ANALYTICAL REPORT

Job Number: 160-17797-1

Job Description: Hill AFB 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
7/13/2016 5:10 PM

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07/13/2016

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: Hill AFB and Cabrera - Hill AFB WR111
Report Number: 160-17797-1

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 06/15/2016; the samples arrived in good condition. The temperature of the cooler at receipt was 19.0º C. Thermal preservation is not required for the requested analyses; therefore, the laboratory will proceed with the requested analyses. Corrective action is deemed unnecessary. The client was notified on 6/16/16.

Sample WR111-REF-018-SS-P-00 (160-17797-20) was cancelled for all analyses per client request on 6/15/16.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WR111-REF-001-SS-P-00 (160-17797-1), WR111-REF-001-SS-DUP-00 (160-17797-2), WR111-REF-002-SS-P-00 (160-17797-3), WR111-REF-003-SS-P-00 (160-17797-4), WR111-REF-004-SS-P-00 (160-17797-5), WR111-REF-005-SS-P-00 (160-17797-6), WR111-REF-006-SS-P-00 (160-17797-7), WR111-REF-007-SS-P-00 (160-17797-8), WR111-REF-008-SS-P-00 (160-17797-9), WR111-REF-009-SS-P-00 (160-17797-10), WR111-REF-010-SS-P-00 (160-17797-11), WR111-REF-011-SS-P-00 (160-17797-12), WR111-REF-011-SS-DUP-00 (160-17797-13), WR111-REF-012-SS-P-00 (160-17797-14), WR111-REF-013-SS-P-00 (160-17797-15), WR111-REF-014-SS-P-00 (160-17797-16), WR111-REF-015-SS-P-00 (160-17797-17), WR111-REF-016-SS-P-00 (160-17797-18) and WR111-REF-017-SS-P-00 (160-17797-19) were analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with EPA 901.1. The samples were leached on 06/16/2016, prepared on 06/21/2016 and analyzed on 07/12/2016.

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

DRY AND GRIND

Samples WR111-REF-001-SS-P-00 (160-17797-1), WR111-REF-001-SS-DUP-00 (160-17797-2), WR111-REF-002-SS-P-00 (160-17797-3), WR111-REF-003-SS-P-00 (160-17797-4), WR111-REF-004-SS-P-00 (160-17797-5), WR111-REF-005-SS-P-00 (160-17797-6), WR111-REF-006-SS-P-00 (160-17797-7), WR111-REF-007-SS-P-00 (160-17797-8), WR111-REF-008-SS-P-00 (160-17797-9), WR111-REF-009-SS-P-00 (160-17797-10), WR111-REF-010-SS-P-00 (160-17797-11), WR111-REF-011-SS-P-00 (160-17797-12), WR111-REF-011-SS-DUP-00 (160-17797-13), WR111-REF-012-SS-P-00 (160-17797-14), WR111-REF-013-SS-P-00 (160-17797-15), WR111-REF-014-SS-P-00 (160-17797-16), WR111-REF-015-SS-P-00 (160-17797-17), WR111-REF-016-SS-P-00 (160-17797-18) and WR111-REF-017-SS-P-00 (160-17797-19) were analyzed for Dry and Grind in accordance with Dry and Grind. The samples were leached on 06/16/2016, prepared on 06/22/2016 and analyzed on 07/08/2016 and 07/11/2016.

Thorium-230 was detected in method blank MB 160-257496/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged “J”. However, because the result concentration was less than ½ the reporting limit, no corrective action was necessary.

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: Hill AFB and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-17797-1

Client Sample ID: WR111-REF-001-SS-P-00 — Lab Sample ID: 160-17797-1

No Detections.

Client Sample ID: WR111-REF-001-SS-DUP-00 — Lab Sample ID: 160-17797-2

No Detections.

Client Sample ID: WR111-REF-002-SS-P-00 — Lab Sample ID: 160-17797-3

No Detections.

Client Sample ID: WR111-REF-003-SS-P-00 — Lab Sample ID: 160-17797-4

No Detections.

Client Sample ID: WR111-REF-004-SS-P-00 — Lab Sample ID: 160-17797-5

No Detections.

Client Sample ID: WR111-REF-005-SS-P-00 — Lab Sample ID: 160-17797-6

No Detections.

Client Sample ID: WR111-REF-006-SS-P-00 — Lab Sample ID: 160-17797-7

No Detections.

Client Sample ID: WR111-REF-007-SS-P-00 — Lab Sample ID: 160-17797-8

No Detections.

Client Sample ID: WR111-REF-008-SS-P-00 — Lab Sample ID: 160-17797-9

No Detections.

Client Sample ID: WR111-REF-009-SS-P-00 — Lab Sample ID: 160-17797-10

No Detections.

Client Sample ID: WR111-REF-010-SS-P-00 — Lab Sample ID: 160-17797-11

No Detections.

Client Sample ID: WR111-REF-011-SS-P-00 — Lab Sample ID: 160-17797-12

No Detections.

Client Sample ID: WR111-REF-011-SS-DUP-00 — Lab Sample ID: 160-17797-13

No Detections.

Client Sample ID: WR111-REF-012-SS-P-00 — Lab Sample ID: 160-17797-14

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

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

TestAmerica Job ID: 160-17797-1

Client Sample ID: WR111-REF-013-SS-P-00 — Lab Sample ID: 160-17797-15

No Detections.

Client Sample ID: WR111-REF-014-SS-P-00 — Lab Sample ID: 160-17797-16

No Detections.

Client Sample ID: WR111-REF-015-SS-P-00 — Lab Sample ID: 160-17797-17

No Detections.

Client Sample ID: WR111-REF-016-SS-P-00 — Lab Sample ID: 160-17797-18

No Detections.

Client Sample ID: WR111-REF-017-SS-P-00 — Lab Sample ID: 160-17797-19

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: WR111-REF-001-SS-P-00

Lab Sample ID: 160-17797-1
Date Collected: 06/14/16 13:20
Matrix: Solid
Date Received: 06/15/16 09:15

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		0.247	0.282	0.500	0.251	pCi/g	06/21/16 13:11	07/12/16 10:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	2.04		0.206	0.267	0.100	0.0287	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.45		0.173	0.211	0.100	0.0339	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.6*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-001-SS-DUP-00

Lab Sample ID: 160-17797-2
Date Collected: 06/14/16 13:20
Matrix: Solid
Date Received: 06/15/16 09:15

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	1.69		0.322	0.367	0.500	0.225	pCi/g	06/21/16 13:11	07/12/16 09:56	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	1.61		0.177	0.223	0.100	0.0270	pCi/g	06/22/16 10:40	07/11/16 19:29	1
Thorium-232	1.41		0.165	0.203	0.100	0.0146	pCi/g	06/22/16 10:40	07/11/16 19:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.5*		*30 - 110*	*06/22/16 10:40*	*07/11/16 19:29*	*1*

Client Sample ID: WR111-REF-002-SS-P-00

Lab Sample ID: 160-17797-3
Date Collected: 06/14/16 13:25
Matrix: Solid
Date Received: 06/15/16 09:15

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	1.24		0.224	0.259	0.500	0.159	pCi/g	06/21/16 13:11	07/12/16 09:58	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	1.82		0.197	0.249	0.100	0.0294	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.52		0.180	0.220	0.100	0.0293	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Client Sample ID: WR111-REF-002-SS-P-00 — Lab Sample ID: 160-17797-3

Date Collected: 06/14/16 13:25 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.5		30 - 110	06/22/16 10:40	07/08/16 12:38	1

Client Sample ID: WR111-REF-003-SS-P-00 — Lab Sample ID: 160-17797-4

Date Collected: 06/14/16 13:30 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.47		0.258	0.300	0.500	0.149	pCi/g	06/21/16 13:11	07/12/16 09:57	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	1.60		0.182	0.226	0.100	0.0337	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.63		0.182	0.228	0.100	0.0153	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.5		30 - 110	06/22/16 10:40	07/08/16 12:38	1

Client Sample ID: WR111-REF-004-SS-P-00 — Lab Sample ID: 160-17797-5

Date Collected: 06/14/16 13:45 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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		0.259	0.292	0.500	0.216	pCi/g	06/21/16 13:11	07/12/16 10:33	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	1.63		0.187	0.232	0.100	0.0297	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.60		0.186	0.229	0.100	0.0351	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.4		30 - 110	06/22/16 10:40	07/08/16 12:38	1

Client Sample ID: WR111-REF-005-SS-P-00 — Lab Sample ID: 160-17797-6

Date Collected: 06/14/16 13:50 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.58		0.297	0.339	0.500	0.209	pCi/g	06/21/16 13:11	07/12/16 10:34	1

Client Sample ID: WR111-REF-005-SS-P-00 — Lab Sample ID: 160-17797-6

Date Collected: 06/14/16 13:50 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	2.49		0.234	0.314	0.100	0.0165	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.97		0.207	0.265	0.100	0.0164	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.1*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-006-SS-P-00 — Lab Sample ID: 160-17797-7

Date Collected: 06/14/16 13:55 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.62		0.256	0.306	0.500	0.148	pCi/g	06/21/16 13:11	07/12/16 10:33	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	1.40		0.164	0.202	0.100	0.0384	pCi/g	06/22/16 10:40	07/11/16 19:29	1
Thorium-232	1.50		0.169	0.211	0.100	0.0312	pCi/g	06/22/16 10:40	07/11/16 19:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*97.2*		*30 - 110*	*06/22/16 10:40*	*07/11/16 19:29*	*1*

Client Sample ID: WR111-REF-007-SS-P-00 — Lab Sample ID: 160-17797-8

Date Collected: 06/14/16 14:00 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.74		0.271	0.326	0.500	0.143	pCi/g	06/21/16 13:11	07/12/16 10:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.65		0.192	0.237	0.100	0.0309	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.71		0.195	0.242	0.100	0.0167	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.5*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-008-SS-P-00 — Lab Sample ID: 160-17797-9

Date Collected: 06/14/16 14:05 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.47		0.247	0.291	0.500	0.231	pCi/g	06/21/16 13:11	07/12/16 11:32	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	1.88		0.220	0.271	0.100	0.0470	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.66		0.205	0.248	0.100	0.0417	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*74.0*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-009-SS-P-00 — Lab Sample ID: 160-17797-10

Date Collected: 06/14/16 14:10 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.35		0.254	0.290	0.500	0.209	pCi/g	06/21/16 13:11	07/12/16 10:40	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.72		0.202	0.249	0.100	0.0437	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.57		0.192	0.233	0.100	0.0177	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*72.1*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-010-SS-P-00 — Lab Sample ID: 160-17797-11

Date Collected: 06/14/16 14:15 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.62		0.322	0.363	0.500	0.252	pCi/g	06/21/16 13:11	07/12/16 12:20	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	1.63		0.188	0.232	0.100	0.0298	pCi/g	06/22/16 10:40	07/11/16 19:29	1
Thorium-232	1.76		0.195	0.244	0.100	0.0296	pCi/g	06/22/16 10:40	07/11/16 19:29	1

Client Sample ID: WR111-REF-010-SS-P-00 — Lab Sample ID: 160-17797-11

Date Collected: 06/14/16 14:15 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.6		30 - 110	06/22/16 10:40	07/11/16 19:29	1

Client Sample ID: WR111-REF-011-SS-P-00 — Lab Sample ID: 160-17797-12

Date Collected: 06/14/16 14:20 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.44		0.234	0.278	0.500	0.179	pCi/g	06/21/16 13:11	07/12/16 11:27	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	1.48		0.177	0.216	0.100	0.0584	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.66		0.186	0.232	0.100	0.0415	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	83.9		30 - 110	06/22/16 10:40	07/08/16 12:38	1

Client Sample ID: WR111-REF-011-SS-DUP-00 — Lab Sample ID: 160-17797-13

Date Collected: 06/14/16 14:20 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.18		0.292	0.317	0.500	0.255	pCi/g	06/21/16 13:11	07/12/16 11:28	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	2.34		0.224	0.298	0.100	0.0295	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.56		0.182	0.224	0.100	0.0294	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.0		30 - 110	06/22/16 10:40	07/08/16 12:38	1

Client Sample ID: WR111-REF-012-SS-P-00 — Lab Sample ID: 160-17797-14

Date Collected: 06/14/16 14:30 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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		0.221	0.252	0.500	0.166	pCi/g	06/21/16 13:11	07/12/16 11:29	1

Client Sample ID: WR111-REF-012-SS-P-00 — Lab Sample ID: 160-17797-14

Date Collected: 06/14/16 14:30 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.80		0.205	0.255	0.100	0.0382	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.70		0.198	0.244	0.100	0.0173	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.9*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-013-SS-P-00 — Lab Sample ID: 160-17797-15

Date Collected: 06/14/16 14:35 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.62		0.309	0.351	0.500	0.217	pCi/g	06/21/16 13:11	07/12/16 12:18	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		0.210	0.254	0.100	0.0192	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.75		0.212	0.258	0.100	0.0353	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*67.6*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-014-SS-P-00 — Lab Sample ID: 160-17797-16

Date Collected: 06/14/16 14:45 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.48		0.321	0.356	0.500	0.277	pCi/g	06/21/16 13:11	07/12/16 12:14	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.89		0.232	0.281	0.100	0.0608	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.94		0.233	0.285	0.100	0.0460	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*65.2*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-015-SS-P-00 — Lab Sample ID: 160-17797-17

Date Collected: 06/14/16 14:40 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.49		0.367	0.398	0.500	0.312	pCi/g	06/21/16 13:11	07/12/16 12:16	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	1.63		0.182	0.227	0.100	0.0280	pCi/g	06/22/16 10:40	07/11/16 19:29	1
Thorium-232	1.41		0.169	0.206	0.100	0.0151	pCi/g	06/22/16 10:40	07/11/16 19:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/22/16 10:40*	*07/11/16 19:29*	*1*

Client Sample ID: WR111-REF-016-SS-P-00 — Lab Sample ID: 160-17797-18

Date Collected: 06/14/16 14:50 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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		0.230	0.269	0.500	0.155	pCi/g	06/21/16 13:11	07/12/16 12:16	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	1.97		0.220	0.275	0.100	0.0339	pCi/g	06/22/16 10:40	07/08/16 12:38	1
Thorium-232	1.40		0.185	0.219	0.100	0.0401	pCi/g	06/22/16 10:40	07/08/16 12:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*72.1*		*30 - 110*	*06/22/16 10:40*	*07/08/16 12:38*	*1*

Client Sample ID: WR111-REF-017-SS-P-00 — Lab Sample ID: 160-17797-19

Date Collected: 06/14/16 14:55 — **Matrix: Solid**
Date Received: 06/15/16 09:15

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	1.55		0.305	0.345	0.500	0.249	pCi/g	06/21/16 13:11	07/12/16 12:21	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	1.37		0.170	0.205	0.100	0.0159	pCi/g	06/22/16 10:40	07/11/16 19:29	1
Thorium-232	1.51		0.179	0.219	0.100	0.0372	pCi/g	06/22/16 10:40	07/11/16 19:29	1

Client Sample ID: WR111-REF-017-SS-P-00

Lab Sample ID: 160-17797-19

Date Collected: 06/14/16 14:55
Date Received: 06/15/16 09:15

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.0		30 - 110	06/22/16 10:40	07/11/16 19:29	1

Tracer/Carrier Summary

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

TestAmerica Job ID: 160-17797-1

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)**						
160-17797-1	WR111-REF-001-SS-P-00	90.6						
160-17797-1 DU	WR111-REF-001-SS-P-00	88.2						
160-17797-2	WR111-REF-001-SS-DUP-00	89.5						
160-17797-3	WR111-REF-002-SS-P-00	86.5						
160-17797-4	WR111-REF-003-SS-P-00	82.5						
160-17797-5	WR111-REF-004-SS-P-00	82.4						
160-17797-6	WR111-REF-005-SS-P-00	85.1						
160-17797-7	WR111-REF-006-SS-P-00	97.2						
160-17797-8	WR111-REF-007-SS-P-00	81.5						
160-17797-9	WR111-REF-008-SS-P-00	74.0						
160-17797-10	WR111-REF-009-SS-P-00	72.1						
160-17797-11	WR111-REF-010-SS-P-00	86.6						
160-17797-12	WR111-REF-011-SS-P-00	83.9						
160-17797-13	WR111-REF-011-SS-DUP-00	86.0						
160-17797-14	WR111-REF-012-SS-P-00	75.9						
160-17797-15	WR111-REF-013-SS-P-00	67.6						
160-17797-16	WR111-REF-014-SS-P-00	65.2						
160-17797-17	WR111-REF-015-SS-P-00	85.4						
160-17797-18	WR111-REF-016-SS-P-00	72.1						
160-17797-19	WR111-REF-017-SS-P-00	81.0						
LCS 160-257496/2-A	Lab Control Sample	80.5						
MB 160-257496/1-A	Method Blank	89.2						

Tracer/Carrier Legend

Th-229 = Thorium-229

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

Lab Sample ID: MB 160-257318/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 260174 — **Prep Batch: 257318**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.009406	U	0.0172	0.0173	0.500	0.284	pCi/g	06/21/16 13:11	07/12/16 10:01	1

Lab Sample ID: LCS 160-257318/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 260175 — **Prep Batch: 257318**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.1	99.51		10.4		1.13	pCi/g	102	87 - 116		
Cesium-137			29.6	29.46		3.14		0.226	pCi/g	100	87 - 120		
Cobalt-60			16.9	16.65		1.72		0.0983	pCi/g	98	87 - 115		

Lab Sample ID: 160-17797-1 DU — **Client Sample ID: WR111-REF-001-SS-P-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 260175 — **Prep Batch: 257318**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Radium-226	1.30			1.415		0.286	0.500	0.249	pCi/g			0.21	1

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

Lab Sample ID: MB 160-257496/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 260076 — **Prep Batch: 257496**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.06090		0.0366	0.0369	0.100	0.0289	pCi/g	06/22/16 10:40	07/11/16 19:29	1
Thorium-232	-0.001174	U	0.00319	0.00319	0.100	0.0253	pCi/g	06/22/16 10:40	07/11/16 19:29	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.2*		*30 - 110*	*06/22/16 10:40*	*07/11/16 19:29*	*1*

Lab Sample ID: LCS 160-257496/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 259861 — **Prep Batch: 257496**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	28.50		2.63	0.100	0.0315	pCi/g	116	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*80.5*		*30 - 110*

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

Lab Sample ID: 160-17797-1 DU
Matrix: Solid
Analysis Batch: 260077

Client Sample ID: WR111-REF-001-SS-P-00
Prep Type: Total/NA
Prep Batch: 257496

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit			RER	RER Limit
Thorium-230	2.04			1.894		0.254	0.100	0.0155	pCi/g			0.27	1
Thorium-232	1.45			1.765		0.242	0.100	0.0338	pCi/g			0.70	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*88.2*		*30 - 110*

Rad

Leach Batch: 256780

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17797-1	WR111-REF-001-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-1 DU	WR111-REF-001-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-2	WR111-REF-001-SS-DUP-00	Total/NA	Solid	Dry and Grind	
160-17797-3	WR111-REF-002-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-4	WR111-REF-003-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-5	WR111-REF-004-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-6	WR111-REF-005-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-7	WR111-REF-006-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-8	WR111-REF-007-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-9	WR111-REF-008-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-10	WR111-REF-009-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-11	WR111-REF-010-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-12	WR111-REF-011-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-13	WR111-REF-011-SS-DUP-00	Total/NA	Solid	Dry and Grind	
160-17797-14	WR111-REF-012-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-15	WR111-REF-013-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-16	WR111-REF-014-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-17	WR111-REF-015-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-18	WR111-REF-016-SS-P-00	Total/NA	Solid	Dry and Grind	
160-17797-19	WR111-REF-017-SS-P-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 257318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17797-1	WR111-REF-001-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-1 DU	WR111-REF-001-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-2	WR111-REF-001-SS-DUP-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-3	WR111-REF-002-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-4	WR111-REF-003-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-5	WR111-REF-004-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-6	WR111-REF-005-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-7	WR111-REF-006-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-8	WR111-REF-007-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-9	WR111-REF-008-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-10	WR111-REF-009-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-11	WR111-REF-010-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-12	WR111-REF-011-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-13	WR111-REF-011-SS-DUP-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-14	WR111-REF-012-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-15	WR111-REF-013-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-16	WR111-REF-014-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-17	WR111-REF-015-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-18	WR111-REF-016-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
160-17797-19	WR111-REF-017-SS-P-00	Total/NA	Solid	Fill_Geo-21	256780
LCS 160-257318/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-257318/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 257496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17797-1	WR111-REF-001-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-1 DU	WR111-REF-001-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-2	WR111-REF-001-SS-DUP-00	Total/NA	Solid	ExtChrom	256780

Rad (Continued)

Prep Batch: 257496 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17797-3	WR111-REF-002-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-4	WR111-REF-003-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-5	WR111-REF-004-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-6	WR111-REF-005-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-7	WR111-REF-006-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-8	WR111-REF-007-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-9	WR111-REF-008-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-10	WR111-REF-009-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-11	WR111-REF-010-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-12	WR111-REF-011-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-13	WR111-REF-011-SS-DUP-00	Total/NA	Solid	ExtChrom	256780
160-17797-14	WR111-REF-012-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-15	WR111-REF-013-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-16	WR111-REF-014-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-17	WR111-REF-015-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-18	WR111-REF-016-SS-P-00	Total/NA	Solid	ExtChrom	256780
160-17797-19	WR111-REF-017-SS-P-00	Total/NA	Solid	ExtChrom	256780
LCS 160-257496/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-257496/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Lab Chronicle

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

TestAmerica Job ID: 160-17797-1

Client Sample ID: WR111-REF-001-SS-P-00 — Lab Sample ID: 160-17797-1

Date Collected: 06/14/16 13:20
Matrix: Solid
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260176	07/12/16 10:00	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259862	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-001-SS-DUP-00 — Lab Sample ID: 160-17797-2

Date Collected: 06/14/16 13:20
Matrix: Solid
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260173	07/12/16 09:56	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	260078	07/11/16 19:29	ALD	TAL SL

Client Sample ID: WR111-REF-002-SS-P-00 — Lab Sample ID: 160-17797-3

Date Collected: 06/14/16 13:25
Matrix: Solid
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260170	07/12/16 09:58	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259865	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-003-SS-P-00 — Lab Sample ID: 160-17797-4

Date Collected: 06/14/16 13:30
Matrix: Solid
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260172	07/12/16 09:57	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259866	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-004-SS-P-00 — Lab Sample ID: 160-17797-5

Date Collected: 06/14/16 13:45 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260169	07/12/16 10:33	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259867	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-005-SS-P-00 — Lab Sample ID: 160-17797-6

Date Collected: 06/14/16 13:50 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260172	07/12/16 10:34	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259868	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-006-SS-P-00 — Lab Sample ID: 160-17797-7

Date Collected: 06/14/16 13:55 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260170	07/12/16 10:33	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	260080	07/11/16 19:29	ALD	TAL SL

Client Sample ID: WR111-REF-007-SS-P-00 — Lab Sample ID: 160-17797-8

Date Collected: 06/14/16 14:00 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260173	07/12/16 10:39	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259870	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-008-SS-P-00 — Lab Sample ID: 160-17797-9

Date Collected: 06/14/16 14:05 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260174	07/12/16 11:32	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259871	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-009-SS-P-00 — Lab Sample ID: 160-17797-10

Date Collected: 06/14/16 14:10 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260176	07/12/16 10:40	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259873	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-010-SS-P-00 — Lab Sample ID: 160-17797-11

Date Collected: 06/14/16 14:15 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260175	07/12/16 12:20	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	260081	07/11/16 19:29	ALD	TAL SL

Client Sample ID: WR111-REF-011-SS-P-00 — Lab Sample ID: 160-17797-12

Date Collected: 06/14/16 14:20 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260169	07/12/16 11:27	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259875	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-011-SS-DUP-00 — Lab Sample ID: 160-17797-13

Date Collected: 06/14/16 14:20 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260172	07/12/16 11:28	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259876	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-012-SS-P-00 — Lab Sample ID: 160-17797-14

Date Collected: 06/14/16 14:30 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260170	07/12/16 11:29	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259877	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-013-SS-P-00 — Lab Sample ID: 160-17797-15

Date Collected: 06/14/16 14:35 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260173	07/12/16 12:18	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259880	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-014-SS-P-00 — Lab Sample ID: 160-17797-16

Date Collected: 06/14/16 14:45 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260169	07/12/16 12:14	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259881	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-015-SS-P-00 — Lab Sample ID: 160-17797-17

Date Collected: 06/14/16 14:40 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260172	07/12/16 12:16	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	260082	07/11/16 19:29	ALD	TAL SL

Client Sample ID: WR111-REF-016-SS-P-00 — Lab Sample ID: 160-17797-18

Date Collected: 06/14/16 14:50 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260170	07/12/16 12:16	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	259883	07/08/16 12:38	ALD	TAL SL

Client Sample ID: WR111-REF-017-SS-P-00 — Lab Sample ID: 160-17797-19

Date Collected: 06/14/16 14:55 — **Matrix: Solid**
Date Received: 06/15/16 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			257318	06/21/16 13:11	R1S	TAL SL
Total/NA	Analysis	901.1		1	260174	07/12/16 12:21	RTM	TAL SL
Total/NA	Leach	Dry and Grind			256780	06/16/16 11:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			257496	06/22/16 10:40	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	260083	07/11/16 19:29	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: Hill AFB and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-17797-1

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	07-31-16 *
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	09-30-16 *
Missouri	State Program	7	780	06-30-17
Nevada	State Program	9	MO000542016-1	07-31-16 *
New Jersey	NELAP	2	MO002	06-30-17
New York	NELAP	2	11616	03-31-17
North Dakota	State Program	8	R207	06-30-16 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-16 *
Pennsylvania	NELAP	3	68-00540	02-28-17 *
South Carolina	State Program	4	85002001	06-30-16 *
Texas	NELAP	6	T104704193-15-9	07-31-16 *
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542015-7	07-31-16 *
Virginia	NELAP	3	460230	06-14-17
Washington	State Program	10	C592	08-30-16 *
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: Hill AFB and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-17797-1

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: Hill AFB and Cabrera - Hill AFB WR111

TestAmerica Job ID: 160-17797-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17797-1	WR111-REF-001-SS-P-00	Solid	06/14/16 13:20	06/15/16 09:15
160-17797-2	WR111-REF-001-SS-DUP-00	Solid	06/14/16 13:20	06/15/16 09:15
160-17797-3	WR111-REF-002-SS-P-00	Solid	06/14/16 13:25	06/15/16 09:15
160-17797-4	WR111-REF-003-SS-P-00	Solid	06/14/16 13:30	06/15/16 09:15
160-17797-5	WR111-REF-004-SS-P-00	Solid	06/14/16 13:45	06/15/16 09:15
160-17797-6	WR111-REF-005-SS-P-00	Solid	06/14/16 13:50	06/15/16 09:15
160-17797-7	WR111-REF-006-SS-P-00	Solid	06/14/16 13:55	06/15/16 09:15
160-17797-8	WR111-REF-007-SS-P-00	Solid	06/14/16 14:00	06/15/16 09:15
160-17797-9	WR111-REF-008-SS-P-00	Solid	06/14/16 14:05	06/15/16 09:15
160-17797-10	WR111-REF-009-SS-P-00	Solid	06/14/16 14:10	06/15/16 09:15
160-17797-11	WR111-REF-010-SS-P-00	Solid	06/14/16 14:15	06/15/16 09:15
160-17797-12	WR111-REF-011-SS-P-00	Solid	06/14/16 14:20	06/15/16 09:15
160-17797-13	WR111-REF-011-SS-DUP-00	Solid	06/14/16 14:20	06/15/16 09:15
160-17797-14	WR111-REF-012-SS-P-00	Solid	06/14/16 14:30	06/15/16 09:15
160-17797-15	WR111-REF-013-SS-P-00	Solid	06/14/16 14:35	06/15/16 09:15
160-17797-16	WR111-REF-014-SS-P-00	Solid	06/14/16 14:45	06/15/16 09:15
160-17797-17	WR111-REF-015-SS-P-00	Solid	06/14/16 14:40	06/15/16 09:15
160-17797-18	WR111-REF-016-SS-P-00	Solid	06/14/16 14:50	06/15/16 09:15
160-17797-19	WR111-REF-017-SS-P-00	Solid	06/14/16 14:55	06/15/16 09:15

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60	Eckert & Ziegler, Lot 82232-334			(Purchased Reagent)		Americium-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60	Eckert & Zigler, Lot 82233-334			(Purchased Reagent)		Americium-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60	Eckert & Zigler, Lot 82234-334			(Purchased Reagent)		Americium-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60	Eckert & Ziegler, Lot 82235-334			(Purchased Reagent)		Americium-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60	Eckert & Ziegler, Lot 82236-334			(Purchased Reagent)		Americium-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60	Eckert & Ziegler, Lot 82237-334			(Purchased Reagent)		Americium-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60	Eckert & Ziegler, Lot 82240-334			(Purchased Reagent)		Americium-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60	Eckert & Ziegler, Lot 82241-334			(Purchased Reagent)		Americium-241	6.638 Bq
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60	Eckert & Ziegler, Lot 82242-334			(Purchased Reagent)		Americium-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60	Eckert & Ziegler, Lot 82243-334			(Purchased Reagent)		Americium-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60	Eckert & Zigler, Lot 82244-334			(Purchased Reagent)		Americium-241	6.897 Bq
							Pu-239	6.717 Bq
							Thorium-230	7.352 Bq
82245-334_00001	06/09/60	Eckert & Ziegler, Lot 82245-334			(Purchased Reagent)		Americium-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
82246-334_00001	06/09/60	Eckert & Ziegler, Lot 82246-334			(Purchased Reagent)		Americium-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 Source	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source G_00001	01/01/61	01/01/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	1.8639 g	Americium-241	1693.09 Bq
							Cd-109	24592.1 Bq
							Ce-139	816.481 Bq
							Cesium-137	681.815 Bq
							Co-57	532.386 Bq
							Cobalt-60	1120.87 Bq
							Hg-203	1766.08 Bq
							Sn-113	1445.98 Bq
							Y-88	2359.21 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source H_00002	01/01/51	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.1184 g	Americium-241	1924.27 Bq
							Cd-109	27950 Bq
							Ce-139	927.965 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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_00020	08/05/16	07/16/15	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	08/05/16	08/20/14	0.1M HNO3, Lot n/a	100 mL	Th-229_00016	5.0464 g	At-217	2240.99 dpm/mL
							Thorium-229	2240.99 dpm/mL
..Th-229_00016	08/06/64	Analytics, Lot 97790			(Purchased Reagent)		At-217	740.127 Bq/g
							Thorium-229	740.127 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Radium-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g
Tuna Can LCS_00005	10/29/16	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15	Eckert & Ziegler, Lot 81427-334			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq
							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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Pb-210	14936 Bq
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Cesium-137	453 Bq
							Co-57	354 Bq
							Cobalt-60	745 Bq
							Hg-203	1175 Bq
							Pb-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq

Reagent

82232-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82233-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

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ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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24937 Avenue Tibbitts Valencia, California 91355

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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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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

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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

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."

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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

82237-334_00003

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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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."

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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

82240-334_00001

Eckert & Ziegler
Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82241-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82243-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1966

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82245-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

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

This standard will expire one year after the reference date.

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

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

Reagent

Source A_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source C_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source G_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

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

This standard will expire one year after the reference date.

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

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

Reagent

Source H_00002

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

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

This standard will expire one year after the reference date.

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

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

Reagent

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_00020

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00020

True Value = 66.223 DPM/L or g

Date Analyzed: 8/5/2015

Radionuclide: Th-229

	Replicates	
#1	66.657	DPM/L or g
#2	65.249	DPM/L or g
#3	68.757	DPM/L or g

Mean = 66.88767

1 sigma = 1.765339

1.96 sigma = 3.460064

True Value minus 5% = 62.91185 (True Value - 5%)

True Value plus 5% = 69.53415 (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: Rachel T. Mueller 8/11/2015

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:31:53PM 8/11/2015

Sample

Sample Name: Verification 1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_00020
AnalysisID: 650912

Analyst: 60040

Tracer

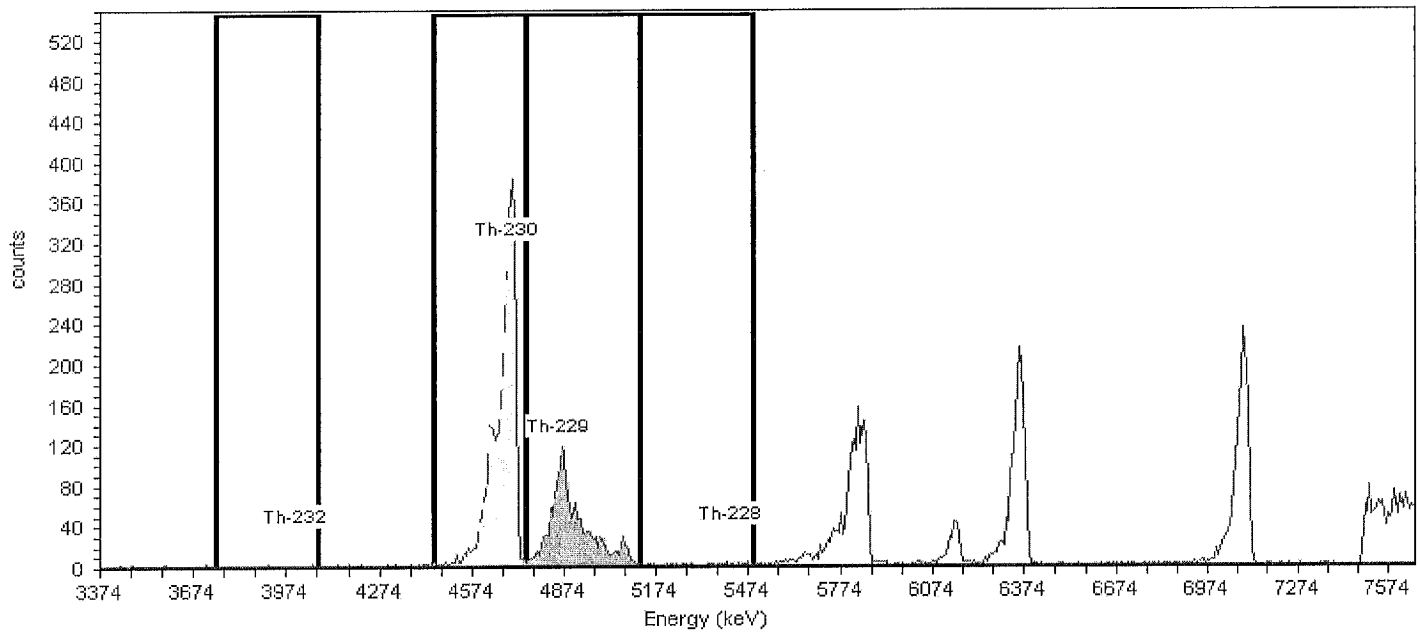
Tracer Name: Th-230_00025
Tracer Activity: 44.56 DPM/mL x (Vol.)0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 12:00:04PM

Tracer Nuclide: Th-230
Tracer Recovery: 99.76%

Acquisition

Detector: AV115
Serial Number: 49-037E4
Acquisition Start Date: 8/5/2015 12:04:12PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 7/17/2015 12:56:42PM
Background Info: Sample: ICB;AV115; Det: AV115; Spectrum #1; Jul-17-2015 12:56

Calibration Name: IC-9817;AV115-20150603
Calibration Date: 6/4/2015 1:31:22AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.44% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 8/5/2015 12:01:32PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

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	10.7	100.2	2	3.4586	-1.46	-0.060	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	31.9	99.7	3250	2.0000	3248.00	133.370	DPM/mL
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	75.3	99.8	1624	3.0000	1621.00	66.657	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	11.0	99.8	28	3.0000	25.15	1.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:35PM 8/11/2015

Sample

Sample Name: Verification 2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_00020
AnalysisID: 650913

Analyst: 60040

Tracer

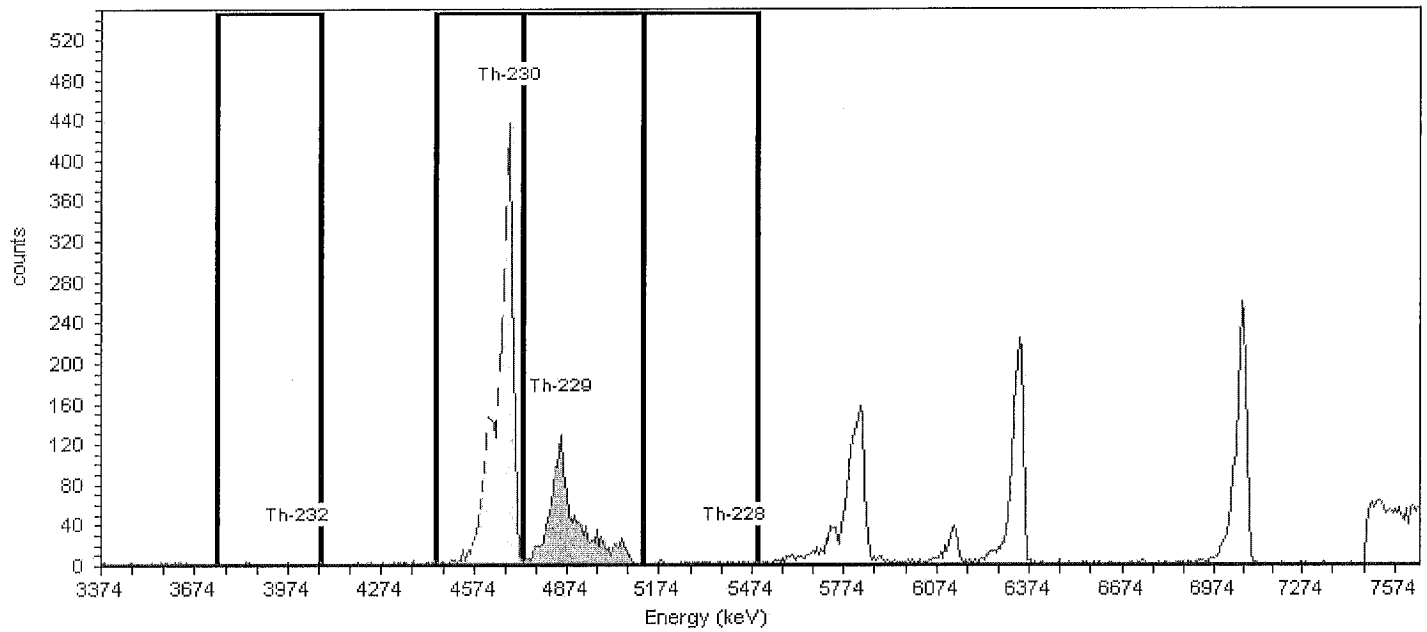
Tracer Name: Th-230_00025
Tracer Activity: 44.56 DPM/mL x (Vol.)0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 12:00:04PM

Tracer Nuclide: Th-230
Tracer Recovery: 102.76%

Acquisition

Detector: AV116
Serial Number: 49-034G1
Acquisition Start Date: 8/5/2015 12:04:13PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 7/17/2015 12:56:44PM
Background Info: Sample: ICB;AV116; Det: AV116; Spectrum #1; Jul-17-2015 12:56

Calibration Name: IC-9884;AV116-20150603
Calibration Date: 6/4/2015 1:31:31AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.86% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 8/5/2015 12:01:32PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.6	100.2	4	1.0000	2.54	0.103	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	40.1	99.7	3272	3.0000	3269.00	137.388	DPM/mL
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	69.1	99.8	1599	2.0000	1597.00	65.249	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.3	99.8	24	4.0000	19.94	0.815	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:34:26PM 8/11/2015

Sample

Sample Name: Verification 3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_00020
AnalysisID: 650914

Analyst: 60040

Tracer

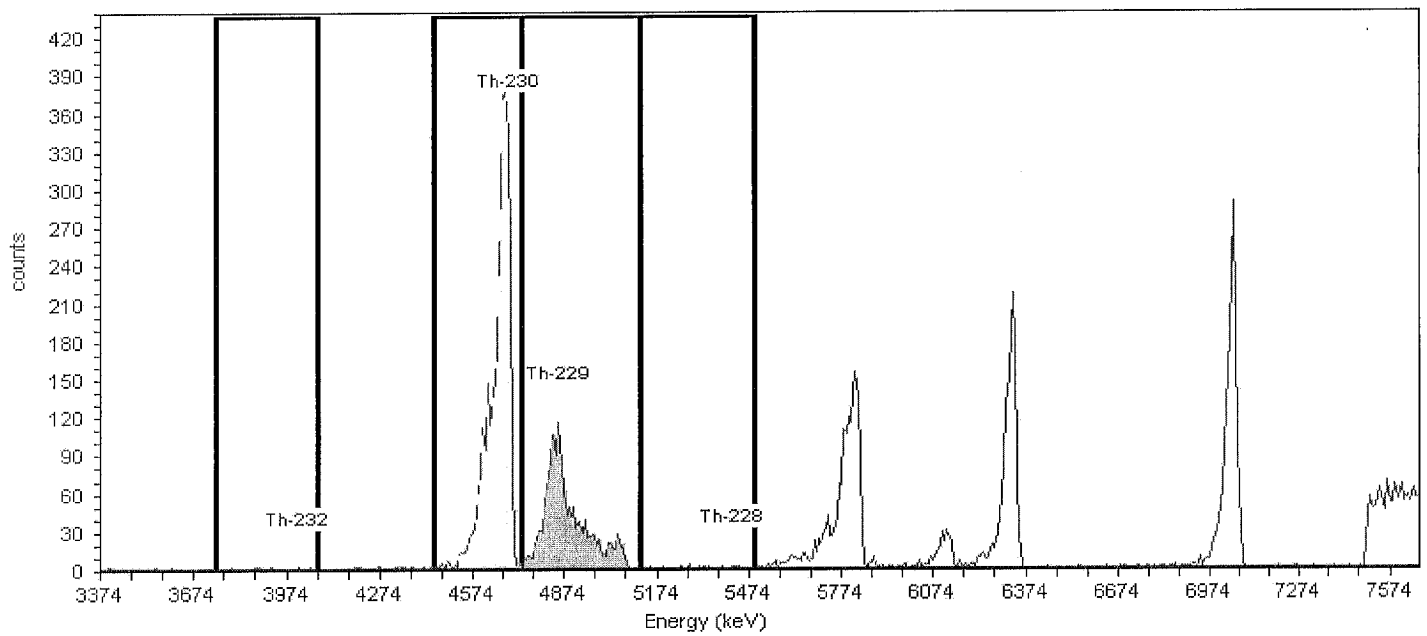
Tracer Name: Th-230_00025
Tracer Activity: 44.56 DPM/mL x (Vol.)0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 12:00:04PM

