	1.1332E-01	1.1332E-01	6.792E+03%		2.56E+01
Ir-192 #A	3.8078E-01	3.8078E-01	9.560E+01%		3.41E+00
Cs-136 #A	1.1276E+00	1.1276E+00	2.896E+01%		1.80E+00
Np-239 #A	-2.0742E+00	-2.0746E+00	2.260E+02%		1.56E+01
Nd-147 #A	1.8962E+00	1.8962E+00	1.311E+02%		9.38E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 4.494E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 4.4938181E+02 Bq/Sample

265170_Gamma_160-18567-A-15-B. 8_Gamma_20161471.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20161633

Sample Description: 265170_Gamma_160-18567-A-16-B
Detector: Detector # 9
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-16-B

Decay to Time: 9/7/2016 18:33 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:33:24 Real Time: 1803 sec
Analysis Time: 9/7/2016 19:03 Dead Time: 0.19 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev11.lib
Bkgd Correction File: 9_2016-09-06_0605.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	3.848E+00	100.6	3.872E+00	3.877E+00	1.300E+01
NA-22	-3.235E-01	155.5	5.030E-01	5.033E-01	1.741E+00
K-40	2.590E+02	4.8	1.234E+01	1.811E+01	1.076E+01
Sc-46	-8.337E-01	85.1	7.098E-01	7.110E-01	2.367E+00
CR-51	2.423E+00	206.5	5.005E+00	5.007E+00	1.683E+01
MN-54	5.365E-01	98.7	5.294E-01	5.302E-01	1.184E+00
FE-59	4.956E-02	2255.8	1.118E+00	1.118E+00	2.506E+00
Co-56	1.746E+00	22.8	3.973E-01	4.073E-01	9.636E-01
CO-57	1.345E-01	102.1	1.373E-01	1.375E-01	1.204E+00
CO-58	2.520E-01	161.0	4.057E-01	4.059E-01	1.397E+00
CO-60	2.372E-01	87.4	2.074E-01	2.077E-01	1.581E+00
ZN-65	0.000E+00	1.#INF	3.143E-01	3.143E-01	4.992E+00
NB-94	6.503E-01	86.0	5.590E-01	5.600E-01	1.867E+00
ZR-95	9.434E-01	84.6	7.980E-01	7.995E-01	2.325E+00
NB-95	-6.489E-02	933.3	6.056E-01	6.056E-01	2.083E+00
RU-103	-2.460E-01	203.1	4.996E-01	4.998E-01	1.199E+00
RH-106	3.552E+00	84.2	2.991E+00	2.996E+00	1.151E+01
AG-108M	1.245E-01	363.3	4.523E-01	4.524E-01	1.092E+00
AG-110M	4.074E-01	85.6	3.487E-01	3.493E-01	2.892E+00
SN-113	-4.996E-01	184.4	9.214E-01	9.217E-01	3.095E+00
SB-124	-6.733E-01	62.8	4.225E-01	4.240E-01	3.288E+00
SB-125	-2.479E-01	90.3	2.238E-01	2.242E-01	3.710E+00
I-131	-3.614E-01	109.3	3.951E-01	3.956E-01	1.371E+00
Gd-153	0.000E+00	1.#INF	3.081E-01	3.081E-01	1.121E+01
Ga-68	-5.261E-01	4170.1	2.194E+01	2.194E+01	4.922E+01
Tc-99m	4.121E-01	151.4	6.240E-01	6.245E-01	2.077E+00
BA-133	5.522E-01	185.6	1.025E+00	1.025E+00	3.434E+00
CS-134	1.084E+00	19.9	2.156E-01	2.229E-01	3.249E+00
CS-137	3.656E+00	14.3	5.242E-01	5.577E-01	9.285E-01
CE-139	4.711E-01	95.8	4.513E-01	4.536E-01	1.502E+00
Ba-140	-1.512E-01	1833.7	2.772E+00	2.772E+00	4.742E+00
La-140	-5.638E-01	263.6	1.486E+00	1.486E+00	1.664E+00
CE-141	-8.012E-02	930.9	7.459E-01	7.459E-01	1.917E+00

CE-144	3.142E+00	146.3	4.595E+00	4.598E+00	1.529E+01
PM-144	-7.283E-01	73.7	5.369E-01	5.383E-01	1.783E+00
EU-152	2.606E-01	77.3	2.013E-01	2.018E-01	4.994E+00
EU-154	1.924E+00	69.1	1.330E+00	1.334E+00	1.283E+01
EU-155	-1.700E+00	275.1	4.676E+00	4.677E+00	1.551E+01
HF-181	4.725E-01	106.8	5.045E-01	5.051E-01	1.990E+00
Ta-182	-5.691E-01	161.5	9.190E-01	9.195E-01	7.601E+00
Hg-203	-1.422E-01	316.6	4.502E-01	4.503E-01	1.528E+00
TL-208	1.276E+01	5.9	7.510E-01	1.001E+00	9.334E-01
pm-146	3.627E-01	170.3	6.176E-01	6.179E-01	3.724E+00
y-88	1.348E-01	375.7	5.064E-01	5.064E-01	1.180E+00
Cd-113m	-7.185E+03	111.0	7.975E+03	7.988E+03	2.660E+04
Cd-109	0.000E+00	1.#INF	2.926E+01	2.926E+01	9.700E+01
Cf-251	-6.705E-01	351.2	2.355E+00	2.356E+00	6.035E+00
Cf-249	-4.652E-01	102.4	4.765E-01	4.771E-01	3.029E+00
Sn-126	-5.845E+00	107.7	6.294E+00	6.302E+00	2.091E+01
PB-210	-3.805E+00	500.8	1.905E+01	1.905E+01	6.399E+01
PB-212	4.207E+01	3.1	1.316E+00	3.023E+00	1.844E+00
PB-214	1.897E+01	6.1	1.156E+00	1.519E+00	2.656E+00
BI-207	-1.007E-01	398.8	4.016E-01	4.016E-01	1.407E+00
BI-212	3.840E+01	13.4	5.138E+00	5.511E+00	8.802E+00
BI-214	1.525E+01	8.3	1.270E+00	1.496E+00	2.005E+00
BI-210M	-8.300E-01	112.3	9.323E-01	9.336E-01	3.111E+00
AC-228	3.903E+01	4.9	1.902E+00	2.754E+00	2.871E+00
TH-227	-1.511E-01	3669.7	5.545E+00	5.545E+00	3.006E+01
TH-229	4.337E+00	99.1	4.300E+00	4.314E+00	2.473E+01
TH-234	2.642E+01	32.3	8.543E+00	8.654E+00	2.720E+01
PA-231	-1.611E+01	176.1	2.837E+01	2.838E+01	9.455E+01
PA-233	-1.271E+00	115.6	1.470E+00	1.471E+00	4.906E+00
PA-234	1.922E+00	142.3	2.734E+00	2.736E+00	9.101E+00
PA-234M	6.058E+01	86.1	5.215E+01	5.223E+01	2.354E+02
U-235	2.635E+00	101.2	2.668E+00	2.671E+00	1.682E+01
AM-241	-1.792E+00	54.9	9.838E-01	9.882E-01	6.301E+00
Np-237	0.000E+00	1.#INF	8.765E+00	8.765E+00	2.905E+01
Ir-192	2.672E-01	86.4	2.309E-01	2.314E-01	2.108E+00
Cs-136	5.108E-01	56.4	2.879E-01	2.893E-01	9.382E-01
Np-239	-2.051E+00	215.5	4.420E+00	4.422E+00	1.465E+01
Nd-147	1.337E-01	2301.4	3.078E+00	3.078E+00	7.560E+00
Total	5.497E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-16-B

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20161633.An1

Acquisition information
Start time: 9/7/2016 6:33:24 PM
Live time: 1800
Real time: 1803
Dead time: 0.19 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-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 (37.59keV)
Stop channel: 8000 (1999.34keV)
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	9/7/2016 6:33:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2016-09-06_0605.PBC 9/6/2016 6:05:43 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1522

***** 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
44.27	36.	46.69	0.47	2.366E-02				
53.13	38.	45.34	0.98	3.156E-02				
63.12	71.	32.34	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
74.81	389.	8.87	1.03	4.574E-02				
77.18	689.	5.36	1.03	4.680E-02				
84.09	91.	26.30	1.03	4.937E-02				
87.21	248.	10.69	1.04	5.029E-02	86.49	13.100	2.102E+01	Np237
					86.54	30.700	8.966E+00	EU155
					86.94	9.040	3.038E+01	Sn126
					87.57	37.500	7.299E+00	Sn126
					88.04	3.790	7.204E+01	Cd109
90.00	151.	16.41	1.04	5.100E-02				
123.10	33.	88.86	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
131.29	32.	142.29	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	33.	144.22	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.140E+00	CE144
133.54	33.	146.28	1.08	5.189E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.142E+00	CE144
135.87	33.	149.97	1.08	5.150E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.295E+00	CO57
136.30	33.	148.01	1.08	5.152E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.295E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
140.51	33.	151.44	1.09	5.091E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	32.	95.80	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139
205.33	29.	101.23	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
210.85	35.	99.14	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
238.52	1134.	4.04	1.01	3.733E-02	238.63	43.300	3.900E+01	PB212
241.91	144.	15.53	1.18	3.697E-02	242.00	7.430	2.922E+01	PB214
270.11	88.	29.03	0.92	3.436E-02				
277.34	76.	27.16	1.40	3.372E-02	277.28	6.310	1.973E+01	TL208
284.30	6.	359.78	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.15	245.	11.87	1.04	3.231E-02	295.09	19.300	2.185E+01	PB214
300.08	70.	21.46	1.24	3.195E-02	300.03	3.280	3.685E+01	PB212
					300.07	2.460	4.914E+01	PA231
					300.18	6.200	1.950E+01	PA233
320.08	13.	206.53	1.25	3.056E-02	320.08	9.940	PBC<MDA	CR51
333.44	11.	348.34	1.27	2.970E-02	333.44	15.510	PBC<MDA	Cf249
338.19	265.	8.88	1.25	2.941E-02	338.32	12.010	4.174E+01	AC228
345.83	8.	248.64	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181
351.88	350.	8.86	1.21	2.861E-02	351.93	37.600	1.807E+01	PB214
356.00	18.	185.56	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
433.94	5.	363.32	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
453.88	11.	170.28	1.37	2.388E-02	453.88	65.000	PBC<MDA	pm146
463.37	13.	141.94	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	23.	86.43	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.60	17.	100.63	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
510.66	201.	12.79	1.08	2.192E-02	511.86	20.000	2.548E+01	RH106
563.24	19.	98.83	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.70	-4.	398.84	1.47	2.023E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.33	386.	5.88	1.60	1.988E-02	583.02	84.500	1.276E+01	TL208
609.33	243.	8.33	1.40	1.925E-02	609.31	46.090	1.525E+01	BI214
					610.30	5.750	1.224E+02	RU103
661.78	102.	14.34	1.20	1.810E-02	661.66	85.210	3.656E+00	CS137
702.63	20.	85.96	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
724.20	20.	84.58	1.60	1.691E-02	724.20	44.150	PBC<MDA	ZR95
727.48	88.	13.38	1.60	1.686E-02	727.17	7.550	3.840E+01	BI212
747.16	3.	563.73	1.62	1.651E-02	747.16	34.000	PBC<MDA	pm146
756.73	8.	206.85	1.62	1.635E-02	756.73	54.460	PBC<MDA	ZR95
766.41	20.	86.08	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.372E+02	PA234M
785.81	33.	22.12	1.12	1.590E-02	785.42	1.280	8.919E+01	BI212
795.87	62.	19.89	1.66	1.574E-02	795.87	85.530	2.559E+00	CS134
810.78	7.	160.99	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
818.50	12.	96.04	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
834.85	15.	98.69	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
846.77	13.	87.78	1.70	1.501E-02	846.77	99.935	PBC<MDA	Co56
860.36	65.	16.68	2.20	1.482E-02	860.56	12.420	1.956E+01	TL208
873.23	7.	164.77	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
898.04	3.	375.68	1.74	1.434E-02	898.04	93.700	PBC<MDA	y88
911.26	273.	6.74	1.51	1.418E-02	911.07	29.000	3.690E+01	AC228
964.11	15.	142.88	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
969.17	173.	9.46	1.71	1.352E-02	968.97	17.460	4.069E+01	AC228
996.33	14.	89.26	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
1037.84	35.	22.75	1.84	1.281E-02	1037.84	14.130	1.064E+01	Co56
1048.07	11.	58.99	1.85	1.271E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	9.	84.20	1.85	1.269E-02	1050.36	1.560	PBC<MDA	RH106
1120.13	69.	15.38	2.27	1.206E-02	1120.29	15.100	2.094E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	17.	87.44	1.94	1.163E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	4.	345.51	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1384.30	7.	85.58	2.08	1.018E-02	1384.30	24.290	PBC<MDA	AG110M
1461.00	485.	4.76	2.09	9.748E-03	1460.83	10.670	2.590E+02	K40
1764.08	63.	13.32	2.31	8.350E-03	1764.49	15.400	2.733E+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
176.71	44.27	86.	36.	1.514E+03	46.69	0.471	- s
212.17	53.13	106.	38.	1.220E+03	45.34	0.976	- s
298.86	74.83	396.	396.	8.649E+03	8.71	1.025	- sD
308.32	77.20	326.	701.	1.498E+04	5.24	1.027	- D
336.02	84.12	239.	91.	1.839E+03	26.27	1.034	- D
359.66	90.04	244.	148.	2.903E+03	17.05	1.040	- sD
1079.88	269.79	121.	88.	2.561E+03	29.03	0.920	- s
2042.00	510.66	105.	201.	9.157E+03	12.79	1.081	- 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	702.	-8.	-0.004	500.75	0.998s
AM-241	237.77	59.54	985.	-42.	-0.024	54.88	1.010s
TH-234	252.77	63.29	228.	71.	0.039	32.34	1.014D
Sn-126	256.74	64.28	939.	-41.	-0.023	107.69	1.015s
BA-133	323.56	80.99	5379.	-43.	-0.024	242.51	1.031s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.55	86.49	5336.	0.	0.000	240.32	1.036A
EU-155	345.76	86.54	5293.	-43.	-0.024	239.36	1.036s
Sn-126	347.35	86.94	5104.	-43.	-0.024	235.01	1.037s
Sn-126	349.87	87.57	4888.	-43.	-0.024	229.84	1.037s
Cd-109	351.75	88.04	5061.	0.	0.000	233.75	1.038A
Nd-147	363.99	91.10	4845.	-43.	-0.024	228.09	1.041s
TH-234	369.94	92.59	4768.	-43.	-0.024	225.97	1.042s
AC-228	372.98	93.35	4590.	-34.	-0.019	285.35	1.043s
Gd-153	389.58	97.50	4556.	0.	0.000	1000.00	1.047s
Np-239	397.58	99.50	4556.	0.	0.000	1000.00	1.049
Gd-153	412.37	103.20	4556.	0.	0.000	1000.00	1.052s
Np-239	414.37	103.70	4556.	0.	0.000	1000.00	1.053s
EU-155	420.82	105.31	4486.	-34.	-0.019	275.06	1.054s
Np-239	424.09	106.13	4598.	-45.	-0.025	215.50	1.055s
EU-152	486.65	121.78	385.	-38.	-0.021	74.60	1.070
CO-57	487.80	122.06	421.	-21.	-0.012	138.47	1.070s
EU-154	491.95	123.10	410.	33.	0.018	88.86	1.071s
PA-234	524.72	131.29	1052.	32.	0.018	142.29	1.079
HF-181	531.64	133.02	1084.	33.	0.018	144.22	1.081s
CE-144	533.69	133.54	1117.	33.	0.018	146.28	1.081s
HF-181	544.74	136.30	1149.	33.	0.018	148.01	1.084s
CO-57	545.43	136.47	1180.	33.	0.018	149.97	1.084s
Tc-99m	561.57	140.51	1213.	33.	0.018	151.44	1.088
CE-141	581.29	145.44	299.	-3.	-0.002	930.91	1.092s
Ba-140	650.15	162.66	494.	-34.	-0.019	95.17	1.108s
U-235	653.03	163.38	528.	-20.	-0.011	160.64	1.109s
CE-139	662.92	165.85	456.	32.	0.018	95.80	1.111s
Cf-251	705.90	176.60	304.	-9.	-0.005	351.21	1.122s
TH-229	773.52	193.51	304.	-12.	-0.007	285.94	1.137s
U-235	820.80	205.33	220.	29.	0.016	101.23	1.148
TH-229	842.87	210.85	300.	35.	0.019	99.14	1.153s
Cf-251	907.45	227.00	248.	-32.	-0.018	98.04	1.168
PB-212	953.97	238.63	119.	1224.	0.680	3.13	1.179D
PB-214	967.43	242.00	180.	144.	0.080	15.53	1.182D
EU-152	978.21	244.69	1859.	-31.	-0.017	198.72	1.185
TH-227	1024.40	256.24	245.	-33.	-0.018	115.29	1.195s
Cd-113m	1054.23	263.70	438.	-27.	-0.015	110.99	1.202s
BI-210M	1062.75	265.83	411.	-26.	-0.014	112.32	1.204s
TL-208	1108.77	277.34	83.	76.	0.042	27.16	1.397
Hg-203	1116.22	279.20	242.	-7.	-0.004	316.55	1.216s
I-131	1136.61	284.30	120.	6.	0.003	359.78	1.221s
PB-214	1179.77	295.09	73.	233.	0.129	8.37	1.231D
PB-212	1199.52	300.03	76.	70.	0.039	21.46	1.235D
PA-231	1199.68	300.07	1130.	-26.	-0.015	180.68	1.235s
PA-233	1200.12	300.18	1104.	-26.	-0.015	178.58	1.235
PA-231	1210.00	302.65	1077.	-27.	-0.015	176.13	1.237s
BA-133	1210.81	302.85	1051.	-27.	-0.015	173.94	1.238s
Ba-140	1218.80	304.85	1024.	-27.	-0.015	171.51	1.240s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1218.99	304.90	998.	-20.	-0.011	227.30	1.240s
PA-233	1247.44	312.01	426.	-26.	-0.014	115.61	1.246s
Ir-192	1265.35	316.49	451.	-9.	-0.005	327.83	1.250s
CR-51	1279.73	320.08	367.	13.	0.007	206.53	1.253s
La-140	1314.43	328.76	883.	-27.	-0.015	154.69	1.261s
Cf-249	1333.15	333.44	734.	11.	0.006	348.34	1.265
AC-228	1352.13	338.19	70.	265.	0.147	8.88	1.248s
EU-152	1376.53	344.29	204.	-27.	-0.015	77.26	1.275s
HF-181	1382.70	345.83	192.	8.	0.004	248.64	1.276s
PB-214	1406.88	351.88	109.	350.	0.194	8.86	1.214
BA-133	1423.37	356.00	518.	18.	0.010	185.56	1.285s
I-131	1457.31	364.48	132.	-21.	-0.012	109.32	1.293s
BA-133	1534.73	383.84	374.	-28.	-0.016	109.53	1.310s
Cf-249	1551.17	387.95	402.	-28.	-0.016	102.43	1.314
SN-113	1566.12	391.69	389.	-15.	-0.008	184.44	1.317s
SB-125	1710.86	427.88	100.	-19.	-0.010	111.60	1.349s
AG-108M	1735.10	433.94	78.	5.	0.003	363.32	1.354s
pm-146	1814.87	453.88	87.	11.	0.006	170.28	1.372
SB-125	1852.82	463.37	175.	13.	0.007	141.94	1.380
Ir-192	1871.59	468.06	179.	23.	0.013	86.43	1.384s
BE-7	1909.73	477.60	134.	17.	0.009	100.63	1.392s
HF-181	1927.34	482.00	184.	-7.	-0.004	279.12	1.396s
La-140	1947.43	487.02	209.	-16.	-0.009	127.69	1.400s
RU-103	1987.56	497.05	78.	-9.	-0.005	203.06	1.409s
RH-106	2046.81	511.86	357.	-17.	-0.009	159.04	2.672s
CS-134	2252.30	563.24	71.	19.	0.010	98.83	1.466s
CS-134	2276.64	569.32	93.	-2.	-0.001	589.19	1.471s
PA-234	2277.24	569.47	96.	0.	0.000	1000.00	1.471s
BI-207	2278.16	569.70	103.	-4.	-0.002	398.84	1.471s
TL-208	2332.67	583.33	30.	386.	0.214	5.88	1.605
SB-125	2401.36	600.50	579.	-22.	-0.012	65.17	1.497s
SB-124	2410.29	602.73	558.	-23.	-0.013	62.75	1.499s
CS-134	2418.21	604.71	535.	-22.	-0.012	153.63	1.500s
BI-214	2436.70	609.33	40.	243.	0.135	8.33	1.402
RU-103	2440.56	610.30	514.	-6.	-0.003	562.74	1.505s
AG-108M	2456.49	614.28	508.	0.	0.000	1000.00	1.508s
SB-125	2542.94	635.89	70.	-3.	-0.002	398.61	1.526s
AG-110M	2630.43	657.76	206.	-20.	-0.011	103.57	1.544s
CS-137	2646.50	661.78	24.	102.	0.056	14.34	1.201
PM-144	2785.58	696.54	128.	-23.	-0.013	73.72	1.576s
NB-94	2809.93	702.63	135.	20.	0.011	85.96	1.581s
SB-124	2890.57	722.79	222.	-23.	-0.013	94.30	1.598s
AG-108M	2891.17	722.94	199.	-23.	-0.013	89.55	1.598s
EU-154	2892.85	723.36	170.	-2.	-0.001	786.22	1.598s
ZR-95	2896.22	724.20	134.	20.	0.011	84.58	1.599s
BI-212	2909.34	727.48	14.	88.	0.049	13.38	1.604
pm-146	2942.31	735.72	61.	-14.	-0.008	123.89	1.608
pm-146	2988.08	747.16	56.	3.	0.002	563.73	1.617

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3026.36	756.73	55.	8.	0.004	206.85	1.625s
AG-110M	3055.23	763.94	144.	-28.	-0.015	63.97	1.631s
NB-95	3062.61	765.79	154.	-2.	-0.001	933.26	1.632s
PA-234M	3065.10	766.41	143.	20.	0.011	86.08	1.633s
EU-152	3115.14	778.92	85.	-24.	-0.013	67.68	1.643s
BI-212	3142.70	785.81	5.	33.	0.018	22.12	1.123s
CS-134	3182.95	795.87	45.	62.	0.034	19.89	1.656s
CS-134	3207.29	801.95	134.	-16.	-0.009	103.23	1.661s
CO-58	3242.59	810.78	60.	7.	0.004	160.99	1.668s
Cs-136	3273.50	818.50	25.	12.	0.007	96.04	1.674
MN-54	3338.91	834.85	40.	15.	0.008	98.69	1.687
Co-56	3386.61	846.77	25.	13.	0.007	87.78	1.696s
TL-208	3440.97	860.36	11.	65.	0.036	16.68	2.196s
NB-94	3483.94	871.10	63.	-12.	-0.007	95.59	1.715s
EU-154	3492.47	873.23	69.	7.	0.004	164.77	1.717
PA-234	3521.68	880.53	107.	-19.	-0.010	81.60	1.722s
PA-234	3532.53	883.24	125.	0.	0.000	1000.00	1.724
AG-110M	3538.30	884.68	125.	0.	0.000	1000.00	1.725
Sc-46	3556.69	889.28	160.	-22.	-0.012	85.14	1.729s
y-88	3591.74	898.04	31.	3.	0.002	375.68	1.736s
AC-228	3644.63	911.26	16.	273.	0.152	6.74	1.506
AG-110M	3749.60	937.49	75.	-24.	-0.013	51.04	1.766s
PA-234	3783.72	946.02	45.	-15.	-0.008	101.65	1.772s
EU-152	3856.11	964.11	229.	15.	0.008	142.88	1.786s
AC-228	3876.34	969.17	18.	173.	0.096	9.46	1.709
EU-154	3985.03	996.33	75.	14.	0.008	89.26	1.810s
EU-154	4018.82	1004.77	69.	-10.	-0.006	185.79	1.816s
Co-56	4151.13	1037.84	5.	35.	0.019	22.75	1.841s
Cs-136	4192.07	1048.07	16.	11.	0.006	58.99	1.848s
RH-106	4201.23	1050.36	25.	9.	0.005	84.20	1.850s
BI-207	4254.46	1063.66	55.	-2.	-0.001	738.19	1.860s
EU-152	4448.20	1112.07	139.	-13.	-0.007	128.16	1.895
ZN-65	4462.09	1115.55	126.	0.	0.000	1000.00	1.897s
BI-214	4480.44	1120.13	10.	69.	0.038	15.38	2.269
Sc-46	4482.12	1120.55	126.	0.	0.000	1000.00	1.901
Ta-182	4485.12	1121.30	138.	-10.	-0.006	161.48	1.901
CO-60	4692.96	1173.24	37.	17.	0.009	87.44	1.938s
Ta-182	4756.25	1189.05	34.	4.	0.002	345.51	1.949
Ta-182	4885.75	1221.41	68.	-15.	-0.008	131.49	1.972
Co-56	4953.27	1238.28	85.	-20.	-0.011	71.51	1.984s
NA-22	5098.35	1274.53	45.	-6.	-0.004	155.51	2.008s
EU-154	5098.40	1274.54	52.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	45.	-18.	-0.010	89.24	2.020s
CO-60	5330.37	1332.50	34.	-6.	-0.003	231.54	2.047s
AG-110M	5537.69	1384.30	6.	7.	0.004	85.58	2.082s
EU-152	5632.56	1408.00	18.	-5.	-0.003	314.56	2.097s
K-40	5844.71	1461.00	14.	485.	0.269	4.76	2.091
La-140	6385.95	1596.21	25.	-9.	-0.005	263.62	2.215s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	7059.65	1764.49	4.	63.	0.035	13.32	2.314s
Co-56	7087.11	1771.35	67.	0.	0.000	1000.00	2.318s
y-88	7346.20	1836.06	13.	-7.	-0.004	138.11	2.354s

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	3.8481E+00				5.31E+01	
			477.60	3.848E+00	?(	1.300E+01 1.01E+02 1.05E+01	G
NA-22	C	-3.2349E-01				9.50E+02	
			1274.53	-3.235E-01	?(	1.741E+00 1.56E+02 9.99E+01	G
K-40	N	2.5903E+02				4.66E+11	
			1460.83	2.590E+02	(P	1.076E+01 4.76E+00 1.07E+01	G
Sc-46	F	-8.3367E-01				8.38E+01	
			889.28	-8.337E-01	?(	2.367E+00 8.51E+01 1.00E+02	G
			1120.55	0.000E+00	+	2.535E+00 1.00E+03 1.00E+02	G
CR-51	F	2.4233E+00				2.77E+01	
			320.08	2.423E+00	&(P	1.683E+01 2.07E+02 9.94E+00	G
MN-54	C	5.3647E-01				3.12E+02	
			834.85	5.365E-01	(P	1.184E+00 9.87E+01 1.00E+02	G
FE-59	F	4.9557E-02				4.45E+01	
			1099.25	4.956E-02	&(P	2.506E+00 2.26E+03 5.65E+01	G
			1291.60	-2.190E+00	+	4.071E+00 8.92E+01 4.32E+01	G
Co-56	C	1.7461E+00				7.73E+01	
			846.77	4.886E-01	?(	9.636E-01 8.78E+01 9.99E+01	G
			1238.28	-1.533E+00	& P	3.454E+00 7.15E+01 6.61E+01	G
			1037.84	1.064E+01	&(	4.135E+00 2.28E+01 1.41E+01	G
			1771.35	0.000E+00	-	1.762E+01 1.00E+03 1.55E+01	A
CO-57	C	1.3450E-01				2.72E+02	
			122.06	-2.598E-01	?(	1.204E+00 1.38E+02 8.56E+01	G
			136.47	3.295E+00	&(	1.644E+01 1.50E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	2.5202E-01					7.09E+01	
			810.78	2.520E-01	?(	1.397E+00	1.61E+02	9.95E+01 G
CO-60	F	2.3720E-01					1.93E+03	
			1332.50	-3.175E-01	?(	1.581E+00	2.32E+02	1.00E+02 G
			1173.24	7.923E-01	(P	1.493E+00	8.74E+01	9.99E+01 G
NB-94	I	6.5031E-01					7.41E+06	
			702.63	6.503E-01	?(	1.867E+00	8.60E+01	9.79E+01 G
			871.10	-4.672E-01	-	1.507E+00	9.56E+01	9.99E+01 G
ZR-95	I	9.4345E-01					6.40E+01	
			756.73	4.990E-01	?(	2.325E+00	2.07E+02	5.45E+01 G
			724.20	1.492E+00	&(	4.211E+00	8.46E+01	4.42E+01 G
NB-95	I	-6.4891E-02					6.40E+01	
			765.79	-6.489E-02	?(	2.083E+00	9.33E+02	9.98E+01 G
RU-103	I	-2.4604E-01					3.93E+01	
			497.05	-2.460E-01	?(	1.199E+00	2.03E+02	9.09E+01 G
			610.30	-2.871E+00	+	5.445E+01	5.63E+02	5.75E+00 GA
RH-106	I	3.5519E+00					3.74E+02	
			621.92	9.838E-02	%(	1.151E+01	4.96E+03	9.93E+00 G
			1050.36	2.553E+01	?(	7.273E+01	8.42E+01	1.56E+00 G
			511.86	-2.158E+00	+	1.152E+01	1.59E+02	2.00E+01 GA
AG-108M	C	1.2450E-01					1.53E+05	
			433.94	1.245E-01	&(	1.092E+00	3.63E+02	9.05E+01 G
			722.94	-8.274E-01	+	2.472E+00	8.96E+01	9.08E+01 G
			614.28	0.000E+00	-	3.482E+00	1.00E+03	8.98E+01 G
AG-110M	F	4.0744E-01					2.50E+02	
			884.68	0.000E+00	&(	2.892E+00	1.00E+03	7.27E+01 G
			657.76	-6.488E-01	+	2.250E+00	1.04E+02	9.46E+01 G
			937.49	-2.806E+00	+ P	5.029E+00	5.10E+01	3.44E+01 G
			1384.30	1.627E+00	?(	3.100E+00	8.56E+01	2.43E+01 G
			763.94	-4.266E+00	+	9.004E+00	6.40E+01	2.23E+01 G
SN-113	F	-4.9955E-01					1.15E+02	
			391.69	-4.996E-01	?(	3.095E+00	1.84E+02	6.40E+01 G
SB-124	F	-6.7334E-01					6.02E+01	
			602.73	-6.733E-01	?(P	3.288E+00	6.28E+01	9.83E+01 G
			1690.98	-2.477E-01	% P	2.003E+00	1.26E+03	4.78E+01 G
			722.79	-6.952E+00	+	2.189E+01	9.43E+01	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	-2.4791E-01					1.01E+03	
			427.88	-1.407E+00	?(	3.710E+00	1.12E+02	2.96E+01 G
			600.50	-3.523E+00	+ P	1.836E+01	6.52E+01	1.79E+01 G
			635.89	-7.904E-01	+	1.099E+01	3.99E+02	1.13E+01 G
			463.37	3.028E+00	(P	1.450E+01	1.42E+02	1.05E+01 G
I-131	I	-3.6144E-01					8.02E+00	
			364.48	-5.117E-01	?(	1.371E+00	1.09E+02	8.17E+01 G
			284.30	1.638E+00	?(	1.467E+01	3.60E+02	6.14E+00 G
			636.97	-4.161E-01	%	1.879E+01	1.29E+03	7.17E+00 G
Ga-68	C	-5.2615E-01					4.71E-02	
			1077.40	-5.261E-01	%(	4.922E+01	4.17E+03	3.30E+00 G
Tc-99m	I	4.1205E-01					2.51E-01	
			140.51	4.121E-01	&(	2.077E+00	1.51E+02	8.93E+01 G
BA-133	F	5.5221E-01					3.85E+03	
			356.00	5.522E-01	&(	3.434E+00	1.86E+02	6.20E+01 G
			302.85	-2.532E+00	+	1.468E+01	1.74E+02	1.83E+01 G
			383.84	-6.535E+00	+ P	2.143E+01	1.10E+02	8.94E+00 GA
			80.99	-1.447E+00	+	1.163E+01	2.43E+02	3.41E+01 GA
CS-134	I	1.0844E+00					7.54E+02	
			604.71	-6.324E-01	&(	3.249E+00	1.54E+02	9.76E+01 G
			795.87	2.559E+00	&(	1.402E+00	1.99E+01	8.55E+01 G
			569.32	-4.164E-01	+	8.518E+00	5.89E+02	1.54E+01 G
			801.95	-6.675E+00	+	2.315E+01	1.03E+02	8.69E+00 G
			563.24	6.051E+00	?(P	1.371E+01	9.88E+01	8.35E+00 G
CS-137	I	3.6564E+00					1.10E+04	
			661.66	3.656E+00	(	9.285E-01	1.43E+01	8.52E+01 G
CE-139	F	4.7110E-01					1.38E+02	
			165.85	4.711E-01	&(	1.502E+00	9.58E+01	7.99E+01 G
Ba-140	I	-1.5119E-01					1.28E+01	
			537.26	-1.512E-01	%(P	4.742E+00	1.83E+03	2.44E+01 G
			162.66	-6.396E+00	&	2.024E+01	9.52E+01	6.22E+00 G
			304.85	-1.088E+01	+	6.223E+01	1.72E+02	4.29E+00 G
La-140	I	-5.6375E-01					1.28E+01	
			1596.21	-5.638E-01	?(P	1.664E+00	2.64E+02	9.54E+01 G
			487.02	-8.789E-01	&	3.774E+00	1.28E+02	4.55E+01 G
			328.76	-2.498E+00	+	1.288E+01	1.55E+02	2.03E+01 G
			815.77	-1.779E-01	% P	6.364E+00	1.40E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-8.0121E-02					3.25E+01	
			145.44	-8.012E-02	(	1.917E+00	9.31E+02	4.82E+01 G
CE-144	I	3.1416E+00					2.85E+02	
			133.54	3.142E+00	(	1.529E+01	1.46E+02	1.11E+01 G
PM-144	C	-7.2832E-01					3.63E+02	
			696.54	-7.283E-01	?(	1.783E+00	7.37E+01	9.90E+01 G
			618.06	-1.285E-02	% P	3.173E+00	4.65E+03	9.91E+01 G
EU-152	F	2.6057E-01					4.94E+03	
			344.29	-1.946E+00	?(	4.994E+00	7.73E+01	2.65E+01 G
			1112.07	-4.475E+00	+	1.937E+01	1.28E+02	1.36E+01 G
			121.78	-1.396E+00	&	3.450E+00	7.46E+01	2.86E+01 G
			778.92	-6.341E+00	& P	1.226E+01	6.77E+01	1.29E+01 G
			964.11	4.264E+00	?(	2.051E+01	1.43E+02	1.46E+01 G
			244.69	-6.154E+00	&	4.067E+01	1.99E+02	7.58E+00 G
			1408.00	-1.220E+00	+ P	5.866E+00	3.15E+02	2.10E+01 GA
EU-154	I	1.9242E+00					3.14E+03	
			873.23	2.266E+00	?(	1.283E+01	1.65E+02	1.23E+01 G
			123.10	8.456E-01	?(	2.497E+00	8.89E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.252E+00	1.00E+03	3.52E+01 G
			723.36	-3.825E-01	-	1.031E+01	7.86E+02	2.02E+01 G
			1004.77	-2.426E+00	&	9.745E+00	1.86E+02	1.80E+01 G
			996.33	5.679E+00	&(	1.703E+01	8.93E+01	1.06E+01 G
EU-155	I	-1.7000E+00					1.81E+03	
			105.31	-1.700E+00	(	1.551E+01	2.75E+02	2.12E+01 G
			86.54	-1.556E+00	+	1.234E+01	2.39E+02	3.07E+01 G
HF-181	F	4.7246E-01					4.24E+01	
			482.00	-2.094E-01	?(	1.990E+00	2.79E+02	8.05E+01 G
			133.02	8.033E-01	&(	3.856E+00	1.44E+02	4.33E+01 G
			345.83	1.014E+00	?(	8.565E+00	2.49E+02	1.51E+01 G
			136.30	6.012E+00	&(	2.962E+01	1.48E+02	5.85E+00 G
Ta-182	F	-5.6912E-01					1.14E+02	
			1121.30	-1.387E+00	(	7.601E+00	1.61E+02	3.49E+01 G
			1221.41	-2.741E+00	+	7.517E+00	1.31E+02	2.70E+01 G
			1189.05	1.192E+00	(	8.908E+00	3.46E+02	1.62E+01 G
Hg-203	F	-1.4224E-01					4.66E+01	
			279.20	-1.422E-01	?(	1.528E+00	3.17E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.2761E+01					6.98E+02	
			583.02	1.276E+01	(	9.334E-01	5.88E+00	8.45E+01 G
			277.28	1.973E+01	+ P	1.182E+01	2.72E+01	6.31E+00 G
			860.56	1.956E+01	+ P	5.523E+00	1.67E+01	1.24E+01 G
pm-146	C	3.6270E-01					2.02E+03	
			747.16	2.805E-01	(P	3.724E+00	5.64E+02	3.40E+01 G
			735.72	-2.020E+00	+	5.765E+00	1.24E+02	2.25E+01 G
			453.88	4.057E-01	(	1.650E+00	1.70E+02	6.50E+01 G
y-88	F	1.3479E-01					1.07E+02	
			898.04	1.348E-01	?(P	1.180E+00	3.76E+02	9.37E+01 G
			1836.06	-4.621E-01	+	1.337E+00	1.38E+02	9.92E+01 G
Cd-113m		-7.1853E+03					5.33E+03	
			263.70	-7.185E+03	(	2.660E+04	1.11E+02	6.00E-03 K
Cf-251	T	-6.7055E-01					3.28E+05	
			176.60	-6.705E-01	&(	6.035E+00	3.51E+02	1.70E+01 G
			227.00	-7.307E+00	+	1.739E+01	9.80E+01	6.30E+00 GA
Cf-249	T	-4.6519E-01					1.28E+05	
			387.95	-8.874E-01	&(	3.029E+00	1.02E+02	6.60E+01 G
			333.44	1.331E+00	&(	1.555E+01	3.48E+02	1.55E+01 G
Sn-126		-5.8448E+00					3.65E+07	
			87.57	-1.268E+00	}	9.660E+00	2.30E+02	3.75E+01 GA
			64.28	-5.845E+00	?(	2.091E+01	1.08E+02	9.70E+00 G
			86.94	-5.273E+00	}	4.108E+01	2.35E+02	9.04E+00 GA
PB-210	N	-3.8049E+00					8.14E+03	
			46.54	-3.805E+00	(	6.399E+01	5.01E+02	4.25E+00 G
PB-212	N	4.2068E+01					6.98E+02	
			238.63	4.207E+01	(P	1.844E+00	3.13E+00	4.33E+01 G
			300.03	3.685E+01	-	2.304E+01	2.15E+01	3.28E+00 GA
PB-214	N	1.8970E+01					5.84E+05	
			351.93	1.807E+01	(P	2.656E+00	8.86E+00	3.76E+01 G
			295.09	2.073E+01	(	3.793E+00	8.37E+00	1.93E+01 G
			242.00	2.922E+01	+	1.318E+01	1.55E+01	7.43E+00 GA
BI-207	C	-1.0068E-01					1.18E+04	
			569.70	-1.007E-01	?(P	1.407E+00	3.99E+02	9.77E+01 G
			1063.66	-1.327E-01	+ P	2.216E+00	7.38E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	3.8405E+01					6.98E+02	
			727.17	3.840E+01	(P	8.802E+00	1.34E+01	7.55E+00 G
			785.42	8.919E+01	+	3.678E+01	2.21E+01	1.28E+00 GA
BI-214	N	1.5247E+01					5.84E+05	
			609.31	1.525E+01	(P	2.005E+00	8.33E+00	4.61E+01 G
			1120.29	2.094E+01	+ P	5.401E+00	1.54E+01	1.51E+01 G
			1764.49	2.733E+01	+ P	5.059E+00	1.33E+01	1.54E+01 G
BI-210M	T	-8.3002E-01					1.10E+09	
			265.83	-8.300E-01	?(	3.111E+00	1.12E+02	5.00E+01 G
			304.90	-1.240E+00	+	9.413E+00	2.27E+02	2.80E+01 G
AC-228	N	3.9027E+01					2.10E+03	
			911.07	3.690E+01	(	2.871E+00	6.74E+00	2.90E+01 G
			968.97	4.069E+01	(P	5.309E+00	9.46E+00	1.75E+01 G
			338.32	4.174E+01	(	6.546E+00	8.88E+00	1.20E+01 G
			93.35	-6.499E+00	-	6.152E+01	2.85E+02	5.56E+00 XA
TH-227	N	-1.5110E-01					7.95E+03	
			50.14	-1.511E-01	%(P	3.006E+01	3.67E+03	8.00E+00 G
			256.24	-7.410E+00	+ P	1.687E+01	1.15E+02	7.00E+00 G
TH-229	N	4.3371E+00					2.68E+06	
			193.51	-3.535E+00	&(	2.473E+01	2.86E+02	4.40E+00 G
			210.85	1.592E+01	?(	3.826E+01	9.91E+01	2.99E+00 G
TH-234	N	2.6418E+01					1.63E+12	
			63.29	2.642E+01	(	2.720E+01	3.23E+01	3.81E+00 G
			92.59	-8.358E+00	&	6.261E+01	2.26E+02	5.58E+00 G
PA-231	N	-1.6105E+01					1.20E+07	
			302.65	-1.611E+01	?(	9.455E+01	1.76E+02	2.88E+00 G
			300.07	-1.871E+01	+	1.127E+02	1.81E+02	2.46E+00 G
PA-233	C	-1.2713E+00					7.82E+08	
			312.01	-1.271E+00	?(	4.906E+00	1.16E+02	3.60E+01 G
			300.18	-7.426E+00	+	4.420E+01	1.79E+02	6.20E+00 G
PA-234	N	1.9216E+00					1.63E+12	
			131.29	1.922E+00	(	9.101E+00	1.42E+02	1.80E+01 G
			946.02	-4.515E+00	+	1.023E+01	1.02E+02	1.34E+01 G
			569.47	0.000E+00	-	1.617E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	2.186E+01	1.00E+03	9.60E+00 G
			880.53	-1.187E+01	+	3.233E+01	8.16E+01	6.00E+00 GA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
PA-234M	N	6.0579E+01						1.63E+12	
			1001.00	-1.471E+00	%(P	2.354E+02	5.60E+03	8.37E-01	G
			766.41	2.372E+02	?(	6.818E+02	8.61E+01	2.94E-01	G
U-235	N	2.6351E+00						2.57E+11	
			143.79	2.498E-01	&(	1.682E+01	2.01E+03	1.10E+01	G
			205.33	7.853E+00	?(P	1.933E+01	1.01E+02	5.01E+00	G
			163.38	-4.775E+00	+	2.567E+01	1.61E+02	5.08E+00	G
AM-241	T	-1.7924E+00						1.58E+05	
			59.54	-1.792E+00	&(P	6.301E+00	5.49E+01	3.59E+01	G
Ir-192	F	2.6716E-01						7.40E+01	
			316.49	-1.909E-01	?(	2.108E+00	3.28E+02	8.70E+01	G
			468.06	1.038E+00	?(	2.991E+00	8.64E+01	5.18E+01	G
			308.44	-8.517E-07	&	8.286E+00	2.90E+08	3.18E+01	G
Cs-136	F	5.1080E-01						1.30E+01	
			818.50	4.328E-01	?(	9.382E-01	9.60E+01	1.00E+02	G
			1048.07	6.082E-01	?(	1.166E+00	5.90E+01	8.00E+01	G
			340.57	-6.176E-07	&	5.258E+00	2.53E+08	4.69E+01	G
Np-239	T	-2.0512E+00						2.36E+00	
			103.70	0.000E+00	+	1.384E+01	1.00E+03	2.40E+01	X
			106.13	-2.051E+00	&(	1.465E+01	2.16E+02	2.27E+01	G
			99.50	0.000E+00	+	2.231E+01	1.00E+03	1.50E+01	X
Nd-147		1.3373E-01						1.11E+01	
			531.00	1.337E-01	%(	7.560E+00	2.30E+03	1.30E+01	G
			91.10	-1.657E+00	+	1.253E+01	2.28E+02	2.83E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	702.	-8.	-0.004	500.75	-3.805E+00	
AM-241	59.54	985.	-42.	-0.024	54.88	-1.792E+00	P
Sn-126	64.28	939.	-41.	-0.023	107.69	-5.845E+00	
BA-133	80.99	5379.	-43.	-0.024	242.51	-1.447E+00	
EU-155	86.54	5293.	-43.	-0.024	239.36	-1.556E+00	
Sn-126	86.94	5104.	-43.	-0.024	235.01	-5.273E+00	
Sn-126	87.57	4888.	-43.	-0.024	229.84	-1.268E+00	
Nd-147	91.10	4845.	-43.	-0.024	228.09	-1.657E+00	
EU-155	105.31	4486.	-34.	-0.019	275.06	-1.700E+00	
Np-239	106.13	4598.	-45.	-0.025	215.50	-2.051E+00	
EU-152	121.78	385.	-38.	-0.021	74.60	-1.396E+00	
EU-154	123.10	410.	33.	0.018	88.86	8.456E-01	
PA-234	131.29	1052.	32.	0.018	142.29	1.922E+00	
HF-181	133.02	1084.	33.	0.018	144.22	8.033E-01	
CE-144	133.54	1117.	33.	0.018	146.28	3.142E+00	
HF-181	136.30	1149.	33.	0.018	148.01	6.012E+00	
Tc-99m	140.51	1213.	33.	0.018	151.44	4.121E-01	
CE-141	145.44	299.	-3.	-0.002	930.91	-8.012E-02	
Ba-140	162.66	494.	-34.	-0.019	95.17	-6.396E+00	
U-235	163.38	528.	-20.	-0.011	160.64	-4.775E+00	
CE-139	165.85	456.	32.	0.018	95.80	4.711E-01	
Cf-251	176.60	304.	-9.	-0.005	351.21	-6.705E-01	
TH-229	193.51	304.	-12.	-0.007	285.94	-3.535E+00	
U-235	205.33	220.	29.	0.016	101.23	7.853E+00	P
TH-229	210.85	300.	35.	0.019	99.14	1.592E+01	
Cf-251	227.00	248.	-32.	-0.018	98.04	-7.307E+00	
EU-152	244.69	1859.	-31.	-0.017	198.72	-6.154E+00	
TH-227	256.24	245.	-33.	-0.018	115.29	-7.410E+00	P
Cd-113m	263.70	438.	-27.	-0.015	110.99	-7.185E+03	
BI-210M	265.83	411.	-26.	-0.014	112.32	-8.300E-01	
Hg-203	279.20	242.	-7.	-0.004	316.55	-1.422E-01	
I-131	284.30	120.	6.	0.003	359.78	1.638E+00	
PA-231	300.07	1130.	-26.	-0.015	180.68	-1.871E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	300.18	1104.	-26.	-0.015	178.58	-7.426E+00	
PA-231	302.65	1077.	-27.	-0.015	176.13	-1.611E+01	
BA-133	302.85	1051.	-27.	-0.015	173.94	-2.532E+00	
Ba-140	304.85	1024.	-27.	-0.015	171.51	-1.088E+01	
BI-210M	304.90	998.	-20.	-0.011	227.30	-1.240E+00	
PA-233	312.01	426.	-26.	-0.014	115.61	-1.271E+00	
Ir-192	316.49	451.	-9.	-0.005	327.83	-1.909E-01	
CR-51	320.08	367.	13.	0.007	206.53	2.423E+00	P
La-140	328.76	883.	-27.	-0.015	154.69	-2.498E+00	
Cf-249	333.44	734.	11.	0.006	348.34	1.331E+00	
EU-152	344.29	204.	-27.	-0.015	77.26	-1.946E+00	
HF-181	345.83	192.	8.	0.004	248.64	1.014E+00	
BA-133	356.00	518.	18.	0.010	185.56	5.522E-01	
I-131	364.48	132.	-21.	-0.012	109.32	-5.117E-01	
BA-133	383.84	374.	-28.	-0.016	109.53	-6.535E+00	P
Cf-249	387.95	402.	-28.	-0.016	102.43	-8.874E-01	
SN-113	391.69	389.	-15.	-0.008	184.44	-4.996E-01	
SB-125	427.88	100.	-19.	-0.010	111.60	-1.407E+00	
AG-108M	433.94	78.	5.	0.003	363.32	1.245E-01	
pm-146	453.88	87.	11.	0.006	170.28	4.057E-01	
SB-125	463.37	175.	13.	0.007	141.94	3.028E+00	P
Ir-192	468.06	179.	23.	0.013	86.43	1.038E+00	
BE-7	477.60	134.	17.	0.009	100.63	3.848E+00	
HF-181	482.00	184.	-7.	-0.004	279.12	-2.094E-01	
La-140	487.02	209.	-16.	-0.009	127.69	-8.789E-01	
RU-103	497.05	78.	-9.	-0.005	203.06	-2.460E-01	
RH-106	511.86	357.	-17.	-0.009	159.04	-2.158E+00	
CS-134	563.24	71.	19.	0.010	98.83	6.051E+00	P
CS-134	569.32	93.	-2.	-0.001	589.19	-4.164E-01	
BI-207	569.70	103.	-4.	-0.002	398.84	-1.007E-01	P
SB-125	600.50	579.	-22.	-0.012	65.17	-3.523E+00	P
SB-124	602.73	558.	-23.	-0.013	62.75	-6.733E-01	P
CS-134	604.71	535.	-22.	-0.012	153.63	-6.324E-01	
RU-103	610.30	514.	-6.	-0.003	562.74	-2.871E+00	
SB-125	635.89	70.	-3.	-0.002	398.61	-7.904E-01	
AG-110M	657.76	206.	-20.	-0.011	103.57	-6.488E-01	
PM-144	696.54	128.	-23.	-0.013	73.72	-7.283E-01	
NB-94	702.63	135.	20.	0.011	85.96	6.503E-01	
SB-124	722.79	222.	-23.	-0.013	94.30	-6.952E+00	
AG-108M	722.94	199.	-23.	-0.013	89.55	-8.274E-01	
EU-154	723.36	170.	-2.	-0.001	786.22	-3.825E-01	
ZR-95	724.20	134.	20.	0.011	84.58	1.492E+00	
pm-146	735.72	61.	-14.	-0.008	123.89	-2.020E+00	
pm-146	747.16	56.	3.	0.002	563.73	2.805E-01	P
ZR-95	756.73	55.	8.	0.004	206.85	4.990E-01	
AG-110M	763.94	144.	-28.	-0.015	63.97	-4.266E+00	
NB-95	765.79	154.	-2.	-0.001	933.26	-6.489E-02	
PA-234M	766.41	143.	20.	0.011	86.08	2.372E+02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	778.92	85.	-24.	-0.013	67.68	-6.341E+00		P
CS-134	795.87	45.	62.	0.034	19.89	2.559E+00		
CS-134	801.95	134.	-16.	-0.009	103.23	-6.675E+00		
CO-58	810.78	60.	7.	0.004	160.99	2.520E-01		
Cs-136	818.50	25.	12.	0.007	96.04	4.328E-01		
MN-54	834.85	40.	15.	0.008	98.69	5.365E-01		P
NB-94	871.10	63.	-12.	-0.007	95.59	-4.672E-01		
EU-154	873.23	69.	7.	0.004	164.77	2.266E+00		
PA-234	880.53	107.	-19.	-0.010	81.60	-1.187E+01		
Sc-46	889.28	160.	-22.	-0.012	85.14	-8.337E-01		
y-88	898.04	31.	3.	0.002	375.68	1.348E-01		P
AG-110M	937.49	75.	-24.	-0.013	51.04	-2.806E+00		P
PA-234	946.02	45.	-15.	-0.008	101.65	-4.515E+00		
EU-152	964.11	229.	15.	0.008	142.88	4.264E+00		
EU-154	996.33	75.	14.	0.008	89.26	5.679E+00		
EU-154	1004.77	69.	-10.	-0.006	185.79	-2.426E+00		
Cs-136	1048.07	16.	11.	0.006	58.99	6.082E-01		
RH-106	1050.36	25.	9.	0.005	84.20	2.553E+01		
BI-207	1063.66	55.	-2.	-0.001	738.19	-1.327E-01		P
EU-152	1112.07	139.	-13.	-0.007	128.16	-4.475E+00		
Ta-182	1121.30	138.	-10.	-0.006	161.48	-1.387E+00		
CO-60	1173.24	37.	17.	0.009	87.44	7.923E-01		P
Ta-182	1189.05	34.	4.	0.002	345.51	1.192E+00		
Ta-182	1221.41	68.	-15.	-0.008	131.49	-2.741E+00		
NA-22	1274.53	45.	-6.	-0.004	155.51	-3.235E-01		
FE-59	1291.60	45.	-18.	-0.010	89.24	-2.190E+00		
CO-60	1332.50	34.	-6.	-0.003	231.54	-3.175E-01		
AG-110M	1384.30	6.	7.	0.004	85.58	1.627E+00		
EU-152	1408.00	18.	-5.	-0.003	314.56	-1.220E+00		P
La-140	1596.21	25.	-9.	-0.005	263.62	-5.638E-01		P
y-88	1836.06	13.	-7.	-0.004	138.11	-4.621E-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	3.8481E+00	3.8481E+00	1.006E+02%	1.30E+01
NA-22	#A	-3.2349E-01	-3.2349E-01	1.555E+02%	1.74E+00
K-40		2.5903E+02	2.5903E+02	4.764E+00%	1.08E+01
Sc-46	#A	-8.3367E-01	-8.3367E-01	8.514E+01%	2.37E+00
CR-51	#A	2.4233E+00	2.4233E+00	2.065E+02%	1.68E+01
MN-54	#A	5.3647E-01	5.3647E-01	9.869E+01%	1.18E+00
FE-59	#A	4.9556E-02	4.9557E-02	2.256E+03%	2.51E+00
Co-56	#	1.7461E+00	1.7461E+00	2.275E+01%	9.64E-01
CO-57	#A	1.3450E-01	1.3450E-01	1.021E+02%	1.20E+00

CO-58	#A	2.5202E-01	2.5202E-01	1.610E+02%	1.40E+00
CO-60	#A	2.3720E-01	2.3720E-01	8.744E+01%	1.58E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.99E+00
NB-94	#A	6.5031E-01	6.5031E-01	8.596E+01%	1.87E+00
ZR-95	#A	9.4344E-01	9.4345E-01	8.458E+01%	2.32E+00
NB-95	#A	-6.4890E-02	-6.4891E-02	9.333E+02%	2.08E+00
RU-103	#A	-2.4604E-01	-2.4604E-01	2.031E+02%	1.20E+00
RH-106	#A	3.5519E+00	3.5519E+00	8.420E+01%	1.15E+01
AG-108M	#A	1.2450E-01	1.2450E-01	3.633E+02%	1.09E+00
AG-110M	#A	4.0744E-01	4.0744E-01	8.558E+01%	2.89E+00
SN-113	#A	-4.9955E-01	-4.9955E-01	1.844E+02%	3.10E+00
SB-124	#A	-6.7333E-01	-6.7334E-01	6.275E+01%	3.29E+00
SB-125	#A	-2.4791E-01	-2.4791E-01	9.028E+01%	3.71E+00
I-131	#A	-3.6144E-01	-3.6144E-01	1.093E+02%	1.37E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.12E+01
Ga-68	#A	-5.2400E-01	-5.2615E-01	4.170E+03%	4.92E+01
Tc-99m	#A	4.1174E-01	4.1205E-01	1.514E+02%	2.08E+00
BA-133	#A	5.5221E-01	5.5221E-01	1.856E+02%	3.43E+00
CS-134	#A	1.0844E+00	1.0844E+00	1.989E+01%	3.25E+00
CS-137		3.6564E+00	3.6564E+00	1.434E+01%	9.29E-01
CE-139	#A	4.7110E-01	4.7110E-01	9.580E+01%	1.50E+00
Ba-140	#A	-1.5119E-01	-1.5119E-01	1.834E+03%	4.74E+00
La-140	#A	-5.6375E-01	-5.6375E-01	2.636E+02%	1.66E+00
CE-141	#A	-8.0121E-02	-8.0121E-02	9.309E+02%	1.92E+00
CE-144	#A	3.1415E+00	3.1416E+00	1.463E+02%	1.53E+01
PM-144	#A	-7.2832E-01	-7.2832E-01	7.372E+01%	1.78E+00
EU-152	#A	2.6057E-01	2.6057E-01	7.726E+01%	4.99E+00
EU-154	#A	1.9242E+00	1.9242E+00	6.913E+01%	1.28E+01
EU-155	#A	-1.7000E+00	-1.7000E+00	2.751E+02%	1.55E+01
HF-181	#A	4.7245E-01	4.7246E-01	1.068E+02%	1.99E+00
Ta-182	#A	-5.6912E-01	-5.6912E-01	1.615E+02%	7.60E+00
Hg-203	#A	-1.4224E-01	-1.4224E-01	3.166E+02%	1.53E+00
TL-208		1.2761E+01	1.2761E+01	5.885E+00%	9.33E-01
pm-146	#A	3.6270E-01	3.6270E-01	1.703E+02%	3.72E+00
y-88	#A	1.3479E-01	1.3479E-01	3.757E+02%	1.18E+00
Cd-113m	#A	-7.1853E+03	-7.1853E+03	1.110E+02%	2.66E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.70E+01
Cf-251	#A	-6.7055E-01	-6.7055E-01	3.512E+02%	6.04E+00
Cf-249	#A	-4.6519E-01	-4.6519E-01	1.024E+02%	3.03E+00
Sn-126	#A	-5.8448E+00	-5.8448E+00	1.077E+02%	2.09E+01
PB-210	#A	-3.8049E+00	-3.8049E+00	5.008E+02%	6.40E+01
PB-212		4.2068E+01	4.2068E+01	3.127E+00%	1.84E+00
PB-214		1.8970E+01	1.8970E+01	6.092E+00%	2.66E+00
BI-207	#A	-1.0068E-01	-1.0068E-01	3.988E+02%	1.41E+00
BI-212		3.8405E+01	3.8405E+01	1.338E+01%	8.80E+00
BI-214		1.5247E+01	1.5247E+01	8.327E+00%	2.00E+00
BI-210M	#A	-8.3002E-01	-8.3002E-01	1.123E+02%	3.11E+00
AC-228		3.9027E+01	3.9027E+01	4.874E+00%	2.87E+00
TH-227	#A	-1.5110E-01	-1.5110E-01	3.670E+03%	3.01E+01

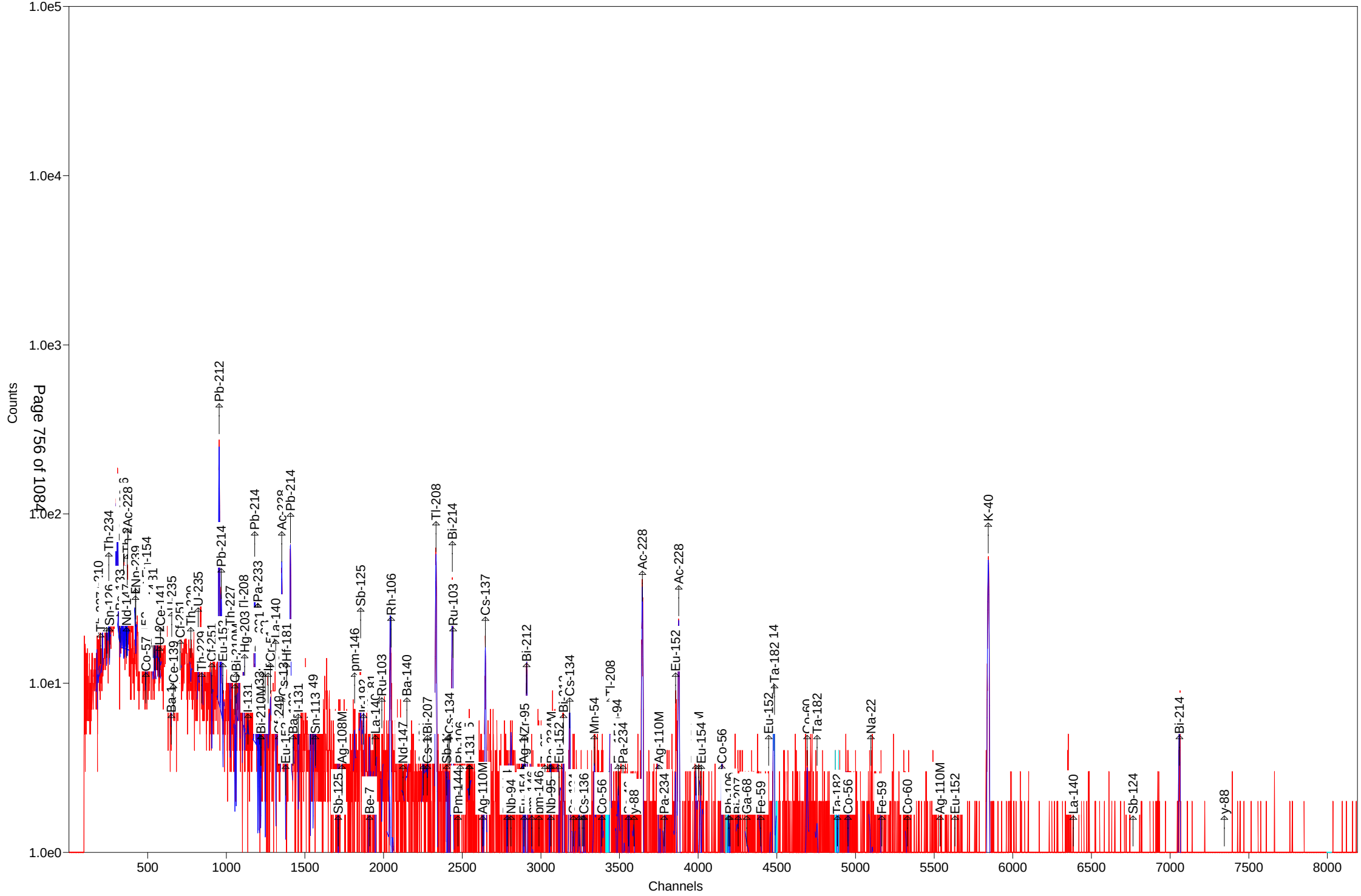
TH-229 #A	4.3371E+00	4.3371E+00	9.914E+01%		2.47E+01
TH-234 A	2.6418E+01	2.6418E+01	3.234E+01%		2.72E+01
PA-231 #A	-1.6105E+01	-1.6105E+01	1.761E+02%		9.45E+01
PA-233 #A	-1.2713E+00	-1.2713E+00	1.156E+02%		4.91E+00
PA-234 #A	1.9216E+00	1.9216E+00	1.423E+02%		9.10E+00
PA-234M#A	6.0579E+01	6.0579E+01	8.608E+01%		2.35E+02
U-235 #A	2.6351E+00	2.6351E+00	1.012E+02%		1.68E+01
AM-241 #A	-1.7924E+00	-1.7924E+00	5.488E+01%		6.30E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.91E+01
Ir-192 #A	2.6716E-01	2.6716E-01	8.643E+01%		2.11E+00
Cs-136 #A	5.1079E-01	5.1080E-01	5.636E+01%		9.38E-01
Np-239 #A	-2.0510E+00	-2.0512E+00	2.155E+02%		1.47E+01
Nd-147 #A	1.3373E-01	1.3373E-01	2.301E+03%		7.56E+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 1999.3 keV) 4.556E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 4.5558383E+02 Bq/Sample