Tracer Nuclide: Th-230
Tracer Recovery: 99.73%

Acquisition

Detector: AV117
Serial Number: 49-037X4
Acquisition Start Date: 8/5/2015 12:04:18PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 7/19/2015 5:26:41PM
Background Info: Sample: ICB;AV117; Det: AV117; Spectrum #1; Jul-19-2015 17:26

Calibration Name: IC-9885;AV117-20150603
Calibration Date: 6/4/2015 1:31:41AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.89% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 8/5/2015 12:01:32PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.2	100.2	7	1.0000	6.00	0.251	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	46.3	99.7	3176	0.0000	3176.00	133.339	DPM/mL
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	78.5	99.8	1635	0.0000	1635.00	68.757	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	258.3	99.8	16	2.0866	14.09	0.593	DPM/mL

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Th-229 Tracer Verification

Actinide Prep

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	Ver 1	0.1	115	
2	2	1	116	
3	3	1	117	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

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

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230-00025

Vol (mL) : 0.3

Ref Activity (dpm/mL) :

Act Ref Date :

Samples Spiked and Traced By: SLB 8/3/15
Initials / Date

Verification Signature & Date: NN 8-3-15
Initials / Date

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229 ~~0002~~ SLB 7/16/15

Std Sol'n ID. : Th-229-0002D

Vol (mL) : 0.1 decay to

Ref Activity (dpm/mL) : 67.229

Act Ref Date : 08-06-14 66.223 dpm

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 : SLB

Date : 7/16/15

Reviewed by: _____

Date: _____

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-229_00020

Reagent ID: Th-229_00020

		Expiration Date:	12/24/2015
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:	07/16/2015		
Open Date:			
Container(s):	684059		
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	08/06/2064	2240.98600	dpm/mL	67.22958	dpm/mL
Th-229	Th-229_00017	08/06/2064	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		08/06/64				15.00000	mL

Reagent

TRM-2_00001

Perry, Doug E

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

Pam, Doug
FYI

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

Doug:

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

PEM-1:

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

TRM-2

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

NBHD

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

Reagent

Tuna Can LCS_00005

St. Louis Radiological Standard Reverification Form

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

Radionuclide: Gamma LCS Cs-137

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

Mean = 29.45667

1 sigma = 0.525959

1.96 sigma = 1.030881

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

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

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

Standard Reverification Acceptable? Yes

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

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

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

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

Radionuclide: Gamma LCS Am-241

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

Mean = 97.07333

1 sigma = 0.22745

1.96 sigma = 0.445801

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

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

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

Standard Reverification Acceptable? Yes

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

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

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

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

Radionuclide: Gamma LCS Co-60

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

Mean = 18.06

1 sigma = 0.554256

1.96 sigma = 1.086342

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

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

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

Standard Reverification Acceptable? **Yes**

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

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

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 217910 **Operator:**

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Blanks Information

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

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 218441 **Operator:**

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Blanks Information

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

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 218442 **Operator:**

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Blanks Information

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

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

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

74139-334

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

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

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

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

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

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

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

Source Prepared by: M. I. Taskaeva, Radiochemist

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

End of Certificate

Reagent

Tuna Can_00002

Rc'd 2/3/10

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81427-334

1.0 Liter Sand in 1 Liter HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

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

Source Prepared by: _____
W. Mao, Radiochemist

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

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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Tel 404·352·8677
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office
Laboratory

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

ALPHA SPECTROSCOPY

Method A-01-R Th

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

Prep Batch: 257496

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 257496

Lab ID: MB 160-257496/1-A
Client ID:
Sigma: 2

Analyzed: 07/11/16 19:29
Detector: AV191
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	0.06090	0.0366	0.0369		pCi/g	0.100	0.0289	260076
Thorium-232	-0.001174	0.00319	0.00319	U	pCi/g	0.100	0.0253	260076

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.700	0.225	0.319		pCi/g	0.0254	3.03	89.2	30 - 110

Lab ID: LCS 160-257496/2-A
Client ID:
Sigma: 2

Analyzed: 07/08/16 12:38
Detector: AV148
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	28.50	1.09	2.63		pCi/g	0.100	0.0315	259861

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.865	0.406	0.576		pCi/g	0.0555	6.05	80.5	30 - 110

Lab ID: 160-17797-1
Client ID: WR111-REF-001-SS-P-00
Sigma: 2

Analyzed: 07/08/16 12:38
Detector: AV149
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.04	0.206	0.267		pCi/g	0.100	0.0287	259862
Thorium-232	1.45	0.173	0.211		pCi/g	0.100	0.0339	259862

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.74	0.227	0.323		pCi/g	0.0309	3.03	90.6	30 - 110

Lab ID: 160-17797-1 DU
Client ID: WR111-REF-001-SS-P-00
Sigma: 2

Analyzed: 07/11/16 19:29
Detector: AV194
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 400

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.894	0.198	0.254		pCi/g	0.100	0.0155	260077
Thorium-232	1.765	0.191	0.242		pCi/g	0.100	0.0338	260077

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.673	0.221	0.315		pCi/g	0.0336	3.03	88.2	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 257496

Lab ID: 160-17797-2 | Analyzed: 07/11/16 19:29 | Decay Corrected: No
Client ID: WR111-REF-001-SS-DUP-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	1.61	0.177	0.223		pCi/g	0.100	0.0270	260078
Thorium-232	1.41	0.165	0.203		pCi/g	0.100	0.0146	260078

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.71	0.218	0.315		pCi/g	0.0378	3.03	89.5	30 - 110

Lab ID: 160-17797-3 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-002-SS-P-00 | Detector: AV152 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.82	0.197	0.249		pCi/g	0.100	0.0294	259865
Thorium-232	1.52	0.180	0.220		pCi/g	0.100	0.0293	259865

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.62	0.220	0.311		pCi/g	0.0340	3.03	86.5	30 - 110

Lab ID: 160-17797-4 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-003-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	1.60	0.182	0.226		pCi/g	0.100	0.0337	259866
Thorium-232	1.63	0.182	0.228		pCi/g	0.100	0.0153	259866

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.49	0.206	0.294		pCi/g	0.0279	3.02	82.5	30 - 110

Lab ID: 160-17797-5 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-004-SS-P-00 | Detector: AV154 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.63	0.187	0.232		pCi/g	0.100	0.0297	259867
Thorium-232	1.60	0.186	0.229		pCi/g	0.100	0.0351	259867

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.49	0.210	0.297		pCi/g	0.0291	3.03	82.4	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 257496

Lab ID: 160-17797-6 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-005-SS-P-00 | Detector: AV155 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.49	0.234	0.314		pCi/g	0.100	0.0165	259868
Thorium-232	1.97	0.207	0.265		pCi/g	0.100	0.0164	259868

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.58	0.220	0.309		pCi/g	0.0183	3.03	85.1	30 - 110

Lab ID: 160-17797-7 | Analyzed: 07/11/16 19:29 | Decay Corrected: No
Client ID: WR111-REF-006-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	1.40	0.164	0.202		pCi/g	0.100	0.0384	260080
Thorium-232	1.50	0.169	0.211		pCi/g	0.100	0.0312	260080

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.94	0.234	0.340		pCi/g	0.0373	3.03	97.2	30 - 110

Lab ID: 160-17797-8 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-007-SS-P-00 | Detector: AV157 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.65	0.192	0.237		pCi/g	0.100	0.0309	259870
Thorium-232	1.71	0.195	0.242		pCi/g	0.100	0.0167	259870

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.47	0.212	0.297		pCi/g	0.0137	3.03	81.5	30 - 110

Lab ID: 160-17797-9 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-008-SS-P-00 | Detector: AV160 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.88	0.220	0.271		pCi/g	0.100	0.0470	259871
Thorium-232	1.66	0.205	0.248		pCi/g	0.100	0.0417	259871

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.24	0.206	0.279		pCi/g	0.0310	3.03	74.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 257496

Lab ID: 160-17797-10 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-009-SS-P-00 | Detector: AV162 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.72	0.202	0.249		pCi/g	0.100	0.0437	259873
Thorium-232	1.57	0.192	0.233		pCi/g	0.100	0.0177	259873

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.18	0.194	0.266		pCi/g	0.0344	3.02	72.1	30 - 110

Lab ID: 160-17797-11 | Analyzed: 07/11/16 19:29 | Decay Corrected: No
Client ID: WR111-REF-010-SS-P-00 | Detector: AV202 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.63	0.188	0.232		pCi/g	0.100	0.0298	260081
Thorium-232	1.76	0.195	0.244		pCi/g	0.100	0.0296	260081

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.62	0.221	0.312		pCi/g	0.0258	3.02	86.6	30 - 110

Lab ID: 160-17797-12 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-011-SS-P-00 | Detector: AV165 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.48	0.177	0.216		pCi/g	0.100	0.0584	259875
Thorium-232	1.66	0.186	0.232		pCi/g	0.100	0.0415	259875

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.53	0.211	0.300		pCi/g	0.0442	3.02	83.9	30 - 110

Lab ID: 160-17797-13 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-011-SS-DUP-00 | Detector: AV166 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	2.34	0.224	0.298		pCi/g	0.100	0.0295	259876
Thorium-232	1.56	0.182	0.224		pCi/g	0.100	0.0294	259876

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.61	0.219	0.310		pCi/g	0.0339	3.03	86.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 257496

Lab ID: 160-17797-14 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-012-SS-P-00 | Detector: AV167 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.80	0.205	0.255		pCi/g	0.100	0.0382	259877
Thorium-232	1.70	0.198	0.244		pCi/g	0.100	0.0173	259877

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.30	0.201	0.279		pCi/g	0.0244	3.02	75.9	30 - 110

Lab ID: 160-17797-15 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-013-SS-P-00 | Detector: AV170 | 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	0.210	0.254		pCi/g	0.100	0.0192	259880
Thorium-232	1.75	0.212	0.258		pCi/g	0.100	0.0353	259880

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.04	0.188	0.255		pCi/g	0.0285	3.02	67.6	30 - 110

Lab ID: 160-17797-16 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-014-SS-P-00 | Detector: AV171 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.89	0.232	0.281		pCi/g	0.100	0.0608	259881
Thorium-232	1.94	0.233	0.285		pCi/g	0.100	0.0460	259881

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	1.97	0.191	0.253		pCi/g	0.0397	3.02	65.2	30 - 110

Lab ID: 160-17797-17 | Analyzed: 07/11/16 19:29 | Decay Corrected: No
Client ID: WR111-REF-015-SS-P-00 | Detector: AV203 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.63	0.182	0.227		pCi/g	0.100	0.0280	260082
Thorium-232	1.41	0.169	0.206		pCi/g	0.100	0.0151	260082

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.58	0.212	0.303		pCi/g	0.0240	3.02	85.4	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 257496

Lab ID: 160-17797-18 | Analyzed: 07/08/16 12:38 | Decay Corrected: No
Client ID: WR111-REF-016-SS-P-00 | Detector: AV173 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.97	0.220	0.275		pCi/g	0.100	0.0339	259883
Thorium-232	1.40	0.185	0.219		pCi/g	0.100	0.0401	259883

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.18	0.197	0.269		pCi/g	0.0383	3.03	72.1	30 - 110

Lab ID: 160-17797-19 | Analyzed: 07/11/16 19:29 | Decay Corrected: No
Client ID: WR111-REF-017-SS-P-00 | Detector: AV204 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 400

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Thorium-230	1.37	0.170	0.205		pCi/g	0.100	0.0159	260083
Thorium-232	1.51	0.179	0.219		pCi/g	0.100	0.0372	260083

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.45	0.205	0.290		pCi/g	0.0282	3.02	81.0	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-257496/1-A	Thorium-230			0.06090		pCi/g							3.29710717
MB 160-257496/1-A	Thorium-232			-0.001174	U	pCi/g							-.73545843

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-257496/2-A	Thorium-230		24.5	28.50		pCi/g	116	81 - 118					2.3089291026

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-17797-1	Thorium-230	2.04		1.894		pCi/g			7	0.27	0.77	1	
160-17797-1	Thorium-232	1.45		1.765		pCi/g			20	0.70	1.99	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Batch Number: 257496 Batch Start Date: 06/22/16 10:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/07/16 08:53

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00020	TRM-2 00001	AnalysisComment		
MB 160-257496/1		ExtChrom, A-01-R		1.0 g	0.1 mL				
LCS 160-257496/2		ExtChrom, A-01-R		0.5009 g	0.1 mL	0.5009 g	TRM		
160-17797-A-1-A	WR111-REF-001-SS-P-00	ExtChrom, A-01-R	T	1.0008 g	0.1 mL				
160-17797-A-1-A DU	WR111-REF-001-SS-P-00	ExtChrom, A-01-R	T	0.9993 g	0.1 mL				
160-17797-A-2-A	WR111-REF-001-SS-DUP-00	ExtChrom, A-01-R	T	0.9992 g	0.1 mL				
160-17797-A-3-A	WR111-REF-002-SS-P-00	ExtChrom, A-01-R	T	0.9990 g	0.1 mL				
160-17797-A-4-A	WR111-REF-003-SS-P-00	ExtChrom, A-01-R	T	1.0027 g	0.1 mL				
160-17797-A-5-A	WR111-REF-004-SS-P-00	ExtChrom, A-01-R	T	1.0006 g	0.1 mL				
160-17797-A-6-A	WR111-REF-005-SS-P-00	ExtChrom, A-01-R	T	0.9989 g	0.1 mL				
160-17797-A-7-A	WR111-REF-006-SS-P-00	ExtChrom, A-01-R	T	0.9997 g	0.1 mL				
160-17797-A-8-A	WR111-REF-007-SS-P-00	ExtChrom, A-01-R	T	0.9992 g	0.1 mL				
160-17797-A-9-A	WR111-REF-008-SS-P-00	ExtChrom, A-01-R	T	0.9990 g	0.1 mL				
160-17797-A-10-A	WR111-REF-009-SS-P-00	ExtChrom, A-01-R	T	1.0020 g	0.1 mL				
160-17797-A-11-A	WR111-REF-010-SS-P-00	ExtChrom, A-01-R	T	1.0025 g	0.1 mL				
160-17797-A-12-A	WR111-REF-011-SS-P-00	ExtChrom, A-01-R	T	1.0028 g	0.1 mL				
160-17797-A-13-A	WR111-REF-011-SS-DUP-00	ExtChrom, A-01-R	T	0.9982 g	0.1 mL				
160-17797-A-14-A	WR111-REF-012-SS-P-00	ExtChrom, A-01-R	T	1.0012 g	0.1 mL				
160-17797-A-15-A	WR111-REF-013-SS-P-00	ExtChrom, A-01-R	T	1.0032 g	0.1 mL				
160-17797-A-16-A	WR111-REF-014-SS-P-00	ExtChrom, A-01-R	T	1.0013 g	0.1 mL				
160-17797-A-17-A	WR111-REF-015-SS-P-00	ExtChrom, A-01-R	T	1.0033 g	0.1 mL				
160-17797-A-18-A	WR111-REF-016-SS-P-00	ExtChrom, A-01-R	T	0.9987 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.: 160-17797-1

SDG No.:

Batch Number: 257496 Batch Start Date: 06/22/16 10:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/07/16 08:53

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00020	TRM-2 00001	AnalysisComment		
160-17797-A-19-A	WR111-REF-017-SS-P-00	ExtChrom, A-01-R	T	1.0024 g	0.1 mL				

Batch Notes	
Balance ID	27050421
Analyst ID - Column	nmn
Column Date	7/5/16
Analyst ID - CoPrecipitation	nmn
CoPrecipitation Date	7/7/16
Pipette ID	rad097
Analyst ID - Reagent Drop Witness	rjs per nmn
Analyst ID - Reagent Drop	sek
SOP Number	st rc 0003 st rc 0004 st rc0100 st rc 0242

Basis	Basis Description
T	Total/NA

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:12AM 7/12/2016

Sample

Sample Name: MB 160-257496/1-A Type: Blank
Spectrum #3 Analysis #1
: MB 160-257496/1-A
Sample Collection Date: 7/7/2016 8:51:00AM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 171019
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

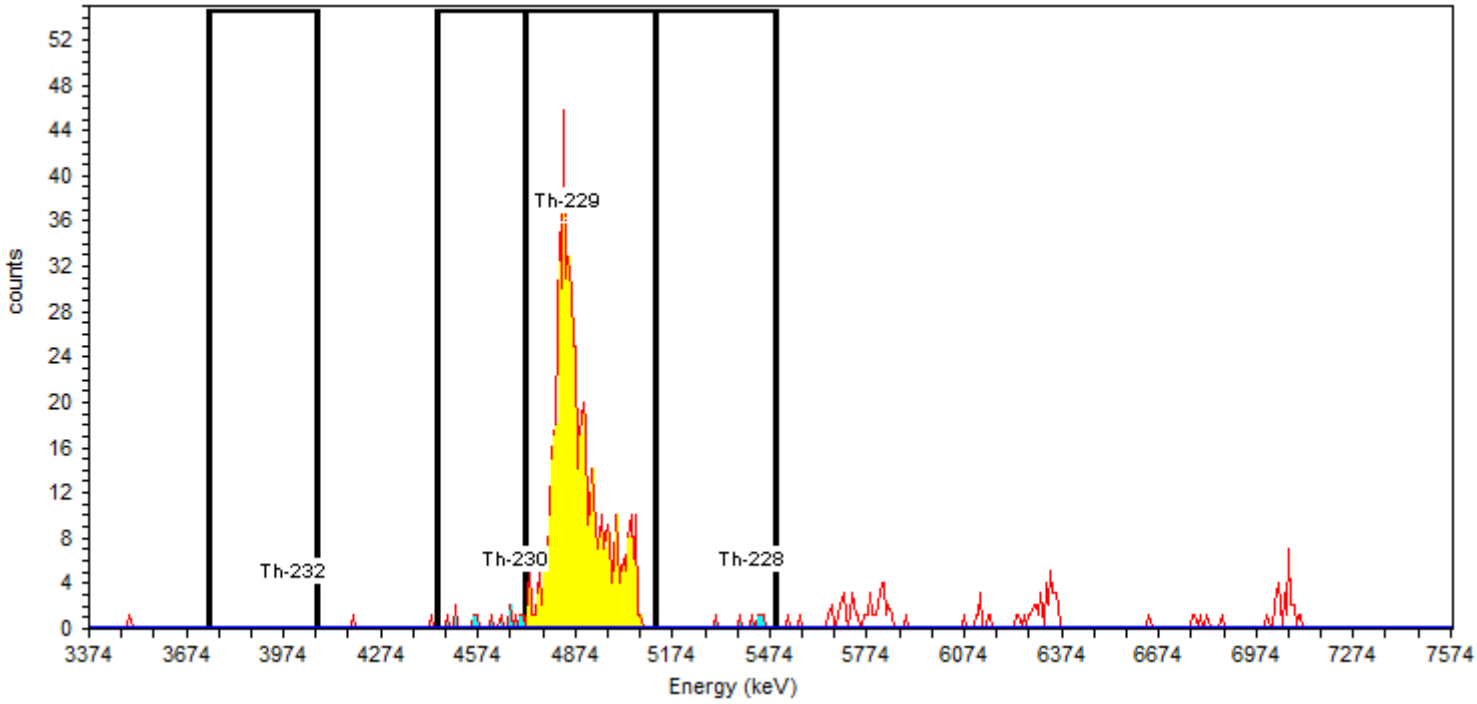
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.17%

Acquisition

Detector: AV191 SN: 50-112A2
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/26/2016 5:10:12PM
Bkgd Info: Sample: ICB;AV191; Det: AV191; Spectrum #4; 6/26/2016 5:10:12 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:7/7/2016 1:05:10PM
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	.0	100.2	0	0.2256	-0.23	-1.174E-003	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	9.8	99.7	12	0.4167	11.65	6.090E-002	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	82.2	99.6	579	0.3900	578.67	2.700E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	17.0	99.8	6	7.0567	-1.06	-5.546E-003	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:46PM 7/8/2016

Sample

Sample Name: LCS 160-257496/2-A Type: Control
Spectrum #2 Analysis #1
: LCS 160-257496/2-A
Sample Collection Date: 7/7/2016 8:51:00AM
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: 257496
AnalysisResultsID: 170795
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

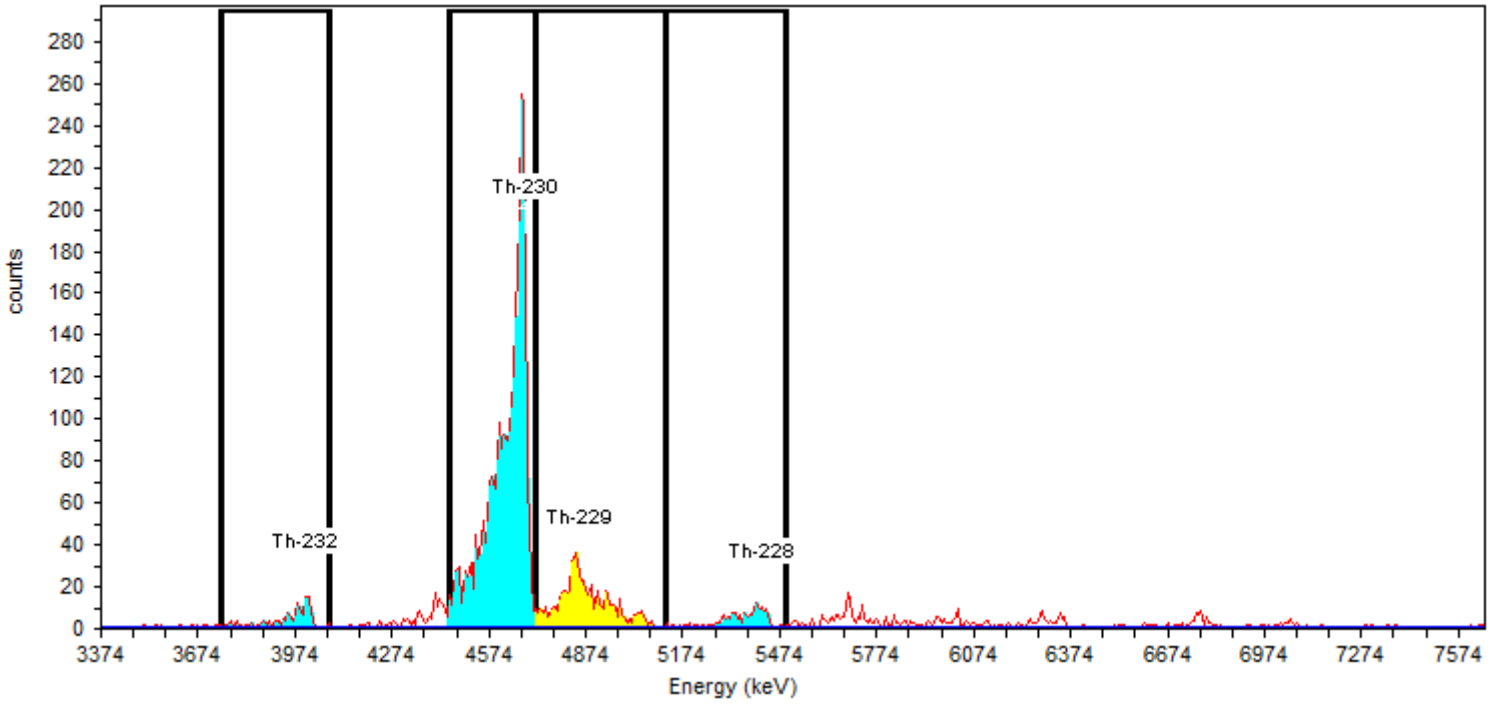
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.48%

Acquisition

Detector: AV148 SN: 50-05/R2
Acquisition Start Date: 7/8/2016 12:38:27PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:34PM
Bkgd Info: Sample: ICB;AV148; Det: AV148; Spectrum #1; 6/24/2016 4:15:34 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:7/7/2016 1:05:09PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.5	100.2	141	0.4167	140.24	1.463E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.4	99.7	2599	0.0000	2598.86	2.725E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.2	99.6	577	0.8333	576.10	4.866E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	124.1	99.8	153	5.4167	147.58	1.548E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:03:46AM 7/11/2016

Sample

Sample Name: LCS 160-257496/2-A Type: Control
Spectrum #2 Analysis #1
: LCS 160-257496/2-A
Sample Collection Date: 7/7/2016 8:51:00AM
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: 257496
AnalysisResultsID: 170820
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

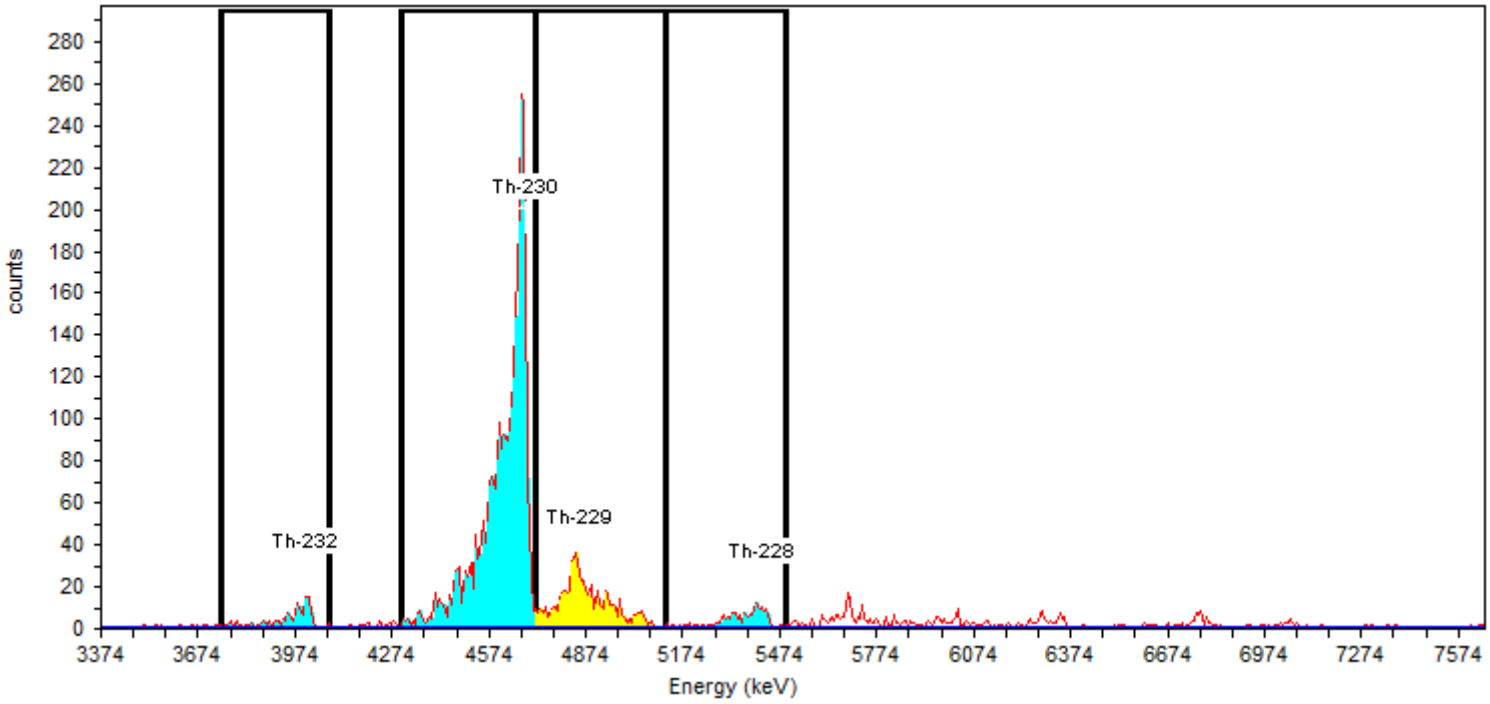
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.48%

Acquisition

Detector: AV148 SN: 50-05/R2
Acquisition Start Date: 7/8/2016 12:38:27PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:34PM
Bkgd Info: Sample: ICB;AV148; Det: AV148; Spectrum #1; 6/24/2016 4:15:34 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 Interactive ROI Analysis
Decay Correction:7/7/2016 1:05:09PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 07/11/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.5	100.2	141	0.4167	140.24	1.463E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4299.1	4716.8	19.0	99.7	2718	0.0000	2718.00	2.850E+001	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.2	99.6	577	0.8333	576.10	4.866E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	124.1	99.8	153	5.4167	147.58	1.548E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:55PM 7/8/2016

Sample

Sample Name: 160-17797-A-1-D Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-1-D
Sample Collection Date: 6/14/2016 1:20:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 170797
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

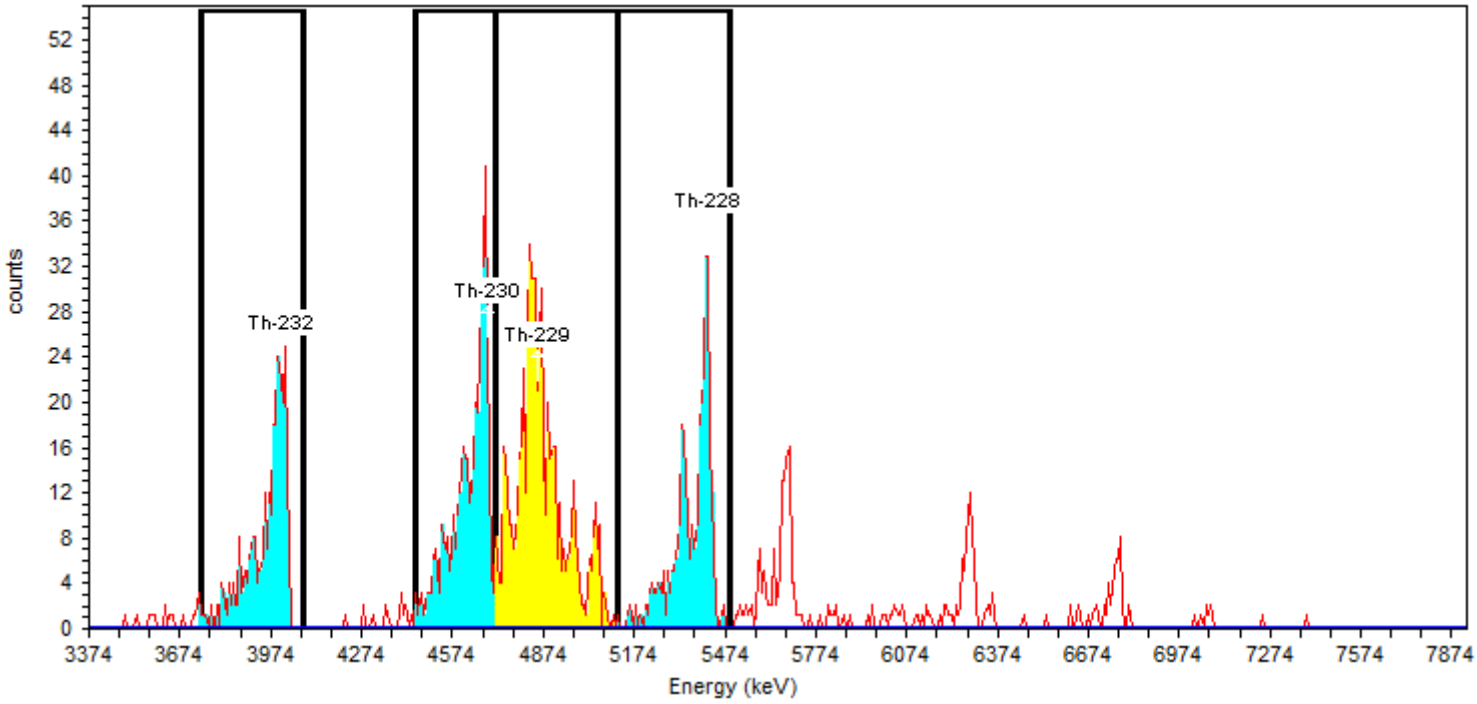
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.55%

Acquisition

Detector: AV149 SN: 50-05/R3
Acquisition Start Date: 7/8/2016 12:38:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/26/2016 5:10:13PM
Bkgd Info: Sample: ICB;AV149; Det: AV149; Spectrum #4; 6/26/2016 5:10:13 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:7/7/2016 1:05:08PM
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	70.8	100.2	281	0.8333	280.17	1.446E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.0	99.7	393	0.4167	392.54	2.036E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	97.4	99.6	584	0.8333	582.98	2.740E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	99.4	99.8	318	5.8333	312.10	1.619E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:07AM 7/12/2016

Sample

Sample Name: 160-17797-A-1-E DU Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-1-E DU
Sample Collection Date: 6/14/2016 1:20:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 171018
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

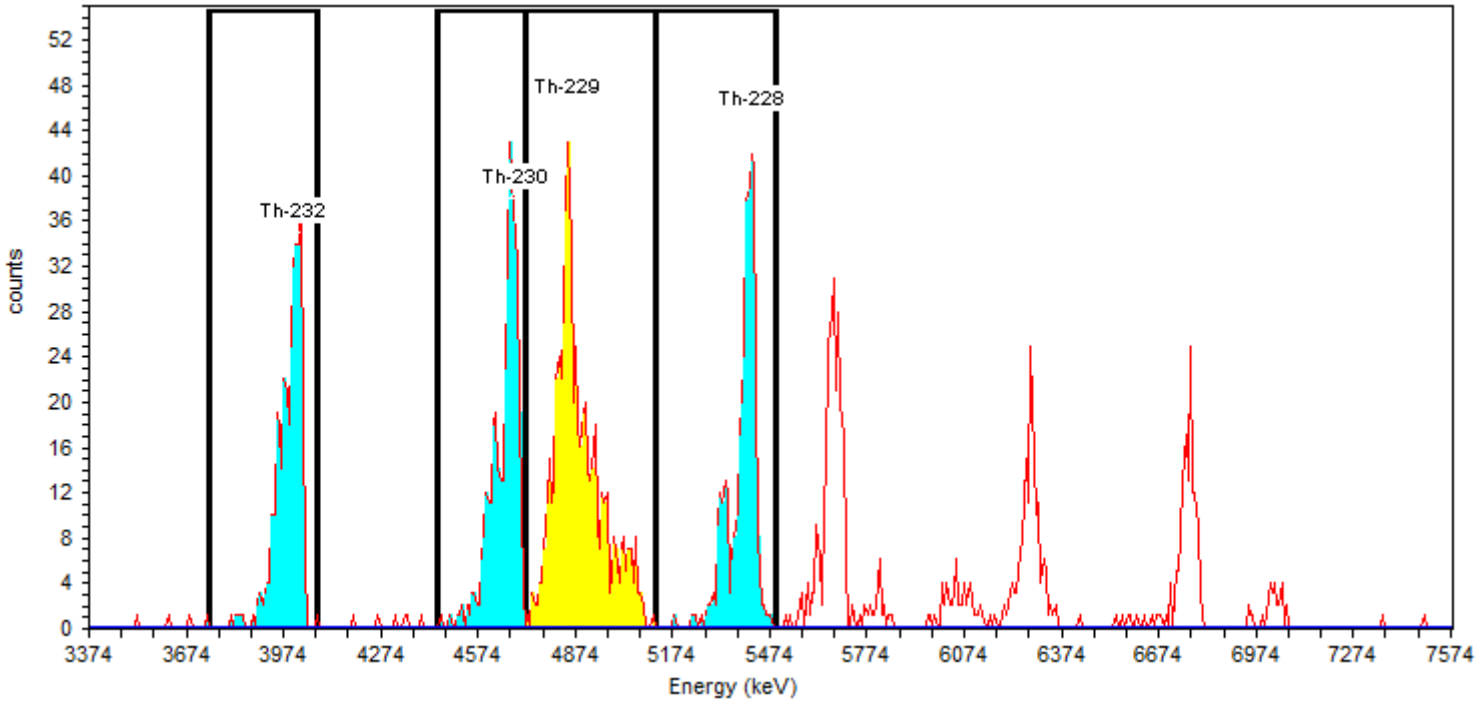
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.21%

Acquisition

Detector: AV194 SN: 50-119J2
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 6/24/2016 4:15:20PM
Bkgd Info: Sample: ICB;AV194; Det: AV194; Spectrum #1; 6/24/2016 4:15:20 PM

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	64.2	100.2	345	0.8333	343.71	1.765E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.4	99.7	367	0.0000	367.03	1.894E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.8	99.6	588	1.2500	586.84	2.673E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.1	99.8	357	8.3333	348.73	1.806E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:10:59AM 7/12/2016

Sample

Sample Name: 160-17797-A-2-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-2-C
Sample Collection Date: 6/14/2016 1:20:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 171016
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

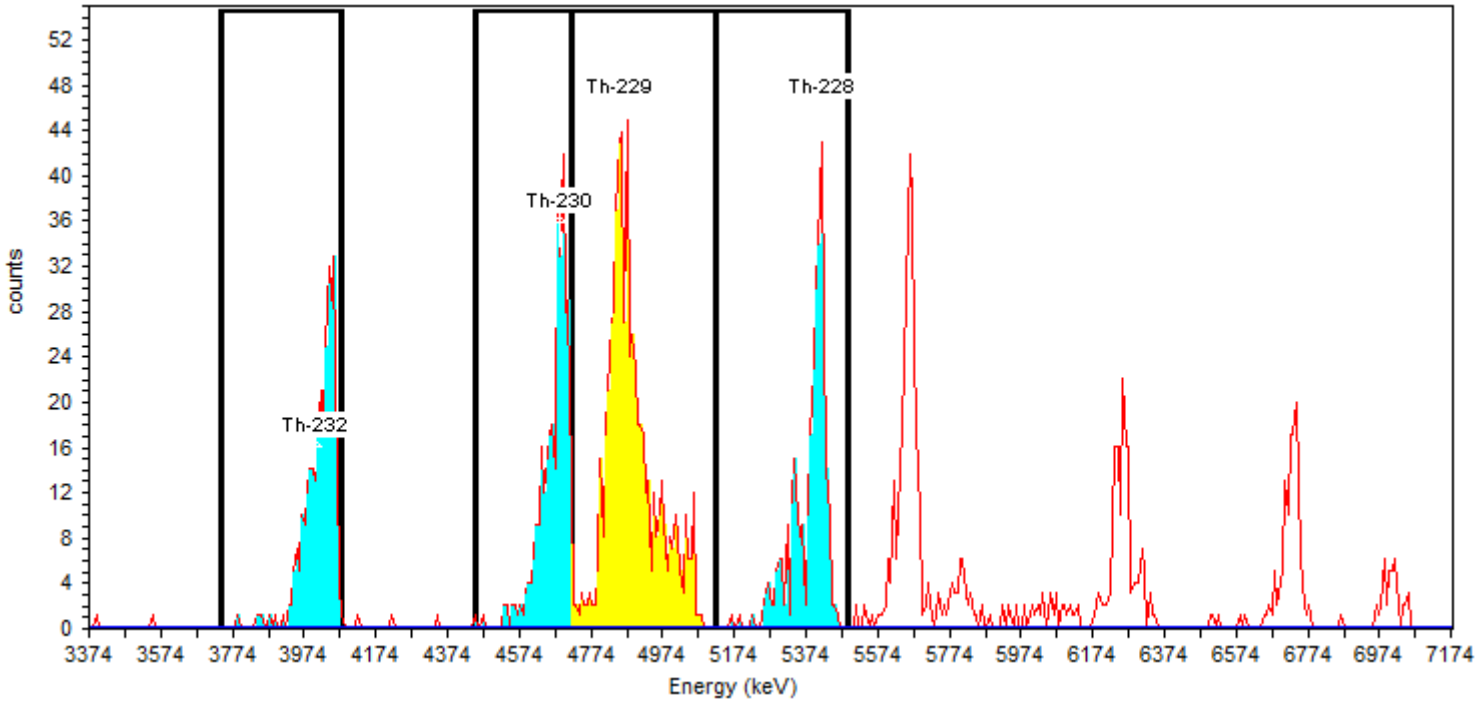
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 91.59%

Acquisition

Detector: AV198 SN: 50-117AA7
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:21PM
Bkgd Info: Sample: ICB;AV198; Det: AV198; Spectrum #1; 6/24/2016 4:15:21 PM