265170_Gamma_160-18567-A-16-B. 9_Gamma_20161633.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20161117

Sample Description: 265170_Gamma_160-18567-A-17-B
Detector: Detector #15
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-17-B

Decay to Time: 9/7/2016 18:33 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:33:49 Real Time: 1802 sec
Analysis Time: 9/7/2016 19:04 Dead Time: 0.13 %
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_2016-09-03_2257.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	3.465E+00	109.6	3.797E+00	3.802E+00	1.291E+01
NA-22	1.352E+00	25.0	3.380E-01	3.447E-01	6.227E-01
K-40	1.928E+02	9.0	1.741E+01	2.002E+01	2.603E+01
Sc-46	8.016E-02	75.1	6.019E-02	6.033E-02	2.547E+00
CR-51	5.134E+00	176.7	9.074E+00	9.079E+00	3.038E+01
MN-54	3.094E-01	199.5	6.172E-01	6.174E-01	1.487E+00
FE-59	-2.721E-01	438.3	1.192E+00	1.192E+00	2.808E+00
Co-56	1.059E+00	31.3	3.310E-01	3.354E-01	1.359E+00
CO-57	9.670E-02	338.5	3.273E-01	3.274E-01	1.116E+00
CO-58	7.747E-01	27.2	2.109E-01	2.146E-01	4.230E-01
CO-60	-1.353E+00	69.9	9.463E-01	9.487E-01	2.365E+00
ZN-65	1.322E+00	131.5	1.738E+00	1.740E+00	5.941E+00
NB-94	-7.765E-01	40.0	3.103E-01	3.129E-01	1.701E+00
ZR-95	-6.592E-01	185.9	1.226E+00	1.226E+00	2.901E+00
NB-95	5.996E-01	88.6	5.312E-01	5.322E-01	1.794E+00
RU-103	-5.853E-01	84.3	4.936E-01	4.945E-01	1.464E+00
RH-106	-2.987E+00	94.3	2.817E+00	2.821E+00	3.566E+01
AG-108M	1.975E-01	214.8	4.241E-01	4.242E-01	1.229E+00
AG-110M	6.958E-01	35.4	2.460E-01	2.486E-01	3.197E+00
SN-113	-4.136E-01	201.3	8.324E-01	8.327E-01	2.836E+00
SB-124	-3.118E-04	52.5	1.636E-04	1.644E-04	3.625E+00
SB-125	2.575E+00	49.6	1.277E+00	1.284E+00	3.312E+00
I-131	1.799E-01	122.9	2.211E-01	2.213E-01	1.366E+00
Gd-153	-1.362E+00	187.7	2.555E+00	2.557E+00	8.509E+00
Ga-68	2.256E+01	86.6	1.954E+01	1.958E+01	4.512E+01
Tc-99m	1.330E-07	516585580.6	6.871E-01	6.871E-01	2.311E+00
BA-133	-8.228E-01	148.8	1.224E+00	1.225E+00	4.110E+00
CS-134	3.627E-01	28.9	1.050E-01	1.066E-01	3.560E+00
CS-137	2.993E+00	17.7	5.297E-01	5.522E-01	9.852E-01
CE-139	2.460E-01	174.8	4.300E-01	4.306E-01	1.453E+00
Ba-140	1.289E-01	367.1	4.730E-01	4.730E-01	5.313E+00
La-140	1.151E+00	26.8	3.089E-01	3.148E-01	2.012E+00
CE-141	7.076E-01	93.1	6.589E-01	6.599E-01	2.200E+00

CE-144	-3.530E+00	78.2	2.762E+00	2.768E+00	1.722E+01
PM-144	-9.173E-01	33.0	3.023E-01	3.060E-01	1.845E+00
EU-152	5.313E-01	92.3	4.906E-01	4.914E-01	9.154E+00
EU-154	4.702E+00	82.6	3.882E+00	3.890E+00	1.561E+01
EU-155	1.909E+00	177.5	3.390E+00	3.392E+00	1.129E+01
HF-181	4.713E-01	114.9	5.414E-01	5.419E-01	1.840E+00
Ta-182	1.921E+00	107.8	2.070E+00	2.073E+00	8.589E+00
Hg-203	3.446E-01	126.0	4.341E-01	4.345E-01	1.471E+00
TL-208	5.586E+00	12.9	7.190E-01	7.752E-01	1.115E+00
pm-146	-3.134E-01	565.7	1.773E+00	1.773E+00	4.288E+00
y-88	3.613E-01	136.5	4.932E-01	4.935E-01	1.187E+00
Cd-113m	-2.312E+03	214.7	4.964E+03	4.967E+03	1.710E+04
Cd-109	0.000E+00	1.#INF	2.048E+01	2.048E+01	6.817E+01
Cf-251	7.732E-01	254.2	1.966E+00	1.967E+00	5.120E+00
Cf-249	8.903E-01	103.3	9.196E-01	9.207E-01	2.260E+00
Sn-126	3.640E+00	160.3	5.834E+00	5.837E+00	1.955E+01
PB-210	3.037E+01	40.4	1.226E+01	1.239E+01	3.143E+01
PB-212	1.935E+01	5.6	1.085E+00	1.657E+00	1.648E+00
PB-214	1.449E+01	9.1	1.320E+00	1.520E+00	3.122E+00
BI-207	3.553E-01	93.1	3.308E-01	3.313E-01	1.128E+00
BI-212	9.655E+00	82.4	7.956E+00	7.971E+00	2.667E+01
BI-214	1.114E+01	12.6	1.400E+00	1.515E+00	2.284E+00
BI-210M	-6.668E-01	112.7	7.516E-01	7.526E-01	2.534E+00
AC-228	2.254E+01	8.9	2.016E+00	2.321E+00	2.978E+00
TH-227	-1.176E+00	75.2	8.841E-01	8.865E-01	2.559E+01
TH-229	-3.611E+00	232.6	8.401E+00	8.406E+00	2.183E+01
TH-234	3.278E+00	191.7	6.285E+00	6.287E+00	4.762E+01
PA-231	-1.860E+01	151.2	2.812E+01	2.814E+01	9.411E+01
PA-233	-1.533E+00	162.5	2.493E+00	2.494E+00	8.337E+00
PA-234	-2.153E+00	77.9	1.677E+00	1.681E+00	1.019E+01
PA-234M	-7.564E-02	732.5	5.541E-01	5.541E-01	2.853E+02
U-235	-4.427E+00	66.6	2.948E+00	2.957E+00	1.743E+01
AM-241	-4.062E-01	410.9	1.669E+00	1.669E+00	5.631E+00
Np-237	0.000E+00	1.#INF	6.565E+00	6.566E+00	2.184E+01
Ir-192	-6.564E-02	95.9	6.293E-02	6.305E-02	3.548E+00
Cs-136	-4.501E-01	145.3	6.540E-01	6.545E-01	2.245E+00
Np-239	1.811E+00	176.7	3.199E+00	3.201E+00	1.065E+01
Nd-147	-9.264E-01	428.8	3.973E+00	3.973E+00	9.823E+00
Total	3.729E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-17-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20161117.An1

Acquisition information
Start time: 9/7/2016 6:33:49 PM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
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	9/7/2016 6:33:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2016-09-03_2257.PBC 9/3/2016 10:57:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1402

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.73	45.	40.38	1.19	1.957E-02	46.54	4.250	PBC<MDA	PB210
63.26	9.	312.48	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
64.25	19.	160.28	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.87	173.	12.68	0.97	3.384E-02				
77.26	302.	8.25	0.97	3.457E-02				
87.24	87.	20.88	0.98	3.691E-02	86.49	13.100	9.993E+00	Np237
					86.54	30.700	4.263E+00	EU155
					86.94	9.040	1.445E+01	Sn126
					87.57	37.500	3.472E+00	Sn126
					88.04	3.790	3.428E+01	Cd109
90.06	35.	41.93	0.99	3.738E-02				
92.59	9.	222.26	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
105.31	28.	177.54	1.00	3.876E-02	105.31	21.200	PBC<MDA	EU155
106.13	29.	176.68	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
121.78	20.	92.33	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.420E-01	CO57
122.06	6.	338.49	1.02	3.846E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	9.670E-02	CO57
145.44	22.	93.13	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
162.66	6.	367.05	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
165.85	12.	174.80	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
176.60	8.	254.21	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	6.	256.50	1.09	2.900E-02	205.33	5.010	PBC<MDA	U235
238.71	371.	6.47	1.08	2.591E-02	238.63	43.300	1.835E+01	PB212
242.10	90.	16.30	1.12	2.565E-02	242.00	7.430	2.638E+01	PB214
256.24	15.	94.31	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
277.28	16.	89.41	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
279.20	12.	125.95	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
295.29	100.	13.80	1.13	2.204E-02	295.09	19.300	1.310E+01	PB214
299.84	50.	29.14	1.04	2.177E-02	300.03	3.280	3.897E+01	PB212
					300.07	2.460	5.197E+01	PA231
					300.18	6.200	PBC<MDA	PA233
320.08	19.	176.74	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
328.76	14.	168.90	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140
333.44	11.	231.80	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
338.63	100.	13.89	1.32	1.982E-02	338.32	12.010	2.319E+01	AC228
351.96	198.	11.90	1.01	1.923E-02	351.93	37.600	1.520E+01	PB214
383.84	12.	118.92	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
387.95	14.	103.29	1.25	1.781E-02	387.95	66.000	PBC<MDA	Cf249
427.88	13.	92.24	1.28	1.647E-02	427.88	29.600	PBC<MDA	SB125
433.94	6.	217.86	1.29	1.629E-02	433.94	90.480	PBC<MDA	AG108M
463.37	14.	90.01	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	13.	97.85	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
477.60	10.	109.59	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
482.00	10.	114.86	1.33	1.497E-02	482.00	80.500	PBC<MDA	HF181
511.86	51.	52.64	2.60	1.426E-02	511.86	20.000	9.935E+00	RH106
563.24	4.	267.96	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	126.93	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.110E+00	PA234
					569.70	97.740	2.610E-01	BI207
569.70	8.	93.12	1.40	1.307E-02	569.32	15.380	2.257E+00	CS134
					569.47	8.200	4.233E+00	PA234
					569.70	97.740	3.553E-01	BI207
583.12	108.	12.87	1.37	1.282E-02	583.02	84.500	5.556E+00	TL208
609.42	114.	12.57	0.77	1.236E-02	609.31	46.090	1.114E+01	BI214
					610.30	5.750	8.941E+01	RU103
635.89	9.	74.26	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
636.97	5.	122.89	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
657.76	9.	141.18	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
662.05	53.	17.70	1.50	1.155E-02	661.66	85.210	2.993E+00	CS137
722.79	13.	82.17	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.377E-01	AG108M
					723.36	20.220	3.316E+00	EU154
722.94	3.	370.22	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.750E-01	AG108M
					723.36	20.220	7.864E-01	EU154
726.73	14.	82.40	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
765.79	11.	88.61	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.036E+02	PA234M
766.41	1.	943.40	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	1.851E+01	PA234M
795.87	13.	28.94	1.57	9.887E-03	795.87	85.530	8.507E-01	CS134
801.95	5.	128.38	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
810.78	13.	27.22	1.59	9.733E-03	810.78	99.460	7.747E-01	CO58
815.77	28.	26.84	1.59	9.682E-03	815.77	23.280	6.779E+00	La140
834.85	5.	199.50	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
873.23	11.	82.56	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
898.04	5.	136.49	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
911.37	102.	11.17	1.32	8.811E-03	911.07	29.000	2.227E+01	AC228
937.49	7.	137.09	1.68	8.598E-03	937.49	34.360	PBC<MDA	AG110M
969.06	14.	88.62	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	165.86	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1004.77	5.	201.66	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1050.36	6.	127.71	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	9.	86.58	1.77	7.623E-03	1077.40	3.300	PBC<MDA	Ga68
1115.76	9.	131.50	1.80	7.395E-03	1115.55	50.600	PBC<MDA	ZN65
1120.50	8.	116.54	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	11.	98.02	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.191E-01	Sc46
					1121.30	34.900	2.348E+00	Ta182
1121.30	11.	107.76	1.80	7.362E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.194E-01	Sc46
					1121.30	34.900	2.349E+00	Ta182
1173.24	11.	89.42	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	5.	236.19	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	23.	31.27	1.88	6.748E-03	1238.28	66.070	2.824E+00	Co56
1274.53	16.	25.00	1.90	6.579E-03	1274.53	99.940	1.352E+00	NA22
					1274.54	35.190	3.840E+00	EU154
1384.30	8.	35.36	1.97	6.114E-03	1384.30	24.290	2.993E+00	AG110M
1461.09	245.	6.49	1.68	5.827E-03	1460.83	10.670	2.190E+02	K40
1764.52	22.	22.84	2.18	4.916E-03	1764.49	15.400	1.634E+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
299.10	74.91	153.	173.	5.110E+03	12.68	0.972	- D
308.62	77.30	160.	302.	8.742E+03	8.25	0.975	- sD
359.54	89.99	114.	37.	9.918E+02	43.85	0.986	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.61	46.73	91.	45.	0.025	40.38	1.191s
TH-227	200.23	50.14	280.	-21.	-0.011	117.07	0.950s
AM-241	237.79	59.54	432.	-7.	-0.004	410.93	0.958s
TH-234	252.78	63.29	396.	9.	0.005	312.48	0.962s
Sn-126	256.75	64.28	448.	19.	0.010	160.28	0.963s
BA-133	323.54	80.99	1155.	-32.	-0.018	69.24	0.978s
Np-237	345.53	86.49	1606.	0.	0.000	186.36	0.983A
EU-155	345.74	86.54	1434.	-29.	-0.016	183.19	0.983s
Sn-126	347.33	86.94	1355.	14.	0.008	144.92	0.984D
Sn-126	349.84	87.57	1247.	48.	0.027	39.40	0.984D
Cd-109	351.72	88.04	1325.	0.	0.000	175.93	0.985A
Nd-147	363.95	91.10	1274.	-30.	-0.016	172.05	0.987D
TH-234	369.91	92.59	202.	9.	0.005	222.26	0.989D
AC-228	372.95	93.35	1353.	-30.	-0.016	176.84	0.990
Gd-153	389.54	97.50	1382.	-28.	-0.016	187.66	0.993s
Np-239	397.53	99.50	1410.	0.	0.000	1000.00	0.995s
Gd-153	412.32	103.20	1410.	0.	0.000	1000.00	0.998s
Np-239	414.32	103.70	1410.	0.	0.000	1000.00	0.999s
EU-155	420.77	105.31	1243.	28.	0.016	177.54	1.001s
Np-239	424.03	106.13	1270.	29.	0.016	176.68	1.001s
EU-152	486.57	121.78	165.	20.	0.011	92.33	1.016s
CO-57	487.72	122.06	185.	6.	0.003	338.49	1.016s
EU-154	491.87	123.10	188.	-11.	-0.006	178.84	1.017s
PA-234	524.63	131.29	685.	-26.	-0.015	77.90	1.024s
HF-181	531.54	133.02	710.	-27.	-0.015	77.70	1.026s
CE-144	533.60	133.54	735.	-26.	-0.015	78.25	1.026s
HF-181	544.63	136.30	759.	-18.	-0.010	220.69	1.029s
U-235	574.56	143.79	690.	-32.	-0.018	66.60	1.036s
CE-141	581.17	145.44	203.	22.	0.012	93.13	1.037s
Ba-140	650.01	162.66	235.	6.	0.003	367.05	1.053s
U-235	652.88	163.38	216.	-11.	-0.006	194.27	1.053s
CE-139	662.77	165.85	214.	12.	0.007	174.80	1.055
Cf-251	705.73	176.60	106.	8.	0.004	254.21	1.065s
TH-229	773.33	193.51	114.	-9.	-0.005	232.64	1.080s
U-235	820.60	205.33	78.	6.	0.004	256.50	1.091s
TH-229	842.65	210.85	159.	-14.	-0.008	122.45	1.096s
Cf-251	907.22	227.00	92.	-9.	-0.005	209.45	1.110
PB-212	953.72	238.63	43.	391.	0.217	5.61	1.120D
PB-214	967.17	242.00	64.	90.	0.050	16.30	1.123D
EU-152	977.95	244.69	659.	-15.	-0.008	147.10	1.126s
TH-227	1024.12	256.24	55.	15.	0.008	94.31	1.136s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1053.94	263.70	80.	-6.	-0.003	214.73	1.142s
BI-210M	1062.46	265.83	123.	-14.	-0.008	112.71	1.144s
TL-208	1108.25	277.28	91.	16.	0.009	89.41	1.154
Hg-203	1115.91	279.20	101.	12.	0.006	125.95	1.156s
I-131	1136.30	284.30	100.	-20.	-0.011	99.64	1.160s
PB-214	1180.22	295.29	31.	100.	0.056	13.80	1.125
PB-212	1198.42	299.84	38.	50.	0.028	29.14	1.045
PA-231	1199.35	300.07	528.	-21.	-0.012	157.75	1.174
PA-233	1199.79	300.18	507.	-21.	-0.012	154.65	1.174
PA-231	1209.66	302.65	486.	-21.	-0.012	151.23	1.176s
BA-133	1210.47	302.85	488.	-21.	-0.012	151.44	1.176s
Ba-140	1218.46	304.85	509.	-21.	-0.012	154.35	1.178s
BI-210M	1218.64	304.90	530.	-21.	-0.012	157.40	1.178s
Ir-192	1232.81	308.44	550.	-21.	-0.012	160.00	1.181
PA-233	1247.09	312.01	571.	-21.	-0.012	162.55	1.184s
Ir-192	1265.00	316.49	592.	-21.	-0.012	164.92	1.188s
CR-51	1279.37	320.08	555.	19.	0.011	176.74	1.191s
La-140	1314.06	328.76	290.	14.	0.008	168.90	1.199s
Cf-249	1332.77	333.44	304.	11.	0.006	231.80	1.203s
AC-228	1353.53	338.63	23.	99.	0.055	13.97	1.319s
Cs-136	1361.28	340.57	315.	0.	0.000	1000.00	1.209s
EU-152	1376.13	344.29	315.	0.	0.000	1000.00	1.212s
HF-181	1382.30	345.83	355.	-16.	-0.009	165.02	1.213s
PB-214	1406.81	351.96	66.	198.	0.110	11.90	1.008
BA-133	1422.97	356.00	331.	-18.	-0.010	148.82	1.222s
I-131	1456.89	364.48	56.	-2.	-0.001	735.98	1.229s
BA-133	1534.29	383.84	98.	12.	0.007	118.92	1.246s
Cf-249	1550.72	387.95	94.	14.	0.008	103.29	1.249s
SN-113	1565.67	391.69	139.	-8.	-0.005	201.27	1.253s
SB-125	1710.36	427.88	32.	13.	0.007	92.24	1.283s
AG-108M	1734.60	433.94	41.	6.	0.003	217.86	1.288s
pm-146	1814.35	453.88	44.	-11.	-0.006	116.14	1.304s
SB-125	1852.29	463.37	69.	14.	0.008	90.01	1.312s
Ir-192	1871.05	468.06	74.	13.	0.007	97.85	1.316s
BE-7	1909.18	477.60	54.	10.	0.005	109.59	1.324
HF-181	1926.79	482.00	64.	10.	0.006	114.86	1.328s
La-140	1946.87	487.02	117.	-14.	-0.008	113.19	1.332s
RU-103	1987.00	497.05	48.	-14.	-0.008	84.34	1.340s
RH-106	2046.22	511.86	98.	51.	0.028	52.64	2.602
Nd-147	2122.75	531.00	39.	-3.	-0.002	428.82	1.368s
Ba-140	2147.78	537.26	39.	-1.	-0.001	822.64	1.373s
CS-134	2251.67	563.24	22.	4.	0.002	267.96	1.394s
CS-134	2276.00	569.32	26.	6.	0.003	126.93	1.399
PA-234	2276.59	569.47	38.	-4.	-0.002	198.14	1.399
BI-207	2277.52	569.70	25.	8.	0.005	93.12	1.399
TL-208	2331.17	583.12	17.	108.	0.060	12.87	1.366
SB-125	2400.69	600.50	290.	-15.	-0.008	164.15	1.424s
SB-124	2409.62	602.73	275.	-15.	-0.008	65.29	1.425s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2417.53	604.71	260.	-15.	-0.008	155.36	1.427s
BI-214	2436.39	609.42	20.	114.	0.063	12.57	0.772s
RU-103	2439.88	610.30	245.	-5.	-0.003	452.94	1.431s
AG-108M	2455.81	614.28	240.	0.	0.000	1000.00	1.435s
PM-144	2470.93	618.06	258.	-17.	-0.009	139.13	1.437s
RH-106	2486.35	621.92	257.	-17.	-0.009	138.83	1.440s
SB-125	2542.23	635.89	17.	9.	0.005	74.26	1.451s
I-131	2546.57	636.97	14.	5.	0.003	122.89	1.452
AG-110M	2629.71	657.76	74.	9.	0.005	141.18	1.469s
CS-137	2646.87	662.05	10.	53.	0.029	17.70	1.504
PM-144	2784.82	696.54	52.	-18.	-0.010	32.95	1.499s
NB-94	2809.17	702.63	42.	-15.	-0.008	39.96	1.503s
SB-124	2889.79	722.79	50.	13.	0.007	82.17	1.519s
AG-108M	2890.40	722.94	63.	3.	0.002	370.22	1.519s
EU-154	2892.07	723.36	66.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	127.	-23.	-0.013	72.19	1.520s
BI-212	2907.33	727.17	60.	14.	0.008	82.40	1.522s
pm-146	2987.29	747.16	28.	-2.	-0.001	565.69	1.537s
ZR-95	3025.56	756.73	33.	-7.	-0.004	185.94	1.544s
AG-110M	3054.42	763.94	48.	-5.	-0.003	201.00	1.550s
NB-95	3061.80	765.79	42.	11.	0.006	88.61	1.551s
PA-234M	3064.30	766.41	44.	1.	0.001	943.40	1.552s
EU-152	3114.33	778.92	28.	-11.	-0.006	106.41	1.561s
CS-134	3182.12	795.87	0.	13.	0.007	28.94	1.574s
CS-134	3206.46	801.95	22.	5.	0.003	128.38	1.578s
CO-58	3241.75	810.78	0.	13.	0.007	27.22	1.585s
La-140	3261.74	815.77	13.	28.	0.015	26.84	1.589s
Cs-136	3272.66	818.50	61.	-8.	-0.004	145.30	1.591s
MN-54	3338.05	834.85	24.	5.	0.003	199.50	1.603s
Co-56	3385.75	846.77	19.	-2.	-0.001	577.31	1.612s
TL-208	3440.93	860.56	37.	-1.	-0.001	975.96	1.622
NB-94	3483.06	871.10	43.	-12.	-0.007	81.57	1.629s
EU-154	3491.60	873.23	38.	11.	0.006	82.56	1.631s
PA-234	3520.80	880.53	53.	-3.	-0.002	314.64	1.636s
PA-234	3531.64	883.24	57.	0.	0.000	1000.00	1.638s
AG-110M	3537.42	884.68	57.	0.	0.000	1000.00	1.639s
Sc-46	3555.81	889.28	68.	-11.	-0.006	113.79	1.642s
y-88	3590.85	898.04	11.	5.	0.003	136.49	1.649s
AC-228	3644.17	911.37	6.	102.	0.057	11.17	1.315
AG-110M	3748.69	937.49	15.	7.	0.004	137.09	1.677s
PA-234	3782.81	946.02	30.	-7.	-0.004	176.13	1.683s
EU-152	3855.18	964.11	117.	-25.	-0.014	64.33	1.696s
AC-228	3874.63	968.97	75.	14.	0.008	88.62	1.699s
EU-154	3984.09	996.33	41.	6.	0.003	165.86	1.718s
EU-154	4017.88	1004.77	20.	5.	0.003	201.66	1.724s
Co-56	4150.18	1037.84	20.	-7.	-0.004	145.45	1.747s
Cs-136	4191.11	1048.07	25.	-5.	-0.003	140.31	1.754s
RH-106	4200.27	1050.36	25.	6.	0.003	127.71	1.755s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	4253.49	1063.66	30.	-12.	-0.007	104.42	1.765s
Ga-68	4308.47	1077.40	10.	9.	0.005	86.58	1.774s
FE-59	4395.90	1099.25	16.	-2.	-0.001	438.25	1.789s
EU-152	4447.22	1112.07	75.	-2.	-0.001	606.79	1.797s
ZN-65	4461.11	1115.55	64.	9.	0.005	131.50	1.800s
BI-214	4480.08	1120.29	43.	8.	0.005	116.54	1.803
Sc-46	4481.13	1120.55	51.	11.	0.006	98.02	1.803
Ta-182	4484.13	1121.30	63.	11.	0.006	107.76	1.803s
CO-60	4691.97	1173.24	16.	11.	0.006	89.42	1.838s
Ta-182	4755.25	1189.05	22.	-3.	-0.002	354.62	1.848s
Ta-182	4884.75	1221.41	21.	5.	0.003	236.19	1.869
Co-56	4952.26	1238.28	5.	23.	0.013	31.27	1.879s
NA-22	5097.34	1274.53	0.	16.	0.009	25.00	1.902s
EU-154	5097.40	1274.54	16.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	16.	-1.	-0.001	914.69	1.913s
CO-60	5329.36	1332.50	27.	-15.	-0.009	69.92	1.938s
AG-110M	5536.68	1384.30	0.	8.	0.004	35.36	1.970s
EU-152	5631.56	1408.00	17.	-3.	-0.002	327.45	1.984s
K-40	5843.03	1460.83	32.	216.	0.120	9.03	2.015s
La-140	6384.98	1596.21	12.	-4.	-0.002	538.07	2.092s
SB-124	6764.43	1690.98	0.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	2.	22.	0.012	22.84	2.181s
Co-56	7086.23	1771.35	24.	0.	0.000	1000.00	2.184s

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	3.4650E+00					5.31E+01
			477.60	3.465E+00	(P	1.291E+01	1.10E+02 1.05E+01 G
NA-22	C	1.3519E+00					9.50E+02
			1274.53	1.352E+00	?(	6.227E-01	2.50E+01 9.99E+01 G
K-40	N	1.9283E+02					4.66E+11
			1460.83	1.928E+02	?(P	2.603E+01	9.03E+00 1.07E+01 G
Sc-46	F	8.0157E-02					8.38E+01
			889.28	-6.588E-01	?(	2.547E+00	1.14E+02 1.00E+02 G
			1120.55	8.191E-01	?(	2.720E+00	9.80E+01 1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	5.1343E+00					2.77E+01	
			320.08	5.134E+00	?(P	3.038E+01	1.77E+02	9.94E+00 G
MN-54	C	3.0935E-01					3.12E+02	
			834.85	3.094E-01	?(P	1.487E+00	2.00E+02	1.00E+02 G
FE-59	F	-2.7205E-01					4.45E+01	
			1099.25	-2.721E-01	?(P	2.808E+00	4.38E+02	5.65E+01 G
			1291.60	-1.978E-01	+	4.223E+00	9.15E+02	4.32E+01 G
Co-56	C	1.0587E+00					7.73E+01	
			846.77	-1.086E-01	?(P	1.359E+00	5.77E+02	9.99E+01 G
			1238.28	2.824E+00	?(	1.679E+00	3.13E+01	6.61E+01 G
			1037.84	-3.495E+00	+	1.176E+01	1.45E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.871E+01	1.00E+03	1.55E+01 A
CO-57	C	9.6703E-02					2.72E+02	
			122.06	9.670E-02	?(	1.116E+00	3.38E+02	8.56E+01 G
			136.47	-1.066E-06	&	1.852E+01	5.17E+08	1.07E+01 G
CO-58	C	7.7468E-01					7.09E+01	
			810.78	7.747E-01	?(	4.230E-01	2.72E+01	9.95E+01 G
CO-60	F	-1.3533E+00					1.93E+03	
			1332.50	-1.353E+00	?(P	2.365E+00	6.99E+01	1.00E+02 G
			1173.24	8.527E-01	+ P	1.688E+00	8.94E+01	9.99E+01 G
ZN-65	F	1.3219E+00					2.44E+02	
			1115.55	1.322E+00	?(	5.941E+00	1.32E+02	5.06E+01 G
NB-94	I	-7.7649E-01					7.41E+06	
			702.63	-7.765E-01	?(P	1.701E+00	4.00E+01	9.79E+01 G
			871.10	-7.390E-01	+	2.024E+00	8.16E+01	9.99E+01 G
ZR-95	I	-6.5917E-01					6.40E+01	
			756.73	-6.592E-01	?(	2.901E+00	1.86E+02	5.45E+01 G
			724.20	-2.707E+00	&	6.483E+00	7.22E+01	4.42E+01 G
NB-95	I	5.9956E-01					6.40E+01	
			765.79	5.996E-01	?(	1.794E+00	8.86E+01	9.98E+01 G
RU-103	I	-5.8525E-01					3.93E+01	
			497.05	-5.853E-01	&(P	1.464E+00	8.43E+01	9.09E+01 G
			610.30	-3.843E+00	+	5.920E+01	4.53E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-2.9869E+00					3.74E+02	
			621.92	-7.644E+00	?(	3.566E+01	1.39E+02	9.93E+00 G
			1050.36	2.666E+01	?(	1.185E+02	1.28E+02	1.56E+00 G
			511.86	9.935E+00	?	9.514E+00	5.26E+01	2.00E+01 GA
AG-108M	C	1.9745E-01					1.53E+05	
			433.94	2.200E-01	?(P	1.229E+00	2.18E+02	9.05E+01 G
			722.94	1.750E-01	?(	2.263E+00	3.70E+02	9.08E+01 G
			614.28	0.000E+00	-	3.772E+00	1.00E+03	8.98E+01 G
AG-110M	F	6.9577E-01					2.50E+02	
			884.68	0.000E+00	&(	3.197E+00	1.00E+03	7.27E+01 G
			657.76	4.474E-01	(	2.158E+00	1.41E+02	9.46E+01 G
			937.49	1.228E+00	?(P	3.957E+00	1.37E+02	3.44E+01 G
			1384.30	2.993E+00	?(	2.757E+00	3.54E+01	2.43E+01 G
			763.94	-1.218E+00	+	8.526E+00	2.01E+02	2.23E+01 G
SN-113	F	-4.1360E-01					1.15E+02	
			391.69	-4.136E-01	?(	2.836E+00	2.01E+02	6.40E+01 G
SB-124	F	-3.1177E-04					6.02E+01	
			602.73	-6.822E-01	&(P	3.625E+00	6.53E+01	9.83E+01 G
			1690.98	0.000E+00	+	1.677E+00	1.00E+03	4.78E+01 G
			722.79	6.198E+00	?(	1.709E+01	8.22E+01	1.08E+01 G
SB-125	I	2.5753E+00					1.01E+03	
			427.88	1.437E+00	?(	3.312E+00	9.22E+01	2.96E+01 G
			600.50	-3.691E+00	+	2.039E+01	1.64E+02	1.79E+01 G
			635.89	3.590E+00	?(P	8.911E+00	7.43E+01	1.13E+01 G
			463.37	4.698E+00	&(	1.422E+01	9.00E+01	1.05E+01 G
I-131	I	1.7991E-01					8.02E+00	
			364.48	-7.270E-02	(	1.366E+00	7.36E+02	8.17E+01 G
			284.30	-8.040E+00	+	1.967E+01	9.96E+01	6.14E+00 G
			636.97	3.058E+00	(P	1.320E+01	1.23E+02	7.17E+00 G
Gd-153	F	-1.3618E+00					2.42E+02	
			97.50	-1.362E+00	(	8.509E+00	1.88E+02	3.00E+01 G
			103.20	0.000E+00	&	1.171E+01	1.00E+03	2.18E+01 G
Ga-68	C	2.2564E+01					4.71E-02	
			1077.40	2.256E+01	?(	4.512E+01	8.66E+01	3.30E+00 G
Tc-99m	I	1.3301E-07					2.51E-01	
			140.51	1.330E-07	%(	2.311E+00	5.17E+08	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-8.2277E-01					3.85E+03	
			356.00	-8.228E-01	?(	4.110E+00	1.49E+02	6.20E+01 G
			302.85	-2.923E+00	+	1.481E+01	1.51E+02	1.83E+01 G
			383.84	4.205E+00	? P	1.692E+01	1.19E+02	8.94E+00 GA
			80.99	-1.455E+00	+ P	7.385E+00	6.92E+01	3.41E+01 GA
CS-134	I	3.6275E-01					7.54E+02	
			604.71	-6.808E-01	?(	3.560E+00	1.55E+02	9.76E+01 G
			795.87	8.507E-01	?(P	4.842E-01	2.89E+01	8.55E+01 G
			569.32	1.658E+00	?(	7.314E+00	1.27E+02	1.54E+01 G
			801.95	3.571E+00	?(	1.601E+01	1.28E+02	8.69E+00 G
			563.24	1.840E+00	?(P	1.248E+01	2.68E+02	8.35E+00 G
CS-137	I	2.9930E+00					1.10E+04	
			661.66	2.993E+00	(	9.852E-01	1.77E+01	8.52E+01 G
CE-139	F	2.4600E-01					1.38E+02	
			165.85	2.460E-01	&(	1.453E+00	1.75E+02	7.99E+01 G
Ba-140	I	1.2886E-01					1.28E+01	
			537.26	-2.394E-01	?(P	5.313E+00	8.23E+02	2.44E+01 G
			162.66	1.573E+00	&(P	1.961E+01	3.67E+02	6.22E+00 G
			304.85	-1.257E+01	+	6.493E+01	1.54E+02	4.29E+00 G
La-140	I	1.1507E+00					1.28E+01	
			1596.21	-3.923E-01	?(P	2.012E+00	5.38E+02	9.54E+01 G
			487.02	-1.142E+00	+	4.362E+00	1.13E+02	4.55E+01 G
			328.76	1.948E+00	&(	1.107E+01	1.69E+02	2.03E+01 G
			815.77	6.779E+00	?(	4.888E+00	2.68E+01	2.33E+01 G
CE-141	I	7.0757E-01					3.25E+01	
			145.44	7.076E-01	(	2.200E+00	9.31E+01	4.82E+01 G
CE-144	I	-3.5297E+00					2.85E+02	
			133.54	-3.530E+00	?(P	1.722E+01	7.82E+01	1.11E+01 G
PM-144	C	-9.1734E-01					3.63E+02	
			696.54	-9.173E-01	?(P	1.845E+00	3.30E+01	9.90E+01 G
			618.06	-7.604E-01	+	3.556E+00	1.39E+02	9.91E+01 G
EU-152	F	5.3133E-01					4.94E+03	
			344.29	0.000E+00	?(	9.154E+00	1.00E+03	2.65E+01 G
			1112.07	-1.116E+00	&	2.365E+01	6.07E+02	1.36E+01 G
			121.78	1.024E+00	&(	3.161E+00	9.23E+01	2.86E+01 G
			778.92	-4.690E+00	+	1.167E+01	1.06E+02	1.29E+01 G
			964.11	-1.134E+01	+	2.407E+01	6.43E+01	1.46E+01 G
			244.69	-4.314E+00	+ P	3.525E+01	1.47E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-1.317E+00	+	9.628E+00	3.27E+02	2.10E+01 GA
EU-154	I	4.7024E+00					3.14E+03	
			873.23	5.620E+00	&(	1.561E+01	8.26E+01	1.23E+01 G
			123.10	-3.902E-01	-	2.363E+00	1.79E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.123E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.040E+01	1.00E+03	2.02E+01 G
			1004.77	1.904E+00	-	8.970E+00	2.02E+02	1.80E+01 G
			996.33	3.640E+00	?(	2.099E+01	1.66E+02	1.06E+01 G
EU-155	I	1.9095E+00					1.81E+03	
			105.31	1.909E+00	?(	1.129E+01	1.78E+02	2.12E+01 G
			86.54	-1.445E+00	+	8.814E+00	1.83E+02	3.07E+01 G
HF-181	F	4.7132E-01					4.24E+01	
			482.00	4.713E-01	?(P	1.840E+00	1.15E+02	8.05E+01 G
			133.02	-9.052E-01	+ P	4.330E+00	7.77E+01	4.33E+01 G
			345.83	-3.088E+00	+	1.712E+01	1.65E+02	1.51E+01 G
			136.30	-4.527E+00	&	3.342E+01	2.21E+02	5.85E+00 G
Ta-182	F	1.9213E+00					1.14E+02	
			1121.30	2.349E+00	?(	8.589E+00	1.08E+02	3.49E+01 G
			1221.41	1.369E+00	?(P	7.319E+00	2.36E+02	2.70E+01 G
			1189.05	-1.349E+00	- P	1.199E+01	3.55E+02	1.62E+01 G
Hg-203	F	3.4462E-01					4.66E+01	
			279.20	3.446E-01	?(	1.471E+00	1.26E+02	8.15E+01 G
TL-208	N	5.5861E+00					6.98E+02	
			583.02	5.556E+00	(	1.115E+00	1.29E+01	8.45E+01 G
			277.28	5.991E+00	(P	1.795E+01	8.94E+01	6.31E+00 G
			860.56	-6.447E-01	-	1.508E+01	9.76E+02	1.24E+01 G
pm-146	C	-3.1337E-01					2.02E+03	
			747.16	-3.134E-01	?(	4.288E+00	5.66E+02	3.40E+01 G
			735.72	-1.046E-01	% P	4.773E+00	1.36E+03	2.25E+01 G
			453.88	-5.991E-01	+ P	1.829E+00	1.16E+02	6.50E+01 G
y-88	F	3.6133E-01					1.07E+02	
			898.04	3.613E-01	?(P	1.187E+00	1.36E+02	9.37E+01 G
			1836.06	-4.794E-02	% P	1.713E+00	1.27E+03	9.92E+01 G
Cd-113m		-2.3119E+03					5.33E+03	
			263.70	-2.312E+03	&(	1.710E+04	2.15E+02	6.00E-03 K
Cf-251	T	7.7320E-01					3.28E+05	
			176.60	7.732E-01	?(	5.120E+00	2.54E+02	1.70E+01 G
			227.00	-2.840E+00	+	1.551E+01	2.09E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	8.9031E-01					1.28E+05	
			387.95	6.490E-01	?(	2.260E+00	1.03E+02	6.60E+01 G
			333.44	1.917E+00	&(	1.500E+01	2.32E+02	1.55E+01 G
Sn-126		3.6398E+00					3.65E+07	
			87.57	1.934E+00	}	6.700E+00	3.94E+01	3.75E+01 GA
			64.28	3.640E+00	?(	1.955E+01	1.60E+02	9.70E+00 G
			86.94	2.307E+00	}	2.905E+01	1.45E+02	9.04E+00 GA
PB-210	N	3.0367E+01					8.14E+03	
			46.54	3.037E+01	(P	3.143E+01	4.04E+01	4.25E+00 G
PB-212	N	1.9353E+01					6.98E+02	
			238.63	1.935E+01	(P	1.648E+00	5.61E+00	4.33E+01 G
			300.03	3.897E+01	+ P	2.444E+01	2.91E+01	3.28E+00 GA
PB-214	N	1.4486E+01					5.84E+05	
			351.93	1.520E+01	(P	3.122E+00	1.19E+01	3.76E+01 G
			295.09	1.310E+01	(P	3.723E+00	1.38E+01	1.93E+01 G
			242.00	2.638E+01	+	1.162E+01	1.63E+01	7.43E+00 GA
BI-207	C	3.5528E-01					1.18E+04	
			569.70	3.553E-01	?(	1.128E+00	9.31E+01	9.77E+01 G
			1063.66	-1.161E+00	+	2.731E+00	1.04E+02	7.45E+01 G
BI-212	N	9.6551E+00					6.98E+02	
			727.17	9.655E+00	?(	2.667E+01	8.24E+01	7.55E+00 G
			785.42	-2.894E+00	%	1.274E+02	1.82E+03	1.28E+00 GA
BI-214	N	1.1139E+01					5.84E+05	
			609.31	1.114E+01	(P	2.284E+00	1.26E+01	4.61E+01 G
			1120.29	4.167E+00	- P	1.659E+01	1.17E+02	1.51E+01 G
			1764.49	1.634E+01	+ P	6.495E+00	2.28E+01	1.54E+01 G
BI-210M	T	-6.6682E-01					1.10E+09	
			265.83	-6.668E-01	&(	2.534E+00	1.13E+02	5.00E+01 G
			304.90	-1.927E+00	+	1.015E+01	1.57E+02	2.80E+01 G
AC-228	N	2.2541E+01					2.10E+03	
			911.07	2.227E+01	(P	2.978E+00	1.12E+01	2.90E+01 G
			968.97	5.511E+00	-	1.640E+01	8.86E+01	1.75E+01 G
			338.32	2.319E+01	@(P	5.797E+00	1.40E+01	1.20E+01 G
			93.35	-7.805E+00	-	4.595E+01	1.77E+02	5.56E+00 XA
TH-227	N	-1.1762E+00					7.95E+03	
			50.14	-6.527E+00	*(	2.559E+01	1.17E+02	8.00E+00 G
			256.24	4.939E+00	(	1.204E+01	9.43E+01	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-3.6113E+00					2.68E+06	
			193.51	-3.611E+00	&(	2.183E+01	2.33E+02	4.40E+00 G
			210.85	-8.934E+00	& P	4.013E+01	1.22E+02	2.99E+00 G
TH-234	N	3.2778E+00					1.63E+12	
			63.29	4.533E+00	?(P	4.762E+01	3.12E+02	3.81E+00 G
			92.59	2.421E+00	(P	1.816E+01	2.22E+02	5.58E+00 G
PA-231	N	-1.8595E+01					1.20E+07	
			302.65	-1.860E+01	?(	9.411E+01	1.51E+02	2.88E+00 G
			300.07	-2.158E+01	+	1.139E+02	1.58E+02	2.46E+00 G
PA-233	C	-1.5335E+00					7.82E+08	
			312.01	-1.533E+00	?(	8.337E+00	1.63E+02	3.60E+01 G
			300.18	-8.568E+00	+	4.433E+01	1.55E+02	6.20E+00 G
PA-234	N	-2.1527E+00					1.63E+12	
			131.29	-2.153E+00	?(P	1.019E+01	7.79E+01	1.80E+01 G
			946.02	-3.402E+00	+	1.372E+01	1.76E+02	1.34E+01 G
			569.47	-2.333E+00	+	1.620E+01	1.98E+02	8.20E+00 G
			883.24	0.000E+00	+	2.417E+01	1.00E+03	9.60E+00 G
			880.53	-3.402E+00	+	3.750E+01	3.15E+02	6.00E+00 GA
PA-234M	N	-7.5637E-02					1.63E+12	
			1001.00	-6.605E+00	%(P	2.853E+02	1.12E+03	8.37E-01 G
			766.41	1.851E+01	?(	6.224E+02	9.43E+02	2.94E-01 G
U-235	N	-4.4267E+00					2.57E+11	
			143.79	-4.427E+00	&(P	1.743E+01	6.66E+01	1.10E+01 G
			205.33	2.483E+00	+ P	1.672E+01	2.57E+02	5.01E+00 G
			163.38	-3.656E+00	+ P	2.314E+01	1.94E+02	5.08E+00 G
AM-241	T	-4.0619E-01					1.58E+05	
			59.54	-4.062E-01	*(	5.631E+00	4.11E+02	3.59E+01 G
Ir-192	F	-6.5635E-02					7.40E+01	
			316.49	-6.434E-01	?(	3.548E+00	1.65E+02	8.70E+01 G
			468.06	9.061E-01	?(	2.991E+00	9.79E+01	5.18E+01 G
			308.44	-1.719E+00	+	9.200E+00	1.60E+02	3.18E+01 G
Cs-136	F	-4.5008E-01					1.30E+01	
			818.50	-4.501E-01	?(	2.245E+00	1.45E+02	1.00E+02 G
			1048.07	-4.743E-01	+	2.327E+00	1.40E+02	8.00E+01 G
			340.57	0.000E+00	+	5.129E+00	1.00E+03	4.69E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   1.8106E+00                                        2.36E+00
                          103.70 0.000E+00 &   1.063E+01 1.00E+03 2.40E+01 X
                          106.13 1.811E+00 &(  1.065E+01 1.77E+02 2.27E+01 G
                           99.50 0.000E+00 -   1.712E+01 1.00E+03 1.50E+01 X

Nd-147      -9.2639E-01                                        1.11E+01
                          531.00-9.264E-01  (  9.823E+00 4.29E+02 1.30E+01 G
                           91.10-1.543E+00 +   8.838E+00 1.72E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   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 %
 ____________________________________________________________________________
 TH-227      50.14       280.       -21.    -0.011   117.07  -6.527E+00
 AM-241      59.54       432.        -7.    -0.004   410.93  -4.062E-01
 BA-133      80.99      1155.       -32.    -0.018    69.24  -1.455E+00  P
 EU-155      86.54      1434.       -29.    -0.016   183.19  -1.445E+00
 Nd-147      91.10      1274.       -30.    -0.016   172.05  -1.543E+00
 Gd-153      97.50      1382.       -28.    -0.016   187.66  -1.362E+00
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Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	105.31	1243.	28.	0.016	177.54	1.909E+00	
Np-239	106.13	1270.	29.	0.016	176.68	1.811E+00	
EU-152	121.78	165.	20.	0.011	92.33	1.024E+00	
CO-57	122.06	185.	6.	0.003	338.49	9.670E-02	
EU-154	123.10	188.	-11.	-0.006	178.84	-3.902E-01	
PA-234	131.29	685.	-26.	-0.015	77.90	-2.153E+00	P
HF-181	133.02	710.	-27.	-0.015	77.70	-9.052E-01	P
CE-144	133.54	735.	-26.	-0.015	78.25	-3.530E+00	P
HF-181	136.30	759.	-18.	-0.010	220.69	-4.527E+00	
U-235	143.79	690.	-32.	-0.018	66.60	-4.427E+00	P
CE-141	145.44	203.	22.	0.012	93.13	7.076E-01	
Ba-140	162.66	235.	6.	0.003	367.05	1.573E+00	P
U-235	163.38	216.	-11.	-0.006	194.27	-3.656E+00	P
CE-139	165.85	214.	12.	0.007	174.80	2.460E-01	
Cf-251	176.60	106.	8.	0.004	254.21	7.732E-01	
TH-229	193.51	114.	-9.	-0.005	232.64	-3.611E+00	
U-235	205.33	78.	6.	0.004	256.50	2.483E+00	P
TH-229	210.85	159.	-14.	-0.008	122.45	-8.934E+00	P
Cf-251	227.00	92.	-9.	-0.005	209.45	-2.840E+00	
EU-152	244.69	659.	-15.	-0.008	147.10	-4.314E+00	P
TH-227	256.24	55.	15.	0.008	94.31	4.939E+00	
Cd-113m	263.70	80.	-6.	-0.003	214.73	-2.312E+03	
BI-210M	265.83	123.	-14.	-0.008	112.71	-6.668E-01	
Hg-203	279.20	101.	12.	0.006	125.95	3.446E-01	
I-131	284.30	100.	-20.	-0.011	99.64	-8.040E+00	
PA-231	300.07	528.	-21.	-0.012	157.75	-2.158E+01	
PA-233	300.18	507.	-21.	-0.012	154.65	-8.568E+00	
PA-231	302.65	486.	-21.	-0.012	151.23	-1.860E+01	
BA-133	302.85	488.	-21.	-0.012	151.44	-2.923E+00	
Ba-140	304.85	509.	-21.	-0.012	154.35	-1.257E+01	
BI-210M	304.90	530.	-21.	-0.012	157.40	-1.927E+00	
Ir-192	308.44	550.	-21.	-0.012	160.00	-1.719E+00	
PA-233	312.01	571.	-21.	-0.012	162.55	-1.533E+00	
Ir-192	316.49	592.	-21.	-0.012	164.92	-6.434E-01	
CR-51	320.08	555.	19.	0.011	176.74	5.134E+00	P
La-140	328.76	290.	14.	0.008	168.90	1.948E+00	
Cf-249	333.44	304.	11.	0.006	231.80	1.917E+00	
HF-181	345.83	355.	-16.	-0.009	165.02	-3.088E+00	
BA-133	356.00	331.	-18.	-0.010	148.82	-8.228E-01	
I-131	364.48	56.	-2.	-0.001	735.98	-7.270E-02	
BA-133	383.84	98.	12.	0.007	118.92	4.205E+00	P
Cf-249	387.95	94.	14.	0.008	103.29	6.490E-01	
SN-113	391.69	139.	-8.	-0.005	201.27	-4.136E-01	
SB-125	427.88	32.	13.	0.007	92.24	1.437E+00	
AG-108M	433.94	41.	6.	0.003	217.86	2.200E-01	P
pm-146	453.88	44.	-11.	-0.006	116.14	-5.991E-01	P
SB-125	463.37	69.	14.	0.008	90.01	4.698E+00	
Ir-192	468.06	74.	13.	0.007	97.85	9.061E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	477.60	54.	10.	0.005	109.59	3.465E+00	P
HF-181	482.00	64.	10.	0.006	114.86	4.713E-01	P
La-140	487.02	117.	-14.	-0.008	113.19	-1.142E+00	
RU-103	497.05	48.	-14.	-0.008	84.34	-5.853E-01	P
RH-106	511.86	98.	51.	0.028	52.64	9.935E+00	
Nd-147	531.00	39.	-3.	-0.002	428.82	-9.264E-01	
Ba-140	537.26	39.	-1.	-0.001	822.64	-2.394E-01	P
CS-134	563.24	22.	4.	0.002	267.96	1.840E+00	P
CS-134	569.32	26.	6.	0.003	126.93	1.658E+00	
PA-234	569.47	38.	-4.	-0.002	198.14	-2.333E+00	
BI-207	569.70	25.	8.	0.005	93.12	3.553E-01	
SB-125	600.50	290.	-15.	-0.008	164.15	-3.691E+00	
SB-124	602.73	275.	-15.	-0.008	65.29	-6.822E-01	P
CS-134	604.71	260.	-15.	-0.008	155.36	-6.808E-01	
RU-103	610.30	245.	-5.	-0.003	452.94	-3.843E+00	
PM-144	618.06	258.	-17.	-0.009	139.13	-7.604E-01	
RH-106	621.92	257.	-17.	-0.009	138.83	-7.644E+00	
SB-125	635.89	17.	9.	0.005	74.26	3.590E+00	P
I-131	636.97	14.	5.	0.003	122.89	3.058E+00	P
AG-110M	657.76	74.	9.	0.005	141.18	4.474E-01	
PM-144	696.54	52.	-18.	-0.010	32.95	-9.173E-01	P
NB-94	702.63	42.	-15.	-0.008	39.96	-7.765E-01	P
SB-124	722.79	50.	13.	0.007	82.17	6.198E+00	
AG-108M	722.94	63.	3.	0.002	370.22	1.750E-01	
ZR-95	724.20	127.	-23.	-0.013	72.19	-2.707E+00	
pm-146	747.16	28.	-2.	-0.001	565.69	-3.134E-01	
ZR-95	756.73	33.	-7.	-0.004	185.94	-6.592E-01	
AG-110M	763.94	48.	-5.	-0.003	201.00	-1.218E+00	
NB-95	765.79	42.	11.	0.006	88.61	5.996E-01	
PA-234M	766.41	44.	1.	0.001	943.40	1.851E+01	
EU-152	778.92	28.	-11.	-0.006	106.41	-4.690E+00	
CS-134	795.87	0.	13.	0.007	28.94	8.507E-01	P
CS-134	801.95	22.	5.	0.003	128.38	3.571E+00	
La-140	815.77	13.	28.	0.015	26.84	6.779E+00	
Cs-136	818.50	61.	-8.	-0.004	145.30	-4.501E-01	
MN-54	834.85	24.	5.	0.003	199.50	3.094E-01	P
Co-56	846.77	19.	-2.	-0.001	577.31	-1.086E-01	P
NB-94	871.10	43.	-12.	-0.007	81.57	-7.390E-01	
EU-154	873.23	38.	11.	0.006	82.56	5.620E+00	
PA-234	880.53	53.	-3.	-0.002	314.64	-3.402E+00	
Sc-46	889.28	68.	-11.	-0.006	113.79	-6.588E-01	
y-88	898.04	11.	5.	0.003	136.49	3.613E-01	P
AG-110M	937.49	15.	7.	0.004	137.09	1.228E+00	P
PA-234	946.02	30.	-7.	-0.004	176.13	-3.402E+00	
EU-152	964.11	117.	-25.	-0.014	64.33	-1.134E+01	
EU-154	996.33	41.	6.	0.003	165.86	3.640E+00	
EU-154	1004.77	20.	5.	0.003	201.66	1.904E+00	
Co-56	1037.84	20.	-7.	-0.004	145.45	-3.495E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cs-136	1048.07	25.	-5.	-0.003	140.31	-4.743E-01		
RH-106	1050.36	25.	6.	0.003	127.71	2.666E+01		
BI-207	1063.66	30.	-12.	-0.007	104.42	-1.161E+00		
Ga-68	1077.40	10.	9.	0.005	86.58	2.256E+01		
FE-59	1099.25	16.	-2.	-0.001	438.25	-2.721E-01		P
EU-152	1112.07	75.	-2.	-0.001	606.79	-1.116E+00		
Sc-46	1120.55	51.	11.	0.006	98.02	8.191E-01		
Ta-182	1121.30	63.	11.	0.006	107.76	2.349E+00		
CO-60	1173.24	16.	11.	0.006	89.42	8.527E-01		P
Ta-182	1189.05	22.	-3.	-0.002	354.62	-1.349E+00		P
Ta-182	1221.41	21.	5.	0.003	236.19	1.369E+00		P
Co-56	1238.28	5.	23.	0.013	31.27	2.824E+00		
FE-59	1291.60	16.	-1.	-0.001	914.69	-1.978E-01		
CO-60	1332.50	27.	-15.	-0.009	69.92	-1.353E+00		P
AG-110M	1384.30	0.	8.	0.004	35.36	2.993E+00		
EU-152	1408.00	17.	-3.	-0.002	327.45	-1.317E+00		
La-140	1596.21	12.	-4.	-0.002	538.07	-3.923E-01		P

P - Peakbackground subtraction

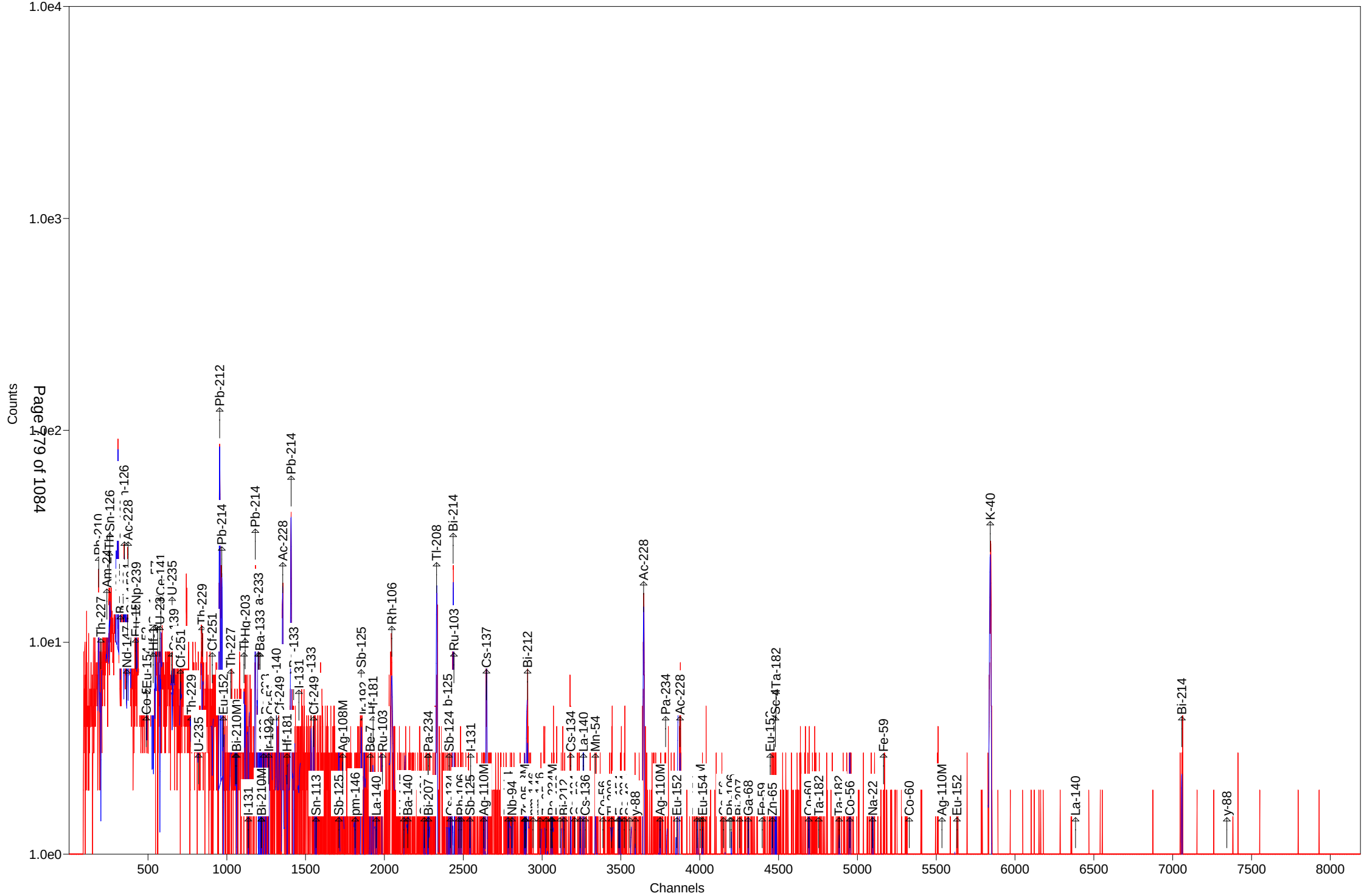
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	3.4649E+00	3.4650E+00	1.096E+02%	1.29E+01
NA-22	#	1.3519E+00	1.3519E+00	2.500E+01%	6.23E-01
K-40	#	1.9283E+02	1.9283E+02	9.031E+00%	2.60E+01
Sc-46	#A	8.0157E-02	8.0157E-02	7.510E+01%	2.55E+00
CR-51	#A	5.1343E+00	5.1343E+00	1.767E+02%	3.04E+01
MN-54	#A	3.0935E-01	3.0935E-01	1.995E+02%	1.49E+00
FE-59	#A	-2.7205E-01	-2.7205E-01	4.383E+02%	2.81E+00
Co-56	#A	1.0587E+00	1.0587E+00	3.127E+01%	1.36E+00
CO-57	#A	9.6703E-02	9.6703E-02	3.385E+02%	1.12E+00
CO-58	#	7.7467E-01	7.7468E-01	2.722E+01%	4.23E-01
CO-60	#A	-1.3533E+00	-1.3533E+00	6.992E+01%	2.37E+00
ZN-65	#A	1.3219E+00	1.3219E+00	1.315E+02%	5.94E+00
NB-94	#A	-7.7649E-01	-7.7649E-01	3.996E+01%	1.70E+00
ZR-95	#A	-6.5916E-01	-6.5917E-01	1.859E+02%	2.90E+00
NB-95	#A	5.9955E-01	5.9956E-01	8.861E+01%	1.79E+00
RU-103	#A	-5.8524E-01	-5.8525E-01	8.434E+01%	1.46E+00
RH-106	#A	-2.9869E+00	-2.9869E+00	9.432E+01%	3.57E+01
AG-108M	#A	1.9745E-01	1.9745E-01	2.148E+02%	1.23E+00
AG-110M	#A	6.9577E-01	6.9577E-01	3.536E+01%	3.20E+00
SN-113	#A	-4.1359E-01	-4.1360E-01	2.013E+02%	2.84E+00
SB-124	#A	-3.1177E-04	-3.1177E-04	5.247E+01%	3.62E+00
SB-125	#A	2.5753E+00	2.5753E+00	4.958E+01%	3.31E+00
I-131	#A	1.7990E-01	1.7991E-01	1.229E+02%	1.37E+00

Gd-153 #A	-1.3618E+00	-1.3618E+00	1.877E+02%	8.51E+00
Ga-68 #A	2.2376E+01	2.2564E+01	8.658E+01%	4.51E+01
Tc-99m #A	1.3280E-07	1.3301E-07	5.166E+08%	2.31E+00
BA-133 #A	-8.2277E-01	-8.2277E-01	1.488E+02%	4.11E+00
CS-134 #A	3.6275E-01	3.6275E-01	2.894E+01%	3.56E+00
CS-137	2.9930E+00	2.9930E+00	1.770E+01%	9.85E-01
CE-139 #A	2.4600E-01	2.4600E-01	1.748E+02%	1.45E+00
Ba-140 #A	1.2885E-01	1.2886E-01	3.671E+02%	5.31E+00
La-140 #A	1.1506E+00	1.1507E+00	2.684E+01%	2.01E+00
CE-141 #A	7.0756E-01	7.0757E-01	9.313E+01%	2.20E+00
CE-144 #A	-3.5297E+00	-3.5297E+00	7.825E+01%	1.72E+01
PM-144 #A	-9.1734E-01	-9.1734E-01	3.295E+01%	1.84E+00
EU-152 #A	5.3133E-01	5.3133E-01	9.233E+01%	9.15E+00
EU-154 #A	4.7024E+00	4.7024E+00	8.256E+01%	1.56E+01
EU-155 #A	1.9095E+00	1.9095E+00	1.775E+02%	1.13E+01
HF-181 #A	4.7132E-01	4.7132E-01	1.149E+02%	1.84E+00
Ta-182 #A	1.9212E+00	1.9213E+00	1.078E+02%	8.59E+00
Hg-203 #A	3.4461E-01	3.4462E-01	1.260E+02%	1.47E+00
TL-208	5.5861E+00	5.5861E+00	1.287E+01%	1.11E+00
pm-146 #A	-3.1337E-01	-3.1337E-01	5.657E+02%	4.29E+00
y-88 #A	3.6133E-01	3.6133E-01	1.365E+02%	1.19E+00
Cd-113m#A	-2.3119E+03	-2.3119E+03	2.147E+02%	1.71E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.82E+01
Cf-251 #A	7.7320E-01	7.7320E-01	2.542E+02%	5.12E+00
Cf-249 #A	8.9031E-01	8.9031E-01	1.033E+02%	2.26E+00
Sn-126 #A	3.6398E+00	3.6398E+00	1.603E+02%	1.95E+01
PB-210 A	3.0367E+01	3.0367E+01	4.038E+01%	3.14E+01
PB-212	1.9353E+01	1.9353E+01	5.608E+00%	1.65E+00
PB-214	1.4486E+01	1.4486E+01	9.112E+00%	3.12E+00
BI-207 #A	3.5528E-01	3.5528E-01	9.312E+01%	1.13E+00
BI-212 #A	9.6551E+00	9.6551E+00	8.240E+01%	2.67E+01
BI-214	1.1139E+01	1.1139E+01	1.257E+01%	2.28E+00
BI-210M#A	-6.6682E-01	-6.6682E-01	1.127E+02%	2.53E+00
AC-228	2.2541E+01	2.2541E+01	8.942E+00%	2.98E+00
TH-227 #A	-1.1762E+00	-1.1762E+00	7.516E+01%	2.56E+01
TH-229 #A	-3.6113E+00	-3.6113E+00	2.326E+02%	2.18E+01
TH-234 #A	3.2778E+00	3.2778E+00	1.917E+02%	4.76E+01
PA-231 #A	-1.8595E+01	-1.8595E+01	1.512E+02%	9.41E+01
PA-233 #A	-1.5335E+00	-1.5335E+00	1.625E+02%	8.34E+00
PA-234 #A	-2.1527E+00	-2.1527E+00	7.790E+01%	1.02E+01
PA-234M#A	-7.5637E-02	-7.5637E-02	7.325E+02%	2.85E+02
U-235 #A	-4.4267E+00	-4.4267E+00	6.660E+01%	1.74E+01
AM-241 #A	-4.0619E-01	-4.0619E-01	4.109E+02%	5.63E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+01
Ir-192 #A	-6.5635E-02	-6.5635E-02	9.588E+01%	3.55E+00
Cs-136 #A	-4.5007E-01	-4.5008E-01	1.453E+02%	2.24E+00
Np-239 #A	1.8103E+00	1.8106E+00	1.767E+02%	1.07E+01
Nd-147 #A	-9.2635E-01	-9.2639E-01	4.288E+02%	9.82E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     2.993E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.5 keV) 2.9929651E+02  Bq/Sample
```

265170_Gamma_160-18567-A-17-B. 15_Gamma_20161117.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20162154

Sample Description: 265170_Gamma_160-18567-A-18-B
Detector: Detector #16
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-18-B

Decay to Time: 9/7/2016 18:34 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:34:49 Real Time: 1817 sec
Analysis Time: 9/7/2016 19:05 Dead Time: 0.94 %
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_2016-09-03_2304.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	-5.237E+00	101.7	5.326E+00	5.333E+00	1.784E+01
NA-22	-8.075E-01	70.6	5.698E-01	5.712E-01	1.894E+00
K-40	2.434E+02	5.2	1.255E+01	1.768E+01	1.093E+01
Sc-46	-6.561E-01	85.0	5.576E-01	5.586E-01	1.870E+00
CR-51	3.927E+00	175.7	6.899E+00	6.903E+00	2.311E+01
MN-54	-4.639E-01	110.6	5.131E-01	5.136E-01	1.544E+00
FE-59	1.963E+00	48.5	9.515E-01	9.566E-01	1.995E+00
Co-56	5.179E-01	104.4	5.406E-01	5.413E-01	1.130E+00
CO-57	-4.136E-01	96.6	3.996E-01	4.002E-01	1.330E+00
CO-58	-7.633E-01	81.8	6.241E-01	6.253E-01	2.084E+00
CO-60	6.922E-02	116.9	8.095E-02	8.102E-02	1.522E+00
ZN-65	-6.402E-01	243.5	1.559E+00	1.559E+00	5.350E+00
NB-94	2.095E-01	164.9	3.453E-01	3.455E-01	1.899E+00
ZR-95	7.787E-02	81.6	6.354E-02	6.367E-02	2.413E+00
NB-95	-4.200E-03	11335.0	4.760E-01	4.760E-01	1.677E+00
RU-103	-5.479E-01	99.8	5.468E-01	5.475E-01	1.298E+00
RH-106	-6.445E+00	160.2	1.032E+01	1.033E+01	3.460E+01
AG-108M	4.418E-01	74.6	3.297E-01	3.305E-01	9.462E-01
AG-110M	1.297E-01	424.3	5.501E-01	5.502E-01	2.139E+00
SN-113	7.624E-01	108.0	8.231E-01	8.240E-01	2.757E+00
SB-124	2.959E-02	154.8	4.581E-02	4.584E-02	3.281E+00
SB-125	2.314E+00	65.6	1.519E+00	1.523E+00	3.349E+00
I-131	2.779E-01	159.8	4.441E-01	4.444E-01	1.113E+00
Gd-153	-1.231E+00	178.9	2.201E+00	2.203E+00	7.324E+00
Ga-68	-1.540E+01	170.2	2.621E+01	2.623E+01	5.762E+01
Tc-99m	-4.501E-01	144.5	6.503E-01	6.508E-01	2.165E+00
BA-133	6.595E-01	151.9	1.002E+00	1.003E+00	3.362E+00
CS-134	6.787E-01	67.6	4.589E-01	4.602E-01	3.283E+00
CS-137	4.032E+00	14.0	5.650E-01	6.027E-01	9.291E-01
CE-139	4.077E-01	98.0	3.997E-01	4.016E-01	1.334E+00
Ba-140	1.209E+00	131.4	1.588E+00	1.589E+00	3.875E+00
La-140	7.598E-01	93.8	7.125E-01	7.136E-01	1.417E+00
CE-141	-7.929E-01	147.0	1.165E+00	1.166E+00	3.882E+00

CE-144	3.040E+00	152.4	4.633E+00	4.636E+00	1.544E+01
PM-144	-4.265E-01	118.8	5.066E-01	5.071E-01	1.846E+00
EU-152	1.768E+00	86.9	1.536E+00	1.539E+00	8.500E+00
EU-154	2.384E+00	76.4	1.821E+00	1.826E+00	8.925E+00
EU-155	6.462E-01	130.2	8.416E-01	8.424E-01	9.953E+00
HF-181	2.234E-01	160.5	3.586E-01	3.588E-01	2.462E+00
Ta-182	1.796E+00	85.7	1.539E+00	1.542E+00	7.422E+00
Hg-203	-4.426E-01	97.9	4.333E-01	4.341E-01	1.452E+00
TL-208	7.338E+00	8.9	6.501E-01	7.534E-01	9.130E-01
pm-146	1.374E-01	367.8	5.053E-01	5.053E-01	4.200E+00
y-88	-9.144E-01	85.5	7.815E-01	7.829E-01	1.727E+00
Cd-113m	-2.679E+03	208.3	5.580E+03	5.583E+03	1.898E+04
Cd-109	1.024E+01	124.7	1.277E+01	1.278E+01	4.252E+01
Cf-251	-2.109E+00	105.4	2.222E+00	2.230E+00	5.661E+00
Cf-249	-1.374E-01	157.5	2.165E-01	2.166E-01	2.796E+00
Sn-126	4.947E+00	115.1	5.696E+00	5.702E+00	1.897E+01
PB-210	1.296E+01	83.8	1.086E+01	1.089E+01	3.054E+01
PB-212	1.859E+01	5.6	1.037E+00	1.588E+00	1.995E+00
PB-214	1.339E+01	8.0	1.065E+00	1.272E+00	2.529E+00
BI-207	5.047E-01	42.7	2.156E-01	2.172E-01	1.683E+00
BI-212	-8.410E+00	96.1	8.083E+00	8.095E+00	2.713E+01
BI-214	1.480E+01	9.6	1.420E+00	1.615E+00	2.276E+00
BI-210M	6.558E-01	88.8	5.826E-01	5.839E-01	1.950E+00
AC-228	2.111E+01	10.4	2.198E+00	2.447E+00	4.113E+00
TH-227	5.827E+00	117.1	6.822E+00	6.830E+00	2.282E+01
TH-229	5.760E+00	96.6	5.564E+00	5.583E+00	1.827E+01
TH-234	-2.428E+01	36.6	8.893E+00	8.983E+00	5.285E+01
PA-231	-1.587E+01	148.6	2.358E+01	2.360E+01	7.885E+01
PA-233	1.138E+00	168.6	1.919E+00	1.920E+00	6.425E+00
PA-234	-1.858E+00	151.1	2.808E+00	2.810E+00	9.360E+00
PA-234M	-4.142E+00	1775.9	7.355E+01	7.355E+01	2.363E+02
U-235	-3.784E+00	125.5	4.749E+00	4.753E+00	1.757E+01
AM-241	-2.066E+00	45.7	9.446E-01	9.507E-01	6.035E+00
Np-237	0.000E+00	1.#INF	3.140E+00	3.140E+00	1.060E+01
Ir-192	6.910E-01	119.2	8.235E-01	8.245E-01	2.732E+00
Cs-136	1.411E-02	4926.4	6.952E-01	6.952E-01	2.404E+00
Np-239	-1.726E+00	170.2	2.938E+00	2.939E+00	9.769E+00
Nd-147	6.702E+00	38.4	2.576E+00	2.605E+00	5.772E+00
Total	3.965E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-18-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20162154.An1

Acquisition information
Start time: 9/7/2016 6:34:49 PM
Live time: 1800
Real time: 1817
Dead time: 0.94 %
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	9/7/2016 6:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-09-03_2304.PBC 9/3/2016 11:04:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1069

***** 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	23.	83.84	0.53	2.354E-02	46.54	4.250	PBC<MDA	PB210
50.14	22.	117.08	0.96	2.644E-02	50.14	8.000	PBC<MDA	TH227
65.60	31.	115.15	0.98	3.619E-02	64.28	9.700	PBC<MDA	Sn126
74.81	199.	13.33	0.99	4.139E-02				
77.16	290.	9.41	0.99	4.230E-02				
80.97	30.	159.51	0.99	4.361E-02	80.99	34.060	PBC<MDA	BA133
86.54	27.	130.24	1.00	4.516E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.092E+00	EU155
					86.94	9.040	3.702E+00	Sn126
86.97	33.	68.56	1.00	4.525E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.304E+00	EU155
					86.94	9.040	4.418E+00	Sn126
87.60	27.	129.27	1.00	4.540E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	8.790E+00	Cd109
88.04	32.	124.75	1.00	4.550E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.024E+01	Cd109
91.10	32.	126.89	1.00	4.612E-02	91.10	28.300	PBC<MDA	Nd147
92.76	-23.	181.25	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
134.10	28.	152.41	1.04	4.612E-02	133.54	11.090	PBC<MDA	CE144
136.30	9.	481.05	1.04	4.576E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	9.874E-01	CO57
165.85	24.	98.04	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	22.	96.59	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
210.85	6.	397.93	1.11	3.511E-02	210.85	2.990	PBC<MDA	TH229
227.00	18.	111.53	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.54	482.	6.10	1.35	3.217E-02	238.63	43.300	1.921E+01	PB212
241.98	80.	19.94	1.14	3.185E-02	242.00	7.430	1.877E+01	PB214
244.69	21.	190.19	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
265.83	18.	88.84	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
277.41	26.	46.14	1.84	2.890E-02	277.28	6.310	PBC<MDA	TL208
295.12	137.	13.20	0.80	2.765E-02	295.09	19.300	1.430E+01	PB214
299.90	34.	34.16	1.19	2.732E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.831E+01	PA231
					300.18	6.200	PBC<MDA	PA233
308.44	20.	165.98	1.20	2.678E-02	308.44	31.750	PBC<MDA	Ir192
312.01	20.	168.60	1.20	2.656E-02	312.01	36.000	PBC<MDA	PA233
316.49	20.	171.02	1.21	2.629E-02	316.49	87.040	PBC<MDA	Ir192
320.08	18.	175.69	1.21	2.608E-02	320.08	9.940	PBC<MDA	CR51
328.76	19.	152.96	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
333.44	11.	274.06	1.22	2.533E-02	333.44	15.510	PBC<MDA	Cf249
337.97	93.	15.02	1.14	2.508E-02	338.32	12.010	1.710E+01	AC228
345.83	18.	160.54	1.23	2.467E-02	345.83	15.070	PBC<MDA	HF181
351.75	252.	9.04	1.45	2.437E-02	351.93	37.600	1.526E+01	PB214
356.44	18.	151.92	1.24	2.416E-02	356.00	62.050	PBC<MDA	BA133
364.48	10.	159.81	1.25	2.375E-02	364.48	81.700	PBC<MDA	I131
391.69	20.	107.96	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
427.88	16.	97.89	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
433.94	11.	123.10	1.31	2.093E-02	433.94	90.480	PBC<MDA	AG108M
463.37	18.	87.42	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
487.02	18.	108.82	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
511.86	94.	26.49	2.63	1.856E-02	511.86	20.000	1.407E+01	RH106
531.00	28.	38.44	1.40	1.807E-02	531.00	13.000	6.702E+00	Nd147
537.26	10.	131.36	1.40	1.791E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	158.72	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
583.20	187.	8.86	1.68	1.687E-02	583.02	84.500	7.297E+00	TL208
609.42	201.	9.59	1.59	1.633E-02	609.31	46.090	1.480E+01	BI214
635.89	1.	943.40	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
661.58	95.	14.01	1.56	1.537E-02	661.66	85.210	4.032E+00	CS137
702.63	8.	183.60	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
722.79	7.	154.84	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
722.94	13.	84.36	1.57	1.439E-02	722.79	10.810	4.764E+00	SB124
					722.94	90.840	5.669E-01	AG108M
					723.36	20.220	2.548E+00	EU154
723.36	13.	92.81	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.670E-01	AG108M
					723.36	20.220	2.548E+00	EU154
724.20	13.	100.50	1.57	1.437E-02	724.20	44.150	PBC<MDA	ZR95
735.72	3.	367.83	1.58	1.421E-02	735.72	22.500	PBC<MDA	pm146

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
778.92	11.	86.88	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.42	13.	88.84	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
795.87	15.	67.61	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
801.95	11.	117.91	1.64	1.332E-02	801.95	8.690	PBC<MDA	CS134
846.77	11.	104.38	1.67	1.280E-02	846.77	99.935	PBC<MDA	Co56
860.41	29.	42.52	1.69	1.264E-02	860.56	12.420	1.026E+01	TL208
871.10	3.	273.86	1.69	1.253E-02	871.10	99.890	PBC<MDA	NB94
873.23	6.	121.42	1.70	1.251E-02	873.23	12.270	PBC<MDA	EU154
880.53	4.	218.52	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
910.88	124.	12.62	1.73	1.211E-02	911.07	29.000	1.961E+01	AC228
968.97	86.	16.56	1.78	1.157E-02	968.97	17.460	2.361E+01	AC228
1063.66	20.	42.72	1.86	1.079E-02	1063.66	74.500	1.406E+00	BI207
1099.25	21.	48.48	1.89	1.052E-02	1099.25	56.500	PBC<MDA	FE59
1120.82	57.	18.16	1.98	1.037E-02	1120.29	15.100	2.009E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.699E+00	Ta182
1173.24	9.	116.94	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	15.	85.68	1.96	9.916E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	7.	242.01	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1384.30	2.	424.26	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	87.41	2.14	8.723E-03	1408.00	21.005	PBC<MDA	EU152
1461.10	396.	5.16	1.55	8.481E-03	1460.83	10.670	2.434E+02	K40
1596.21	4.	209.54	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1764.64	42.	17.00	2.43	7.342E-03	1764.49	15.400	2.057E+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	
298.89	74.83	251.	199.	4.810E+03	13.33	0.985	-	D
308.31	77.18	226.	290.	6.857E+03	9.41	0.988	-	D
1351.13	337.97	30.	93.	3.695E+03	15.02	1.139	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.94	46.56	126.	23.	0.013	83.84	0.527s
TH-227	200.26	50.14	326.	22.	0.012	117.08	0.963s
AM-241	237.83	59.54	743.	-44.	-0.025	45.71	0.971
TH-234	252.82	63.29	735.	-59.	-0.033	36.62	0.975
Sn-126	256.79	64.28	632.	31.	0.017	115.15	0.976s
BA-133	323.60	80.99	1162.	30.	0.017	159.51	0.991s
Np-237	345.59	86.49	559.	0.	0.000	1000.00	0.996A
EU-155	345.80	86.54	617.	27.	0.015	130.24	0.996s
Sn-126	347.39	86.94	595.	33.	0.018	68.56	0.997D
Sn-126	349.91	87.57	608.	27.	0.015	129.27	0.997s
Cd-109	351.79	88.04	770.	32.	0.018	124.75	0.998s
Nd-147	364.02	91.10	802.	32.	0.018	126.89	1.001s
TH-234	369.98	92.59	880.	-23.	-0.013	181.25	1.002s
AC-228	373.02	93.35	1599.	-31.	-0.017	182.36	1.003
Gd-153	389.61	97.50	1550.	-31.	-0.017	178.86	1.007s
Np-239	397.61	99.50	1519.	-31.	-0.017	176.75	1.008
Gd-153	412.40	103.20	1487.	-23.	-0.013	239.25	1.012s
Np-239	414.40	103.70	1464.	0.	0.000	1000.00	1.012
EU-155	420.85	105.31	1464.	0.	0.000	1000.00	1.014s
Np-239	424.11	106.13	1621.	-34.	-0.019	170.19	1.014s
EU-152	486.67	121.78	379.	-30.	-0.017	93.15	1.029s
CO-57	487.81	122.06	409.	-30.	-0.017	96.62	1.029s
PA-234	524.73	131.29	877.	-28.	-0.016	151.11	1.038
HF-181	531.64	133.02	849.	-28.	-0.015	149.75	1.039s
CE-144	533.70	133.54	896.	28.	0.016	152.41	1.040s
HF-181	544.74	136.30	868.	9.	0.005	481.05	1.042
CO-57	545.43	136.47	859.	0.	0.000	1000.00	1.042
Tc-99m	561.57	140.51	1032.	-32.	-0.018	144.47	1.046s
U-235	574.67	143.79	1066.	-33.	-0.019	125.50	1.049
CE-141	581.29	145.44	992.	-31.	-0.017	146.99	1.050
Ba-140	650.14	162.66	312.	-12.	-0.007	210.16	1.066s
U-235	653.01	163.38	246.	-11.	-0.006	369.26	1.067s
CE-139	662.90	165.85	273.	24.	0.014	98.04	1.069s
Cf-251	705.88	176.60	202.	-26.	-0.014	105.38	1.079s
TH-229	773.49	193.51	121.	22.	0.012	96.59	1.094s
U-235	820.76	205.33	219.	-32.	-0.018	129.52	1.105s
TH-229	842.82	210.85	180.	6.	0.004	397.93	1.110s
Cf-251	907.40	227.00	110.	18.	0.010	111.53	1.125s
PB-212	953.91	238.63	103.	466.	0.259	5.58	1.136D
PB-214	967.37	242.00	87.	80.	0.044	19.94	1.139D
EU-152	978.14	244.69	803.	21.	0.012	190.19	1.141s
TH-227	1024.32	256.24	136.	-17.	-0.009	136.48	1.152s
Cd-113m	1054.15	263.70	159.	-9.	-0.005	208.33	1.158
BI-210M	1062.67	265.83	113.	18.	0.010	88.84	1.160s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.98	277.41	39.	26.	0.014	46.14	1.843s
Hg-203	1116.13	279.20	158.	-19.	-0.010	97.91	1.173s
I-131	1136.52	284.30	120.	-16.	-0.009	136.36	1.177s
PB-214	1179.78	295.12	55.	137.	0.076	13.20	0.796s
PB-212	1199.42	300.03	51.	34.	0.019	34.16	1.191D
PA-231	1199.58	300.07	584.	-22.	-0.012	154.75	1.192
PA-233	1200.02	300.18	562.	-22.	-0.012	151.83	1.192
PA-231	1209.90	302.65	540.	-22.	-0.012	148.57	1.194s
BA-133	1210.70	302.85	568.	-22.	-0.012	152.23	1.194s
Ba-140	1218.69	304.85	590.	-23.	-0.013	51.85	1.196s
BI-210M	1218.88	304.90	613.	-14.	-0.008	84.17	1.196s
Ir-192	1233.05	308.44	516.	20.	0.011	165.98	1.199s
PA-233	1247.34	312.01	536.	20.	0.011	168.60	1.202s
Ir-192	1265.24	316.49	556.	20.	0.011	171.02	1.206
CR-51	1279.62	320.08	509.	18.	0.010	175.69	1.210s
La-140	1314.31	328.76	409.	19.	0.011	152.96	1.217s
Cf-249	1333.02	333.44	428.	11.	0.006	274.06	1.222s
AC-228	1352.54	338.32	439.	0.	0.000	1000.00	1.226
Cs-136	1361.54	340.57	439.	0.	0.000	1000.00	1.228s
EU-152	1376.40	344.29	439.	0.	0.000	1000.00	1.231s
HF-181	1382.56	345.83	402.	18.	0.010	160.54	1.233s
PB-214	1406.97	351.93	70.	213.	0.118	8.87	1.238D
BA-133	1423.24	356.00	357.	18.	0.010	151.92	1.242s
I-131	1457.16	364.48	60.	10.	0.005	159.81	1.250
BA-133	1534.57	383.84	222.	-21.	-0.012	102.18	1.267s
Cf-249	1551.01	387.95	243.	-14.	-0.008	157.51	1.271
SN-113	1565.96	391.69	219.	20.	0.011	107.96	1.274s
SB-125	1710.67	427.88	56.	16.	0.009	97.89	1.307s
AG-108M	1734.91	433.94	40.	11.	0.006	123.10	1.312s
pm-146	1814.67	453.88	66.	-8.	-0.004	167.97	1.330s
SB-125	1852.61	463.37	115.	18.	0.010	87.42	1.338s
Ir-192	1871.38	468.06	143.	-9.	-0.005	197.51	1.342s
BE-7	1909.51	477.60	184.	-19.	-0.011	101.70	1.351s
HF-181	1927.12	482.00	204.	-10.	-0.005	208.22	1.355s
La-140	1947.21	487.02	176.	18.	0.010	108.82	1.359s
RU-103	1987.33	497.05	65.	-17.	-0.009	99.80	1.368s
RH-106	2046.57	511.86	77.	94.	0.052	26.49	2.631s
Nd-147	2123.10	531.00	22.	28.	0.016	38.44	1.398s
Ba-140	2148.14	537.26	35.	10.	0.005	131.36	1.404s
CS-134	2252.03	563.24	43.	9.	0.005	158.72	1.427s
CS-134	2276.36	569.32	65.	-14.	-0.008	85.71	1.432s
PA-234	2276.96	569.47	90.	-8.	-0.005	161.95	1.432s
BI-207	2277.89	569.70	106.	-6.	-0.003	268.76	1.432s
TL-208	2331.86	583.20	20.	187.	0.104	8.86	1.676
SB-125	2401.07	600.50	415.	-17.	-0.009	173.00	1.460s
SB-124	2409.99	602.73	397.	-7.	-0.004	423.93	1.462
CS-134	2417.91	604.71	390.	0.	0.000	1000.00	1.463s
BI-214	2436.75	609.42	36.	201.	0.111	9.59	1.591s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.26	610.30	390.	0.	0.000	1000.00	1.468s
AG-108M	2456.19	614.28	390.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	390.	0.	0.000	1000.00	1.475s
RH-106	2486.73	621.92	431.	-19.	-0.010	160.19	1.479s
SB-125	2542.62	635.89	44.	1.	0.001	943.40	1.491s
I-131	2546.96	636.97	44.	-2.	-0.001	566.04	1.492s
AG-110M	2630.10	657.76	184.	-18.	-0.010	108.08	1.510
CS-137	2645.38	661.58	17.	95.	0.053	14.01	1.559s
PM-144	2785.22	696.54	97.	-11.	-0.006	118.79	1.544s
NB-94	2809.57	702.63	100.	8.	0.004	183.60	1.549s
SB-124	2890.19	722.79	50.	7.	0.004	154.84	1.567s
AG-108M	2890.80	722.94	57.	13.	0.007	84.36	1.567s
EU-154	2892.47	723.36	70.	13.	0.007	92.81	1.567s
ZR-95	2895.84	724.20	83.	13.	0.007	100.50	1.568s
BI-212	2907.73	727.17	116.	-16.	-0.009	96.11	1.570s
pm-146	2941.93	735.72	33.	3.	0.002	367.83	1.578s
ZR-95	3025.97	756.73	42.	-11.	-0.006	128.56	1.596s
AG-110M	3054.82	763.94	62.	-8.	-0.005	163.49	1.602s
PA-234M	3064.70	766.41	96.	-17.	-0.010	68.95	1.605s
EU-152	3114.73	778.92	19.	11.	0.006	86.88	1.615s
BI-212	3140.74	785.42	28.	13.	0.007	88.84	1.621s
CS-134	3182.53	795.87	44.	15.	0.008	67.61	1.630s
CS-134	3206.86	801.95	78.	11.	0.006	117.91	1.635s
CO-58	3242.16	810.78	100.	-18.	-0.010	81.76	1.643s
La-140	3262.14	815.77	118.	-15.	-0.008	106.07	1.647s
MN-54	3338.46	834.85	51.	-11.	-0.006	110.60	1.663s
Co-56	3386.15	846.77	25.	11.	0.006	104.38	1.674
TL-208	3441.33	860.56	26.	29.	0.016	42.52	1.685s
NB-94	3483.47	871.10	25.	3.	0.001	273.86	1.695s
EU-154	3492.00	873.23	22.	6.	0.003	121.42	1.696s
PA-234	3521.21	880.53	43.	4.	0.002	218.52	1.703s
PA-234	3532.05	883.24	47.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	47.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	69.	-15.	-0.008	84.99	1.710s
y-88	3591.26	898.04	50.	-19.	-0.010	85.47	1.718s
AC-228	3643.38	911.07	25.	124.	0.069	12.62	1.729s
AG-110M	3749.09	937.49	55.	-20.	-0.011	60.57	1.751s
PA-234	3783.21	946.02	30.	-1.	-0.001	930.14	1.759s
EU-152	3855.58	964.11	85.	-25.	-0.014	82.12	1.774s
AC-228	3875.02	968.97	58.	86.	0.048	16.56	1.778
EU-154	3984.48	996.33	64.	0.	0.000	1000.00	1.801s
Co-56	4150.56	1037.84	43.	-9.	-0.005	174.65	1.836s
Cs-136	4191.49	1048.07	46.	-12.	-0.006	88.04	1.845s
BI-207	4253.86	1063.66	11.	20.	0.011	42.72	1.858s
Ga-68	4308.84	1077.40	37.	-8.	-0.005	170.22	1.870s
FE-59	4396.27	1099.25	16.	21.	0.012	48.48	1.888s
EU-152	4447.58	1112.07	121.	-15.	-0.008	108.45	1.899s
ZN-65	4461.46	1115.55	106.	-6.	-0.003	243.46	1.901s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4482.57	1120.82	9.	57.	0.031	18.16	1.979s
Sc-46	4481.49	1120.55	100.	0.	0.000	1000.00	1.906
CO-60	4692.30	1173.24	18.	9.	0.005	116.94	1.950s
Ta-182	4755.57	1189.05	28.	15.	0.008	85.68	1.963
Ta-182	4885.06	1221.41	51.	-12.	-0.007	142.52	1.990
Co-56	4952.57	1238.28	45.	7.	0.004	242.01	2.004s
NA-22	5097.62	1274.53	40.	-14.	-0.008	70.56	2.034s
EU-154	5097.68	1274.54	53.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	45.	-20.	-0.011	81.49	2.048s
CO-60	5329.61	1332.50	23.	-6.	-0.003	281.47	2.081
AG-110M	5536.89	1384.30	12.	2.	0.001	424.26	2.124s
EU-152	5631.75	1408.00	6.	7.	0.004	87.41	2.143
K-40	5844.28	1461.10	10.	396.	0.220	5.16	1.548s
La-140	6385.02	1596.21	13.	4.	0.002	209.54	2.294s
BI-214	7058.61	1764.49	4.	42.	0.023	17.00	2.427s
Co-56	7086.08	1771.35	46.	0.	0.000	1000.00	2.433s
y-88	7345.12	1836.06	13.	-3.	-0.002	284.60	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	-5.2371E+00				5.31E+01	
			477.60	-5.237E+00	(	1.784E+01 1.02E+02 1.05E+01	G
NA-22	C	-8.0746E-01				9.50E+02	
			1274.53	-8.075E-01	?(	1.894E+00 7.06E+01 9.99E+01	G
K-40	N	2.4339E+02				4.66E+11	
			1460.83	2.434E+02	(P	1.093E+01 5.16E+00 1.07E+01	G
Sc-46	F	-6.5605E-01				8.38E+01	
			889.28	-6.561E-01	?(	1.870E+00 8.50E+01 1.00E+02	G
			1120.55	0.000E+00	+	2.642E+00 1.00E+03 1.00E+02	G
CR-51	F	3.9271E+00				2.77E+01	
			320.08	3.927E+00	(	2.311E+01 1.76E+02 9.94E+00	G
MN-54	C	-4.6393E-01				3.12E+02	
			834.85	-4.639E-01	?(P	1.544E+00 1.11E+02 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F 1.9625E+00					4.45E+01	
		1099.25	1.963E+00	?(	1.995E+00	4.85E+01	5.65E+01 G
		1291.60	-2.781E+00	&	4.706E+00	8.15E+01	4.32E+01 G
Co-56	C 5.1792E-01					7.73E+01	
		846.77	4.779E-01	&(	1.130E+00	1.04E+02	9.99E+01 G
		1238.28	5.784E-01	?(P	2.982E+00	2.42E+02	6.61E+01 G
		1037.84	-3.101E+00	+	1.186E+01	1.75E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.682E+01	1.00E+03	1.55E+01 A
CO-57	C -4.1356E-01					2.72E+02	
		122.06	-4.136E-01	?(	1.330E+00	9.66E+01	8.56E+01 G
		136.47	0.000E+00	+	1.584E+01	1.00E+03	1.07E+01 G
CO-58	C -7.6331E-01					7.09E+01	
		810.78	-7.633E-01	?(	2.084E+00	8.18E+01	9.95E+01 G
CO-60	F 6.9218E-02					1.93E+03	
		1332.50	-3.477E-01	?(P	1.522E+00	2.81E+02	1.00E+02 G
		1173.24	4.865E-01	&(P	1.255E+00	1.17E+02	9.99E+01 G
ZN-65	F -6.4019E-01					2.44E+02	
		1115.55	-6.402E-01	?(	5.350E+00	2.43E+02	5.06E+01 G
NB-94	I 2.0947E-01					7.41E+06	
		702.63	3.024E-01	?(	1.899E+00	1.84E+02	9.79E+01 G
		871.10	1.184E-01	?(	1.162E+00	2.74E+02	9.99E+01 G
ZR-95	I 7.7872E-02					6.40E+01	
		756.73	-8.066E-01	?(	2.413E+00	1.29E+02	5.45E+01 G
		724.20	1.169E+00	?(	3.962E+00	1.01E+02	4.42E+01 G
NB-95	I -4.1997E-03					6.40E+01	
		765.79	-4.200E-03	&(P	1.677E+00	1.13E+04	9.98E+01 G
RU-103	I -5.4793E-01					3.93E+01	
		497.05	-5.479E-01	?(	1.298E+00	9.98E+01	9.09E+01 G
		610.30	0.000E+00	+	5.612E+01	1.00E+03	5.75E+00 GA
RH-106	I -6.4450E+00					3.74E+02	
		621.92	-6.445E+00	?(	3.460E+01	1.60E+02	9.93E+00 G
		1050.36	-1.635E+00	%	1.274E+02	2.20E+03	1.56E+00 G
		511.86	1.407E+01	?	6.526E+00	2.65E+01	2.00E+01 GA
AG-108M	C 4.4184E-01					1.53E+05	
		433.94	3.162E-01	?(P	9.462E-01	1.23E+02	9.05E+01 G
		722.94	5.669E-01	?(	1.606E+00	8.44E+01	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	0.000E+00	-	3.608E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.2967E-01					2.50E+02	
			884.68	0.000E+00	?(	2.139E+00	1.00E+03	7.27E+01 G
			657.76	-6.915E-01	+	2.507E+00	1.08E+02	9.46E+01 G
			937.49	-2.787E+00	+ P	5.092E+00	6.06E+01	3.44E+01 G
			1384.30	5.176E-01	?(	4.880E+00	4.24E+02	2.43E+01 G
			763.94	-1.481E+00	+ P	7.123E+00	1.63E+02	2.23E+01 G
SN-113	F	7.6236E-01					1.15E+02	
			391.69	7.624E-01	?(	2.757E+00	1.08E+02	6.40E+01 G
SB-124	F	2.9587E-02					6.02E+01	
			602.73	-2.291E-01	?(	3.281E+00	4.24E+02	9.83E+01 G
			1690.98	-7.713E-02	% P	1.130E+00	4.07E+03	4.78E+01 G
			722.79	2.381E+00	?(	1.273E+01	1.55E+02	1.08E+01 G
SB-125	I	2.3140E+00					1.01E+03	
			427.88	1.438E+00	?(P	3.349E+00	9.79E+01	2.96E+01 G
			600.50	-3.171E+00	&	1.841E+01	1.73E+02	1.79E+01 G
			635.89	3.104E-01	-	1.044E+01	9.43E+02	1.13E+01 G
			463.37	4.790E+00	(	1.401E+01	8.74E+01	1.05E+01 G
I-131	I	2.7793E-01					8.02E+00	
			364.48	2.779E-01	&(P	1.113E+00	1.60E+02	8.17E+01 G
			284.30	-5.099E+00	+	1.713E+01	1.36E+02	6.14E+00 G
			636.97	-8.171E-01	+	1.643E+01	5.66E+02	7.17E+00 G
Gd-153	F	-1.2308E+00					2.42E+02	
			97.50	-1.231E+00	?(	7.324E+00	1.79E+02	3.00E+01 G
			103.20	-1.226E+00	+	9.775E+00	2.39E+02	2.18E+01 G
Ga-68	C	-1.5399E+01					4.71E-02	
			1077.40	-1.540E+01	?(	5.762E+01	1.70E+02	3.30E+00 G
Tc-99m	I	-4.5009E-01					2.51E-01	
			140.51	-4.501E-01	&(	2.165E+00	1.44E+02	8.93E+01 G
BA-133	F	6.5951E-01					3.85E+03	
			356.00	6.595E-01	?(	3.362E+00	1.52E+02	6.20E+01 G
			302.85	-2.496E+00	+	1.270E+01	1.52E+02	1.83E+01 G
			383.84	-5.736E+00	+	1.961E+01	1.02E+02	8.94E+00 GA
			80.99	1.138E+00	? P	6.043E+00	1.60E+02	3.41E+01 GA
CS-134	I	6.7872E-01					7.54E+02	
			604.71	0.000E+00	?(	3.283E+00	1.00E+03	9.76E+01 G
			795.87	7.289E-01	?(	1.632E+00	6.76E+01	8.55E+01 G
			569.32	-2.946E+00	+	8.475E+00	8.57E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	5.259E+00	?(	2.105E+01	1.18E+02	8.69E+00 G
			563.24	3.332E+00	?(	1.284E+01	1.59E+02	8.35E+00 G
CS-137	I	4.0322E+00					1.10E+04	
			661.66	4.032E+00	*(P	9.291E-01	1.40E+01	8.52E+01 G
CE-139	F	4.0770E-01					1.38E+02	
			165.85	4.077E-01	&(	1.334E+00	9.80E+01	7.99E+01 G
Ba-140	I	1.2090E+00					1.28E+01	
			537.26	1.209E+00	*(P	3.875E+00	1.31E+02	2.44E+01 G
			162.66	-2.591E+00	+	1.836E+01	2.10E+02	6.22E+00 G
			304.85	-1.088E+01	+ P	5.558E+01	5.18E+01	4.29E+00 G
La-140	I	7.5980E-01					1.28E+01	
			1596.21	3.183E-01	&(	1.417E+00	2.10E+02	9.54E+01 G
			487.02	1.121E+00	?(	4.096E+00	1.09E+02	4.55E+01 G
			328.76	2.024E+00	?(	1.037E+01	1.53E+02	2.03E+01 G
			815.77	-2.710E+00	+	9.676E+00	1.06E+02	2.33E+01 G
CE-141	I	-7.9289E-01					3.25E+01	
			145.44	-7.929E-01	&(	3.882E+00	1.47E+02	4.82E+01 G
CE-144	I	3.0398E+00					2.85E+02	
			133.54	3.040E+00	&(	1.544E+01	1.52E+02	1.11E+01 G
PM-144	C	-4.2646E-01					3.63E+02	
			696.54	-4.265E-01	?(P	1.846E+00	1.19E+02	9.90E+01 G
			618.06	0.000E+00	+	3.286E+00	1.00E+03	9.91E+01 G
EU-152	F	1.7681E+00					4.94E+03	
			344.29	0.000E+00	(	8.500E+00	1.00E+03	2.65E+01 G
			1112.07	-5.764E+00	+	2.106E+01	1.08E+02	1.36E+01 G
			121.78	-1.238E+00	+	3.837E+00	9.31E+01	2.86E+01 G
			778.92	3.541E+00	&(	7.202E+00	8.69E+01	1.29E+01 G
			964.11	-8.332E+00	+	1.496E+01	8.21E+01	1.46E+01 G
			244.69	4.922E+00	?(P	3.127E+01	1.90E+02	7.58E+00 G
			1408.00	2.260E+00	?	4.282E+00	8.74E+01	2.10E+01 GA
EU-154	I	2.3837E+00					3.14E+03	
			873.23	2.112E+00	?(	8.925E+00	1.21E+02	1.23E+01 G
			123.10	-6.466E-02	%	2.667E+00	1.22E+03	4.08E+01 G
			1274.54	0.000E+00	-	6.165E+00	1.00E+03	3.52E+01 G
			723.36	2.548E+00	?(	7.964E+00	9.28E+01	2.02E+01 G
			1004.77	2.740E-01	%	7.966E+00	1.29E+03	1.80E+01 G
			996.33	0.000E+00	-	1.850E+01	1.00E+03	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	6.4624E-01					1.81E+03	
			105.31	0.000E+00	*(	9.953E+00	1.00E+03	2.12E+01 G
			86.54	1.092E+00	(	4.746E+00	1.30E+02	3.07E+01 G
HF-181	F	2.2338E-01					4.24E+01	
			482.00	-3.490E-01	?(	2.462E+00	2.08E+02	8.05E+01 G
			133.02	-7.706E-01	&	3.847E+00	1.50E+02	4.33E+01 G
			345.83	2.668E+00	?(P	1.436E+01	1.61E+02	1.51E+01 G
			136.30	1.802E+00	?(	2.905E+01	4.81E+02	5.85E+00 G
Ta-182	F	1.7961E+00					1.14E+02	
			1121.30	1.792E-01	%(	7.422E+00	1.19E+03	3.49E+01 G
			1221.41	-2.541E+00	+	7.621E+00	1.43E+02	2.70E+01 G
			1189.05	5.280E+00	(	9.516E+00	8.57E+01	1.62E+01 G
Hg-203	F	-4.4261E-01					4.66E+01	
			279.20	-4.426E-01	?(	1.452E+00	9.79E+01	8.15E+01 G
TL-208	N	7.3379E+00					6.98E+02	
			583.02	7.297E+00	(P	9.130E-01	8.86E+00	8.45E+01 G
			277.28	7.885E+00	(P	9.703E+00	4.61E+01	6.31E+00 G
			860.56	1.026E+01	+ P	9.364E+00	4.25E+01	1.24E+01 G
pm-146	C	1.3736E-01					2.02E+03	
			747.16	-1.551E-01	%(	4.200E+00	1.14E+03	3.40E+01 G
			735.72	5.793E-01	?(	5.100E+00	3.68E+02	2.25E+01 G
			453.88	-3.359E-01	+ P	1.711E+00	1.68E+02	6.50E+01 G
y-88	F	-9.1440E-01					1.07E+02	
			898.04	-9.144E-01	?(	1.727E+00	8.55E+01	9.37E+01 G
			1836.06	-2.622E-01	+	1.551E+00	2.85E+02	9.92E+01 G
Cd-113m		-2.6786E+03					5.33E+03	
			263.70	-2.679E+03	?(	1.898E+04	2.08E+02	6.00E-03 K
Cd-109	F	1.0237E+01					4.53E+02	
			88.04	1.024E+01	?(	4.252E+01	1.25E+02	3.79E+00 G
Cf-251	T	-2.1091E+00					3.28E+05	
			176.60	-2.109E+00	?(	5.661E+00	1.05E+02	1.70E+01 G
			227.00	4.763E+00	?	1.365E+01	1.12E+02	6.30E+00 GA
Cf-249	T	-1.3744E-01					1.28E+05	
			387.95	-5.269E-01	(	2.796E+00	1.58E+02	6.60E+01 G
			333.44	1.520E+00	&(	1.402E+01	2.74E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		4.9470E+00					3.65E+07	
			87.57	8.905E-01	-	3.840E+00	1.29E+02	3.75E+01 GA
			64.28	4.947E+00	&(	1.897E+01	1.15E+02	9.70E+00 G
			86.94	4.418E+00	}	1.580E+01	6.86E+01	9.04E+00 GA
PB-210	N	1.2959E+01					8.14E+03	
			46.54	1.296E+01	(P	3.054E+01	8.38E+01	4.25E+00 G
PB-212	N	1.8587E+01					6.98E+02	
			238.63	1.859E+01	(P	1.995E+00	5.58E+00	4.33E+01 G
			300.03	2.123E+01	+ P	2.232E+01	3.42E+01	3.28E+00 GA
PB-214	N	1.3386E+01					5.84E+05	
			351.93	1.292E+01	(P	2.529E+00	8.87E+00	3.76E+01 G
			295.09	1.430E+01	(P	3.869E+00	1.32E+01	1.93E+01 G
			242.00	1.877E+01	+	1.085E+01	1.99E+01	7.43E+00 GA
BI-207	C	5.0468E-01					1.18E+04	
			569.70	-1.822E-01	?(	1.683E+00	2.69E+02	9.77E+01 G
			1063.66	1.406E+00	?(	1.240E+00	4.27E+01	7.45E+01 G
BI-212	N	-8.4105E+00					6.98E+02	
			727.17	-8.410E+00	@(	2.713E+01	9.61E+01	7.55E+00 G
			785.42	4.279E+01	? P	8.842E+01	8.88E+01	1.28E+00 GA
BI-214	N	1.4804E+01					5.84E+05	
			609.31	1.480E+01	@(P	2.276E+00	9.59E+00	4.61E+01 G
			1120.29	2.009E+01	+ P	6.017E+00	1.82E+01	1.51E+01 G
			1764.49	2.057E+01	+ P	5.990E+00	1.70E+01	1.54E+01 G
BI-210M	T	6.5578E-01					1.10E+09	
			265.83	6.558E-01	&(	1.950E+00	8.88E+01	5.00E+01 G
			304.90	-1.033E+00	+ P	8.672E+00	8.42E+01	2.80E+01 G
AC-228	N	2.1110E+01					2.10E+03	
			911.07	1.961E+01	?(	4.113E+00	1.26E+01	2.90E+01 G
			968.97	2.361E+01	(	1.052E+01	1.66E+01	1.75E+01 G
			338.32	0.000E+00	-	1.852E+01	1.00E+03	1.20E+01 G
			93.35	-6.694E+00	-	4.061E+01	1.82E+02	5.56E+00 XA
TH-227	N	5.8268E+00					7.95E+03	
			50.14	5.827E+00	?(	2.282E+01	1.17E+02	8.00E+00 G
			256.24	-4.413E+00	+	1.481E+01	1.36E+02	7.00E+00 G
TH-229	N	5.7601E+00					2.68E+06	
			193.51	7.397E+00	*(	1.827E+01	9.66E+01	4.40E+00 G
			210.85	3.352E+00	?(	3.449E+01	3.98E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-2.4283E+01					1.63E+12	
			63.29	-2.428E+01	(P	5.285E+01	3.66E+01	3.81E+00 G
			92.59	-4.944E+00	+ P	3.023E+01	1.81E+02	5.58E+00 G
PA-231	N	-1.5875E+01					1.20E+07	
			302.65	-1.587E+01	?(	7.885E+01	1.49E+02	2.88E+00 G
			300.07	-1.844E+01	+	9.537E+01	1.55E+02	2.46E+00 G
PA-233	C	1.1385E+00					7.82E+08	
			312.01	1.138E+00	?(	6.425E+00	1.69E+02	3.60E+01 G
			300.18	-7.317E+00	+	3.714E+01	1.52E+02	6.20E+00 G
PA-234	N	-1.8582E+00					1.63E+12	
			131.29	-1.858E+00	(	9.360E+00	1.51E+02	1.80E+01 G
			946.02	-4.703E-01	+ P	9.989E+00	9.30E+02	1.34E+01 G
			569.47	-3.355E+00	+	1.857E+01	1.62E+02	8.20E+00 G
			883.24	0.000E+00	+	1.618E+01	1.00E+03	9.60E+00 G
			880.53	3.229E+00	?	2.470E+01	2.19E+02	6.00E+00 GA
PA-234M	N	-4.1416E+00					1.63E+12	
			1001.00	-4.142E+00	&(P	2.363E+02	1.78E+03	8.37E-01 G
			766.41	-2.352E+02	+ P	6.648E+02	6.90E+01	2.94E-01 G
U-235	N	-3.7837E+00					2.57E+11	
			143.79	-3.784E+00	&(P	1.757E+01	1.26E+02	1.10E+01 G
			205.33	-1.005E+01	+ P	2.223E+01	1.30E+02	5.01E+00 G
			163.38	-3.009E+00	& P	2.012E+01	3.69E+02	5.08E+00 G
AM-241	T	-2.0665E+00					1.58E+05	
			59.54	-2.066E+00	(P	6.035E+00	4.57E+01	3.59E+01 G
Ir-192	F	6.9105E-01					7.40E+01	
			316.49	4.773E-01	&(	2.732E+00	1.71E+02	8.70E+01 G
			468.06	-4.704E-01	+	3.163E+00	1.98E+02	5.18E+01 G
			308.44	1.277E+00	&(	7.096E+00	1.66E+02	3.18E+01 G
Cs-136	F	1.4111E-02					1.30E+01	
			818.50	1.411E-02	%(	2.404E+00	4.93E+03	1.00E+02 G
			1048.07	-7.323E-01	+	2.174E+00	8.80E+01	8.00E+01 G
			340.57	0.000E+00	&	4.765E+00	1.00E+03	4.69E+01 G
Np-239	T	-1.7260E+00					2.36E+00	
			103.70	0.000E+00	+	8.808E+00	1.00E+03	2.40E+01 X
			106.13	-1.726E+00	&(	9.769E+00	1.70E+02	2.27E+01 G
			99.50	-2.456E+00	+	1.444E+01	1.77E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	6.7019E+00					1.11E+01	
		531.00	6.702E+00	?(	5.772E+00	3.84E+01	1.30E+01 G
		91.10	1.356E+00	-	5.731E+00	1.27E+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:
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	326.	22.	0.012	117.08	5.827E+00	
AM-241	59.54	743.	-44.	-0.025	45.71	-2.066E+00	P
TH-234	63.29	735.	-59.	-0.033	36.62	-2.428E+01	P
EU-155	86.54	617.	27.	0.015	130.24	1.092E+00	
Cd-109	88.04	770.	32.	0.018	124.75	1.024E+01	
TH-234	92.59	880.	-23.	-0.013	181.25	-4.944E+00	P
Gd-153	97.50	1550.	-31.	-0.017	178.86	-1.231E+00	
Np-239	99.50	1519.	-31.	-0.017	176.75	-2.456E+00	
Gd-153	103.20	1487.	-23.	-0.013	239.25	-1.226E+00	
Np-239	106.13	1621.	-34.	-0.019	170.19	-1.726E+00	
EU-152	121.78	379.	-30.	-0.017	93.15	-1.238E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	122.06	409.	-30.	-0.017	96.62	-4.136E-01	
PA-234	131.29	877.	-28.	-0.016	151.11	-1.858E+00	
HF-181	133.02	849.	-28.	-0.015	149.75	-7.706E-01	
HF-181	136.30	868.	9.	0.005	481.05	1.802E+00	
Tc-99m	140.51	1032.	-32.	-0.018	144.47	-4.501E-01	
U-235	143.79	1066.	-33.	-0.019	125.50	-3.784E+00	P
CE-141	145.44	992.	-31.	-0.017	146.99	-7.929E-01	
Ba-140	162.66	312.	-12.	-0.007	210.16	-2.591E+00	
U-235	163.38	246.	-11.	-0.006	369.26	-3.009E+00	P
CE-139	165.85	273.	24.	0.014	98.04	4.077E-01	
Cf-251	176.60	202.	-26.	-0.014	105.38	-2.109E+00	
TH-229	193.51	121.	22.	0.012	96.59	7.397E+00	
U-235	205.33	219.	-32.	-0.018	129.52	-1.005E+01	P
TH-229	210.85	180.	6.	0.004	397.93	3.352E+00	
Cf-251	227.00	110.	18.	0.010	111.53	4.763E+00	
EU-152	244.69	803.	21.	0.012	190.19	4.922E+00	P
TH-227	256.24	136.	-17.	-0.009	136.48	-4.413E+00	
Cd-113m	263.70	159.	-9.	-0.005	208.33	-2.679E+03	
BI-210M	265.83	113.	18.	0.010	88.84	6.558E-01	
Hg-203	279.20	158.	-19.	-0.010	97.91	-4.426E-01	
I-131	284.30	120.	-16.	-0.009	136.36	-5.099E+00	
PA-231	300.07	584.	-22.	-0.012	154.75	-1.844E+01	
PA-233	300.18	562.	-22.	-0.012	151.83	-7.317E+00	
PA-231	302.65	540.	-22.	-0.012	148.57	-1.587E+01	
Ba-140	304.85	590.	-23.	-0.013	51.85	-1.088E+01	P
BI-210M	304.90	613.	-14.	-0.008	84.17	-1.033E+00	P
Ir-192	308.44	516.	20.	0.011	165.98	1.277E+00	
PA-233	312.01	536.	20.	0.011	168.60	1.138E+00	
Ir-192	316.49	556.	20.	0.011	171.02	4.773E-01	
CR-51	320.08	509.	18.	0.010	175.69	3.927E+00	
La-140	328.76	409.	19.	0.011	152.96	2.024E+00	
Cf-249	333.44	428.	11.	0.006	274.06	1.520E+00	
HF-181	345.83	402.	18.	0.010	160.54	2.668E+00	P
I-131	364.48	60.	10.	0.005	159.81	2.779E-01	P
Cf-249	387.95	243.	-14.	-0.008	157.51	-5.269E-01	
SN-113	391.69	219.	20.	0.011	107.96	7.624E-01	
SB-125	427.88	56.	16.	0.009	97.89	1.438E+00	P
AG-108M	433.94	40.	11.	0.006	123.10	3.162E-01	P
pm-146	453.88	66.	-8.	-0.004	167.97	-3.359E-01	P
SB-125	463.37	115.	18.	0.010	87.42	4.790E+00	
Ir-192	468.06	143.	-9.	-0.005	197.51	-4.704E-01	
BE-7	477.60	184.	-19.	-0.011	101.70	-5.237E+00	
HF-181	482.00	204.	-10.	-0.005	208.22	-3.490E-01	
La-140	487.02	176.	18.	0.010	108.82	1.121E+00	
RU-103	497.05	65.	-17.	-0.009	99.80	-5.479E-01	
RH-106	511.86	77.	94.	0.052	26.49	1.407E+01	
Ba-140	537.26	35.	10.	0.005	131.36	1.209E+00	P
CS-134	563.24	43.	9.	0.005	158.72	3.332E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	569.32	65.	-14.	-0.008	85.71	-2.946E+00	
PA-234	569.47	90.	-8.	-0.005	161.95	-3.355E+00	
BI-207	569.70	106.	-6.	-0.003	268.76	-1.822E-01	
SB-125	600.50	415.	-17.	-0.009	173.00	-3.171E+00	
SB-124	602.73	397.	-7.	-0.004	423.93	-2.291E-01	
RH-106	621.92	431.	-19.	-0.010	160.19	-6.445E+00	
SB-125	635.89	44.	1.	0.001	943.40	3.104E-01	
I-131	636.97	44.	-2.	-0.001	566.04	-8.171E-01	
AG-110M	657.76	184.	-18.	-0.010	108.08	-6.915E-01	
PM-144	696.54	97.	-11.	-0.006	118.79	-4.265E-01	P
NB-94	702.63	100.	8.	0.004	183.60	3.024E-01	
SB-124	722.79	50.	7.	0.004	154.84	2.381E+00	
AG-108M	722.94	57.	13.	0.007	84.36	5.669E-01	
EU-154	723.36	70.	13.	0.007	92.81	2.548E+00	
ZR-95	724.20	83.	13.	0.007	100.50	1.169E+00	
BI-212	727.17	116.	-16.	-0.009	96.11	-8.410E+00	
pm-146	735.72	33.	3.	0.002	367.83	5.793E-01	
ZR-95	756.73	42.	-11.	-0.006	128.56	-8.066E-01	
AG-110M	763.94	62.	-8.	-0.005	163.49	-1.481E+00	P
PA-234M	766.41	96.	-17.	-0.010	68.95	-2.352E+02	P
EU-152	778.92	19.	11.	0.006	86.88	3.541E+00	
BI-212	785.42	28.	13.	0.007	88.84	4.279E+01	P
CS-134	795.87	44.	15.	0.008	67.61	7.289E-01	
CS-134	801.95	78.	11.	0.006	117.91	5.259E+00	
CO-58	810.78	100.	-18.	-0.010	81.76	-7.633E-01	
La-140	815.77	118.	-15.	-0.008	106.07	-2.710E+00	
MN-54	834.85	51.	-11.	-0.006	110.60	-4.639E-01	P
Co-56	846.77	25.	11.	0.006	104.38	4.779E-01	
NB-94	871.10	25.	3.	0.001	273.86	1.184E-01	
EU-154	873.23	22.	6.	0.003	121.42	2.112E+00	
PA-234	880.53	43.	4.	0.002	218.52	3.229E+00	
Sc-46	889.28	69.	-15.	-0.008	84.99	-6.561E-01	
y-88	898.04	50.	-19.	-0.010	85.47	-9.144E-01	
AG-110M	937.49	55.	-20.	-0.011	60.57	-2.787E+00	P
PA-234	946.02	30.	-1.	-0.001	930.14	-4.703E-01	P
EU-152	964.11	85.	-25.	-0.014	82.12	-8.332E+00	
Co-56	1037.84	43.	-9.	-0.005	174.65	-3.101E+00	
Cs-136	1048.07	46.	-12.	-0.006	88.04	-7.323E-01	
BI-207	1063.66	11.	20.	0.011	42.72	1.406E+00	
Ga-68	1077.40	37.	-8.	-0.005	170.22	-1.540E+01	
FE-59	1099.25	16.	21.	0.012	48.48	1.963E+00	
EU-152	1112.07	121.	-15.	-0.008	108.45	-5.764E+00	
ZN-65	1115.55	106.	-6.	-0.003	243.46	-6.402E-01	
CO-60	1173.24	18.	9.	0.005	116.94	4.865E-01	P
Ta-182	1189.05	28.	15.	0.008	85.68	5.280E+00	
Ta-182	1221.41	51.	-12.	-0.007	142.52	-2.541E+00	
Co-56	1238.28	45.	7.	0.004	242.01	5.784E-01	P
NA-22	1274.53	40.	-14.	-0.008	70.56	-8.075E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1291.60	45.	-20.	-0.011	81.49	-2.781E+00		
CO-60	1332.50	23.	-6.	-0.003	281.47	-3.477E-01		P
AG-110M	1384.30	12.	2.	0.001	424.26	5.176E-01		
EU-152	1408.00	6.	7.	0.004	87.41	2.260E+00		
La-140	1596.21	13.	4.	0.002	209.54	3.183E-01		
y-88	1836.06	13.	-3.	-0.002	284.60	-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 Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-5.2370E+00	-5.2371E+00	1.017E+02%	1.78E+01
NA-22	#A	-8.0746E-01	-8.0746E-01	7.056E+01%	1.89E+00
K-40		2.4339E+02	2.4339E+02	5.158E+00%	1.09E+01
Sc-46	#A	-6.5605E-01	-6.5605E-01	8.499E+01%	1.87E+00
CR-51	#A	3.9270E+00	3.9271E+00	1.757E+02%	2.31E+01
MN-54	#A	-4.6393E-01	-4.6393E-01	1.106E+02%	1.54E+00
FE-59	#A	1.9625E+00	1.9625E+00	4.848E+01%	2.00E+00
Co-56	#A	5.1792E-01	5.1792E-01	1.044E+02%	1.13E+00
CO-57	#A	-4.1356E-01	-4.1356E-01	9.662E+01%	1.33E+00
CO-58	#A	-7.6331E-01	-7.6331E-01	8.176E+01%	2.08E+00
CO-60	#A	6.9218E-02	6.9218E-02	1.169E+02%	1.52E+00
ZN-65	#A	-6.4019E-01	-6.4019E-01	2.435E+02%	5.35E+00
NB-94	#A	2.0947E-01	2.0947E-01	1.649E+02%	1.90E+00
ZR-95	#A	7.7872E-02	7.7872E-02	8.159E+01%	2.41E+00
NB-95	#A	-4.1997E-03	-4.1997E-03	1.134E+04%	1.68E+00
RU-103	#A	-5.4792E-01	-5.4793E-01	9.980E+01%	1.30E+00
RH-106	#A	-6.4450E+00	-6.4450E+00	1.602E+02%	3.46E+01
AG-108M	#A	4.4184E-01	4.4184E-01	7.462E+01%	9.46E-01
AG-110M	#A	1.2967E-01	1.2967E-01	4.243E+02%	2.14E+00
SN-113	#A	7.6236E-01	7.6236E-01	1.080E+02%	2.76E+00
SB-124	#A	2.9587E-02	2.9587E-02	1.548E+02%	3.28E+00
SB-125	#A	2.3140E+00	2.3140E+00	6.562E+01%	3.35E+00
I-131	#A	2.7791E-01	2.7793E-01	1.598E+02%	1.11E+00
Gd-153	#A	-1.2308E+00	-1.2308E+00	1.789E+02%	7.32E+00
Ga-68	#A	-1.5271E+01	-1.5399E+01	1.702E+02%	5.76E+01
Tc-99m	#A	-4.4939E-01	-4.5009E-01	1.445E+02%	2.16E+00
BA-133	#A	6.5951E-01	6.5951E-01	1.519E+02%	3.36E+00
CS-134	#A	6.7872E-01	6.7872E-01	6.761E+01%	3.28E+00
CS-137	#	4.0322E+00	4.0322E+00	1.401E+01%	9.29E-01
CE-139	#A	4.0770E-01	4.0770E-01	9.804E+01%	1.33E+00
Ba-140	#A	1.2090E+00	1.2090E+00	1.314E+02%	3.87E+00
La-140	#A	7.5978E-01	7.5980E-01	9.377E+01%	1.42E+00
CE-141	#A	-7.9288E-01	-7.9289E-01	1.470E+02%	3.88E+00
CE-144	A	3.0398E+00	3.0398E+00	1.524E+02%	1.54E+01

PM-144 #A	-4.2646E-01	-4.2646E-01	1.188E+02%	1.85E+00
EU-152 #A	1.7681E+00	1.7681E+00	8.688E+01%	8.50E+00
EU-154 #A	2.3837E+00	2.3837E+00	7.641E+01%	8.93E+00
EU-155 #A	6.4624E-01	6.4624E-01	1.302E+02%	9.95E+00
HF-181 #A	2.2338E-01	2.2338E-01	1.605E+02%	2.46E+00
Ta-182 #A	1.7961E+00	1.7961E+00	8.568E+01%	7.42E+00
Hg-203 #A	-4.4261E-01	-4.4261E-01	9.791E+01%	1.45E+00
TL-208	7.3379E+00	7.3379E+00	8.860E+00%	9.13E-01
pm-146 #A	1.3736E-01	1.3736E-01	3.678E+02%	4.20E+00
y-88 #A	-9.1440E-01	-9.1440E-01	8.547E+01%	1.73E+00
Cd-113m#A	-2.6786E+03	-2.6786E+03	2.083E+02%	1.90E+04
Cd-109 #A	1.0237E+01	1.0237E+01	1.247E+02%	4.25E+01
Cf-251 #A	-2.1091E+00	-2.1091E+00	1.054E+02%	5.66E+00
Cf-249 #A	-1.3744E-01	-1.3744E-01	1.575E+02%	2.80E+00
Sn-126 A	4.9470E+00	4.9470E+00	1.151E+02%	1.90E+01
PB-210 A	1.2959E+01	1.2959E+01	8.384E+01%	3.05E+01
PB-212	1.8587E+01	1.8587E+01	5.577E+00%	2.00E+00
PB-214	1.3386E+01	1.3386E+01	7.952E+00%	2.53E+00
BI-207 #A	5.0468E-01	5.0468E-01	4.272E+01%	1.68E+00
BI-212 #A	-8.4105E+00	-8.4105E+00	9.611E+01%	2.71E+01
BI-214 #	1.4804E+01	1.4804E+01	9.593E+00%	2.28E+00
BI-210M#A	6.5578E-01	6.5578E-01	8.884E+01%	1.95E+00
AC-228	2.1110E+01	2.1110E+01	1.041E+01%	4.11E+00
TH-227 #A	5.8268E+00	5.8268E+00	1.171E+02%	2.28E+01
TH-229 #A	5.7601E+00	5.7601E+00	9.659E+01%	1.83E+01
TH-234 #A	-2.4283E+01	-2.4283E+01	3.662E+01%	5.29E+01
PA-231 #A	-1.5875E+01	-1.5875E+01	1.486E+02%	7.88E+01
PA-233 #A	1.1385E+00	1.1385E+00	1.686E+02%	6.43E+00
PA-234 #A	-1.8582E+00	-1.8582E+00	1.511E+02%	9.36E+00
PA-234M#A	-4.1416E+00	-4.1416E+00	1.776E+03%	2.36E+02
U-235 #A	-3.7837E+00	-3.7837E+00	1.255E+02%	1.76E+01
AM-241 #A	-2.0665E+00	-2.0665E+00	4.571E+01%	6.04E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.06E+01
Ir-192 #A	6.9104E-01	6.9105E-01	1.192E+02%	2.73E+00
Cs-136 #A	1.4111E-02	1.4111E-02	4.926E+03%	2.40E+00
Np-239 #A	-1.7257E+00	-1.7260E+00	1.702E+02%	9.77E+00
Nd-147 #	6.7016E+00	6.7019E+00	3.844E+01%	5.77E+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

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-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.6 keV)     3.226E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.6 keV) 3.2264526E+02  Bq/Sample
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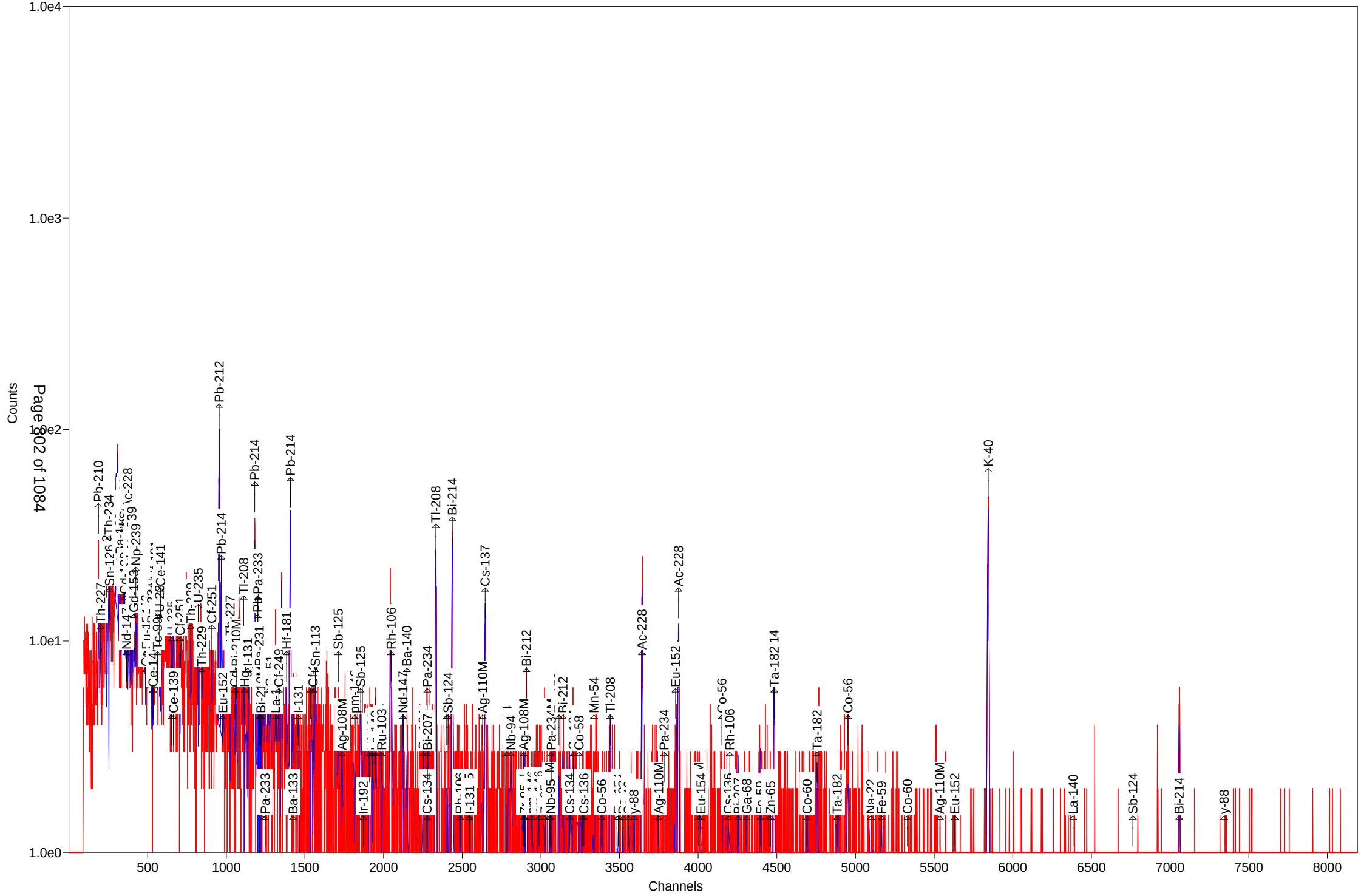
265170_Gamma_160-18567-A-18-B. 16_Gamma_20162154.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20161176

Sample Description: 265170_Gamma_160-18567-A-19-B
Detector: Detector #17
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-19-B

Decay to Time: 9/7/2016 18:35 Live Time: 1800 sec
Acquisition Time: 9/7/2016 18:35:55 Real Time: 1835 sec
Analysis Time: 9/7/2016 19:06 Dead Time: 1.91 %
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_2016-09-04_0724.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	-5.766E-01	703.6	4.057E+00	4.057E+00	1.408E+01
NA-22	3.166E-01	121.7	3.852E-01	3.855E-01	1.352E+00
K-40	2.525E+02	5.2	1.315E+01	1.844E+01	9.999E+00
Sc-46	-7.655E-01	93.3	7.142E-01	7.153E-01	2.397E+00
CR-51	-3.945E+00	101.8	4.018E+00	4.023E+00	1.390E+01
MN-54	-4.276E-01	142.7	6.101E-01	6.105E-01	1.429E+00
FE-59	-8.994E-01	137.9	1.240E+00	1.241E+00	2.822E+00
Co-56	8.407E-01	40.1	3.371E-01	3.398E-01	1.368E+00
CO-57	0.000E+00	1.#INF	2.429E-01	2.429E-01	1.135E+00
CO-58	-6.667E-01	92.5	6.166E-01	6.175E-01	1.956E+00
CO-60	7.677E-01	30.0	2.304E-01	2.336E-01	4.829E-01
ZN-65	0.000E+00	1.#INF	4.514E-01	4.514E-01	5.643E+00
NB-94	5.974E-02	885.0	5.287E-01	5.287E-01	1.317E+00
ZR-95	4.949E-01	155.2	7.680E-01	7.684E-01	1.907E+00
NB-95	-9.517E-01	71.4	6.791E-01	6.809E-01	2.253E+00
RU-103	3.476E-01	99.9	3.471E-01	3.475E-01	8.772E-01
RH-106	-5.778E+00	176.4	1.019E+01	1.019E+01	3.423E+01
AG-108M	-4.603E-03	8803.1	4.052E-01	4.052E-01	1.096E+00
AG-110M	7.500E-01	96.8	7.258E-01	7.268E-01	2.530E+00
SN-113	5.256E-01	122.6	6.442E-01	6.448E-01	2.177E+00
SB-124	-6.099E-01	176.0	1.074E+00	1.074E+00	3.602E+00
SB-125	4.115E+00	21.6	8.906E-01	9.151E-01	3.417E+00
I-131	-2.753E-01	172.1	4.739E-01	4.741E-01	1.241E+00
Gd-153	-7.620E-01	148.0	1.128E+00	1.129E+00	3.786E+00
Ga-68	1.386E+01	106.3	1.473E+01	1.475E+01	3.455E+01
Tc-99m	-3.370E-01	128.0	4.315E-01	4.319E-01	1.444E+00
BA-133	6.601E-03	15294.6	1.010E+00	1.010E+00	3.434E+00
CS-134	5.400E-02	116.6	6.296E-02	6.302E-02	3.564E+00
CS-137	3.525E+00	16.1	5.680E-01	5.969E-01	9.648E-01
CE-139	3.636E-02	1079.4	3.924E-01	3.924E-01	1.339E+00
Ba-140	-4.826E-01	73.4	3.542E-01	3.550E-01	4.593E+00
La-140	5.463E-01	43.1	2.354E-01	2.372E-01	1.973E+00
CE-141	5.746E-01	129.0	7.414E-01	7.420E-01	2.483E+00

CE-144	-2.779E+00	128.6	3.573E+00	3.576E+00	1.194E+01
PM-144	2.245E-01	163.3	3.665E-01	3.667E-01	1.150E+00
EU-152	1.515E+00	46.8	7.085E-01	7.129E-01	6.875E+00
EU-154	3.108E-01	287.0	8.920E-01	8.922E-01	1.298E+01
EU-155	1.169E+00	132.6	1.550E+00	1.552E+00	5.197E+00
HF-181	8.128E-01	81.2	6.600E-01	6.613E-01	1.674E+00
Ta-182	1.327E+00	135.5	1.798E+00	1.799E+00	7.834E+00
Hg-203	-4.556E-01	103.8	4.731E-01	4.738E-01	1.587E+00
TL-208	6.307E+00	11.1	7.018E-01	7.743E-01	1.119E+00
pm-146	8.053E-01	93.2	7.504E-01	7.516E-01	3.034E+00
y-88	1.937E-01	39.4	7.631E-02	7.695E-02	1.528E+00
Cd-113m	0.000E+00	1.#INF	1.878E+03	1.878E+03	2.456E+04
Cd-109	0.000E+00	1.#INF	1.476E+01	1.476E+01	4.960E+01
Cf-251	-1.752E+00	108.2	1.895E+00	1.902E+00	5.096E+00
Cf-249	7.676E-02	557.3	4.278E-01	4.278E-01	2.351E+00
Sn-126	3.858E+00	114.3	4.408E+00	4.413E+00	1.475E+01
PB-210	4.055E+01	33.4	1.355E+01	1.375E+01	3.435E+01
PB-212	1.820E+01	5.7	1.046E+00	1.575E+00	1.949E+00
PB-214	1.330E+01	9.6	1.281E+00	1.456E+00	2.372E+00
BI-207	-1.176E-01	336.7	3.961E-01	3.961E-01	1.383E+00
BI-212	2.462E+01	19.9	4.893E+00	5.058E+00	9.545E+00
BI-214	1.353E+01	8.7	1.178E+00	1.372E+00	1.762E+00
BI-210M	0.000E+00	1.#INF	2.832E-01	2.832E-01	2.964E+00
AC-228	1.905E+01	9.9	1.879E+00	2.116E+00	2.228E+00
TH-227	-2.947E-01	2064.0	6.082E+00	6.082E+00	1.762E+01
TH-229	9.765E-01	713.0	6.963E+00	6.963E+00	1.916E+01
TH-234	1.147E+01	70.7	8.114E+00	8.136E+00	2.673E+01
PA-231	-1.418E+01	140.8	1.998E+01	1.999E+01	6.699E+01
PA-233	-4.023E-02	2705.6	1.088E+00	1.088E+00	5.821E+00
PA-234	1.858E+00	74.8	1.390E+00	1.393E+00	6.726E+00
PA-234M	4.744E+01	85.2	4.044E+01	4.051E+01	2.377E+02
U-235	-1.709E+00	185.8	3.175E+00	3.176E+00	1.190E+01
AM-241	8.374E-01	144.5	1.210E+00	1.211E+00	3.441E+00
Np-237	0.000E+00	1.#INF	4.588E+00	4.588E+00	1.531E+01
Ir-192	-1.119E-01	101.6	1.137E-01	1.139E-01	1.448E+00
Cs-136	5.679E-01	65.1	3.695E-01	3.709E-01	2.320E+00
Np-239	-8.545E-01	178.4	1.524E+00	1.525E+00	5.125E+00
Nd-147	2.520E-01	1179.0	2.971E+00	2.971E+00	7.729E+00
Total	4.886E+02				

Analyst: Aaron Schroder

Sample description
265170_Gamma_160-18567-A-19-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20161176.An1

Acquisition information
Start time: 9/7/2016 6:35:55 PM
Live time: 1800
Real time: 1835
Dead time: 1.91 %
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	9/7/2016 6:35:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2016-09-04_0724.PBC 9/4/2016 7:24:49 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1233

***** 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	65.	33.40	0.60	2.104E-02	46.54	4.250	4.055E+01	PB210
59.54	16.	144.50	0.79	2.957E-02	59.54	35.900	PBC<MDA	AM241
63.15	28.	77.17	0.83	3.157E-02	63.29	3.810	PBC<MDA	TH234
64.33	22.	114.26	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
74.88	180.	11.64	0.80	3.682E-02				
77.22	260.	8.65	0.80	3.765E-02				
87.29	99.	18.74	0.81	4.044E-02	86.54	30.700	4.430E+00	EU155
					86.94	9.040	1.501E+01	Sn126
					87.57	37.500	3.606E+00	Sn126
					88.04	3.790	3.560E+01	Cd109
90.08	83.	20.94	0.82	4.101E-02				
92.95	108.	17.70	0.82	4.150E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.598E+01	AC228
99.50	21.	112.25	0.82	4.234E-02	99.50	15.000	PBC<MDA	Np239
105.31	19.	132.58	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155
121.78	20.	108.86	0.85	4.277E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.985E-01	CO57
145.44	20.	129.03	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
162.66	19.	115.08	0.88	3.813E-02	162.66	6.220	PBC<MDA	Ba140
185.74	106.	18.54	1.39	3.545E-02				
193.51	3.	713.05	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229
238.53	428.	6.35	0.90	2.990E-02	238.63	43.300	1.836E+01	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.89	79.	19.84	0.96	2.960E-02	242.00	7.430	2.007E+01	PB214
244.69	19.	207.68	0.96	2.938E-02	244.69	7.580	PBC<MDA	EU152
260.21	14.	51.25	0.68	2.816E-02				
277.02	29.	42.05	1.70	2.694E-02	277.28	6.310	PBC<MDA	TL208
295.02	97.	18.02	1.06	2.580E-02	295.09	19.300	1.080E+01	PB214
300.11	41.	40.00	0.36	2.550E-02	300.03	3.280	2.723E+01	PB212
					300.07	2.460	3.631E+01	PA231
					300.18	6.200	1.441E+01	PA233
328.76	35.	43.09	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	3.	557.27	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.43	78.	16.18	1.05	2.344E-02	338.32	12.010	1.538E+01	AC228
345.83	15.	130.50	1.05	2.308E-02	345.83	15.070	PBC<MDA	HF181
351.94	205.	9.63	1.24	2.279E-02	351.93	37.600	1.330E+01	PB214
383.84	8.	224.71	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
391.69	13.	122.57	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
463.37	56.	21.65	1.16	1.872E-02	463.37	10.470	1.584E+01	SB125
468.06	7.	193.76	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
482.00	14.	96.68	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
487.02	11.	101.26	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
497.05	10.	99.86	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	90.	28.30	2.45	1.742E-02	511.86	20.000	1.441E+01	RH106
563.24	1.	854.37	1.25	1.624E-02	563.24	8.350	PBC<MDA	CS134
583.20	152.	11.13	1.04	1.583E-02	583.02	84.500	6.307E+00	TL208
609.39	172.	8.70	1.20	1.533E-02	609.31	46.090	1.353E+01	BI214
					610.30	5.750	1.086E+02	RU103
618.06	15.	163.25	1.30	1.517E-02	618.06	99.100	PBC<MDA	PM144
661.58	78.	16.12	0.98	1.443E-02	661.66	85.210	3.525E+00	CS137
702.63	1.	884.95	1.37	1.380E-02	702.63	97.900	PBC<MDA	NB94
727.48	45.	19.88	1.52	1.345E-02	727.17	7.550	2.462E+01	BI212
735.72	10.	93.18	1.40	1.333E-02	735.72	22.500	PBC<MDA	pm146
747.16	1.	803.96	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	6.	155.20	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
763.94	4.	262.64	1.42	1.296E-02	763.94	22.280	PBC<MDA	AG110M
766.41	16.	85.25	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	15.	46.78	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152
795.87	7.	168.00	1.45	1.257E-02	795.87	85.530	PBC<MDA	CS134
801.95	8.	116.58	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
816.00	13.	118.66	1.47	1.231E-02	815.77	23.280	PBC<MDA	La140
					818.50	100.000	5.782E-01	Cs136
860.41	31.	20.80	0.55	1.185E-02	860.56	12.420	1.176E+01	TL208
883.24	13.	96.46	1.52	1.162E-02	883.24	9.600	PBC<MDA	PA234
884.68	12.	96.78	1.52	1.161E-02	884.68	72.680	PBC<MDA	AG110M
911.43	113.	9.86	1.55	1.135E-02	911.07	29.000	1.905E+01	AC228
946.02	8.	138.45	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	10.	133.06	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.16	53.	16.24	1.73	1.083E-02	968.97	17.460	1.566E+01	AC228
996.33	3.	323.33	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1037.84	3.	288.58	1.65	1.028E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	8.	65.06	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1077.40	7.	106.27	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1120.43	59.	17.38	2.42	9.697E-03	1120.29	15.100	2.222E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	9.619E+00	Ta182
1121.27	10.	135.52	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