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:7/7/2016 1:05:08PM
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	34.9	100.2	290	0.0000	290.38	1.377E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	48.9	99.7	324	0.4167	323.93	1.544E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.9	99.6	638	2.0833	635.58	2.776E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.3	99.8	313	4.5833	308.42	1.475E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:33:32AM 7/12/2016

Sample

Sample Name: 160-17797-A-2-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-2-C
Sample Collection Date: 6/14/2016 1:20:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 171028
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

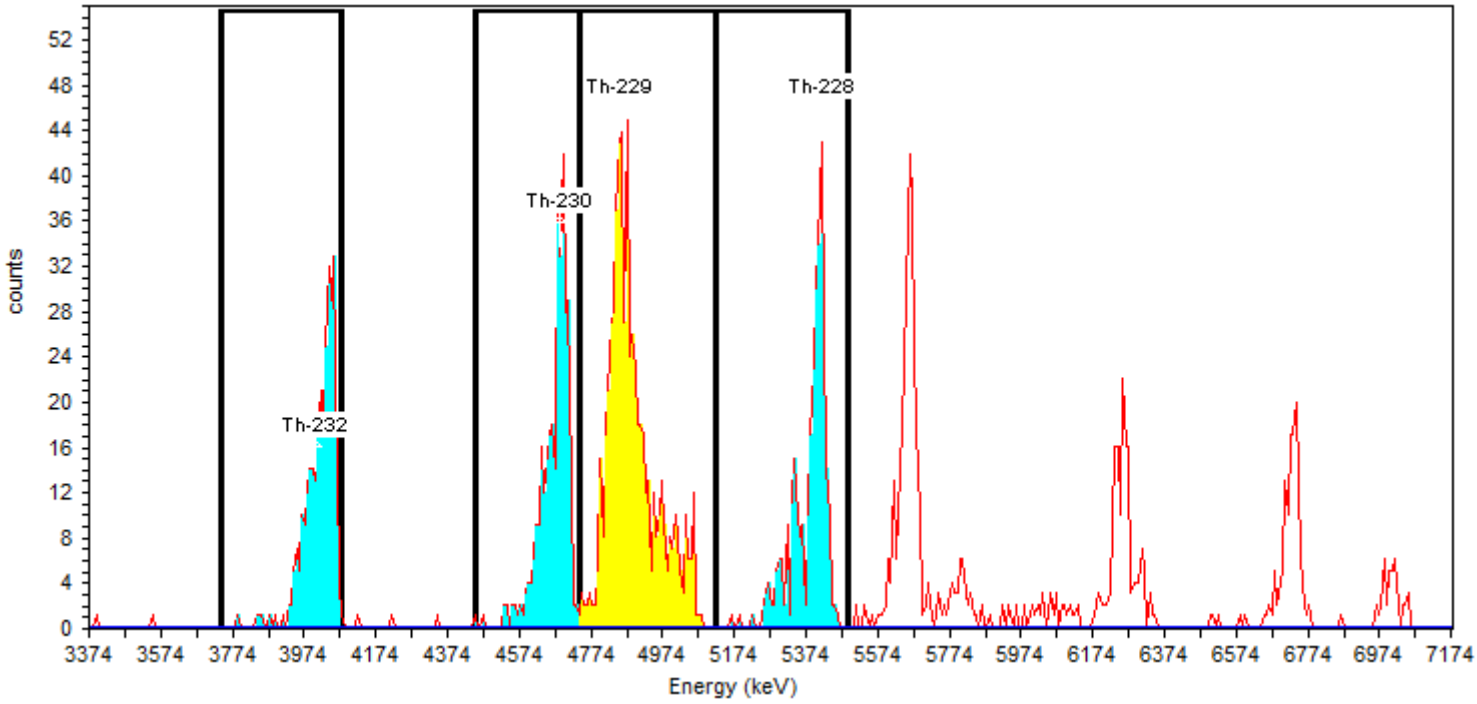
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.48%

Acquisition

Detector: AV198 SN: 50-117AA7
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:21PM
Bkgd Info: Sample: ICB;AV198; Det: AV198; Spectrum #1; 6/24/2016 4:15:21 PM

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:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 07/12/2016 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	34.9	100.2	290	0.0000	290.38	1.409E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.6	99.7	330	0.4167	329.58	1.608E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	86.9	99.6	623	2.0833	620.92	2.712E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.3	99.8	313	4.5833	308.42	1.510E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:13PM 7/8/2016

Sample

Sample Name: 160-17797-A-3-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-3-C
Sample Collection Date: 6/14/2016 1:25:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 170801
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

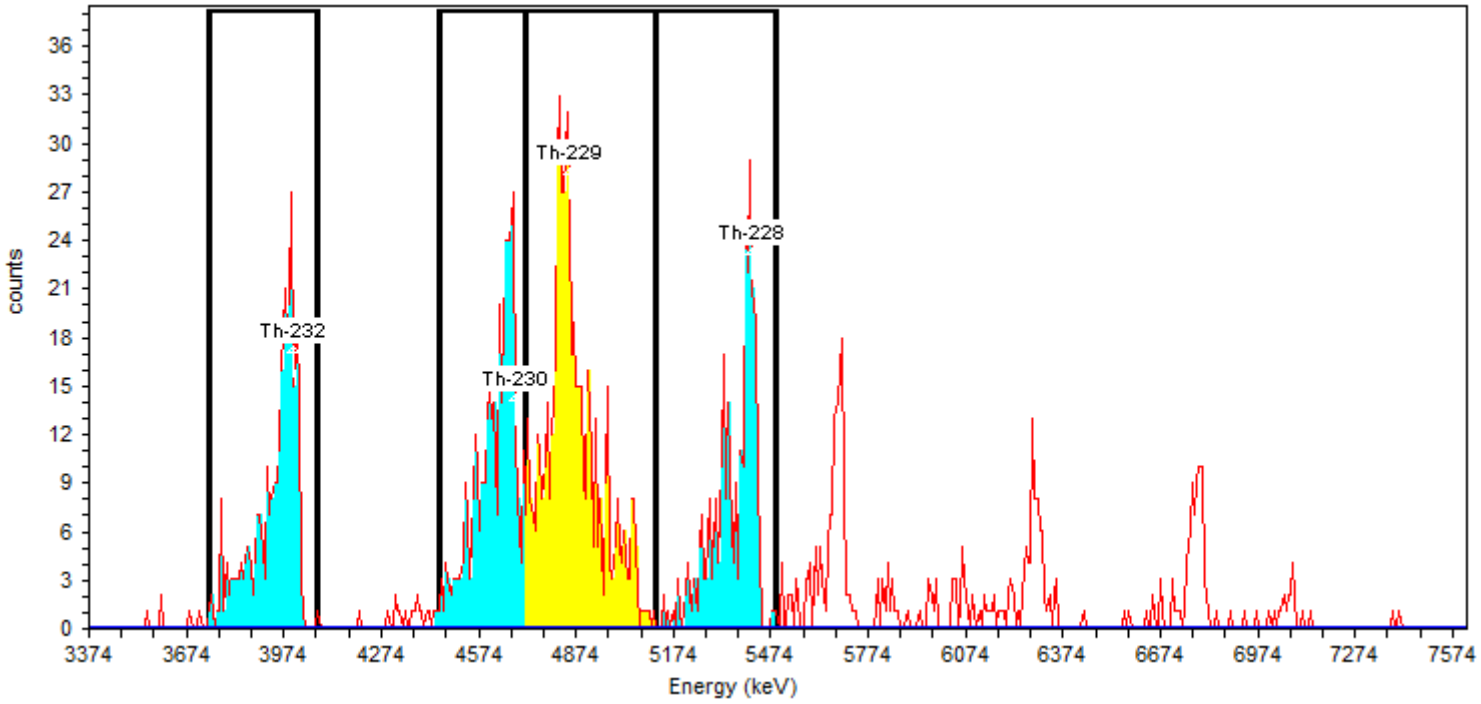
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.12%

Acquisition

Detector: AV152 SN: 50-05/R6
Acquisition Start Date: 7/8/2016 12:38:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/26/2016 5:10:10PM
Bkgd Info: Sample: ICB;AV152; Det: AV152; Spectrum #4; 6/26/2016 5:10:10 PM

Energy Calibration: IC-9520;AV152-20151016
Efficiency Calibration:IC-9520;AV152-20151016
Calibration Date: 10/16/2015 6:46:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.54% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.0	100.2	287	0.4167	286.55	1.599E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.3	99.7	358	0.4167	357.77	2.007E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.1	99.6	541	1.2500	540.00	2.489E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.8	99.8	292	4.5833	287.39	1.613E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:09:51AM 7/11/2016

Sample

Sample Name: 160-17797-A-3-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-3-C
Sample Collection Date: 6/14/2016 1:25:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 170825
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

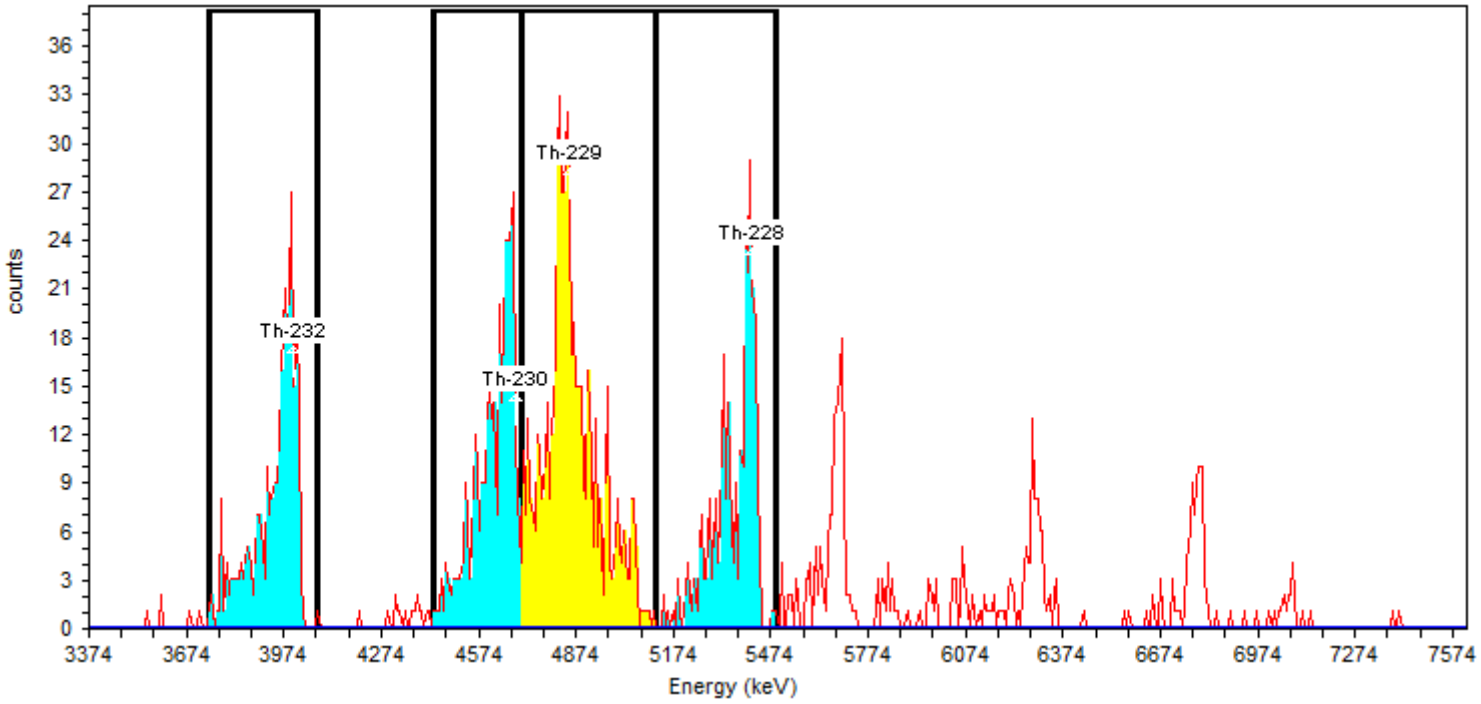
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.50%

Acquisition

Detector: AV152 SN: 50-05/R6
Acquisition Start Date: 7/8/2016 12:38:25PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/26/2016 5:10:10PM
Bkgd Info: Sample: ICB;AV152; Det: AV152; Spectrum #4; 6/26/2016 5:10:10 PM

Energy Calibration: IC-9520;AV152-20151016
Efficiency Calibration:IC-9520;AV152-20151016
Calibration Date: 10/16/2015 6:46:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.54% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 07/11/2016 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	69.0	100.2	287	0.4167	286.55	1.519E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4433.4	4701.9	30.2	99.7	342	0.4167	341.58	1.819E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4701.9	5119.5	78.1	99.6	570	1.2500	568.75	2.622E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.8	99.8	292	4.5833	287.39	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
7:20:04PM 7/8/2016

Sample

Sample Name: 160-17797-A-4-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-4-C
Sample Collection Date: 6/14/2016 1:30:00PM
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: 257496
AnalysisResultsID: 170799
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

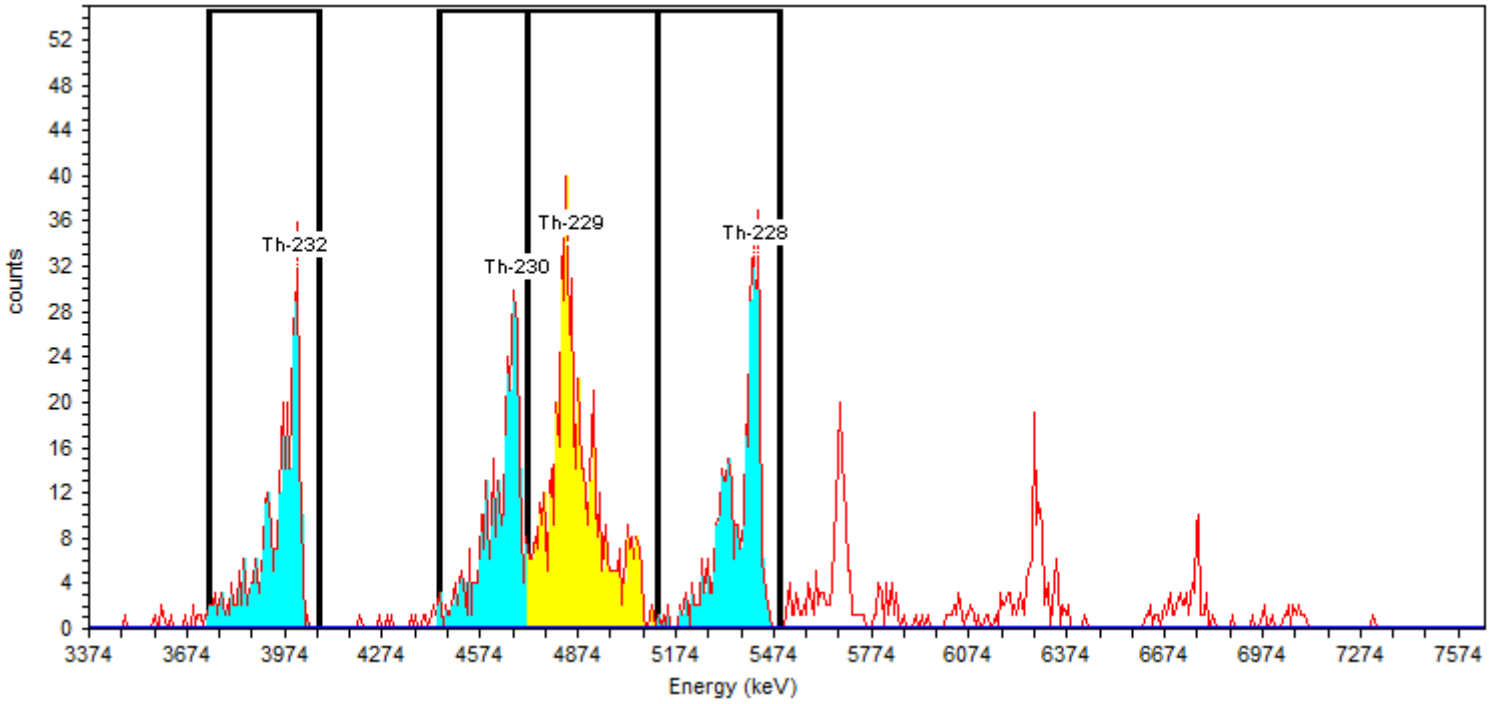
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 79.99%

Acquisition

Detector: AV153 SN: 54-011 Y6
Acquisition Start Date: 7/8/2016 12:38:25PM
Live Time: 400.00 min.
Real Time: 400.02 min.
Background Date: 6/24/2016 4:15:17PM
Bkgd Info: Sample: ICB;AV153; Det: AV153; Spectrum #1; 6/24/2016 4:15:17 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:7/7/2016 1:05:08PM
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	61.9	100.2	319	0.0000	319.00	1.680E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.8	99.7	331	0.8333	329.83	1.746E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.3	99.6	571	0.8333	570.07	2.416E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	374	3.7500	370.19	1.961E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:09:06AM 7/11/2016

Sample

Sample Name: 160-17797-A-4-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-4-C
Sample Collection Date: 6/14/2016 1:30:00PM
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: 257496
AnalysisResultsID: 170824
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

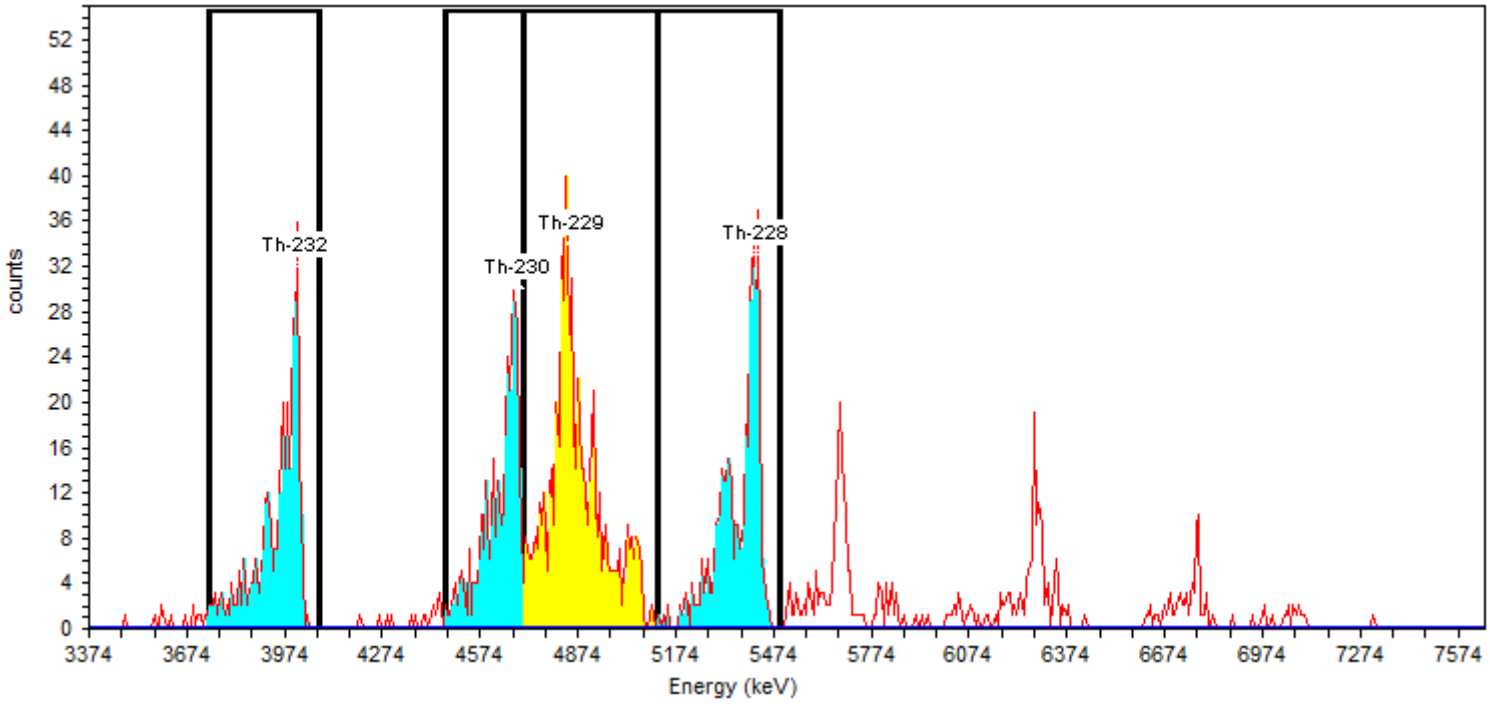
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.53%

Acquisition

Detector: AV153 SN: 54-011 Y6
Acquisition Start Date: 7/8/2016 12:38:25PM
Live Time: 400.00 min.
Real Time: 400.02 min.
Background Date: 6/24/2016 4:15:17PM
Bkgd Info: Sample: ICB;AV153; Det: AV153; Spectrum #1; 6/24/2016 4:15:17 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 Interactive ROI Analysis
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 07/11/2016 ALD

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.9	100.2	319	0.0000	319.00	1.629E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4463.2	4701.9	35.3	99.7	313	0.8333	312.17	1.602E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4701.9	5119.5	72.3	99.6	589	0.8333	588.17	2.493E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	374	3.7500	370.19	1.900E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:50PM 7/8/2016

Sample

Sample Name: 160-17797-A-5-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-5-C
Sample Collection Date: 6/14/2016 1:45:00PM
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: 257496
AnalysisResultsID: 170781
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

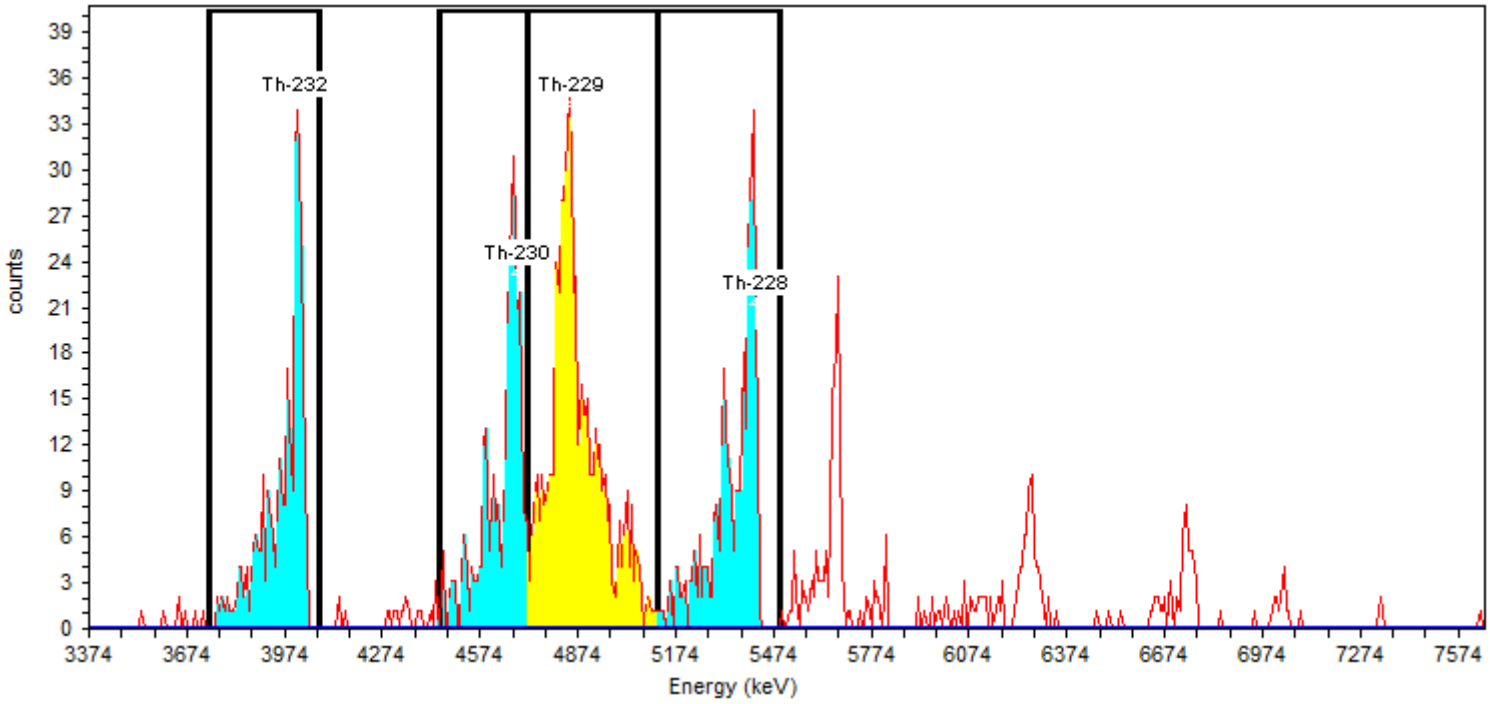
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.00%

Acquisition

Detector: AV154 SN: 50-05/JJ7
Acquisition Start Date: 7/8/2016 12:38:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:18PM
Bkgd Info: Sample: ICB;AV154; Det: AV154; Spectrum #1; 6/24/2016 4:15:18 PM

Energy Calibration: IC-9793;AV154-20151016
Efficiency Calibration:IC-9793;AV154-20151016
Calibration Date: 10/16/2015 6:47:00PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.50% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	57.4	100.2	301	0.8333	300.17	1.593E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.9	99.7	295	0.2883	294.90	1.573E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.2	99.6	568	0.8333	567.04	2.512E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.4	99.8	321	5.4167	315.67	1.684E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:08:18AM 7/11/2016

Sample

Sample Name: 160-17797-A-5-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-5-C
Sample Collection Date: 6/14/2016 1:45:00PM
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: 257496
AnalysisResultsID: 170823
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

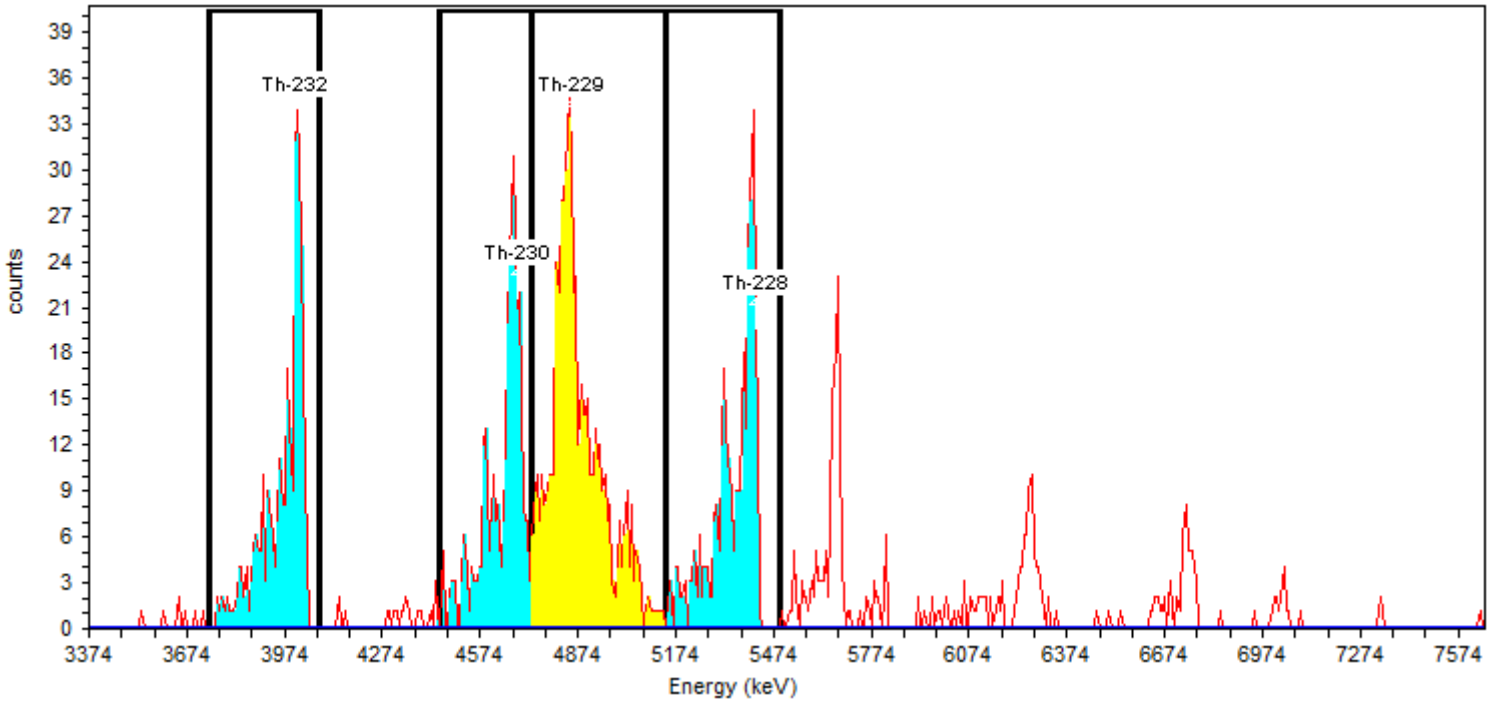
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.44%

Acquisition

Detector: AV154 SN: 50-05/JJ7
Acquisition Start Date: 7/8/2016 12:38:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:18PM
Bkgd Info: Sample: ICB;AV154; Det: AV154; Spectrum #1; 6/24/2016 4:15:18 PM

Energy Calibration: IC-9793;AV154-20151016
Efficiency Calibration:IC-9793;AV154-20151016
Calibration Date: 10/16/2015 6:47:00PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.50% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 07/11/2016 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	57.4	100.2	301	0.8333	300.17	1.604E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	42.6	99.7	304	0.4167	303.58	1.630E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5141.8	78.2	99.6	564	0.8333	563.17	2.495E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5141.8	5492.4	51.4	99.8	318	5.4167	312.58	1.679E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:25PM 7/8/2016

Sample

Sample Name: 160-17797-A-6-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-6-C
Sample Collection Date: 6/14/2016 1:50:00PM
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: 257496
AnalysisResultsID: 170779
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

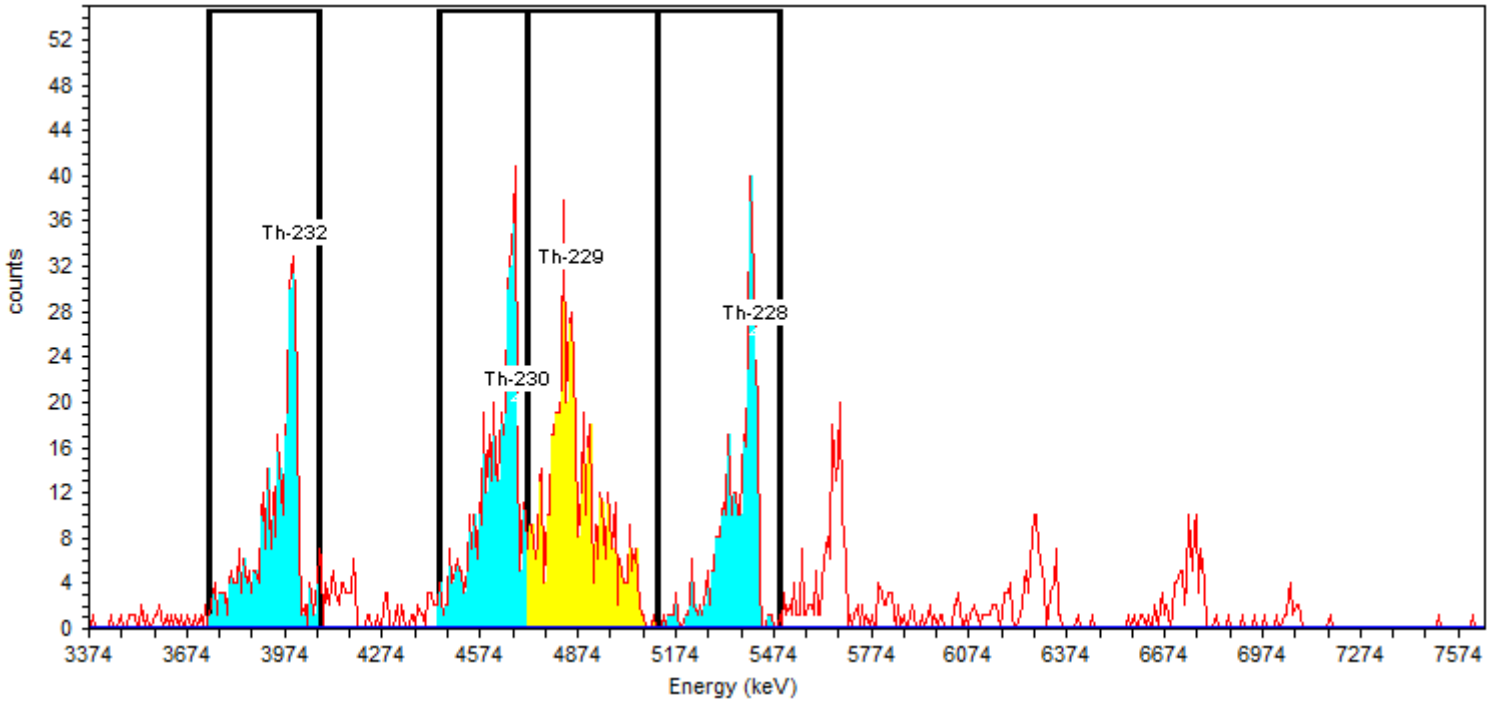
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 85.09%

Acquisition

Detector: AV155 SN: 50-05/II1
Acquisition Start Date: 7/8/2016 12:38:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/26/2016 5:10:11PM
Bkgd Info: Sample: ICB;AV155; Det: AV155; Spectrum #4; 6/26/2016 5:10:11 PM

Energy Calibration: IC-9794;AV155-20151016
Efficiency Calibration:IC-9794;AV155-20151016
Calibration Date: 10/16/2015 6:47:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.17% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:09PM
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	57.1	100.2	359	0.0000	359.47	1.967E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	21.1	99.7	453	0.0000	453.45	2.493E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.3	99.6	551	0.0533	551.01	2.580E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.2	99.8	339	5.8866	333.03	1.832E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:09:22AM 7/12/2016

Sample

Sample Name: 160-17797-A-7-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-7-C
Sample Collection Date: 6/14/2016 1:55:00PM
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: 257496
AnalysisResultsID: 171015
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

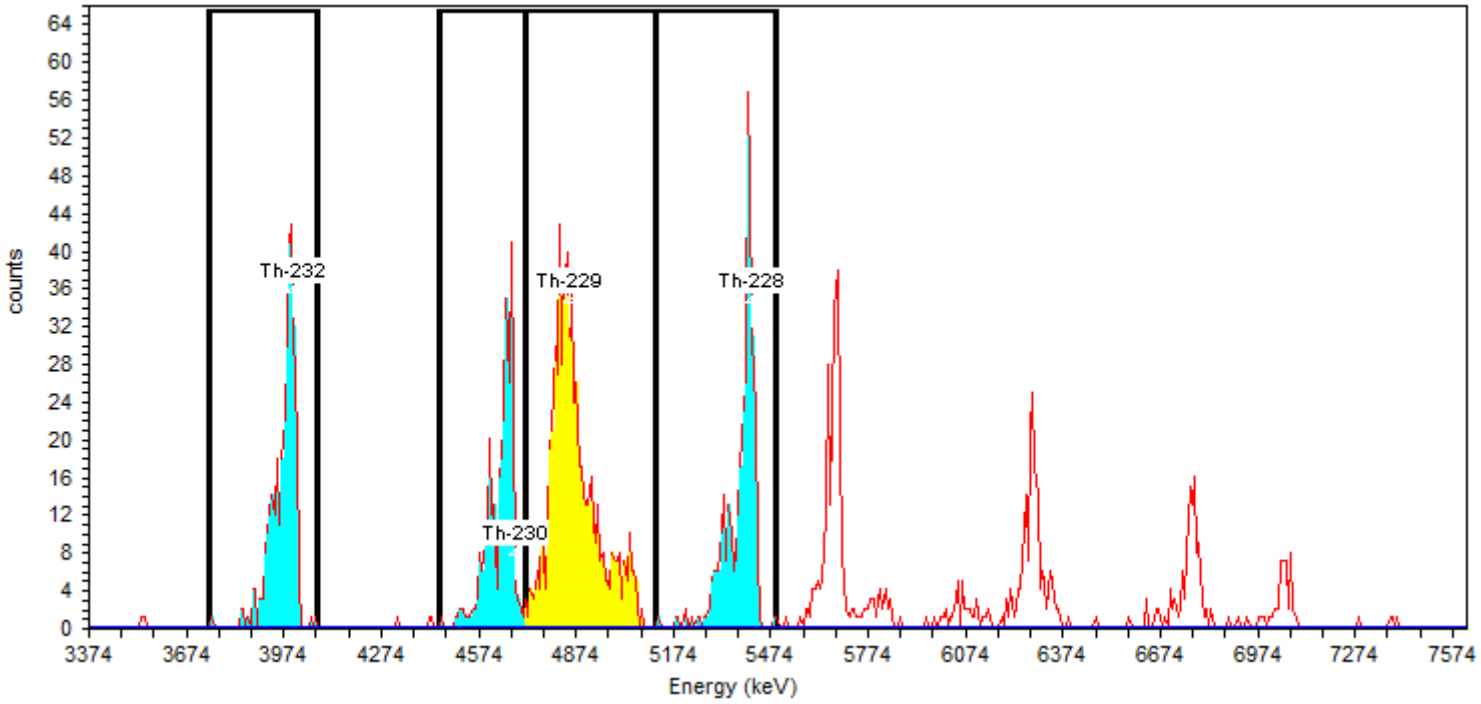
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 97.15%

Acquisition

Detector: AV200 SN: 50-117J6
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:22PM
Bkgd Info: Sample: ICB;AV200; Det: AV200; Spectrum #1; 6/24/2016 4:15:22 PM

Energy Calibration: IC-9884;AV200-20151017
Efficiency Calibration:IC-9884;AV200-20151017
Calibration Date: 10/18/2015 3:55:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.41% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:09PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	53.8	100.2	317	0.8333	316.05	1.498E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	16.6	99.7	295	1.6667	293.27	1.397E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	93.0	99.6	637	1.6667	635.27	2.943E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.3	99.8	350	6.2500	343.66	1.644E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:18:54PM 7/8/2016

Sample

Sample Name: 160-17797-A-8-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-8-C
Sample Collection Date: 6/14/2016 2:00:00PM
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: 257496
AnalysisResultsID: 170782
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

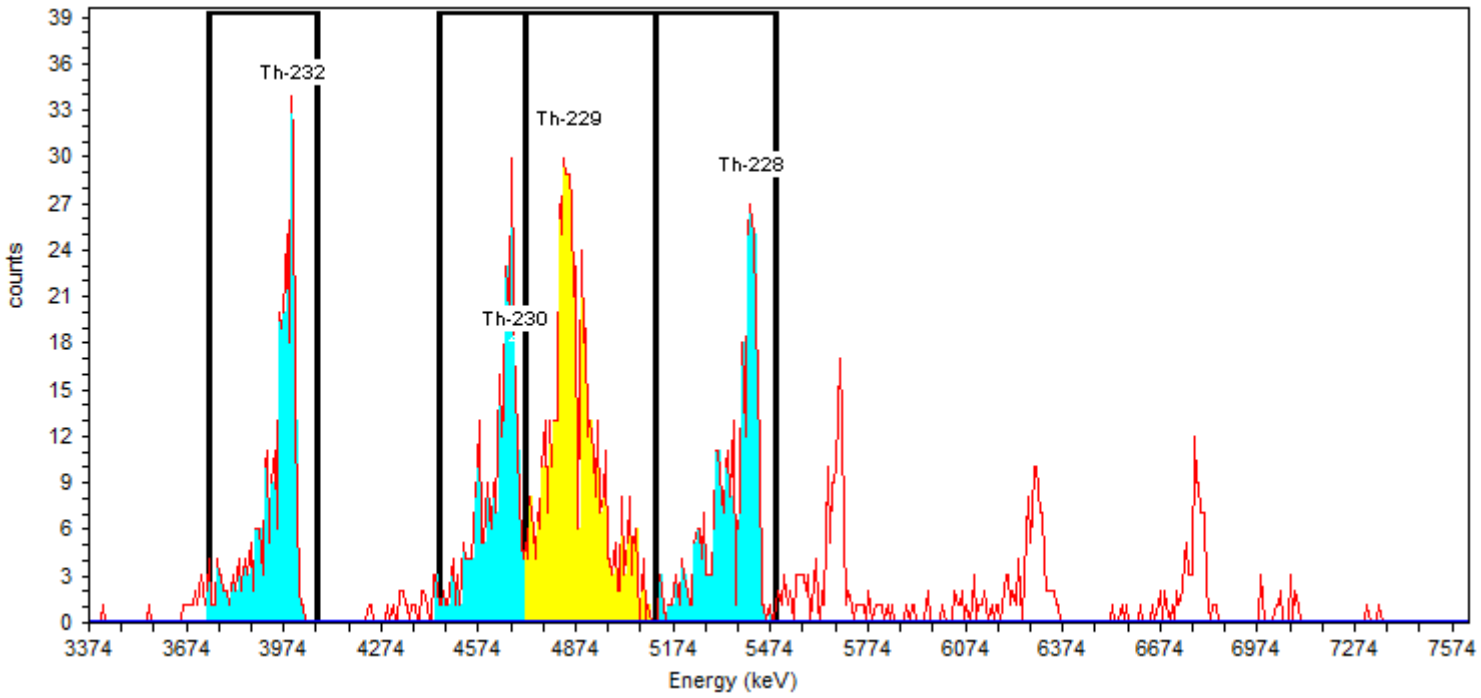
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.47%