1189.05	5.	176.07	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	2.	507.29	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	26.	40.09	1.81	8.977E-03	1238.28	66.070	2.435E+00	Co56
1274.53	5.	121.66	1.84	8.779E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	8.992E-01	EU154
1332.50	12.	30.01	1.89	8.481E-03	1332.50	99.980	7.677E-01	CO60
1460.91	383.	5.21	1.80	7.894E-03	1460.83	10.670	2.525E+02	K40
1765.13	18.	35.98	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	7.	39.41	2.26	6.593E-03	1836.06	99.200	6.328E-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	
298.93	74.87	130.	180.	4.898E+03	11.64	0.802	-	D
308.30	77.21	122.	260.	6.903E+03	8.65	0.804	-	D
359.47	90.10	134.	79.	1.917E+03	23.68	0.816	-	D
742.20	185.74	88.	106.	2.986E+03	18.54	1.389	-	s
1039.95	260.21	16.	14.	4.854E+02	51.25	0.676	-	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	185.85	46.59	127.	65.	0.036	33.40	0.599
AM-241	237.59	59.54	183.	16.	0.009	144.50	0.787s
TH-234	252.59	63.29	141.	25.	0.014	70.74	0.791D
Sn-126	256.56	64.28	295.	22.	0.012	114.26	0.792s
BA-133	323.36	80.99	240.	-11.	-0.006	202.63	0.807

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.35	86.49	936.	0.	0.000	176.96	0.813A
EU-155	345.56	86.54	928.	-26.	-0.014	168.64	0.813D
Sn-126	347.15	86.94	195.	25.	0.014	67.98	0.813D
Sn-126	349.67	87.57	842.	54.	0.030	36.66	0.814D
Cd-109	351.55	88.04	835.	0.	0.000	1000.00	0.814A
Nd-147	363.79	91.10	835.	0.	0.000	1000.00	0.817s
TH-234	369.74	92.59	242.	4.	0.002	605.94	0.818D
AC-228	372.78	93.35	712.	25.	0.014	154.43	0.819s
Gd-153	389.37	97.50	320.	-17.	-0.010	147.99	0.823
Np-239	397.37	99.50	274.	21.	0.012	112.25	0.825s
Gd-153	412.16	103.20	408.	-24.	-0.014	118.70	0.828s
Np-239	414.16	103.70	432.	-24.	-0.014	122.03	0.829s
EU-155	420.61	105.31	311.	19.	0.011	132.58	0.830s
Np-239	423.88	106.13	348.	-15.	-0.008	178.38	0.831s
EU-152	486.43	121.78	219.	20.	0.011	108.86	0.846s
CO-57	487.57	122.06	239.	0.	0.000	1000.00	0.846s
EU-154	491.73	123.10	254.	-22.	-0.012	106.33	0.847s
PA-234	524.49	131.29	366.	-18.	-0.010	147.98	0.855
HF-181	531.41	133.02	384.	0.	0.000	1000.00	0.856
CE-144	533.46	133.54	435.	-23.	-0.013	128.59	0.857
HF-181	544.50	136.30	459.	-23.	-0.013	131.47	0.859s
CO-57	545.20	136.47	482.	-23.	-0.013	134.69	0.859s
Tc-99m	561.34	140.51	373.	-22.	-0.012	128.02	0.863s
U-235	574.43	143.79	399.	-14.	-0.008	185.83	0.866s
CE-141	581.05	145.44	331.	20.	0.011	129.03	0.868s
Ba-140	649.90	162.66	228.	19.	0.011	115.08	0.884s
Cf-251	705.64	176.60	137.	-20.	-0.011	108.16	0.897s
TH-229	773.25	193.51	113.	3.	0.001	713.05	0.913s
U-235	820.52	205.33	133.	-4.	-0.002	519.31	0.924s
TH-229	842.58	210.85	203.	-25.	-0.014	102.60	0.929s
Cf-251	907.16	227.00	133.	-14.	-0.008	145.77	0.944s
PB-212	953.67	238.63	84.	424.	0.236	5.75	0.954D
PB-214	967.13	242.00	85.	79.	0.044	19.84	0.957D
EU-152	977.91	244.69	759.	19.	0.010	207.68	0.960
TH-227	1024.08	256.24	240.	-6.	-0.003	377.73	0.971
Cd-113m	1053.91	263.70	234.	0.	0.000	1000.00	0.978s
BI-210M	1062.44	265.83	234.	0.	0.000	1000.00	0.979s
TL-208	1107.16	277.02	38.	29.	0.016	42.05	1.696s
Hg-203	1115.89	279.20	164.	-18.	-0.010	103.84	0.992s
I-131	1136.28	284.30	92.	-16.	-0.009	74.92	0.996s
PB-214	1179.17	295.02	56.	97.	0.054	18.02	1.060
PB-212	1199.53	300.11	57.	41.	0.023	40.00	0.358s
PA-231	1199.35	300.07	372.	-19.	-0.010	148.62	1.011s
PA-233	1199.79	300.18	354.	-19.	-0.010	144.92	1.011s
PA-231	1209.66	302.65	335.	-19.	-0.010	140.85	1.013
BA-133	1210.47	302.85	346.	-19.	-0.010	143.08	1.013
Ba-140	1218.46	304.85	365.	-15.	-0.008	183.38	1.015s
BI-210M	1218.64	304.90	380.	0.	0.000	1000.00	1.015s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1232.82	308.44	380.	0.	0.000	1000.00	1.019s
Ir-192	1265.01	316.49	130.	-16.	-0.009	101.56	1.026
CR-51	1279.38	320.08	154.	-17.	-0.010	101.83	1.029s
La-140	1314.07	328.76	55.	35.	0.019	43.09	1.037s
Cf-249	1332.79	333.44	62.	3.	0.001	557.27	1.041s
AC-228	1352.30	338.32	41.	78.	0.043	16.18	1.046D
Cs-136	1361.30	340.57	263.	-17.	-0.009	139.71	1.048
EU-152	1376.16	344.29	247.	-17.	-0.009	134.92	1.051s
HF-181	1382.33	345.83	186.	15.	0.008	130.50	1.053
PB-214	1406.76	351.94	53.	205.	0.114	9.63	1.239
I-131	1456.93	364.48	66.	-9.	-0.005	172.13	1.070s
BA-133	1534.34	383.84	140.	8.	0.004	224.71	1.087s
Cf-249	1550.77	387.95	148.	0.	0.000	1000.00	1.091s
SN-113	1565.73	391.69	116.	13.	0.007	122.57	1.094s
SB-125	1852.38	463.37	45.	56.	0.031	21.65	1.158
Ir-192	1871.15	468.06	93.	7.	0.004	193.76	1.163
BE-7	1909.29	477.59	98.	-2.	-0.001	703.56	1.171s
HF-181	1926.89	482.00	79.	14.	0.008	96.68	1.175s
La-140	1946.98	487.02	32.	11.	0.006	101.26	1.180
RU-103	1987.11	497.05	24.	10.	0.006	99.86	1.188s
RH-106	2046.35	511.86	87.	90.	0.050	28.30	2.452
Ba-140	2147.92	537.26	45.	-13.	-0.007	91.11	1.224s
CS-134	2251.82	563.24	33.	1.	0.001	854.37	1.247s
CS-134	2276.15	569.32	44.	-2.	-0.001	474.34	1.252s
PA-234	2276.75	569.47	52.	-3.	-0.002	344.80	1.253s
BI-207	2277.67	569.70	61.	-3.	-0.002	336.75	1.253s
TL-208	2331.65	583.20	27.	152.	0.084	11.13	1.044
SB-125	2400.86	600.50	439.	-17.	-0.009	99.90	1.280s
SB-124	2409.78	602.73	422.	-17.	-0.009	176.04	1.282
CS-134	2417.70	604.71	406.	-17.	-0.009	172.36	1.284s
BI-214	2436.43	609.39	18.	172.	0.096	8.70	1.198
RU-103	2440.05	610.30	389.	-17.	-0.009	168.23	1.288s
AG-108M	2455.98	614.28	372.	-14.	-0.008	193.59	1.292s
PM-144	2471.11	618.06	290.	15.	0.008	163.25	1.295s
RH-106	2486.52	621.92	371.	-16.	-0.009	176.36	1.299s
SB-125	2542.41	635.89	48.	-9.	-0.005	117.67	1.311s
I-131	2546.75	636.97	71.	-5.	-0.003	227.07	1.312s
AG-110M	2629.90	657.76	140.	-14.	-0.008	123.40	1.330s
CS-137	2645.17	661.58	16.	78.	0.043	16.12	0.981s
PM-144	2785.03	696.54	31.	-3.	-0.001	588.86	1.363s
NB-94	2809.38	702.63	40.	1.	0.001	884.95	1.368s
SB-124	2890.01	722.79	95.	-12.	-0.007	116.96	1.386s
AG-108M	2890.61	722.94	83.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	83.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	83.	0.	0.000	1000.00	1.387s
BI-212	2908.79	727.48	10.	45.	0.025	19.88	1.515
pm-146	2941.74	735.72	17.	10.	0.005	93.18	1.397s
pm-146	2987.51	747.16	22.	1.	0.001	803.96	1.407s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3025.79	756.73	22.	6.	0.004	155.20	1.415s
AG-110M	3054.64	763.94	40.	4.	0.002	262.64	1.421s
NB-95	3062.03	765.79	114.	-22.	-0.012	71.35	1.423s
PA-234M	3064.52	766.41	85.	16.	0.009	85.25	1.423s
EU-152	3114.56	778.92	9.	15.	0.009	46.78	1.434s
BI-212	3140.56	785.42	35.	-4.	-0.002	331.91	1.440s
CS-134	3182.35	795.87	35.	7.	0.004	168.00	1.448s
CS-134	3206.69	801.95	17.	8.	0.004	116.58	1.454s
CO-58	3241.99	810.78	76.	-15.	-0.008	92.47	1.461s
La-140	3261.97	815.77	94.	-16.	-0.009	83.50	1.465s
Cs-136	3272.90	818.50	109.	13.	0.007	118.66	1.467s
MN-54	3338.30	834.85	37.	-9.	-0.005	142.68	1.481s
Co-56	3385.99	846.77	33.	-6.	-0.003	225.10	1.491
TL-208	3440.57	860.41	3.	31.	0.017	20.80	0.552s
NB-94	3483.32	871.10	34.	-7.	-0.004	123.72	1.512s
EU-154	3491.85	873.23	44.	-2.	-0.001	474.34	1.514s
PA-234	3521.06	880.53	103.	-17.	-0.009	89.44	1.520s
PA-234	3531.90	883.24	72.	13.	0.007	96.46	1.522s
AG-110M	3537.67	884.68	59.	12.	0.007	96.78	1.523s
Sc-46	3556.06	889.28	102.	-16.	-0.009	93.31	1.527s
y-88	3591.11	898.04	33.	-5.	-0.003	263.00	1.534
AC-228	3644.66	911.43	5.	113.	0.063	9.86	1.547
AG-110M	3748.95	937.49	37.	-12.	-0.007	108.88	1.567s
PA-234	3783.07	946.02	23.	8.	0.004	138.45	1.574s
EU-152	3855.45	964.11	76.	10.	0.005	133.06	1.589s
AC-228	3875.64	969.16	6.	53.	0.030	16.24	1.725
EU-154	3984.36	996.33	51.	3.	0.002	323.33	1.616s
PA-234M	4003.04	1001.00	57.	-3.	-0.002	397.97	1.620s
Co-56	4150.45	1037.84	21.	3.	0.002	288.58	1.650s
Cs-136	4191.39	1048.07	10.	8.	0.005	65.06	1.658
RH-106	4200.55	1050.36	35.	-10.	-0.005	90.75	1.661s
BI-207	4253.77	1063.66	30.	-9.	-0.005	106.66	1.671s
Ga-68	4308.74	1077.40	10.	7.	0.004	106.27	1.683s
FE-59	4396.18	1099.25	30.	-9.	-0.005	137.89	1.700s
EU-152	4447.49	1112.07	106.	-3.	-0.001	548.58	1.711s
ZN-65	4461.38	1115.55	103.	0.	0.000	1000.00	1.713s
BI-214	4480.93	1120.43	11.	59.	0.033	17.38	2.416s
Sc-46	4481.41	1120.55	103.	0.	0.000	1000.00	1.717s
Ta-182	4484.41	1121.30	93.	10.	0.006	135.52	1.718
CO-60	4692.24	1173.24	40.	-8.	-0.004	126.94	1.760s
Ta-182	4755.52	1189.05	15.	5.	0.003	176.07	1.772
Ta-182	4885.02	1221.41	27.	2.	0.001	507.29	1.798
Co-56	4952.53	1238.28	16.	26.	0.014	40.09	1.812s
NA-22	5097.60	1274.53	16.	5.	0.003	121.66	1.840s
EU-154	5097.66	1274.54	21.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	32.	-11.	-0.006	120.72	1.854s
CO-60	5329.61	1332.50	0.	12.	0.007	30.01	1.886s
AG-110M	5536.92	1384.30	16.	-6.	-0.004	57.39	1.926s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5631.79	1408.00	16.	0.	0.000	1000.00	1.944
K-40	5843.55	1460.91	7.	383.	0.213	5.21	1.805
La-140	6385.15	1596.21	23.	-4.	-0.002	528.30	2.087s
SB-124	6764.55	1690.98	18.	-10.	-0.006	107.24	2.157s
BI-214	7058.84	1764.49	13.	18.	0.010	35.98	2.211s
Co-56	7086.31	1771.35	21.	0.	0.000	1000.00	2.216s
y-88	7345.39	1836.06	1.	7.	0.004	39.41	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-5.7662E-01				5.31E+01	
			477.60	-5.766E-01	?(	1.408E+01 7.04E+02 1.05E+01	G
NA-22	C	3.1661E-01				9.50E+02	
			1274.53	3.166E-01	?(	1.352E+00 1.22E+02 9.99E+01	G
K-40	N	2.5252E+02				4.66E+11	
			1460.83	2.525E+02	(P	9.999E+00 5.21E+00 1.07E+01	G
Sc-46	F	-7.6548E-01				8.38E+01	
			889.28	-7.655E-01	&(	2.397E+00 9.33E+01 1.00E+02	G
			1120.55	0.000E+00	+	2.866E+00 1.00E+03 1.00E+02	G
CR-51	F	-3.9455E+00				2.77E+01	
			320.08	-3.945E+00	?(P	1.390E+01 1.02E+02 9.94E+00	G
MN-54	C	-4.2763E-01				3.12E+02	
			834.85	-4.276E-01	?(	1.429E+00 1.43E+02 1.00E+02	G
FE-59	F	-8.9940E-01				4.45E+01	
			1099.25	-8.994E-01	?(	2.822E+00 1.38E+02 5.65E+01	G
			1291.60	-1.628E+00	+	4.303E+00 1.21E+02 4.32E+01	G
Co-56	C	8.4075E-01				7.73E+01	
			846.77	-2.832E-01	?(P	1.368E+00 2.25E+02 9.99E+01	G
			1238.28	2.435E+00	?(	2.000E+00 4.01E+01 6.61E+01	G
			1037.84	1.333E+00	?(P	9.107E+00 2.89E+02 1.41E+01	G
			1771.35	0.000E+00	-	1.278E+01 1.00E+03 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-6.6673E-01					7.09E+01	
			810.78	-6.667E-01	?(P	1.956E+00	9.25E+01	9.95E+01 G
CO-60	F	7.6771E-01					1.93E+03	
			1332.50	7.677E-01	&(P	4.829E-01	3.00E+01	1.00E+02 G
			1173.24	-4.771E-01	- P	1.913E+00	1.27E+02	9.99E+01 G
NB-94	I	5.9743E-02					7.41E+06	
			702.63	5.974E-02	?(P	1.317E+00	8.85E+02	9.79E+01 G
			871.10	-3.315E-01	&	1.415E+00	1.24E+02	9.99E+01 G
ZR-95	I	4.9487E-01					6.40E+01	
			756.73	4.949E-01	?(	1.907E+00	1.55E+02	5.45E+01 G
			724.20	0.000E+00	&	4.213E+00	1.00E+03	4.42E+01 G
NB-95	I	-9.5173E-01					6.40E+01	
			765.79	-9.517E-01	?(	2.253E+00	7.14E+01	9.98E+01 G
RU-103	I	3.4757E-01					3.93E+01	
			497.05	3.476E-01	*(	8.772E-01	9.99E+01	9.09E+01 G
			610.30	-1.057E+01	+	5.969E+01	1.68E+02	5.75E+00 GA
RH-106	I	-5.7783E+00					3.74E+02	
			621.92	-5.778E+00	?(	3.423E+01	1.76E+02	9.93E+00 G
			1050.36	-3.434E+01	&	1.056E+02	9.08E+01	1.56E+00 G
			511.86	1.441E+01	?	7.350E+00	2.83E+01	2.00E+01 GA
AG-108M	C	-4.6031E-03					1.53E+05	
			433.94	-4.603E-03	%(P	1.096E+00	8.80E+03	9.05E+01 G
			722.94	0.000E+00	+	2.045E+00	1.00E+03	9.08E+01 G
			614.28	-5.772E-01	+	3.757E+00	1.94E+02	8.98E+01 G
AG-110M	F	7.4996E-01					2.50E+02	
			884.68	7.735E-01	?(	2.530E+00	9.68E+01	7.27E+01 G
			657.76	-5.618E-01	-	2.339E+00	1.23E+02	9.46E+01 G
			937.49	-1.795E+00	+	4.538E+00	1.09E+02	3.44E+01 G
			1384.30	-1.755E+00	+ P	5.982E+00	5.74E+01	2.43E+01 G
			763.94	6.732E-01	(	6.226E+00	2.63E+02	2.23E+01 G
SN-113	F	5.2559E-01					1.15E+02	
			391.69	5.256E-01	?(P	2.177E+00	1.23E+02	6.40E+01 G
SB-124	F	-6.0989E-01					6.02E+01	
			602.73	-6.099E-01	?(	3.602E+00	1.76E+02	9.83E+01 G
			1690.98	-1.652E+00	+	3.714E+00	1.07E+02	4.78E+01 G
			722.79	-4.628E+00	+	1.832E+01	1.17E+02	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	4.1145E+00					1.01E+03	
			427.88	-3.155E-02	%(	3.417E+00	4.02E+03	2.96E+01 G
			600.50	-3.404E+00	+ P	2.015E+01	9.99E+01	1.79E+01 G
			635.89	-2.865E+00	+	1.153E+01	1.18E+02	1.13E+01 G
			463.37	1.584E+01	(P	9.640E+00	2.16E+01	1.05E+01 G
I-131	I	-2.7529E-01					8.02E+00	
			364.48	-2.753E-01	?(	1.241E+00	1.72E+02	8.17E+01 G
			284.30	-5.495E+00	+ P	1.621E+01	7.49E+01	6.14E+00 G
			636.97	-2.785E+00	+	2.187E+01	2.27E+02	7.17E+00 G
Gd-153	F	-7.6196E-01					2.42E+02	
			97.50	-7.620E-01	&(	3.786E+00	1.48E+02	3.00E+01 G
			103.20	-1.459E+00	+	5.786E+00	1.19E+02	2.18E+01 G
Ga-68	C	1.3863E+01					4.71E-02	
			1077.40	1.386E+01	?(	3.455E+01	1.06E+02	3.30E+00 G
Tc-99m	I	-3.3702E-01					2.51E-01	
			140.51	-3.370E-01	(	1.444E+00	1.28E+02	8.93E+01 G
BA-133	F	6.6010E-03					3.85E+03	
			356.00	6.601E-03	&(	3.434E+00	1.53E+04	6.20E+01 G
			302.85	-2.230E+00	+	1.070E+01	1.43E+02	1.83E+01 G
			383.84	2.192E+00	? P	1.680E+01	2.25E+02	8.94E+00 GA
			80.99	-4.663E-01	+ P	3.146E+00	2.03E+02	3.41E+01 GA
CS-134	I	5.4003E-02					7.54E+02	
			604.71	-6.162E-01	?(	3.564E+00	1.72E+02	9.76E+01 G
			795.87	3.789E-01	?(	1.558E+00	1.68E+02	8.55E+01 G
			569.32	-4.482E-01	+	7.535E+00	4.74E+02	1.54E+01 G
			801.95	3.921E+00	?(	1.131E+01	1.17E+02	8.69E+00 G
			563.24	5.370E-01	&(P	1.202E+01	8.54E+02	8.35E+00 G
CS-137	I	3.5249E+00					1.10E+04	
			661.66	3.525E+00	(	9.648E-01	1.61E+01	8.52E+01 G
CE-139	F	3.6355E-02					1.38E+02	
			165.85	3.636E-02	%(	1.339E+00	1.08E+03	7.99E+01 G
Ba-140	I	-4.8260E-01					1.28E+01	
			537.26	-1.737E+00	?(P	4.593E+00	9.11E+01	2.44E+01 G
			162.66	4.436E+00	(	1.712E+01	1.15E+02	6.22E+00 G
			304.85	-7.641E+00	+	4.710E+01	1.83E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	5.4631E-01					1.28E+01	
			1596.21	-2.986E-01	?(P	1.973E+00	5.28E+02	9.54E+01 G
			487.02	7.745E-01	&(P	1.970E+00	1.01E+02	4.55E+01 G
			328.76	4.006E+00	&(	4.265E+00	4.31E+01	2.03E+01 G
			815.77	-3.177E+00	+ P	9.239E+00	8.35E+01	2.33E+01 G
CE-141	I	5.7456E-01					3.25E+01	
			145.44	5.746E-01	&(	2.483E+00	1.29E+02	4.82E+01 G
CE-144	I	-2.7785E+00					2.85E+02	
			133.54	-2.779E+00	?(	1.194E+01	1.29E+02	1.11E+01 G
PM-144	C	2.2452E-01					3.63E+02	
			696.54	-1.030E-01	&(P	1.150E+00	5.89E+02	9.90E+01 G
			618.06	5.517E-01	&(	3.031E+00	1.63E+02	9.91E+01 G
EU-152	F	1.5147E+00					4.94E+03	
			344.29	-1.516E+00	&(	6.875E+00	1.35E+02	2.65E+01 G
			1112.07	-1.113E+00	&	2.113E+01	5.49E+02	1.36E+01 G
			121.78	8.938E-01	&(	3.260E+00	1.09E+02	2.86E+01 G
			778.92	5.153E+00	?(	5.521E+00	4.68E+01	1.29E+01 G
			964.11	3.348E+00	(	1.519E+01	1.33E+02	1.46E+01 G
			244.69	4.709E+00	?(	3.270E+01	2.08E+02	7.58E+00 G
			1408.00	0.000E+00	-	6.950E+00	1.00E+03	2.10E+01 GA
EU-154	I	3.1078E-01					3.14E+03	
			873.23	-7.724E-01	?(	1.298E+01	4.74E+02	1.23E+01 G
			123.10	-6.899E-01	+	2.454E+00	1.06E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.328E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	9.190E+00	1.00E+03	2.02E+01 G
			1004.77	9.756E-02	%	1.097E+01	3.17E+03	1.80E+01 G
			996.33	1.565E+00	&(	1.775E+01	3.23E+02	1.06E+01 G
EU-155	I	1.1693E+00					1.81E+03	
			105.31	1.169E+00	&(P	5.197E+00	1.33E+02	2.12E+01 G
			86.54	-1.156E+00	+	6.503E+00	1.69E+02	3.07E+01 G
HF-181	F	8.1279E-01					4.24E+01	
			482.00	5.138E-01	?(	1.674E+00	9.67E+01	8.05E+01 G
			133.02	0.000E+00	-	2.875E+00	1.00E+03	4.33E+01 G
			345.83	2.410E+00	&(	1.059E+01	1.30E+02	1.51E+01 G
			136.30	-5.319E+00	&	2.337E+01	1.31E+02	5.85E+00 G
Ta-182	F	1.3266E+00					1.14E+02	
			1121.30	1.700E+00	(	7.834E+00	1.36E+02	3.49E+01 G
			1221.41	5.292E-01	(	6.072E+00	5.07E+02	2.70E+01 G
			1189.05	1.851E+00	(	7.685E+00	1.76E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-4.5559E-01					4.66E+01	
			279.20	-4.556E-01	&(	1.587E+00	1.04E+02	8.15E+01 G
TL-208	N	6.3065E+00					6.98E+02	
			583.02	6.307E+00	(P	1.119E+00	1.11E+01	8.45E+01 G
			277.28	9.318E+00	+ P	1.033E+01	4.21E+01	6.31E+00 G
			860.56	1.176E+01	+	3.983E+00	2.08E+01	1.24E+01 G
pm-146	C	8.0533E-01					2.02E+03	
			747.16	1.478E-01	?(P	3.034E+00	8.04E+02	3.40E+01 G
			735.72	1.799E+00	?(	4.095E+00	9.32E+01	2.25E+01 G
			453.88	-3.962E-02	% P	1.703E+00	1.48E+03	6.50E+01 G
y-88	F	1.9366E-01					1.07E+02	
			898.04	-2.712E-01	?(P	1.528E+00	2.63E+02	9.37E+01 G
			1836.06	6.328E-01	?(P	6.260E-01	3.94E+01	9.92E+01 G
Cf-251	T	-1.7524E+00					3.28E+05	
			176.60	-1.752E+00	?(	5.096E+00	1.08E+02	1.70E+01 G
			227.00	-4.086E+00	&	1.611E+01	1.46E+02	6.30E+00 GA
Cf-249	T	7.6764E-02					1.28E+05	
			387.95	0.000E+00	?(	2.351E+00	1.00E+03	6.60E+01 G
			333.44	4.034E-01	?(	5.976E+00	5.57E+02	1.55E+01 G
Sn-126		3.8579E+00					3.65E+07	
			87.57	1.985E+00	}	5.045E+00	3.67E+01	3.75E+01 GA
			64.28	3.858E+00	&(	1.475E+01	1.14E+02	9.70E+00 G
			86.94	3.858E+00	}	1.032E+01	6.80E+01	9.04E+00 GA
PB-210	N	4.0552E+01					8.14E+03	
			46.54	4.055E+01	(P	3.435E+01	3.34E+01	4.25E+00 G
PB-212	N	1.8203E+01					6.98E+02	
			238.63	1.820E+01	(P	1.949E+00	5.75E+00	4.33E+01 G
			300.03	2.723E+01	+	2.517E+01	4.00E+01	3.28E+00 GA
PB-214	N	1.3300E+01					5.84E+05	
			351.93	1.330E+01	(P	2.372E+00	9.63E+00	3.76E+01 G
			295.09	1.080E+01	- P	4.200E+00	1.80E+01	1.93E+01 G
			242.00	2.007E+01	+	1.151E+01	1.98E+01	7.43E+00 GA
BI-207	C	-1.1761E-01					1.18E+04	
			569.70	-1.176E-01	?(	1.383E+00	3.37E+02	9.77E+01 G
			1063.66	-7.016E-01	+ P	2.102E+00	1.07E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	2.4619E+01					6.98E+02	
			727.17	2.462E+01	(	9.545E+00	1.99E+01	7.55E+00 G
			785.42	-1.253E+01	-	1.031E+02	3.32E+02	1.28E+00 GA
BI-214	N	1.3531E+01					5.84E+05	
			609.31	1.353E+01	(P	1.762E+00	8.70E+00	4.61E+01 G
			1120.29	2.222E+01	+ P	7.009E+00	1.74E+01	1.51E+01 G
			1764.49	9.758E+00	- P	1.021E+01	3.60E+01	1.54E+01 G
AC-228	N	1.9055E+01					2.10E+03	
			911.07	1.905E+01	(P	2.228E+00	9.86E+00	2.90E+01 G
			968.97	1.566E+01	-	4.054E+00	1.62E+01	1.75E+01 G
			338.32	1.538E+01	-	6.391E+00	1.62E+01	1.20E+01 G
			93.35	5.925E+00	-	3.054E+01	1.54E+02	5.56E+00 XA
TH-227	N	-2.9467E-01					7.95E+03	
			50.14	-2.947E-01	%(	1.762E+01	2.06E+03	8.00E+00 G
			256.24	-1.627E+00	+	2.088E+01	3.78E+02	7.00E+00 G
TH-229	N	9.7646E-01					2.68E+06	
			193.51	9.765E-01	?(	1.916E+01	7.13E+02	4.40E+00 G
			210.85	-1.440E+01	+	3.950E+01	1.03E+02	2.99E+00 G
TH-234	N	1.1470E+01					1.63E+12	
			63.29	1.147E+01	(P	2.673E+01	7.07E+01	3.81E+00 G
			92.59	8.776E-01	- P	1.804E+01	6.06E+02	5.58E+00 G
PA-231	N	-1.4184E+01					1.20E+07	
			302.65	-1.418E+01	?(	6.699E+01	1.41E+02	2.88E+00 G
			300.07	-1.647E+01	+	8.204E+01	1.49E+02	2.46E+00 G
PA-233	C	-4.0232E-02					7.82E+08	
			312.01	-4.023E-02	&(P	5.821E+00	2.71E+03	3.60E+01 G
			300.18	-6.536E+00	+	3.176E+01	1.45E+02	6.20E+00 G
PA-234	N	1.8577E+00					1.63E+12	
			131.29	-1.355E+00	?(	6.726E+00	1.48E+02	1.80E+01 G
			946.02	2.881E+00	?(	9.476E+00	1.38E+02	1.34E+01 G
			569.47	-1.261E+00	+	1.527E+01	3.45E+02	8.20E+00 G
			883.24	6.455E+00	?(	2.100E+01	9.65E+01	9.60E+00 G
			880.53	-1.328E+01	&	3.980E+01	8.94E+01	6.00E+00 GA
PA-234M	N	4.7439E+01					1.63E+12	
			1001.00	-1.805E+01	?(P	2.377E+02	3.98E+02	8.37E-01 G
			766.41	2.339E+02	?(P	6.675E+02	8.52E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N  -1.7087E+00                                      2.57E+11
                         143.79-1.709E+00 ?(P 1.190E+01 1.86E+02 1.10E+01 G
                         205.33-1.279E+00 + P 1.889E+01 5.19E+02 5.01E+00 G
                         163.38 5.268E-01 % P 2.194E+01 1.22E+03 5.08E+00 G

AM-241   T   8.3736E-01                                      1.58E+05
                          59.54 8.374E-01  (  3.441E+00 1.44E+02 3.59E+01 G

Ir-192   F  -1.1193E-01                                      7.40E+01
                         316.49-4.246E-01 ?(  1.448E+00 1.02E+02 8.70E+01 G
                         468.06 4.139E-01 ?(  2.750E+00 1.94E+02 5.18E+01 G
                         308.44 0.000E+00 +   6.542E+00 1.00E+03 3.18E+01 G

Cs-136   F   5.6790E-01                                      1.30E+01
                         818.50 5.782E-01 &(  2.320E+00 1.19E+02 1.00E+02 G
                        1048.07 5.550E-01  (  1.187E+00 6.51E+01 8.00E+01 G
                         340.57-8.475E-01 +   3.979E+00 1.40E+02 4.69E+01 G

Np-239   T  -8.5453E-01                                      2.36E+00
                         103.70-1.325E+00 +   5.403E+00 1.22E+02 2.40E+01 X
                         106.13-8.545E-01 *(  5.125E+00 1.78E+02 2.27E+01 G
                          99.50 1.860E+00     6.986E+00 1.12E+02 1.50E+01 X

Nd-147       2.5199E-01                                      1.11E+01
                         531.00 2.520E-01 &(  7.729E+00 1.18E+03 1.30E+01 G
                          91.10 0.000E+00 -   6.547E+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
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F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	183.	16.	0.009	144.50	8.374E-01	
BA-133	80.99	240.	-11.	-0.006	202.63	-4.663E-01	P
EU-155	86.54	928.	-26.	-0.014	168.64	-1.156E+00	
Gd-153	97.50	320.	-17.	-0.010	147.99	-7.620E-01	
Np-239	99.50	274.	21.	0.012	112.25	1.860E+00	
Gd-153	103.20	408.	-24.	-0.014	118.70	-1.459E+00	
Np-239	103.70	432.	-24.	-0.014	122.03	-1.325E+00	
EU-155	105.31	311.	19.	0.011	132.58	1.169E+00	P
Np-239	106.13	348.	-15.	-0.008	178.38	-8.545E-01	
EU-152	121.78	219.	20.	0.011	108.86	8.938E-01	
EU-154	123.10	254.	-22.	-0.012	106.33	-6.899E-01	
PA-234	131.29	366.	-18.	-0.010	147.98	-1.355E+00	
CE-144	133.54	435.	-23.	-0.013	128.59	-2.779E+00	
HF-181	136.30	459.	-23.	-0.013	131.47	-5.319E+00	
CO-57	136.47	482.	-23.	-0.013	134.69	-2.915E+00	
Tc-99m	140.51	373.	-22.	-0.012	128.02	-3.370E-01	
U-235	143.79	399.	-14.	-0.008	185.83	-1.709E+00	P
CE-141	145.44	331.	20.	0.011	129.03	5.746E-01	
Ba-140	162.66	228.	19.	0.011	115.08	4.436E+00	
Cf-251	176.60	137.	-20.	-0.011	108.16	-1.752E+00	
TH-229	193.51	113.	3.	0.001	713.05	9.765E-01	
U-235	205.33	133.	-4.	-0.002	519.31	-1.279E+00	P
TH-229	210.85	203.	-25.	-0.014	102.60	-1.440E+01	
Cf-251	227.00	133.	-14.	-0.008	145.77	-4.086E+00	
EU-152	244.69	759.	19.	0.010	207.68	4.709E+00	
TH-227	256.24	240.	-6.	-0.003	377.73	-1.627E+00	
Hg-203	279.20	164.	-18.	-0.010	103.84	-4.556E-01	
I-131	284.30	92.	-16.	-0.009	74.92	-5.495E+00	P
PA-231	300.07	372.	-19.	-0.010	148.62	-1.647E+01	
PA-233	300.18	354.	-19.	-0.010	144.92	-6.536E+00	
PA-231	302.65	335.	-19.	-0.010	140.85	-1.418E+01	
BA-133	302.85	346.	-19.	-0.010	143.08	-2.230E+00	
Ba-140	304.85	365.	-15.	-0.008	183.38	-7.641E+00	
Ir-192	316.49	130.	-16.	-0.009	101.56	-4.246E-01	
CR-51	320.08	154.	-17.	-0.010	101.83	-3.945E+00	P
La-140	328.76	55.	35.	0.019	43.09	4.006E+00	
Cf-249	333.44	62.	3.	0.001	557.27	4.034E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	344.29	247.	-17.	-0.009	134.92	-1.516E+00		
HF-181	345.83	186.	15.	0.008	130.50	2.410E+00		
I-131	364.48	66.	-9.	-0.005	172.13	-2.753E-01		
BA-133	383.84	140.	8.	0.004	224.71	2.192E+00		P
SN-113	391.69	116.	13.	0.007	122.57	5.256E-01		P
Ir-192	468.06	93.	7.	0.004	193.76	4.139E-01		
BE-7	477.59	98.	-2.	-0.001	703.56	-5.766E-01		
HF-181	482.00	79.	14.	0.008	96.68	5.138E-01		
La-140	487.02	32.	11.	0.006	101.26	7.745E-01		P
RU-103	497.05	24.	10.	0.006	99.86	3.476E-01		
RH-106	511.86	87.	90.	0.050	28.30	1.441E+01		
Ba-140	537.26	45.	-13.	-0.007	91.11	-1.737E+00		P
CS-134	563.24	33.	1.	0.001	854.37	5.370E-01		P
CS-134	569.32	44.	-2.	-0.001	474.34	-4.482E-01		
PA-234	569.47	52.	-3.	-0.002	344.80	-1.261E+00		
BI-207	569.70	61.	-3.	-0.002	336.75	-1.176E-01		
SB-124	602.73	422.	-17.	-0.009	176.04	-6.099E-01		
CS-134	604.71	406.	-17.	-0.009	172.36	-6.162E-01		
RU-103	610.30	389.	-17.	-0.009	168.23	-1.057E+01		
AG-108M	614.28	372.	-14.	-0.008	193.59	-5.772E-01		
PM-144	618.06	290.	15.	0.008	163.25	5.517E-01		
RH-106	621.92	371.	-16.	-0.009	176.36	-5.778E+00		
I-131	636.97	71.	-5.	-0.003	227.07	-2.785E+00		
AG-110M	657.76	140.	-14.	-0.008	123.40	-5.618E-01		
PM-144	696.54	31.	-3.	-0.001	588.86	-1.030E-01		P
NB-94	702.63	40.	1.	0.001	884.95	5.974E-02		P
SB-124	722.79	95.	-12.	-0.007	116.96	-4.628E+00		
pm-146	735.72	17.	10.	0.005	93.18	1.799E+00		
pm-146	747.16	22.	1.	0.001	803.96	1.478E-01		P
ZR-95	756.73	22.	6.	0.004	155.20	4.949E-01		
AG-110M	763.94	40.	4.	0.002	262.64	6.732E-01		
NB-95	765.79	114.	-22.	-0.012	71.35	-9.517E-01		
PA-234M	766.41	85.	16.	0.009	85.25	2.339E+02		P
EU-152	778.92	9.	15.	0.009	46.78	5.153E+00		
CS-134	795.87	35.	7.	0.004	168.00	3.789E-01		
CS-134	801.95	17.	8.	0.004	116.58	3.921E+00		
CO-58	810.78	76.	-15.	-0.008	92.47	-6.667E-01		P
La-140	815.77	94.	-16.	-0.009	83.50	-3.177E+00		P
MN-54	834.85	37.	-9.	-0.005	142.68	-4.276E-01		
Co-56	846.77	33.	-6.	-0.003	225.10	-2.832E-01		P
NB-94	871.10	34.	-7.	-0.004	123.72	-3.315E-01		
EU-154	873.23	44.	-2.	-0.001	474.34	-7.724E-01		
PA-234	880.53	103.	-17.	-0.009	89.44	-1.328E+01		
PA-234	883.24	72.	13.	0.007	96.46	6.455E+00		
AG-110M	884.68	59.	12.	0.007	96.78	7.735E-01		
Sc-46	889.28	102.	-16.	-0.009	93.31	-7.655E-01		
y-88	898.04	33.	-5.	-0.003	263.00	-2.712E-01		P
AG-110M	937.49	37.	-12.	-0.007	108.88	-1.795E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	946.02	23.	8.	0.004	138.45	2.881E+00		
EU-152	964.11	76.	10.	0.005	133.06	3.348E+00		
EU-154	996.33	51.	3.	0.002	323.33	1.565E+00		
PA-234M	1001.00	57.	-3.	-0.002	397.97	-1.805E+01		P
Co-56	1037.84	21.	3.	0.002	288.58	1.333E+00		P
RH-106	1050.36	35.	-10.	-0.005	90.75	-3.434E+01		
BI-207	1063.66	30.	-9.	-0.005	106.66	-7.016E-01		P
Ga-68	1077.40	10.	7.	0.004	106.27	1.386E+01		
FE-59	1099.25	30.	-9.	-0.005	137.89	-8.994E-01		
EU-152	1112.07	106.	-3.	-0.001	548.58	-1.113E+00		
Ta-182	1121.30	93.	10.	0.006	135.52	1.700E+00		
Ta-182	1189.05	15.	5.	0.003	176.07	1.851E+00		
Ta-182	1221.41	27.	2.	0.001	507.29	5.292E-01		
Co-56	1238.28	16.	26.	0.014	40.09	2.435E+00		
NA-22	1274.53	16.	5.	0.003	121.66	3.166E-01		
FE-59	1291.60	32.	-11.	-0.006	120.72	-1.628E+00		
AG-110M	1384.30	16.	-6.	-0.004	57.39	-1.755E+00		P
La-140	1596.21	23.	-4.	-0.002	528.30	-2.986E-01		P
SB-124	1690.98	18.	-10.	-0.006	107.24	-1.652E+00		
y-88	1836.06	1.	7.	0.004	39.41	6.328E-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	-5.7662E-01	-5.7662E-01	7.036E+02%	1.41E+01
NA-22	#A	3.1661E-01	3.1661E-01	1.217E+02%	1.35E+00
K-40		2.5252E+02	2.5252E+02	5.208E+00%	1.00E+01
Sc-46	#A	-7.6547E-01	-7.6548E-01	9.331E+01%	2.40E+00
CR-51	#A	-3.9454E+00	-3.9455E+00	1.018E+02%	1.39E+01
MN-54	#A	-4.2763E-01	-4.2763E-01	1.427E+02%	1.43E+00
FE-59	#A	-8.9939E-01	-8.9940E-01	1.379E+02%	2.82E+00
Co-56	#A	8.4074E-01	8.4075E-01	4.009E+01%	1.37E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.13E+00
CO-58	#A	-6.6673E-01	-6.6673E-01	9.247E+01%	1.96E+00
CO-60	#	7.6771E-01	7.6771E-01	3.001E+01%	4.83E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.64E+00
NB-94	#A	5.9743E-02	5.9743E-02	8.850E+02%	1.32E+00
ZR-95	#A	4.9486E-01	4.9487E-01	1.552E+02%	1.91E+00
NB-95	#A	-9.5172E-01	-9.5173E-01	7.135E+01%	2.25E+00
RU-103	#A	3.4756E-01	3.4757E-01	9.986E+01%	8.77E-01
RH-106	#A	-5.7783E+00	-5.7783E+00	1.764E+02%	3.42E+01
AG-108M	#A	-4.6031E-03	-4.6031E-03	8.803E+03%	1.10E+00
AG-110M	#A	7.4996E-01	7.4996E-01	9.678E+01%	2.53E+00
SN-113	#A	5.2559E-01	5.2559E-01	1.226E+02%	2.18E+00

SB-124	#A	-6.0988E-01	-6.0989E-01	1.760E+02%	3.60E+00
SB-125	#C	4.1145E+00	4.1145E+00	2.165E+01%	3.42E+00
I-131	#A	-2.7527E-01	-2.7529E-01	1.721E+02%	1.24E+00
Gd-153	#A	-7.6196E-01	-7.6196E-01	1.480E+02%	3.79E+00
Ga-68	#A	1.3733E+01	1.3863E+01	1.063E+02%	3.46E+01
Tc-99m	#A	-3.3643E-01	-3.3702E-01	1.280E+02%	1.44E+00
BA-133	#A	6.6010E-03	6.6010E-03	1.529E+04%	3.43E+00
CS-134	#A	5.4003E-02	5.4003E-02	1.166E+02%	3.56E+00
CS-137		3.5249E+00	3.5249E+00	1.612E+01%	9.65E-01
CE-139	#A	3.6355E-02	3.6355E-02	1.079E+03%	1.34E+00
Ba-140	#A	-4.8258E-01	-4.8260E-01	7.339E+01%	4.59E+00
La-140	#A	5.4629E-01	5.4631E-01	4.309E+01%	1.97E+00
CE-141	#A	5.7456E-01	5.7456E-01	1.290E+02%	2.48E+00
CE-144	#A	-2.7785E+00	-2.7785E+00	1.286E+02%	1.19E+01
PM-144	#A	2.2452E-01	2.2452E-01	1.633E+02%	1.15E+00
EU-152	#A	1.5147E+00	1.5147E+00	4.678E+01%	6.87E+00
EU-154	#A	3.1078E-01	3.1078E-01	2.870E+02%	1.30E+01
EU-155	#A	1.1693E+00	1.1693E+00	1.326E+02%	5.20E+00
HF-181	#A	8.1278E-01	8.1279E-01	8.120E+01%	1.67E+00
Ta-182	#A	1.3266E+00	1.3266E+00	1.355E+02%	7.83E+00
Hg-203	#A	-4.5558E-01	-4.5559E-01	1.038E+02%	1.59E+00
TL-208		6.3065E+00	6.3065E+00	1.113E+01%	1.12E+00
pm-146	#A	8.0533E-01	8.0533E-01	9.318E+01%	3.03E+00
y-88	#A	1.9366E-01	1.9366E-01	3.941E+01%	1.53E+00
Cd-113m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.46E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.96E+01
Cf-251	#A	-1.7524E+00	-1.7524E+00	1.082E+02%	5.10E+00
Cf-249	#A	7.6764E-02	7.6764E-02	5.573E+02%	2.35E+00
Sn-126	A	3.8579E+00	3.8579E+00	1.143E+02%	1.47E+01
PB-210		4.0552E+01	4.0552E+01	3.340E+01%	3.43E+01
PB-212		1.8203E+01	1.8203E+01	5.745E+00%	1.95E+00
PB-214		1.3300E+01	1.3300E+01	9.634E+00%	2.37E+00
BI-207	#A	-1.1761E-01	-1.1761E-01	3.367E+02%	1.38E+00
BI-212		2.4619E+01	2.4619E+01	1.988E+01%	9.54E+00
BI-214		1.3531E+01	1.3531E+01	8.705E+00%	1.76E+00
BI-210M	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.96E+00
AC-228		1.9055E+01	1.9055E+01	9.863E+00%	2.23E+00
TH-227	#A	-2.9467E-01	-2.9467E-01	2.064E+03%	1.76E+01
TH-229	#A	9.7646E-01	9.7646E-01	7.130E+02%	1.92E+01
TH-234	A	1.1470E+01	1.1470E+01	7.074E+01%	2.67E+01
PA-231	#A	-1.4184E+01	-1.4184E+01	1.408E+02%	6.70E+01
PA-233	#A	-4.0232E-02	-4.0232E-02	2.706E+03%	5.82E+00
PA-234	#A	1.8577E+00	1.8577E+00	7.481E+01%	6.73E+00
PA-234M	#A	4.7439E+01	4.7439E+01	8.525E+01%	2.38E+02
U-235	#A	-1.7087E+00	-1.7087E+00	1.858E+02%	1.19E+01
AM-241	#A	8.3736E-01	8.3736E-01	1.445E+02%	3.44E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.53E+01
Ir-192	#A	-1.1193E-01	-1.1193E-01	1.016E+02%	1.45E+00
Cs-136	A	5.6788E-01	5.6790E-01	6.506E+01%	2.32E+00

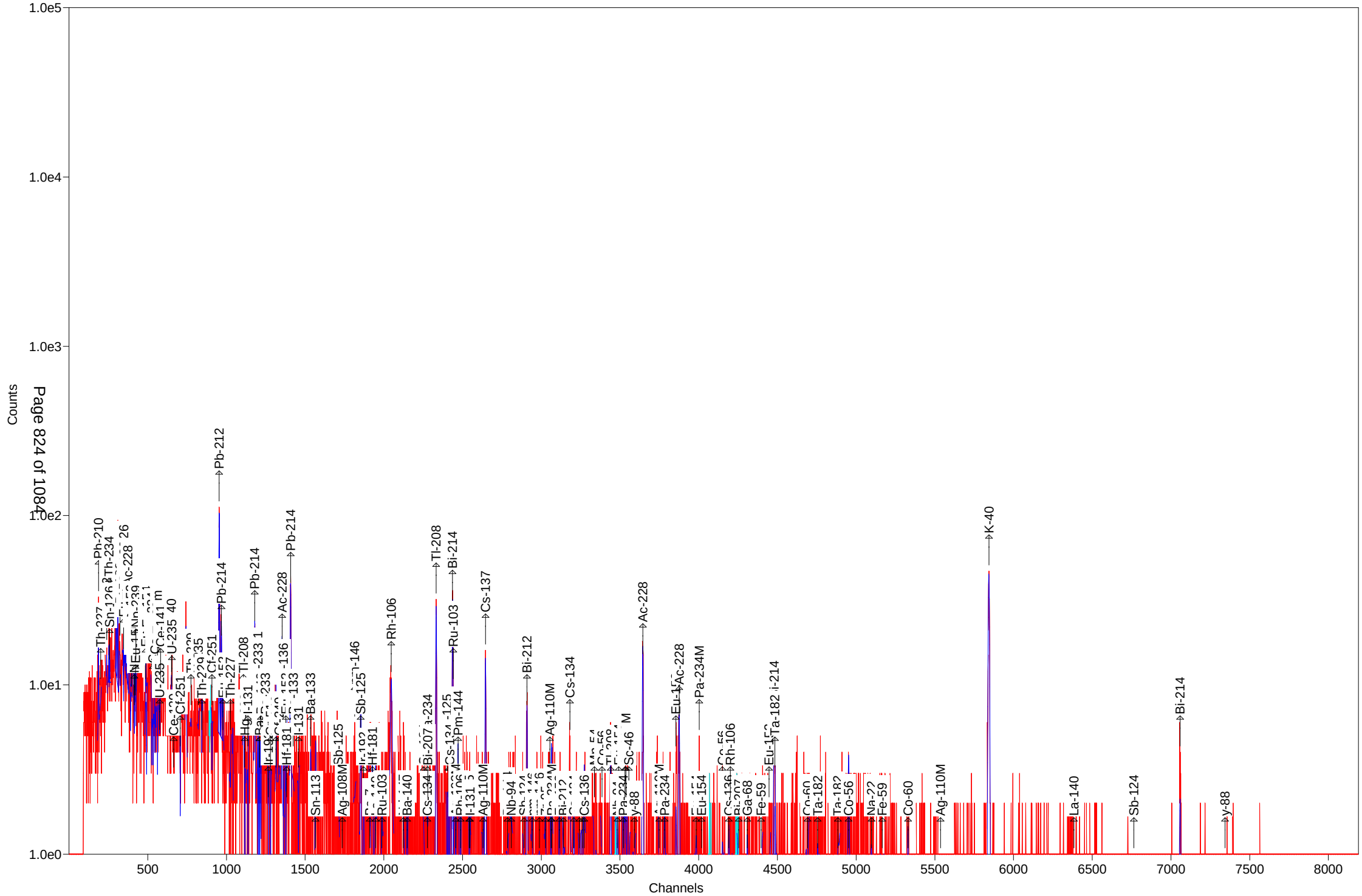
Np-239 #A	-8.5437E-01	-8.5453E-01	1.784E+02%	5.12E+00
Nd-147 #A	2.5198E-01	2.5199E-01	1.179E+03%	7.73E+00

- 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) 3.916E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.9161118E+02 Bq/Sample

265170_Gamma_160-18567-A-19-B. 17_Gamma_20161176.spc.



Test America St. Louis Spectrum ID: 3_Gamma_20161395

Sample Description: 265170_Gamma_160-18567-A-20-B
Detector: Detector # 3
Batch ID: 265170
Work Order Number: Gamma
Lot Number: 160-18567-A-20-B

Decay to Time: 9/7/2016 19:11 Live Time: 1800 sec
Acquisition Time: 9/7/2016 19:11:52 Real Time: 1803 sec
Analysis Time: 9/7/2016 19:42 Dead Time: 0.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 3_Soil_TunaCan.Clb
Efficiency Cal Desc: 3_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 11:26
Energy Cal Date: 2/28/2012 19:25
Library: Client_Long_Rev11.lib
Bkgd Correction File: 3_2016-09-04_0702.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	3.192E+00	108.4	3.458E+00	3.462E+00	1.172E+01
NA-22	-6.891E-01	72.8	5.014E-01	5.026E-01	1.673E+00
K-40	2.734E+02	4.9	1.349E+01	1.944E+01	1.128E+01
Sc-46	-7.439E-01	95.6	7.112E-01	7.122E-01	2.388E+00
CR-51	-1.524E-01	2241.8	3.417E+00	3.417E+00	2.067E+01
MN-54	4.835E-01	106.4	5.145E-01	5.151E-01	1.203E+00
FE-59	-2.811E-01	302.4	8.499E-01	8.501E-01	2.580E+00
Co-56	1.108E+00	38.9	4.308E-01	4.345E-01	1.393E+00
CO-57	-2.418E-01	120.1	2.904E-01	2.907E-01	9.758E-01
CO-58	-2.215E-01	220.8	4.890E-01	4.891E-01	1.653E+00
CO-60	4.054E-01	49.1	1.991E-01	2.001E-01	1.571E+00
ZN-65	8.197E-01	190.8	1.564E+00	1.564E+00	5.352E+00
NB-94	3.181E-01	39.4	1.255E-01	1.266E-01	1.424E+00
ZR-95	-3.044E-01	278.1	8.463E-01	8.465E-01	2.469E+00
NB-95	0.000E+00	1.#INF	2.261E-01	2.261E-01	1.674E+00
RU-103	4.009E-01	95.8	3.841E-01	3.846E-01	9.630E-01
RH-106	4.283E+00	85.8	3.676E+00	3.682E+00	3.411E+01
AG-108M	1.453E-01	260.3	3.783E-01	3.783E-01	9.682E-01
AG-110M	6.972E-01	86.2	6.013E-01	6.023E-01	1.754E+00
SN-113	9.596E-02	944.0	9.058E-01	9.059E-01	3.084E+00
SB-124	-7.268E-02	82.9	6.025E-02	6.036E-02	3.406E+00
SB-125	3.750E+00	23.5	8.827E-01	9.033E-01	1.758E+00
I-131	-1.337E-01	477.7	6.386E-01	6.387E-01	1.278E+00
Gd-153	-9.700E-01	151.0	1.465E+00	1.466E+00	4.893E+00
Ga-68	-3.411E+01	90.6	3.090E+01	3.096E+01	6.631E+01
Tc-99m	3.125E-01	120.8	3.775E-01	3.779E-01	1.264E+00
BA-133	-7.350E-01	148.2	1.089E+00	1.090E+00	3.649E+00
CS-134	1.202E+00	43.1	5.181E-01	5.218E-01	3.345E+00
CS-137	3.699E+00	15.3	5.676E-01	5.994E-01	9.422E-01
CE-139	1.755E-01	247.0	4.333E-01	4.337E-01	1.464E+00
Ba-140	1.452E+00	97.9	1.421E+00	1.423E+00	3.441E+00
La-140	4.765E-01	83.8	3.991E-01	3.999E-01	1.433E+00
CE-141	2.958E-01	234.2	6.928E-01	6.929E-01	2.337E+00

CE-144	1.023E+00	344.6	3.525E+00	3.525E+00	1.187E+01
PM-144	5.217E-01	94.1	4.910E-01	4.918E-01	1.137E+00
EU-152	1.575E+00	124.4	1.960E+00	1.961E+00	7.033E+00
EU-154	1.400E+00	86.0	1.204E+00	1.206E+00	1.014E+01
EU-155	1.298E+00	162.8	2.113E+00	2.114E+00	7.057E+00
HF-181	4.926E-01	91.5	4.509E-01	4.516E-01	1.652E+00
Ta-182	1.541E+00	120.1	1.852E+00	1.853E+00	7.355E+00
Hg-203	3.030E-02	1490.4	4.516E-01	4.516E-01	1.552E+00
TL-208	7.117E+00	9.5	6.738E-01	7.684E-01	1.010E+00
pm-146	2.215E-01	96.5	2.138E-01	2.141E-01	4.293E+00
y-88	2.610E-01	154.9	4.042E-01	4.044E-01	1.302E+00
Cd-113m	5.425E+03	86.3	4.682E+03	4.695E+03	1.567E+04
Cd-109	9.088E+00	149.6	1.359E+01	1.360E+01	4.533E+01
Cf-251	-1.662E+00	116.2	1.932E+00	1.937E+00	5.193E+00
Cf-249	-2.361E-01	74.7	1.762E-01	1.766E-01	3.001E+00
Sn-126	1.813E+00	266.1	4.825E+00	4.826E+00	1.624E+01
PB-210	3.351E+01	38.8	1.299E+01	1.313E+01	3.239E+01
PB-212	2.244E+01	4.9	1.100E+00	1.821E+00	1.857E+00
PB-214	1.428E+01	8.8	1.258E+00	1.461E+00	2.527E+00
BI-207	4.896E-01	43.7	2.137E-01	2.152E-01	1.227E+00
BI-212	2.094E+01	28.2	5.916E+00	6.015E+00	1.154E+01
BI-214	1.488E+01	9.1	1.356E+00	1.561E+00	2.637E+00
BI-210M	-5.455E-01	123.7	6.745E-01	6.753E-01	2.275E+00
AC-228	2.144E+01	8.4	1.791E+00	2.099E+00	3.262E+00
TH-227	2.320E-01	204.4	4.742E-01	4.744E-01	2.534E+01
TH-229	-2.796E+00	161.1	4.505E+00	4.511E+00	2.114E+01
TH-234	-1.220E+01	80.8	9.854E+00	9.875E+00	4.051E+01
PA-231	0.000E+00	1.#INF	5.761E+00	5.761E+00	6.854E+01
PA-233	0.000E+00	1.#INF	2.804E-01	2.804E-01	5.600E+00
PA-234	2.761E+00	52.6	1.451E+00	1.458E+00	6.939E+00
PA-234M	-1.423E+02	53.6	7.626E+01	7.660E+01	3.306E+02
U-235	-1.071E+00	150.4	1.611E+00	1.612E+00	1.014E+01
AM-241	-1.783E-01	808.9	1.442E+00	1.443E+00	3.901E+00
Np-237	-2.755E+00	161.8	4.459E+00	4.462E+00	1.486E+01
Ir-192	0.000E+00	1.#INF	1.540E-01	1.540E-01	2.339E+00
Cs-136	8.361E-02	60.2	5.032E-02	5.054E-02	1.725E+00
Np-239	1.237E+00	147.1	1.820E+00	1.822E+00	6.081E+00
Nd-147	1.688E+00	93.6	1.581E+00	1.584E+00	7.290E+00
Total	5.882E+03				

Analyst: Mike Aldridge

Sample description
265170_Gamma_160-18567-A-20-B

Spectrum Filename: C:\User\SPC\Det3\3_Gamma_20161395.An1

Acquisition information
Start time: 9/7/2016 7:11:52 PM
Live time: 1800
Real time: 1803
Dead time: 0.15 %
Detector ID: 3

Detector system
Ge 3 SN/131

Calibration
Filename: 3_Soil_TunaCan.Clb
3_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 7:25:37 PM
Zero offset: 0.122 keV
Gain: 0.250 keV/channel
Quadratic: 3.421E-08 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 11:26:55 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.64 %
Log(Eff): -6.102019E-01 + (-3.642282E-01*Log(E)) + (-2.895398E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.29 %
Log(Eff): -2.525141E+01 + (9.446449E+00*Log(E)) + (-1.005974E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (2000.59keV)
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	9/7/2016 7:11:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	3_2016-09-04_0702.PBC 9/4/2016 7:02:58 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0902

***** 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
46.36	78.	27.48	0.87	2.199E-02	46.54	4.250	3.351E+01	PB210
64.28	11.	266.13	0.84	3.475E-02	64.28	9.700	PBC<MDA	Sn126
74.80	182.	14.18	0.85	3.994E-02				
77.13	283.	8.87	0.85	4.085E-02				
87.02	133.	16.46	0.86	4.381E-02	86.49	13.100	1.291E+01	Np237
					86.54	30.700	5.505E+00	EU155
					86.94	9.040	1.866E+01	Sn126
					87.57	37.500	4.483E+00	Sn126
88.04	27.	149.58	0.86	4.404E-02	88.04	3.790	PBC<MDA	Cd109
89.78	65.	28.18	0.86	4.440E-02				
91.10	27.	151.46	0.86	4.465E-02	91.10	28.300	PBC<MDA	Nd147
93.17	29.	145.55	0.87	4.503E-02	93.35	5.561	PBC<MDA	AC228
105.47	23.	162.76	0.88	4.612E-02	105.31	21.200	PBC<MDA	EU155
106.13	23.	147.12	0.88	4.614E-02	106.13	22.700	PBC<MDA	Np239
121.78	11.	200.62	0.90	4.566E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.564E-01	CO57
123.10	16.	131.55	0.90	4.555E-02	123.10	40.790	PBC<MDA	EU154
129.14	56.	32.59	0.52	4.493E-02				
131.29	22.	138.87	0.91	4.467E-02	131.29	18.000	PBC<MDA	PA234
133.02	22.	141.88	0.91	4.445E-02	133.02	43.300	PBC<MDA	HF181
133.54	9.	344.58	0.91	4.438E-02	133.54	11.090	PBC<MDA	CE144
140.51	21.	120.81	0.92	4.337E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	11.	234.23	0.92	4.257E-02	145.44	48.200	PBC<MDA	CE141
165.85	10.	246.98	0.94	3.963E-02	165.85	79.900	PBC<MDA	CE139
205.33	9.	259.06	0.98	3.437E-02	205.33	5.010	PBC<MDA	U235
210.85	9.	276.28	0.99	3.376E-02	210.85	2.990	PBC<MDA	TH229
227.00	18.	111.53	1.00	3.212E-02	227.00	6.300	PBC<MDA	Cf251
238.65	520.	5.75	1.10	3.105E-02	238.63	43.300	2.148E+01	PB212
242.06	85.	19.29	1.02	3.075E-02	242.00	7.430	2.063E+01	PB214
244.69	13.	331.85	1.02	3.052E-02	244.69	7.580	PBC<MDA	EU152
256.24	10.	204.43	1.03	2.957E-02	256.24	7.000	PBC<MDA	TH227
263.70	17.	86.30	1.04	2.900E-02	263.70	0.006	PBC<MDA	Cd113m
277.27	20.	86.24	1.05	2.801E-02	277.28	6.310	PBC<MDA	TL208
295.05	144.	14.60	0.78	2.683E-02	295.09	19.300	1.541E+01	PB214
300.20	41.	37.27	0.75	2.652E-02	300.03	3.280	2.645E+01	PB212
					300.07	2.460	3.528E+01	PA231
					300.18	6.200	PBC<MDA	PA233
327.65	2.	649.61	0.00	2.494E-02				
328.76	17.	83.75	1.11	2.489E-02	328.76	20.300	PBC<MDA	La140
333.44	14.	96.33	1.11	2.464E-02	333.44	15.510	PBC<MDA	Cf249
338.24	103.	15.15	0.79	2.439E-02	338.32	12.010	1.957E+01	AC228
351.99	220.	9.87	0.91	2.372E-02	351.93	37.600	1.370E+01	PB214
391.69	2.	944.00	1.17	2.200E-02	391.69	64.000	PBC<MDA	SN113
427.48	41.	23.54	0.53	2.065E-02	427.88	29.600	3.750E+00	SB125
433.94	5.	260.32	1.21	2.045E-02	433.94	90.480	PBC<MDA	AG108M
453.88	14.	96.54	1.23	1.980E-02	453.88	65.000	PBC<MDA	pm146
463.06	66.	19.30	2.33	1.951E-02	463.37	10.470	1.785E+01	SB125
475.97	12.	108.35	1.25	1.909E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	115.69	1.26	1.896E-02	482.00	80.500	PBC<MDA	HF181
487.02	3.	454.53	1.26	1.882E-02	487.02	45.500	PBC<MDA	La140
497.05	12.	95.80	1.27	1.854E-02	497.05	90.900	PBC<MDA	RU103
511.86	115.	22.59	2.54	1.815E-02	511.86	20.000	1.765E+01	RH106
531.00	11.	110.13	1.31	1.767E-02	531.00	13.000	PBC<MDA	Nd147
537.26	11.	97.85	1.31	1.752E-02	537.26	24.390	PBC<MDA	Ba140
563.24	27.	43.09	1.34	1.693E-02	563.24	8.350	1.061E+01	CS134
568.02	10.	72.40	1.34	1.680E-02	569.32	15.380	PBC<MDA	CS134
569.47	4.	248.59	1.34	1.679E-02	569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.13	180.	9.47	1.14	1.651E-02	583.02	84.500	7.185E+00	TL208
604.92	12.	227.42	1.38	1.607E-02	604.71	97.620	PBC<MDA	CS134
609.42	201.	9.10	1.29	1.598E-02	609.31	46.090	1.514E+01	BI214
					610.30	5.750	1.215E+02	RU103
661.90	85.	15.34	1.65	1.504E-02	661.66	85.210	3.699E+00	CS137
696.54	13.	94.12	1.46	1.448E-02	696.54	99.000	PBC<MDA	PM144
722.79	7.	182.07	1.49	1.408E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.895E-01	AG108M
					723.36	20.220	1.301E+00	EU154
727.19	40.	28.25	1.27	1.402E-02	727.17	7.550	2.094E+01	BI212
735.72	5.	231.42	1.50	1.390E-02	735.72	22.500	PBC<MDA	pm146
763.94	13.	86.24	1.53	1.351E-02	763.94	22.280	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	12.	84.39	1.53	1.348E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.666E+02	PA234M
778.92	2.	565.69	1.54	1.332E-02	778.92	12.940	PBC<MDA	EU152
785.78	34.	22.38	0.56	1.323E-02	785.42	1.280	1.104E+02	BI212
795.87	9.	128.14	1.56	1.310E-02	795.87	85.530	PBC<MDA	CS134
802.03	13.	87.92	1.56	1.303E-02	801.95	8.690	PBC<MDA	CS134
815.77	9.	88.58	1.57	1.286E-02	815.77	23.280	PBC<MDA	La140
834.85	11.	106.41	1.59	1.264E-02	834.85	99.980	PBC<MDA	MN54
860.46	48.	17.48	1.09	1.236E-02	860.56	12.420	1.747E+01	TL208
871.10	15.	39.44	1.62	1.224E-02	871.10	99.890	PBC<MDA	NB94
873.23	4.	193.65	1.63	1.222E-02	873.23	12.270	PBC<MDA	EU154
880.53	6.	88.78	1.63	1.214E-02	880.53	6.000	PBC<MDA	PA234
883.24	13.	52.56	1.64	1.211E-02	883.24	9.600	PBC<MDA	PA234
884.68	6.	140.01	1.64	1.210E-02	884.68	72.680	PBC<MDA	AG110M
898.04	4.	253.37	1.65	1.196E-02	898.04	93.700	PBC<MDA	y88
911.13	141.	10.53	1.16	1.183E-02	911.07	29.000	2.283E+01	AC228
937.49	2.	489.46	1.68	1.158E-02	937.49	34.360	PBC<MDA	AG110M
946.02	8.	112.15	1.69	1.150E-02	946.02	13.400	PBC<MDA	PA234
964.11	12.	125.88	1.71	1.133E-02	964.11	14.605	PBC<MDA	EU152
969.15	72.	16.96	1.22	1.129E-02	968.97	17.460	2.043E+01	AC228
1004.77	12.	108.73	1.74	1.098E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	9.	100.31	1.77	1.071E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	11.	60.18	1.78	1.063E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	10.	85.82	1.79	1.062E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	20.	43.65	1.80	1.051E-02	1063.66	74.500	1.433E+00	BI207
1112.07	11.	124.43	1.84	1.016E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	8.	190.78	1.84	1.014E-02	1115.55	50.600	PBC<MDA	ZN65
1120.17	42.	23.10	1.85	1.010E-02	1120.29	15.100	1.542E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.19	9.	150.55	1.85	1.010E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.432E+00	Ta182
1173.24	17.	49.10	1.89	9.749E-03	1173.24	99.900	PBC<MDA	CO60
1188.46	5.	187.26	1.91	9.648E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	31.	38.89	1.95	9.349E-03	1238.28	66.070	2.765E+00	Co56
1408.00	1.	972.11	2.09	8.458E-03	1408.00	21.005	PBC<MDA	EU152
1460.86	432.	4.93	2.14	8.216E-03	1460.83	10.670	2.734E+02	K40
1690.98	1.	945.38	2.32	7.319E-03	1690.98	47.790	PBC<MDA	SB124
1764.80	34.	20.14	1.94	7.075E-03	1764.49	15.400	1.735E+01	BI214
1836.06	4.	178.26	2.43	6.854E-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
298.94	74.81	240.	184.	4.609E+03	14.02	0.848	- sD
308.29	77.14	173.	288.	7.050E+03	8.75	0.850	- D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
358.09	89.75	134.	67.	1.514E+03	27.23	0.863	- D
516.48	129.14	97.	56.	1.243E+03	32.59	0.520	- s
1311.00	327.65	43.	2.	6.681E+01	649.61	0.000	- 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	185.10	46.36	125.	57.	0.032	38.75	0.870
TH-227	200.24	50.14	362.	-7.	-0.004	405.28	0.822
AM-241	237.85	59.54	277.	-4.	-0.002	808.94	0.832
TH-234	252.87	63.29	392.	-29.	-0.016	80.76	0.836
Sn-126	256.84	64.28	423.	11.	0.006	266.13	0.837
BA-133	323.73	80.99	270.	-3.	-0.002	976.39	0.854
Np-237	345.75	86.49	1041.	-28.	-0.016	161.84	0.860D
EU-155	345.96	86.54	1012.	31.	0.017	77.14	0.860D
Sn-126	347.55	86.94	936.	13.	0.007	185.59	0.860D
Sn-126	350.08	87.57	893.	28.	0.016	149.90	0.861D
Cd-109	351.96	88.04	821.	27.	0.015	149.58	0.862s
Nd-147	364.21	91.10	848.	27.	0.015	151.46	0.865s
AC-228	373.21	93.35	863.	29.	0.016	145.55	0.867s
Gd-153	389.83	97.50	638.	-24.	-0.013	151.04	0.871s
Np-239	397.83	99.50	614.	-24.	-0.013	147.89	0.873s
Gd-153	412.64	103.20	608.	-24.	-0.013	146.57	0.877s
Np-239	414.64	103.70	632.	-7.	-0.004	497.60	0.878s
EU-155	421.10	105.31	680.	23.	0.013	162.76	0.879s
Np-239	424.37	106.13	577.	23.	0.013	147.12	0.880s
EU-152	487.00	121.78	238.	11.	0.006	200.62	0.896s
CO-57	488.14	122.06	200.	-17.	-0.009	120.12	0.897s
EU-154	492.30	123.10	223.	16.	0.009	131.55	0.898s
PA-234	525.11	131.29	440.	22.	0.012	138.87	0.906s
HF-181	532.03	133.02	461.	22.	0.012	141.88	0.908
CE-144	534.09	133.54	483.	9.	0.005	344.58	0.909
HF-181	545.14	136.30	492.	0.	0.000	1000.00	0.911
CO-57	545.83	136.47	492.	0.	0.000	1000.00	0.912
Tc-99m	561.99	140.51	315.	21.	0.012	120.81	0.916s
U-235	575.10	143.79	317.	-24.	-0.014	152.95	0.919
CE-141	581.73	145.44	322.	11.	0.006	234.23	0.921s
Ba-140	650.65	162.66	323.	-23.	-0.013	110.94	0.939s
U-235	653.53	163.38	348.	-22.	-0.012	167.91	0.939s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-139	663.43	165.85	300.	10.	0.006	246.98	0.942s
Cf-251	706.45	176.60	153.	-19.	-0.011	116.22	0.953s
TH-229	774.13	193.51	150.	-22.	-0.012	165.90	0.970s
U-235	821.46	205.33	151.	9.	0.005	259.06	0.982s
TH-229	843.54	210.85	161.	9.	0.005	276.28	0.988s
Cf-251	908.18	227.00	110.	18.	0.010	111.53	1.004s
PB-212	954.74	238.63	82.	543.	0.302	4.90	1.016D
PB-214	968.20	242.00	91.	85.	0.047	19.29	1.019D
EU-152	978.99	244.69	878.	13.	0.007	331.85	1.022s
TH-227	1025.21	256.24	110.	10.	0.005	204.43	1.034s
Cd-113m	1055.07	263.70	99.	17.	0.009	86.30	1.041s
BI-210M	1063.60	265.83	146.	-14.	-0.008	123.66	1.044s
TL-208	1109.43	277.28	135.	20.	0.011	86.24	1.055
I-131	1137.51	284.30	95.	-10.	-0.006	179.49	1.062s
PB-214	1180.55	295.05	73.	144.	0.080	14.60	0.778s
PB-212	1201.16	300.20	52.	41.	0.023	37.27	0.750s
PA-233	1201.07	300.18	381.	0.	0.000	1000.00	1.078s
PA-231	1210.95	302.65	381.	0.	0.000	1000.00	1.081s
BA-133	1211.76	302.85	381.	0.	0.000	1000.00	1.081s
Ba-140	1219.75	304.85	381.	0.	0.000	1000.00	1.083s
BI-210M	1219.94	304.90	381.	0.	0.000	1000.00	1.083s
Ir-192	1234.12	308.44	381.	0.	0.000	1000.00	1.086s
PA-233	1248.42	312.01	381.	0.	0.000	1000.00	1.090s
Ir-192	1266.34	316.49	381.	0.	0.000	1000.00	1.094s
La-140	1315.45	328.76	90.	17.	0.009	83.75	1.107s
Cf-249	1334.18	333.44	51.	14.	0.008	96.33	1.111s
AC-228	1353.39	338.24	37.	103.	0.057	15.15	0.791s
Cs-136	1362.71	340.57	296.	-15.	-0.008	167.84	1.119s
EU-152	1377.58	344.29	281.	0.	0.000	1000.00	1.122s
HF-181	1383.75	345.83	281.	0.	0.000	1000.00	1.124s
PB-214	1408.41	351.99	66.	220.	0.122	9.87	0.908
BA-133	1424.46	356.00	400.	-19.	-0.011	148.17	1.134s
I-131	1458.41	364.48	77.	-5.	-0.003	477.65	1.142
BA-133	1535.87	383.84	247.	-21.	-0.011	110.13	1.162s
Cf-249	1552.32	387.95	268.	-21.	-0.011	114.07	1.165
SN-113	1567.28	391.69	262.	2.	0.001	944.00	1.169s
SB-125	1710.51	427.48	13.	41.	0.023	23.54	0.531s
AG-108M	1736.34	433.94	40.	5.	0.003	260.32	1.211s
pm-146	1816.14	453.88	44.	14.	0.008	96.54	1.230s
SB-125	1852.88	463.06	18.	66.	0.036	19.30	2.328s
Ir-192	1872.88	468.06	168.	-16.	-0.009	120.35	1.244s
BE-7	1911.04	477.60	72.	12.	0.006	108.35	1.254s
HF-181	1928.65	482.00	84.	12.	0.006	115.69	1.258s
La-140	1948.75	487.02	106.	3.	0.002	454.53	1.263s
RU-103	1988.90	497.05	32.	12.	0.007	95.80	1.273s
RH-106	2048.16	511.86	87.	115.	0.064	22.59	2.537s
Nd-147	2124.72	531.00	35.	11.	0.006	110.13	1.306s
Ba-140	2149.77	537.26	26.	11.	0.006	97.85	1.312s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2253.70	563.24	26.	27.	0.015	43.09	1.337
CS-134	2278.04	569.32	23.	10.	0.006	72.40	1.342s
PA-234	2278.64	569.47	37.	4.	0.002	248.59	1.343s
BI-207	2279.57	569.70	52.	-7.	-0.004	172.99	1.343s
TL-208	2333.28	583.13	24.	180.	0.100	9.47	1.141
SB-125	2402.79	600.50	425.	-16.	-0.009	51.11	1.372
SB-124	2411.71	602.73	410.	-10.	-0.006	82.89	1.374s
CS-134	2419.63	604.71	388.	12.	0.007	227.42	1.376
BI-214	2438.04	609.31	48.	184.	0.102	9.11	1.381D
RU-103	2441.99	610.30	400.	0.	0.000	1000.00	1.382s
AG-108M	2457.92	614.28	400.	0.	0.000	1000.00	1.385s
PM-144	2473.05	618.06	400.	0.	0.000	1000.00	1.389s
SB-125	2544.37	635.89	39.	-3.	-0.001	335.41	1.406s
I-131	2548.71	636.97	65.	-17.	-0.009	71.37	1.407s
AG-110M	2631.87	657.76	175.	-17.	-0.010	111.62	1.427s
CS-137	2648.45	661.90	17.	85.	0.047	15.34	1.653s
PM-144	2787.02	696.54	33.	13.	0.007	94.12	1.463s
SB-124	2892.00	722.79	70.	7.	0.004	182.07	1.488s
AG-108M	2892.61	722.94	77.	0.	0.000	1000.00	1.488s
EU-154	2894.28	723.36	77.	0.	0.000	1000.00	1.488s
ZR-95	2897.65	724.20	77.	0.	0.000	1000.00	1.489s
BI-212	2909.60	727.19	17.	40.	0.022	28.25	1.269
pm-146	2943.74	735.72	33.	5.	0.003	231.42	1.500
pm-146	2989.50	747.16	51.	-8.	-0.005	185.64	1.510s
ZR-95	3027.78	756.73	42.	-4.	-0.002	278.05	1.519s
AG-110M	3056.63	763.94	53.	13.	0.007	86.24	1.526s
NB-95	3064.02	765.79	66.	0.	0.000	1000.00	1.528s
PA-234M	3066.51	766.41	44.	12.	0.007	84.39	1.528s
EU-152	3116.54	778.92	28.	2.	0.001	565.69	1.540s
BI-212	3143.97	785.78	4.	34.	0.019	22.38	0.558s
CS-134	3184.33	795.87	57.	9.	0.005	128.14	1.556
CS-134	3208.67	801.95	62.	13.	0.007	87.92	1.561s
CO-58	3243.96	810.78	58.	-5.	-0.003	220.81	1.569s
La-140	3263.94	815.77	30.	9.	0.005	88.58	1.574s
Cs-136	3274.86	818.50	63.	-9.	-0.005	123.24	1.576s
MN-54	3340.25	834.85	28.	11.	0.006	106.41	1.591s
Co-56	3387.93	846.77	38.	-7.	-0.004	169.12	1.602s
TL-208	3442.68	860.46	5.	48.	0.027	17.48	1.086s
NB-94	3485.23	871.10	10.	15.	0.008	39.44	1.625s
EU-154	3493.77	873.23	28.	4.	0.002	193.65	1.627s
PA-234	3522.96	880.53	10.	6.	0.003	88.78	1.633s
PA-234	3533.80	883.24	16.	13.	0.007	52.56	1.636s
AG-110M	3539.58	884.68	29.	6.	0.003	140.01	1.637s
Sc-46	3557.96	889.28	111.	-16.	-0.009	95.60	1.641s
y-88	3593.00	898.04	26.	4.	0.002	253.37	1.649s
AC-228	3645.35	911.13	14.	141.	0.078	10.53	1.162s
AG-110M	3750.78	937.49	31.	2.	0.001	489.46	1.685s
PA-234	3784.89	946.02	15.	8.	0.004	112.15	1.692s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	3857.23	964.11	106.	12.	0.007	125.88	1.709s
AC-228	3877.38	969.15	18.	72.	0.040	16.96	1.218s
EU-154	3986.08	996.33	102.	-19.	-0.011	78.10	1.737s
PA-234M	4004.75	1001.00	125.	-24.	-0.013	53.58	1.742s
EU-154	4019.86	1004.77	81.	12.	0.007	108.73	1.745s
Co-56	4152.08	1037.84	15.	9.	0.005	100.31	1.774s
Cs-136	4192.99	1048.07	16.	11.	0.006	60.18	1.783s
RH-106	4202.15	1050.36	30.	10.	0.005	85.82	1.785s
BI-207	4255.33	1063.66	12.	20.	0.011	43.65	1.797s
Ga-68	4310.28	1077.40	48.	-18.	-0.010	90.61	1.809s
FE-59	4397.65	1099.25	27.	-3.	-0.002	302.36	1.828s
EU-152	4448.93	1112.07	89.	11.	0.006	124.43	1.839s
ZN-65	4462.81	1115.55	100.	8.	0.004	190.78	1.842s
BI-214	4481.77	1120.29	26.	42.	0.024	23.10	1.846D
Sc-46	4482.82	1120.55	108.	0.	0.000	1000.00	1.847
Ta-182	4485.82	1121.30	89.	9.	0.005	150.55	1.847s
CO-60	4693.48	1173.24	11.	17.	0.010	49.10	1.892s
Ta-182	4756.71	1189.05	16.	5.	0.003	187.26	1.906s
Co-56	4953.53	1238.28	22.	31.	0.017	38.89	1.948
NA-22	5098.46	1274.53	28.	-11.	-0.006	72.76	1.979s
EU-154	5098.51	1274.54	58.	-14.	-0.008	79.65	1.979s
FE-59	5166.69	1291.60	29.	-11.	-0.006	112.24	1.993s
CO-60	5330.21	1332.50	23.	-3.	-0.002	425.92	2.028s
AG-110M	5537.27	1384.30	11.	-1.	-0.001	598.44	2.071s
EU-152	5632.02	1408.00	17.	1.	0.001	972.11	2.090s
K-40	5843.32	1460.86	10.	432.	0.240	4.93	2.141
La-140	6384.26	1596.21	12.	0.	0.000	1000.00	2.242s
SB-124	6763.00	1690.98	6.	1.	0.000	945.38	2.317s
BI-214	7057.98	1764.80	6.	34.	0.019	20.14	1.940
Co-56	7084.14	1771.35	50.	-6.	-0.003	167.35	2.379s
y-88	7342.69	1836.06	6.	4.	0.002	178.26	2.428s

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	3.1916E+00				5.31E+01	
			477.60	3.192E+00	&(	1.172E+01	1.08E+02 1.05E+01 G
NA-22	C	-6.8915E-01				9.50E+02	
			1274.53	-6.891E-01	?(	1.673E+00	7.28E+01 9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	2.7345E+02					4.66E+11	
			1460.83	2.734E+02	(P	1.128E+01	4.93E+00	1.07E+01 G
Sc-46	F	-7.4392E-01					8.38E+01	
			889.28	-7.439E-01	?(	2.388E+00	9.56E+01	1.00E+02 G
			1120.55	0.000E+00	+	2.813E+00	1.00E+03	1.00E+02 G
CR-51	F	-1.5240E-01					2.77E+01	
			320.08	-1.524E-01	%(P	2.067E+01	2.24E+03	9.94E+00 G
MN-54	C	4.8353E-01					3.12E+02	
			834.85	4.835E-01	?(	1.203E+00	1.06E+02	1.00E+02 G
FE-59	F	-2.8110E-01					4.45E+01	
			1099.25	-2.811E-01	?(P	2.580E+00	3.02E+02	5.65E+01 G
			1291.60	-1.519E+00	+ P	3.933E+00	1.12E+02	4.32E+01 G
Co-56	C	1.1076E+00					7.73E+01	
			846.77	-2.986E-01	(P	1.393E+00	1.69E+02	9.99E+01 G
			1238.28	2.765E+00	&(P	2.221E+00	3.89E+01	6.61E+01 G
			1037.84	3.303E+00	?(	7.618E+00	1.00E+02	1.41E+01 G
			1771.35	-3.138E+00	+	1.817E+01	1.67E+02	1.55E+01 A
CO-57	C	-2.4177E-01					2.72E+02	
			122.06	-2.418E-01	&(	9.758E-01	1.20E+02	8.56E+01 G
			136.47	0.000E+00	&	1.255E+01	1.00E+03	1.07E+01 G
CO-58	C	-2.2145E-01					7.09E+01	
			810.78	-2.215E-01	?(P	1.653E+00	2.21E+02	9.95E+01 G
CO-60	F	4.0540E-01					1.93E+03	
			1332.50	-1.775E-01	?(P	1.571E+00	4.26E+02	1.00E+02 G
			1173.24	9.888E-01	?(	1.023E+00	4.91E+01	9.99E+01 G
ZN-65	F	8.1973E-01					2.44E+02	
			1115.55	8.197E-01	?(	5.352E+00	1.91E+02	5.06E+01 G
NB-94	I	3.1812E-01					7.41E+06	
			702.63	-5.260E-02	%(	1.424E+00	1.14E+03	9.79E+01 G
			871.10	6.815E-01	?(	7.926E-01	3.94E+01	9.99E+01 G
ZR-95	I	-3.0438E-01					6.40E+01	
			756.73	-3.044E-01	?(P	2.469E+00	2.78E+02	5.45E+01 G
			724.20	0.000E+00	+	3.901E+00	1.00E+03	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	4.0091E-01					3.93E+01	
			497.05	4.009E-01	?(P	9.630E-01	9.58E+01	9.09E+01 G
			610.30	0.000E+00	-	5.805E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.2827E+00					3.74E+02	
			621.92	-1.909E-01	%(P	3.411E+01	3.13E+03	9.93E+00 G
			1050.36	3.276E+01	&(	9.505E+01	8.58E+01	1.56E+00 G
			511.86	1.765E+01	?	7.053E+00	2.26E+01	2.00E+01 GA
AG-108M	C	1.4531E-01					1.53E+05	
			433.94	1.453E-01	?(P	9.682E-01	2.60E+02	9.05E+01 G
			722.94	0.000E+00	-	1.894E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.733E+00	1.00E+03	8.98E+01 G
AG-110M	F	6.9717E-01					2.50E+02	
			884.68	3.595E-01	?(	1.754E+00	1.40E+02	7.27E+01 G
			657.76	-6.678E-01	+	2.503E+00	1.12E+02	9.46E+01 G
			937.49	3.479E-01	&(P	3.973E+00	4.89E+02	3.44E+01 G
			1384.30	-3.558E-01	+	4.910E+00	5.98E+02	2.43E+01 G
			763.94	2.337E+00	?(	6.780E+00	8.62E+01	2.23E+01 G
SN-113	F	9.5958E-02					1.15E+02	
			391.69	9.596E-02	?(P	3.084E+00	9.44E+02	6.40E+01 G
SB-124	F	-7.2680E-02					6.02E+01	
			602.73	-3.483E-01	?(P	3.406E+00	8.29E+01	9.83E+01 G
			1690.98	1.059E-01	+	2.293E+00	9.45E+02	4.78E+01 G
			722.79	2.433E+00	?(	1.525E+01	1.82E+02	1.08E+01 G
SB-125	I	3.7499E+00					1.01E+03	
			427.88	3.750E+00	@(P	1.758E+00	2.35E+01	2.96E+01 G
			600.50	-3.059E+00	& P	1.903E+01	5.11E+01	1.79E+01 G
			635.89	-8.458E-01	-	1.005E+01	3.35E+02	1.13E+01 G
			463.37	1.785E+01	+ P	6.173E+00	1.93E+01	1.05E+01 G
I-131	I	-1.3370E-01					8.02E+00	
			364.48	-1.337E-01	(P	1.278E+00	4.78E+02	8.17E+01 G
			284.30	-3.396E+00	&	1.584E+01	1.79E+02	6.14E+00 G
			636.97	-8.490E+00	+	2.013E+01	7.14E+01	7.17E+00 G
Gd-153	F	-9.6998E-01					2.42E+02	
			97.50	-9.700E-01	&(	4.893E+00	1.51E+02	3.00E+01 G
			103.20	-1.331E+00	+	6.514E+00	1.47E+02	2.18E+01 G
Ga-68	C	-3.4108E+01					4.71E-02	
			1077.40	-3.411E+01	&(	6.631E+01	9.06E+01	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	3.1248E-01					2.51E-01	
			140.51	3.125E-01	&(	1.264E+00	1.21E+02	8.93E+01 G
BA-133	F	-7.3499E-01					3.85E+03	
			356.00	-7.350E-01	&(	3.649E+00	1.48E+02	6.20E+01 G
			302.85	0.000E+00	&	1.077E+01	1.00E+03	1.83E+01 G
			383.84	-5.737E+00	+	2.115E+01	1.10E+02	8.94E+00 GA
			80.99	-1.160E-01	&	3.067E+00	9.76E+02	3.41E+01 GA
CS-134	I	1.2024E+00					7.54E+02	
			604.71	4.370E-01	?(	3.345E+00	2.27E+02	9.76E+01 G
			795.87	4.296E-01	(	1.883E+00	1.28E+02	8.55E+01 G
			569.32	2.244E+00	&(	5.423E+00	7.24E+01	1.54E+01 G
			801.95	6.524E+00	?(	1.928E+01	8.79E+01	8.69E+00 G
			563.24	1.061E+01	(	1.040E+01	4.31E+01	8.35E+00 G
CS-137	I	3.6994E+00					1.10E+04	
			661.66	3.699E+00	(	9.422E-01	1.53E+01	8.52E+01 G
CE-139	F	1.7545E-01					1.38E+02	
			165.85	1.755E-01	?(	1.464E+00	2.47E+02	7.99E+01 G
Ba-140	I	1.4521E+00					1.28E+01	
			537.26	1.452E+00	?(	3.441E+00	9.79E+01	2.44E+01 G
			162.66	-5.282E+00	&	1.959E+01	1.11E+02	6.22E+00 G
			304.85	0.000E+00	&	4.624E+01	1.00E+03	4.29E+00 G
La-140	I	4.7652E-01					1.28E+01	
			1596.21	0.000E+00	?(	1.433E+00	1.00E+03	9.54E+01 G
			487.02	2.092E-01	(	3.286E+00	4.55E+02	4.55E+01 G
			328.76	1.845E+00	?(	5.169E+00	8.38E+01	2.03E+01 G
			815.77	1.758E+00	?(	5.277E+00	8.86E+01	2.33E+01 G
CE-141	I	2.9577E-01					3.25E+01	
			145.44	2.958E-01	?(	2.337E+00	2.34E+02	4.82E+01 G
CE-144	I	1.0228E+00					2.85E+02	
			133.54	1.023E+00	(	1.187E+01	3.45E+02	1.11E+01 G
PM-144	C	5.2173E-01					3.63E+02	
			696.54	5.217E-01	?(	1.137E+00	9.41E+01	9.90E+01 G
			618.06	0.000E+00	-	3.400E+00	1.00E+03	9.91E+01 G
EU-152	F	1.5750E+00					4.94E+03	
			344.29	0.000E+00	?(	7.033E+00	1.00E+03	2.65E+01 G
			1112.07	4.437E+00	&(	1.874E+01	1.24E+02	1.36E+01 G
			121.78	4.683E-01	&(	3.176E+00	2.01E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	6.448E-01	?(	8.823E+00	5.66E+02	1.29E+01 G
			964.11	3.986E+00	?(	1.700E+01	1.26E+02	1.46E+01 G
			244.69	3.044E+00	?(	3.381E+01	3.32E+02	7.58E+00 G
			1408.00	3.127E-01	?	6.856E+00	9.72E+02	2.10E+01 GA
EU-154	I	1.3996E+00					3.14E+03	
			873.23	1.482E+00	?(	1.014E+01	1.94E+02	1.23E+01 G
			123.10	4.884E-01	?(	2.160E+00	1.32E+02	4.08E+01 G
			1274.54	-2.475E+00	+	6.597E+00	7.96E+01	3.52E+01 G
			723.36	0.000E+00	-	8.511E+00	1.00E+03	2.02E+01 G
			1004.77	3.407E+00	?(	1.253E+01	1.09E+02	1.80E+01 G
			996.33	-9.054E+00	+	2.356E+01	7.81E+01	1.06E+01 G
EU-155	I	1.2980E+00					1.81E+03	
			105.31	1.298E+00	?(P	7.057E+00	1.63E+02	2.12E+01 G
			86.54	1.298E+00	}	6.252E+00	7.71E+01	3.07E+01 G
HF-181	F	4.9263E-01					4.24E+01	
			482.00	4.213E-01	?(	1.652E+00	1.16E+02	8.05E+01 G
			133.02	6.252E-01	(	2.967E+00	1.42E+02	4.33E+01 G
			345.83	0.000E+00	&	1.241E+01	1.00E+03	1.51E+01 G
			136.30	0.000E+00	&	2.290E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.5413E+00					1.14E+02	
			1121.30	1.432E+00	?(	7.355E+00	1.51E+02	3.49E+01 G
			1221.41	-1.452E-01	&	7.218E+00	2.23E+03	2.70E+01 G
			1189.05	1.777E+00	?(	7.589E+00	1.87E+02	1.62E+01 G
Hg-203	F	3.0299E-02					4.66E+01	
			279.20	3.030E-02	&(	1.552E+00	1.49E+03	8.15E+01 G
TL-208	N	7.1170E+00					6.98E+02	
			583.02	7.185E+00	(P	1.010E+00	9.47E+00	8.45E+01 G
			277.28	6.211E+00	?(	1.789E+01	8.62E+01	6.31E+00 G
			860.56	1.747E+01	+ P	4.661E+00	1.75E+01	1.24E+01 G
pm-146	C	2.2146E-01					2.02E+03	
			747.16	-9.911E-01	?(	4.293E+00	1.86E+02	3.40E+01 G
			735.72	9.475E-01	&(	5.213E+00	2.31E+02	2.25E+01 G
			453.88	6.044E-01	?(	1.451E+00	9.65E+01	6.50E+01 G
y-88	F	2.6095E-01					1.07E+02	
			898.04	2.201E-01	?(P	1.302E+00	2.53E+02	9.37E+01 G
			1836.06	2.996E-01	?(	1.180E+00	1.78E+02	9.92E+01 G
Cd-113m		5.4252E+03					5.33E+03	
			263.70	5.425E+03	?(	1.567E+04	8.63E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-109	F	9.0884E+00					4.53E+02	
			88.04	9.088E+00	?(	4.533E+01	1.50E+02	3.79E+00 G
Cf-251	T	-1.6620E+00					3.28E+05	
			176.60	-1.662E+00	(	5.193E+00	1.16E+02	1.70E+01 G
			227.00	4.942E+00	&	1.416E+01	1.12E+02	6.30E+00 GA
Cf-249	T	-2.3607E-01					1.28E+05	
			387.95	-7.856E-01	?(	3.001E+00	1.14E+02	6.60E+01 G
			333.44	2.102E+00	&(	5.247E+00	9.63E+01	1.55E+01 G
Sn-126		1.8132E+00					3.65E+07	
			87.57	9.582E-01	&	4.787E+00	1.50E+02	3.75E+01 GA
			64.28	1.813E+00	(	1.624E+01	2.66E+02	9.70E+00 G
			86.94	1.813E+00	}	2.039E+01	1.86E+02	9.04E+00 GA
PB-210	N	3.3512E+01					8.14E+03	
			46.54	3.351E+01	(P	3.239E+01	3.88E+01	4.25E+00 G
PB-212	N	2.2435E+01					6.98E+02	
			238.63	2.244E+01	(P	1.857E+00	4.90E+00	4.33E+01 G
			300.03	2.645E+01	+ P	2.310E+01	3.73E+01	3.28E+00 GA
PB-214	N	1.4281E+01					5.84E+05	
			351.93	1.370E+01	(P	2.527E+00	9.87E+00	3.76E+01 G
			295.09	1.541E+01	(P	4.572E+00	1.46E+01	1.93E+01 G
			242.00	2.063E+01	+ P	1.147E+01	1.93E+01	7.43E+00 GA
BI-207	C	4.8960E-01					1.18E+04	
			569.70	-2.292E-01	&(P	1.227E+00	1.73E+02	9.77E+01 G
			1063.66	1.433E+00	?(P	1.328E+00	4.37E+01	7.45E+01 G
BI-212	N	2.0943E+01					6.98E+02	
			727.17	2.094E+01	(P	1.154E+01	2.82E+01	7.55E+00 G
			785.42	1.104E+02	+	4.070E+01	2.24E+01	1.28E+00 GA
BI-214	N	1.4885E+01					5.84E+05	
			609.31	1.388E+01	(P	2.637E+00	9.11E+00	4.61E+01 G
			1120.29	1.542E+01	(P	9.674E+00	2.31E+01	1.51E+01 G
			1764.49	1.735E+01	(P	7.183E+00	2.01E+01	1.54E+01 G
BI-210M	T	-5.4547E-01					1.10E+09	
			265.83	-5.455E-01	?(	2.275E+00	1.24E+02	5.00E+01 G
			304.90	0.000E+00	&	7.086E+00	1.00E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	2.1442E+01					2.10E+03	
			911.07	2.283E+01	(	3.262E+00	1.05E+01	2.90E+01 G
			968.97	2.043E+01	(	6.257E+00	1.70E+01	1.75E+01 G
			338.32	1.957E+01	@(	5.878E+00	1.52E+01	1.20E+01 G
			93.35	6.384E+00	&	3.097E+01	1.46E+02	5.56E+00 XA
TH-227	N	2.3198E-01					7.95E+03	
			50.14	-1.850E+00	&(	2.534E+01	4.05E+02	8.00E+00 G
			256.24	2.611E+00	?(P	1.386E+01	2.04E+02	7.00E+00 G
TH-229	N	-2.7959E+00					2.68E+06	
			193.51	-7.937E+00	?(P	2.114E+01	1.66E+02	4.40E+00 G
			210.85	4.769E+00	?(	3.406E+01	2.76E+02	2.99E+00 G
TH-234	N	-1.2201E+01					1.63E+12	
			63.29	-1.220E+01	(P	4.051E+01	8.08E+01	3.81E+00 G
			92.59	-2.943E-01	% P	3.094E+01	3.13E+03	5.58E+00 G
PA-234	N	2.7615E+00					1.63E+12	
			131.29	1.493E+00	?(	6.939E+00	1.39E+02	1.80E+01 G
			946.02	2.884E+00	?(	7.484E+00	1.12E+02	1.34E+01 G
			569.47	1.437E+00	&(	1.260E+01	2.49E+02	8.20E+00 G
			883.24	6.099E+00	?(	1.023E+01	5.26E+01	9.60E+00 G
			880.53	4.418E+00	?	1.349E+01	8.88E+01	6.00E+00 GA
PA-234M	N	-1.4232E+02					1.63E+12	
			1001.00	-1.423E+02	?(P	3.306E+02	5.36E+01	8.37E-01 G
			766.41	1.666E+02	+	4.729E+02	8.44E+01	2.94E-01 G
U-235	N	-1.0709E+00					2.57E+11	
			143.79	-2.879E+00	?(P	1.014E+01	1.53E+02	1.10E+01 G
			205.33	2.886E+00	(P	1.935E+01	2.59E+02	5.01E+00 G
			163.38	-6.179E+00	+ P	2.494E+01	1.68E+02	5.08E+00 G
AM-241	T	-1.7832E-01					1.58E+05	
			59.54	-1.783E-01	?(	3.901E+00	8.09E+02	3.59E+01 G
Np-237	F	-2.7553E+00					2.14E+06	
			86.49	-2.755E+00	!(	1.486E+01	1.62E+02	1.31E+01 G
Cs-136	F	8.3611E-02					1.30E+01	
			818.50	-4.104E-01	?(	1.725E+00	1.23E+02	1.00E+02 G
			1048.07	7.011E-01	?(	1.375E+00	6.02E+01	8.00E+01 G
			340.57	-7.156E-01	+	4.042E+00	1.68E+02	4.69E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-239	T	1.2371E+00					2.36E+00	
			103.70	-3.603E-01	-	6.028E+00	4.98E+02	2.40E+01 X
			106.13	1.237E+00	*(	6.081E+00	1.47E+02	2.27E+01 G
			99.50	-1.937E+00	+	9.566E+00	1.48E+02	1.50E+01 X
Nd-147		1.6882E+00					1.11E+01	
			531.00	2.740E+00	?(	7.290E+00	1.10E+02	1.30E+01 G
			91.10	1.205E+00	?(	6.085E+00	1.51E+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	362.	-7.	-0.004	405.28	-1.850E+00	
AM-241	59.54	277.	-4.	-0.002	808.94	-1.783E-01	
TH-234	63.29	392.	-29.	-0.016	80.76	-1.220E+01	P
BA-133	80.99	270.	-3.	-0.002	976.39	-1.160E-01	
Np-237	86.49	1041.	-28.	-0.016	161.84	-2.755E+00	
Cd-109	88.04	821.	27.	0.015	149.58	9.088E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	91.10	848.	27.	0.015	151.46	1.205E+00	
Gd-153	97.50	638.	-24.	-0.013	151.04	-9.700E-01	
Np-239	99.50	614.	-24.	-0.013	147.89	-1.937E+00	
Gd-153	103.20	608.	-24.	-0.013	146.57	-1.331E+00	
Np-239	103.70	632.	-7.	-0.004	497.60	-3.603E-01	
Np-239	106.13	577.	23.	0.013	147.12	1.237E+00	
EU-152	121.78	238.	11.	0.006	200.62	4.683E-01	
CO-57	122.06	200.	-17.	-0.009	120.12	-2.418E-01	
EU-154	123.10	223.	16.	0.009	131.55	4.884E-01	
PA-234	131.29	440.	22.	0.012	138.87	1.493E+00	
HF-181	133.02	461.	22.	0.012	141.88	6.252E-01	
CE-144	133.54	483.	9.	0.005	344.58	1.023E+00	
Tc-99m	140.51	315.	21.	0.012	120.81	3.125E-01	
U-235	143.79	317.	-24.	-0.014	152.95	-2.879E+00	P
CE-141	145.44	322.	11.	0.006	234.23	2.958E-01	
Ba-140	162.66	323.	-23.	-0.013	110.94	-5.282E+00	
U-235	163.38	348.	-22.	-0.012	167.91	-6.179E+00	P
CE-139	165.85	300.	10.	0.006	246.98	1.755E-01	
Cf-251	176.60	153.	-19.	-0.011	116.22	-1.662E+00	
TH-229	193.51	150.	-22.	-0.012	165.90	-7.937E+00	P
U-235	205.33	151.	9.	0.005	259.06	2.886E+00	P
TH-229	210.85	161.	9.	0.005	276.28	4.769E+00	
Cf-251	227.00	110.	18.	0.010	111.53	4.942E+00	
EU-152	244.69	878.	13.	0.007	331.85	3.044E+00	
TH-227	256.24	110.	10.	0.005	204.43	2.611E+00	P
Cd-113m	263.70	99.	17.	0.009	86.30	5.425E+03	
BI-210M	265.83	146.	-14.	-0.008	123.66	-5.455E-01	
I-131	284.30	95.	-10.	-0.006	179.49	-3.396E+00	
La-140	328.76	90.	17.	0.009	83.75	1.845E+00	
Cf-249	333.44	51.	14.	0.008	96.33	2.102E+00	
Cs-136	340.57	296.	-15.	-0.008	167.84	-7.156E-01	
BA-133	356.00	400.	-19.	-0.011	148.17	-7.350E-01	
I-131	364.48	77.	-5.	-0.003	477.65	-1.337E-01	P
BA-133	383.84	247.	-21.	-0.011	110.13	-5.737E+00	
Cf-249	387.95	268.	-21.	-0.011	114.07	-7.856E-01	
SN-113	391.69	262.	2.	0.001	944.00	9.596E-02	P
AG-108M	433.94	40.	5.	0.003	260.32	1.453E-01	P
pm-146	453.88	44.	14.	0.008	96.54	6.044E-01	
Ir-192	468.06	168.	-16.	-0.009	120.35	-8.650E-01	
HF-181	482.00	84.	12.	0.006	115.69	4.213E-01	
La-140	487.02	106.	3.	0.002	454.53	2.092E-01	
RU-103	497.05	32.	12.	0.007	95.80	4.009E-01	P
RH-106	511.86	87.	115.	0.064	22.59	1.765E+01	
Nd-147	531.00	35.	11.	0.006	110.13	2.740E+00	
Ba-140	537.26	26.	11.	0.006	97.85	1.452E+00	
PA-234	569.47	37.	4.	0.002	248.59	1.437E+00	
BI-207	569.70	52.	-7.	-0.004	172.99	-2.292E-01	P
SB-124	602.73	410.	-10.	-0.006	82.89	-3.483E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
I-131	636.97	65.	-17.	-0.009	71.37	-8.490E+00		
AG-110M	657.76	175.	-17.	-0.010	111.62	-6.678E-01		
PM-144	696.54	33.	13.	0.007	94.12	5.217E-01		
SB-124	722.79	70.	7.	0.004	182.07	2.433E+00		
pm-146	735.72	33.	5.	0.003	231.42	9.475E-01		
pm-146	747.16	51.	-8.	-0.005	185.64	-9.911E-01		
ZR-95	756.73	42.	-4.	-0.002	278.05	-3.044E-01		P
AG-110M	763.94	53.	13.	0.007	86.24	2.337E+00		
PA-234M	766.41	44.	12.	0.007	84.39	1.666E+02		
EU-152	778.92	28.	2.	0.001	565.69	6.448E-01		
CO-58	810.78	58.	-5.	-0.003	220.81	-2.215E-01		P
La-140	815.77	30.	9.	0.005	88.58	1.758E+00		
Cs-136	818.50	63.	-9.	-0.005	123.24	-4.104E-01		
MN-54	834.85	28.	11.	0.006	106.41	4.835E-01		
Co-56	846.77	38.	-7.	-0.004	169.12	-2.986E-01		P
NB-94	871.10	10.	15.	0.008	39.44	6.815E-01		
EU-154	873.23	28.	4.	0.002	193.65	1.482E+00		
PA-234	880.53	10.	6.	0.003	88.78	4.418E+00		
PA-234	883.24	16.	13.	0.007	52.56	6.099E+00		
AG-110M	884.68	29.	6.	0.003	140.01	3.595E-01		
Sc-46	889.28	111.	-16.	-0.009	95.60	-7.439E-01		
y-88	898.04	26.	4.	0.002	253.37	2.201E-01		P
AG-110M	937.49	31.	2.	0.001	489.46	3.479E-01		P
PA-234	946.02	15.	8.	0.004	112.15	2.884E+00		
EU-152	964.11	106.	12.	0.007	125.88	3.986E+00		
EU-154	996.33	102.	-19.	-0.011	78.10	-9.054E+00		
PA-234M	1001.00	125.	-24.	-0.013	53.58	-1.423E+02		P
EU-154	1004.77	81.	12.	0.007	108.73	3.407E+00		
Co-56	1037.84	15.	9.	0.005	100.31	3.303E+00		
Cs-136	1048.07	16.	11.	0.006	60.18	7.011E-01		
RH-106	1050.36	30.	10.	0.005	85.82	3.276E+01		
BI-207	1063.66	12.	20.	0.011	43.65	1.433E+00		P
Ga-68	1077.40	48.	-18.	-0.010	90.61	-3.411E+01		
FE-59	1099.25	27.	-3.	-0.002	302.36	-2.811E-01		P
EU-152	1112.07	89.	11.	0.006	124.43	4.437E+00		
ZN-65	1115.55	100.	8.	0.004	190.78	8.197E-01		
CO-60	1173.24	11.	17.	0.010	49.10	9.888E-01		
Co-56	1238.28	22.	31.	0.017	38.89	2.765E+00		P
NA-22	1274.53	28.	-11.	-0.006	72.76	-6.891E-01		
EU-154	1274.54	58.	-14.	-0.008	79.65	-2.475E+00		
FE-59	1291.60	29.	-11.	-0.006	112.24	-1.519E+00		P
CO-60	1332.50	23.	-3.	-0.002	425.92	-1.775E-01		P
AG-110M	1384.30	11.	-1.	-0.001	598.44	-3.558E-01		
EU-152	1408.00	17.	1.	0.001	972.11	3.127E-01		
SB-124	1690.98	6.	1.	0.000	945.38	1.059E-01		
Co-56	1771.35	50.	-6.	-0.003	167.35	-3.138E+00		
y-88	1836.06	6.	4.	0.002	178.26	2.996E-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	3.1916E+00	3.1916E+00	1.084E+02%	1.17E+01
NA-22	#A	-6.8915E-01	-6.8915E-01	7.276E+01%	1.67E+00
K-40		2.7345E+02	2.7345E+02	4.934E+00%	1.13E+01
Sc-46	#A	-7.4392E-01	-7.4392E-01	9.560E+01%	2.39E+00
CR-51	#A	-1.5240E-01	-1.5240E-01	2.242E+03%	2.07E+01
MN-54	#A	4.8352E-01	4.8353E-01	1.064E+02%	1.20E+00
FE-59	#A	-2.8110E-01	-2.8110E-01	3.024E+02%	2.58E+00
Co-56	#A	1.1076E+00	1.1076E+00	3.889E+01%	1.39E+00
CO-57	#A	-2.4177E-01	-2.4177E-01	1.201E+02%	9.76E-01
CO-58	#A	-2.2145E-01	-2.2145E-01	2.208E+02%	1.65E+00
CO-60	#A	4.0540E-01	4.0540E-01	4.910E+01%	1.57E+00
ZN-65	#A	8.1973E-01	8.1973E-01	1.908E+02%	5.35E+00
NB-94	#A	3.1812E-01	3.1812E-01	3.944E+01%	1.42E+00
ZR-95	#A	-3.0438E-01	-3.0438E-01	2.781E+02%	2.47E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.67E+00
RU-103	#A	4.0091E-01	4.0091E-01	9.580E+01%	9.63E-01
RH-106	#A	4.2827E+00	4.2827E+00	8.582E+01%	3.41E+01
AG-108M	#A	1.4531E-01	1.4531E-01	2.603E+02%	9.68E-01
AG-110M	#A	6.9717E-01	6.9717E-01	8.624E+01%	1.75E+00
SN-113	#A	9.5957E-02	9.5958E-02	9.440E+02%	3.08E+00
SB-124	#A	-7.2680E-02	-7.2680E-02	8.289E+01%	3.41E+00
SB-125	#	3.7499E+00	3.7499E+00	2.354E+01%	1.76E+00
I-131	#A	-1.3369E-01	-1.3370E-01	4.777E+02%	1.28E+00
Gd-153	#A	-9.6997E-01	-9.6998E-01	1.510E+02%	4.89E+00
Ga-68	#A	-3.3807E+01	-3.4108E+01	9.061E+01%	6.63E+01
Tc-99m	#A	3.1196E-01	3.1248E-01	1.208E+02%	1.26E+00
BA-133	#A	-7.3499E-01	-7.3499E-01	1.482E+02%	3.65E+00
CS-134	A	1.2024E+00	1.2024E+00	4.309E+01%	3.34E+00
CS-137	#	3.6994E+00	3.6994E+00	1.534E+01%	9.42E-01
CE-139	#A	1.7545E-01	1.7545E-01	2.470E+02%	1.46E+00
Ba-140	#A	1.4521E+00	1.4521E+00	9.785E+01%	3.44E+00
La-140	#A	4.7651E-01	4.7652E-01	8.375E+01%	1.43E+00
CE-141	#A	2.9577E-01	2.9577E-01	2.342E+02%	2.34E+00
CE-144	#A	1.0228E+00	1.0228E+00	3.446E+02%	1.19E+01
PM-144	#A	5.2173E-01	5.2173E-01	9.412E+01%	1.14E+00
EU-152	#A	1.5750E+00	1.5750E+00	1.244E+02%	7.03E+00
EU-154	#A	1.3996E+00	1.3996E+00	8.604E+01%	1.01E+01
EU-155	#A	1.2980E+00	1.2980E+00	1.628E+02%	7.06E+00
HF-181	#A	4.9262E-01	4.9263E-01	9.154E+01%	1.65E+00
Ta-182	#A	1.5412E+00	1.5413E+00	1.201E+02%	7.35E+00
Hg-203	#A	3.0299E-02	3.0299E-02	1.490E+03%	1.55E+00
TL-208		7.1170E+00	7.1170E+00	9.468E+00%	1.01E+00
pm-146	#A	2.2146E-01	2.2146E-01	9.654E+01%	4.29E+00

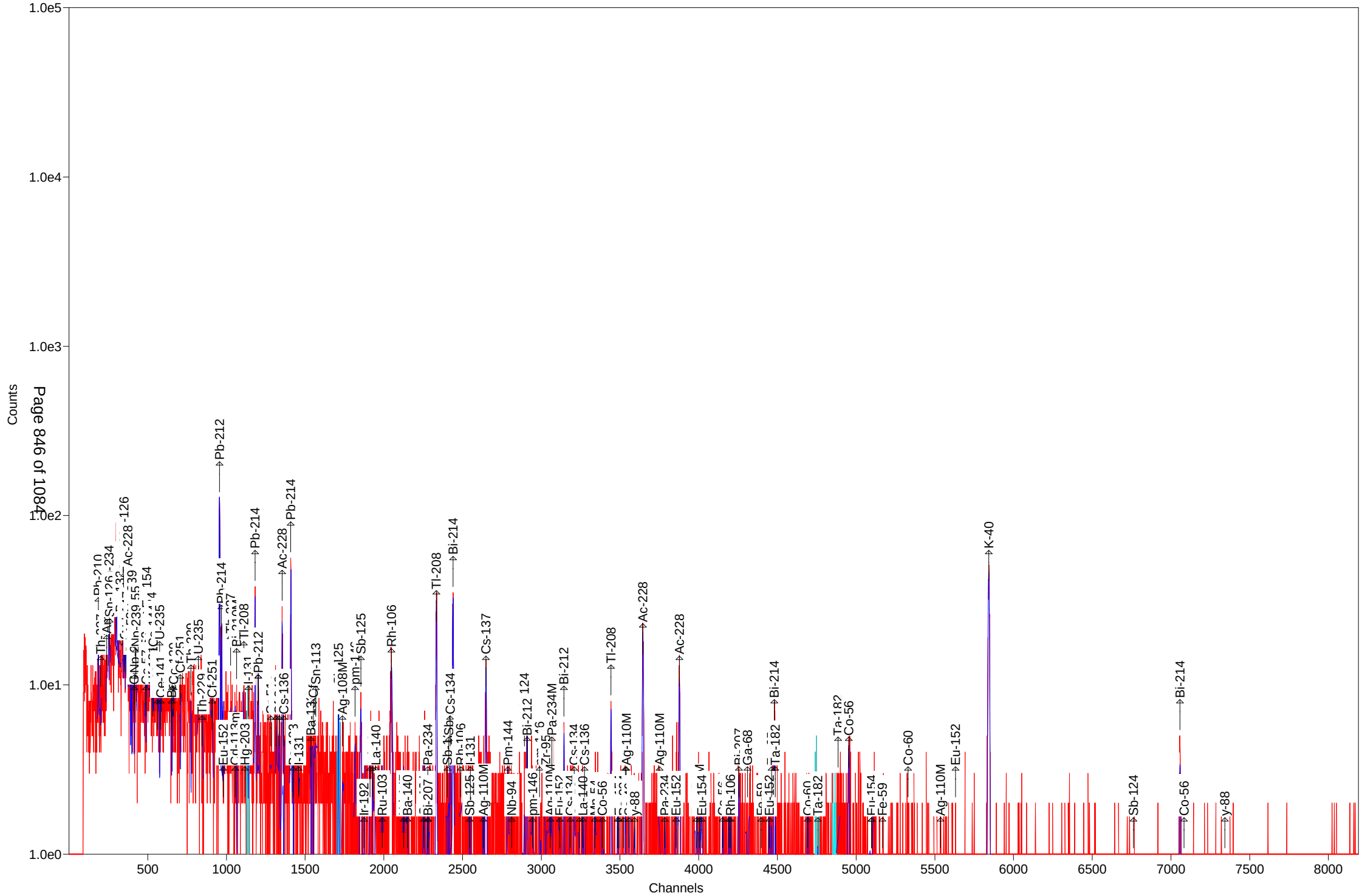
y-88 #A	2.6095E-01	2.6095E-01	1.549E+02%		1.30E+00
Cd-113m#A	5.4252E+03	5.4252E+03	8.630E+01%		1.57E+04
Cd-109 #A	9.0884E+00	9.0884E+00	1.496E+02%		4.53E+01
Cf-251 #A	-1.6620E+00	-1.6620E+00	1.162E+02%		5.19E+00
Cf-249 #A	-2.3607E-01	-2.3607E-01	7.465E+01%		3.00E+00
Sn-126 A	1.8132E+00	1.8132E+00	2.661E+02%		1.62E+01
PB-210	3.3512E+01	3.3512E+01	3.875E+01%		3.24E+01
PB-212	2.2435E+01	2.2435E+01	4.902E+00%		1.86E+00
PB-214	1.4281E+01	1.4281E+01	8.812E+00%		2.53E+00
BI-207 #A	4.8960E-01	4.8960E-01	4.365E+01%		1.23E+00
BI-212	2.0943E+01	2.0943E+01	2.825E+01%		1.15E+01
BI-214	1.4885E+01	1.4885E+01	9.112E+00%		2.64E+00
BI-210M#A	-5.4547E-01	-5.4547E-01	1.237E+02%		2.28E+00
AC-228	2.1442E+01	2.1442E+01	8.354E+00%		3.26E+00
TH-227 #A	2.3198E-01	2.3198E-01	2.044E+02%		2.53E+01
TH-229 #A	-2.7959E+00	-2.7959E+00	1.611E+02%		2.11E+01
TH-234 #A	-1.2201E+01	-1.2201E+01	8.076E+01%		4.05E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.85E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		5.60E+00
PA-234 #A	2.7615E+00	2.7615E+00	5.256E+01%		6.94E+00
PA-234M#A	-1.4232E+02	-1.4232E+02	5.358E+01%		3.31E+02
U-235 #A	-1.0709E+00	-1.0709E+00	1.504E+02%		1.01E+01
AM-241 #A	-1.7832E-01	-1.7832E-01	8.089E+02%		3.90E+00
Np-237 #A	-2.7553E+00	-2.7553E+00	1.618E+02%		1.49E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.34E+00
Cs-136 #A	8.3608E-02	8.3611E-02	6.018E+01%		1.72E+00
Np-239 #A	1.2369E+00	1.2371E+00	1.471E+02%		6.08E+00
Nd-147 #A	1.6882E+00	1.6882E+00	9.363E+01%		7.29E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.6 keV) 4.155E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.6 keV) 4.1550903E+02 Bq/Sample

265170_Gamma_160-18567-A-20-B. 3_Gamma_20161395.spc.



Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 3_20160907001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 9/7/2016 1:03:07 AM
Detector: Detector # 3
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.54	59.79	60.04	PASS
FWHM	0.81	0.00	0.00	0.83	1.91	2.01	PASS
ActivityDiff	647.00	-5.00	-4.00	0.37	4.00	5.00	PASS
QA-662							
FWHM	1.46	0.00	0.00	1.40	3.16	3.26	PASS
ActivityDiff	606.50	-5.00	-4.00	-1.41	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.50	1333.01	1333.26	PASS
FWHM	2.07	0.00	0.00	2.01	4.27	4.37	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.87	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 3_20160907002_BG
Description: Background Contamination Check
Acquired: 9/7/2016 1:22:43 AM
Detector: Detector # 3
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	2.39	2.13	2.22	2.41	2.56	2.65	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 7_20160907001_BG
Description: Background Contamination Check
Acquired: 9/7/2016 12:38:40 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.26	1.40	1.45	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 7_20160907002_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 9/7/2016 1:44:14 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.61	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.90	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.23	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.50	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-1.83	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.72	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.09	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.46	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 8_20160907001_BG
Description: Background Contamination Check
Acquired: 9/7/2016 12:39:35 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.58	1.68	1.74	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 8_20160907002_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 9/7/2016 1:45:59 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.53	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.84	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.19	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.31	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	1.65	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.62	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.89	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.57	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 17_20160907001_BG
Description: Background Contamination Check
Acquired: 9/7/2016 1:18:09 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	2.30	2.42	2.46	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 17_20160907002_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 9/7/2016 2:29:56 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	59.63	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	2.12	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.36	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	1.49	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.60	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.84	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-3.58	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Initial Calibrations

Gamma Verification per Geometry

Detector:	Ge3
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	15038	100.7
Am-241	2037	418	0.3590	1163	1231.1	105.8
Cd-109	2881	591	0.0361	16363	16045	98.1
Co-57	1511	310	0.8560	362	348.66	96.3
Ce-139	2139	439	0.7990	549	542.18	98.8
Hg-203	4651	954	0.8146	1171	1190.9	101.7
Sn-113	3015	618	0.6400	966	974.14	100.9
Cs-137	1938	397	0.8510	467	465.73	99.7
Y-88	7264	1489	0.9370	1589	1562.9	98.3
Co-60	3580	734	0.9997	734	732.25	99.7
Co-60	3581	734	0.9999	734	726.4	98.9
Y-88	7690	1577	0.9920	1589	1616.3	101.7

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 3_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 11:26:42 AM
Efficiency Calibration Date: 3/28/2012 Time: 11:26:55 AM

Calibration Description:
3_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.1475 +0.249738*Channel +3.68165e-008*Channel**2
FWHM (ch) = 3.1011 +0.001004*Channel -1.23886e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.95	46.54	46.59	-0.10%	0.82	0.82	0.35%
237.88	59.54	59.56	-0.03%	0.81	0.83	-2.35%
351.51	88.03	87.94	0.11%	0.85	0.86	-1.11%
487.69	122.06	121.95	0.09%	0.89	0.90	-0.30%
663.54	165.85	165.87	-0.01%	0.96	0.94	1.71%
1117.25	279.17	279.21	-0.02%	1.06	1.05	1.21%
1567.81	391.69	391.78	-0.02%	1.16	1.16	-0.08%
2647.99	661.66	661.71	-0.01%	1.42	1.42	-0.09%
3593.39	898.02	898.03	-0.00%	1.68	1.64	2.32%
4693.77	1173.24	1173.17	0.01%	1.85	1.89	-1.87%
5330.55	1332.50	1332.44	0.00%	2.01	2.03	-0.79%
7343.39	1836.01	1836.06	-0.00%	2.47	2.45	0.53%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.6409 %
Ln(Eff) = -0.6102 -0.364228*Ln(Eng) -0.028954*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2945 %
Ln(Eff) = -25.2514 +9.446449*Ln(Eng) -1.00597*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.1302E-002	2.2144E-002	-3.95%
59.54	3.3461E-002	3.1823E-002	4.89%
88.03	4.3165E-002	4.4041E-002	-2.03%
122.06	4.3938E-002	4.5635E-002	-3.86%
165.85	========== Knee ==========		
165.85	3.9111E-002	3.9630E-002	-1.33%
279.17	2.8374E-002	2.7881E-002	1.74%
391.69	2.2192E-002	2.1995E-002	0.89%
661.66	1.5033E-002	1.5039E-002	-0.04%
898.02	1.1768E-002	1.1963E-002	-1.66%
1173.24	9.7156E-003	9.7485E-003	-0.34%
1332.50	8.7374E-003	8.8303E-003	-1.06%
1836.01	6.9703E-003	6.8546E-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  3/28/2012 11:31:04 AM
TestAmerica                      Spectrum name: 3_TunaCan_20120996.An1

Sample description
     3_TunaCan_90099_32712


Spectrum Filename: C:\User\SPC\Det3\3_TunaCan_20120996.An1

Acquisition information
       Start time:                 3/27/2012 6:49:29 PM
       Live time:               3600
       Real time:               3659
       Dead time:                  1.62 %
       Detector ID:                   3

Detector system
     Ge 3 SN/131


Calibration
       Filename:                   3_Soil_TunaCan.Clb
     3_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 11:26:42 AM
            Zero offset:           0.147 keV
            Gain:                  0.250 keV/channel
            Quadratic:             3.682E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 11:26:55 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.64 %
            Log(Eff):             -6.102019E-01 + (-3.642282E-01*Log(E) ) +
                                   ( -2.895398E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.29 %
            Log(Eff):             -2.525141E+01 + ( 9.446449E+00*Log(E) ) +
                                   ( -1.005974E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.41keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 11:31:04 AM
TestAmerica Spectrum name: 3_TunaCan_20120996.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: 0.0476

***** 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
46.59	50574.	0.65	0.82	2.218E-02	46.54	4.250	1.504E+04	Pb210
59.56	50333.	0.68	0.81	3.183E-02	59.54	35.700	1.231E+03	AM241
70.80	1766.	9.08	0.85	3.816E-02				
72.87	3614.	4.56	0.85	3.911E-02				
74.96	1613.	9.70	0.85	3.999E-02				
87.94	80693.	0.50	0.85	4.402E-02	88.03	3.610	1.605E+04	CD109
121.95	39343.	0.74	0.89	4.564E-02	122.06	85.600	3.487E+02	CO57
136.41	4721.	3.34	0.95	4.398E-02				
165.87	40014.	0.68	0.96	3.963E-02	165.85	79.900	5.422E+02	Ce139
255.13	1516.	9.66	0.98	2.966E-02				
279.21	26998.	0.85	1.06	2.788E-02	279.17	81.500	1.191E+03	Hg203
391.78	29352.	0.72	1.16	2.199E-02	391.69	64.000	9.741E+02	SN113
661.71	21369.	0.89	1.42	1.504E-02	661.66	85.210	4.657E+02	CS137
898.02	35979.	0.66	1.68	1.196E-02	898.02	93.700	1.563E+03	Y898
1173.16	24887.	0.79	1.85	9.749E-03	1173.24	99.900	7.323E+02	Co1173
1332.44	22381.	0.80	2.01	8.831E-03	1332.50	99.982	7.264E+02	Co1332
1836.03	22571.	0.73	2.47	6.855E-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	
282.89	70.78	11968.	1765.	4.626E+04	9.08	0.845	-	D
291.19	72.85	11762.	3610.	9.232E+04	4.56	0.847	-	D
299.57	74.94	11439.	1606.	4.017E+04	9.74	0.849	-	D
545.58	136.41	6353.	4721.	1.073E+05	3.34	0.952	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 11:31:04 AM
TestAmerica Spectrum name: 3_TunaCan_20120996.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1020.86	255.13	4778.	1516.	5.109E+04	9.66	0.975	- 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	185.95	46.59	15712.	50574.	14.048	0.65	0.824
AM-241	237.88	59.56	16997.	50333.	13.981	0.68	0.815
CD-109	351.51	87.94	18663.	80693.	22.415	0.50	0.853
CO-57	487.69	121.95	10697.	39343.	10.929	0.74	0.893
Ce-139	663.54	165.87	7740.	40014.	11.115	0.68	0.956
Hg-203	1117.25	279.21	5084.	26998.	7.499	0.85	1.064
SN-113	1567.81	391.78	3251.	29352.	8.153	0.72	1.160
CS-137	2647.99	661.71	2996.	21369.	5.936	0.89	1.417
Y-898	3593.36	898.02	2796.	35979.	9.994	0.66	1.677
Co-1173	4693.73	1173.16	1727.	24887.	6.913	0.79	1.854
Co-1332	5330.55	1332.44	1300.	22381.	6.217	0.80	2.010
Y-1836	7343.29	1836.03	413.	22571.	6.270	0.73	2.474

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	1.5038E+04				8.15E+03	
			46.54	1.504E+04	(	1.745E+02 6.50E-01 4.25E+00	G
AM-241		1.2311E+03				1.58E+05	
			59.54	1.231E+03	(	1.493E+01 6.75E-01 3.57E+01	G
CD-109		1.6045E+04				4.63E+02	
			88.03	1.605E+04	(	1.271E+02 4.98E-01 3.61E+00	G
CO-57		3.4866E+02				2.72E+02	
			122.06	3.487E+02	(	4.295E+00 7.36E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 11:31:04 AM
TestAmerica Spectrum name: 3_TunaCan_20120996.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.4218E+02						1.38E+02
		165.85	5.422E+02	(	5.592E+00	6.78E-01	7.99E+01 G
Hg-203	1.1909E+03						4.66E+01
		279.17	1.191E+03	(	1.478E+01	8.48E-01	8.15E+01 G
SN-113	9.7414E+02						1.15E+02
		391.69	9.741E+02	(	8.908E+00	7.23E-01	6.40E+01 G
CS-137	4.6573E+02						1.10E+04
		661.66	4.657E+02	(	5.618E+00	8.92E-01	8.52E+01 G
Y-898	1.5629E+03						1.07E+02
		898.02	1.563E+03	(	1.082E+01	6.55E-01	9.37E+01 G
Co-1173	7.3225E+02						1.93E+03
		1173.24	7.323E+02	(	5.778E+00	7.93E-01	9.99E+01 G
Co-1332	7.2640E+02						1.93E+03
		1332.50	7.264E+02	(	5.541E+00	8.01E-01	1.00E+02 G
Y-1836	1.6163E+03						1.07E+02
		1836.01	1.616E+03	(	6.976E+00	7.29E-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

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 11:31:04 AM
TestAmerica Spectrum name: 3_TunaCan_20120996.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	1.4927E+04	1.5038E+04	6.504E-01%	1.74E+02
AM-241	1.2307E+03	1.2311E+03	6.752E-01%	1.49E+01
CD-109	1.4098E+04	1.6045E+04	4.981E-01%	1.27E+02
CO-57	2.7976E+02	3.4866E+02	7.363E-01%	4.30E+00
Ce-139	3.5103E+02	5.4218E+02	6.778E-01%	5.59E+00
Hg-203	3.3004E+02	1.1909E+03	8.480E-01%	1.48E+01
SN-113	5.7920E+02	9.7414E+02	7.232E-01%	8.91E+00
CS-137	4.6320E+02	4.6573E+02	8.922E-01%	5.62E+00
Y-898	8.9159E+02	1.5629E+03	6.551E-01%	1.08E+01
Co-1173	7.0984E+02	7.3225E+02	7.934E-01%	5.78E+00
Co-1332	7.0417E+02	7.2640E+02	8.009E-01%	5.54E+00
Y-1836	9.2205E+02	1.6163E+03	7.286E-01%	6.98E+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 (77.1 to 2000.4 keV) 3.549E+04 Bq
Total Decayed Activity (77.1 to 2000.4 keV) 4.0473316E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14353	96.2
Am-241	2037	418	0.3590	1163	1230.2	105.7
Cd-109	2881	591	0.0361	16363	16101	98.4
Co-57	1511	310	0.8560	362	347.72	96.1
Ce-139	2139	439	0.7990	549	538.4	98.1
Hg-203	4651	954	0.8146	1171	1208.4	103.2
Sn-113	3015	618	0.6400	966	972.07	100.6
Cs-137	1938	397	0.8510	467	462.35	99.0
Y-88	7264	1489	0.9370	1589	1559.3	98.1
Co-60	3580	734	0.9997	734	722.51	98.4
Co-60	3581	734	0.9999	734	739.67	100.7
Y-88	7690	1577	0.9920	1589	1613.8	101.5

Reviewed By: Jody Watson

Date: 3/27/2012

Calibration Data from file: 5_Soil_TunaCan.Clb
Energy Calibration Date: 3/27/2012 Time: 5:20:02 PM
Efficiency Calibration Date: 3/27/2012 Time: 5:20:37 PM

Calibration Description:
5_Soil_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1351 +0.249831*Channel +2.72022e-008*Channel**2
FWHM (ch) = 2.8138 +0.001050*Channel -2.57606e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.61	-0.15%	0.74	0.75	-1.17%
237.86	59.54	59.56	-0.04%	0.74	0.77	-4.07%
351.46	88.03	87.95	0.10%	0.80	0.79	1.28%
487.52	122.06	121.94	0.10%	0.85	0.83	2.66%
663.26	165.85	165.85	0.00%	0.88	0.87	0.98%
1116.90	279.17	279.20	-0.01%	0.97	0.99	-2.35%
1567.36	391.69	391.78	-0.02%	1.12	1.10	1.78%
2647.45	661.66	661.74	-0.01%	1.38	1.35	1.91%
3592.51	898.02	898.01	0.00%	1.55	1.56	-1.11%
4692.96	1173.24	1173.18	0.00%	1.77	1.79	-1.18%
5329.72	1332.50	1332.44	0.00%	1.93	1.92	0.31%
7342.77	1836.01	1836.05	-0.00%	2.29	2.29	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8682 %
Ln(Eff) = 0.6466 -0.783045*Ln(Eng) -0.0041175*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4296 %
Ln(Eff) = -24.6225 +9.075211*Ln(Eng) -0.966442*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7205E-002	1.7882E-002	-3.93%
59.54	2.6619E-002	2.5335E-002	4.82%
88.03	3.4045E-002	3.4617E-002	-1.68%
122.06	3.4394E-002	3.5819E-002	-4.15%
165.85	========== Knee ==========		
165.85	3.0704E-002	3.1331E-002	-2.04%
279.17	2.1030E-002	2.0365E-002	3.17%
391.69	1.5475E-002	1.5370E-002	0.68%
661.66	9.8486E-003	9.9244E-003	-0.77%
898.02	7.5404E-003	7.6837E-003	-1.90%
1173.24	6.0360E-003	6.1381E-003	-1.69%
1332.50	5.5560E-003	5.5144E-003	0.75%
1836.01	4.2722E-003	4.2078E-003	1.51%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/27/2012 5:22:03 PM
TestAmerica                      Spectrum name: 5_TunaCan_20120810.An1

Sample description
     5_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan_20120810.An1

Acquisition information
       Start time:                 3/26/2012 3:05:42 PM
       Live time:               3600
       Real time:               3652
       Dead time:                  1.44 %
       Detector ID:                   5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0527

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.61	38986.	0.74	0.74	1.793E-02	46.54	4.250	1.435E+04	Pb210
59.56	40041.	0.74	0.74	2.535E-02	59.54	35.700	1.230E+03	AM241
70.85	1493.	9.22	0.78	3.019E-02				
72.87	2354.	5.96	0.78	3.089E-02				
87.95	63754.	0.53	0.80	3.460E-02	88.03	3.610	1.610E+04	CD109
121.94	30888.	0.76	0.85	3.583E-02	122.06	85.600	3.477E+02	CO57
136.41	3768.	3.80	0.89	3.457E-02				
165.85	31597.	0.74	0.88	3.066E-02	165.85	79.900	5.384E+02	Ce139
279.20	20358.	0.87	0.97	2.036E-02	279.17	81.500	1.208E+03	Hg203
391.78	20611.	0.93	1.12	1.537E-02	391.69	64.000	9.721E+02	SN113
661.74	14000.	1.10	1.38	9.923E-03	661.66	85.210	4.623E+02	CS137
898.01	23228.	0.82	1.55	7.684E-03	898.02	93.700	1.559E+03	Y898
1173.18	15468.	0.93	1.77	6.138E-03	1173.24	99.900	7.225E+02	Co1173
1332.44	14238.	0.98	1.93	5.515E-03	1332.50	99.982	7.397E+02	Co1332
1836.04	13938.	0.87	2.30	4.208E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.16	72.88	8722.	2253.	7.295E+04	7.09	0.801	-
545.44	136.41	5274.	3768.	1.090E+05	3.80	0.888	-

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	12895.	38986.	10.829	0.74	0.743
AM-241	237.86	59.56	13293.	40041.	11.122	0.74	0.735
CD-109	351.46	87.95	12894.	63754.	17.710	0.53	0.805
CO-57	487.52	121.94	6935.	30888.	8.580	0.76	0.852
Ce-139	663.26	165.85	5616.	31597.	8.777	0.74	0.883
Hg-203	1116.90	279.20	2848.	20358.	5.655	0.87	0.966
SN-113	1567.36	391.78	3046.	20611.	5.725	0.93	1.119
CS-137	2647.45	661.74	1982.	14000.	3.889	1.10	1.380
Y-898	3592.51	898.01	1944.	23228.	6.452	0.82	1.547
Co-1173	4692.96	1173.18	847.	15468.	4.297	0.93	1.774
Co-1332	5329.75	1332.44	693.	14238.	3.955	0.98	1.927
Y-1836	7342.72	1836.04	102.	13938.	3.872	0.87	2.295

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4353E+04						8.15E+03	
			46.54	1.435E+04	(	1.958E+02	7.44E-01	4.25E+00	G
AM-241		1.2302E+03						1.58E+05	
			59.54	1.230E+03	(	1.659E+01	7.44E-01	3.57E+01	G
CD-109		1.6101E+04						4.63E+02	
			88.03	1.610E+04	(	1.343E+02	5.28E-01	3.61E+00	G
CO-57		3.4772E+02						2.72E+02	
			122.06	3.477E+02	(	4.399E+00	7.60E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3840E+02					1.38E+02	
		165.85	5.384E+02	(	5.997E+00	7.36E-01	7.99E+01 G
Hg-203	1.2084E+03					4.66E+01	
		279.17	1.208E+03	(	1.492E+01	8.69E-01	8.15E+01 G
SN-113	9.7207E+02					1.15E+02	
		391.69	9.721E+02	(	1.226E+01	9.31E-01	6.40E+01 G
CS-137	4.6235E+02					1.10E+04	
		661.66	4.623E+02	(	6.941E+00	1.10E+00	8.52E+01 G
Y-898	1.5593E+03					1.07E+02	
		898.02	1.559E+03	(	1.397E+01	8.19E-01	9.37E+01 G
Co-1173	7.2251E+02					1.93E+03	
		1173.24	7.225E+02	(	6.463E+00	9.30E-01	9.99E+01 G
Co-1332	7.3967E+02					1.93E+03	
		1332.50	7.397E+02	(	6.515E+00	9.82E-01	1.00E+02 G
Y-1836	1.6138E+03					1.07E+02	
		1836.01	1.614E+03	(	5.776E+00	8.71E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4250E+04	1.4353E+04	7.439E-01%	1.96E+02
AM-241	1.2297E+03	1.2302E+03	7.442E-01%	1.66E+01
CD-109	1.4172E+04	1.6101E+04	5.277E-01%	1.34E+02
CO-57	2.7983E+02	3.4772E+02	7.604E-01%	4.40E+00
Ce-139	3.5061E+02	5.3840E+02	7.359E-01%	6.00E+00
Hg-203	3.4071E+02	1.2084E+03	8.687E-01%	1.49E+01
SN-113	5.8200E+02	9.7207E+02	9.315E-01%	1.23E+01
CS-137	4.5987E+02	4.6235E+02	1.097E+00%	6.94E+00
Y-898	8.9620E+02	1.5593E+03	8.189E-01%	1.40E+01
Co-1173	7.0069E+02	7.2251E+02	9.300E-01%	6.46E+00
Co-1332	7.1733E+02	7.3967E+02	9.821E-01%	6.52E+00
Y-1836	9.2756E+02	1.6138E+03	8.711E-01%	5.78E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.5 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 2000.5 keV) 3.9848164E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	==========	Knee	==========
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  2/28/2014 11:43:43 AM
TestAmerica                      Spectrum name: 7_TunaCan_20120388.An1

Sample description
     7_TunaCan_90099_030512


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
       Start time:                 3/5/2012 2:07:36 PM
       Live time:               3600
       Real time:               3721
       Dead time:                  3.25 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0324

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.63	53946.	0.53	0.87	2.487E-02	46.54	4.250	1.428E+04	Pb210
59.57	59050.	0.65	0.86	3.704E-02	59.54	35.700	1.242E+03	AM241
70.74	2770.	6.58	0.90	4.527E-02				
72.95	4536.	4.27	0.90	4.661E-02				
88.03	100494.	0.43	0.91	5.328E-02	88.03	3.610	1.598E+04	CD109
121.99	50865.	0.71	0.97	5.606E-02	122.06	85.600	3.468E+02	CO57
136.41	6524.	3.77	0.93	5.411E-02				
165.76	54838.	0.57	1.00	4.767E-02	165.85	79.900	5.395E+02	Ce139
255.13	1772.	7.37	1.21	3.404E-02				
279.24	42776.	0.59	1.13	3.153E-02	279.17	81.500	1.199E+03	Hg203
391.73	36096.	0.66	1.21	2.360E-02	391.69	64.000	9.768E+02	SN113
661.68	21323.	0.77	1.47	1.492E-02	661.66	85.210	4.677E+02	CS137
898.03	39603.	0.63	1.66	1.137E-02	898.02	93.700	1.567E+03	Y898
1173.21	22788.	0.85	1.92	8.929E-03	1173.24	99.900	7.262E+02	Co1173
1332.49	20124.	0.85	2.02	7.951E-03	1332.50	99.982	7.196E+02	Co1332
1836.00	22787.	0.70	2.43	5.919E-03	1836.01	99.200	1.636E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.41	70.73	15146.	2828.	6.248E+04	6.43	0.896	-	D
291.25	72.94	16305.	4682.	1.005E+05	4.12	0.899	-	D
545.11	136.41	12980.	6524.	1.206E+05	3.77	0.932	-	
1020.07	255.13	4580.	1772.	5.204E+04	7.37	1.209	-	

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.73	46.58	19825.	55636.	15.454	0.65	0.856
AM-241	237.72	59.57	21942.	59050.	16.403	0.65	0.857
CD-109	351.56	88.03	21396.	100494.	27.915	0.43	0.912
CO-57	487.42	121.99	16859.	50865.	14.129	0.71	0.971
Ce-139	662.55	165.76	9893.	54838.	15.233	0.57	1.005
Hg-203	1116.52	279.24	5111.	42776.	11.882	0.59	1.126
SN-113	1566.54	391.73	4106.	36096.	10.027	0.66	1.211
CS-137	2646.33	661.66	2922.	21323.	5.923	0.77	1.466D
Y-898	3591.84	898.03	3210.	39603.	11.001	0.63	1.659
Co-1173	4692.50	1173.21	1804.	22788.	6.330	0.85	1.924
Co-1332	5329.58	1332.49	1286.	20124.	5.590	0.85	2.020
Y-1836	7343.30	1836.00	283.	22787.	6.330	0.70	2.426

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4726E+04					8.15E+03
			46.54	1.473E+04	(	1.744E+02	6.52E-01 4.25E+00 G
AM-241		1.2416E+03					1.58E+05
			59.54	1.242E+03	(	1.457E+01	6.49E-01 3.57E+01 G
CD-109		1.5976E+04					4.63E+02
			88.03	1.598E+04	(	1.088E+02	4.29E-01 3.61E+00 G
CO-57		3.4677E+02					2.72E+02
			122.06	3.468E+02	(	4.144E+00	7.08E-01 8.56E+01 G

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3948E+02					1.38E+02	
		165.85	5.395E+02	(	4.586E+00	5.65E-01	7.99E+01 G
Hg-203	1.1992E+03					4.66E+01	
		279.17	1.199E+03	(	9.415E+00	5.92E-01	8.15E+01 G
SN-113	9.7676E+02					1.15E+02	
		391.69	9.768E+02	(	8.153E+00	6.55E-01	6.40E+01 G
CS-137	4.6766E+02					1.10E+04	
		661.66	4.677E+02	(	5.584E+00	7.73E-01	8.52E+01 G
Y-898	1.5673E+03					1.07E+02	
		898.02	1.567E+03	(	1.056E+01	6.29E-01	9.37E+01 G
Co-1173	7.2623E+02					1.93E+03	
		1173.24	7.262E+02	(	6.394E+00	8.53E-01	9.99E+01 G
Co-1332	7.1964E+02					1.93E+03	
		1332.50	7.196E+02	(	6.072E+00	8.54E-01	1.00E+02 G
Y-1836	1.6357E+03					1.07E+02	
		1836.01	1.636E+03	(	5.819E+00	7.02E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - 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 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA
Pb-210	1.4646E+04	1.4726E+04	6.521E-01%	1.74E+02
AM-241	1.2413E+03	1.2416E+03	6.489E-01%	1.46E+01
CD-109	1.4512E+04	1.5976E+04	4.292E-01%	1.09E+02
CO-57	2.9445E+02	3.4677E+02	7.076E-01%	4.14E+00
Ce-139	3.9059E+02	5.3948E+02	5.652E-01%	4.59E+00
Hg-203	4.6224E+02	1.1992E+03	5.917E-01%	9.42E+00
SN-113	6.6381E+02	9.7676E+02	6.552E-01%	8.15E+00
CS-137	4.6577E+02	4.6766E+02	7.730E-01%	5.58E+00
Y-898	1.0329E+03	1.5673E+03	6.291E-01%	1.06E+01
Co-1173	7.0966E+02	7.2623E+02	8.534E-01%	6.39E+00
Co-1332	7.0321E+02	7.1964E+02	8.542E-01%	6.07E+00
Y-1836	1.0780E+03	1.6357E+03	7.017E-01%	5.82E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (701.8 to 2000.2 keV) 3.620E+04 Bq
Total Decayed Activity (701.8 to 2000.2 keV) 4.0121711E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:               3600
       Real time:               3655
       Dead time:                  1.49 %
       Detector ID:                   8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4960E+04					8.15E+03		
			46.54	1.496E+04	(	2.033E+02	7.55E-01	4.25E+00	G
AM-241		1.2405E+03					1.58E+05		
			59.54	1.240E+03	(	1.715E+01	7.72E-01	3.57E+01	G
CD-109		1.6066E+04					4.63E+02		
			88.03	1.607E+04	(	1.353E+02	5.26E-01	3.61E+00	G
CO-57		3.4512E+02					2.72E+02		
			122.06	3.451E+02	(	4.486E+00	7.68E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge9
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	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Calibration Data from file: 9_Soil_TunaCan.Clb
Energy Calibration Date: 6/14/2012 Time: 10:19:40 AM
Efficiency Calibration Date: 6/14/2012 Time: 10:19:51 AM

Calibration Description:
9_Soil_TunaCan_90099_050312

Energy Calibration Fit
Energy = 0.0875 +0.250109*Channel -2.0385e-008*Channel**2
FWHM (ch) = 4.1690 +0.000934*Channel -2.36522e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.85	46.54	46.57	-0.06%	1.07	1.09	-1.37%
237.85	59.54	59.58	-0.06%	1.08	1.10	-1.96%
351.79	88.03	88.07	-0.05%	1.12	1.12	-0.18%
487.79	122.06	122.08	-0.02%	1.14	1.16	-1.17%
662.64	165.85	165.81	0.02%	1.23	1.19	2.51%
1115.53	279.17	279.07	0.04%	1.30	1.30	0.44%
1565.74	391.69	391.64	0.01%	1.43	1.39	2.81%
2645.81	661.66	661.69	-0.00%	1.60	1.62	-0.83%
3591.21	898.02	898.02	0.00%	1.80	1.80	-0.02%
4692.44	1173.24	1173.26	-0.00%	2.01	2.01	0.18%
5329.80	1332.50	1332.54	-0.00%	2.09	2.12	-1.38%
7344.77	1836.01	1835.98	0.00%	2.45	2.44	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3038 %
Ln(Eff) = -0.8080 -0.236727*Ln(Eng) -0.0395064*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4241 %
Ln(Eff) = -23.8792 +8.875647*Ln(Eng) -0.94011*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.4596E-002	2.5767E-002	-4.76%
59.54	3.8891E-002	3.6589E-002	5.92%
88.03	4.9059E-002	5.0504E-002	-2.95%
122.06	5.0886E-002	5.3031E-002	-4.22%
165.85	========== Knee ==========		
165.85	4.6197E-002	4.7361E-002	-2.52%
279.17	3.4900E-002	3.3566E-002	3.82%
391.69	2.6668E-002	2.6526E-002	0.53%
661.66	1.8125E-002	1.8099E-002	0.14%
898.02	1.4012E-002	1.4341E-002	-2.34%
1173.24	1.1507E-002	1.1627E-002	-1.05%
1332.50	1.0296E-002	1.0501E-002	-2.00%
1836.01	8.3305E-003	8.0796E-003	3.01%

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  6/14/2012 10:20:07 AM
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120147.An1

Sample description
     9_TunaCan_90099_050312


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120147.An1

Acquisition information
       Start time:                 5/3/2012 1:37:42 PM
       Live time:               3600
       Real time:               3661
       Dead time:                  1.65 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-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 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       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 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.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: 0.0265

***** 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
46.57	55553.	0.67	1.07	2.579E-02	46.54	4.250	1.424E+04	Pb210
59.56	58492.	0.66	1.08	3.660E-02	59.54	35.700	1.245E+03	AM241
88.07	86792.	0.48	1.12	5.052E-02	88.03	3.610	1.590E+04	CD109
122.08	41484.	0.73	1.14	5.303E-02	122.06	85.600	3.475E+02	CO57
136.48	5266.	4.55	1.22	5.150E-02				
165.81	39272.	0.74	1.23	4.626E-02	165.85	79.900	5.359E+02	Ce139
279.06	19221.	1.24	1.30	3.358E-02	279.17	81.500	1.217E+03	Hg203
391.64	28263.	0.86	1.43	2.653E-02	391.69	64.000	9.707E+02	SN113
661.69	25703.	0.90	1.61	1.810E-02	661.66	85.210	4.666E+02	CS137
898.02	33728.	0.69	1.80	1.434E-02	898.02	93.700	1.552E+03	Y898
1173.24	29087.	0.72	2.01	1.163E-02	1173.24	99.900	7.271E+02	Co1173
1332.54	26026.	0.70	2.09	1.050E-02	1332.50	99.982	7.198E+02	Co1332
1835.94	21237.	0.73	2.46	8.080E-03	1836.01	99.200	1.639E+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
545.34	136.48	10776.	5266.	1.023E+05	4.55	1.225	-

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.57	18837.	55553.	15.431	0.67	1.071
AM-241	237.79	59.56	19448.	58492.	16.248	0.66	1.078
CD-109	351.79	88.07	19261.	86792.	24.109	0.48	1.122
CO-57	487.79	122.08	11232.	41484.	11.523	0.73	1.142
Ce-139	662.64	165.81	9084.	39272.	10.909	0.74	1.225
Hg-203	1115.51	279.06	6250.	19221.	5.339	1.24	1.302
SN-113	1565.73	391.64	4864.	28263.	7.851	0.86	1.434
CS-137	2645.81	661.69	4037.	25703.	7.140	0.90	1.605
Y-898	3591.21	898.02	2958.	33728.	9.369	0.69	1.803
Co-1173	4692.36	1173.24	1710.	29087.	8.080	0.72	2.014
Co-1332	5329.80	1332.54	1048.	26026.	7.229	0.70	2.088
Y-1836	7344.62	1835.94	304.	21237.	5.899	0.73	2.457

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	1.4240E+04					8.15E+03		
			46.54	1.424E+04	(	1.646E+02	6.67E-01	4.25E+00	G
AM-241		1.2445E+03					1.58E+05		
			59.54	1.245E+03	(	1.388E+01	6.60E-01	3.57E+01	G
CD-109		1.5902E+04					4.63E+02		
			88.03	1.590E+04	(	1.190E+02	4.84E-01	3.61E+00	G
CO-57		3.4748E+02					2.72E+02		
			122.06	3.475E+02	(	4.159E+00	7.31E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3587E+02					1.38E+02	
		165.85	5.359E+02	(	6.097E+00	7.41E-01	7.99E+01 G
Hg-203	1.2167E+03					4.66E+01	
		279.17	1.217E+03	(	2.349E+01	1.24E+00	8.15E+01 G
SN-113	9.7065E+02					1.15E+02	
		391.69	9.707E+02	(	1.125E+01	8.60E-01	6.40E+01 G
CS-137	4.6658E+02					1.10E+04	
		661.66	4.666E+02	(	5.424E+00	8.98E-01	8.52E+01 G
Y-898	1.5525E+03					1.07E+02	
		898.02	1.552E+03	(	1.179E+01	6.92E-01	9.37E+01 G
Co-1173	7.2712E+02					1.93E+03	
		1173.24	7.271E+02	(	4.884E+00	7.20E-01	9.99E+01 G
Co-1332	7.1975E+02					1.93E+03	
		1332.50	7.198E+02	(	4.248E+00	6.98E-01	1.00E+02 G
Y-1836	1.6388E+03					1.07E+02	
		1836.01	1.639E+03	(	6.479E+00	7.29E-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 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.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	1.4091E+04	1.4240E+04	6.667E-01%	1.65E+02
AM-241	1.2439E+03	1.2445E+03	6.605E-01%	1.39E+01
CD-109	1.3223E+04	1.5902E+04	4.843E-01%	1.19E+02
CO-57	2.5385E+02	3.4748E+02	7.313E-01%	4.16E+00
Ce-139	2.8828E+02	5.3587E+02	7.410E-01%	6.10E+00
Hg-203	1.9517E+02	1.2167E+03	1.239E+00%	2.35E+01
SN-113	4.6244E+02	9.7065E+02	8.599E-01%	1.13E+01
CS-137	4.6297E+02	4.6658E+02	8.981E-01%	5.42E+00
Y-898	6.9723E+02	1.5525E+03	6.917E-01%	1.18E+01
Co-1173	6.9559E+02	7.2712E+02	7.204E-01%	4.88E+00
Co-1332	6.8854E+02	7.1975E+02	6.982E-01%	4.25E+00
Y-1836	7.3602E+02	1.6388E+03	7.291E-01%	6.48E+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 1999.7 keV) 3.304E+04 Bq
Total Decayed Activity (37.6 to 1999.7 keV) 3.9561668E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector:	Ge15
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

Calibration Data from file: 15_Soil_TunaCan.Clb
Energy Calibration Date: 3/22/2012 Time: 1:02:46 PM
Efficiency Calibration Date: 3/22/2012 Time: 1:03:01 PM

Calibration Description:
15_TunaCan_90099_032212

Energy Calibration Fit
Energy = 0.0042 +0.250192*Channel -3.10425e-008*Channel**2
FWHM (ch) = 3.5032 +0.001000*Channel -3.73783e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.91	46.54	46.52	0.05%	0.90	0.92	-2.54%
237.99	59.54	59.55	-0.01%	0.91	0.94	-2.43%
352.01	88.03	88.07	-0.05%	0.95	0.96	-1.92%
487.92	122.06	122.07	-0.01%	1.00	1.00	0.30%
663.08	165.85	165.89	-0.02%	1.05	1.04	1.34%
1115.99	279.17	279.18	-0.00%	1.18	1.14	3.23%
1565.41	391.69	391.58	0.03%	1.26	1.24	1.14%
2645.35	661.66	661.63	0.00%	1.50	1.47	2.11%
3590.98	898.02	898.04	-0.00%	1.67	1.65	0.79%
4692.06	1173.24	1173.24	-0.00%	1.80	1.84	-2.06%
5329.66	1332.50	1332.56	-0.00%	1.90	1.94	-2.28%
7344.95	1836.01	1835.98	0.00%	2.23	2.21	1.30%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9975 %
Ln(Eff) = -0.6895 -0.329061*Ln(Eng) -0.0387563*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1273 %
Ln(Eff) = -23.6268 +8.666669*Ln(Eng) -0.921464*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8904E-002	1.9569E-002	-3.52%
59.54	2.8630E-002	2.7372E-002	4.39%
88.03	3.6378E-002	3.7061E-002	-1.88%
122.06	3.7201E-002	3.8461E-002	-3.39%
165.85	========== Knee ==========		
165.85	3.3266E-002	3.3919E-002	-1.96%
279.17	2.3641E-002	2.3007E-002	2.68%
391.69	1.7841E-002	1.7674E-002	0.94%
661.66	1.1534E-002	1.1545E-002	-0.10%
898.02	8.8355E-003	8.9209E-003	-0.97%
1173.24	6.9001E-003	7.0763E-003	-2.55%
1332.50	6.2597E-003	6.3249E-003	-1.04%
1836.01	4.8716E-003	4.7412E-003	2.68%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1

Sample description
     15_TunaCan_90099_032212


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan_20120283.An1

Acquisition information
       Start time:                 3/22/2012 11:06:02 AM
       Live time:               3600
       Real time:               3653
       Dead time:                  1.44 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1
                                      Page 1
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       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0249
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	42849.	0.75	0.90	1.955E-02	46.54	4.250	1.441E+04	Pb210
59.55	42443.	0.72	0.91	2.738E-02	59.54	35.700	1.207E+03	AM241
72.95	2606.	6.34	0.95	3.318E-02				
88.07	68550.	0.54	0.95	3.707E-02	88.03	3.610	1.607E+04	CD109
122.10	33756.	0.64	1.00	3.846E-02	122.06	85.600	3.502E+02	CO57
136.52	4295.	2.96	1.01	3.724E-02				
165.89	34959.	0.78	1.05	3.391E-02	165.85	79.900	5.388E+02	Ce139
279.18	24347.	0.88	1.18	2.301E-02	279.17	81.500	1.202E+03	Hg203
391.58	24366.	0.82	1.26	1.768E-02	391.69	64.000	9.746E+02	SN113
661.63	16400.	1.16	1.50	1.155E-02	661.66	85.210	4.654E+02	CS137
898.03	27965.	0.74	1.67	8.921E-03	898.02	93.700	1.574E+03	Y898
1173.23	17709.	0.94	1.81	7.076E-03	1173.24	99.900	7.164E+02	Co1173
1332.55	16065.	0.98	1.90	6.325E-03	1332.50	99.982	7.266E+02	Co1332
1835.95	16330.	0.85	2.24	4.741E-03	1836.01	99.200	1.633E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.58	72.93	12341.	2606.	7.854E+04	6.34	0.949	-	D
545.42	136.45	8010.	4524.	1.215E+05	4.23	1.054	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.91	46.52	15447.	42849.	11.903	0.75	0.900
AM-241	237.99	59.55	14029.	42443.	11.790	0.72	0.913
CD-109	352.01	88.07	16260.	68550.	19.042	0.54	0.945
CO-57	487.92	122.07	9130.	34324.	9.535	0.78	0.999
Ce-139	663.08	165.89	8215.	34959.	9.711	0.78	1.052
Hg-203	1115.99	279.18	4252.	24347.	6.763	0.88	1.182
SN-113	1565.41	391.58	3012.	24366.	6.768	0.82	1.259
CS-137	2645.35	661.63	3077.	16400.	4.555	1.16	1.503
Y-898	3590.94	898.03	2252.	27965.	7.768	0.74	1.667
Co-1173	4692.02	1173.23	1355.	17709.	4.919	0.94	1.807
Co-1332	5329.60	1332.55	1160.	16065.	4.463	0.98	1.900
Y-1836	7344.81	1835.95	345.	16330.	4.536	0.85	2.240

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4410E+04					8.15E+03	
			46.54	1.441E+04	(	1.957E+02	7.55E-01 4.25E+00	G
AM-241		1.2069E+03					1.58E+05	
			59.54	1.207E+03	(	1.577E+01	7.22E-01 3.57E+01	G
CD-109		1.6069E+04					4.63E+02	
			88.03	1.607E+04	(	1.399E+02	5.44E-01 3.61E+00	G
CO-57		3.5606E+02					2.72E+02	
			122.06	3.561E+02	(	4.647E+00	7.84E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3881E+02				1.38E+02	
		165.85	5.388E+02	(	6.551E+00 7.82E-01 7.99E+01	G
Hg-203	1.2024E+03				4.66E+01	
		279.17	1.202E+03	(	1.514E+01 8.77E-01 8.15E+01	G
SN-113	9.7462E+02				1.15E+02	
		391.69	9.746E+02	(	1.034E+01 8.20E-01 6.40E+01	G
CS-137	4.6543E+02				1.10E+04	
		661.66	4.654E+02	(	7.413E+00 1.16E+00 8.52E+01	G
Y-898	1.5737E+03				1.07E+02	