Acquisition

Detector: AV157 SN: 50-05/II3
Acquisition Start Date: 7/8/2016 12:38:26PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:18PM
Bkgd Info: Sample: ICB;AV157; Det: AV157; Spectrum #1; 6/24/2016 4:15:18 PM

Energy Calibration: IC-9817;AV157-20151016
Efficiency Calibration:IC-9817;AV157-20151016
Calibration Date: 10/16/2015 6:47:07PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.78% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:09PM
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	58.9	100.2	307	0.0000	306.72	1.709E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.0	99.7	295	0.4167	294.17	1.647E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	97.7	99.6	541	0.0000	540.97	2.469E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.8	99.8	323	4.5833	318.50	1.784E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:11PM 7/8/2016

Sample

Sample Name: 160-17797-A-9-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-9-C
Sample Collection Date: 6/14/2016 2:05:00PM
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: 257496
AnalysisResultsID: 170786
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

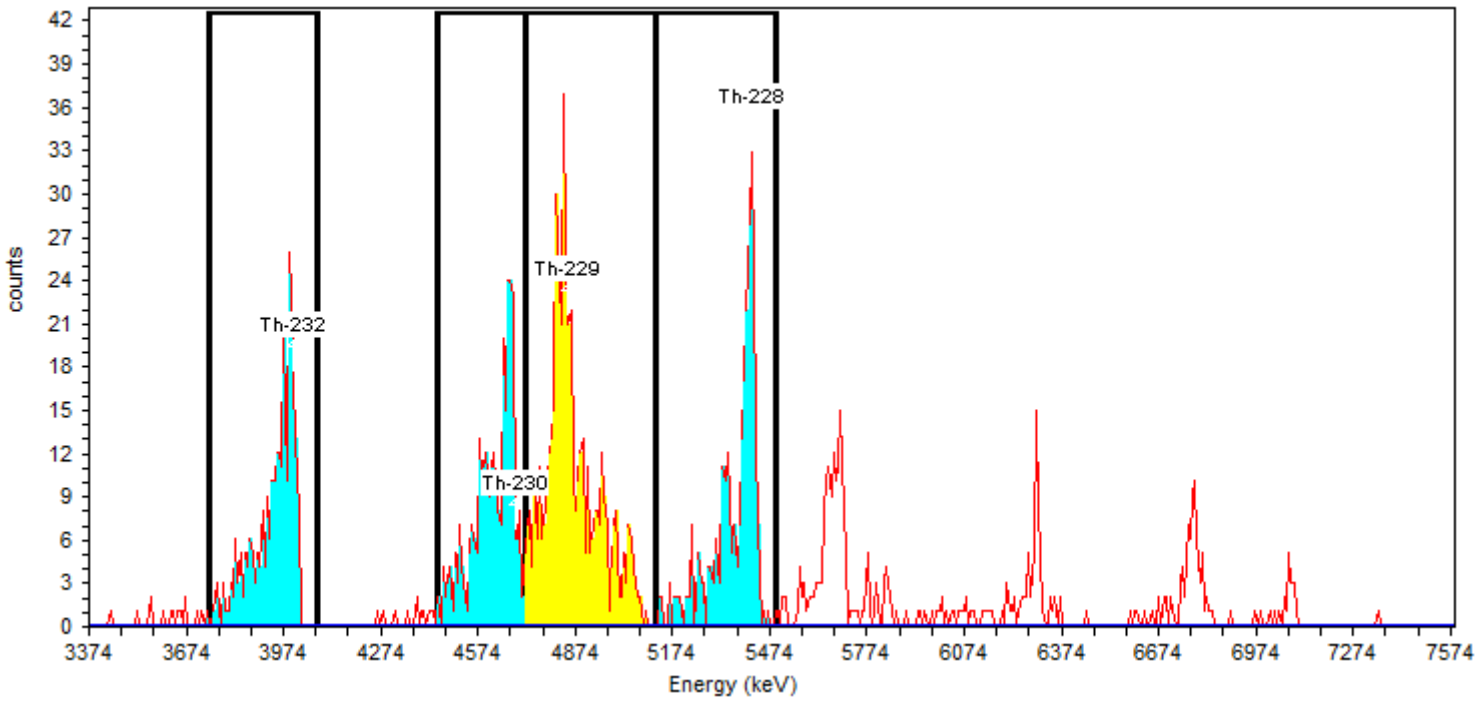
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 73.99%

Acquisition

Detector: AV160 SN: 50-05/II6
Acquisition Start Date: 7/8/2016 12:38:27PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 6/24/2016 4:15:19PM
Bkgd Info: Sample: ICB;AV160; Det: AV160; Spectrum #1; 6/24/2016 4:15:19 PM

Energy Calibration: IC-9886;AV160-20151016a
Efficiency Calibration:IC-9886;AV160-20151016a
Calibration Date: 10/16/2015 6:47:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.97% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:09PM
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	262	0.8333	261.17	1.656E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	19.3	99.7	296	1.2500	295.20	1.882E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.3	99.6	476	0.8333	475.23	2.243E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.0	99.8	287	2.9167	284.08	1.811E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:00PM 7/8/2016

Sample

Sample Name: 160-17797-A-10-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-10-C
Sample Collection Date: 6/14/2016 2:10:00PM
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: 257496
AnalysisResultsID: 170784
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

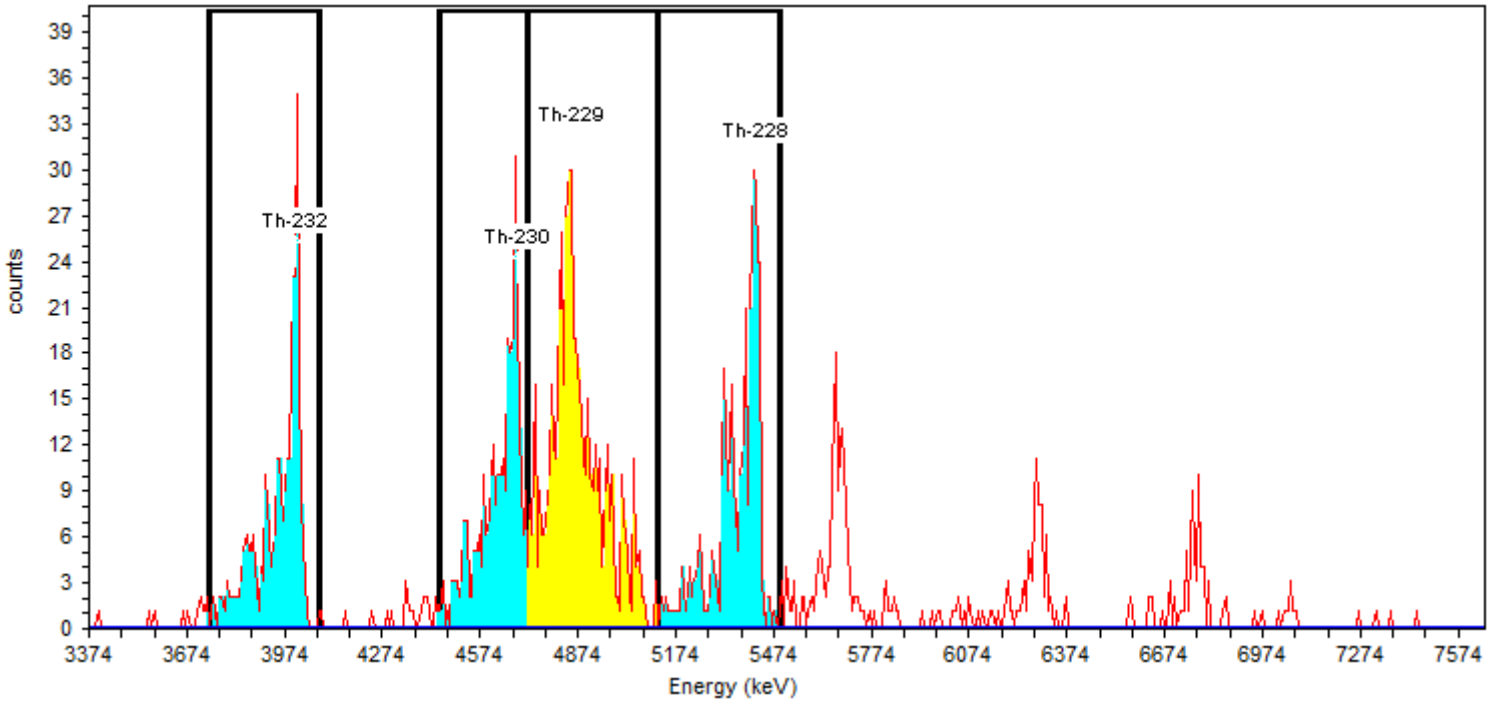
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 72.12%

Acquisition

Detector: AV162 SN: 50-05/JJ6
Acquisition Start Date: 7/8/2016 12:38:27PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:20PM
Bkgd Info: Sample: ICB;AV162; Det: AV162; Spectrum #1; 6/24/2016 4:15:20 PM

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.9	100.2	266	0.0000	266.39	1.571E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.8	99.7	291	1.2500	289.87	1.718E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.8	99.6	511	1.6667	509.65	2.180E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	108.9	99.8	333	7.0833	326.28	1.934E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:17AM 7/12/2016

Sample

Sample Name: 160-17797-A-11-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-11-C
Sample Collection Date: 6/14/2016 2:15:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 171020
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

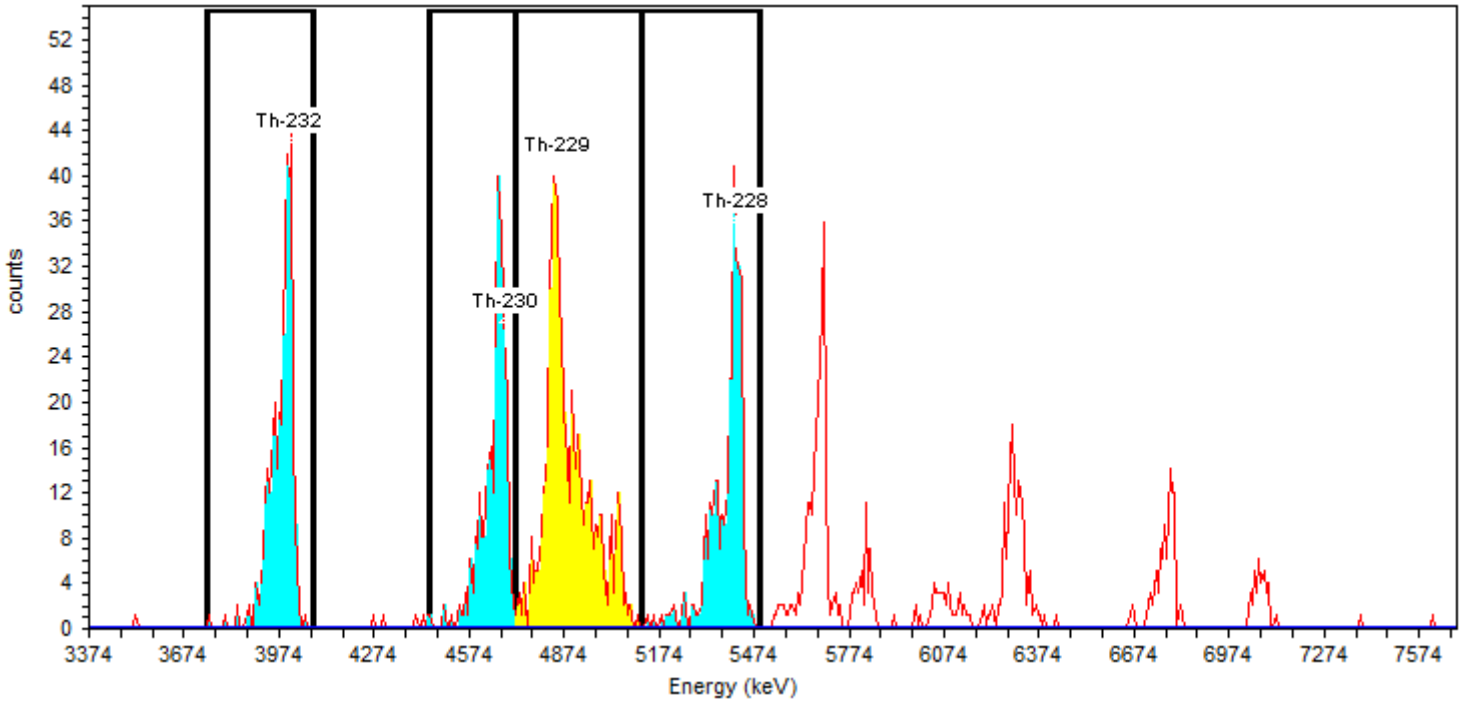
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.61%

Acquisition

Detector: AV202 SN: 50-117Z2
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.01 min.
Background Date: 6/26/2016 5:10:13PM
Bkgd Info: Sample: ICB;AV202; Det: AV202; Spectrum #4; 6/26/2016 5:10:13 PM

Energy Calibration: IC-9886;AV202-20151017a
Efficiency Calibration:IC-9886;AV202-20151017a
Calibration Date: 10/18/2015 3:55:45PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.16% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	56.9	100.2	329	0.4167	329.01	1.763E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.5	99.7	303	0.4167	302.61	1.629E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	64.7	99.6	561	0.4167	560.61	2.616E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.5	99.8	327	4.5472	322.45	1.743E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:07PM 7/8/2016

Sample

Sample Name: 160-17797-A-12-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-12-C
Sample Collection Date: 6/14/2016 2:20:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 170785
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

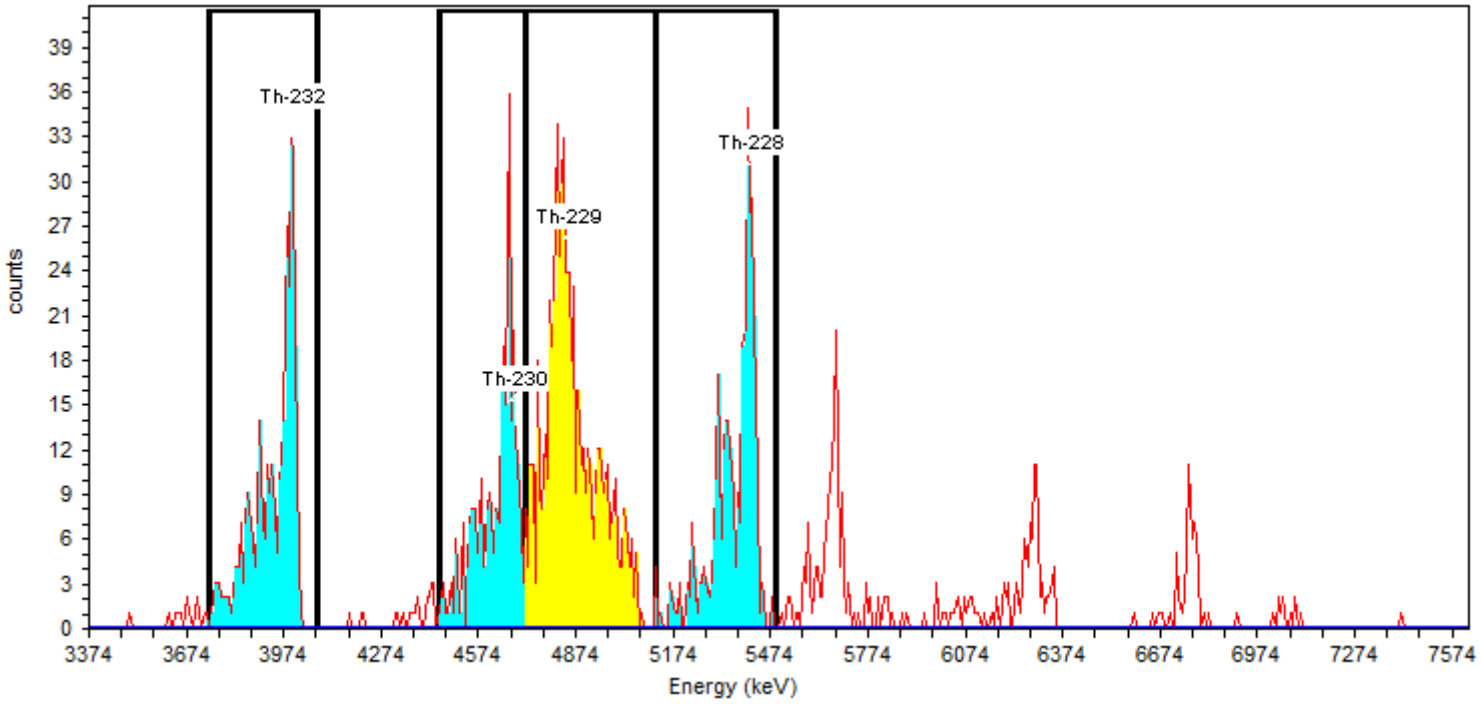
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.94%

Acquisition

Detector: AV165 SN: 50-112F7
Acquisition Start Date: 7/8/2016 12:38:27PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:20PM
Bkgd Info: Sample: ICB;AV165; Det: AV165; Spectrum #1; 6/24/2016 4:15:20 PM

Energy Calibration: IC-8877;AV165-20151016
Efficiency Calibration:IC-8877;AV165-20151016
Calibration Date: 10/17/2015 2:36:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.89% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	48.8	100.2	323	1.6667	321.76	1.659E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	42.3	99.7	290	4.4679	285.10	1.478E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	90.4	99.6	586	3.3462	582.27	2.535E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.0	99.8	340	7.9528	331.79	1.720E+000	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
7:19:15PM 7/8/2016

Sample

Sample Name: 160-17797-A-13-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-13-C
Sample Collection Date: 6/14/2016 2:20:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 170787
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

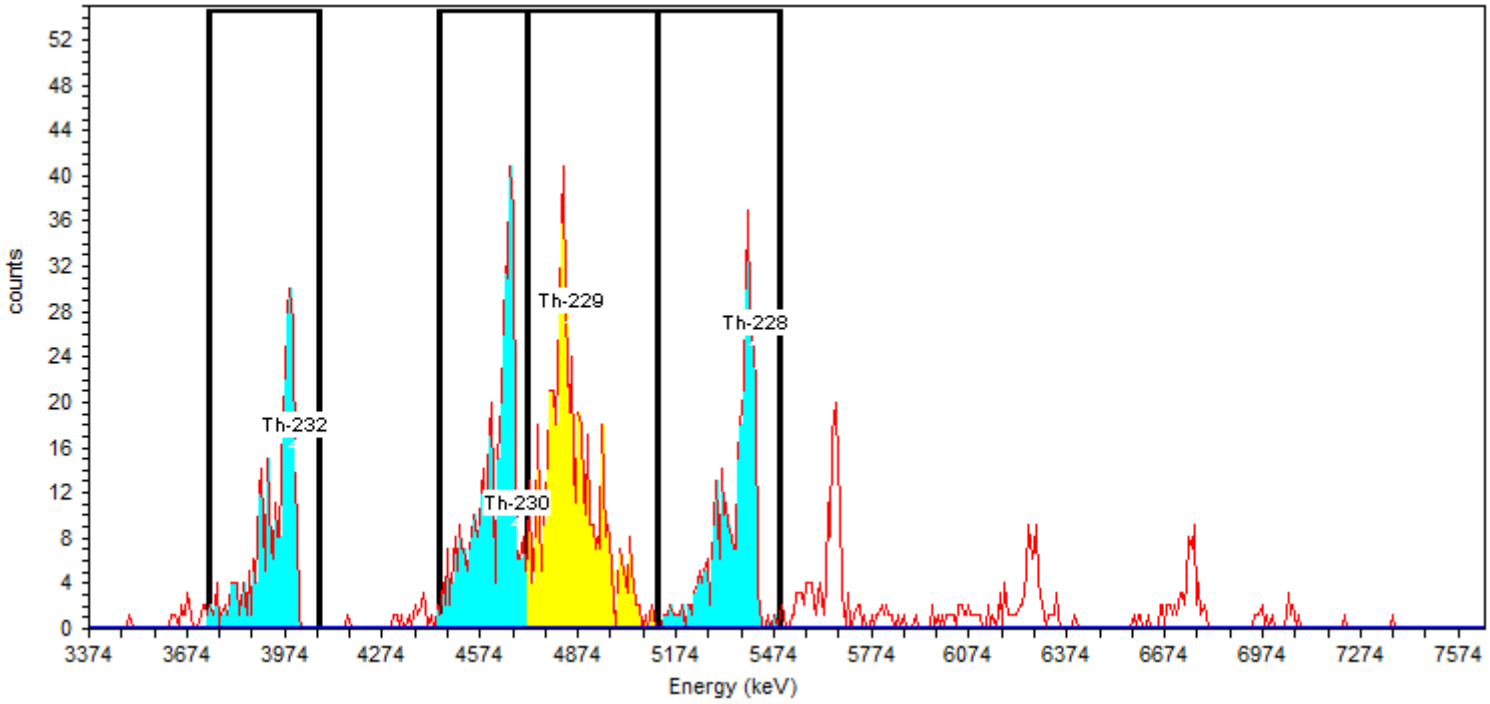
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.04%

Acquisition

Detector: AV166 SN: 50-112 G1
Acquisition Start Date: 7/8/2016 12:38:27PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:20PM
Bkgd Info: Sample: ICB;AV166; Det: AV166; Spectrum #1; 6/24/2016 4:15:20 PM

Energy Calibration: IC-9520;AV166-20151016a
Efficiency Calibration:IC-9520;AV166-20151016a
Calibration Date: 10/17/2015 2:37:00PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	50.4	100.2	294	0.4167	293.16	1.557E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.2	99.7	440	0.4167	439.11	2.344E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.6	99.6	569	1.2500	567.97	2.610E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.2	99.8	348	5.4167	342.67	1.830E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:19PM 7/8/2016

Sample

Sample Name: 160-17797-A-14-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-14-C
Sample Collection Date: 6/14/2016 2:30:00PM
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: 257496
AnalysisResultsID: 170788
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

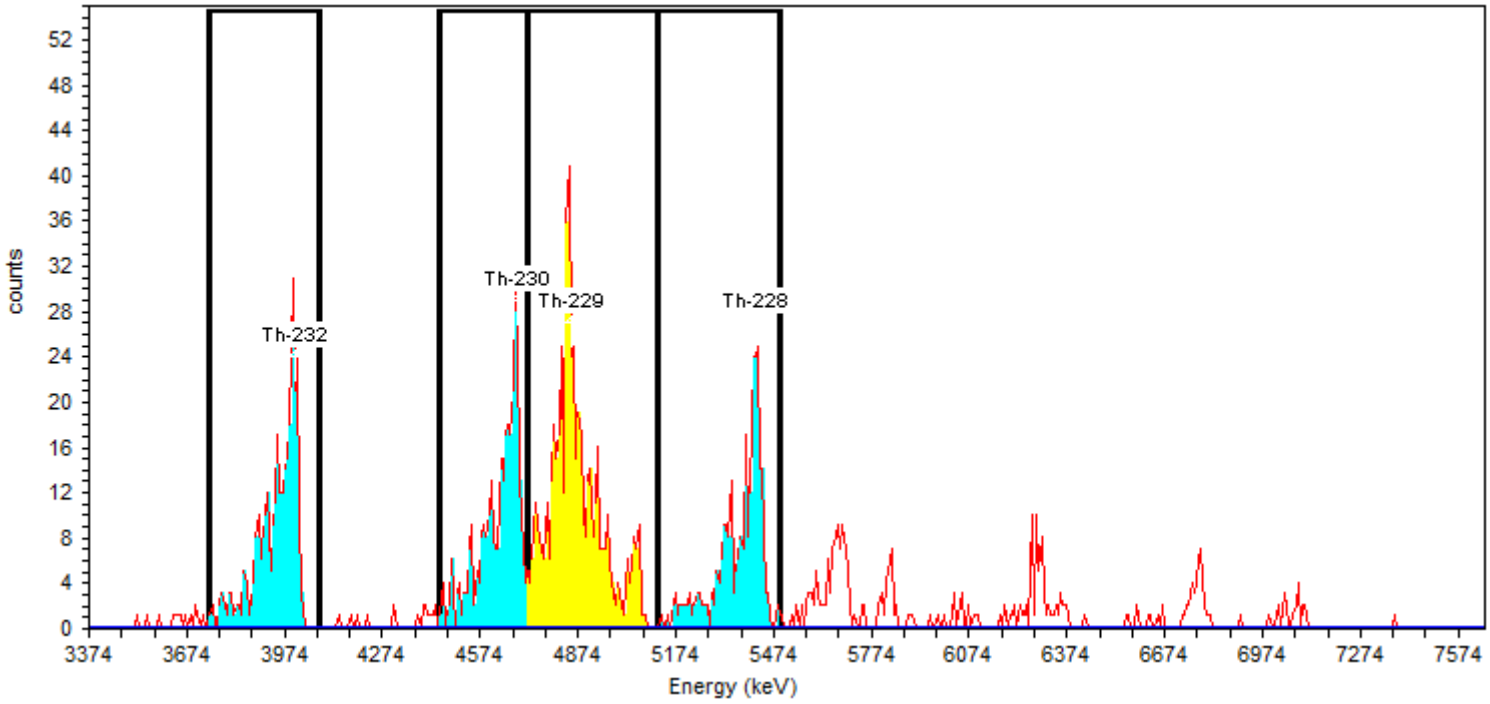
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 75.90%

Acquisition

Detector: AV167 SN: 50-112 G3
Acquisition Start Date: 7/8/2016 12:38:28PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:21PM
Bkgd Info: Sample: ICB;AV167; Det: AV167; Spectrum #1; 6/24/2016 4:15:21 PM

Energy Calibration: IC-9792;AV167-20151016a
Efficiency Calibration:IC-9792;AV167-20151016a
Calibration Date: 10/17/2015 2:37:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.60% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	78.8	100.2	293	0.0000	293.43	1.695E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.2	99.7	311	0.8333	309.83	1.799E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.9	99.6	521	0.4167	520.55	2.296E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.7	99.8	270	5.0000	265.00	1.539E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:27PM 7/8/2016

Sample

Sample Name: 160-17797-A-15-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-15-C
Sample Collection Date: 6/14/2016 2:35:00PM
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: 257496
AnalysisResultsID: 170790
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

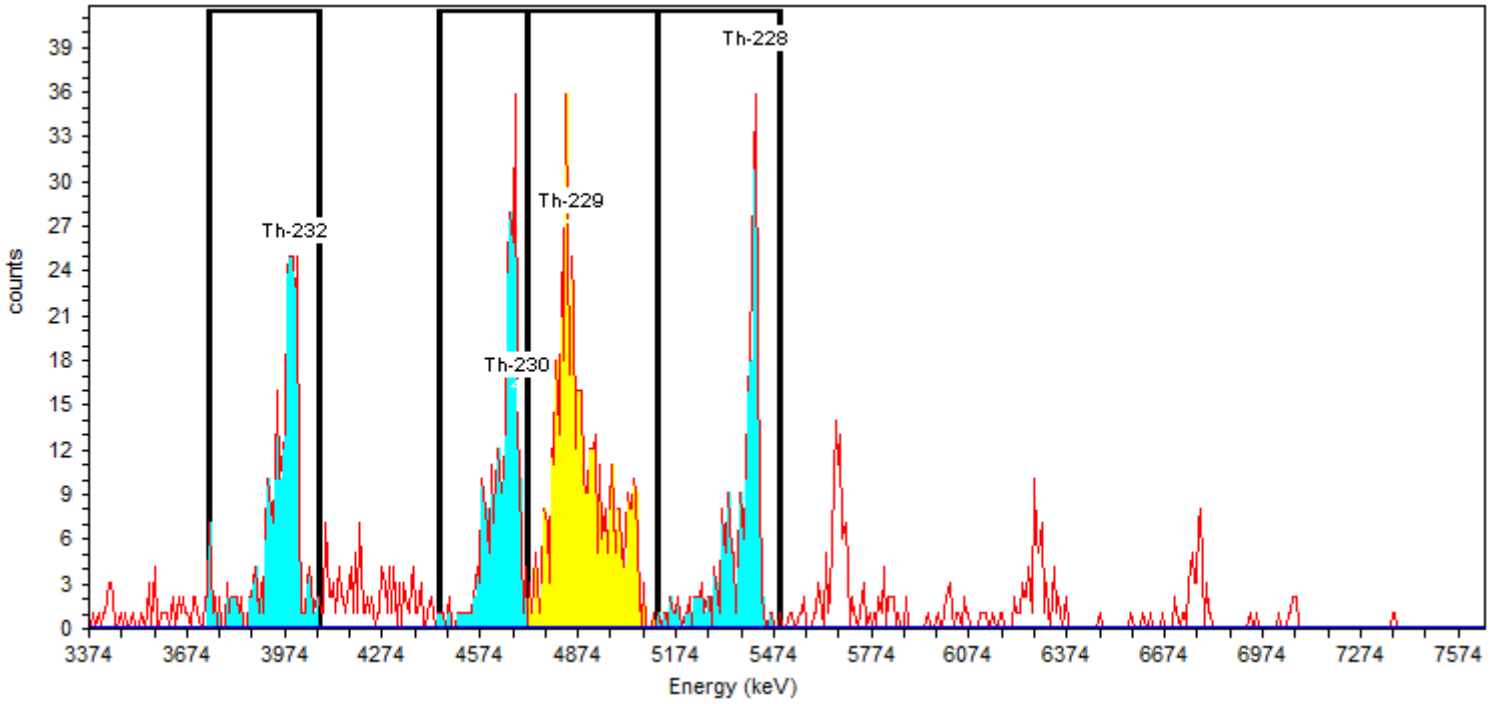
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 67.62%

Acquisition

Detector: AV170 SN: 50-112 G7
Acquisition Start Date: 7/8/2016 12:38:28PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/26/2016 5:10:11PM
Bkgd Info: Sample: ICB;AV170; Det: AV170; Spectrum #4; 6/26/2016 5:10:11 PM

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	59.9	100.2	274	0.4167	274.03	1.749E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.7	99.7	267	0.0000	267.09	1.714E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.8	99.6	471	0.8333	470.20	2.041E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.8	99.8	238	5.0000	232.85	1.494E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:23PM 7/8/2016

Sample

Sample Name: 160-17797-A-16-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-16-C
Sample Collection Date: 6/14/2016 2:45:00PM
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: 257496
AnalysisResultsID: 170789
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

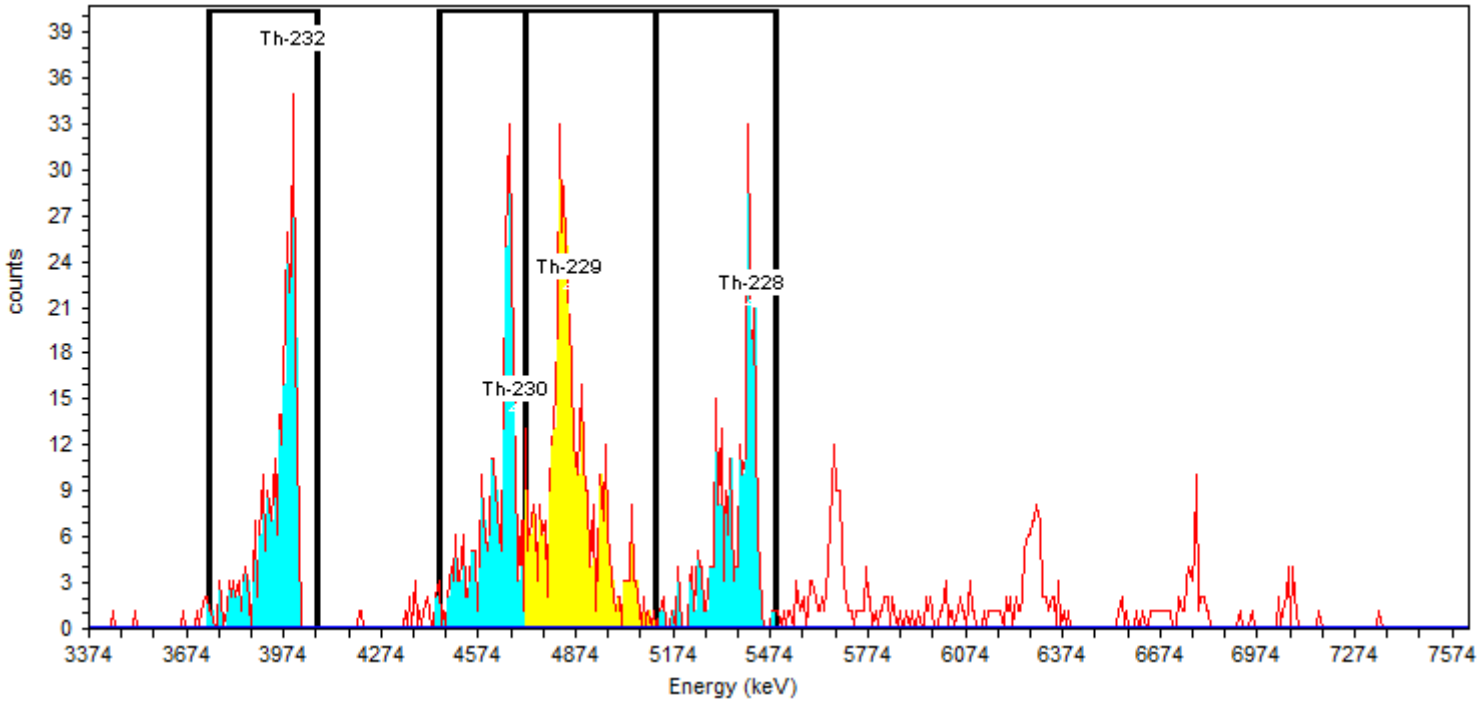
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 65.24%

Acquisition

Detector: AV171 SN: 50-112 Y2
Acquisition Start Date: 7/8/2016 12:38:28PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:21PM
Bkgd Info: Sample: ICB;AV171; Det: AV171; Spectrum #1; 6/24/2016 4:15:21 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:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.1	100.2	278	0.8333	277.17	1.940E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.1	99.7	271	2.0833	269.36	1.894E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.6	99.6	432	2.0833	429.73	1.973E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.3	99.8	265	5.4167	259.65	1.827E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:22AM 7/12/2016

Sample

Sample Name: 160-17797-A-17-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-17-C
Sample Collection Date: 6/14/2016 2:40:00PM
Comment:

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

Batch

Batch Name: 257496
AnalysisResultsID: 171021
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

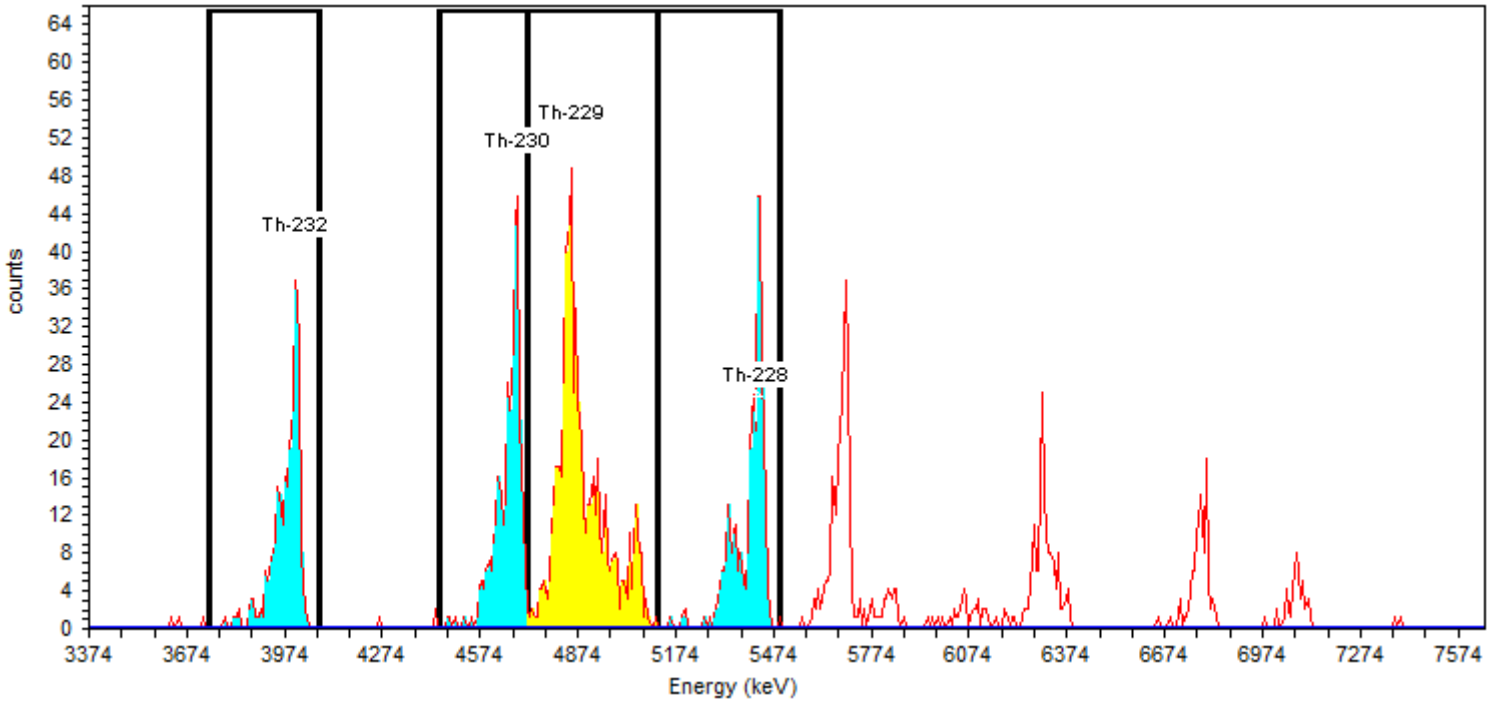
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 85.43%

Acquisition

Detector: AV203 SN: 50-117J4
Acquisition Start Date: 7/11/2016 7:29:20PM
Live Time: 400.00 min.
Real Time: 400.08 min.
Background Date: 6/24/2016 4:15:22PM
Bkgd Info: Sample: ICB;AV203; Det: AV203; Spectrum #1; 6/24/2016 4:15:22 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:7/7/2016 1:05:08PM
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	57.3	100.2	279	0.0000	279.00	1.408E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.0	99.7	321	0.4167	320.55	1.626E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	64.7	99.6	595	0.4167	594.62	2.578E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.8	99.8	310	4.1667	305.81	1.557E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:19:34PM 7/8/2016

Sample

Sample Name: 160-17797-A-18-C Type: Sample
Spectrum #2 Analysis #1
: 160-17797-A-18-C
Sample Collection Date: 6/14/2016 2:50:00PM
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: 257496
AnalysisResultsID: 170792
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

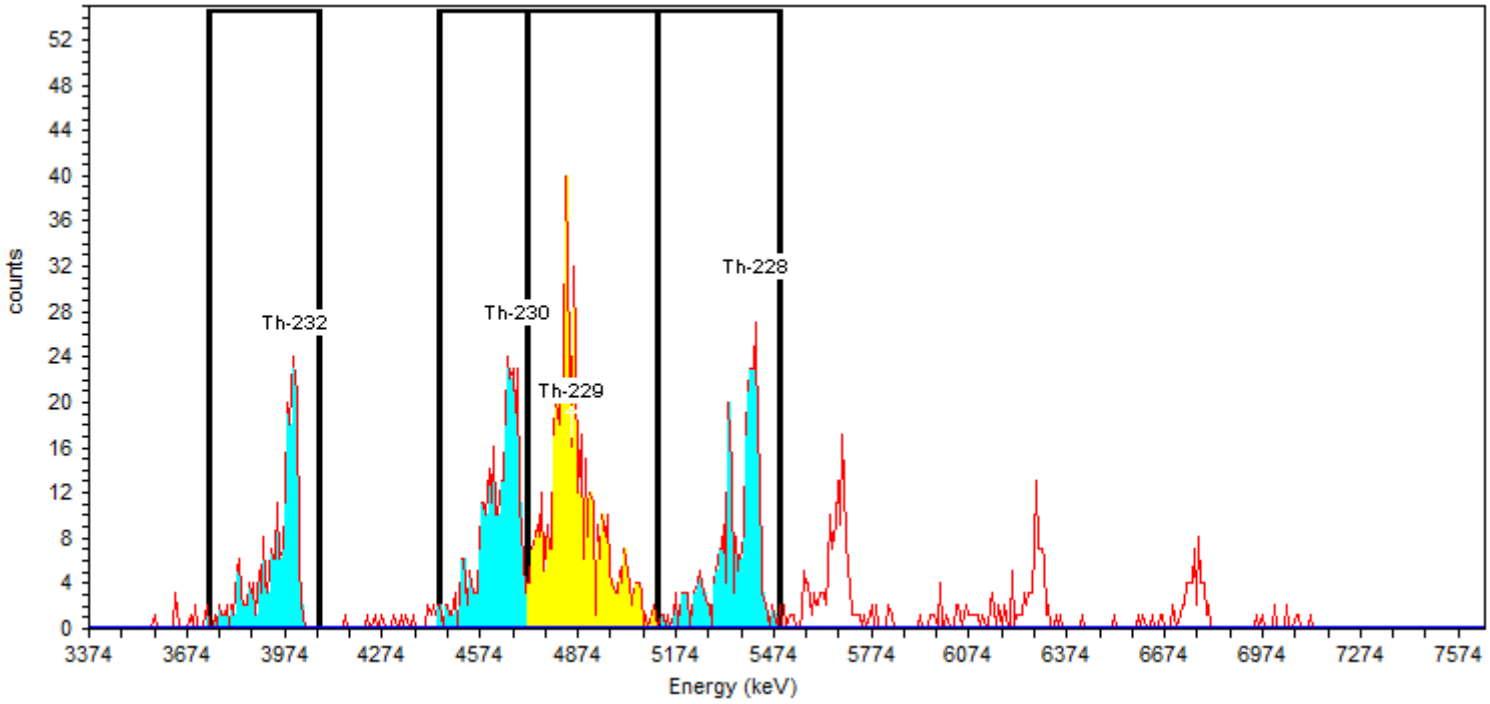
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 72.06%