```
                          898.02 1.574E+03  (  1.260E+01 7.45E-01 9.37E+01 G

Co-1173      7.1644E+02                                        1.93E+03
                         1173.24 7.164E+02  (  7.050E+00 9.39E-01 9.99E+01 G

Co-1332      7.2655E+02                                        1.93E+03
                         1332.50 7.266E+02  (  7.301E+00 9.83E-01 1.00E+02 G

Y-1836       1.6332E+03                                        1.07E+02
                         1836.01 1.633E+03  (  8.923E+00 8.49E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



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   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4311E+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 Centroid Channel	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       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    Bq
_____________________________________________________________________________
   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  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   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  -
```

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  3
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1


  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
                                     Page 2
```

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:	Ge3
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	Rad10-0006

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1165	100.1
Cs-137	1926	396	0.851	465	443.73	95.4
Co-60	3611	742	0.99974	742	700.09	94.3
Co-60	3612	742	0.999856	742	704.11	94.9

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 11:28:58 AM   Page  1
TestAmerica                     Spectrum name: 3_TunaCan2nd_20120999.An1

Sample description
     3_TunaCan_81427-334_2ndsource_032712


Spectrum Filename: C:\User\SPC\Det3\3_TunaCan2nd_20120999.An1

Acquisition information
       Start time:                 3/27/2012 10:50:55 PM
       Live time:               3600
       Real time:               3624
       Dead time:                  0.65 %
       Detector ID:                    3

Detector system
     Ge 3 SN/131


Calibration
       Filename:                   3_Soil_TunaCan.Clb
     3_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 11:26:42 AM
            Zero offset:           0.147 keV
            Gain:                  0.250 keV/channel
            Quadratic:             3.682E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 11:26:55 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.64 %
            Log(Eff):             -6.102019E-01 + (-3.642282E-01*Log(E) ) +
                                   ( -2.895398E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.29 %
            Log(Eff):             -2.525141E+01 + ( 9.446449E+00*Log(E) ) +
                                   ( -1.005974E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.41keV )
       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 11:28:58 AM   Page  2
TestAmerica                     Spectrum name: 3_TunaCan2nd_20120999.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	3_2012-02-26_0244.PBC 2/26/2012 2:44:46 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0561

***** 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
36.57	684.	13.49	0.86	1.380E-02				
46.58	46359.	0.64	0.82	2.218E-02	46.54	4.250	1.465E+04	Pb210
49.41	474.	26.39	0.62	2.446E-02				
55.13	148.	69.87	0.50	2.879E-02				
59.56	47477.	0.63	0.80	3.183E-02	59.54	35.700	1.165E+03	AM241
63.23	116.	55.13	0.52	3.413E-02				
74.81	347.	24.83	0.85	3.992E-02				
77.26	173.	50.89	0.85	4.088E-02				
87.94	26078.	0.87	0.86	4.402E-02	88.03	3.610	1.549E+04	CD109
121.96	6006.	2.27	0.93	4.564E-02	122.06	85.600	3.426E+02	CO57
136.40	688.	9.11	0.98	4.398E-02				
157.37	39.	92.20	0.44	4.044E-02				
165.86	1056.	7.85	0.99	3.963E-02	165.85	79.900	5.658E+02	Ce139
210.61	83.	58.19	0.66	3.379E-02				
272.61	73.	46.14	0.59	2.834E-02				
332.61	124.	44.81	0.91	2.468E-02				
391.78	370.	17.84	1.12	2.199E-02	391.69	64.000	9.986E+02	SN113
621.40	108.	40.97	0.41	1.575E-02				
661.73	19442.	0.81	1.44	1.504E-02	661.66	85.210	4.437E+02	CS137
719.67	90.	45.03	0.66	1.413E-02				
813.20	114.	49.57	0.70	1.289E-02				
898.03	310.	14.07	1.64	1.196E-02	898.02	93.700	1.553E+03	Y898
901.05	12.	303.83	1.64	1.193E-02				
974.92	130.	55.88	0.66	1.124E-02				
1145.48	114.	31.99	0.24	9.931E-03				
1173.20	18293.	0.84	1.86	9.749E-03	1173.24	99.900	7.001E+02	Co1173
1332.46	16679.	0.82	1.95	8.830E-03	1332.50	99.982	7.041E+02	Co1332
1836.29	148.	9.58	2.45	6.855E-03	1836.01	99.200	1.225E+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 **********

3_TunaCan2nd_20120999

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.86	36.57	2766.	684.	4.960E+04	13.49	0.858	- s
197.25	49.41	5697.	474.	1.939E+04	26.39	0.620	- sM
220.16	55.13	4834.	148.	5.123E+03	69.87	0.497	- sc
252.57	63.23	1834.	116.	3.399E+03	55.13	0.521	- s

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 11:28:58 AM Page 3
TestAmerica Spectrum name: 3_TunaCan2nd_20120999.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
298.78	74.77	3800.	394.	9.858E+03	26.85	0.961	-
308.61	77.22	3690.	220.	5.394E+03	46.86	0.670	-
545.54	136.40	1213.	688.	1.563E+04	9.11	0.979	-
629.48	157.37	627.	39.	9.644E+02	92.20	0.441	- c
842.63	210.61	900.	83.	2.456E+03	58.19	0.661	- s
1090.83	272.61	495.	73.	2.587E+03	46.14	0.594	- s
1330.98	332.61	884.	124.	5.010E+03	44.81	0.910	-
2486.71	621.40	501.	108.	6.835E+03	40.97	0.412	- s
2879.89	719.67	427.	90.	6.393E+03	45.03	0.665	- s
3254.07	813.20	660.	114.	8.842E+03	49.57	0.696	- s
3605.81	901.13	695.	12.	1.042E+03	301.14	1.640	- sc
3900.95	974.92	936.	130.	1.157E+04	55.88	0.655	- s
4583.05	1145.48	294.	114.	1.153E+04	31.99	0.244	- 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	185.92	46.58	11142.	46316.	12.866	0.64	0.818
AM-241	237.87	59.56	10162.	47477.	13.188	0.63	0.799
CD-109	351.53	87.94	5716.	26078.	7.244	0.87	0.855
CO-57	487.71	121.96	2782.	6006.	1.668	2.27	0.932
Ce-139	663.45	165.85	1658.	1078.	0.300	7.99	0.995s
SN-113	1567.82	391.78	1043.	370.	0.103	17.84	1.118
CS-137	2648.06	661.73	971.	19442.	5.401	0.81	1.437
Y-898	3593.36	898.02	795.	310.	0.086	14.06	1.637D
Co-1173	4693.90	1173.20	663.	18293.	5.081	0.84	1.858
Co-1332	5330.66	1332.46	231.	16679.	4.633	0.82	1.949
Y-1836	7344.33	1836.29	27.	148.	0.041	9.58	2.454

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 11:28:58 AM Page 4
TestAmerica Spectrum name: 3_TunaCan2nd_20120999.An1

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.4654E+04                                      8.15E+03
                            46.54 1.465E+04  (P 1.565E+02 6.36E-01 4.25E+00 G

AM-241       1.1650E+03                                      1.58E+05
                            59.54 1.165E+03  (  1.159E+01 6.31E-01 3.57E+01 G

CD-109       1.5485E+04                                      4.63E+02
                            88.03 1.549E+04  (  2.108E+02 8.73E-01 3.61E+00 G

CO-57        3.4265E+02                                      2.72E+02
                           122.06 3.426E+02  (  1.418E+01 2.27E+00 8.56E+01 G

Ce-139       5.7768E+02                                      1.38E+02
                           165.85 5.777E+02 *(  1.031E+02 7.99E+00 7.99E+01 G

Hg-203       1.3708E-02                                      4.66E+01
                           279.17 1.371E-02 %(  2.387E+00 5.21E+03 8.15E+01 G

SN-113       9.9863E+02                                      1.15E+02
                           391.69 9.986E+02  (  4.131E+02 1.78E+01 6.40E+01 G

CS-137       4.4373E+02                                      1.10E+04
                           661.66 4.437E+02  (  3.375E+00 8.12E-01 8.52E+01 G

Y-898        1.5527E+03                                      1.07E+02
                           898.02 1.553E+03  (  6.719E+02 1.41E+01 9.37E+01 G

Co-1173      7.0009E+02                                      1.93E+03
                          1173.24 7.001E+02  (  4.695E+00 8.38E-01 9.99E+01 G

Co-1332      7.0411E+02                                      1.93E+03
                          1332.50 7.041E+02  (  3.104E+00 8.16E-01 1.00E+02 G

Y-1836       1.2247E+03                                      1.07E+02
                          1836.01 1.225E+03 ?(  2.214E+02 9.58E+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	1.3671E+04	1.4654E+04	6.370E-01%		1.56E+02
AM-241	1.1608E+03	1.1650E+03	6.312E-01%		1.16E+01
CD-109	4.5562E+03	1.5485E+04	8.727E-01%		2.11E+02
CO-57	4.2711E+01	3.4265E+02	2.266E+00%		1.42E+01
Ce-139 #	9.4613E+00	5.7768E+02	7.994E+00%		1.03E+02
Hg-203 #A	1.3708E-02	>12 Halflives	5.2116E+03%	2.3868E+00	
SN-113	7.3077E+00	9.9863E+02	1.784E+01%		4.13E+02
CS-137	4.2144E+02	4.4373E+02	8.123E-01%		3.38E+00
Y-898	7.6802E+00	1.5527E+03	1.406E+01%		6.72E+02
Co-1173	5.2177E+02	7.0009E+02	8.377E-01%		4.70E+00
Co-1332	5.2477E+02	7.0411E+02	8.161E-01%		3.10E+00
Y-1836 #	6.0578E+00	1.2247E+03	9.579E+00%		2.21E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 11:28:58 AM Page 6
TestAmerica Spectrum name: 3_TunaCan2nd_20120999.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 (974.7 to 2000.4 keV) 2.093E+04 Bq/Sample
Total Decayed Activity (974.7 to 2000.4 keV) 3.7848984E+04 Bq/Sample

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

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TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 4
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4212E+04				8.15E+03	
			46.54	1.421E+04	(P	1.177E+02 4.91E-01 4.25E+00	G
AM-241		1.1609E+03				1.58E+05	
			59.54	1.161E+03	(	8.959E+00 4.87E-01 3.57E+01	G
CD-109		1.5419E+04				4.63E+02	
			88.03	1.542E+04	(	1.658E+02 6.81E-01 3.61E+00	G
CO-57		3.3478E+02				2.72E+02	
			122.06	3.348E+02	(	1.063E+01 1.66E+00 8.56E+01	G
Ce-139		5.3191E+02				1.38E+02	
			165.85	5.319E+02	(	7.689E+01 6.14E+00 7.99E+01	G
Hg-203		-6.5193E-03				4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00 8.22E+03 8.15E+01	G
SN-113		9.5011E+02				1.15E+02	
			391.69	9.501E+02	(	3.682E+02 1.63E+01 6.40E+01	G
CS-137		4.4236E+02				1.10E+04	
			661.66	4.424E+02	(P	3.020E+00 7.12E-01 8.52E+01	G
Y-898		1.6655E+03				1.07E+02	
			898.02	1.665E+03	(	6.908E+02 1.92E+01 9.37E+01	G
Co-1173		7.0021E+02				1.93E+03	
			1173.24	7.002E+02	(	4.056E+00 7.32E-01 9.99E+01	G
Co-1332		7.0186E+02				1.93E+03	
			1332.50	7.019E+02	(	1.651E+00 7.07E-01 1.00E+02	G
Y-1836		1.6424E+03				1.07E+02	
			1836.01	1.642E+03	(	1.392E+02 7.47E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%		1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%		8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%		1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%		1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%		7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00	
SN-113	6.9747E+00	9.5011E+02	1.633E+01%		3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%		3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%		6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%		4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%		1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%		1.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 8:52:25 AM
TestAmerica                      Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
     7_TunaCan2ndSource_81427-334_032712


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information
       Start time:                 3/27/2012 3:25:25 PM
       Live time:               3600
       Real time:               3684
       Dead time:                  2.28 %
       Detector ID:                   7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	8[illegible]	[illegible]	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.3857E+04					8.15E+03
			46.54	1.386E+04	(P	1.480E+02	6.34E-01 4.25E+00 G
AM-241		1.1504E+03					1.58E+05
			59.54	1.150E+03	(	1.036E+01	5.81E-01 3.57E+01 G
CD-109		1.5217E+04					4.63E+02
			88.03	1.522E+04	(	1.799E+02	7.73E-01 3.61E+00 G
CO-57		3.1712E+02					2.72E+02
			122.06	3.171E+02	(	1.205E+01	2.04E+00 8.56E+01 G
Ce-139		5.1801E+02					1.38E+02
			165.85	5.180E+02	(	7.941E+01	6.45E+00 7.99E+01 G
Hg-203		-4.5441E-01					4.66E+01
			279.17	-4.544E-01	?(	2.347E+00	1.56E+02 8.15E+01 G
SN-113		9.3315E+02					1.15E+02
			391.69	9.332E+02	(	4.178E+02	1.96E+01 6.40E+01 G
CS-137		4.4047E+02					1.10E+04
			661.66	4.405E+02	(	3.706E+00	8.56E-01 8.52E+01 G
Y-898		1.6944E+03					1.07E+02
			898.02	1.694E+03	(	8.216E+02	2.35E+01 9.37E+01 G
Co-1173		6.8172E+02					1.93E+03
			1173.24	6.817E+02	(	4.436E+00	8.58E-01 9.99E+01 G
Co-1332		6.9210E+02					1.93E+03
			1332.50	6.921E+02	(	2.586E+00	8.49E-01 1.00E+02 G
Y-1836		1.7801E+03					1.07E+02
			1836.01	1.780E+03	(	2.065E+02	9.19E+00 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