Acquisition

Detector: AV173 SN: 50-112 Y4
Acquisition Start Date: 7/8/2016 12:38:29PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:22PM
Bkgd Info: Sample: ICB;AV173; Det: AV173; Spectrum #1; 6/24/2016 4:15:22 PM

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:7/7/2016 1:05:08PM
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	230	0.8333	229.17	1.399E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.2	99.7	321	0.4167	320.58	1.966E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.7	99.6	496	2.0833	493.98	2.185E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.7	99.8	294	3.3333	290.56	1.783E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:03AM 7/12/2016

Sample

Sample Name: 160-17797-A-19-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-19-C
Sample Collection Date: 6/14/2016 2:55:00PM
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: 257496
AnalysisResultsID: 171017
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

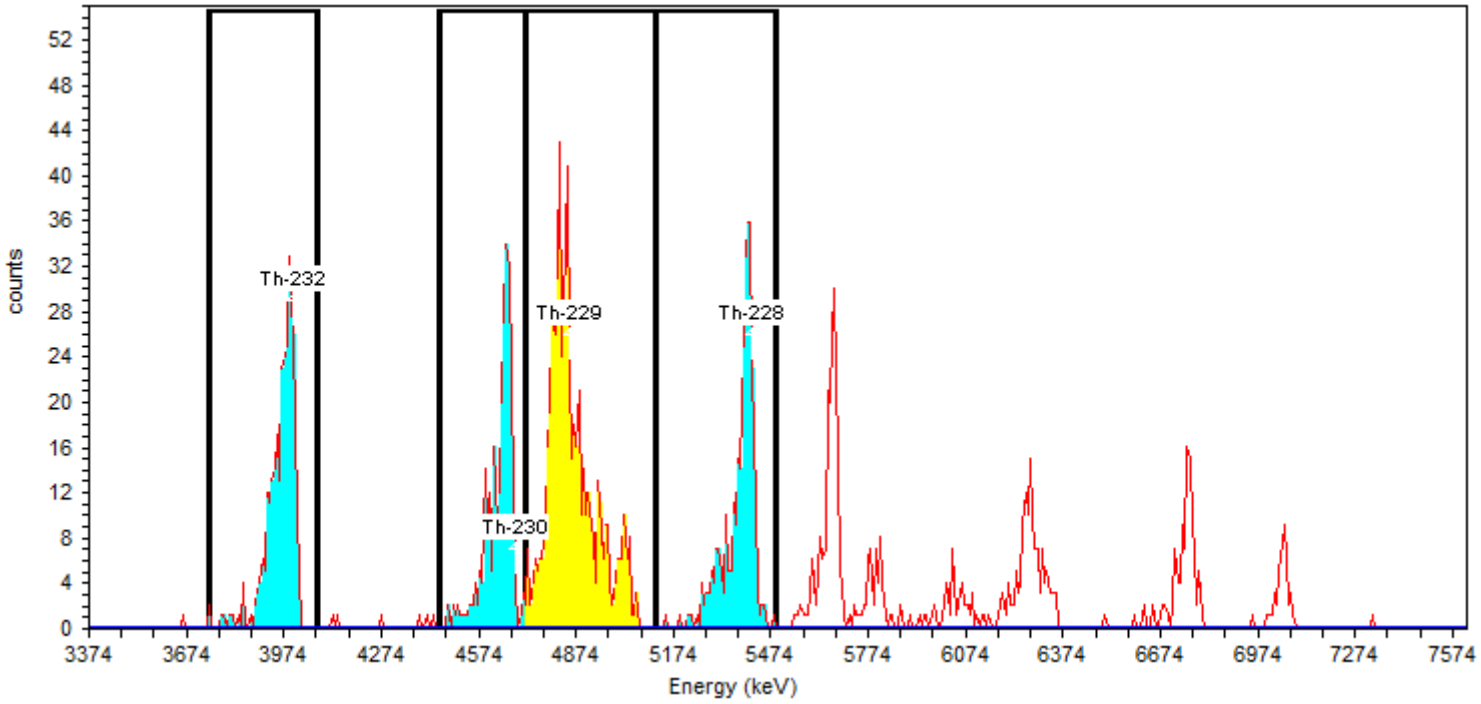
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 79.48%

Acquisition

Detector: AV204 SN: 50-117I4
Acquisition Start Date: 7/11/2016 7:29:21PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:22PM
Bkgd Info: Sample: ICB;AV204; Det: AV204; Spectrum #1; 6/24/2016 4:15:22 PM

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:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.1	100.2	287	1.0729	286.08	1.536E+000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.7	99.7	264	0.0000	264.15	1.426E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.2	99.6	560	0.8333	559.32	2.401E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.1	99.8	291	5.0361	285.96	1.549E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:34:37AM 7/12/2016

Sample

Sample Name: 160-17797-A-19-C Type: Sample
Spectrum #3 Analysis #1
: 160-17797-A-19-C
Sample Collection Date: 6/14/2016 2:55:00PM
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: 257496
AnalysisResultsID: 171029
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

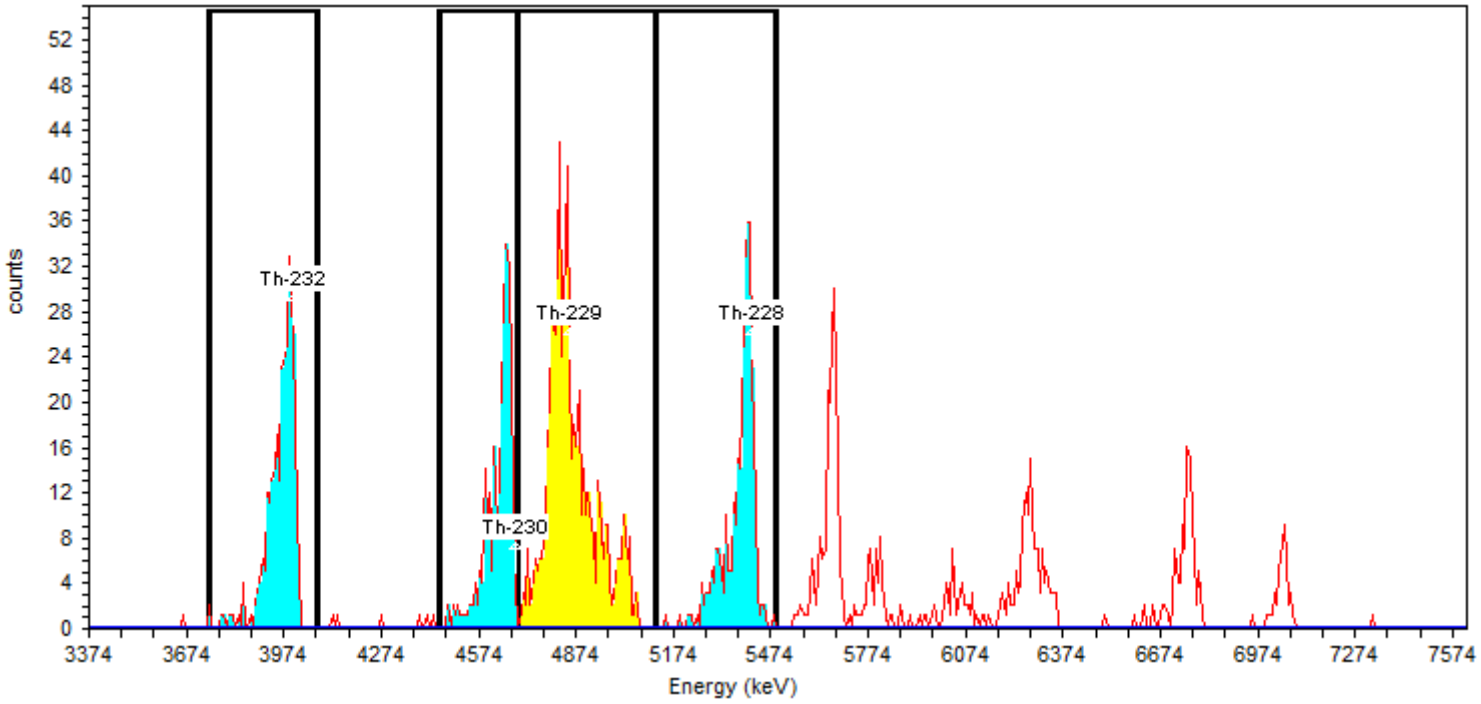
Tracer Name: Th-229_00020
Tracer Activity: 67.23 DPM / mL x (Vol.) 0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 1:28:22PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.02%

Acquisition

Detector: AV204 SN: 50-117I4
Acquisition Start Date: 7/11/2016 7:29:21PM
Live Time: 400.00 min.
Real Time: 400.00 min.
Background Date: 6/24/2016 4:15:22PM
Bkgd Info: Sample: ICB;AV204; Det: AV204; Spectrum #1; 6/24/2016 4:15:22 PM

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 Interactive ROI Analysis
Decay Correction:7/7/2016 1:05:08PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing. 07/12/2016 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	4694.4	25.7	99.7	258	0.0000	258.00	1.366E+000	pCi/g
Th-229	4848.0	4,845.3	2.7	4694.4	5119.5	85.2	99.6	571	0.8333	570.17	2.448E+000	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.1	99.8	291	5.0361	285.96	1.520E+000	pCi/g
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.1	100.2	287	1.0729	286.08	1.507E+000	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/08/16

		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	07/08/16 08:48	6011	5686.2-6284.7	Pass	14.6	10-20	Pass	222.1	218.0-228.0	Pass	5023	4990.0-5070.0	Pass
AV149	07/08/16 08:47	5829	5704.3-6304.8	Pass	12.7	10-20	Pass	223.0	217.9-227.9	Pass	5030	4989.4-5069.4	Pass
AV152	07/08/16 08:47	6009	5683.1-6281.3	Pass	15.2	10-20	Pass	224.1	218.9-228.9	Pass	5038	4996.9-5076.9	Pass
AV153	07/08/16 08:47	5982	5694.3-6293.7	Pass	16.3	10-20	Pass	223.0	218.0-228.0	Pass	5030	4989.9-5069.9	Pass
AV154	07/08/16 08:47	5818	5712.1-6313.4	Pass	12.6	10-20	Pass	221.0	216.0-226.0	Pass	5015	4974.8-5054.8	Pass
AV155	07/08/16 08:47	5880	5702.4-6302.6	Pass	12.2	10-20	Pass	222.0	216.5-226.5	Pass	5023	4978.5-5058.5	Pass
AV157	07/08/16 08:47	5929	5565.7-6151.5	Pass	12.3	10-20	Pass	222.0	218.1-228.1	Pass	5022	4990.4-5070.4	Pass
AV160	07/08/16 08:47	6003	5658.3-6253.9	Pass	19.7	10-20	Pass	221.9	216.9-226.9	Pass	5022	4981.7-5061.7	Pass
AV162	07/08/16 08:47	6013	5631.4-6224.2	Pass	13.6	10-20	Pass	223.0	218.0-228.0	Pass	5030	4990.0-5070.0	Pass
AV165	07/08/16 08:47	6027	5605.6-6195.6	Pass	13.6	10-20	Pass	222.9	218.1-228.1	Pass	5029	4991.0-5071.0	Pass
AV166	07/08/16 08:47	5964	5696.3-6296.0	Pass	16.7	10-20	Pass	219.9	217.8-227.8	Pass	5007	4988.4-5068.4	Pass
AV167	07/08/16 08:47	6032	5716.9-6318.7	Pass	14.0	10-20	Pass	225.0	219.5-229.5	Pass	5045	5001.2-5081.2	Pass
AV170	07/08/16 08:47	5835	5708.9-6309.8	Pass	13.0	10-20	Pass	224.0	218.2-228.2	Pass	5038	4991.8-5071.8	Pass
AV171	07/08/16 08:47	6002	5540.8-6124.1	Pass	14.9	10-20	Pass	222.8	219.0-229.0	Pass	5029	4997.8-5077.8	Pass
AV173	07/08/16 08:47	6003	5721.2-6323.5	Pass	15.2	10-20	Pass	221.1	216.0-226.0	Pass	5016	4975.4-5055.4	Pass

Analysis Date: 07/11/16

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV191	07/11/16 09:24	5688	5518.8-6099.7	Pass	13.2	10-20	Pass	222.1	217.0-227.0	Pass	5023	4982.9-5062.9	Pass
AV194	07/11/16 09:24	5990	5662.9-6259.0	Pass	15.6	10-20	Pass	221.9	217.3-227.3	Pass	5022	4984.8-5064.8	Pass
AV198	07/11/16 09:24	5990	5708.4-6309.3	Pass	15.9	10-20	Pass	224.0	219.2-229.2	Pass	5037	4998.7-5078.7	Pass
AV200	07/11/16 09:24	5998	5688.6-6287.4	Pass	15.2	10-20	Pass	222.2	216.9-226.9	Pass	5024	4981.7-5061.7	Pass
AV202	07/11/16 09:24	6025	5696.8-6296.4	Pass	14.4	10-20	Pass	224.0	218.4-228.4	Pass	5038	4993.1-5073.1	Pass
AV203	07/11/16 09:24	6017	5646.6-6240.9	Pass	14.5	10-20	Pass	207.9	204.0-214.0	Pass	4918	4885.5-4965.5	Pass
AV204	07/11/16 09:24	5992	5563.7-6149.3	Pass	15.4	10-20	Pass	220.8	217.0-227.0	Pass	5014	4982.8-5062.8	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:32AM 7/8/2016

Sample

Sample Name: Pulser;AV148
Comment:

Spectrum #10 Analysis #1

Batch

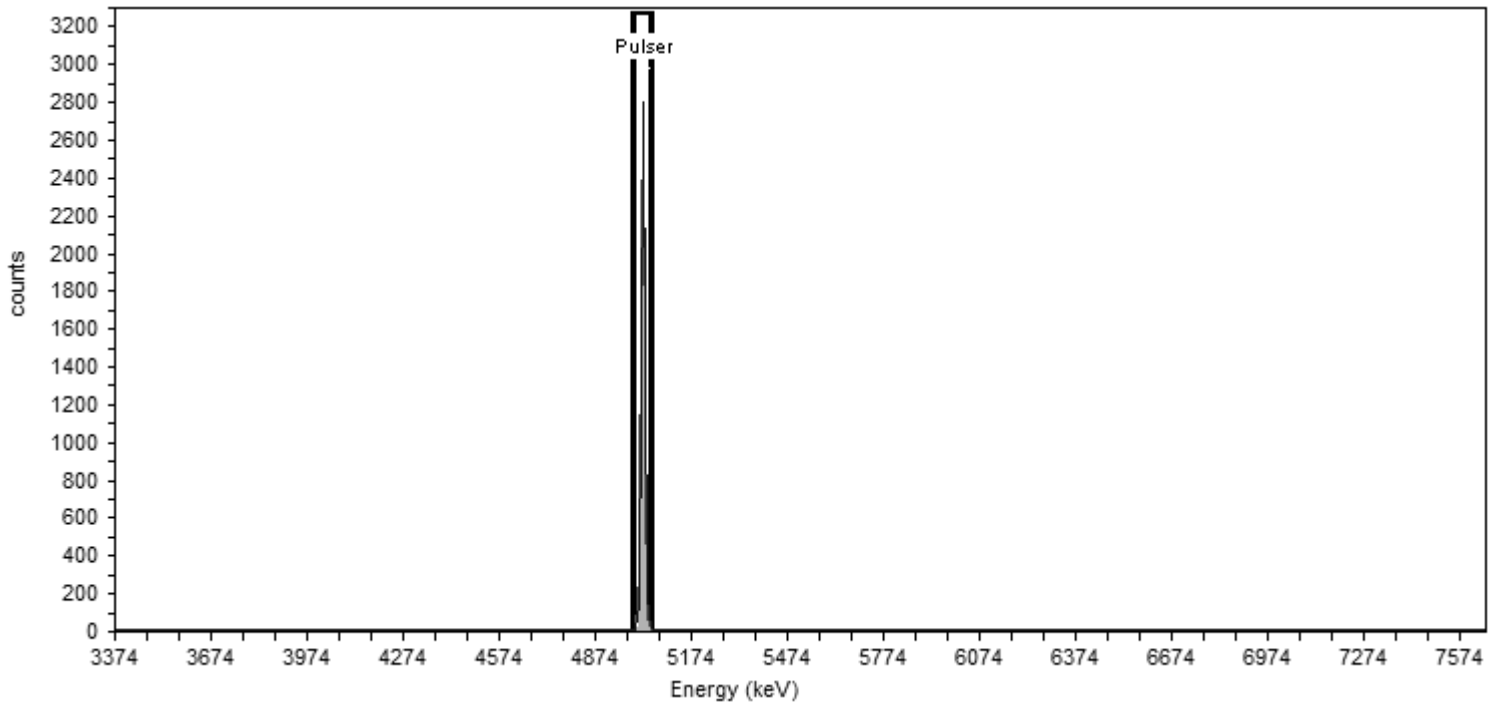
Batch Name: June2016a
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 7/8/2016 8:48:00AM
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	5022.932	4998.096	5047.768	14.59	5,865.53	6,011.19

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:33AM 7/8/2016

Sample

Sample Name: Pulser;AV149
Comment:

Spectrum #10 Analysis #1

Batch

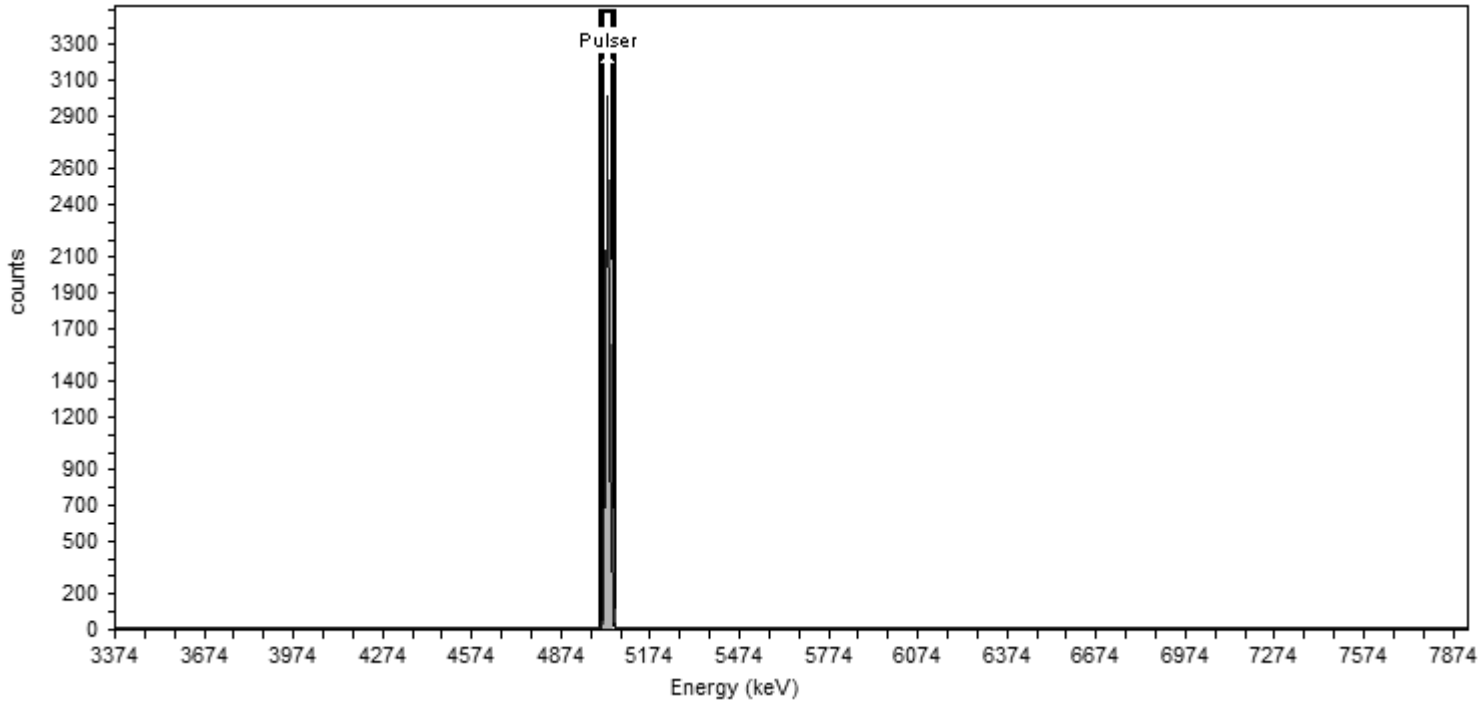
Batch Name: June2016a
Description:

Acquisition

Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 7/8/2016 8:47:54AM
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	5029.675	5008.044	5051.306	12.71	5,492.15	5,829.39

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:43AM 7/8/2016

Sample

Sample Name: Pulser;AV152
Comment:

Spectrum #9 Analysis #1

Batch

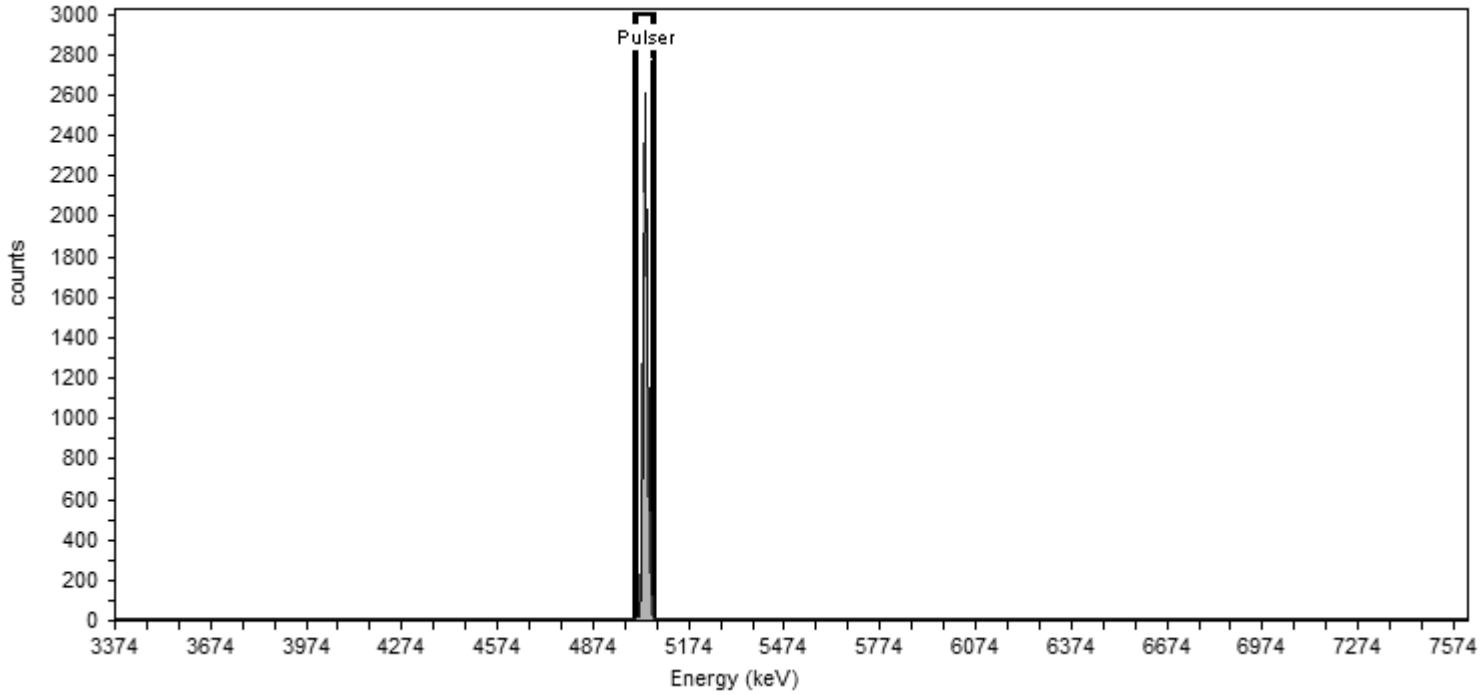
Batch Name: June2016a
Description:

Acquisition

Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 7/8/2016 8:47:54AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV152-20151016
Calibration Date: 10/16/2015 6:46:53PM

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	5037.938	5012.039	5063.835	15.22	5,700.77	6,009.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:41AM 7/8/2016

Sample

Sample Name: Pulser;AV153
Comment:

Spectrum #9 Analysis #1

Batch

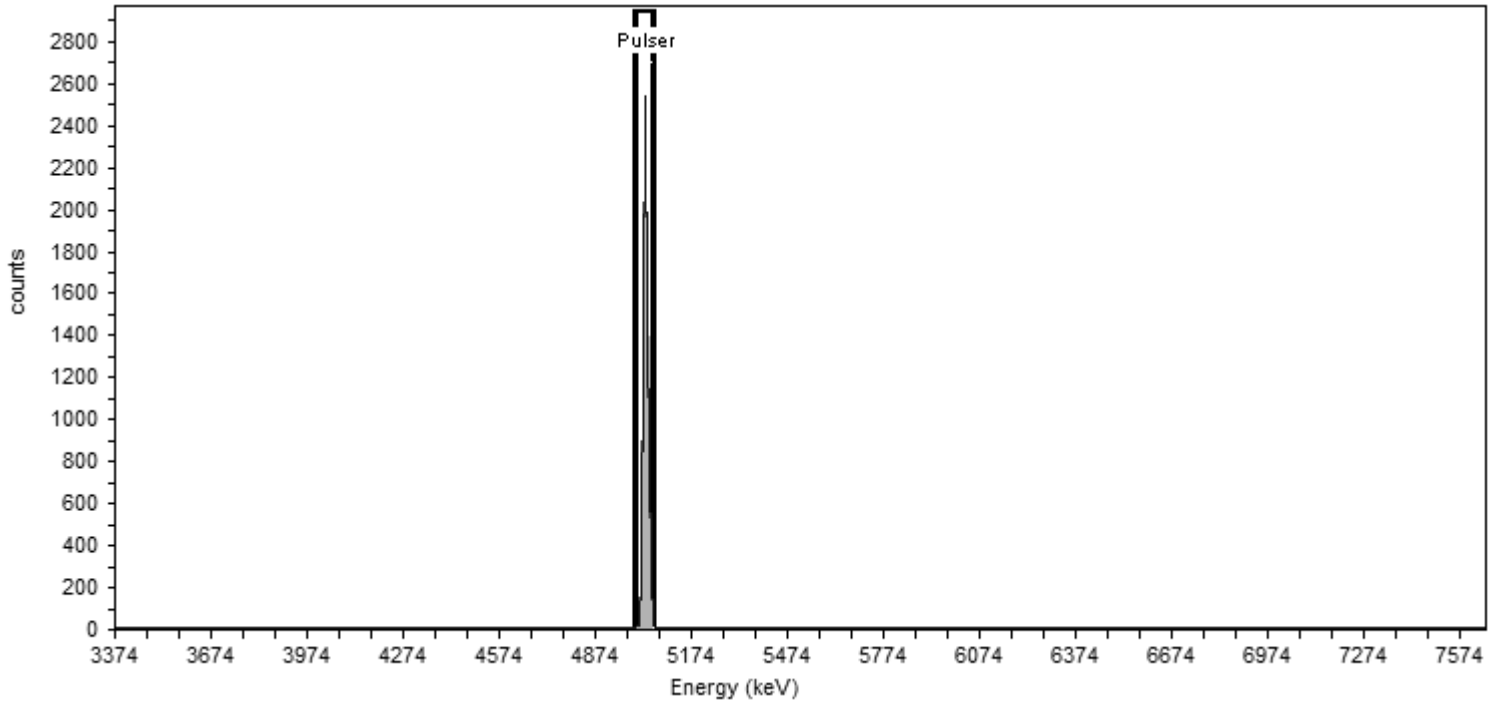
Batch Name: June2016a
Description:

Acquisition

Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 7/8/2016 8:47:54AM
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	5030.054	5002.248	5057.859	16.34	5,952.56	5,981.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:40AM 7/8/2016

Sample

Sample Name: Pulser;AV154
Comment:

Spectrum #10 Analysis #1

Batch

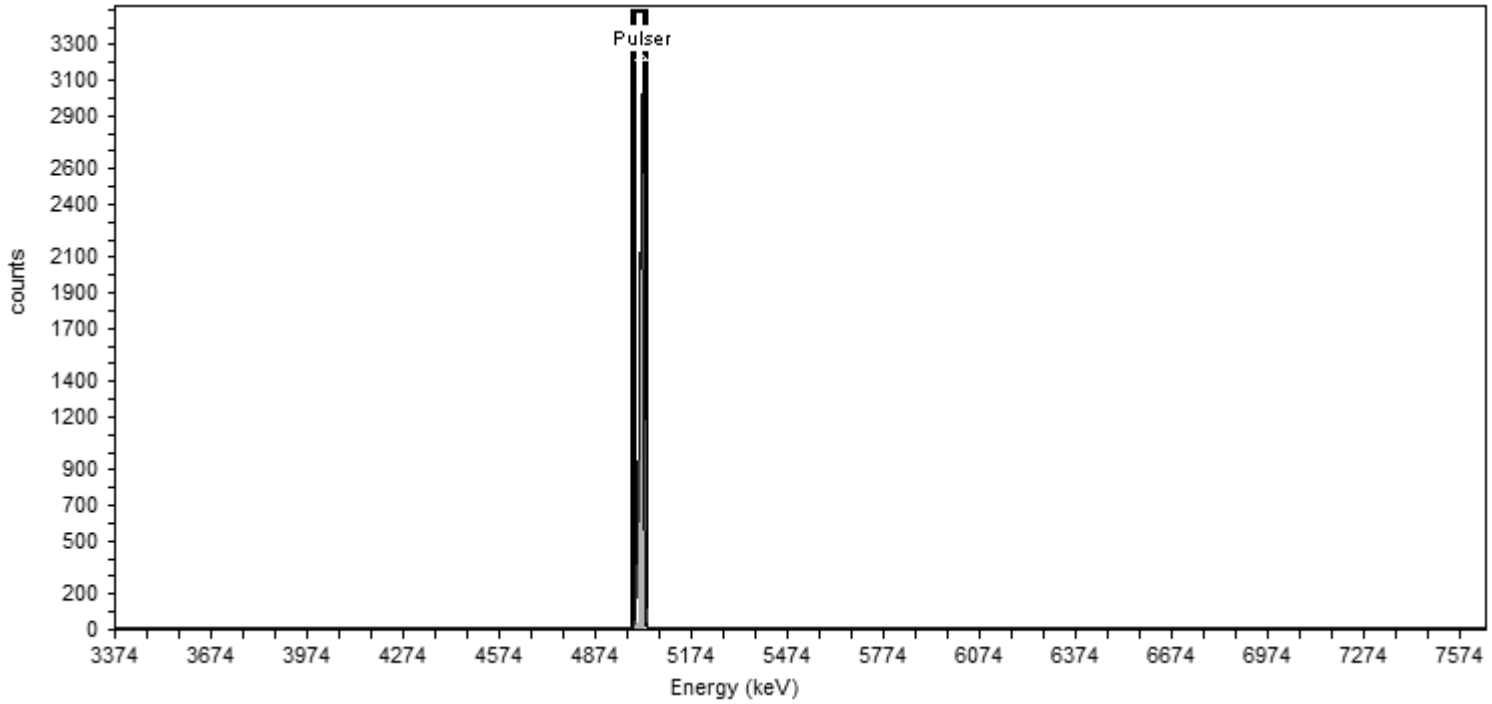
Batch Name: June2016a
Description:

Acquisition

Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 7/8/2016 8:47:55AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9793;AV154-20151016
Calibration Date: 10/16/2015 6:47:00PM

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	5014.736	4993.369	5036.104	12.55	5,441.33	5,818.42

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:42AM 7/8/2016

Sample

Sample Name: Pulser;AV155
Comment:

Spectrum #9 Analysis #1

Batch

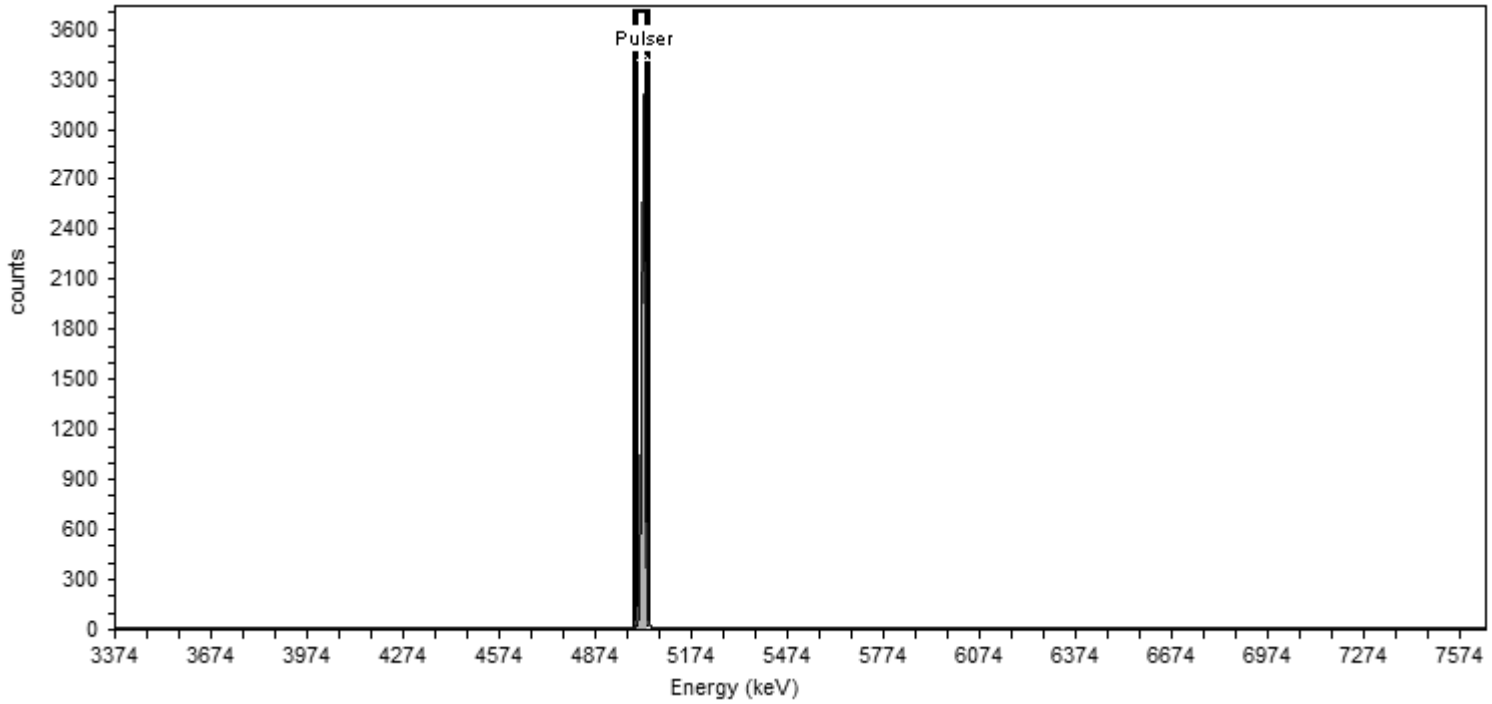
Batch Name: June2016a
Description:

Acquisition

Detector: AV155 , SN: 50-05/II1
Acquisition Start Date: 7/8/2016 8:47:55AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9794;AV155-20151016
Calibration Date: 10/16/2015 6:47:03PM

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	5022.741	5001.986	5043.496	12.19	5,604.36	5,879.83

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:56AM 7/8/2016

Sample

Sample Name: Pulser;AV157
Comment:

Spectrum #9 Analysis #1

Batch

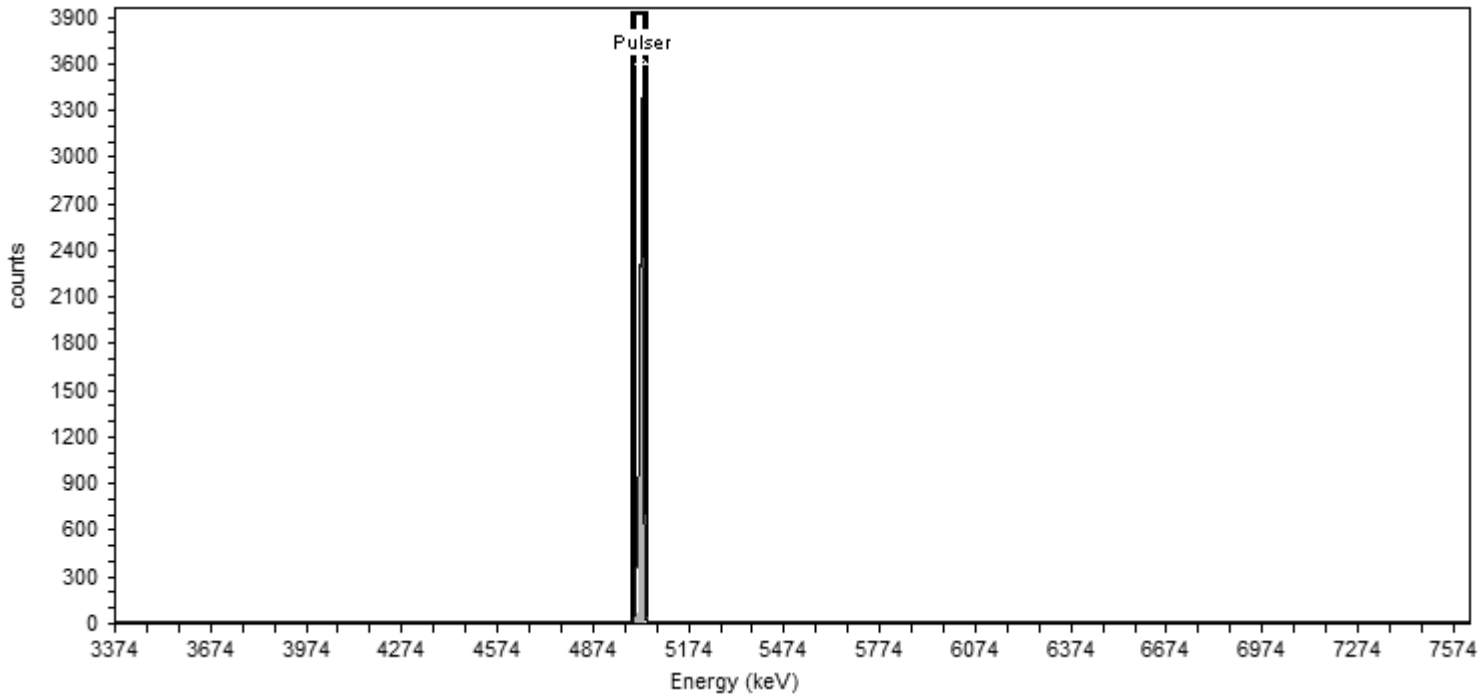
Batch Name: June2016a
Description:

Acquisition

Detector: AV157 , SN: 50-05/II3
Acquisition Start Date: 7/8/2016 8:47:55AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV157-20151016
Calibration Date: 10/16/2015 6:47:07PM

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	5022.487	5001.574	5043.401	12.29	5,954.79	5,928.75

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13715 Rider Trail North
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9:02:57AM 7/8/2016

Sample

Sample Name: Pulser;AV160
Comment:

Spectrum #9 Analysis #1

Batch

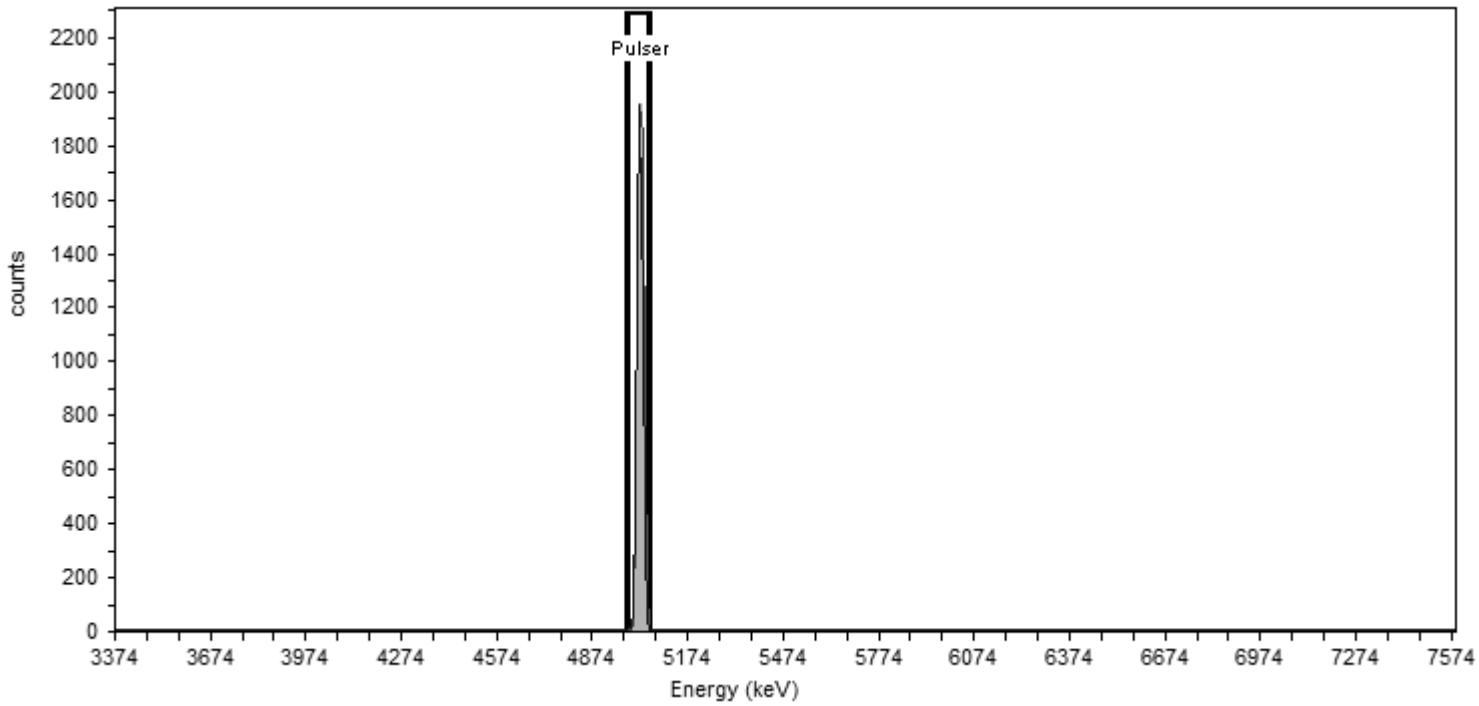
Batch Name: June2016a
Description:

Acquisition

Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 7/8/2016 8:47:55AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV160-20151016a
Calibration Date: 10/16/2015 6:47:48PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.625	4988.128	5055.123	19.68	5,516.07	6,002.68

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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9:02:52AM 7/8/2016

Sample

Sample Name: Pulser;AV162
Comment:

Spectrum #9 Analysis #1

Batch

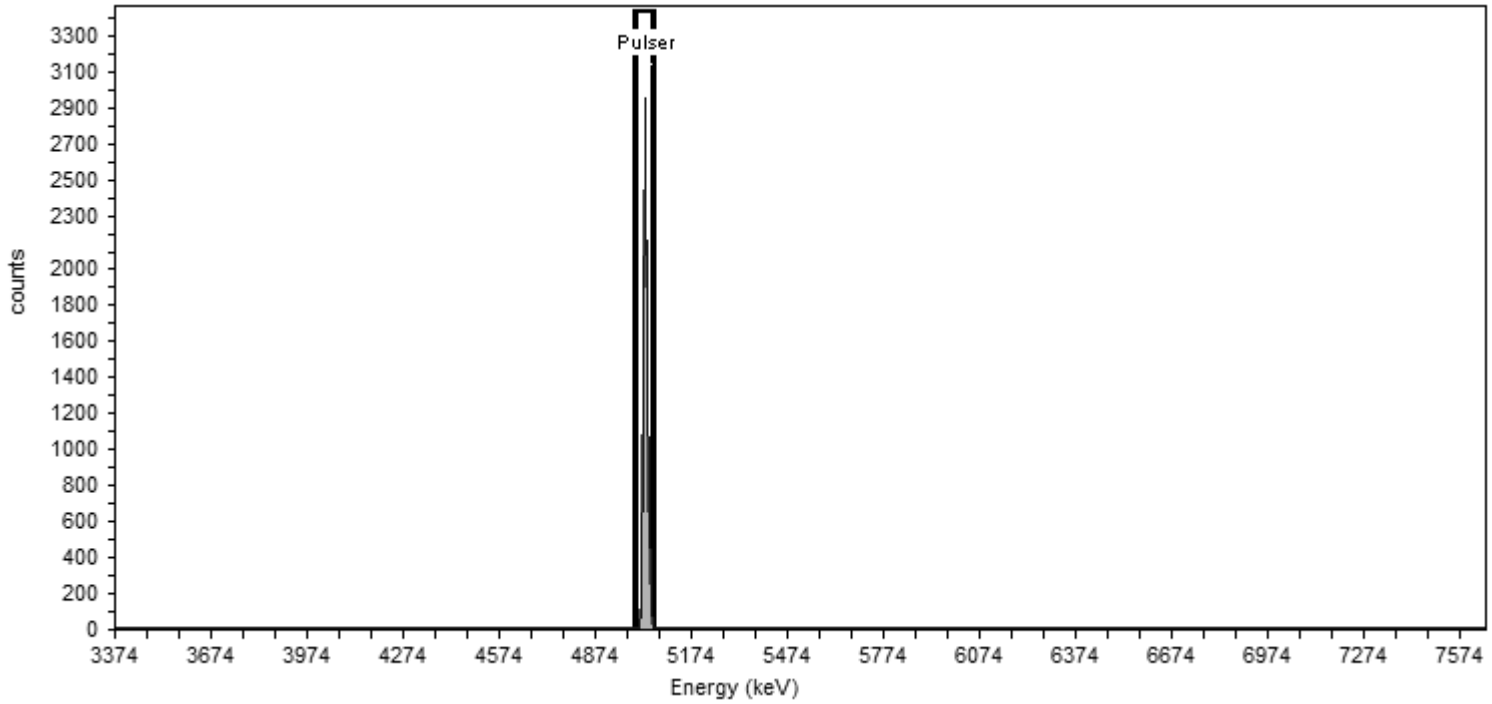
Batch Name: June2016a
Description:

Acquisition

Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 7/8/2016 8:47:56AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV162-20151016
Calibration Date: 10/17/2015 2:36:27PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.321	5007.191	5053.450	13.59	5,755.92	6,013.19

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9:02:14AM 7/8/2016

Sample

Sample Name: Pulser;AV165
Comment:

Spectrum #9 Analysis #1

Batch

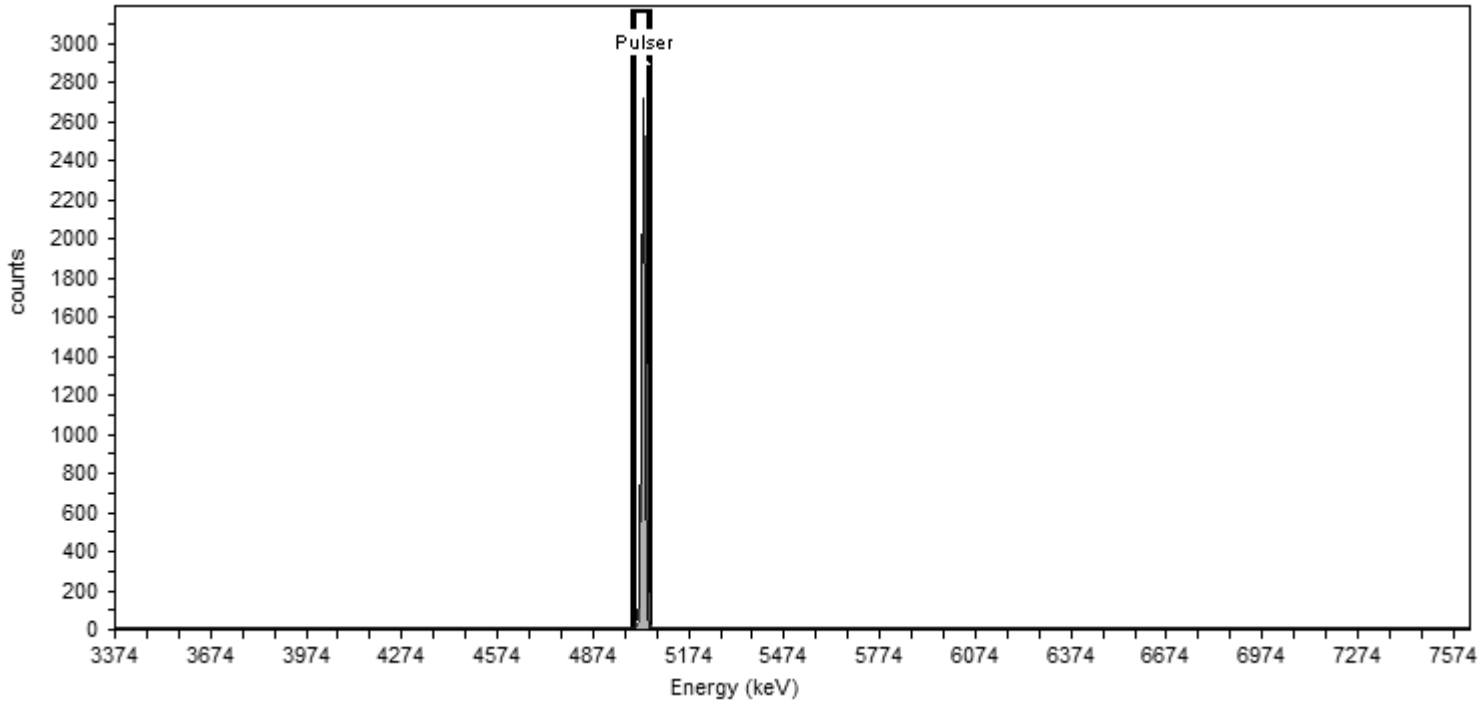
Batch Name: June2016a
Description:

Acquisition

Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 7/8/2016 8:47:56AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV165-20151016
Calibration Date: 10/17/2015 2:36:40PM

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	5029.417	5006.270	5052.564	13.60	5,309.26	6,027.49

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9:02:17AM 7/8/2016

Sample

Sample Name: Pulser;AV166
Comment:

Spectrum #11 Analysis #1

Batch

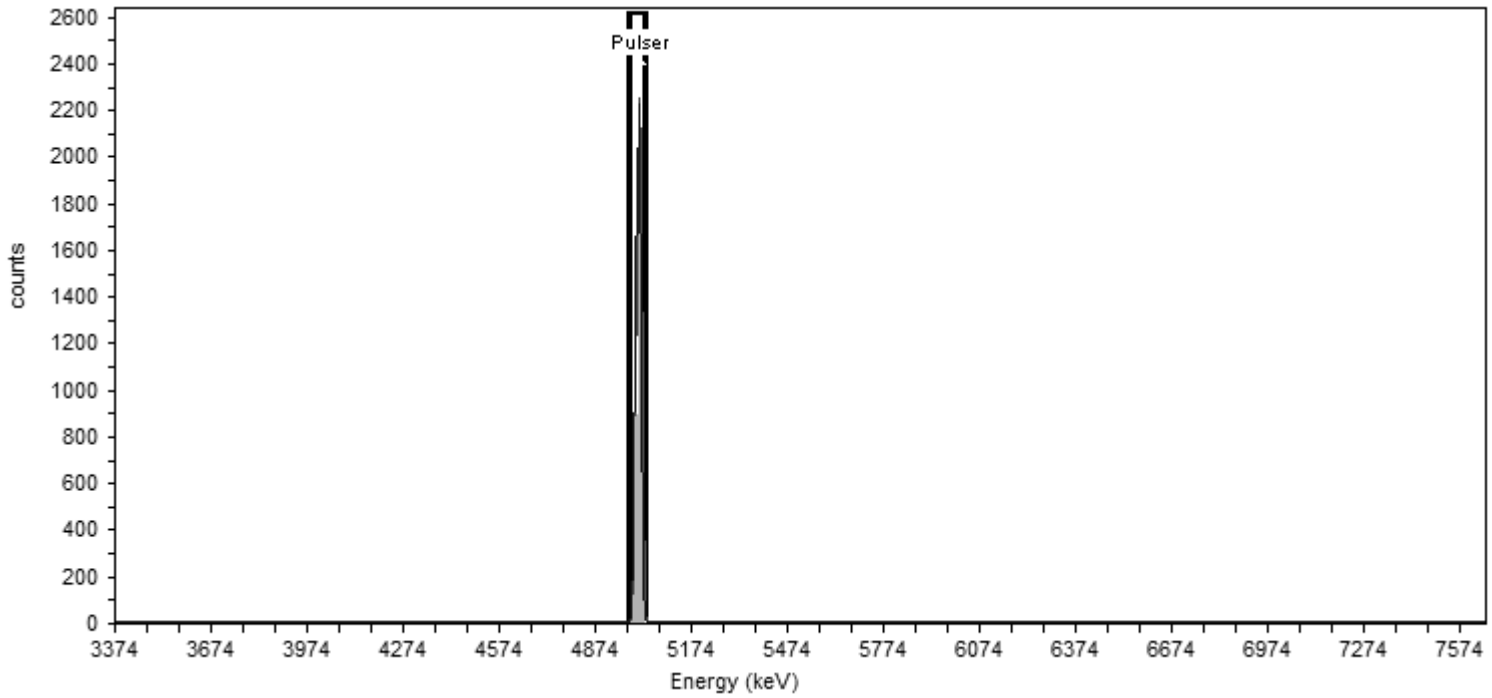
Batch Name: June2016a
Description:

Acquisition

Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 7/8/2016 8:47:57AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV166-20151016a
Calibration Date: 10/17/2015 2:37:00PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5006.658	4978.310	5035.007	16.65	5,373.26	5,964.48

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Alpha-Spectroscopy Pulser Report

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8:48:57AM 7/8/2016

Sample

Sample Name: Pulser;AV167
Comment:

Spectrum #9 Analysis #1

Batch

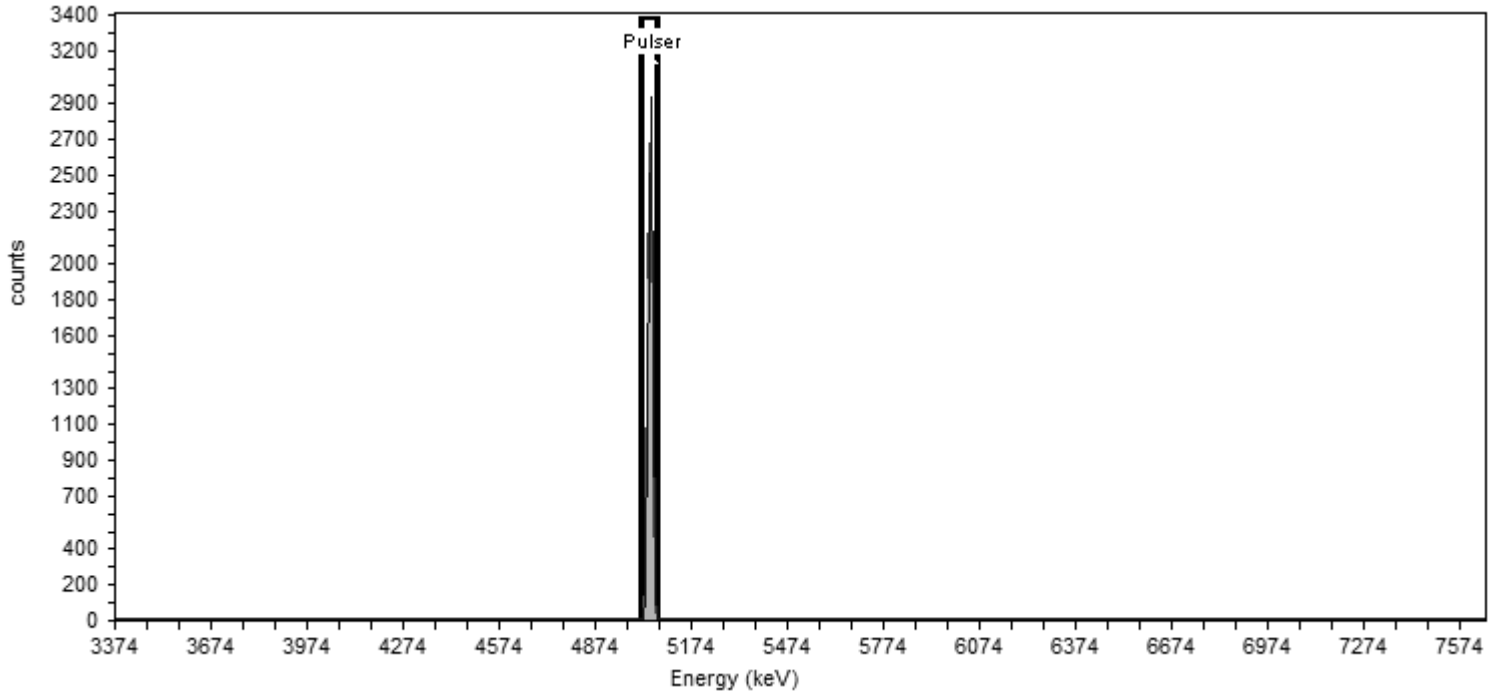
Batch Name: June2016a
Description:

Acquisition

Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 7/8/2016 8:47:57AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9792;AV167-20151016a
Calibration Date: 10/17/2015 2:37:03PM

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	5045.250	5021.393	5069.106	14.02	5,906.85	6,031.54

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Alpha-Spectroscopy Pulser Report

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9:02:15AM 7/8/2016

Sample

Sample Name: Pulser;AV170
Comment:

Spectrum #9 Analysis #1

Batch

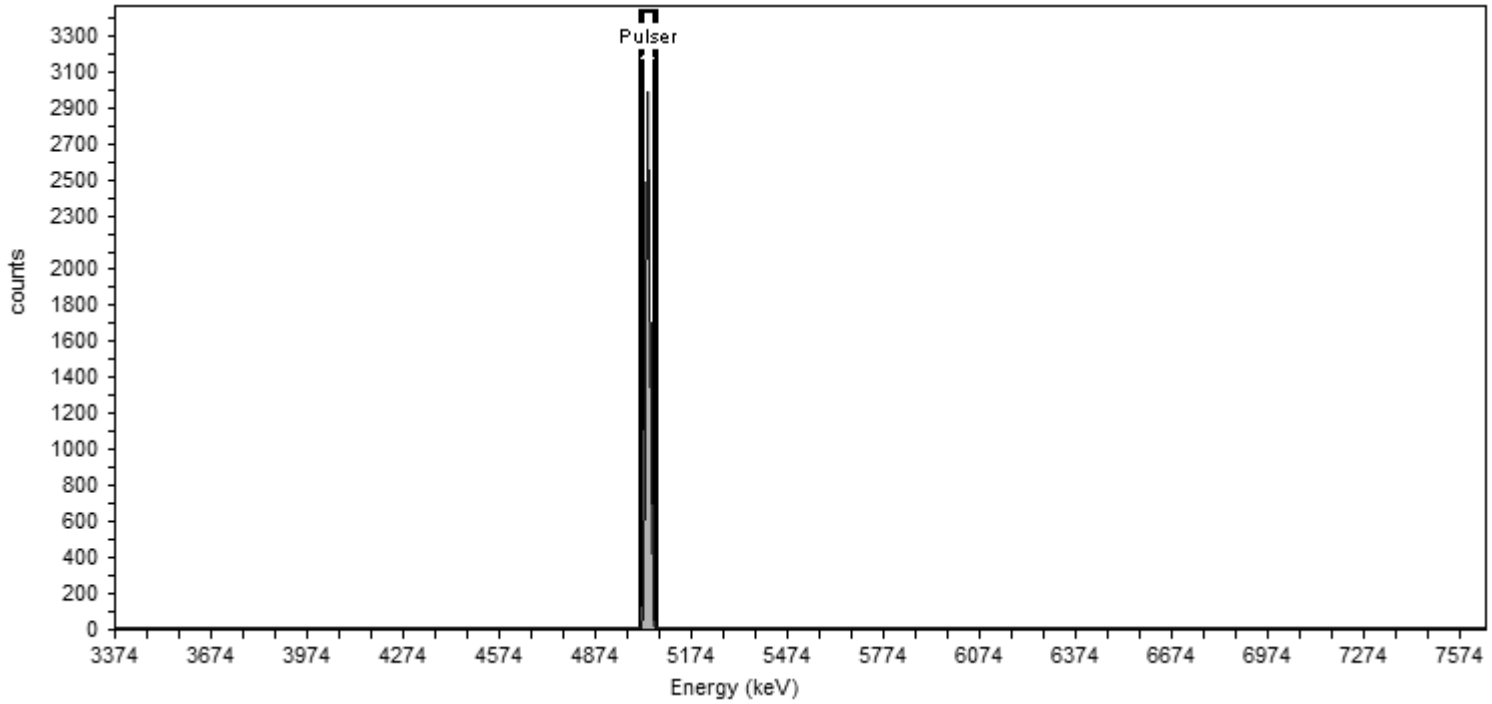
Batch Name: June2016a
Description:

Acquisition

Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 7/8/2016 8:47:57AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9795;AV170-20151016
Calibration Date: 10/17/2015 2:36:50PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.716	5015.606	5059.826	12.99	5,559.71	5,834.58

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Alpha-Spectroscopy Pulser Report

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9:02:19AM 7/8/2016

Sample

Sample Name: Pulser;AV171
Comment:

Spectrum #9 Analysis #1

Batch

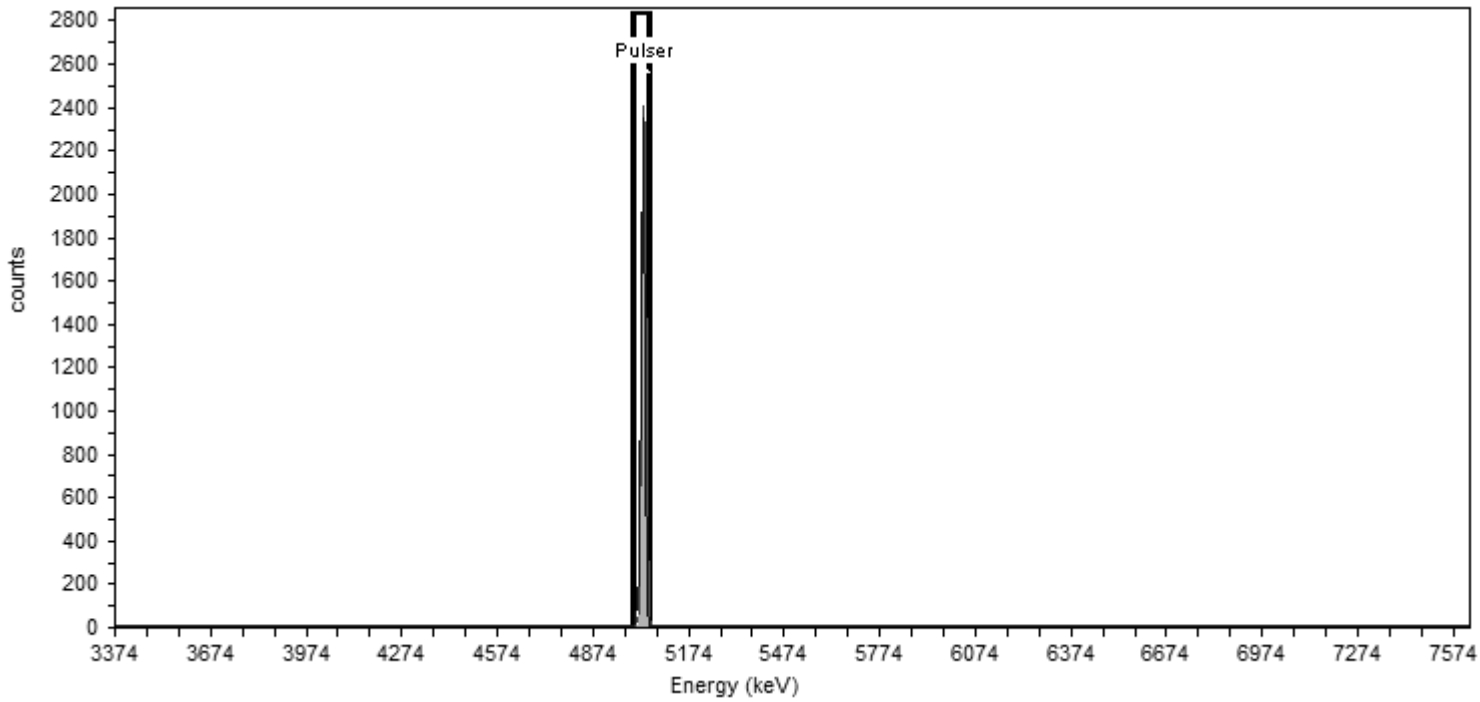
Batch Name: June2016a
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 7/8/2016 8:47:58AM
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	5028.701	5003.424	5053.978	14.85	5,115.92	6,002.02

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9:02:23AM 7/8/2016

Sample

Sample Name: Pulser;AV173
Comment:

Spectrum #9 Analysis #1

Batch

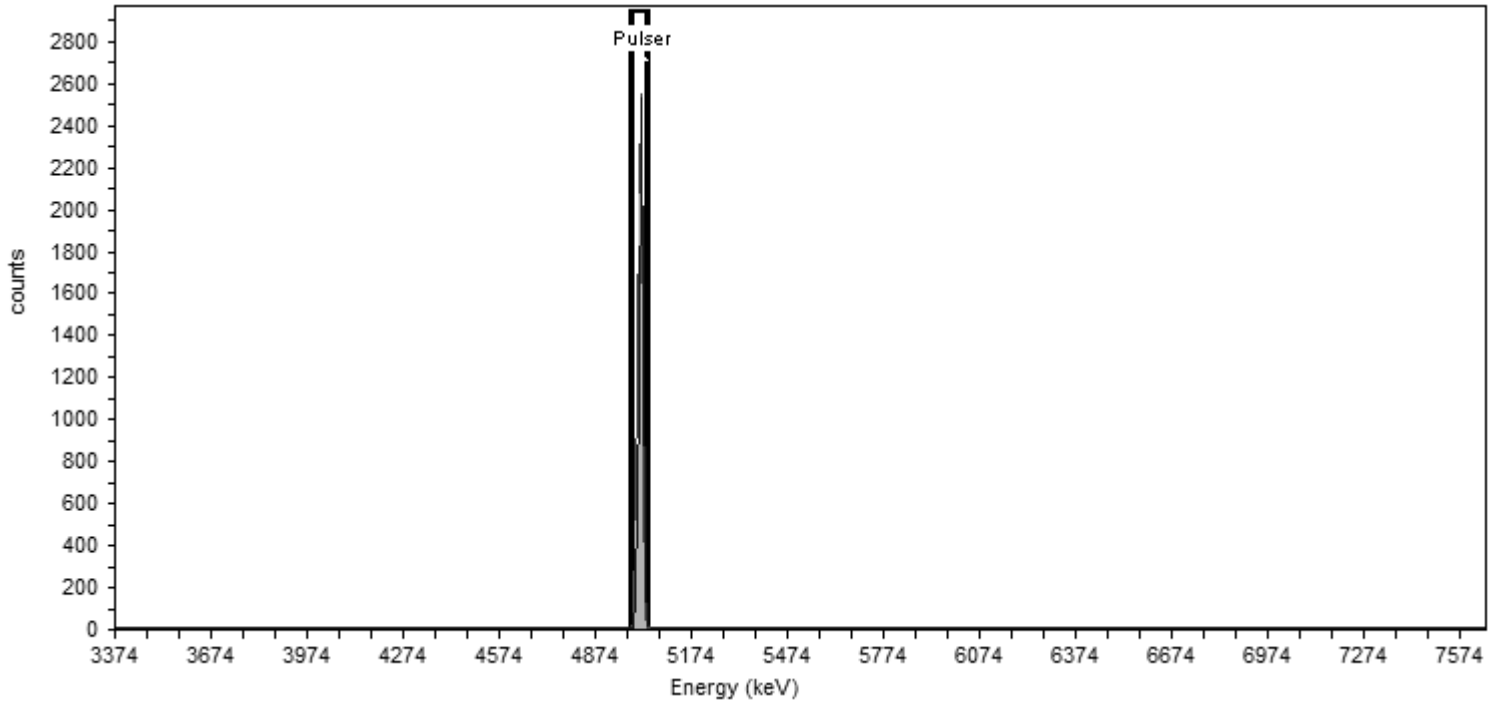
Batch Name: June2016a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 7/8/2016 8:47:58AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.880	4990.045	5041.716	15.18	5,548.12	6,002.54

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Alpha-Spectroscopy Pulser Report

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9:29:00AM 7/11/2016

Sample

Sample Name: Pulser;AV191
Comment:

Spectrum #10 Analysis #1

Batch

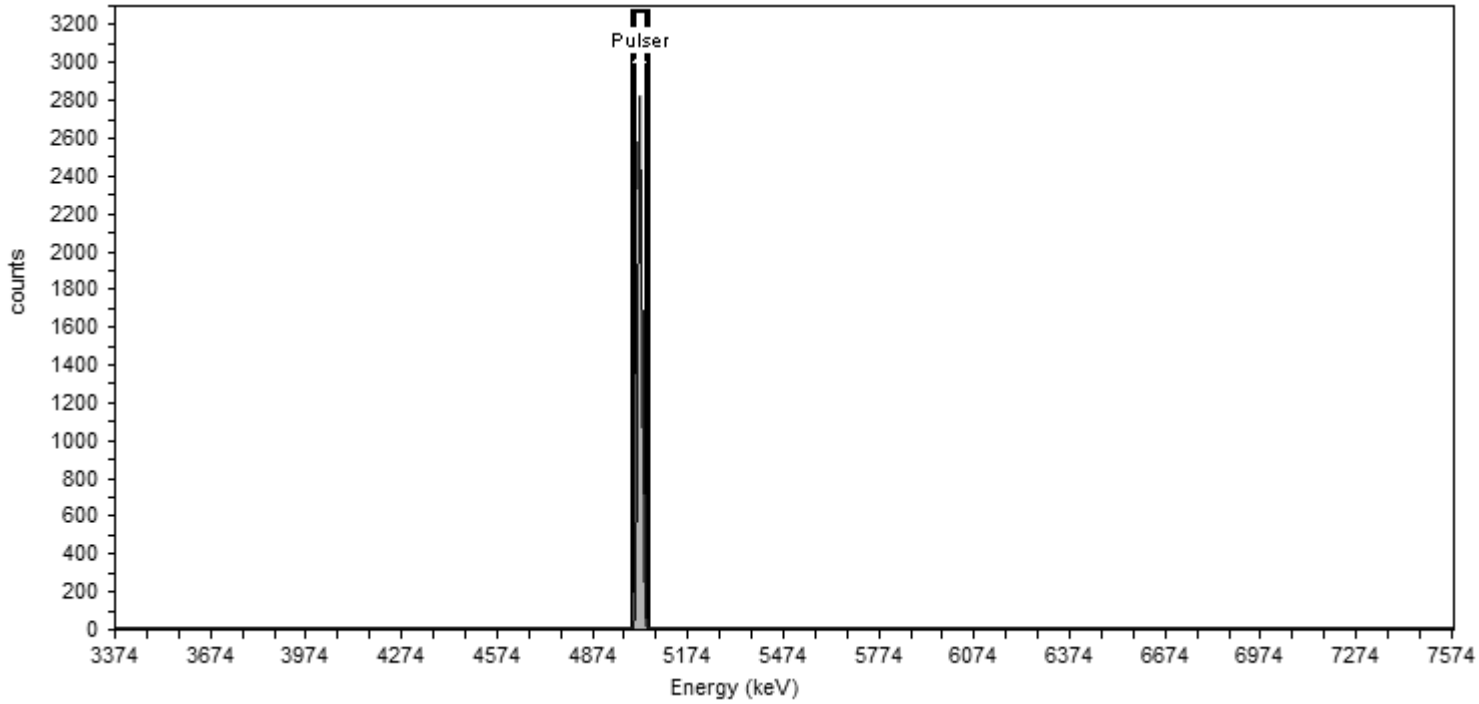
Batch Name: June2016b
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 7/11/2016 9:24:19AM
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	5023.024	5000.513	5045.537	13.23	5,352.61	5,688.41

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Alpha-Spectroscopy Pulser Report

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9:28:58AM 7/11/2016

Sample

Sample Name: Pulser;AV194
Comment:

Spectrum #12 Analysis #1

Batch

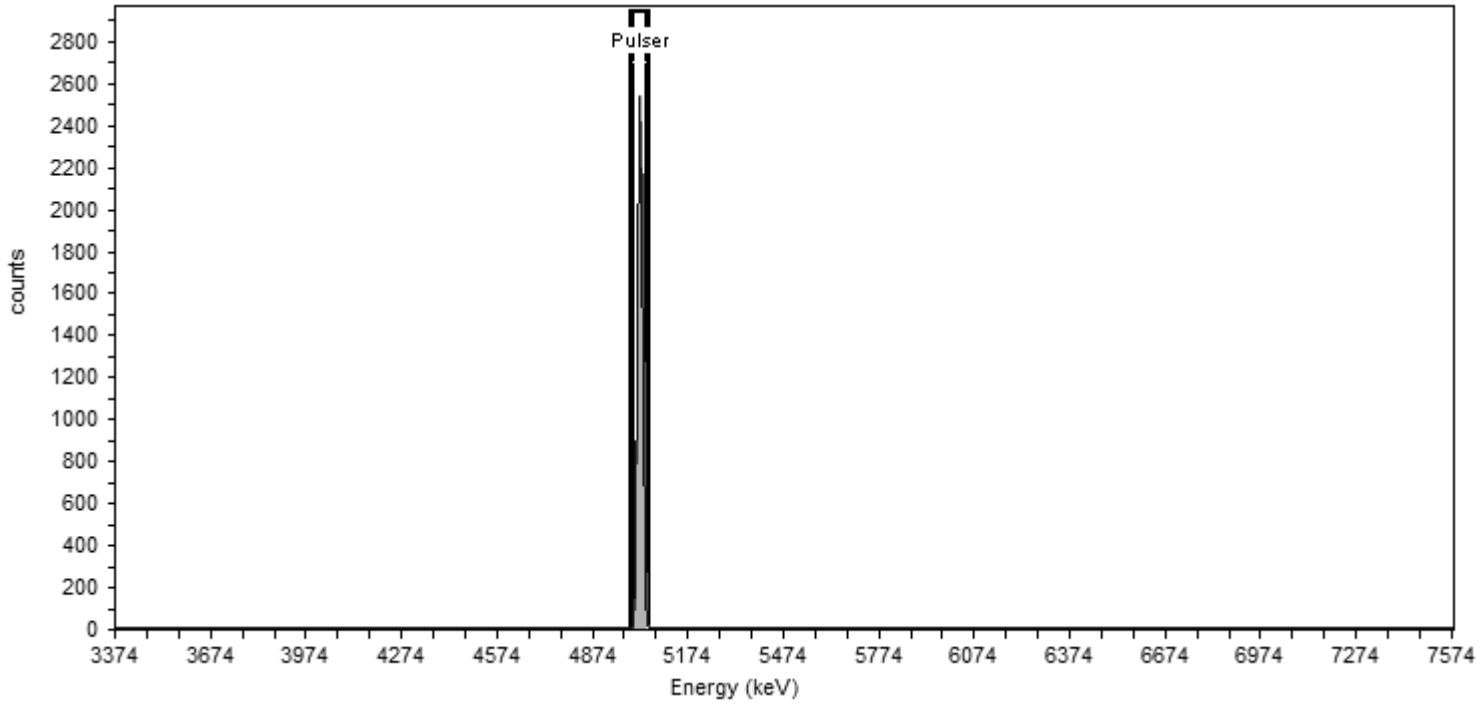
Batch Name: June2016b
Description:

Acquisition

Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 7/11/2016 9:24:19AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.819	4995.215	5048.422	15.63	5,701.87	5,989.92

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Alpha-Spectroscopy Pulser Report

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9:29:01AM 7/11/2016

Sample

Sample Name: Pulser;AV198
Comment:

Spectrum #10 Analysis #1

Batch

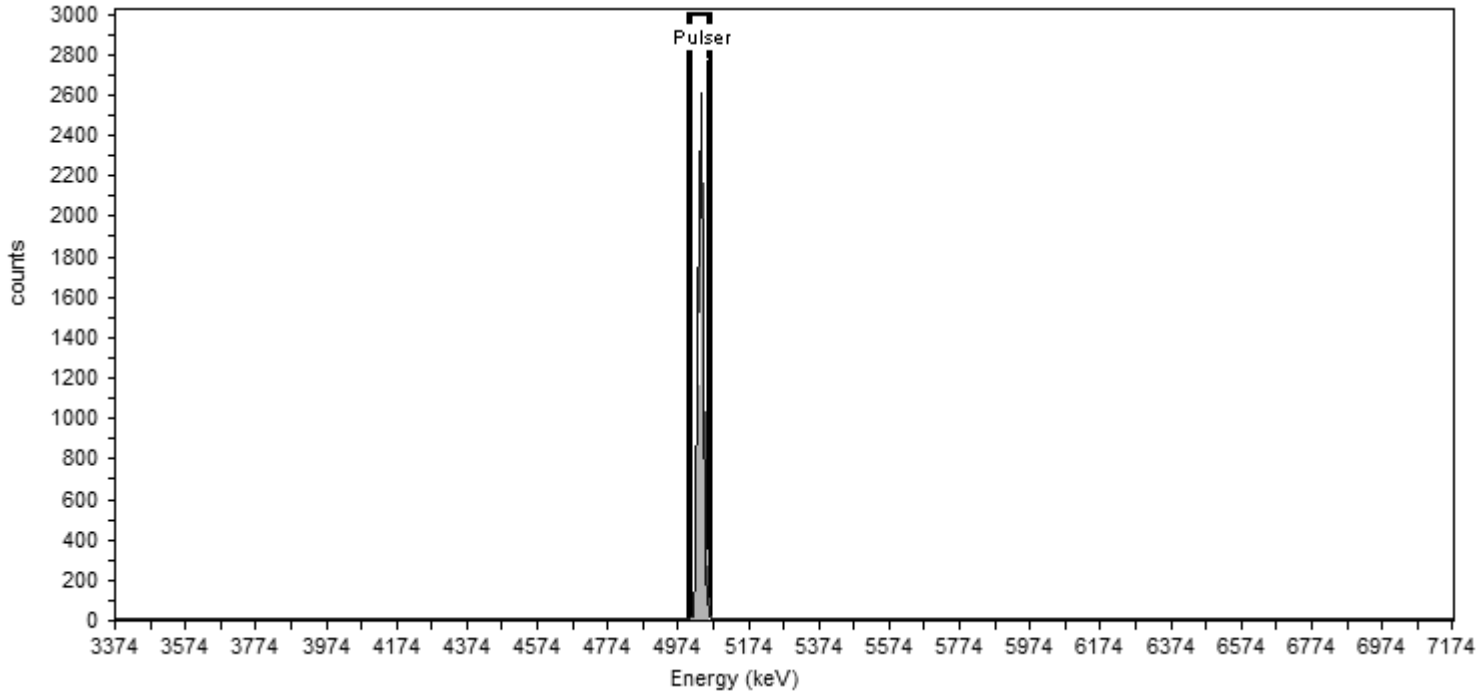
Batch Name: June2016b
Description:

Acquisition

Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 7/11/2016 9:24:20AM
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	5037.245	5010.193	5064.295	15.89	5,938.72	5,989.66

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Alpha-Spectroscopy Pulser Report

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13715 Rider Trail North
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9:29:04AM 7/11/2016

Sample

Sample Name: Pulser;AV200
Comment:

Spectrum #10 Analysis #1

Batch

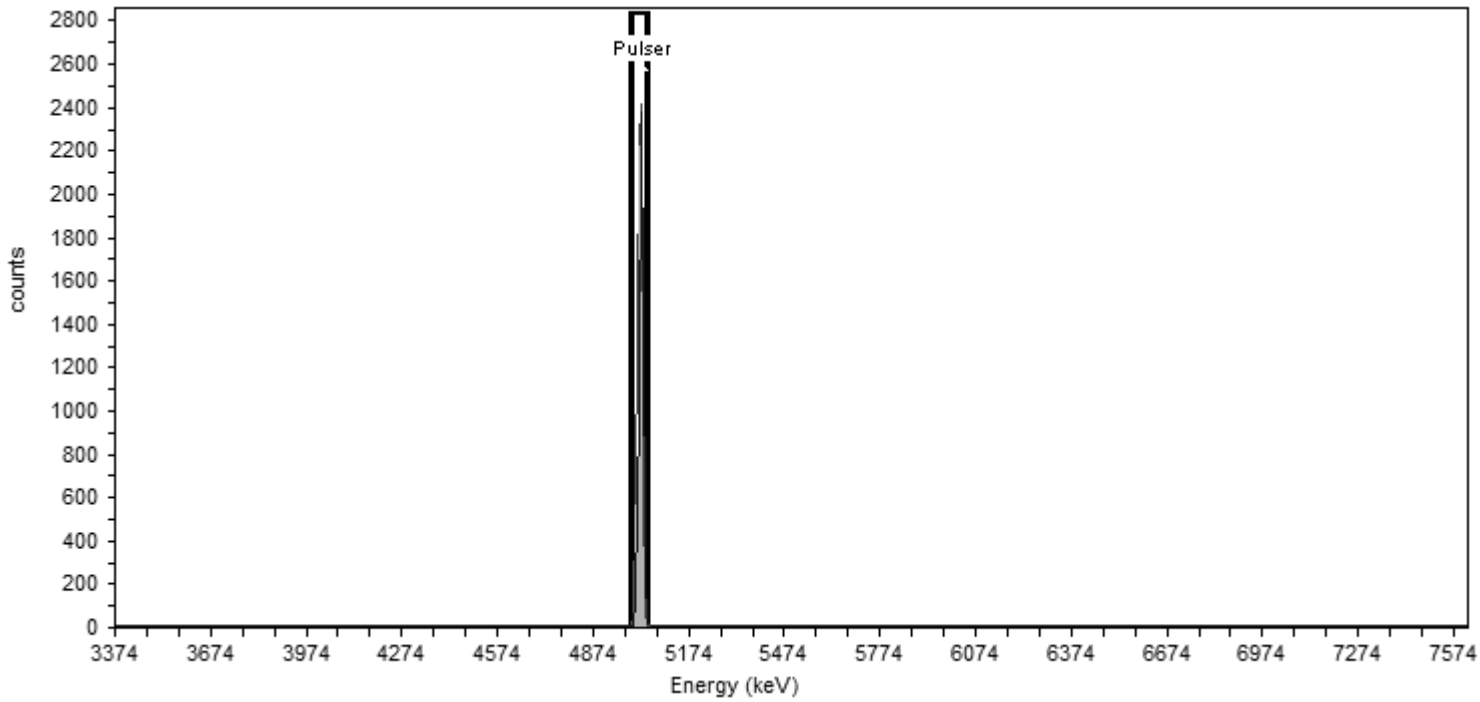
Batch Name: June2016b
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 7/11/2016 9:24:20AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV200-20151017
Calibration Date: 10/18/2015 3:55:33PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5023.676	4997.731	5049.621	15.24	5,283.88	5,997.97

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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9:29:05AM 7/11/2016

Sample

Sample Name: Pulser;AV202
Comment:

Spectrum #11 Analysis #1

Batch

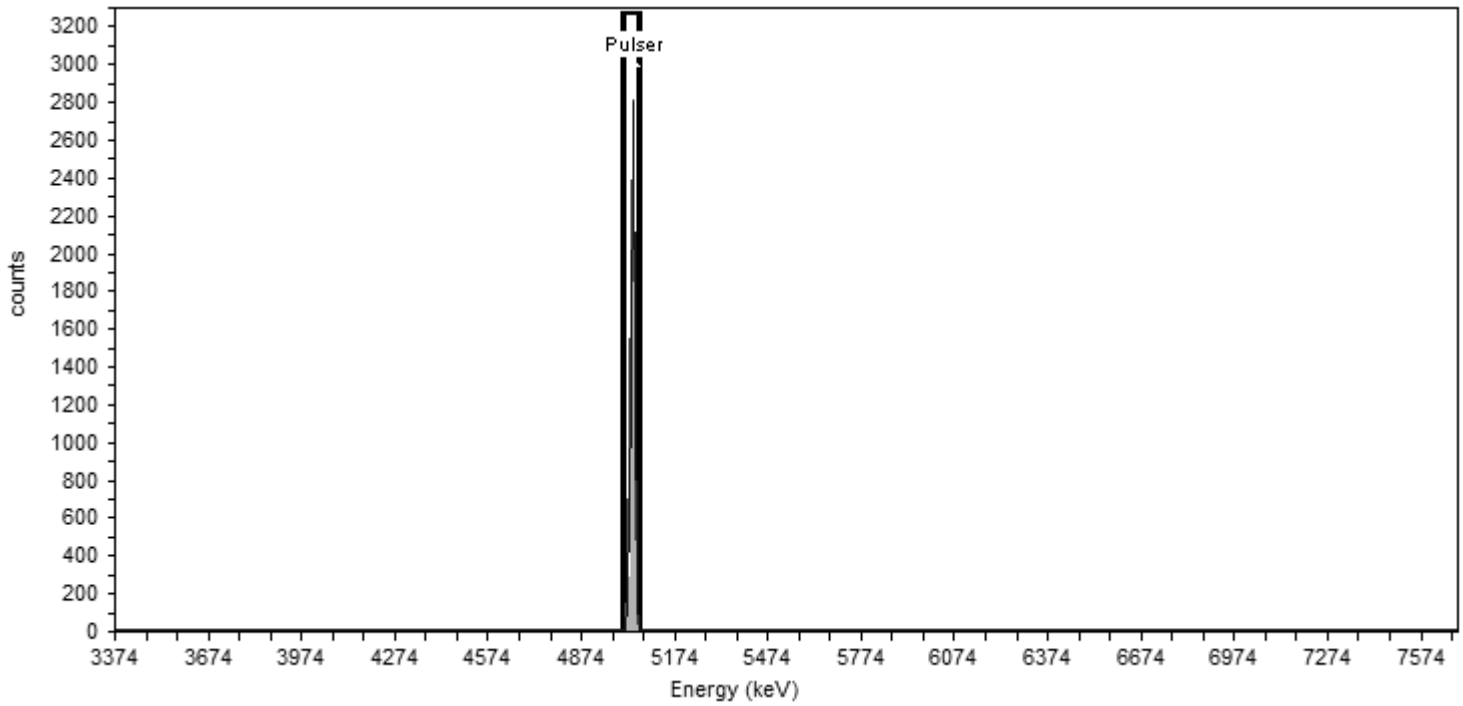
Batch Name: June2016b
Description:

Acquisition

Detector: AV202 , SN: 50-117Z2
Acquisition Start Date: 7/11/2016 9:24:20AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV202-20151017a
Calibration Date: 10/18/2015 3:55:45PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.802	5013.343	5062.261	14.37	5,786.79	6,024.59

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Alpha-Spectroscopy Pulser Report

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13715 Rider Trail North
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9:29:10AM 7/11/2016

Sample

Sample Name: Pulser;AV203
Comment:

Spectrum #10 Analysis #1

Batch

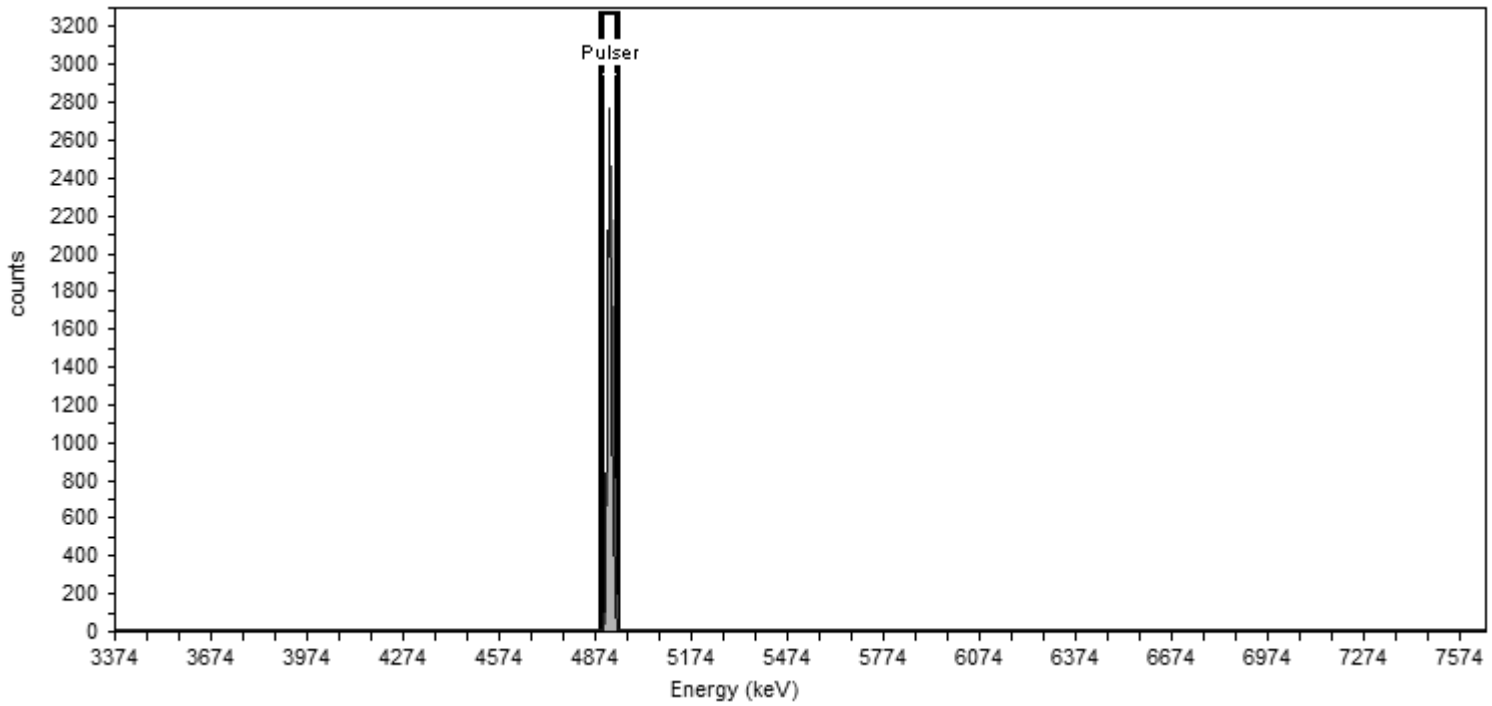
Batch Name: June2016b
Description:

Acquisition

Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 7/11/2016 9:24:20AM
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	4917.569	4892.930	4942.208	14.48	5,748.71	6,017.10

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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9:29:07AM 7/11/2016

Sample

Sample Name: Pulser;AV204
Comment:

Spectrum #10 Analysis #1

Batch

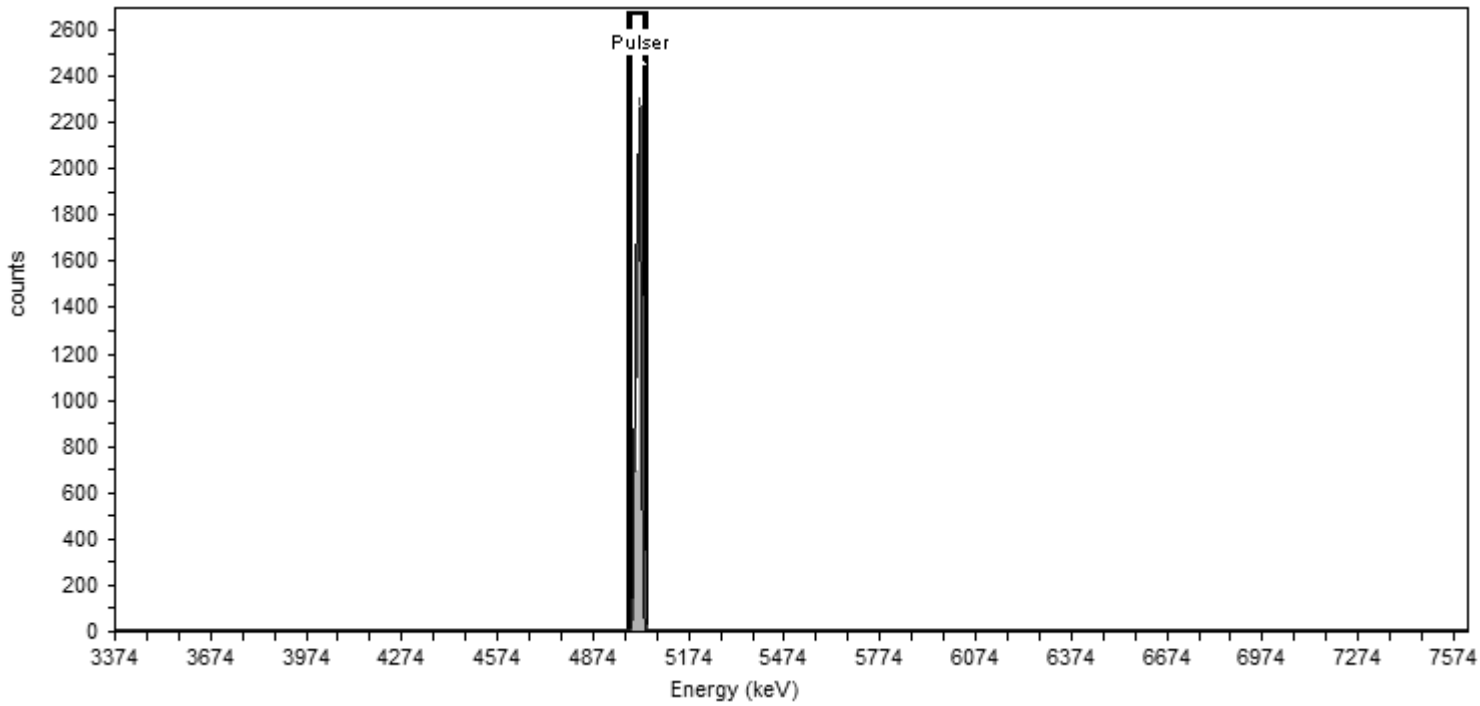
Batch Name: June2016b
Description:

Acquisition

Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 7/11/2016 9:24:21AM
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	5013.778	4987.645	5039.911	15.35	5,076.23	5,991.80

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

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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

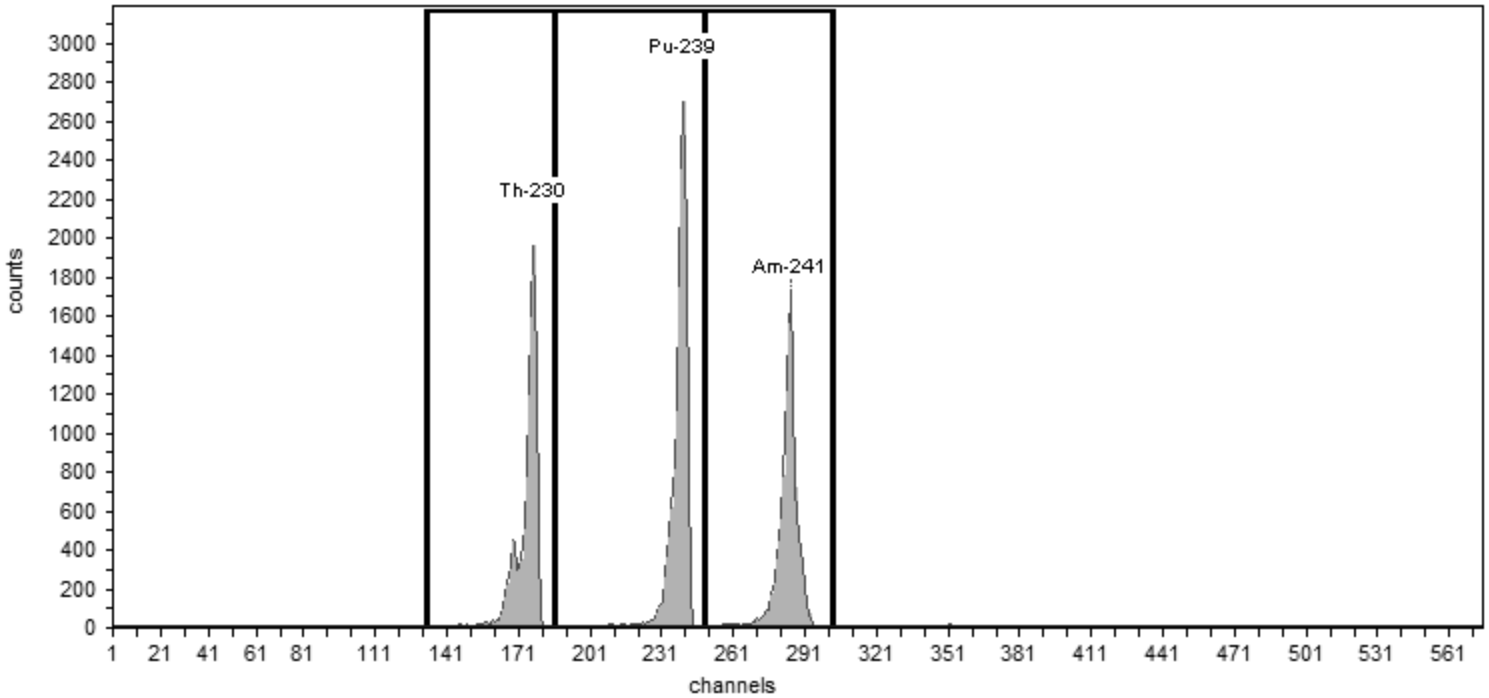
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 10/16/2015 4:27:06PM

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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Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

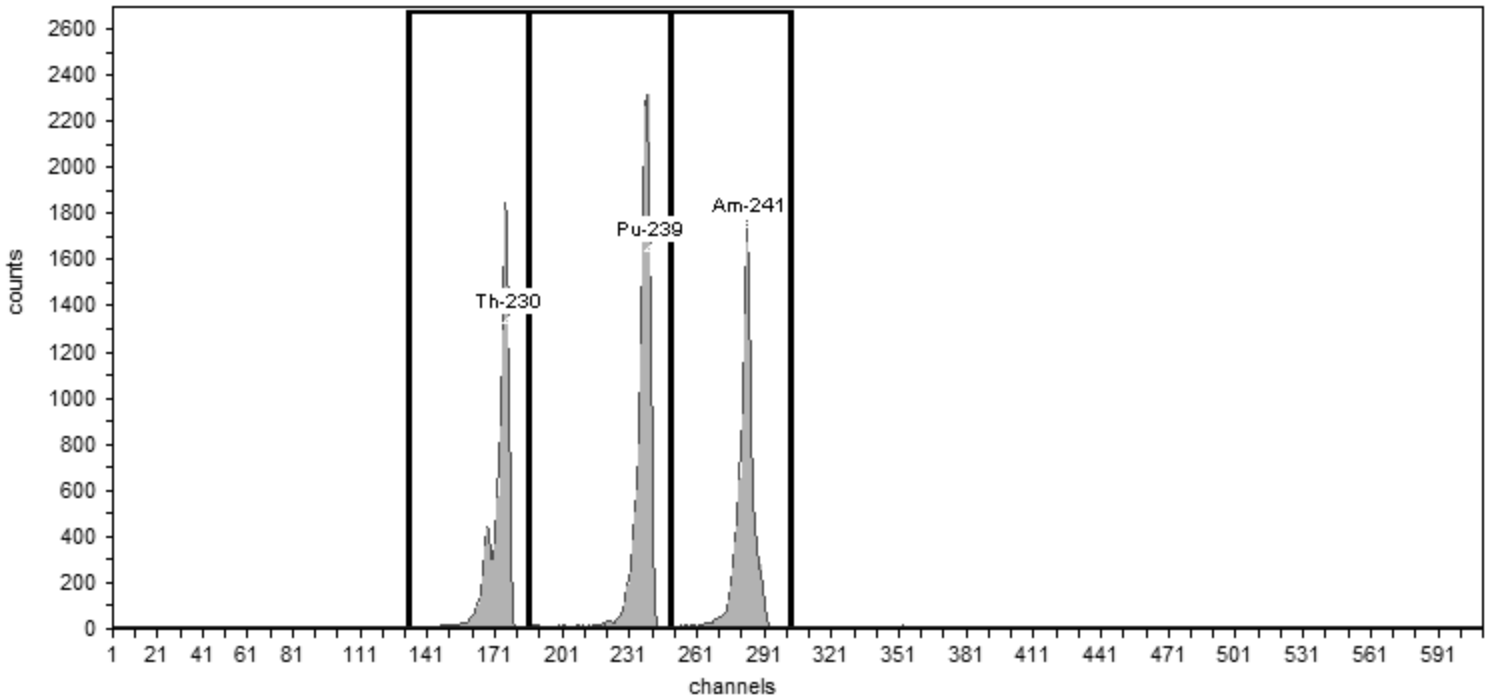
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 10/16/2015 3:51:18PM

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

Efficiency Calibration Name: IC-8875;AV149-20151016

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

Efficiency: 24.03% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.48	10,971.00	78.36
Pu-239	240	5,155.40	186	249	33.62	12,896.00	92.11
Am-241	284	5,485.70	249	303	31.58	11,033.00	78.81

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:05PM 11/23/2015

Calibration

Sample Name: IC-9520;AV152-20151016
Description:
Detector: AV152

Analyst: 60040
Analysis Date: 10/16/2015 6:46:53PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

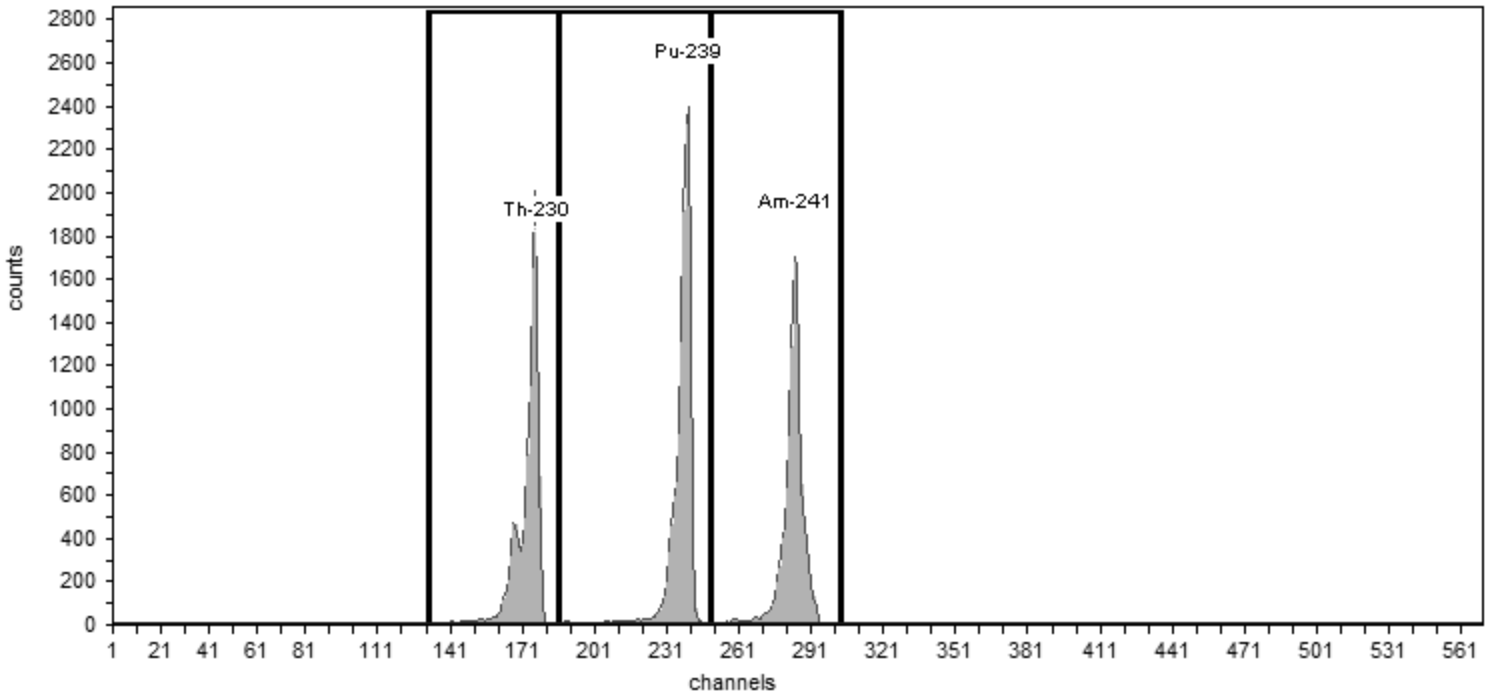
Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 10/16/2015 3:52:05PM

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

Efficiency Calibration Name: IC-9520;AV152-20151016

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

Efficiency: 24.54% +/- 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	29.71	11,699.00	83.56
Pu-239	240	5,155.40	186	249	33.73	13,727.00	98.05
Am-241	284	5,485.70	249	303	34.89	11,357.00	81.12

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

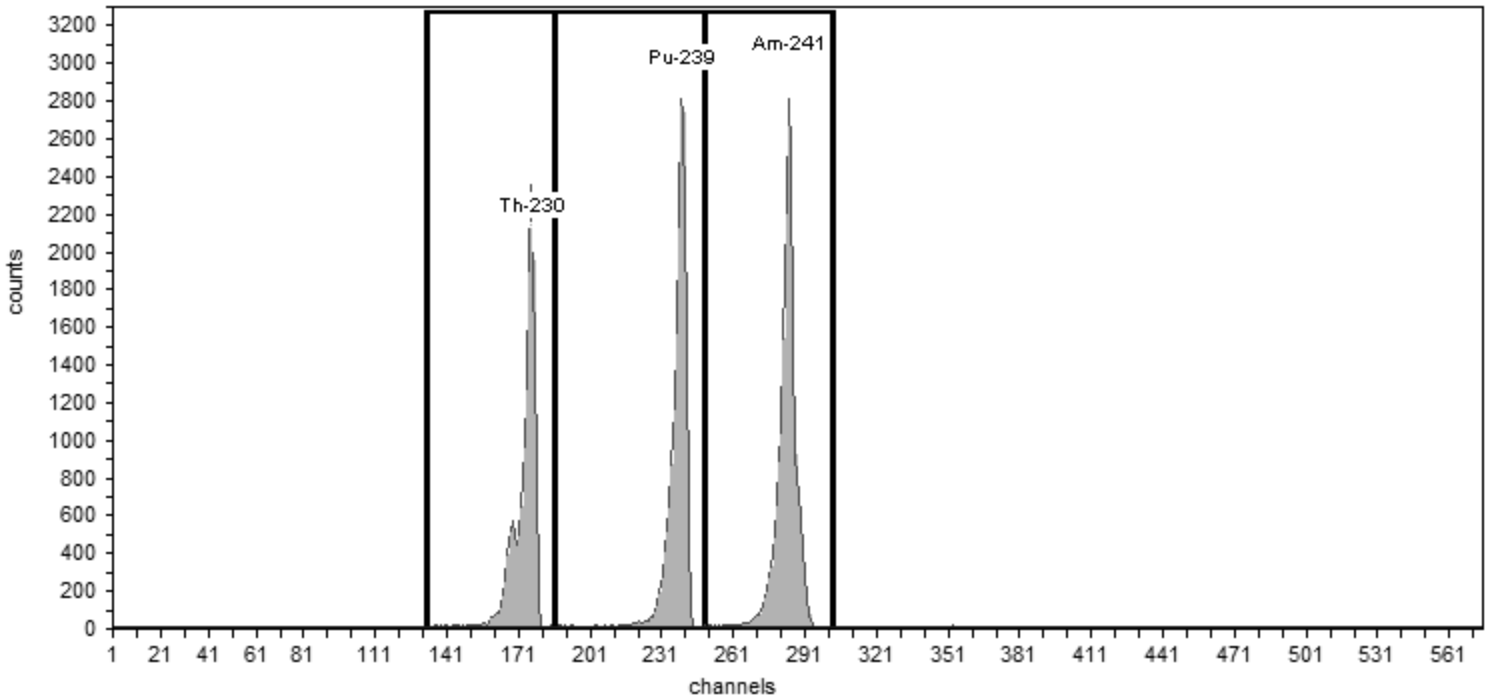
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 10/16/2015 3:52:22PM

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:47:00PM 10/16/2015

Calibration

Sample Name: IC-9793;AV154-20151016
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 10/16/2015 6:47:00PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

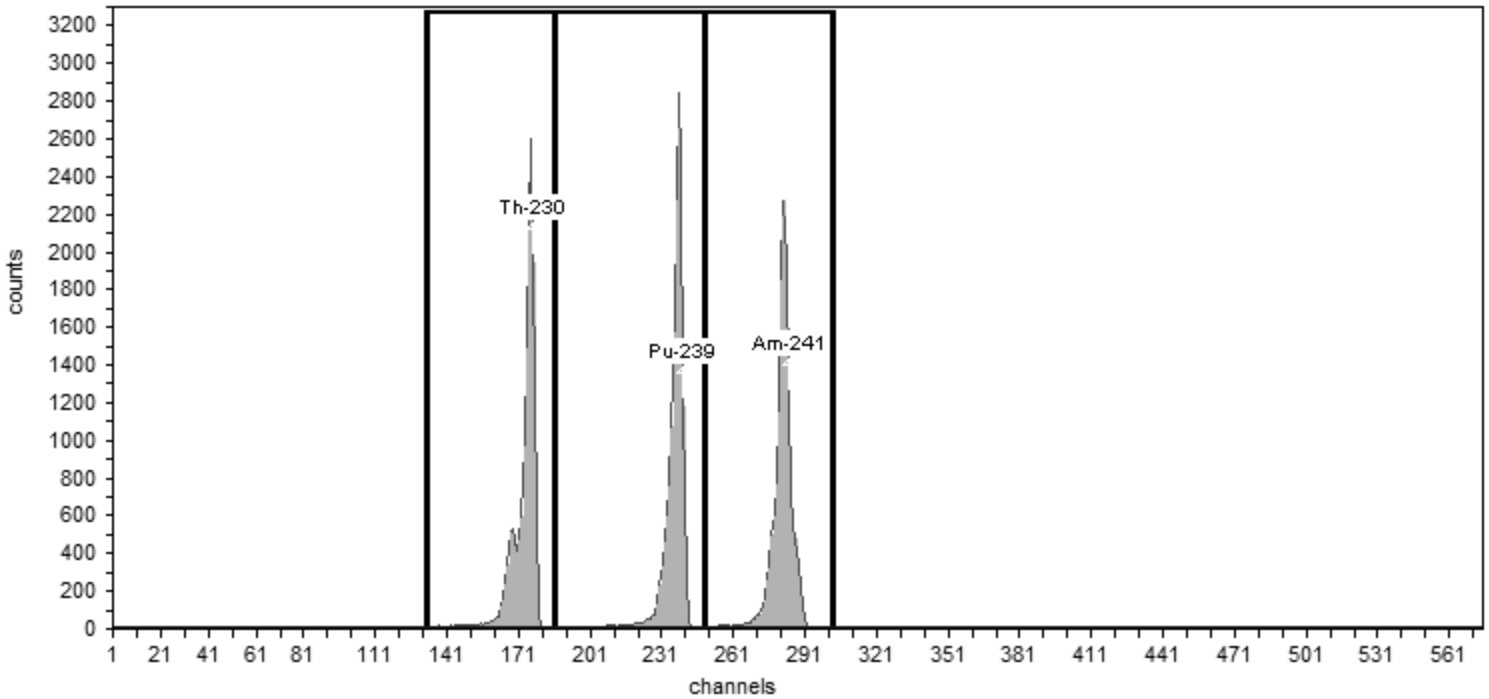
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 10/16/2015 3:52:39PM

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

Efficiency Calibration Name: IC-9793;AV154-20151016

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

Efficiency: 25.50% +/- 0.32% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.72	14,071.00	100.51
Pu-239	240	5,155.40	186	249	30.68	14,748.00	105.34
Am-241	284	5,485.70	249	303	31.45	14,051.00	100.36

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:13PM 11/23/2015

Calibration

Sample Name: IC-9794;AV155-20151016
Description:
Detector: AV155

Analyst: 60040
Analysis Date: 10/16/2015 6:47:03PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

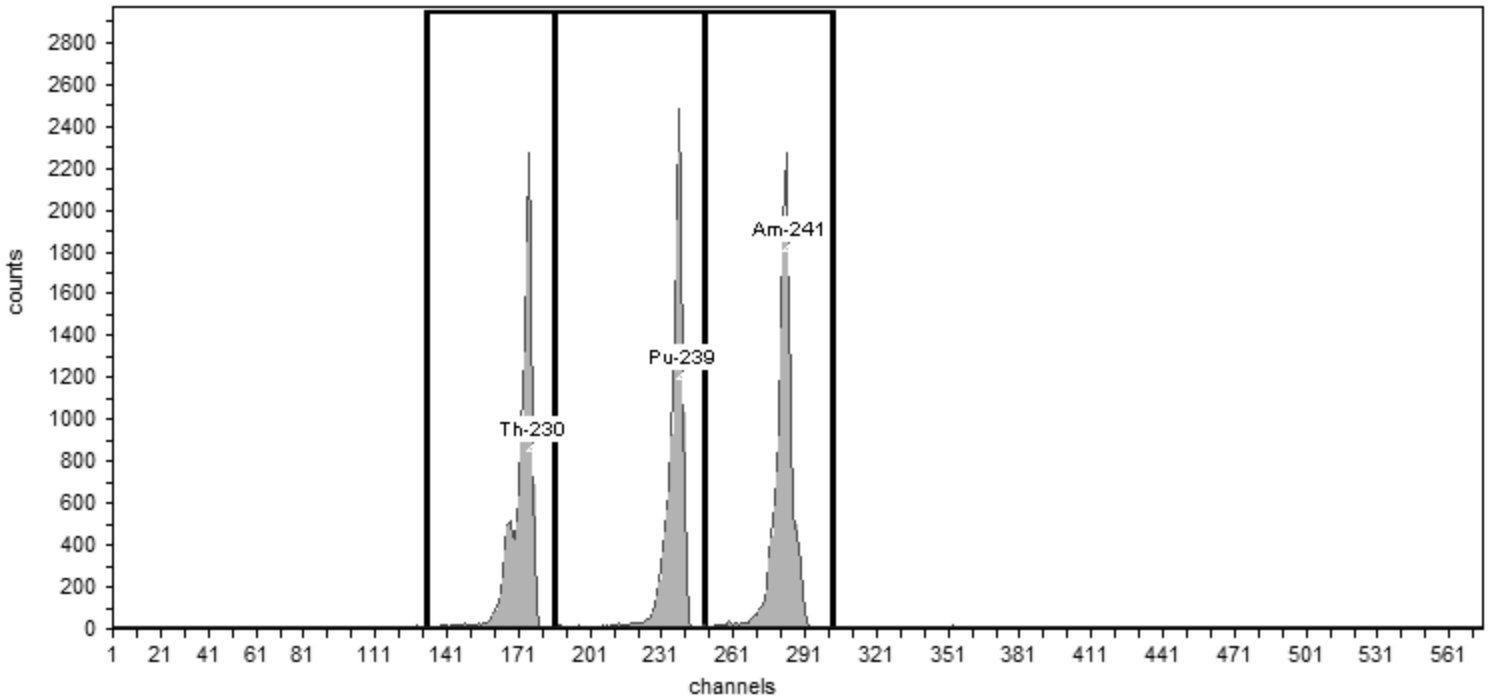
Detector: AV155 , SN: 50-05/II1
Acquisition Start Date: 10/16/2015 3:52:52PM

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

Efficiency Calibration Name: IC-9794;AV155-20151016

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

Efficiency: 24.17% +/- 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	30.44	13,390.00	95.64
Pu-239	240	5,155.40	186	249	30.32	13,163.00	94.02
Am-241	284	5,485.70	249	303	32.54	14,240.00	101.71

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:47:08PM 10/16/2015

Calibration

Sample Name: IC-9817;AV157-20151016
Description:
Detector: AV157

Analyst: 60040
Analysis Date: 10/16/2015 6:47:07PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

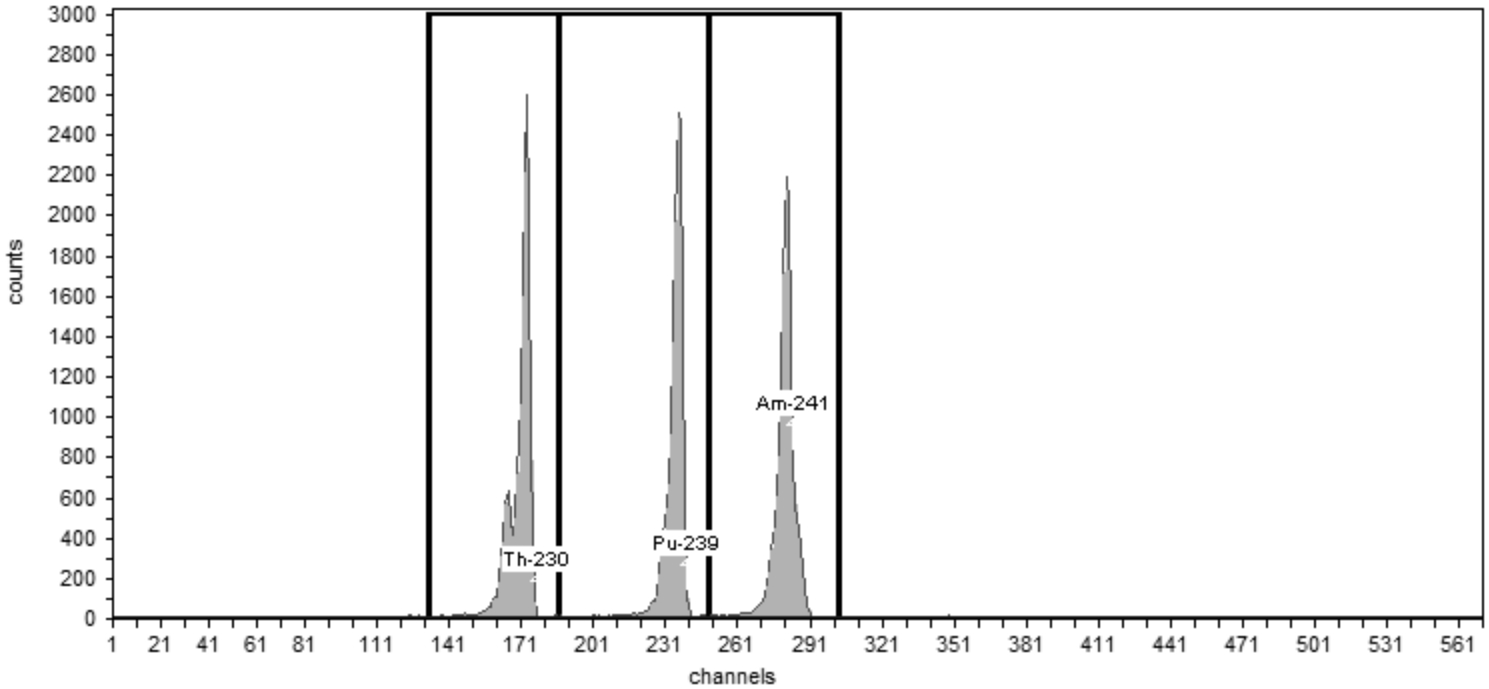
Detector: AV157 , SN: 50-05/II3
Acquisition Start Date: 10/16/2015 3:53:14PM

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

Efficiency Calibration Name: IC-9817;AV157-20151016

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

Efficiency: 24.78% +/- 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	30.82	15,163.00	108.31
Pu-239	240	5,155.40	186	249	33.33	14,109.00	100.78
Am-241	284	5,485.70	249	303	34.11	14,283.00	102.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:47:49PM 10/16/2015

Calibration

Sample Name: IC-9886;AV160-20151016a
Description:
Detector: AV160

Analyst: 60040
Analysis Date: 10/16/2015 6:47:48PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

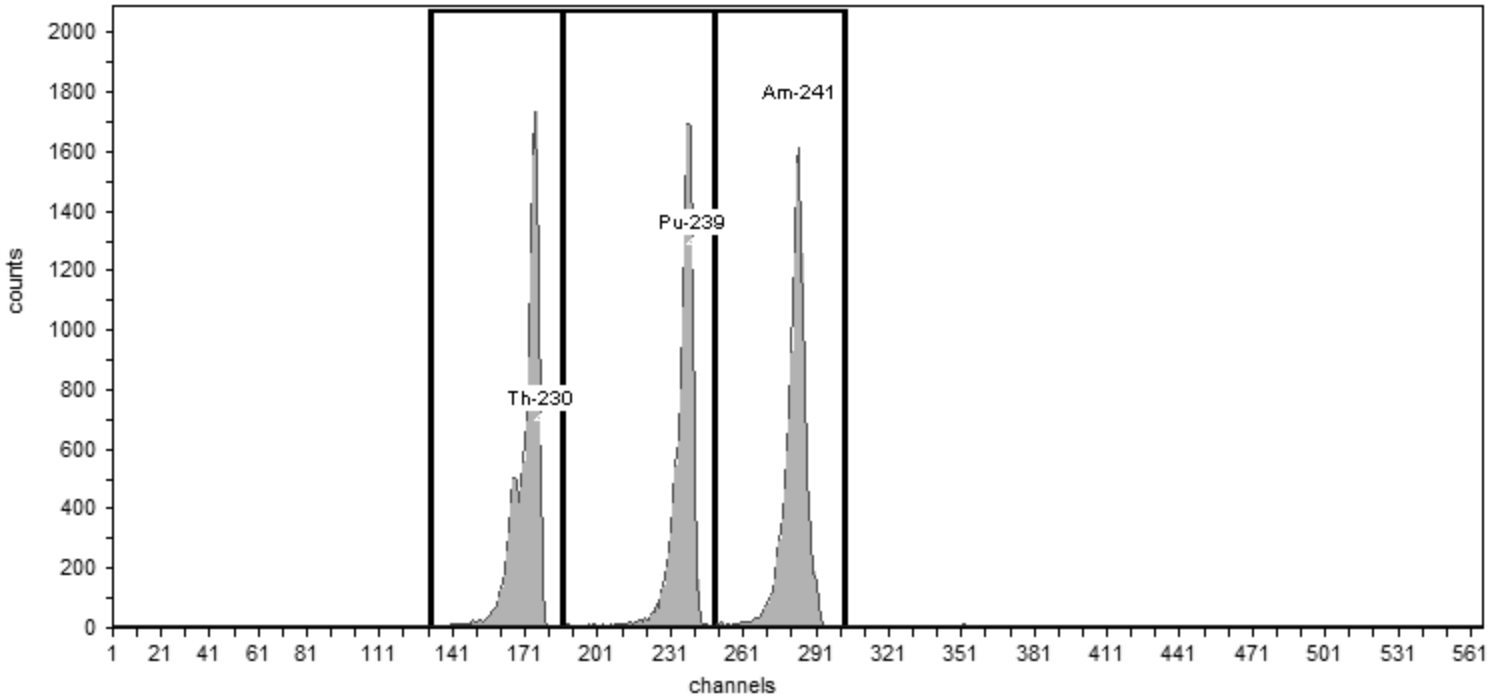
Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 10/16/2015 4:27:46PM