2nd Source Verification

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  1
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
     8_TunaCan_81427-334_2ndsource_032912


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
       Start time:                 3/29/2012 1:58:04 AM
       Live time:               3600
       Real time:               3622
       Dead time:                  0.61 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  2
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

8_TunaCan2nd_20120697

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 3
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 4
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 3

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.4221E+04                                     8.15E+03
                            46.54 1.422E+04  (  1.806E+02 7.43E-01 4.25E+00 G

AM-241       1.1754E+03                                     1.58E+05
                            59.54 1.175E+03  (  1.311E+01 7.10E-01 3.57E+01 G

CD-109       1.5223E+04                                     4.63E+02
                            88.03 1.522E+04  (  2.071E+02 8.83E-01 3.61E+00 G

CO-57        3.3494E+02                                     2.72E+02
                           122.06 3.349E+02  (  1.600E+01 2.55E+00 8.56E+01 G

Ce-139       6.0766E+02                                     1.38E+02
                           165.85 6.077E+02 *(  1.153E+02 8.62E+00 7.99E+01 G

Hg-203       6.1671E-01                                     4.66E+01
                           279.17 6.167E-01  (  2.689E+00 1.31E+02 8.15E+01 G

SN-113       1.0157E+03                                     1.15E+02
                           391.69 1.016E+03  (  4.390E+02 1.79E+01 6.40E+01 G

CS-137       4.4661E+02                                     1.10E+04
                           661.66 4.466E+02  (P 3.489E+00 8.85E-01 8.52E+01 G

Y-898        2.5543E+03                                     1.07E+02
                           898.02 2.554E+03  (  9.046E+02 1.79E+01 9.37E+01 G

Co-1173      6.9722E+02                                     1.93E+03
                          1173.24 6.972E+02  (  4.649E+00 9.19E-01 9.99E+01 G

Co-1332      6.9192E+02                                     1.93E+03
                          1332.50 6.919E+02  (  2.515E+00 9.18E-01 1.00E+02 G

Y-1836       1.7236E+03                                     1.07E+02
                          1836.01 1.724E+03  (  1.542E+02 9.00E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
```

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 6
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector:	Ge9
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	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  1
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1

Sample description
     9_TunaCan_90099_061412


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
       Start time:                 6/14/2012 10:54:15 AM
       Live time:               3600
       Real time:               3629
       Dead time:                  0.81 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-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 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       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  6/14/2012 1:20:45 PM    Page  2
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.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	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

***** 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
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

9_TunaCan_20120371

********** 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
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 3

TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1181.07	295.46	1550.	252.	7.804E+03	33.13	0.562	- s
1263.87	316.16	856.	66.	2.136E+03	75.82	0.245	- sc
1424.84	356.47	930.	45.	1.579E+03	97.50	1.363	- sc
1433.89	358.73	1025.	42.	1.473E+03	110.02	1.365	- sc
1518.22	379.76	367.	37.	1.365E+03	75.05	0.460	- sc
1819.03	454.98	702.	83.	3.496E+03	53.05	0.375	- s
2273.73	568.66	433.	103.	5.068E+03	37.41	0.468	- s
2504.73	626.42	460.	84.	4.455E+03	49.00	0.451	- s
3285.25	821.54	812.	239.	1.556E+04	27.43	0.391	- s
3503.76	876.16	400.	66.	4.538E+03	52.19	0.608	- s
3750.76	937.90	332.	34.	2.488E+03	79.64	0.436	- sc
4284.91	1071.41	226.	38.	3.015E+03	61.01	0.571	- s
4340.51	1085.31	224.	68.	5.498E+03	35.74	1.000	- s
4393.86	1098.64	186.	14.	1.143E+03	140.33	0.472	- sc

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	185.86	46.57	13300.	51041.	14.178	0.65	1.116
AM-241	237.82	59.57	11784.	54776.	15.216	0.62	1.111
CD-109	351.87	88.09	5995.	26880.	7.467	0.87	1.137
CO-57	487.85	122.10	3767.	5522.	1.534	2.86	1.155
Ce-139	662.09	165.67	1864.	814.	0.226	10.74	1.299
Hg-203	1120.44	280.29	2362.	-52.	-0.014	133.84	1.296s
SN-113	1565.85	391.67	1962.	266.	0.074	24.38	1.393
CS-137	2645.72	661.66	1258.	23324.	6.479	0.76	1.614
Y-898	3592.12	898.25	1148.	346.	0.096	23.61	1.524s
Co-1173	4692.30	1173.23	840.	20836.	5.788	0.81	2.049
Co-1332	5329.58	1332.49	131.	18966.	5.268	0.75	2.109
Y-1836	7344.43	1835.90	14.	150.	0.042	10.23	1.719s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 4

Page 3

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.3971E+04                                     8.15E+03
                            46.54 1.397E+04  (  1.478E+02 6.46E-01 4.25E+00 G

AM-241       1.1694E+03                                     1.58E+05
                            59.54 1.169E+03  (  1.086E+01 6.16E-01 3.57E+01 G

CD-109       1.5657E+04                                     4.63E+02
                            88.03 1.566E+04  (  2.117E+02 8.71E-01 3.61E+00 G

CO-57        3.3118E+02                                     2.72E+02
                           122.06 3.312E+02  (  1.731E+01 2.86E+00 8.56E+01 G

Ce-139       5.4173E+02                                     1.38E+02
                           165.85 5.417E+02  (  1.357E+02 1.07E+01 7.99E+01 G

Hg-203      -5.2429E-01                                     4.66E+01
                           279.17-5.243E-01 ?(  2.327E+00 1.34E+02 8.15E+01 G

SN-113       9.5260E+02                                     1.15E+02
                           391.69 9.526E+02 ?(  7.503E+02 2.44E+01 6.40E+01 G

CS-137       4.4452E+02                                     1.10E+04
                           661.66 4.445E+02  (  3.202E+00 7.63E-01 8.52E+01 G

Y-898        2.4057E+03                                     1.07E+02
                           898.02 2.406E+03 @(  1.118E+03 2.36E+01 9.37E+01 G

Co-1173      6.8772E+02                                     1.93E+03
                          1173.24 6.877E+02  (  4.547E+00 8.09E-01 9.99E+01 G

Co-1332      6.9256E+02                                     1.93E+03
                          1332.50 6.926E+02  (  2.044E+00 7.49E-01 1.00E+02 G

Y-1836       1.7452E+03                                     1.07E+02
                          1836.01 1.745E+03  (  2.388E+02 1.02E+01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - 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 %
_____________________________________________________________________________
Hg-203     280.29      2362.       -52.    -0.014   133.84   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   *****
        Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                Bq/Sample

_____________________________________________________________________________
Pb-210       1.2947E+04    1.3971E+04    6.459E-01%                1.48E+02
AM-241       1.1648E+03    1.1694E+03    6.156E-01%                1.09E+01
CD-109       4.0954E+03    1.5657E+04    8.713E-01%                2.12E+02
CO-57        3.3792E+01    3.3118E+02    2.862E+00%                1.73E+01
Ce-139       5.9752E+00    5.4173E+02    1.074E+01%                1.36E+02
Hg-203 #A   -5.2429E-01 >12 Halflives   1.3384E+02%   2.3272E+00
SN-113 #     4.3447E+00    9.5260E+02    2.438E+01%                7.50E+02
CS-137       4.2011E+02    4.4452E+02    7.635E-01%                3.20E+00
Y-898  #     7.1422E+00    2.4057E+03    2.361E+01%                1.12E+03
Co-1173      4.9827E+02    6.8772E+02    8.087E-01%                4.55E+00
Co-1332      5.0178E+02    6.9256E+02    7.487E-01%                2.04E+00
Y-1836       5.1813E+00    1.7452E+03    1.023E+01%                2.39E+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 (  379.7 to  1999.7 keV)     1.968E+04  Bq/Sample
Total Decayed Activity (  379.7 to  1999.7 keV) 3.8598309E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge 15
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1

Sample description
     15_TunaCan2nd_rad10_032312


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan2nd_20120288.An1

Acquisition information
       Start time:                 3/23/2012 6:10:28 AM
       Live time:               7200
       Real time:               7248
       Dead time:                  0.66 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_Soil_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       1/1/2010 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   YES       15_2012-02-26_0425.PBC
                                                 2/26/2012 4:25:10 AM

       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:      26.5953
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.48	1231.	11.17	1.20	1.258E-02				
46.44	76440.	0.51	0.91	1.950E-02	46.54	4.250	1.366E+04	Pb210
49.65	1514.	14.37	1.25	2.160E-02				
59.44	80694.	0.48	0.94	2.732E-02	59.54	35.700	1.151E+03	AM241
87.99	43578.	0.68	0.97	3.705E-02	88.03	3.610	1.527E+04	CD109
92.63	219.	44.56	0.42	3.776E-02				
122.00	10133.	1.58	1.01	3.846E-02	122.06	85.600	3.389E+02	CO57
136.33	1390.	8.77	1.13	3.725E-02				
165.85	1699.	7.29	1.05	3.392E-02	165.85	79.900	5.192E+02	Ce139
238.39	480.	20.10	1.42	2.594E-02				
260.67	81.	57.86	0.33	2.424E-02				
279.32	56.	141.32	1.14	2.301E-02	279.17	81.500	HL>Cutoff	Hg203
352.13	110.	54.66	0.68	1.922E-02				
368.26	125.	49.84	0.46	1.856E-02				
391.56	581.	13.59	1.28	1.768E-02	391.69	64.000	9.477E+02	SN113
400.57	73.	61.58	0.54	1.736E-02				
661.57	29285.	0.71	1.46	1.155E-02	661.66	85.210	4.352E+02	CS137
754.74	100.	52.53	0.39	1.034E-02				
898.10	516.	14.74	1.96	8.921E-03	898.02	93.700	1.681E+03	Y898
904.89	86.	54.53	0.36	8.863E-03				
1000.75	82.	43.22	0.58	8.127E-03				
1096.51	181.	26.16	0.80	7.507E-03				
1173.15	26111.	0.71	1.80	7.077E-03	1173.24	99.900	6.872E+02	Co1173
1226.66	98.	36.87	0.74	6.805E-03				
1332.45	23674.	0.68	1.95	6.325E-03	1332.50	99.982	6.965E+02	Co1332
1835.96	284.	9.76	1.20	4.741E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

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          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/Sample     Bq/Sample                                 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
```



```
  < - 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

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     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
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 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 Centroid Channel	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

Analysis Report for Gamma Spectroscopy

Batch: 229576 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-229576~2-	LCS	341.90g	1.00	GammaVision	GV03	1 / 19 / 16 7:22	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	4.965E-001pCi/g	2.941E-001	2.930E-001	1.062E+000	5.136E-001	0.47	0.2941
AG-108M	10982	-4.175E-002pCi/g	6.792E-002	6.789E-002	2.277E-001	1.106E-001	-0.18	0.0679
AG-110M	10973	-3.575E-003pCi/g	2.188E-002	2.188E-002	4.448E-001	2.156E-001	-0.01	0.0219
AM-241	10818	9.980E+001pCi/g	5.238E+000	7.784E-001	1.133E+000	5.611E-001	88.11	5.2375
BA-133	10469	5.873E-002pCi/g	9.186E-002	9.180E-002	3.075E-001	1.497E-001	0.19	0.0919
BA-140	10463	4.018E-003pCi/g	3.844E-003	3.839E-003	7.823E-001	3.772E-001	0.01	0.0038
BE-7	10435	-8.382E-002pCi/g	6.487E-001	6.487E-001	2.192E+000	1.066E+000	-0.04	0.6487
BI-207	10195	7.936E-002pCi/g	5.743E-002	5.729E-002	1.898E-001	9.128E-002	0.42	0.0574
BI-210M	10173	6.234E-002pCi/g	1.031E-001	1.031E-001	3.449E-001	1.683E-001	0.18	0.1031
BI-212	10160	1.346E+000pCi/g	8.174E-001	8.144E-001	2.681E+000	1.284E+000	0.50	0.8174
BI-214	10154	3.248E-001pCi/g	1.433E-001	1.423E-001	4.660E-001	2.249E-001	0.70	0.1433
CD-109	9254	2.731E+000pCi/g	2.382E+000	2.378E+000	3.514E+000	1.721E+000	0.78	2.3824
CD-113M	17462	8.379E-001pCi/g	8.360E+002	8.360E+002	2.823E+003	1.377E+003	0.00	835.9792
CE-139	9241	3.194E-002pCi/g	4.967E-002	4.958E-002	1.656E-001	8.094E-002	0.19	0.0497
CE-141	9235	-9.276E-002pCi/g	8.336E-002	8.322E-002	2.761E-001	1.351E-001	-0.34	0.0834
CE-144	9221	4.148E-001pCi/g	3.518E-001	3.512E-001	1.164E+000	5.698E-001	0.36	0.3518
CF-249	9215	3.609E-002pCi/g	7.851E-002	7.848E-002	3.006E-001	1.462E-001	0.12	0.0785
CF-251	13690	-9.337E-002pCi/g	2.422E-001	2.421E-001	8.119E-001	3.967E-001	-0.12	0.2422
CO-56	8704	5.712E-003pCi/g	1.869E-002	1.869E-002	2.580E-001	1.242E-001	0.02	0.0187
CO-57	13694	1.046E-002pCi/g	4.413E-002	4.413E-002	1.564E-001	7.667E-002	0.07	0.0441
CO-58	8698	2.582E-002pCi/g	6.995E-002	6.994E-002	2.376E-001	1.142E-001	0.11	0.0700
CO-60	8692	1.791E+001pCi/g	9.248E-001	2.166E-001	3.666E-002	1.159E-002	488.51	0.9248
CR-51	8604	-5.434E-002pCi/g	5.663E-001	5.663E-001	1.911E+000	9.317E-001	-0.03	0.5663
CS-134	8553	8.527E-002pCi/g	5.497E-002	5.479E-002	2.246E-001	1.085E-001	0.38	0.0550
CS-136	8546	6.970E-002pCi/g	6.544E-002	6.532E-002	2.257E-001	1.082E-001	0.31	0.0654
CS-137	8539	2.987E+001pCi/g	1.592E+000	3.439E-001	2.525E-001	1.216E-001	118.28	1.5915
EU-152	7145	4.783E-001pCi/g	2.253E-001	2.239E-001	5.623E-001	2.718E-001	0.85	0.2253
EU-154	7138	1.944E-001pCi/g	3.227E-001	3.226E-001	2.414E+000	1.167E+000	0.08	0.3227
EU-155	7131	4.818E-002pCi/g	1.507E-001	1.507E-001	5.063E-001	2.471E-001	0.10	0.1507
FE-59	7073	1.976E-001pCi/g	1.432E-001	1.428E-001	4.736E-001	2.265E-001	0.42	0.1432
GA-68	18005	5.250E+000pCi/g	2.726E+000	2.710E+000	8.844E+000	4.219E+000	0.59	2.7260
GD-153	6824	1.212E-001pCi/g	8.816E-002	8.785E-002	4.318E-001	2.115E-001	0.28	0.0882
HF-181	6495	8.831E-002pCi/g	8.376E-002	8.363E-002	2.320E-001	1.121E-001	0.38	0.0838
HG-203	6466	7.767E-002pCi/g	5.465E-002	5.447E-002	1.522E-001	7.346E-002	0.51	0.0546
I-131	6380	3.072E-003pCi/g	6.170E-002	6.170E-002	2.094E-001	1.016E-001	0.01	0.0617
IR-192	6303	3.665E-002pCi/g	6.296E-002	6.292E-002	2.108E-001	1.027E-001	0.17	0.0630
K-40	6148	-2.504E-001pCi/g	9.590E-001	9.589E-001	1.437E+000	6.508E-001	-0.17	0.9590
LA-140	6096	7.503E-002pCi/g	7.767E-002	7.757E-002	1.900E-001	8.688E-002	0.39	0.0777
MN-54	5382	-6.356E-002pCi/g	7.748E-002	7.741E-002	2.597E-001	1.252E-001	-0.24	0.0775
NA-22	5201	2.684E-003pCi/g	3.144E-002	3.144E-002	1.160E-001	5.146E-002	0.02	0.0314
NB-94	5160	7.491E-003pCi/g	1.036E-002	1.035E-002	1.803E-001	8.592E-002	0.04	0.0104
NB-95	5154	5.861E-003pCi/g	6.671E-002	6.671E-002	2.282E-001	1.097E-001	0.03	0.0667
ND-147	5083	-5.976E-001pCi/g	5.313E-001	5.302E-001	1.763E+000	8.557E-001	-0.34	0.5313
NP-237	4757	-6.326E-001pCi/g	3.879E-001	3.863E-001	1.273E+000	6.261E-001	-0.50	0.3879
NP-239	4751	1.659E-001pCi/g	1.170E-001	1.165E-001	3.854E-001	1.870E-001	0.43	0.1170
PA-231	4541	2.101E-001pCi/g	1.792E+000	1.792E+000	6.049E+000	2.946E+000	0.03	1.7916
PA-233	4535	8.968E-002pCi/g	1.522E-001	1.521E-001	5.093E-001	2.482E-001	0.18	0.1522
PA-234	4528	2.653E-001pCi/g	1.500E-001	1.494E-001	7.114E-001	3.483E-001	0.37	0.1500
PA-234M	19453	-2.813E-001pCi/g	1.067E+001	1.067E+001	3.643E+001	1.757E+001	-0.01	10.6698
PB-210	4467	9.199E+002pCi/g	5.477E+001	9.060E+000	1.538E+001	7.626E+000	59.82	54.7700

PB-212	4454	**6.332E-001**pCi/g	1.510E-001	1.453E-001	3.483E-001	1.697E-001	1.82	0.1510
PB-214	4448	**5.128E-001**pCi/g	1.570E-001	1.547E-001	4.982E-001	2.424E-001	1.03	0.1570
PM-144	19585	**2.182E-002**pCi/g	2.495E-002	2.492E-002	1.999E-001	9.579E-002	0.11	0.0249
PM-146	2464	**2.659E-002**pCi/g	2.213E-002	2.209E-002	5.997E-001	2.871E-001	0.04	0.0221
RH-106	1882	**8.705E-003**pCi/g	4.824E-001	4.824E-001	1.665E+000	7.944E-001	0.01	0.4824
RU-103	1828	**-2.228E-002**pCi/g	7.147E-002	7.146E-002	2.412E-001	1.171E-001	-0.09	0.0715
SB-124	1784	**1.479E-002**pCi/g	6.348E-002	6.347E-002	2.156E-001	1.040E-001	0.07	0.0635
SB-125	1777	**6.246E-002**pCi/g	8.163E-002	8.157E-002	8.005E-001	3.905E-001	0.08	0.0816
SC-46	1739	**4.902E-002**pCi/g	5.829E-002	5.824E-002	2.659E-001	1.280E-001	0.18	0.0583
SN-113	1570	**-6.202E-002**pCi/g	9.565E-002	9.560E-002	3.201E-001	1.558E-001	-0.19	0.0956
SN-126	17459	**2.876E-001**pCi/g	5.839E-001	5.837E-001	1.948E+000	9.564E-001	0.15	0.5839
TA-182	1301	**9.507E-002**pCi/g	7.136E-002	7.120E-002	7.354E-001	3.508E-001	0.13	0.0714
TC-99M	17412	**-4.559E-004**pCi/g	4.481E-002	4.481E-002	1.508E-001	7.382E-002	0.00	0.0448
TH-227	1058	**3.043E+000**pCi/g	1.854E+000	1.846E+000	6.083E+000	3.012E+000	0.50	1.8537
TH-229	1046	**4.315E-002**pCi/g	8.927E-002	8.920E-002	3.602E+000	1.763E+000	0.01	0.0893
TH-234	1027	**4.427E-001**pCi/g	8.093E-001	8.090E-001	5.471E+000	2.690E+000	0.08	0.8093
TL-208	929	**2.014E-001**pCi/g	1.080E-001	1.075E-001	2.276E-001	1.095E-001	0.88	0.1080
U-235	281	**7.771E-002**pCi/g	2.597E-001	2.597E-001	1.183E+000	5.786E-001	0.07	0.2597
Y-88	74	**7.631E-003**pCi/g	1.276E-002	1.276E-002	2.917E-001	1.406E-001	0.03	0.0128
ZN-65	31	**2.900E-001**pCi/g	1.832E-001	1.827E-001	6.023E-001	2.895E-001	0.48	0.1832
ZR-95	7	**5.699E-002**pCi/g	8.566E-002	8.560E-002	2.916E-001	1.378E-001	0.20	0.0857

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-229576~2-A	LCS 160-229576~2-A	CS-137	2.987E+001	pCi/g	2.992E+001	99.83%	-0.0229
		CO-60	1.791E+001	pCi/g	1.803E+001	99.31%	-0.0954
		AM-241	9.980E+001	pCi/g	9.719E+001	102.69%	0.3571

Sample Duplicate Information

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

ACV TOP 2016 Gamma Detector 3

	Cs-137	Co-60	Am-241
Detector	Recovery	Recovery	Recovery
3	99.83%	99.31%	102.69%

Standard ID

Tuna Can LCS

Tuna Can LCS_00005 #776670
Cert # 74139-334 Ref. date 10/1/2006

Known Activity:

Cs-137	29.92 pCi/g
Co-60	18.03 pCi/g
Am-241	97.19 pCi/g

Recovered Activity:

Cs-137	29.87 pCi/g
Co-60	17.91 pCi/g
Am-241	99.8 pCi/g

Original count ID: LCS 160-229576-2-A

1st review: J Waters 2/29/16

2nd review: Amanda Leigh Dei 3/1/16

Test America St. Louis Spectrum ID: 3_Gamma_20160098

Sample Description: 229576_Gamma_LCS 160-229576~2-A
Detector: Ge 3 SN/131
Batch ID: 229576
Work Order Number: Gamma
Lot Number: LCS 160-229576~2-A

Decay to Time: 1/19/2016 07:22 Live Time: 1800 sec
Acquisition Time: 1/19/2016 07:22:44 Real Time: 1808 sec
Analysis Time: 1/19/2016 07:53 Dead Time: 0.44 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 3_Soil_TunaCan.Clb
Efficiency Cal Desc: 3_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 11:26
Energy Cal Date: 2/28/2012 19:25
Library: Client_Long_Rev11.lib
Bkgd Correction File: 3_2016-01-10_0555.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	-1.060E+00	773.9	8.206E+00	8.206E+00	2.773E+01
NA-22	3.395E-02	1172.0	3.978E-01	3.978E-01	1.467E+00
K-40	-3.167E+00	383.0	1.213E+01	1.213E+01	1.818E+01
Sc-46	6.201E-01	118.8	7.368E-01	7.374E-01	3.363E+00
CR-51	-6.874E-01	1042.0	7.164E+00	7.164E+00	2.417E+01
MN-54	-8.041E-01	121.8	9.793E-01	9.801E-01	3.286E+00
FE-59	2.500E+00	72.3	1.807E+00	1.811E+00	5.991E+00
Co-56	7.226E-02	327.2	2.365E-01	2.365E-01	3.263E+00
CO-57	1.323E-01	422.0	5.583E-01	5.583E-01	1.978E+00
CO-58	3.266E-01	270.9	8.848E-01	8.849E-01	3.006E+00
CO-60	2.266E+02	1.2	2.740E+00	1.170E+01	4.638E-01
ZN-65	3.668E+00	63.0	2.311E+00	2.318E+00	7.619E+00
NB-94	9.476E-02	138.2	1.310E-01	1.310E-01	2.281E+00
ZR-95	7.209E-01	150.2	1.083E+00	1.084E+00	3.688E+00
NB-95	7.414E-02	1138.0	8.439E-01	8.439E-01	2.887E+00
RU-103	-2.818E-01	320.7	9.040E-01	9.041E-01	3.051E+00
RH-106	1.101E-01	5542.0	6.103E+00	6.103E+00	2.106E+01
AG-108M	-5.281E-01	162.6	8.588E-01	8.592E-01	2.881E+00
AG-110M	-4.523E-02	612.0	2.768E-01	2.768E-01	5.626E+00
SN-113	-7.845E-01	154.1	1.209E+00	1.210E+00	4.049E+00
SB-124	1.872E-01	429.0	8.029E-01	8.030E-01	2.727E+00
SB-125	7.901E-01	130.6	1.032E+00	1.033E+00	1.013E+01
I-131	3.887E-02	2008.0	7.805E-01	7.805E-01	2.649E+00
Gd-153	1.534E+00	72.5	1.111E+00	1.115E+00	5.462E+00
Ga-68	6.641E+01	51.6	3.428E+01	3.448E+01	1.119E+02
Tc-99m	-5.768E-03	9829.0	5.669E-01	5.669E-01	1.908E+00
BA-133	7.429E-01	156.3	1.161E+00	1.162E+00	3.890E+00
CS-134	1.079E+00	64.3	6.931E-01	6.954E-01	2.841E+00
CS-137	3.779E+02	1.2	4.350E+00	2.013E+01	3.195E+00
CE-139	4.041E-01	155.2	6.272E-01	6.283E-01	2.095E+00
Ba-140	5.082E-02	95.5	4.856E-02	4.863E-02	9.896E+00
La-140	9.492E-01	103.4	9.813E-01	9.826E-01	2.404E+00
CE-141	-1.174E+00	89.7	1.053E+00	1.055E+00	3.492E+00
CE-144	5.247E+00	84.7	4.442E+00	4.451E+00	1.472E+01
PM-144	2.760E-01	114.2	3.152E-01	3.156E-01	2.529E+00
EU-152	6.050E+00	46.8	2.832E+00	2.850E+00	7.114E+00
EU-154	2.459E+00	166.0	4.081E+00	4.082E+00	3.054E+01
EU-155	6.095E-01	312.7	1.906E+00	1.906E+00	6.405E+00
HF-181	1.117E+00	94.7	1.058E+00	1.060E+00	2.935E+00
Ta-182	1.203E+00	74.9	9.007E-01	9.027E-01	9.303E+00
Hg-203	9.826E-01	70.1	6.890E-01	6.913E-01	1.925E+00
TL-208	2.547E+00	53.4	1.360E+00	1.366E+00	2.879E+00
pm-146	3.364E-01	83.1	2.794E-01	2.800E-01	7.587E+00

y-88	9.654E-02	167.2	1.614E-01	1.615E-01	3.691E+00
Cd-113m	1.060E+01	99770.0	1.058E+04	1.058E+04	3.571E+04
Cd-109	3.455E+01	87.1	3.008E+01	3.014E+01	4.445E+01
Cf-251	-1.181E+00	259.3	3.063E+00	3.065E+00	1.027E+01
Cf-249	4.565E-01	217.5	9.928E-01	9.931E-01	3.803E+00
Sn-126	3.638E+00	203.0	7.384E+00	7.387E+00	2.464E+01
PB-210	1.164E+04	1.0	1.146E+02	6.929E+02	1.945E+02
PB-212	8.010E+00	23.0	1.838E+00	1.910E+00	4.406E+00
PB-214	6.487E+00	30.2	1.957E+00	1.986E+00	6.302E+00
BI-207	1.004E+00	72.2	7.247E-01	7.266E-01	2.401E+00
BI-212	1.703E+01	60.5	1.030E+01	1.034E+01	3.391E+01
BI-214	4.109E+00	43.8	1.800E+00	1.813E+00	5.895E+00
BI-210M	7.886E-01	165.4	1.304E+00	1.305E+00	4.363E+00
AC-228	6.281E+00	59.0	3.707E+00	3.721E+00	1.343E+01
TH-227	3.850E+01	60.7	2.336E+01	2.345E+01	7.695E+01
TH-229	5.458E-01	206.7	1.128E+00	1.129E+00	4.557E+01
TH-234	5.601E+00	182.7	1.023E+01	1.024E+01	6.921E+01
PA-231	2.657E+00	852.9	2.266E+01	2.266E+01	7.652E+01
PA-233	1.135E+00	169.6	1.924E+00	1.925E+00	6.443E+00
PA-234	3.357E+00	56.3	1.890E+00	1.898E+00	8.999E+00
PA-234M	-3.559E+00	3793.0	1.350E+02	1.350E+02	4.608E+02
U-235	9.830E-01	334.2	3.285E+00	3.285E+00	1.496E+01
AM-241	1.263E+03	0.8	9.848E+00	6.626E+01	1.433E+01
Np-237	-8.003E+00	61.1	4.887E+00	4.908E+00	1.610E+01
Ir-192	4.636E-01	171.7	7.960E-01	7.964E-01	2.666E+00
Cs-136	8.817E-01	93.7	8.263E-01	8.278E-01	2.856E+00
Np-239	2.099E+00	70.2	1.474E+00	1.480E+00	4.876E+00
Nd-147	-7.560E+00	88.7	6.708E+00	6.722E+00	2.230E+01
Total	1.375E+04				

Analyst: kody Saulters

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 5**

SpectrumID: 5_20160128006_EffVerif

Analysis Description: ACVTop-776670;TunaCan2006

Calibration: 5_Soil_TunaCan_90099_032612

Detector: Ge 5 SN/157

Verification Date: 2016-01-28 10:21

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.57E+02	-1.7%
Cs-137	661.66	400	3.97E+02	0.7%
Co-1332	1332.5	777	7.71E+02	0.8%

Comments:

Perform ___Jody Watson 1/28/16_____

Reviev _____Rachel Mueller 1/28/16_____

C:\User\CRpt\5_20160128006_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 5 SN/157
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 10:21:33
Analyzed: 2/4/2016 10:52

Analyst: Jody Watson

Efficiency: 5_Soil_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.566E+02	0.45
CS-137	3.974E+02	0.71
Co-1332	7.707E+02	1.09
Total	1.625E+03	

TestAmerica Spectrum name: 5_20160128006_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det5\5_20160128006_EffVerif.An1

Acquisition information
Start time: 1/28/2016 10:21:33 AM
Live time: 7200
Real time: 7242
Dead time: 0.59 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0281

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.59    62614.   0.54   0.73  1.791E-02
   59.55    82059.   0.45   0.73  2.534E-02    59.54 100.000  4.566E+02 AM241
   87.79     1068.   8.88   0.81  3.458E-02
  661.63    22901.   0.71   1.29  9.925E-03   661.66 100.000  3.973E+02 CS137
 1173.12     9966.   1.10   1.75  6.139E-03
 1332.41     8977.   1.09   1.90  5.515E-03  1332.50 100.000  7.707E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.88    46.59     15162.     62614. 3.496E+06    0.54   0.733  -
  350.82    87.79      2502.      1068. 3.087E+04    8.88   0.809  -      s
 4692.76  1173.12       266.      9966. 1.624E+06    1.10   1.754  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-----------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.79	59.55	13086.	82059.	11.397	0.45	0.731
CS-137	2647.26	661.63	612.	22901.	3.181	0.71	1.293
Co-1332	5329.50	1332.41	77.	8977.	1.247	1.09	1.898

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5663E+02				1.58E+05	
			59.54	4.566E+02	(	2.981E+00 4.47E-01 1.00E+02 G	
CS-137		3.9735E+02				1.10E+04	
			661.66	3.973E+02	(	2.047E+00 7.08E-01 1.00E+02 G	
Co-1332		7.7068E+02				1.93E+03	
			1332.50	7.707E+02	(	3.743E+00 1.09E+00 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting	1 Sigma	MDA
AM-241	4.4986E+02	4.5663E+02	4.468E-01%		2.98E+00
CS-137	3.2049E+02	3.9735E+02	7.077E-01%		2.05E+00
Co-1332	2.2610E+02	7.7068E+02	1.091E+00%		3.74E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 9.965E+02 uCi/Source
Total Decayed Activity (37.6 to 2000.8 keV) 1.6246621E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20160123003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2016-01-23 19:25
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.38E+02	2.5%
Cs-137	661.66	400	3.86E+02	3.6%
Co-1332	1332.5	777	7.19E+02	7.5%

Comments:

Perform ____Kody Saulters 2/4/16_____ Reviev ___Jody Watson 2/4/16_____

C:\User\CRpt\7_20160123003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/23/2016 19:25:53
Analyzed: 2/4/2016 10:49

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.380E+02	0.38
CS-137	3.857E+02	0.59
Co-1332	7.189E+02	0.94
Total	1.543E+03	

TestAmerica Spectrum name: 7_20160123003_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20160123003_EffVerif.An1

Acquisition information
Start time: 1/23/2016 7:25:53 PM
Live time: 7200
Real time: 7361
Dead time: 2.18 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) +
(-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) +
(-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0434

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   36.52     1402.   9.33   1.11  1.474E-02
   46.60    75982.   0.45   0.84  2.485E-02
   59.55   114994.   0.38   0.89  3.702E-02    59.54 100.000  4.380E+02 AM241
   87.94     1428.   8.44   0.97  5.326E-02
  661.74    33440.   0.59   1.49  1.492E-02   661.66 100.000  3.857E+02 CS137
 1173.38    13650.   0.99   1.95  8.928E-03
 1332.63    12093.   0.94   1.99  7.950E-03  1332.50 100.000  7.189E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  145.62    36.52      4964.      1402. 9.512E+04    9.33   1.111  -      s
  185.78    46.56     20640.     82430. 3.318E+06    0.48   0.912  -
  351.31    87.94      3932.      1428. 2.682E+04    8.44   0.972  -      s
 4693.26  1173.38       567.     13650. 1.529E+06    0.99   1.950  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.75	59.55	18759.	114994.	15.971	0.38	0.895
CS-137	2646.69	661.74	882.	33440.	4.644	0.59	1.494
Co-1332	5330.24	1332.63	117.	12093.	1.680	0.94	1.990

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.3796E+02				1.58E+05	
			59.54	4.380E+02	(	2.441E+00 3.82E-01 1.00E+02 G	
CS-137		3.8573E+02				1.10E+04	
			661.66	3.857E+02	(	1.628E+00 5.85E-01 1.00E+02 G	
Co-1332		7.1885E+02				1.93E+03	
			1332.50	7.189E+02	(	3.157E+00 9.42E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.3147E+02	4.3796E+02	3.822E-01%	2.44E+00
CS-137	3.1121E+02	3.8573E+02	5.852E-01%	1.63E+00
Co-1332	2.1125E+02	7.1885E+02	9.418E-01%	3.16E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 9.539E+02 uCi/Source
Total Decayed Activity (37.6 to 2000.1 keV) 1.5425436E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 8**

SpectrumID: 8_20160128004_EffVerif

Analysis Description: ACVTop-776670;TunaCan2006

Calibration: 8_Soil_TunaCan_90099_032712

Detector: Ge 8 SN/174

Verification Date: 2016-01-28 18:34

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.79E+02	-6.7%
Cs-137	661.66	400	3.90E+02	2.5%
Co-1332	1332.5	777	7.56E+02	2.7%

Comments:

Perform Aaron Schroder 1/28/16

Reviev __Jody Watson_____1/29/16_____

C:\User\CRpt\8_20160128004_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 8 SN/174
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 18:34:05
Analyzed: 2/4/2016 10:51

Analyst: Jody Watson

Efficiency: 8_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.789E+02	0.41
CS-137	3.899E+02	0.64
Co-1332	7.564E+02	0.99
Total	1.625E+03	

TestAmerica Spectrum name: 8_20160128004_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det8\8_20160128004_EffVerif.An1

Acquisition information
Start time: 1/28/2016 6:34:05 PM
Live time: 7200
Real time: 7434
Dead time: 3.15 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) +
(-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) +
(-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0632

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.57    74004.   0.44   1.01  2.005E-02
   59.58   102880.   0.35   1.02  2.881E-02    59.54 100.000  5.034E+02 AM241
   88.09     1218.   9.96   0.76  3.993E-02
  661.54    27378.   0.64   1.34  1.209E-02   661.66 100.000  3.899E+02 CS137
 1173.07    11810.   1.00   1.56  7.454E-03
 1332.31    10667.   0.99   1.75  6.678E-03  1332.50 100.000  7.564E+02 Co1332


************ U N I D E N T I F I E D    P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.94    46.53     19029.     71370. 3.560E+06    0.54   0.847  -
  352.16    88.09      3683.      1218. 3.051E+04    9.96   0.764  -      s
 4692.32  1173.07       306.     11810. 1.584E+06    1.00   1.561  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.97	59.54	15110.	97876.	13.594	0.41	0.867D
CS-137	2646.10	661.54	638.	27378.	3.802	0.64	1.335
Co-1332	5329.28	1332.31	68.	10667.	1.482	0.99	1.753

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.7889E+02				1.58E+05	
			59.54	4.789E+02	(	2.816E+00 4.13E-01 1.00E+02 G	
CS-137		3.8993E+02				1.10E+04	
			661.66	3.899E+02	(	1.714E+00 6.40E-01 1.00E+02 G	
Co-1332		7.5635E+02				1.93E+03	
			1332.50	7.564E+02	(	2.913E+00 9.90E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.7179E+02	4.7889E+02	4.129E-01%	2.82E+00
CS-137	3.1450E+02	3.8993E+02	6.397E-01%	1.71E+00
Co-1332	2.2187E+02	7.5635E+02	9.900E-01%	2.91E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.008E+03 uCi/Source
Total Decayed Activity (37.5 to 2000.0 keV) 1.6251797E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 9**
SpectrumID: 9_20160122003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 9_Soil_TunaCan_90099_050312
Detector: Ge9 S/N100228730

Verification Date: 2016-01-22 13:21
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	4.36E+02	2.9%
Cs-137	661.66	400	3.87E+02	3.2%
Co-1332	1332.5	777	7.27E+02	6.4%

Comments:

Perforn _____Amanda Dick 01/22/2016___ Revie ___Amanda Dick 01/22/2016_____

C:\User\CRpt\9_20160122003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge9 S/N100228730
Source Date: 10/1/2006 11:00
Acquired: 1/22/2016 13:21:35
Analyzed: 2/3/2016 15:04

Analyst: Jody Watson

Efficiency: 9_Soil_TunaCan_90099_050312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.360E+02	0.41
CS-137	3.871E+02	0.54
Co-1332	7.274E+02	0.81
Total	1.551E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det9\9_20160122003_EffVerif.An1

Acquisition information
Start time: 1/22/2016 1:21:35 PM
Live time: 7200
Real time: 7243
Dead time: 0.59 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-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 (37.59keV)
Stop channel: 8000 (1999.34keV)
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: 0.0668

***** 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
36.55	1436.	9.60	1.09	1.635E-02				
46.56	83904.	0.41	1.00	2.575E-02				
59.53	113158.	0.41	0.98	3.658E-02	59.54	100.000	4.360E+02	AM241
87.88	1564.	8.33	1.04	5.046E-02				
661.55	40702.	0.54	1.51	1.810E-02	661.66	100.000	3.871E+02	CS137
1173.01	17970.	0.83	1.93	1.163E-02				
1332.27	16170.	0.81	2.02	1.050E-02	1332.50	100.000	7.274E+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
145.84	36.55	5276.	1436.	8.786E+04	9.60	1.089	-
185.74	46.52	21582.	84830.	3.294E+06	0.49	0.946	-
351.09	87.88	4203.	1564.	3.100E+04	8.33	1.037	-
4692.04	1173.01	526.	17970.	1.545E+06	0.83	1.934	-

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	237.73	59.53	20524.	113158.	15.716	0.41	0.979
CS-137	2645.58	661.55	1216.	40702.	5.653	0.54	1.512
Co-1332	5329.44	1332.27	150.	16170.	2.246	0.81	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 uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.3599E+02				1.58E+05	
			59.54	4.360E+02	(	2.583E+00 4.07E-01 1.00E+02 G	
CS-137		3.8711E+02				1.10E+04	
			661.66	3.871E+02	(	1.571E+00 5.42E-01 1.00E+02 G	
Co-1332		7.2740E+02				1.93E+03	
			1332.50	7.274E+02	(	2.685E+00 8.13E-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	4.2954E+02	4.3599E+02	4.072E-01%	2.58E+00
CS-137	3.1235E+02	3.8711E+02	5.416E-01%	1.57E+00
Co-1332	2.1385E+02	7.2740E+02	8.132E-01%	2.69E+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 1999.3 keV) 9.557E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.3 keV) 1.5505026E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #15**
SpectrumID: 15_20160504003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 15_TunaCan_90099_032212
Detector: Ge15 SN/11012216

Verification Date: 2016-05-04 18:46
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.45E+02	0.8%
Cs-137	661.66	400	3.87E+02	3.4%
Co-1332	1332.5	777	7.47E+02	3.8%

Comments:

Perform ___Jody Watson 5/5/16_____ Reviev __Kody Saulters 5/5/16_____

C:\User\CRpt\15_20160504003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge15 SN/11012216
Source Date: 10/1/2006 11:00
Acquired: 5/4/2016 18:46:19
Analyzed: 5/5/2016 12:02

Analyst: Jody Watson

Efficiency: 15_TunaCan_90099_032212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.452E+02	0.48
CS-137	3.866E+02	0.67
Co-1332	7.472E+02	1.06
Total	1.579E+03	

Test America Spectrum name: 15_20160504003_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det15\15_20160504003_EffVerif.An1

Acquisition information
Start time: 5/4/2016 6:46:19 PM
Live time: 7200
Real time: 7231
Dead time: 0.42 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0611

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.58    64528.   0.47   0.95  1.956E-02
   59.53    86404.   0.48   0.90  2.737E-02    59.54 100.000  4.452E+02 AM241
  661.75    25760.   0.67   1.44  1.154E-02   661.66 100.000  3.866E+02 CS137
 1173.43    10608.   1.12   1.87  7.075E-03
 1332.71     9639.   1.06   1.94  6.324E-03  1332.50 100.000  7.472E+02 Co1332


************ U N I D E N T I F I E D     P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.80    46.53     18441.     65393. 3.343E+06    0.57   0.887  -
 4692.75  1173.43       481.     10608. 1.499E+06    1.12   1.872  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.76	59.53	17200.	86404.	12.001	0.48	0.904
CS-137	2645.68	661.75	708.	25760.	3.578	0.67	1.435
Co-1332	5330.21	1332.71	114.	9639.	1.339	1.06	1.942

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4521E+02				1.58E+05	
			59.54	4.452E+02	(	3.163E+00 4.77E-01 1.00E+02 G	
CS-137		3.8657E+02				1.10E+04	
			661.66	3.866E+02	(	1.901E+00 6.74E-01 1.00E+02 G	
Co-1332		7.4720E+02				1.93E+03	
			1332.50	7.472E+02	(	4.067E+00 1.06E+00 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

Test America Spectrum name: 15_20160504003_EffVerif.An1

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting	1 Sigma	MDA
AM-241	4.3842E+02	4.4521E+02	4.765E-01%		3.16E+00
CS-137	3.0989E+02	3.8657E+02	6.738E-01%		1.90E+00
Co-1332	2.1166E+02	7.4720E+02	1.062E+00%		4.07E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.600E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5789875E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #16**
SpectrumID: 16_20160122005_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 16_TunaCan_90099_071012
Detector: Ge16 SN/11012217

Verification Date: 2016-01-22 10:56
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.42E+02	1.6%
Cs-137	661.66	400	3.99E+02	0.2%
Co-1332	1332.5	777	7.69E+02	1.0%

Comments:

Perforn Amanda Dick 01/22/2016

Revie' Jody Watson 01/22/2016

C:\User\CRpt\16_20160122005_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge16 SN/11012217
Source Date: 10/1/2006 11:00
Acquired: 1/22/2016 10:56:41
Analyzed: 2/3/2016 14:54

Analyst: Jody Watson

Efficiency: 16_TunaCan_90099_071012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.416E+02	0.43
CS-137	3.993E+02	0.57
Co-1332	7.690E+02	0.84
Total	1.610E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det16\16_20160122005_EffVerif.An1

Acquisition information

Start time:	1/22/2016 10:56:41 AM
Live time:	7200
Real time:	7636
Dead time:	5.70 %
Detector ID:	16

Detector system
Ge16 SN/11012217

Calibration

Filename:	16_Soil_TunaCan.Clb

16_TunaCan_90099_071012

Energy Calibration

Created:	2/28/2012 9:35:31 AM
Zero offset:	0.050 keV
Gain:	0.250 keV/channel
Quadratic:	-2.285E-08 keV/channel^2

Efficiency Calibration

Created:	7/13/2012 9:47:24 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.01 %
Log(Eff):	1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.17 %
Log(Eff):	-2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files

Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.63keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0291
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.50	1362.	9.86	0.91	1.492E-02				
46.55	73583.	0.45	0.96	2.349E-02				
59.54	104212.	0.43	0.98	3.327E-02	59.54	100.000	4.416E+02	AM241
238.61	855.	9.53	1.14	3.217E-02				
661.72	35644.	0.57	1.53	1.537E-02	661.66	100.000	3.992E+02	CS137
1173.34	16190.	0.90	1.97	1.002E-02				
1332.60	14808.	0.84	2.11	9.096E-03	1332.50	100.000	7.690E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.72	36.50	4998.	1362.	9.127E+04	9.86	0.911	-	s
185.73	46.51	21549.	77213.	3.286E+06	0.52	0.970	-	
953.82	238.61	1829.	855.	2.659E+04	9.53	1.137	-	
4692.71	1173.34	609.	16190.	1.616E+06	0.90	1.966	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.84	59.54	19873.	104212.	14.474	0.43	0.978
CS-137	2645.94	661.72	925.	35644.	4.951	0.57	1.529
Co-1332	5330.01	1332.60	89.	14808.	2.057	0.84	2.112

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4160E+02				1.58E+05	
			59.54	4.416E+02	(	2.795E+00 4.26E-01 1.00E+02 G	
CS-137		3.9925E+02				1.10E+04	
			661.66	3.992E+02	(	1.618E+00 5.70E-01 1.00E+02 G	
Co-1332		7.6901E+02				1.93E+03	
			1332.50	7.690E+02	(	2.422E+00 8.41E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3507E+02	4.4160E+02	4.259E-01%	2.80E+00
CS-137	3.2214E+02	3.9925E+02	5.705E-01%	1.62E+00
Co-1332	2.2610E+02	7.6901E+02	8.409E-01%	2.42E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 9.833E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.6 keV) 1.6098567E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #17**
SpectrumID: 17_20160127003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 17_TunaCan_90099_032612
Detector: Ge17 SN/11080671

Verification Date: 2016-01-27 15:26
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.51E+02	-0.5%
Cs-137	661.66	400	3.90E+02	2.6%
Co-1332	1332.5	777	7.57E+02	2.6%

Comments:

Perforn ____Jody Watson 1/28/16_____ Revie ____Rachel Mueller 1/28/16_____

C:\User\CRpt\17_20160127003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge17 SN/11080671
Source Date: 10/1/2006 11:00
Acquired: 1/27/2016 15:26:41
Analyzed: 2/4/2016 09:55

Analyst: Jody Watson

Efficiency: 17_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.514E+02	0.41
CS-137	3.896E+02	0.59
Co-1332	7.570E+02	0.90
Total	1.598E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det17\17_20160127003_EffVerif.An1

Acquisition information

Start time:	1/27/2016 3:26:41 PM
Live time:	7200
Real time:	7328
Dead time:	1.74 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration

Filename:	17_Soil_TunaCan.Clb

17_TunaCan_90099_032612

Energy Calibration

Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration

Created:	4/12/2012 9:28:42 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.91 %
Log(Eff):	-5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files

Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0457

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.64	1282.	9.45	0.84	1.356E-02				
46.60	71264.	0.51	0.76	2.105E-02				
59.59	94693.	0.41	0.77	2.960E-02	59.54	100.000	4.514E+02	AM241
87.94	1141.	9.18	0.87	4.058E-02				
661.62	32640.	0.59	1.34	1.443E-02	661.66	100.000	3.896E+02	CS137
1173.18	14804.	0.88	1.69	9.359E-03				
1332.42	13566.	0.90	1.83	8.481E-03	1332.50	100.000	7.570E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	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: 3_20160903001_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 11:00:56 AM
Detector: Detector # 3
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	2.39	2.13	2.22	2.50	2.56	2.65	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det3\3_20160903001_BGLong.An1

Acquisition information

Start time:	9/3/2016 11:00:56 AM
Live time:	72000
Real time:	72102
Dead time:	0.14 %
Detector ID:	3

Detector system
Ge 3 SN/131

Calibration

Filename:	3_QC.Clb

Ge3_QC

Energy Calibration

Created:	2/28/2012 7:25:37 PM
Zero offset:	0.122 keV
Gain:	0.250 keV/channel
Quadratic:	3.421E-08 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:38:10 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 (37.59keV)
Stop channel:	8000 (2000.59keV)
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

TestAmerica Inc Spectrum name: 3_20160903001_BGLong.An1

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: 0.1304

***** 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
46.57	849.	8.63	0.85	6.682E-02	46.54	4.250	4.157E+00	PB210
63.23	864.	8.02	0.82	9.444E-02	63.29	3.810	3.330E+00	TH234
72.76	539.	9.97	0.85	1.103E-01				
74.95	1275.	4.65	0.85	1.139E-01				
77.04	412.	12.72	0.85	1.174E-01				
84.67	550.	9.45	0.86	1.299E-01				
87.32	403.	11.89	0.86	1.343E-01	86.49	13.100	3.210E-01	Np237
					86.54	30.700	1.369E-01	EU155
92.51	1164.	5.56	1.07	1.357E-01	92.59	5.584	2.134E+00	TH234
					93.35	5.561	2.143E+00	AC228
185.77	656.	9.77	0.97	1.149E-01	185.72	54.000	1.467E-01	U235
					185.99	3.280	2.417E+00	Ra226
238.65	450.	9.31	1.02	1.011E-01	238.63	43.300	1.429E-01	PB212
241.97	173.	23.60	1.02	1.002E-01	240.99	4.100	5.838E-01	RA224
					242.00	7.430	3.230E-01	PB214
295.18	400.	14.29	1.14	8.627E-02	295.09	19.300	3.336E-01	PB214
352.07	641.	9.32	1.07	7.139E-02	351.93	37.600	3.317E-01	PB214
511.13	2592.	4.06	2.51	5.109E-02	511.86	20.000	3.529E+00	RH106
583.37	224.	19.08	1.69	4.508E-02	583.02	84.500	8.168E-02	TL208
609.36	570.	8.50	1.28	4.288E-02	609.31	46.090	4.005E-01	BI214
					610.30	5.750	3.217E+00	RU103
795.07	95.	29.15	0.47	3.252E-02				
802.75	218.	19.38	1.19	3.217E-02	801.95	8.690	1.079E+00	CS134
1000.75	179.	25.20	2.41	2.570E-02	1001.00	0.837	1.156E+01	PA234M
1120.65	196.	19.76	1.34	2.317E-02	1120.29	15.100	7.786E-01	BI214
					1120.55	99.987	1.176E-01	Sc46
					1121.30	34.900	3.372E-01	Ta182

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.85	420.	8.40	2.01	1.865E-02	1460.83	10.670	2.928E+00	K40
					1460.83	10.670	2.928E+00	K40
1764.60	238.	16.96	2.55	1.571E-02	1764.49	15.400	1.369E+00	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
290.79	72.77	1176.	539.	4.891E+03	9.97	0.846	- D
299.54	74.96	1125.	1275.	1.120E+04	4.65	0.848	- D
307.93	77.05	1165.	412.	3.507E+03	12.72	0.850	- D
338.46	84.64	1074.	550.	4.232E+03	9.45	0.858	- sD
349.07	87.29	945.	403.	2.998E+03	11.89	0.861	- D
2045.22	510.84	981.	2592.	5.073E+04	4.06	2.514	- M
3181.15	795.07	168.	95.	2.922E+03	29.15	0.465	- sM
3211.88	802.79	284.	218.	6.761E+03	19.38	1.186	- 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	185.95	46.57	1179.	849.	0.012	8.63	0.854s
TH-234	252.63	63.23	1122.	864.	0.012	8.02	0.818s
TH-234	369.86	92.51	956.	1164.	0.016	5.56	1.069s
Ra-226	743.14	185.77	941.	656.	0.009	9.77	0.974s
PB-212	954.74	238.63	653.	450.	0.006	9.31	1.016D
PB-214	968.20	242.00	685.	171.	0.002	22.91	1.019D
PB-214	1181.07	295.18	717.	400.	0.006	14.29	1.136s
PB-214	1408.75	352.07	677.	641.	0.009	9.32	1.069
TL-208	2334.24	583.37	370.	224.	0.003	19.08	1.690s
BI-214	2438.22	609.36	410.	570.	0.008	8.50	1.283s
PA-234M	4003.77	1000.75	259.	179.	0.002	25.20	2.408s
BI-214	4483.23	1120.65	212.	196.	0.003	19.76	1.335s
K-40	5843.28	1460.85	126.	420.	0.006	8.40	2.011
BI-214	7057.15	1764.60	138.	238.	0.003	16.96	2.545

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
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________

K-40     N   2.9284E+00                                      4.66E+11
                         1460.83 2.928E+00  (  3.848E-01 8.40E+00 1.07E+01 G

TL-208   N   8.1680E-02                                      6.98E+02
                          583.02 8.168E-02  (  3.367E-02 1.91E+01 8.45E+01 G
                          277.28 0.000E+00 &   1.878E-01 1.00E+03 6.31E+00 G
                          860.56 0.000E+00 %   1.795E-01 6.33E+01 1.24E+01 G

PB-210   N   4.1571E+00                                      8.14E+03
                           46.54 4.157E+00 @(  7.963E-01 8.63E+00 4.25E+00 G

PB-212   N   1.4290E-01                                      6.98E+02
                          238.63 1.429E-01  (  3.866E-02 9.31E+00 4.33E+01 G
                          300.03 0.000E+00 %   3.693E-01 9.28E+01 3.28E+00 GA

PB-214   N   3.3232E-01                                      5.84E+05
                          351.93 3.317E-01  (  6.409E-02 9.32E+00 3.76E+01 G
                          295.09 3.336E-01 *(  1.063E-01 1.43E+01 1.93E+01 G
                          242.00 3.196E-01     2.325E-01 2.29E+01 7.43E+00 GA

BI-214   N   4.0052E-01                                      5.84E+05
                          609.31 4.005E-01  (  6.821E-02 8.50E+00 4.61E+01 G
                         1120.29 7.786E-01 +   2.800E-01 1.98E+01 1.51E+01 G
                         1764.49 1.369E+00 +   3.293E-01 1.70E+01 1.54E+01 G

TH-234   N   3.3297E+00                                      1.63E+12
                           63.29 3.330E+00 *(  6.125E-01 8.02E+00 3.81E+00 G
                           92.59 2.134E+00 -   2.690E-01 5.56E+00 5.58E+00 G

PA-234M  N   1.1557E+01                                      1.63E+12
                         1001.00 1.156E+01  (  5.017E+00 2.52E+01 8.37E-01 G
                          766.41 0.000E+00 %   7.482E+00 1.00E+03 2.94E-01 G

Ra-226       2.4174E+00                                      5.84E+05
                          185.99 2.417E+00 *(  5.371E-01 9.77E+00 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

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.0841E-01		
NA-22	<	2.8213E-02		
K-40	#	2.9284E+00	8.4001E+00%	3.848E-01
Sc-46	<	1.6344E-02		
CR-51	<	1.1826E-01		
MN-54	<	2.5309E-02		
FE-59	<	4.3973E-02		
Co-56	<	2.4420E-02		
CO-57	<	1.1120E-02		
CO-58	<	2.0705E-02		
CO-60	<	2.9511E-02		
ZN-65	<	9.3332E-02		
NB-94	<	2.1744E-02		
ZR-95	<	3.8748E-02		
NB-95	<	2.8694E-02		

RU-103	<	1.8212E-02		
RH-106	<	2.0459E-01		
AG-108M	<	1.5960E-02		
AG-110M	<	4.9339E-02		
SN-113	<	2.0748E-02		
SB-124	<	2.2980E-02		
SB-125	<	4.8489E-02		
I-131	<	1.5760E-02		
BA-133	<	2.8597E-02		
CS-134	<	3.8643E-02		
CS-137	<	2.3785E-02		
CE-139	<	1.7925E-02		
Ba-140	<	7.2526E-02		
La-140	<	3.2250E-02		
CE-141	<	2.0309E-02		
CE-144	<	7.0600E-02		
PM-144	<	2.4040E-02		
EU-152	<	6.2908E-02		
EU-154	<	1.5148E-01		
EU-155	<	4.2405E-02		
HF-181	<	2.7122E-02		
Ta-182	<	9.4091E-02		
Hg-203	<	2.4030E-02		
TL-208		8.1680E-02	1.9084E+01%	3.367E-02
pm-146	<	5.9136E-02		
y-88	<	2.7108E-02		
PB-210	#	4.1571E+00	8.6260E+00%	7.963E-01
PB-212		1.4290E-01	9.3091E+00%	3.866E-02
PB-214		3.3232E-01	8.5313E+00%	6.409E-02
BI-207	<	3.0657E-02		
BI-212	<	2.8200E-01		
BI-214		4.0052E-01	8.4987E+00%	6.821E-02
BI-210M	<	2.2182E-02		
RA-224	<	4.7428E-01		
AC-228	<	1.0471E-01		
TH-227	<	1.1281E-01		
TH-229	<	2.3297E-01		
TH-234	#	3.3297E+00	8.0169E+00%	6.125E-01
PA-231	<	5.3709E-01		
PA-233	<	3.4580E-02		
PA-234	<	7.2796E-02		
PA-234M		1.1557E+01	2.5203E+01%	5.017E+00
Ra-226	#	2.4174E+00	9.7744E+00%	5.371E-01
U-235	<	8.9692E-02		
AM-241	<	6.2325E-02		
Np-237	<	1.4734E-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  2000.6 keV)     2.535E+01  DPS
```

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Test America
St. Louis
Background Check

Spectrum: 5_20160903004_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 12:57:35 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	1.39	1.55	1.60	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20160903004_BGLong.An1

Acquisition information

Start time:	9/3/2016 12:57:35 PM
Live time:	72000
Real time:	72329
Dead time:	0.46 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_QC.Clb

Ge5_QC

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:	1/6/2011 8:03:22 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 (37.62keV)
Stop channel:	8000 (2000.81keV)
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. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.3228

***** 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
46.68	595.	10.13	1.04	5.689E-02	46.54	4.250	3.426E+00	PB210
59.42	174.	22.64	1.07	7.404E-02	59.54	35.900	9.099E-02	AM241
63.37	620.	9.18	0.92	7.935E-02	63.29	3.810	2.853E+00	TH234
92.61	818.	6.40	0.89	1.129E-01	92.59	5.584	1.803E+00	TH234
					93.35	5.561	1.809E+00	AC228
185.86	429.	11.95	1.05	9.604E-02	185.72	54.000	1.148E-01	U235
					185.99	3.280	1.891E+00	Ra226
239.00	154.	26.54	1.03	8.314E-02	238.63	43.300	5.935E-02	PB212
352.45	186.	21.69	1.20	5.561E-02	351.93	37.600	1.234E-01	PB214
					351.93	37.600	1.234E-01	PB214
511.48	1626.	5.54	2.29	3.833E-02	511.86	20.000	2.948E+00	RH106
609.73	137.	23.00	1.86	3.199E-02	609.31	46.090	1.292E-01	BI214
					610.30	5.750	1.038E+00	RU103
662.03	178.	21.52	1.44	2.860E-02	661.66	85.210	1.016E-01	CS137
1461.81	134.	18.34	1.60	1.300E-02	1460.83	10.670	1.345E+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	
2046.52	511.48	648.	1626.	4.242E+04	5.54	2.294	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

(Page 3 of 7)

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	186.24	46.68	759.	595.	0.008	10.13	1.044s
AM-241	237.24	59.42	490.	174.	0.002	22.64	1.072s
TH-234	253.08	63.37	683.	620.	0.009	9.18	0.923s
TH-234	370.12	92.61	579.	818.	0.011	6.40	0.891s
Ra-226	743.49	185.88	560.	412.	0.006	12.05	1.036s
PB-212	956.12	239.00	455.	154.	0.002	26.54	1.033
PB-214	1410.15	352.45	377.	186.	0.003	21.69	1.202s
BI-214	2439.60	609.73	224.	137.	0.002	23.00	1.864s
CS-137	2648.86	662.03	243.	178.	0.002	21.52	1.437
K-40	5846.65	1461.81	75.	134.	0.002	18.34	1.603

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	Nuclide Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	1.3453E+00					4.66E+11	
			1460.83	1.345E+00	&(	4.304E-01	1.83E+01	1.07E+01 G
CS-137	I	1.0162E-01					1.10E+04	
			661.66	1.016E-01	(	4.291E-02	2.15E+01	8.52E+01 G
PB-210	N	3.4261E+00					8.14E+03	
			46.54	3.426E+00	*(	7.548E-01	1.01E+01	4.25E+00 G
PB-212	N	5.9348E-02					6.98E+02	
			238.63	5.935E-02	(	3.935E-02	2.65E+01	4.33E+01 G
			300.03	0.000E+00	%	3.724E-01	1.00E+03	3.28E+00 GA
PB-214	N	1.2339E-01					5.84E+05	
			351.93	1.234E-01	*(	6.175E-02	2.17E+01	3.76E+01 G
BI-214	N	1.2920E-01					5.84E+05	
			609.31	1.292E-01	(	6.822E-02	2.30E+01	4.61E+01 G
			1120.29	0.000E+00	%	2.193E-01	1.18E+02	1.51E+01 G
			1764.49	0.000E+00	%	2.636E-01	7.30E+01	1.54E+01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   2.8533E+00                                      1.63E+12
                           63.29 2.853E+00 *(  5.727E-01 9.18E+00 3.81E+00 G
                           92.59 1.803E+00 -   2.529E-01 6.40E+00 5.58E+00 G

Ra-226       1.8171E+00                                      5.84E+05
                          185.99 1.817E+00  (  4.983E-01 1.21E+01 3.28E+00 G

AM-241   T   9.0986E-02                                      1.58E+05
                           59.54 9.099E-02  (  5.517E-02 2.26E+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  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 *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.4104E-01		
NA-22	<	2.4121E-02		
K-40		1.3453E+00	1.8344E+01%	4.304E-01
Sc-46	<	3.3171E-02		
CR-51	<	1.2068E-01		
MN-54	<	2.7147E-02		
FE-59	<	5.4631E-02		
Co-56	<	2.5049E-02		
CO-57	<	1.4112E-02		
CO-58	<	3.4438E-02		
CO-60	<	2.9632E-02		
ZN-65	<	8.9518E-02		
NB-94	<	2.3853E-02		
ZR-95	<	4.1001E-02		
NB-95	<	1.7704E-02		
RU-103	<	1.7359E-02		
RH-106	<	2.3142E-01		
AG-108M	<	1.7461E-02		
AG-110M	<	4.0337E-02		
SN-113	<	2.4291E-02		
SB-124	<	1.4031E-02		
SB-125	<	5.1843E-02		
I-131	<	1.6159E-02		
BA-133	<	3.1533E-02		
CS-134	<	3.1439E-02		
CS-137		1.0162E-01	2.1518E+01%	4.291E-02
CE-139	<	1.4162E-02		
Ba-140	<	7.2819E-02		
La-140	<	2.9781E-02		
CE-141	<	1.8999E-02		
CE-144	<	1.0901E-01		
PM-144	<	2.4867E-02		
EU-152	<	3.5042E-02		
EU-154	<	2.2158E-01		
EU-155	<	3.7487E-02		
HF-181	<	1.8176E-02		
Ta-182	<	1.5141E-01		
Hg-203	<	1.7850E-02		
TL-208	<	2.4354E-02		
pm-146	<	6.6916E-02		
y-88	<	3.1386E-02		
PB-210	#	3.4261E+00	1.0127E+01%	7.548E-01
PB-212		5.9348E-02	2.6541E+01%	3.935E-02

PB-214 #	1.2339E-01	2.1691E+01%		6.175E-02
BI-207 <	3.7873E-02			
BI-212 <	3.0231E-01			
BI-214	1.2920E-01	2.2999E+01%		6.822E-02
BI-210M <	2.1323E-02			
RA-224 <	1.9822E-01			
AC-228 <	1.0110E-01			
TH-227 <	6.8236E-02			
TH-229 <	2.2007E-01			
TH-234 #	2.8533E+00	9.1751E+00%		5.727E-01
PA-231 <	6.3949E-01			
PA-233 <	3.2628E-02			
PA-234 <	5.7876E-02			
PA-234M <	3.4169E+00			
Ra-226 #	1.8171E+00	1.2051E+01%		4.983E-01
U-235 <	8.1872E-02			
AM-241 #	9.0986E-02	2.2645E+01%		5.517E-02
Np-237 <	9.6924E-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 2000.8 keV) 9.946E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20160903004_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 12:58:30 PM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.27	1.40	1.45	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20160903004_BGLong.An1

Acquisition information
Start time: 9/3/2016 12:58:30 PM
Live time: 72000
Real time: 73185
Dead time: 1.62 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 1/6/2011 8:06:10 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 (37.61keV)
Stop channel: 8000 (2000.13keV)
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 7)

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1235

***** 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
39.58	131.	27.02	1.07	6.378E-02				
46.63	624.	9.72	0.90	8.135E-02	46.54	4.250	2.515E+00	PB210
63.38	744.	6.76	0.93	1.231E-01	63.29	3.810	2.209E+00	TH234
74.95	198.	17.27	0.87	1.521E-01				
77.14	188.	18.78	0.87	1.576E-01				
87.38	151.	23.07	1.03	1.807E-01	86.49	13.100	8.871E-02	Np237
					86.54	30.700	3.783E-02	EU155
92.62	1064.	5.77	1.06	1.861E-01	92.59	5.584	1.423E+00	TH234
					93.35	5.561	1.427E+00	AC228
185.69	483.	9.55	1.12	1.633E-01	185.72	54.000	7.607E-02	U235
					185.99	3.280	1.253E+00	Ra226
238.66	278.	14.42	1.10	1.417E-01	238.63	43.300	6.293E-02	PB212
295.64	168.	24.22	1.02	1.186E-01	295.09	19.300	1.020E-01	PB214
351.86	163.	26.25	1.28	9.542E-02	351.93	37.600	6.323E-02	PB214
511.09	1692.	4.72	2.63	6.487E-02	511.86	20.000	1.814E+00	RH106
1000.75	88.	21.80	0.36	2.864E-02	1001.00	0.837	5.099E+00	PA234M
1460.80	119.	24.08	2.75	1.997E-02	1460.83	10.670	7.758E-01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
157.86	39.58	418.	131.	2.049E+03	27.02	1.074	- s
299.38	75.04	485.	198.	1.301E+03	17.27	0.867	- D
308.14	77.23	526.	188.	1.190E+03	18.78	0.869	- sD

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
2044.06	511.09	485.	1692.	2.608E+04	4.72	2.633	- 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	186.08	46.63	735.	624.	0.009	9.72	0.896s
TH-234	253.06	63.38	537.	744.	0.010	6.76	0.934s
Np-237	349.08	87.38	376.	151.	0.002	23.07	1.032s
TH-234	370.05	92.62	706.	1064.	0.015	5.77	1.056s
Ra-226	742.35	185.69	448.	483.	0.007	9.55	1.123
PB-212	954.27	238.66	399.	278.	0.004	14.42	1.095
PB-214	1182.20	295.64	358.	168.	0.002	24.22	1.023s
PB-214	1407.11	351.86	387.	163.	0.002	26.25	1.276s
PA-234M	4002.75	1000.75	56.	88.	0.001	21.80	0.358s
K-40	5842.89	1460.80	86.	119.	0.002	24.08	2.750s

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	7.7580E-01				4.66E+11	
			1460.83	7.758E-01	?(	2.994E-01 2.41E+01 1.07E+01	G
PB-210	N	2.5152E+00				8.14E+03	
			46.54	2.515E+00	@(	5.198E-01 9.72E+00 4.25E+00	G
PB-212	N	6.2931E-02				6.98E+02	
			238.63	6.293E-02	(	2.168E-02 1.44E+01 4.33E+01	G
			300.03	0.000E+00	%	1.933E-01 8.07E+01 3.28E+00	GA
PB-214	N	7.6383E-02				5.84E+05	
			351.93	6.323E-02	@(	3.652E-02 2.63E+01 3.76E+01	G
			295.09	1.020E-01	*(	5.512E-02 2.42E+01 1.93E+01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          242.00 0.000E+00     1.338E-01 0.00E+00 7.43E+00 GA

TH-234   N   2.2087E+00                                      1.63E+12
                           63.29 2.209E+00 @(  3.284E-01 6.76E+00 3.81E+00 G
                           92.59 1.423E+00 -   1.691E-01 5.77E+00 5.58E+00 G

PA-234M  N   5.0988E+00                                      1.63E+12
                         1001.00 5.099E+00  (  2.178E+00 2.18E+01 8.37E-01 G
                          766.41 0.000E+00 %   4.606E+00 4.26E+01 2.94E-01 G

Ra-226       1.2532E+00                                      5.84E+05
                          185.99 1.253E+00  (  2.629E-01 9.55E+00 3.28E+00 G

Np-237   F   8.8712E-02                                      2.14E+06
                           86.49 8.871E-02 &(  5.461E-02 2.31E+01 1.31E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

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	<	1.2469E-01		
NA-22	<	1.4396E-02		
K-40	#	7.7580E-01	2.4083E+01%	2.994E-01
Sc-46	<	2.4747E-02		
CR-51	<	6.5514E-02		
MN-54	<	1.3951E-02		
FE-59	<	2.8498E-02		
Co-56	<	1.5158E-02		
CO-57	<	4.0962E-03		
CO-58	<	1.5805E-02		
CO-60	<	1.7598E-02		
ZN-65	<	2.9927E-02		
NB-94	<	1.4109E-02		
ZR-95	<	2.2414E-02		
NB-95	<	2.2789E-02		
RU-103	<	1.1401E-02		
RH-106	<	1.3170E-01		
AG-108M	<	9.4158E-03		
AG-110M	<	2.9831E-02		
SN-113	<	1.3082E-02		
SB-124	<	2.1349E-02		
SB-125	<	2.8236E-02		
I-131	<	9.2105E-03		
BA-133	<	2.2504E-02		
CS-134	<	2.1028E-02		
CS-137	<	9.2167E-03		
CE-139	<	9.4741E-03		
Ba-140	<	3.9936E-02		
La-140	<	2.3064E-02		
CE-141	<	1.0761E-02		
CE-144	<	6.5646E-02		
PM-144	<	1.5381E-02		
EU-152	<	2.6838E-02		
EU-154	<	6.8959E-02		
EU-155	<	2.2437E-02		
HF-181	<	1.7648E-02		

Ta-182	<	8.0649E-02		
Hg-203	<	1.1764E-02		
TL-208	<	1.3446E-02		
pm-146	<	4.0635E-02		
y-88	<	1.8214E-02		
PB-210	#	2.5152E+00	9.7236E+00%	5.198E-01
PB-212		6.2931E-02	1.4424E+01%	2.168E-02
PB-214	#	7.6383E-02	1.7860E+01%	3.652E-02
BI-207	<	1.7336E-02		
BI-212	<	1.6401E-01		
BI-214	<	2.8491E-02		
BI-210M	<	1.1842E-02		
RA-224	<	2.5958E-01		
AC-228	<	7.5938E-02		
TH-227	<	6.8273E-02		
TH-229	<	1.1596E-01		
TH-234	#	2.2087E+00	6.7619E+00%	3.284E-01
PA-231	<	3.4705E-01		
PA-233	<	1.8441E-02		
PA-234	<	2.2226E-02		
PA-234M	#	5.0988E+00	2.1799E+01%	2.178E+00
Ra-226		1.2532E+00	9.5455E+00%	2.629E-01
U-235	<	4.5339E-02		
AM-241	<	2.4660E-02		
Np-237	#	8.8712E-02	2.3068E+01%	5.461E-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 2000.1 keV) 1.208E+01 DPS

(Page 7 of 7)

Test America
St. Louis
Background Check

Spectrum: 8_20160903004_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 1:00:47 PM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.57	1.68	1.74	PASS

Analyst: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20160903004_BGLong.An1

Acquisition information
Start time: 9/3/2016 1:00:47 PM
Live time: 72000
Real time: 73854
Dead time: 2.51 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 1/6/2011 8:07:20 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

(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:	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. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1096

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.57	452.	9.48	1.02	8.692E-02	59.54	35.900	2.011E-01	AM241
63.31	1058.	4.62	1.03	9.243E-02	63.29	3.810	4.172E+00	TH234
83.99	213.	24.23	1.40	1.230E-01				
92.66	2088.	3.87	1.04	1.295E-01	92.59	5.584	4.010E+00	TH234
					93.35	5.561	4.023E+00	AC228
98.81	196.	21.27	1.02	1.303E-01				
143.63	294.	20.29	0.92	1.248E-01	143.79	10.960	2.984E-01	U235
163.21	154.	29.02	1.58	1.171E-01	163.38	5.080	3.594E-01	U235
					162.66	6.220	2.929E-01	Ba140
185.82	1044.	6.34	0.91	1.107E-01	185.72	54.000	2.424E-01	U235
					185.99	3.280	3.993E+00	Ra226
238.60	241.	19.88	0.98	9.640E-02	238.63	43.300	8.020E-02	PB212
295.18	101.	27.20	0.76	8.101E-02	295.09	19.300	8.940E-02	PB214
351.93	204.	21.88	1.34	6.558E-02	351.93	37.600	1.146E-01	PB214
510.96	1506.	6.40	2.33	4.530E-02	511.86	20.000	2.313E+00	RH106
582.78	160.	21.07	1.19	3.958E-02	583.02	84.500	6.644E-02	TL208
609.25	146.	24.21	1.68	3.750E-02	609.31	46.090	1.171E-01	BI214
					610.30	5.750	9.403E-01	RU103
661.73	253.	11.77	1.22	3.334E-02	661.66	85.210	1.237E-01	CS137
766.16	95.	28.95	2.31	2.899E-02	766.41	0.294	1.548E+01	PA234M
					765.79	99.790	4.557E-02	NB95
1001.10	114.	17.56	1.34	2.158E-02	1001.00	0.837	8.793E+00	PA234M
1173.00	153.	19.25	1.61	1.834E-02	1173.24	99.900	1.160E-01	CO60
1332.72	162.	13.86	1.63	1.637E-02	1332.50	99.980	1.377E-01	CO60
1461.33	128.	16.51	1.79	1.543E-02	1460.83	10.670	1.084E+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
335.79	83.99	735.	213.	1.732E+03	24.23	1.397	- s
395.07	98.81	485.	196.	1.502E+03	21.27	1.021	-
2043.74	510.96	718.	1506.	3.325E+04	6.40	2.327	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.54	690.	452.	0.006	9.48	1.022D
TH-234	252.96	63.29	668.	1058.	0.015	4.62	1.025D
TH-234	370.44	92.66	1023.	2088.	0.029	3.87	1.041
U-235	574.44	143.65	776.	302.	0.004	19.68	0.918s
U-235	652.68	163.21	553.	154.	0.002	29.02	1.583s
U-235	742.71	185.72	770.	1070.	0.015	4.16	0.911D
PB-212	954.24	238.60	560.	241.	0.003	19.88	0.977
PB-214	1180.58	295.18	243.	101.	0.001	27.20	0.757s
PB-214	1407.58	351.93	396.	204.	0.003	21.88	1.342s
TL-208	2331.04	582.78	217.	160.	0.002	21.07	1.187
BI-214	2436.91	609.25	253.	146.	0.002	24.21	1.679s
CS-137	2646.87	661.73	152.	253.	0.004	11.77	1.224
PA-234M	3064.60	766.16	147.	95.	0.001	28.95	2.312s
PA-234M	4004.41	1001.10	67.	114.	0.002	17.56	1.336s
CO-60	4692.03	1173.00	102.	153.	0.002	19.25	1.612
CO-60	5330.92	1332.72	61.	162.	0.002	13.86	1.633s
K-40	5845.39	1461.33	50.	128.	0.002	16.51	1.790

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	1.0843E+00					4.66E+11		
			1460.83	1.084E+00	(	2.995E-01	1.65E+01	1.07E+01	G
CO-60	F	1.2687E-01					1.93E+03		
			1332.50	1.377E-01	*(	3.309E-02	1.39E+01	1.00E+02	G
			1173.24	1.160E-01	(	3.774E-02	1.92E+01	9.99E+01	G
CS-137	I	1.2368E-01					1.10E+04		
			661.66	1.237E-01	(	2.941E-02	1.18E+01	8.52E+01	G
TL-208	N	6.6439E-02					6.98E+02		
			583.02	6.644E-02	(	2.963E-02	2.11E+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	%	1.755E-01	2.99E+02	1.24E+01	G
PB-212	N	8.0201E-02					6.98E+02		
			238.63	8.020E-02	?(	3.760E-02	1.99E+01	4.33E+01	G
			300.03	0.000E+00	&	5.310E-01	0.00E+00	3.28E+00	GA
PB-214	N	1.0607E-01					5.84E+05		
			351.93	1.146E-01	*(	5.373E-02	2.19E+01	3.76E+01	G
			295.09	8.940E-02	?(	6.696E-02	2.72E+01	1.93E+01	G
			242.00	0.000E+00	?	2.002E-01	0.00E+00	7.43E+00	GA
BI-214	N	1.1707E-01					5.84E+05		
			609.31	1.171E-01	(	6.179E-02	2.42E+01	4.61E+01	G
			1120.29	0.000E+00	%	1.689E-01	8.87E+01	1.51E+01	G
			1764.49	0.000E+00	%	1.795E-01	6.68E+01	1.54E+01	G
TH-234	N	4.0754E+00					1.63E+12		
			63.29	4.172E+00	(	4.855E-01	4.62E+00	3.81E+00	G
			92.59	4.010E+00	(	2.915E-01	3.87E+00	5.58E+00	G
PA-234M	N	8.7927E+00					1.63E+12		
			1001.00	8.793E+00	(	3.135E+00	1.76E+01	8.37E-01	G
			766.41	1.548E+01	+	9.650E+00	2.90E+01	2.94E-01	G
U-235	N	3.2354E-01					2.57E+11		
			185.72	2.484E-01	}	3.065E-02	4.16E+00	5.40E+01	GA
			143.79	3.069E-01	(	1.346E-01	1.97E+01	1.10E+01	G
			205.33	0.000E+00	%	1.756E-01	3.64E+01	5.01E+00	G
			163.38	3.594E-01	(	2.621E-01	2.90E+01	5.08E+00	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   2.0102E-01                                      1.58E+05
                            59.54 2.010E-01  (  5.571E-02 9.48E+00 3.59E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
 Nuclide    Activity        Counting                   MDA
               DPS
 ____________________________________________________________________________
 BE-7    <    1.4947E-01
 NA-22   <    3.0054E-02
 K-40         1.0843E+00   1.6513E+01%               2.995E-01
 Sc-46   <    2.6423E-02
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CR-51	<	1.0980E-01		
MN-54	<	2.1634E-02		
FE-59	<	4.6633E-02		
Co-56	<	2.1139E-02		
CO-57	<	1.3892E-02		
CO-58	<	2.1785E-02		
CO-60		1.2687E-01	1.1858E+01%	3.309E-02
ZN-65	<	7.2587E-02		
NB-94	<	2.0233E-02		
ZR-95	<	3.1325E-02		
NB-95	<	3.3308E-02		
RU-103	<	1.6172E-02		
RH-106	<	1.7633E-01		
AG-108M	<	1.6498E-02		
AG-110M	<	1.6951E-02		
SN-113	<	2.3372E-02		
SB-124	<	2.0545E-02		
SB-125	<	5.1676E-02		
I-131	<	1.7201E-02		
BA-133	<	3.3176E-02		
CS-134	<	2.4316E-02		
CS-137		1.2368E-01	1.1767E+01%	2.941E-02
CE-139	<	1.0581E-02		
Ba-140	<	6.1772E-02		
La-140	<	2.5770E-02		
CE-141	<	1.6231E-02		
CE-144	<	7.4732E-02		
PM-144	<	2.2774E-02		
EU-152	<	7.2376E-02		
EU-154	<	1.6471E-01		
EU-155	<	3.9557E-02		
HF-181	<	1.8670E-02		
Ta-182	<	1.2160E-01		
Hg-203	<	1.2254E-02		
TL-208		6.6439E-02	2.1070E+01%	2.963E-02
pm-146	<	6.2289E-02		
y-88	<	2.3691E-02		
PB-210	<	3.9808E-01		
PB-212	#	8.0201E-02	1.9875E+01%	3.760E-02
PB-214	#	1.0607E-01	1.7454E+01%	5.373E-02
BI-207	<	2.3933E-02		
BI-212	<	3.5109E-01		
BI-214	#	1.1707E-01	2.4208E+01%	6.179E-02
BI-210M	<	1.8412E-02		
RA-224	<	4.0836E-01		
AC-228	<	1.0511E-01		
TH-227	<	6.4932E-02		
TH-229	<	2.0560E-01		
TH-234		4.0754E+00	3.0146E+00%	4.855E-01

PA-231	<	3.9081E-01		
PA-233	<	2.9935E-02		
PA-234	<	6.4866E-02		
PA-234M		8.7927E+00	1.7563E+01%	3.135E+00
U-235		3.2354E-01	1.7531E+01%	1.346E-01
AM-241		2.0102E-01	9.4785E+00%	5.571E-02
Np-237	<	9.0622E-02		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.5 to  2000.0 keV)     1.510E+01  DPS
```

Test America
St. Louis
Background Check

Spectrum: 9_20160905001_BGLong
Description: Background Long PBC Count
Acquired: 9/5/2016 6:04:05 PM
Detector: Detector # 9
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	1.89	1.53	1.65	1.77	2.14	2.26	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det9\9_20160905001_BGLong.An1

Acquisition information
Start time: 9/5/2016 6:04:05 PM
Live time: 43200
Real time: 43258
Dead time: 0.13 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 12:03:10 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 (37.59keV)
Stop channel: 8000 (1999.34keV)
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. 8 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1333

***** 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
238.35	137.	24.24	1.07	1.228E-01	238.63	43.300	5.947E-02	PB212
351.95	187.	18.59	1.19	8.640E-02	351.93	37.600	1.330E-01	PB214
510.84	1462.	5.63	2.48	6.210E-02	511.86	20.000	2.730E+00	RH106
570.22	102.	27.19	3.15	5.641E-02	569.70	97.740	4.283E-02	BI207
					569.32	15.380	2.720E-01	CS134
					569.47	8.200	5.103E-01	PA234
609.32	213.	14.06	1.43	5.258E-02	609.31	46.090	2.035E-01	BI214
					610.30	5.750	1.634E+00	RU103
1063.67	46.	28.56	2.41	2.849E-02	1063.66	74.500	4.981E-02	BI207
1119.80	64.	23.38	2.05	2.761E-02	1120.29	15.100	3.581E-01	BI214
					1120.55	99.987	5.408E-02	Sc46
					1121.30	34.900	1.550E-01	Ta182
1460.49	216.	10.29	1.76	2.339E-02	1460.83	10.670	2.005E+00	K40
1764.67	90.	14.30	2.02	2.159E-02	1764.49	15.400	6.230E-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	
2042.71	510.84	492.	1462.	2.355E+04	5.63	2.482	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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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-212	952.84	238.35	303.	137.	0.003	24.24	1.067
PB-214	1407.16	351.95	277.	187.	0.004	18.59	1.186
BI-207	2280.25	570.22	143.	102.	0.002	27.19	3.152s
BI-214	2436.64	609.32	171.	213.	0.005	14.06	1.430s
BI-207	4254.48	1063.67	37.	46.	0.001	28.56	2.407s
BI-214	4479.13	1119.80	42.	64.	0.001	23.38	2.046
K-40	5842.66	1460.49	41.	216.	0.005	10.29	1.764
BI-214	7060.35	1764.67	14.	90.	0.002	14.30	2.018s

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	2.0048E+00					4.66E+11	
			1460.83	2.005E+00	(	3.013E-01	1.03E+01	1.07E+01 G
PB-212	N	5.9473E-02					6.98E+02	
			238.63	5.947E-02	(	3.650E-02	2.42E+01	4.33E+01 G
			300.03	0.000E+00	%	4.568E-01	0.00E+00	3.28E+00 GA
PB-214	N	1.3301E-01					5.84E+05	
			351.93	1.330E-01	(	5.723E-02	1.86E+01	3.76E+01 G
			295.09	0.000E+00	!	9.478E-02	0.00E+00	1.93E+01 G
			242.00	0.000E+00		2.417E-01	0.00E+00	7.43E+00 GA
BI-207	C	4.5845E-02					1.18E+04	
			569.70	4.283E-02	*(	2.453E-02	2.72E+01	9.77E+01 G
			1063.66	4.981E-02	?(	3.401E-02	2.86E+01	7.45E+01 G
BI-214	N	2.0345E-01					5.84E+05	
			609.31	2.035E-01	@(	6.079E-02	1.41E+01	4.61E+01 G
			1120.29	3.581E-01	+	1.837E-01	2.34E+01	1.51E+01 G
			1764.49	6.230E-01	+	1.380E-01	1.43E+01	1.54E+01 G

(- This peak used in the nuclide activity average.

```
  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                    MDA
              DPS
_____________________________________________________________________________
BE-7    <    1.7380E-01
NA-22   <    1.3027E-02
K-40         2.0048E+00   1.0294E+01%               3.013E-01
Sc-46   <    3.8525E-02
CR-51   <    1.4952E-01
MN-54   <    2.3820E-02
FE-59   <    4.3230E-02
Co-56   <    2.7427E-02
CO-57   <    1.4282E-02
CO-58   <    2.4324E-02
CO-60   <    2.5810E-02
```

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ZN-65	<	7.1160E-02		
NB-94	<	3.2047E-02		
ZR-95	<	3.7517E-02		
NB-95	<	1.7891E-02		
RU-103	<	1.8589E-02		
RH-106	<	3.1806E-01		
AG-108M	<	1.8762E-02		
AG-110M	<	5.7611E-02		
SN-113	<	2.4924E-02		
SB-124	<	2.0625E-02		
SB-125	<	5.5986E-02		
I-131	<	1.8759E-02		
BA-133	<	2.8901E-02		
CS-134	<	3.0757E-02		
CS-137	<	2.7377E-02		
CE-139	<	1.7406E-02		
Ba-140	<	6.9002E-02		
La-140	<	1.9511E-02		
CE-141	<	2.1512E-02		
CE-144	<	1.0990E-01		
PM-144	<	2.5930E-02		
EU-152	<	5.5493E-02		
EU-154	<	1.1230E-01		
EU-155	<	4.4184E-02		
HF-181	<	3.2111E-02		
Ta-182	<	7.9526E-02		
Hg-203	<	1.3588E-02		
TL-208	<	2.0884E-02		
pm-146	<	5.3217E-02		
y-88	<	2.9777E-02		
PB-210	<	4.5628E-01		
PB-212		5.9473E-02	2.4237E+01%	3.650E-02
PB-214		1.3301E-01	1.8585E+01%	5.723E-02
BI-207	#	4.5845E-02	1.9718E+01%	2.453E-02
BI-212	<	2.7840E-01		
BI-214		2.0345E-01	1.4061E+01%	6.079E-02
BI-210M	<	2.1523E-02		
RA-224	<	4.4352E-01		
AC-228	<	9.0554E-02		
TH-227	<	1.4377E-01		
TH-229	<	2.3436E-01		
TH-234	<	3.6305E-01		
PA-231	<	7.0853E-01		
PA-233	<	3.4368E-02		
PA-234	<	6.6470E-02		
PA-234M	<	2.8794E+00		
Ra-226	<	5.0551E-01		
U-235	<	9.9409E-02		
AM-241	<	3.8554E-02		

Np-237 < 9.7622E-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 1999.3 keV) 2.447E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 15_20160903001_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 10:55:32 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: Mike Aldridge Reviewer: Aaron Schroder

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det15\15_20160903001_BGLong.An1

Acquisition information

Start time:	9/3/2016 10:55:32 AM
Live time:	43200
Real time:	43247
Dead time:	0.11 %
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

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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: 524.2359

***** 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
46.50	493.	11.24	1.06	6.050E-02	46.54	4.250	6.296E+00	PB210
63.26	413.	12.67	0.84	8.196E-02	63.29	3.810	3.063E+00	TH234
74.96	137.	23.76	0.63	9.694E-02				
92.70	588.	8.28	1.14	1.142E-01	92.59	5.584	2.134E+00	TH234
					93.35	5.561	8.336E+00	AC228
143.96	152.	29.21	1.23	1.100E-01	143.79	10.960	2.919E-01	U235
185.71	272.	15.69	1.14	9.781E-02	185.72	54.000	1.191E-01	U235
					185.99	3.280	1.971E+00	Ra226
238.63	174.	26.46	1.11	8.501E-02	238.63	43.300	6.561E+00	PB212
295.18	164.	21.75	1.30	7.136E-02	295.09	19.300	2.770E-01	PB214
351.77	133.	23.29	1.12	5.766E-02	351.93	37.600	1.432E-01	PB214
609.55	138.	18.86	1.62	3.220E-02	609.31	46.090	2.166E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
1121.32	60.	27.52	0.44	1.693E-02	1120.29	15.100	5.489E-01	BI214
					1121.30	34.900	HL>Cutoff	Ta182
					1120.55	99.987	HL>Cutoff	Sc46
1460.93	92.	19.78	2.84	1.314E-02	1460.83	10.670	1.519E+00	K40
1764.43	42.	20.91	2.18	1.107E-02	1764.49	15.400	5.687E-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
299.44	74.96	369.	137.	1.413E+03	23.76	0.626	- s

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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	185.69	46.50	645.	493.	0.011	11.24	1.059
TH-234	252.66	63.26	635.	413.	0.010	12.67	0.838s
TH-234	370.34	92.70	534.	588.	0.014	8.28	1.137s
U-235	575.25	143.96	496.	152.	0.004	29.21	1.230
U-235	742.19	185.72	421.	252.	0.006	12.72	1.143D
PB-212	953.72	238.63	469.	174.	0.004	26.46	1.109s
PB-214	1179.80	295.18	266.	164.	0.004	21.75	1.304s
PB-214	1406.06	351.77	227.	133.	0.003	23.29	1.116
BI-214	2436.89	609.55	130.	138.	0.003	18.86	1.624
BI-214	4484.21	1121.32	42.	60.	0.001	27.52	0.439s
K-40	5843.44	1460.93	35.	92.	0.002	19.78	2.844s
BI-214	7058.50	1764.43	7.	42.	0.001	20.91	2.180

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	1.5191E+00				4.66E+11	
			1460.83	1.519E+00	(	5.000E-01 1.98E+01 1.07E+01	G
AG-110M	F	9.8091E-45				2.50E+02	
			884.68	0.000E+00 %		0.000E+00 1.00E+03 7.27E+01	G
			657.76	0.000E+00 %		0.000E+00 1.00E+03 9.46E+01	G
			937.49	0.000E+00 %		0.000E+00 8.58E+01 3.44E+01	G
			1384.30	0.000E+00 %		0.000E+00 1.00E+03 2.43E+01	G
			763.94	0.000E+00 ?		0.000E+00 1.00E+03 2.23E+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 2.91E+02 2.70E+01	G
			1189.05	0.000E+00 %		0.000E+00 7.65E+01 1.62E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	6.2957E+00					8.14E+03	
			46.54	6.296E+00	(	1.546E+00	1.12E+01	4.25E+00 G
PB-212	N	6.5608E+00					6.98E+02	
			238.63	6.561E+00	@(	3.899E+00	2.65E+01	4.33E+01 G
			300.03	0.000E+00	&	4.417E+01	9.63E+01	3.28E+00 GA
PB-214	N	1.4316E-01					5.84E+05	
			351.93	1.432E-01	(	7.824E-02	2.33E+01	3.76E+01 G
			295.09	2.770E-01	+	1.329E-01	2.17E+01	1.93E+01 G
			242.00	0.000E+00	?	3.197E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.1657E-01					5.84E+05	
			609.31	2.166E-01	?(	8.747E-02	1.89E+01	4.61E+01 G
			1120.29	5.489E-01	&	2.983E-01	2.75E+01	1.51E+01 G
			1764.49	5.687E-01	+	2.092E-01	2.09E+01	1.54E+01 G
TH-234	N	3.0626E+00					1.63E+12	
			63.29	3.063E+00	@(	8.899E-01	1.27E+01	3.81E+00 G
			92.59	2.134E+00	-	4.010E-01	8.28E+00	5.58E+00 G
U-235	N	2.9191E-01					2.57E+11	
			185.72	1.105E-01	}	4.311E-02	1.27E+01	5.40E+01 GA
			143.79	2.919E-01	?(	2.045E-01	2.92E+01	1.10E+01 G
			205.33	0.000E+00	&	2.772E-01	1.30E+02	5.01E+00 G
			163.38	0.000E+00	%	2.803E-01	2.90E+02	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:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

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 DPS	Time Corrected Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7			>12 Halflives		
NA-22	<	4.6272E-02	9.3272E-01		
K-40		1.5191E+00	1.5191E+00	1.978E+01%	5.00E-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	<	4.0994E-02	1.8057E-01		
ZN-65			>12 Halflives		
NB-94	<	3.5587E-02	3.5600E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	1.7932E-01	3.7316E+02		
AG-108M	<	2.1603E-02	2.2010E-02		
AG-110M	C	9.8091E-45	>12 Halflives	0.000E+00%	0.00E+00
SN-113			>12 Halflives		
SB-124			>12 Halflives		
SB-125	<	7.4068E-02	1.2595E+00		
I-131			>12 Halflives		
BA-133	<	3.1387E-02	6.5884E-02		
CS-134	<	4.2875E-02	1.8880E+00		
CS-137	<	5.3029E-02	6.8810E-02		
CE-139			>12 Halflives		
Ba-140			>12 Halflives		
La-140			>12 Halflives		

CE-141		>12 Halflives				
CE-144		>12 Halflives				
PM-144	<	3.2248E-02	8.3864E+01			
EU-152	<	6.7460E-02	1.2017E-01			
EU-154	<	1.3235E-01	3.2862E-01			
EU-155	<	6.5903E-02	3.1857E-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	<	3.2428E-02	1.9407E+00			
pm-146	<	9.2976E-02	3.8206E-01			
y-88		>12 Halflives				
PB-210		4.4345E+00	6.2957E+00	1.124E+01%		1.55E+00
PB-212	#	1.0963E-01	6.5608E+00	2.646E+01%		3.90E+00
PB-214		1.4247E-01	1.4316E-01	2.329E+01%		7.82E-02
BI-207	<	3.3294E-02	4.2440E-02			
BI-212	<	4.1664E-01	2.4934E+01			
BI-214		2.1551E-01	2.1657E-01	1.886E+01%		8.75E-02
BI-210M	<	3.0556E-02	3.0557E-02			
RA-224	<	5.1857E-01	3.1034E+01			
AC-228	<	1.3037E-01	5.0754E-01			
TH-227	<	9.6956E-02	1.3883E-01			
TH-229	<	3.3561E-01	3.3597E-01			
TH-234	#	3.0626E+00	3.0626E+00	1.267E+01%		8.90E-01
PA-231	<	8.8132E-01	8.8153E-01			
PA-233	<	4.5815E-02	4.5815E-02			
PA-234	<	7.3327E-02	7.3327E-02			
PA-234M	<	4.4849E+00	4.4849E+00			
U-235		2.9191E-01	2.9191E-01	2.921E+01%		2.05E-01
AM-241	<	9.6086E-02	9.7837E-02			
Np-237	<	1.7794E-01	1.7818E-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) 9.776E+00 DPS
Total Decayed Activity (37.6 to 1999.5 keV) 1.8089813E+01 DPS

(Page 7 of 7)

Test America
St. Louis
Background Check

Spectrum: 16_20160903001_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 10:57:01 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	2.63	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_20160903001_BGLong.An1

Acquisition information
Start time: 9/3/2016 10:57:01 AM
Live time: 43200
Real time: 43630
Dead time: 0.98 %
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. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 75.1785

***** 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
46.42	936.	6.50	0.80	7.055E-02	46.54	4.250	1.024E+01	PB210
59.45	294.	13.71	0.97	8.935E-02	59.54	35.900	2.157E-01	AM241
63.24	623.	7.44	0.97	9.482E-02	63.29	3.810	3.983E+00	TH234
74.84	245.	16.96	0.99	1.117E-01				
77.23	224.	19.77	0.99	1.152E-01				
84.30	261.	21.65	1.20	1.254E-01				
92.59	967.	7.24	1.24	1.312E-01	92.59	5.584	3.056E+00	TH234
					93.35	5.561	1.194E+01	AC228
185.69	483.	11.01	1.13	1.130E-01	185.72	54.000	1.832E-01	U235
					185.99	3.280	3.033E+00	Ra226
238.60	377.	11.31	0.69	9.903E-02	238.63	43.300	1.218E+01	PB212
295.02	160.	22.17	1.18	8.409E-02	295.09	19.300	2.286E-01	PB214
351.86	252.	18.52	1.54	6.906E-02	351.93	37.600	2.254E-01	PB214
511.16	1545.	4.27	2.63	4.932E-02	511.86	20.000	7.551E+03	RH106
583.50	218.	16.27	1.55	4.374E-02	583.02	84.500	8.177E+00	TL208
609.62	226.	16.07	1.95	4.174E-02	609.31	46.090	2.735E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
1009.13	52.	25.82	2.62	2.453E-02				
1120.55	80.	20.85	2.27	2.235E-02	1120.29	15.100	5.550E-01	BI214
					1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1461.36	252.	8.51	2.14	1.797E-02	1460.83	10.670	3.043E+00	K40
1764.74	99.	16.98	2.47	1.550E-02	1764.49	15.400	9.680E-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
299.01	74.85	741.	245.	2.193E+03	16.96	0.986	- D
308.57	77.24	871.	224.	1.947E+03	19.77	0.988	- sD
336.82	84.30	877.	261.	2.079E+03	21.65	1.197	- s
2043.74	511.16	419.	1545.	3.132E+04	4.27	2.627	-
4035.70	1009.13	38.	52.	2.140E+03	25.82	2.619	- 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	185.38	46.42	755.	936.	0.022	6.50	0.804
AM-241	237.83	59.54	668.	293.	0.007	13.76	0.971D
TH-234	252.82	63.29	761.	623.	0.014	7.44	0.975D
TH-234	369.99	92.59	1026.	967.	0.022	7.24	1.237s
Ra-226	742.23	185.69	670.	483.	0.011	11.01	1.135
PB-212	953.77	238.60	455.	377.	0.009	11.31	0.690s
PB-214	1179.40	295.02	344.	160.	0.004	22.17	1.177
PB-214	1406.69	351.86	443.	252.	0.006	18.52	1.541s
TL-208	2333.09	583.50	224.	218.	0.005	16.27	1.547s
BI-214	2437.55	609.62	263.	226.	0.005	16.07	1.951s
BI-214	4481.50	1120.55	58.	80.	0.002	20.85	2.272
K-40	5845.31	1461.36	39.	252.	0.006	8.51	2.141
BI-214	7059.60	1764.74	33.	99.	0.002	16.98	2.468

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	3.0427E+00					4.66E+11	
			1460.83	3.043E+00	(	3.841E-01	8.51E+00	1.07E+01 G
ZR-95	I	8.4078E-45					6.40E+01	
			756.73	0.000E+00	&	0.000E+00	1.00E+03	5.45E+01 G
			724.20	0.000E+00	%	0.000E+00	1.00E+03	4.42E+01 G
Ta-182	F	1.5414E-44					1.14E+02	
TL-208	N	8.1772E+00					6.98E+02	
			583.02	8.177E+00	*(	2.712E+00	1.63E+01	8.45E+01 G
			277.28	0.000E+00	%	1.528E+01	6.71E+01	6.31E+00 G
			860.56	0.000E+00	%	1.624E+01	5.90E+01	1.24E+01 G
y-88	F	7.0065E-45					1.07E+02	
PB-210	N	1.0238E+01					8.14E+03	
			46.54	1.024E+01	(	1.429E+00	6.50E+00	4.25E+00 G
PB-212	N	1.2181E+01					6.98E+02	
			238.63	1.218E+01	(	3.299E+00	1.13E+01	4.33E+01 G
			300.03	0.000E+00	%	2.976E+01	4.32E+01	3.28E+00 GA
PB-214	N	2.2652E-01					5.84E+05	
			351.93	2.254E-01	(	9.032E-02	1.85E+01	3.76E+01 G
			295.09	2.286E-01	(	1.279E-01	2.22E+01	1.93E+01 G
			242.00	0.000E+00		3.471E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.7345E-01					5.84E+05	
			609.31	2.735E-01	@(	9.462E-02	1.61E+01	4.61E+01 G
			1120.29	5.550E-01	+	2.623E-01	2.09E+01	1.51E+01 G
			1764.49	9.680E-01	+	2.859E-01	1.70E+01	1.54E+01 G
TH-234	N	3.9826E+00					1.63E+12	
			63.29	3.983E+00	(	8.399E-01	7.44E+00	3.81E+00 G
			92.59	3.056E+00	-	4.801E-01	7.24E+00	5.58E+00 G
Ra-226		3.0330E+00					5.84E+05	
			185.99	3.033E+00	(	7.745E-01	1.10E+01	3.28E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   2.1507E-01                                      1.58E+05
                            59.54 2.151E-01  (  9.028E-02 1.38E+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  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
               DPS            DPS
 ____________________________________________________________________________
 BE-7                     >12 Halflives
 NA-22   <    3.0357E-02    6.1191E-01
 K-40         3.0427E+00    3.0427E+00    8.511E+00%                3.84E-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	<	4.0733E-02	1.7942E-01		
ZN-65			>12 Halflives		
NB-94	<	3.2080E-02	3.2093E-02		
ZR-95	C	8.4078E-45	>12 Halflives	0.000E+00%	0.00E+00
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	2.5082E-01	5.2196E+02		
AG-108M	<	2.3473E-02	2.3916E-02		
AG-110M			>12 Halflives		
SN-113			>12 Halflives		
SB-124			>12 Halflives		
SB-125	<	8.0168E-02	1.3632E+00		
I-131			>12 Halflives		
BA-133	<	3.3425E-02	7.0161E-02		
CS-134	<	4.5448E-02	2.0014E+00		
CS-137	<	3.3985E-02	4.4099E-02		
CE-139			>12 Halflives		
Ba-140			>12 Halflives		
La-140			>12 Halflives		
CE-141			>12 Halflives		
CE-144			>12 Halflives		
PM-144	<	3.4213E-02	8.8975E+01		
EU-152	<	6.6062E-02	1.1767E-01		
EU-154	<	2.9429E-01	7.3074E-01		
EU-155	<	6.7519E-02	3.2638E-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	#	1.3664E-01	8.1772E+00	1.627E+01%	2.71E+00
pm-146	<	8.5478E-02	3.5125E-01		
y-88	C	7.0065E-45	>12 Halflives	0.000E+00%	0.00E+00
PB-210		7.2111E+00	1.0238E+01	6.499E+00%	1.43E+00
PB-212		2.0354E-01	1.2181E+01	1.131E+01%	3.30E+00
PB-214		2.2542E-01	2.2652E-01	1.444E+01%	9.03E-02
BI-207	<	5.0763E-02	6.4707E-02		
BI-212	<	7.2485E-01	4.3379E+01		
BI-214	#	2.7212E-01	2.7345E-01	1.607E+01%	9.46E-02
BI-210M	<	3.1924E-02	3.1924E-02		
RA-224	<	6.6996E-01	4.0094E+01		
AC-228	<	1.6443E-01	6.4012E-01		
TH-227	<	2.2409E-01	3.2087E-01		
TH-229	<	3.3559E-01	3.3595E-01		
TH-234		3.9826E+00	3.9826E+00	7.440E+00%	8.40E-01

PA-231	<	7.4794E-01	7.4812E-01		
PA-233	<	4.8283E-02	4.8283E-02		
PA-234	<	9.6062E-02	9.6062E-02		
PA-234M	<	4.6864E+00	4.6864E+00		
Ra-226		3.0182E+00	3.0330E+00	1.101E+01%	7.74E-01
U-235	<	1.3198E-01	1.3198E-01		
AM-241		2.1122E-01	2.1507E-01	1.376E+01%	9.03E-02
Np-237	<	1.9133E-01	1.9159E-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) 1.830E+01 DPS
Total Decayed Activity (37.6 to 1999.6 keV) 4.1369434E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 17_20160903001_BGLong
Description: Background Long PBC Count
Acquired: 9/3/2016 10:58:27 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: Mike Aldridge Reviewer: Aaron Schroder

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20160903001_BGLong.An1

Acquisition information
Start time: 9/3/2016 10:58:27 AM
Live time: 72000
Real time: 73572
Dead time: 2.14 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	5/26/2005 8:30:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0787

***** 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	1447.	5.35	0.75	5.947E-02	46.54	4.250	1.130E+01	PB210
63.32	1317.	5.67	0.87	8.041E-02	63.29	3.810	5.974E+00	TH234
75.01	385.	12.49	0.80	9.505E-02				
77.19	304.	15.37	0.80	9.778E-02				
84.65	333.	19.54	1.40	1.071E-01				
92.64	1804.	4.14	1.11	1.119E-01	92.59	5.584	4.011E+00	TH234
					93.35	5.561	1.567E+01	AC228
143.65	189.	26.25	0.60	1.094E-01	143.79	10.960	2.187E-01	U235
185.62	907.	7.81	0.97	9.858E-02	185.72	54.000	2.367E-01	U235
					185.99	3.280	3.918E+00	Ra226
198.23	244.	21.82	1.10	9.572E-02				
238.44	400.	12.37	1.07	8.659E-02	238.63	43.300	8.876E+00	PB212
295.07	207.	25.92	0.97	7.372E-02	295.09	19.300	2.031E-01	PB214
352.01	414.	13.27	1.00	6.079E-02	351.93	37.600	2.524E-01	PB214
510.97	2531.	4.38	2.47	4.373E-02	511.86	20.000	8.377E+03	RH106
583.24	183.	21.95	1.80	3.887E-02	583.02	84.500	4.631E+00	TL208
609.42	315.	15.98	1.21	3.709E-02	609.31	46.090	2.574E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
911.53	203.	19.55	1.47	2.354E-02	911.16	29.000	1.606E+00	AC228
					911.16	29.000	1.606E+00	AC228
1001.10	115.	25.87	1.72	2.198E-02	1001.00	0.837	8.683E+00	PA234M
1120.25	151.	17.72	1.97	1.989E-02	1120.29	15.100	7.017E-01	BI214
					1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1460.97	286.	8.98	1.86	1.608E-02	1460.83	10.670	2.310E+00	K40
1764.74	110.	18.04	2.09	1.381E-02	1764.49	15.400	7.253E-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
299.46	75.02	963.	385.	4.051E+03	12.49	0.802	- sD
308.16	77.20	939.	304.	3.108E+03	15.37	0.804	- sD
337.98	84.65	1233.	333.	3.111E+03	19.54	1.405	- sM
792.14	198.23	777.	244.	2.549E+03	21.82	1.101	- s
2042.78	510.97	943.	2531.	5.789E+04	4.38	2.470	- 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_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	185.82	46.59	1240.	1447.	0.020	5.35	0.751s
TH-234	252.73	63.32	1215.	1317.	0.018	5.67	0.870
TH-234	369.93	92.64	1192.	1804.	0.025	4.14	1.105s
U-235	573.91	143.65	799.	189.	0.003	26.25	0.602s
U-235	742.10	185.72	1071.	827.	0.011	6.04	0.975D
PB-212	952.91	238.44	648.	400.	0.006	12.37	1.074s
PB-214	1179.33	295.07	697.	207.	0.003	25.92	0.968
PB-214	1407.04	352.01	578.	414.	0.006	13.27	1.001
TL-208	2331.83	583.24	330.	183.	0.003	21.95	1.804s
BI-214	2436.55	609.42	477.	315.	0.004	15.98	1.206
AC-228	3645.07	911.53	222.	203.	0.003	19.55	1.472
PA-234M	4003.45	1001.10	165.	115.	0.002	25.87	1.718
BI-214	4480.20	1120.25	121.	151.	0.002	17.72	1.970
K-40	5843.80	1460.97	68.	286.	0.004	8.98	1.856
BI-214	7059.86	1764.74	46.	110.	0.002	18.04	2.087

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	2.3104E+00				4.66E+11	
			1460.83	2.310E+00	(	3.318E-01 8.98E+00 1.07E+01	G
Ta-182	F	1.5414E-44				1.14E+02	
TL-208	N	4.6309E+00				6.98E+02	
			583.02	4.631E+00	(	2.211E+00 2.19E+01 8.45E+01	G
			277.28	0.000E+00	&	1.241E+01 1.07E+02 6.31E+00	G
			860.56	0.000E+00	&	1.246E+01 1.00E+03 1.24E+01	G
PB-210	N	1.1301E+01				8.14E+03	
			46.54	1.130E+01	@(	1.303E+00 5.35E+00 4.25E+00	G
PB-212	N	8.8762E+00				6.98E+02	
			238.63	8.876E+00	(	2.691E+00 1.24E+01 4.33E+01	G
			300.03	0.000E+00	%	2.512E+01 1.00E+03 3.28E+00	GA
PB-214	N	2.3569E-01				5.84E+05	
			351.93	2.524E-01	(	7.002E-02 1.33E+01 3.76E+01	G
			295.09	2.031E-01	(	1.233E-01 2.59E+01 1.93E+01	G
			242.00	0.000E+00	&	2.794E-01 0.00E+00 7.43E+00	GA
BI-214	N	2.5739E-01				5.84E+05	
			609.31	2.574E-01	(	8.526E-02 1.60E+01 4.61E+01	G
			1120.29	7.017E-01	+	2.508E-01 1.77E+01 1.51E+01	G
			1764.49	7.253E-01	+	2.264E-01 1.80E+01 1.54E+01	G
AC-228	N	1.6059E+00				2.10E+03	
			911.16	1.606E+00	(	5.714E-01 1.96E+01 2.90E+01	G
TH-234	N	5.9740E+00				1.63E+12	
			63.29	5.974E+00	(	7.491E-01 5.67E+00 3.81E+00	G
			92.59	4.011E+00	-	3.636E-01 4.14E+00 5.58E+00	G
PA-234M	N	8.6828E+00				1.63E+12	
			1001.00	8.683E+00	(	4.724E+00 2.59E+01 8.37E-01	G
			766.41	0.000E+00	&	7.938E+00 9.37E+01 2.94E-01	G
U-235	N	2.1867E-01				2.57E+11	
			185.72	2.157E-01	}	4.050E-02 6.04E+00 5.40E+01	GA
			143.79	2.187E-01	(	1.558E-01 2.63E+01 1.10E+01	G
			205.33	0.000E+00	%	2.481E-01 4.40E+01 5.01E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		163.38	0.000E+00 %		2.491E-01	3.17E+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	<	4.5458E-02	9.1631E-01			
K-40		2.3104E+00	2.3104E+00	8.976E+00%		3.32E-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	<	2.8103E-02	1.2379E-01		
ZN-65			>12 Halflives		
NB-94	<	2.6355E-02	2.6365E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	3.2085E-01	6.6770E+02		
AG-108M	<	1.7033E-02	1.7355E-02		
AG-110M			>12 Halflives		
SN-113			>12 Halflives		
SB-124			>12 Halflives		
SB-125	<	5.3276E-02	9.0592E-01		
I-131			>12 Halflives		
BA-133	<	3.0932E-02	6.4928E-02		
CS-134	<	4.0661E-02	1.7905E+00		
CS-137	<	3.2505E-02	4.2178E-02		
CE-139			>12 Halflives		
Ba-140			>12 Halflives		
La-140			>12 Halflives		
CE-141			>12 Halflives		
CE-144			>12 Halflives		
PM-144	<	2.5562E-02	6.6477E+01		
EU-152	<	9.0464E-02	1.6114E-01		
EU-154	<	1.3076E-01	3.2469E-01		
EU-155	<	4.3687E-02	2.1118E-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		7.7381E-02	4.6309E+00	2.195E+01%	2.21E+00
pm-146	<	6.6817E-02	2.7457E-01		
y-88			>12 Halflives		
PB-210	#	7.9602E+00	1.1301E+01	5.350E+00%	1.30E+00
PB-212	#	1.4832E-01	8.8762E+00	1.237E+01%	2.69E+00
PB-214		2.3454E-01	2.3569E-01	1.327E+01%	7.00E-02
BI-207	<	3.3893E-02	4.3203E-02		
BI-212	<	5.0453E-01	3.0194E+01		
BI-214		2.5614E-01	2.5739E-01	1.598E+01%	8.53E-02
BI-210M	<	2.6235E-02	2.6235E-02		
RA-224	<	5.3046E-01	3.1746E+01		
AC-228	#	4.1251E-01	1.6059E+00	1.955E+01%	5.71E-01
TH-227	<	1.3372E-01	1.9147E-01		
TH-229	<	2.9179E-01	2.9210E-01		
TH-234		5.9740E+00	5.9740E+00	5.667E+00%	7.49E-01
PA-231	<	6.5630E-01	6.5646E-01		
PA-233	<	3.6494E-02	3.6494E-02		

PA-234	<	8.4918E-02	8.4918E-02		
PA-234M		8.6828E+00	8.6828E+00	2.587E+01%	4.72E+00
U-235		2.1867E-01	2.1867E-01	2.625E+01%	1.56E-01
AM-241	<	7.4354E-02	7.5709E-02		
Np-237	<	1.5933E-01	1.5954E-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) 2.627E+01 DPS
Total Decayed Activity (37.6 to 1999.5 keV) 4.4093178E+01 DPS

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Run Logs

Gamma Spectroscopy Run Log

Detector: GV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 18:49		IC 160-11762/1		11762			JLW
03/27/12 22:50		ICV 160-11762/2		11762			JLW
01/19/16 07:22		ACVTOP 160-238517/1		238517			JLW
09/03/16 11:00		ICB 160-267969/1		267969			ALS
09/07/16 00:39		CCV 160-268236/1		268236			
09/07/16 01:03		CCV 160-268236/2		268236			ALS
09/07/16 01:22		CCB 160-268236/3		268236			ALS
09/07/16 02:13	30	ZZZZZ		268236			
09/07/16 08:41	120	ZZZZZ		268236			
09/07/16 11:28	120	ZZZZZ		268236			
09/07/16 18:30	30	160-18567-12	SU03-S-069-SS-P-00	268236	265170	901.1	ALS
09/07/16 19:11	30	160-18567-20	SU03-S-060-SS-DUP-00	268236	265170	901.1	ALS

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
09/03/16 12:57		ICB 160-267970/1		267970			ALS
09/07/16 00:36		CCB 160-268237/1		268237			
09/07/16 01:20		CCV 160-268237/2		268237			
09/07/16 01:42		CCV 160-268237/3		268237			
09/07/16 02:13	30	ZZZZZ		268237			
09/07/16 08:47	120	ZZZZZ		268237			
09/07/16 11:07	60	ZZZZZ		268237			
09/07/16 12:53	60	ZZZZZ		268237			
09/07/16 15:07	60	ZZZZZ		268237			
09/07/16 16:29	30	160-18567-3	SU03-S-060-SS-P-00	268237	265170	901.1	ALS
09/07/16 17:53	30	160-18567-11	SU03-S-068-SS-P-00	268237	265170	901.1	ALS
09/07/16 18:30	30	160-18567-13	SU03-S-070-SS-P-00	268237	265170	901.1	ALS
09/07/16 19:14	30	ZZZZZ		268237			
09/07/16 20:09	30	ZZZZZ		268237			
09/07/16 21:32	60	ZZZZZ		268237			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
01/23/16 19:25		ACVTOP 160-236241/1		236241			PS
09/03/16 12:58		ICB 160-267971/1		267971			ALS
09/07/16 00:38		CCB 160-268238/1		268238			ALS
09/07/16 01:21		CCV 160-268238/2		268238			
09/07/16 01:44		CCV 160-268238/3		268238			ALS
09/07/16 02:14	30	ZZZZZ		268238			
09/07/16 05:59	120	ZZZZZ		268238			
09/07/16 08:29	120	ZZZZZ		268238			
09/07/16 10:49	60	ZZZZZ		268238			
09/07/16 12:44	120	ZZZZZ		268238			
09/07/16 15:12	120	ZZZZZ		268238			
09/07/16 17:52	30	160-18567-10	SU03-S-067-SS-P-00	268238	265170	901.1	ALS
09/07/16 18:31	30	160-18567-14	SU03-S-071-SS-P-00	268238	265170	901.1	ALS

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/07/16 19:13	30	ZZZZZ		268238			
09/07/16 19:58		ZZZZZ		268238			
09/07/16 22:06		ZZZZZ		268238			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
01/28/16 18:34		ACVTOP 160-236248/1		236248			PS
09/03/16 13:00		ICB 160-267972/1		267972			ALS
09/07/16 00:39		CCB 160-268239/1		268239			ALS
09/07/16 01:23		CCV 160-268239/2		268239			
09/07/16 01:45		CCV 160-268239/3		268239			ALS
09/07/16 02:15	30	ZZZZZ		268239			
09/07/16 08:48	60	ZZZZZ		268239			
09/07/16 10:10	60	ZZZZZ		268239			
09/07/16 11:27	60	ZZZZZ		268239			
09/07/16 12:54	60	ZZZZZ		268239			
09/07/16 15:08	60	ZZZZZ		268239			
09/07/16 16:30	30	160-18567-4	SU03-S-061-SS-P-00	268239	265170	901.1	ALS
09/07/16 17:51	30	160-18567-9	SU03-S-066-SS-P-00	268239	265170	901.1	ALS
09/07/16 18:32	30	160-18567-15	SU03-S-072-SS-P-00	268239	265170	901.1	ALS
09/07/16 19:16	30	ZZZZZ		268239			
09/07/16 19:54	30	ZZZZZ		268239			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
01/22/16 13:21		ACVTOP 160-235884/1		235884			PS
09/05/16 18:04		ICB 160-268230/1		268230			ALS
09/07/16 01:13		CCV 160-268241/1		268241			
09/07/16 01:38		CCV 160-268241/2		268241			
09/07/16 02:05		CCB 160-268241/3		268241			
09/07/16 09:55	60	ZZZZZ		268241			
09/07/16 11:27	60	ZZZZZ		268241			
09/07/16 12:55	60	ZZZZZ		268241			
09/07/16 14:58	60	ZZZZZ		268241			
09/07/16 16:27	30	160-18567-2	SU03-S-059-SS-P-00	268241	265170	901.1	ALS
09/07/16 17:50	30	160-18567-8	SU03-S-065-SS-P-00	268241	265170	901.1	ALS
09/07/16 18:33	30	160-18567-16	SU03-S-073-SS-P-00	268241	265170	901.1	ALS
09/07/16 19:19	30	ZZZZZ		268241			
09/07/16 19:52	30	ZZZZZ		268241			
09/07/16 22:52	30	ZZZZZ		268241			
09/07/16 23:56	60	ZZZZZ		268241			

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

Gamma Spectroscopy Run Log

Detector: GV15 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/16 18:46		ACVTOP 160-249629/1		249629			PS
09/03/16 10:55		ICB 160-267977/1		267977			ALS
09/07/16 01:15		CCB 160-268245/1		268245			
09/07/16 02:04		CCV 160-268245/2		268245			
09/07/16 02:27		CCV 160-268245/3		268245			
09/07/16 05:55	120	ZZZZZ		268245			
09/07/16 08:39	60	ZZZZZ		268245			
09/07/16 09:54	60	ZZZZZ		268245			
09/07/16 11:49	60	ZZZZZ		268245			
09/07/16 13:00	120	ZZZZZ		268245			
09/07/16 15:22	30	160-18567-1	SU03-S-058-SS-P-00	268245	265170	901.1	ALS
09/07/16 16:23		ZZZZZ		268245			
09/07/16 16:23	30	MB 160-265170/1-A		268245	265170	901.1	ALS
09/07/16 17:50	30	160-18567-7	SU03-S-064-SS-P-00	268245	265170	901.1	ALS
09/07/16 18:33	30	160-18567-17	SU03-S-074-SS-P-00	268245	265170	901.1	ALS
09/07/16 19:20	30	ZZZZZ		268245			
09/07/16 19:54	30	ZZZZZ		268245			

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
09/03/16 10:57		ICB 160-267978/1		267978			ALS
09/07/16 01:15		CCB 160-268246/1		268246			
09/07/16 02:12		CCV 160-268246/2		268246			
09/07/16 02:35		CCV 160-268246/3		268246			
09/07/16 05:53	120	ZZZZZ		268246			
09/07/16 08:40	60	ZZZZZ		268246			
09/07/16 09:58	60	ZZZZZ		268246			
09/07/16 11:52	60	ZZZZZ		268246			
09/07/16 13:05	60	ZZZZZ		268246			
09/07/16 14:55	60	ZZZZZ		268246			
09/07/16 16:24	30	LCS 160-265170/2-A		268246	265170	901.1	ALS
09/07/16 17:44	30	160-18567-6	SU03-S-063-SS-P-00	268246	265170	901.1	ALS
09/07/16 18:34	30	160-18567-18	SU03-S-075-SS-P-00	268246	265170	901.1	ALS
09/07/16 19:24	30	ZZZZZ		268246			
09/07/16 20:03	30	ZZZZZ		268246			
09/07/16 21:35		ZZZZZ		268246			

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
09/03/16 10:58		ICB 160-267979/1		267979			ALS
09/07/16 01:18		CCB 160-268247/1		268247			ALS
09/07/16 02:05		CCV 160-268247/2		268247			
09/07/16 02:29		CCV 160-268247/3		268247			ALS
09/07/16 05:50	30	ZZZZZ		268247			
09/07/16 08:42	60	ZZZZZ		268247			

Gamma Spectroscopy Run Log

Detector: GV17 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/07/16 10:06	60	ZZZZZ		268247			
09/07/16 11:54	60	ZZZZZ		268247			
09/07/16 13:09	60	ZZZZZ		268247			
09/07/16 14:57	60	ZZZZZ		268247			
09/07/16 16:25	30	160-18567-1 DU	SU03-S-058-SS-P-00 DU	268247	265170	901.1	ALS
09/07/16 17:48	30	160-18567-5	SU03-S-062-SS-P-00	268247	265170	901.1	ALS
09/07/16 18:35	30	160-18567-19	SU03-S-074-SS-DUP-00	268247	265170	901.1	ALS
09/07/16 19:29	30	ZZZZZ		268247			
09/07/16 20:06	30	ZZZZZ		268247			
09/07/16 23:35	60	ZZZZZ		268247			

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: 8/9/2016	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:
SU03-S-058-SS-P-00	8/9/2016	0945	G	S	1			X	X	
SU03-S-059-SS-P-00	8/9/2016	1000	G	S	1			X	X	
SU03-S-060-SS-P-00	8/9/2016	0931	G	S	1			X	X	
SU03-S-061-SS-P-00	8/9/2016	0936	G	S	1			X	X	
SU03-S-062-SS-P-00	8/9/2016	0940	G	S	1			X	X	
SU03-S-063-SS-P-00	8/9/2016	0924	G	S	1			X	X	
SU03-S-064-SS-P-00	8/9/2016	0944	G	S	1			X	X	
SU03-S-065-SS-P-00	8/9/2016	0927	G	S	1			X	X	
SU03-S-066-SS-P-00	8/9/2016	0910	G	S	1			X	X	
SU03-S-067-SS-P-00	8/9/2016	0830	G	S	1			X	X	
SU03-S-068-SS-P-00	8/9/2016	0840	G	S	1			X	X	
SU03-S-069-SS-P-00	8/9/2016	0845	G	S	1			X	X	

160-18567 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	8/9/2016 1300	Jill Clark	TASL	8.10.16 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: 8/8/2016	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:
SU03-S-070-SS-P-00	8/9/2016	1010	G	S	1			X	X	
SU03-S-071-SS-P-00	8/9/2016	0949	G	S	1			X	X	
SU03-S-072-SS-P-00	8/9/2016	1012	G	S	1			X	X	
SU03-S-073-SS-P-00	8/9/2016	0953	G	S	1			X	X	
SU03-S-074-SS-P-00	8/9/2016	0855	G	S	1			X	X	
SU03-S-075-SS-P-00	8/9/2016	0900	G	S	1			X	X	
SU03-S-074-SS-DUP-00	8/9/2016	0855	G	S	1			X	X	
SU03-S-060-SS-DUP-00	8/9/2016	0931	G	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	8/9/2016 1300	Jill Clarke	TA SL	8.10.16 0820
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: 160-18567-1

Login Number: 18567
List Number: 1
Creator: Clarke, Jill C

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.	N/A	
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	