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

Efficiency Calibration Name: IC-9886;AV160-20151016a

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

Efficiency: 23.97% +/- 0.33% 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	35.56	12,479.00	89.14
Pu-239	240	5,155.40	186	249	39.99	11,607.00	82.91
Am-241	284	5,485.70	249	303	42.43	12,651.00	90.36

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

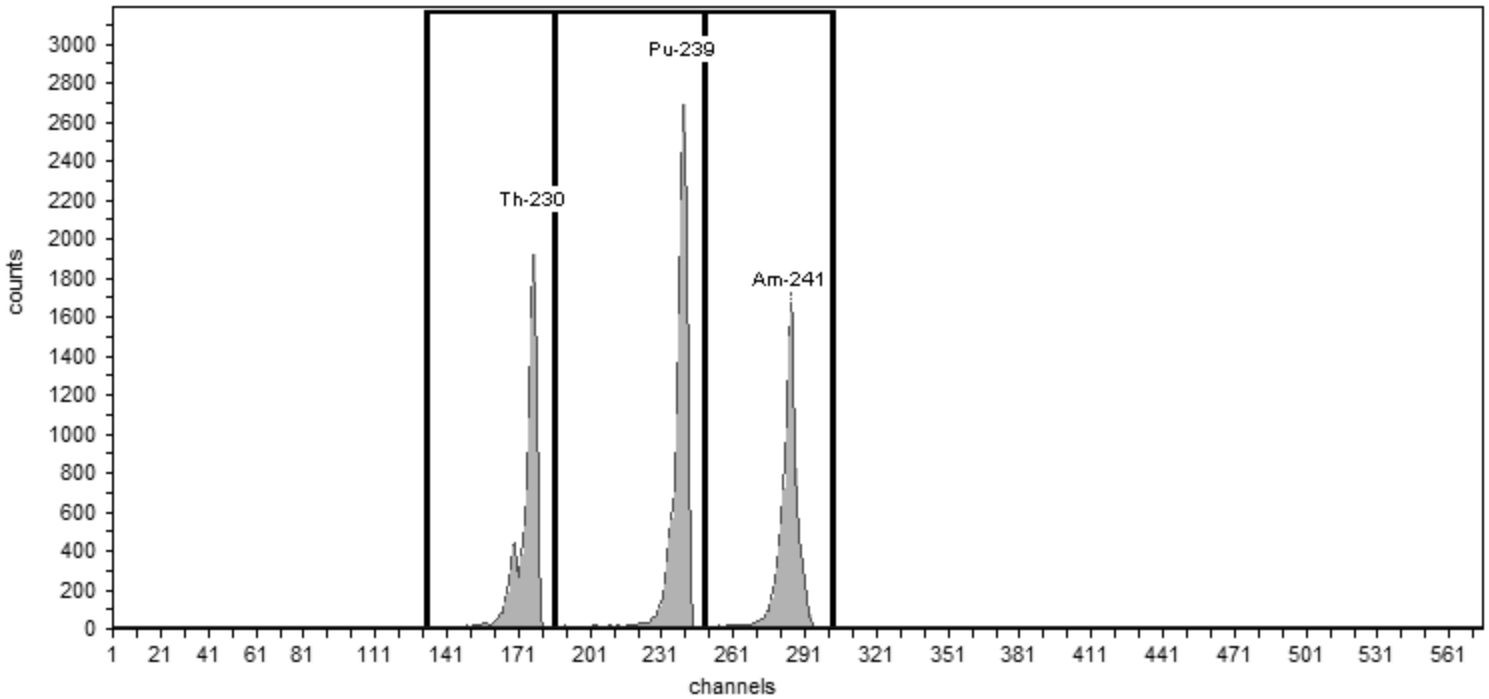
Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 10/16/2015 6:57:31PM

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

Efficiency Calibration Name: IC-8874;AV162-20151016

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

Efficiency: 26.38% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.12	10,534.00	75.24
Pu-239	240	5,155.40	186	249	31.43	13,977.00	99.84
Am-241	284	5,485.70	249	303	31.73	11,128.00	79.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:41PM 10/17/2015

Calibration

Sample Name: IC-8877;AV165-20151016
Description:
Detector: AV165

Analyst: 60040
Analysis Date: 10/17/2015 2:36:40PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

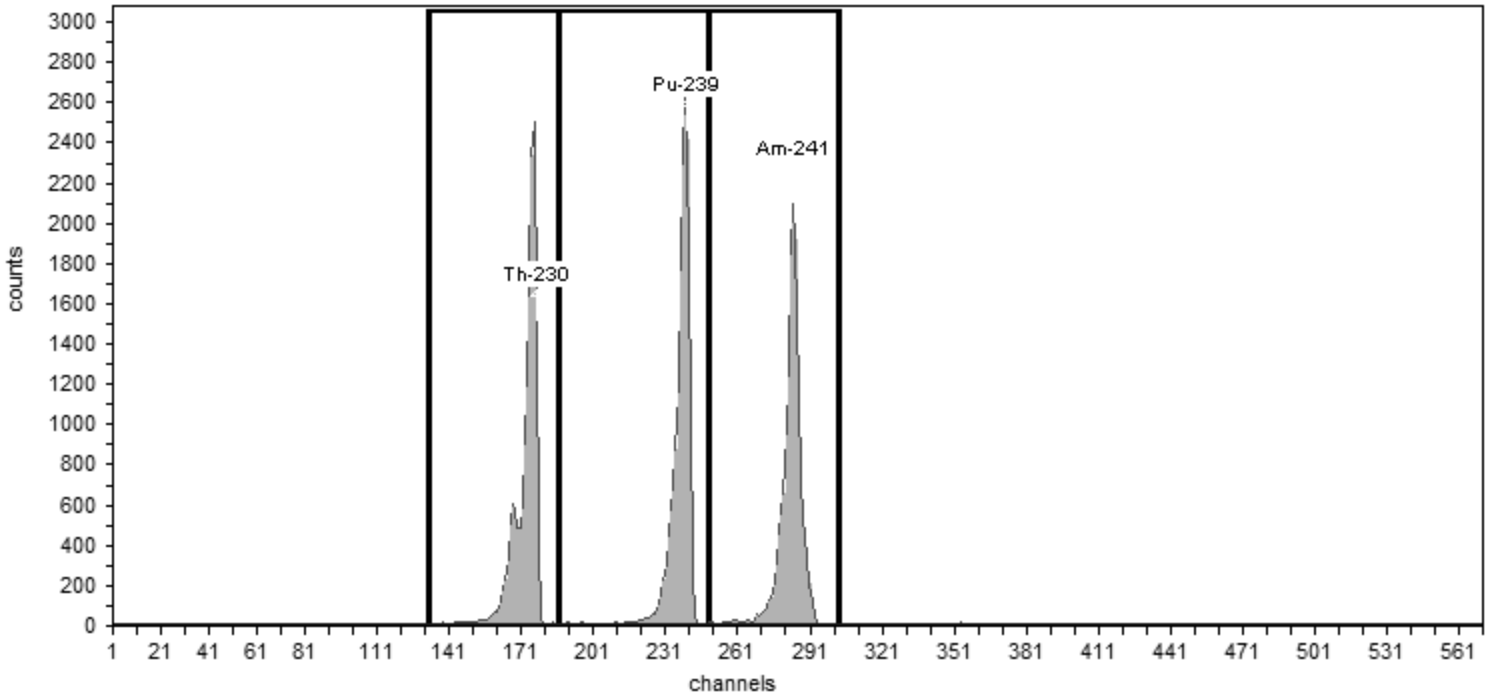
Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 10/16/2015 6:58:30PM

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

Efficiency Calibration Name: IC-8877;AV165-20151016

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

Efficiency: 25.89% +/- 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	30.38	15,008.00	107.20
Pu-239	240	5,155.40	186	249	33.77	15,425.00	110.18
Am-241	284	5,485.70	249	303	36.38	14,540.00	103.86

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:37:01PM 10/17/2015

Calibration

Sample Name: IC-9520;AV166-20151016a
Description:
Detector: AV166

Analyst: 60040
Analysis Date: 10/17/2015 2:37:00PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

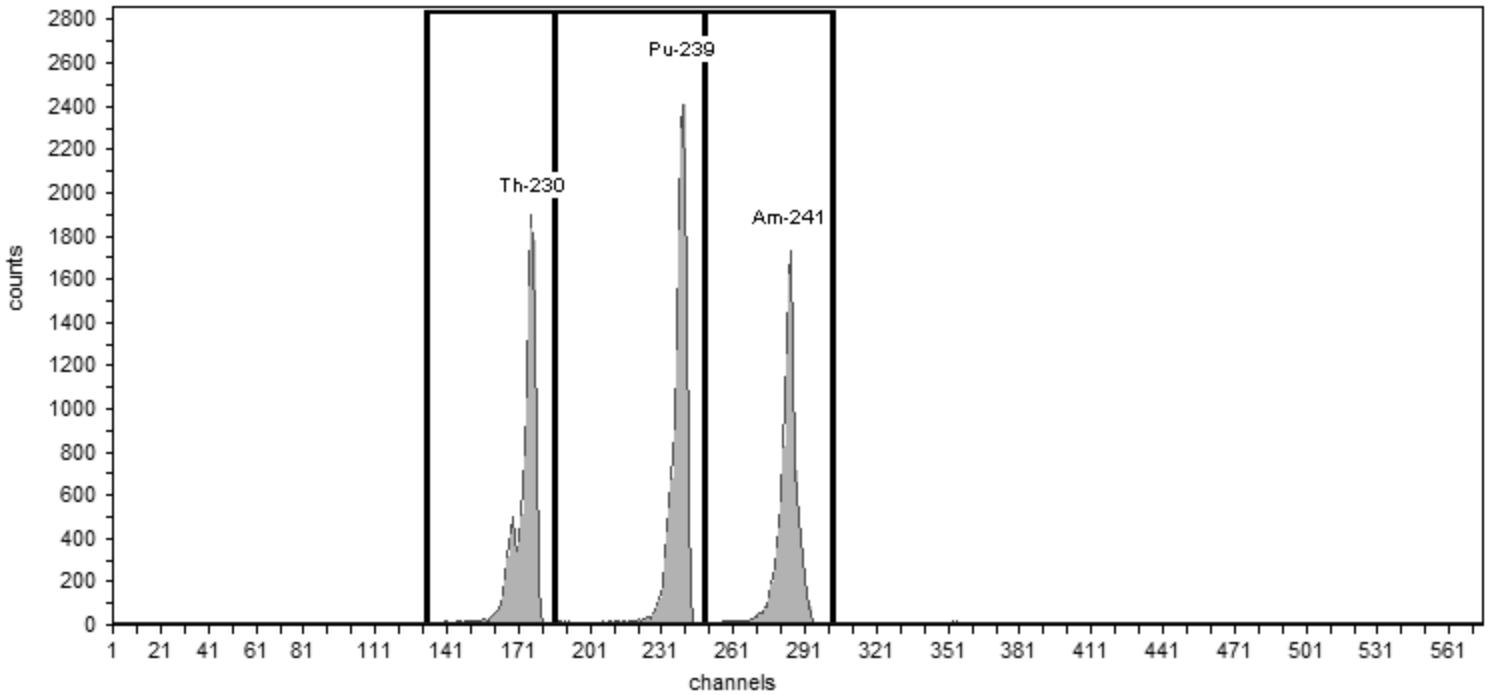
Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 10/16/2015 7:04:15PM

Live Time: 140.00 min.
Real Time: 140.09 min.

Efficiency Calibration Name: IC-9520;AV166-20151016a

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

Efficiency: 24.64% +/- 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	32.09	11,794.00	84.24
Pu-239	240	5,155.40	186	249	34.08	13,736.00	98.11
Am-241	284	5,485.70	249	303	34.37	11,391.00	81.36

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:37:04PM 10/17/2015

Calibration

Sample Name: IC-9792;AV167-20151016a
Description:
Detector: AV167

Analyst: 60040
Analysis Date: 10/17/2015 2:37:03PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

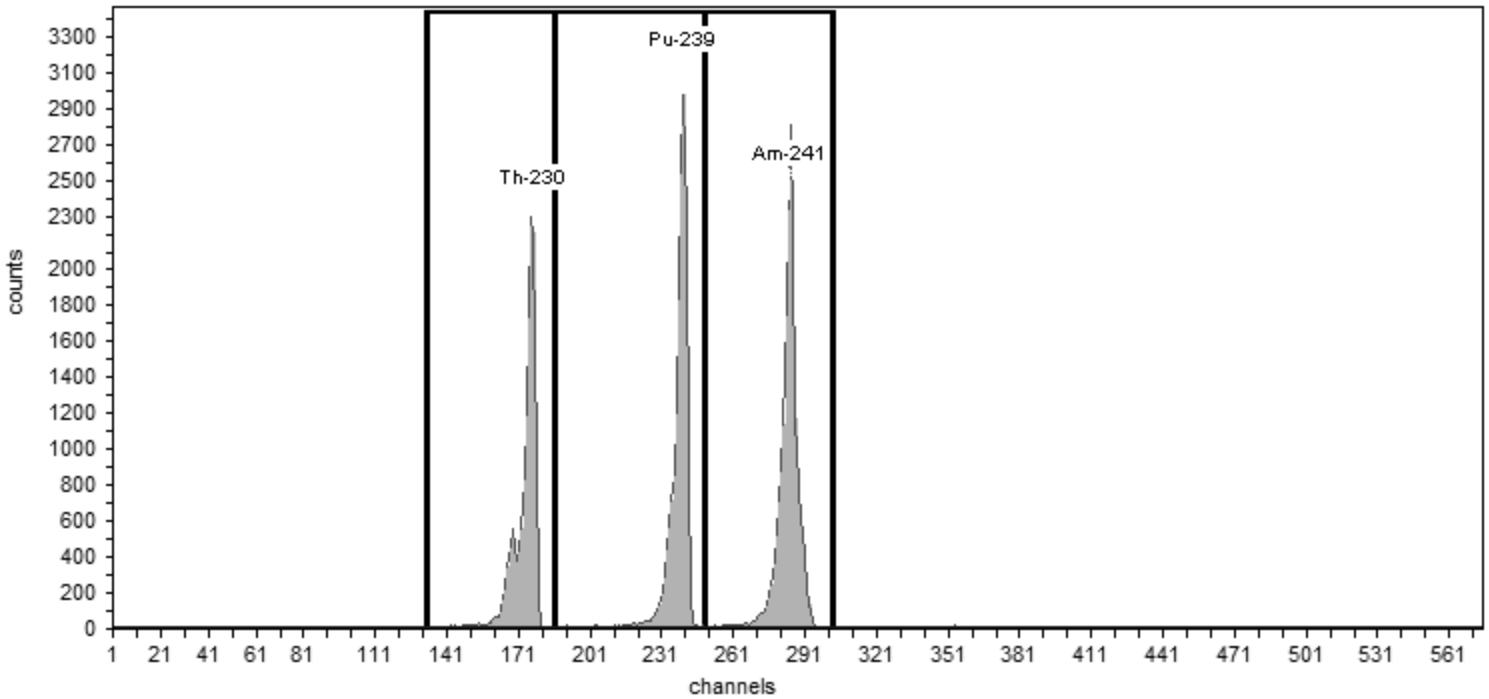
Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 10/16/2015 7:04:32PM

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

Efficiency Calibration Name: IC-9792;AV167-20151016a

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

Efficiency: 25.60% +/- 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	29.50	13,359.00	95.42
Pu-239	240	5,155.40	186	249	30.53	15,666.00	111.90
Am-241	284	5,485.70	249	303	32.36	17,633.00	125.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:36:51PM 10/17/2015

Calibration

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

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

Source Info

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

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

Acquisition

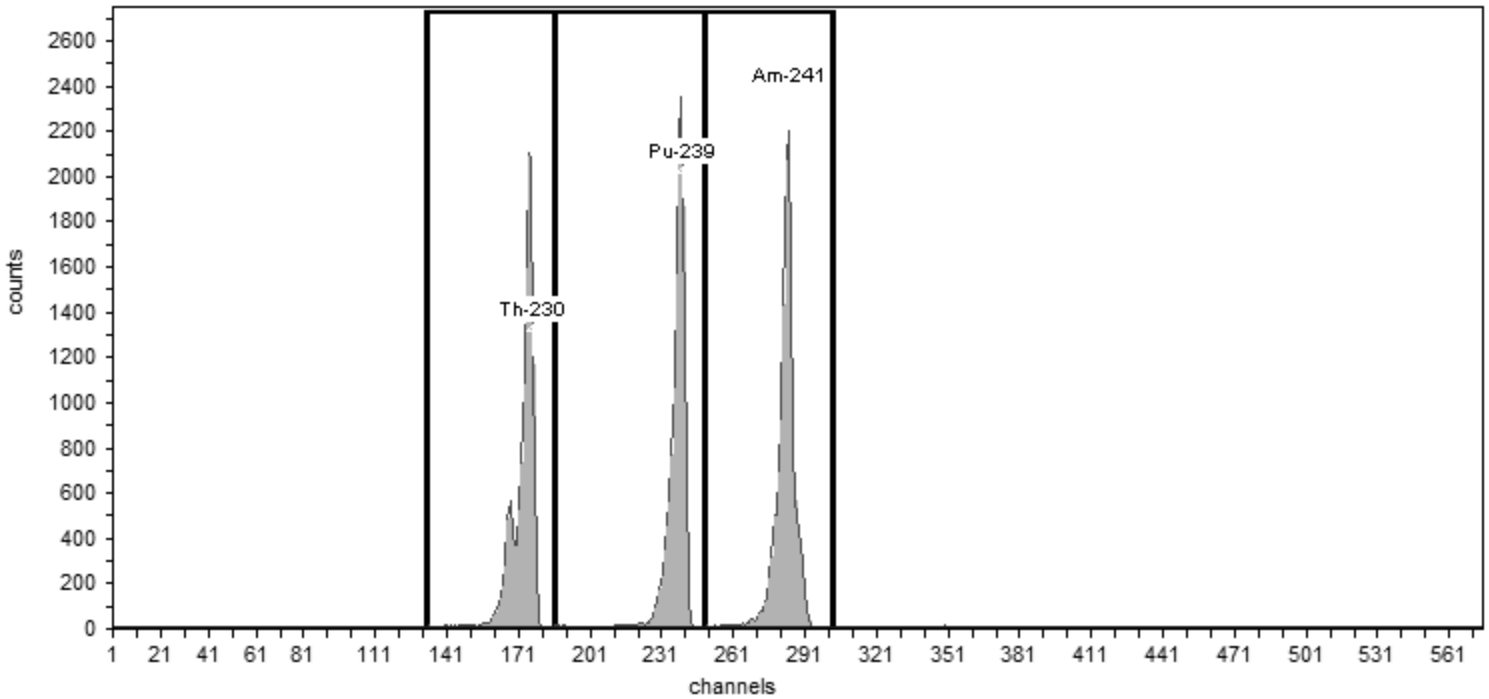
Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 10/16/2015 6:59:28PM

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

Efficiency Calibration Name: IC-9795;AV170-20151016

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

Efficiency: 25.95% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.33	12,817.00	91.55
Pu-239	240	5,155.40	186	249	32.62	12,941.00	92.44
Am-241	284	5,485.70	249	303	31.87	13,865.00	99.04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

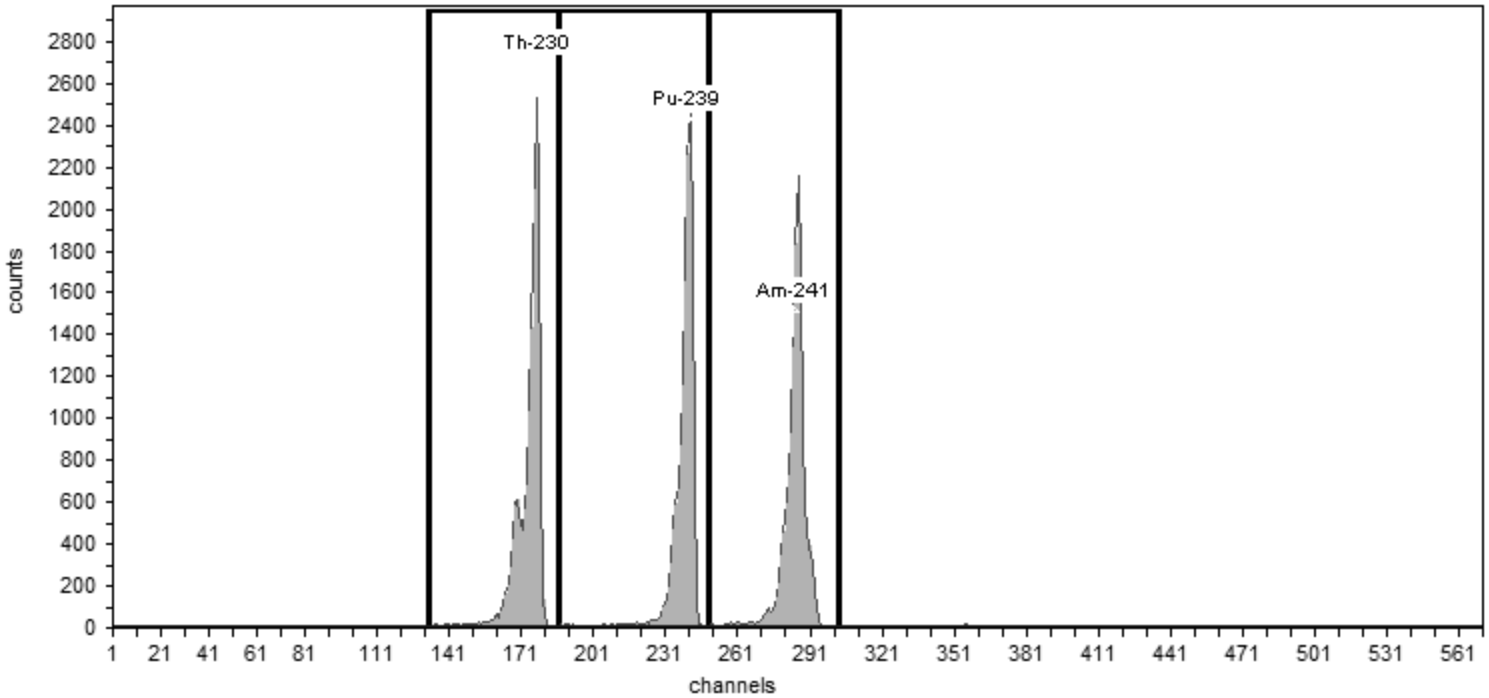
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 10/16/2015 6:59:39PM

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

Efficiency Calibration Name: IC-9817;AV171-20151016

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

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



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:27:47PM 11/23/2015

Calibration

Sample Name: IC-9885;AV173-20151016a
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 10/17/2015 2:37:06PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

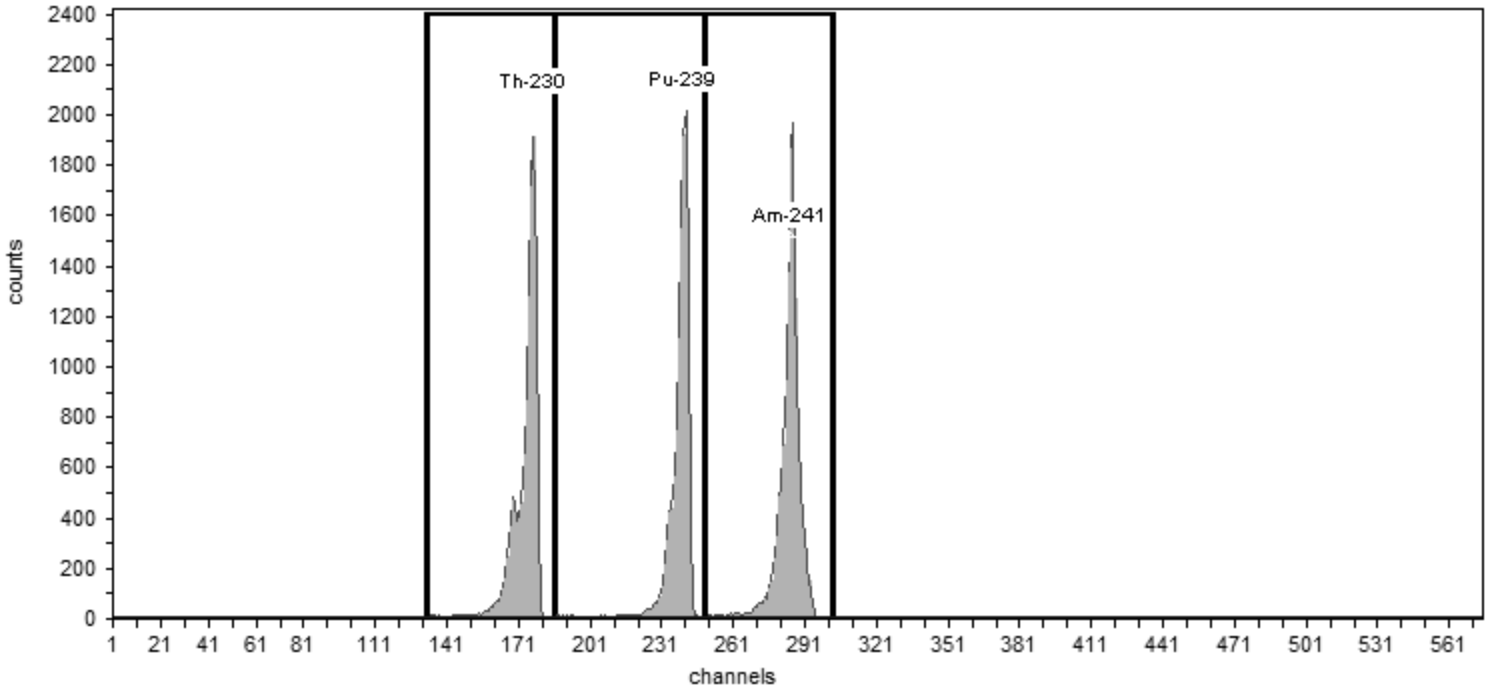
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 10/16/2015 7:04:44PM

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

Efficiency Calibration Name: IC-9885;AV173-20151016a

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

Efficiency: 25.59% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.41	11,828.00	84.49
Pu-239	240	5,155.40	186	249	33.98	11,588.00	82.77
Am-241	284	5,485.70	249	303	32.98	12,863.00	91.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

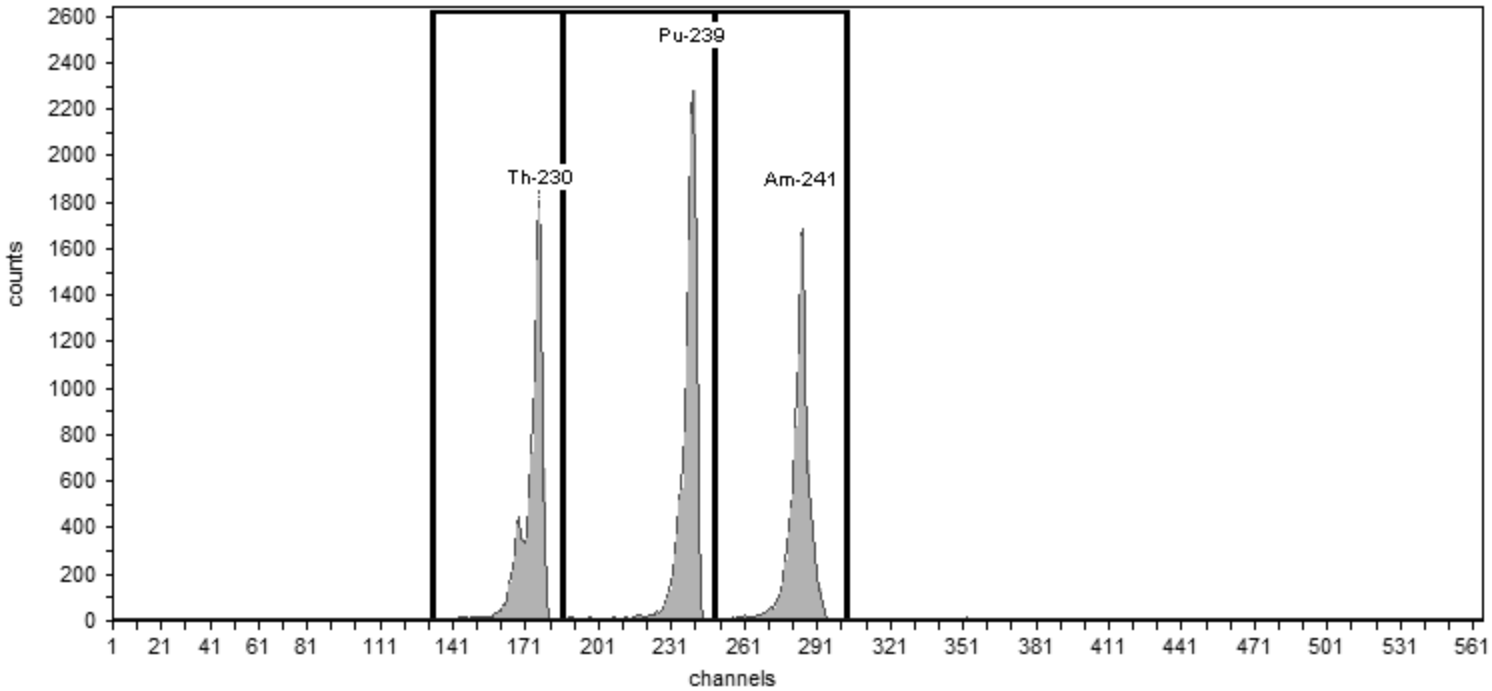
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 10/17/2015 6:13:26PM

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

Efficiency Calibration Name: IC-8875;AV191-20151017

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

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



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:15PM 10/18/2015

Calibration

Sample Name: IC-9520;AV194-20151017
Description:
Detector: AV194

Analyst: 60040
Analysis Date: 10/18/2015 3:55:14PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

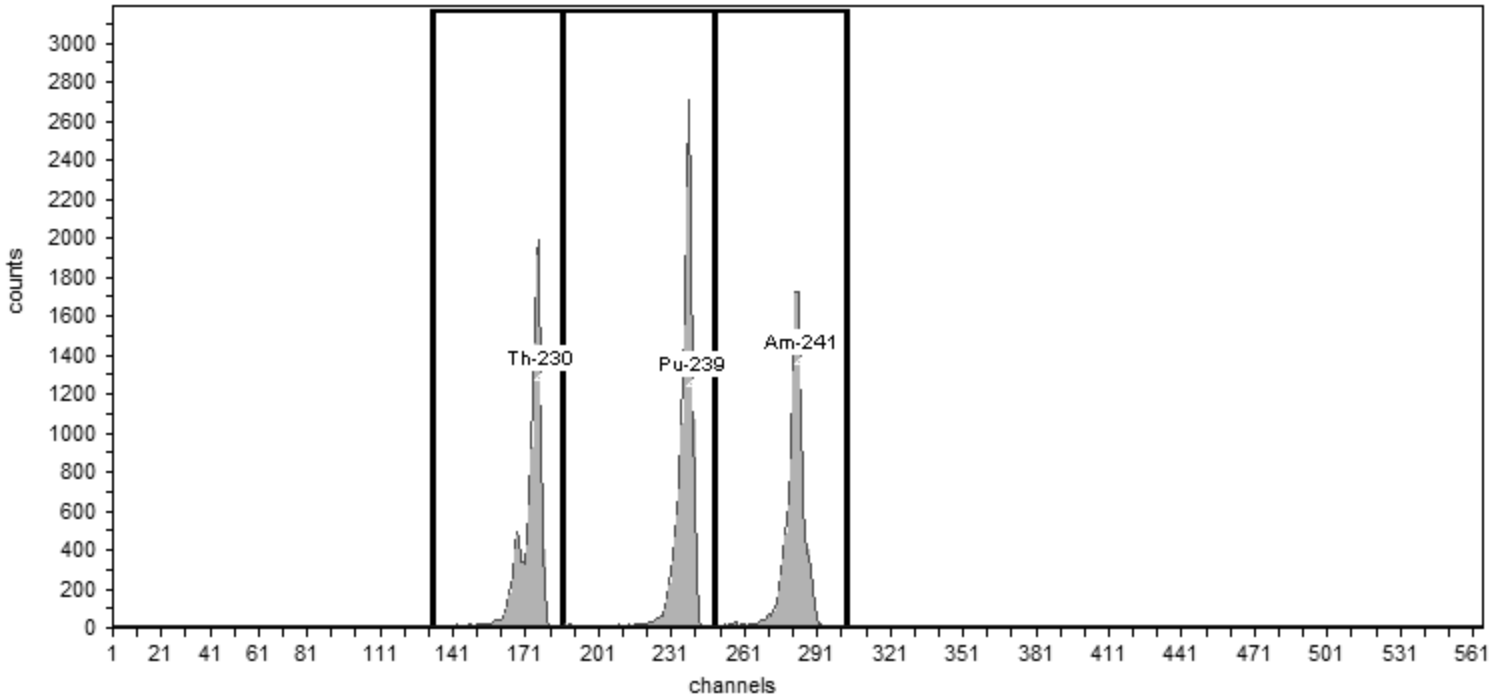
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 10/17/2015 6:13:59PM

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

Efficiency Calibration Name: IC-9520;AV194-20151017

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

Efficiency: 24.83% +/- 0.35% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	11,745.00	83.89
Pu-239	240	5,155.40	186	249	30.76	14,033.00	100.24
Am-241	284	5,485.70	249	303	34.44	11,450.00	81.79

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
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

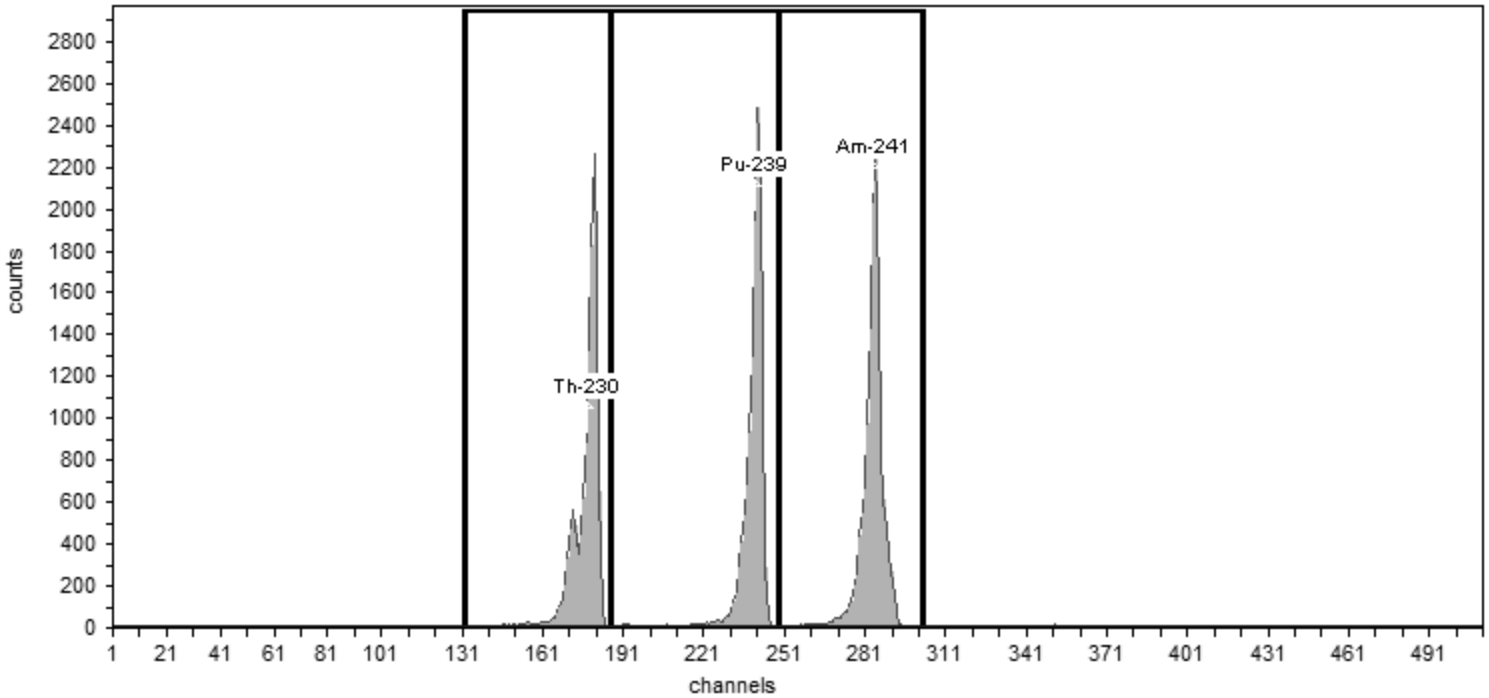
Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 10/17/2015 6:15:03PM

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
3:55:34PM 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

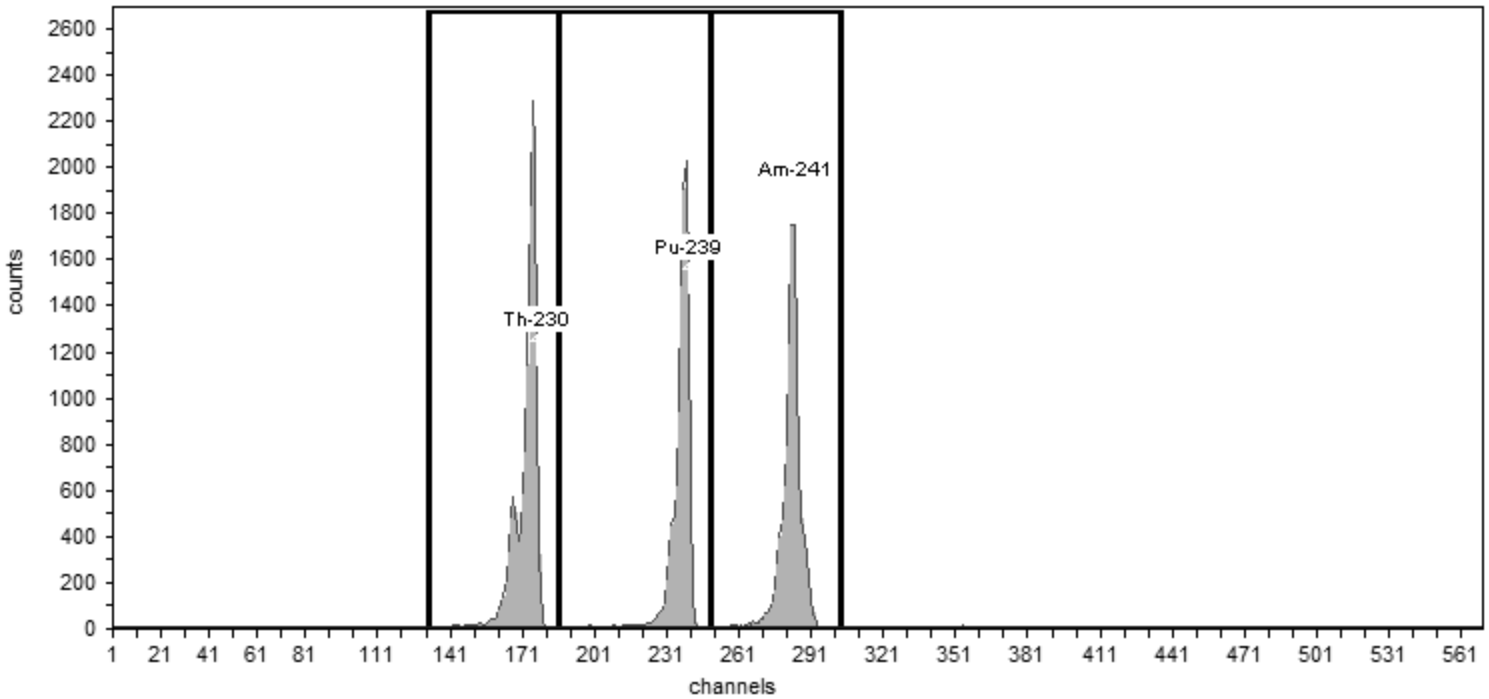
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 10/17/2015 6:15:29PM

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
8:28:45PM 11/23/2015

Calibration

Sample Name: IC-9886;AV202-20151017a
Description:
Detector: AV202

Analyst: 60040
Analysis Date: 10/18/2015 3:55:45PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

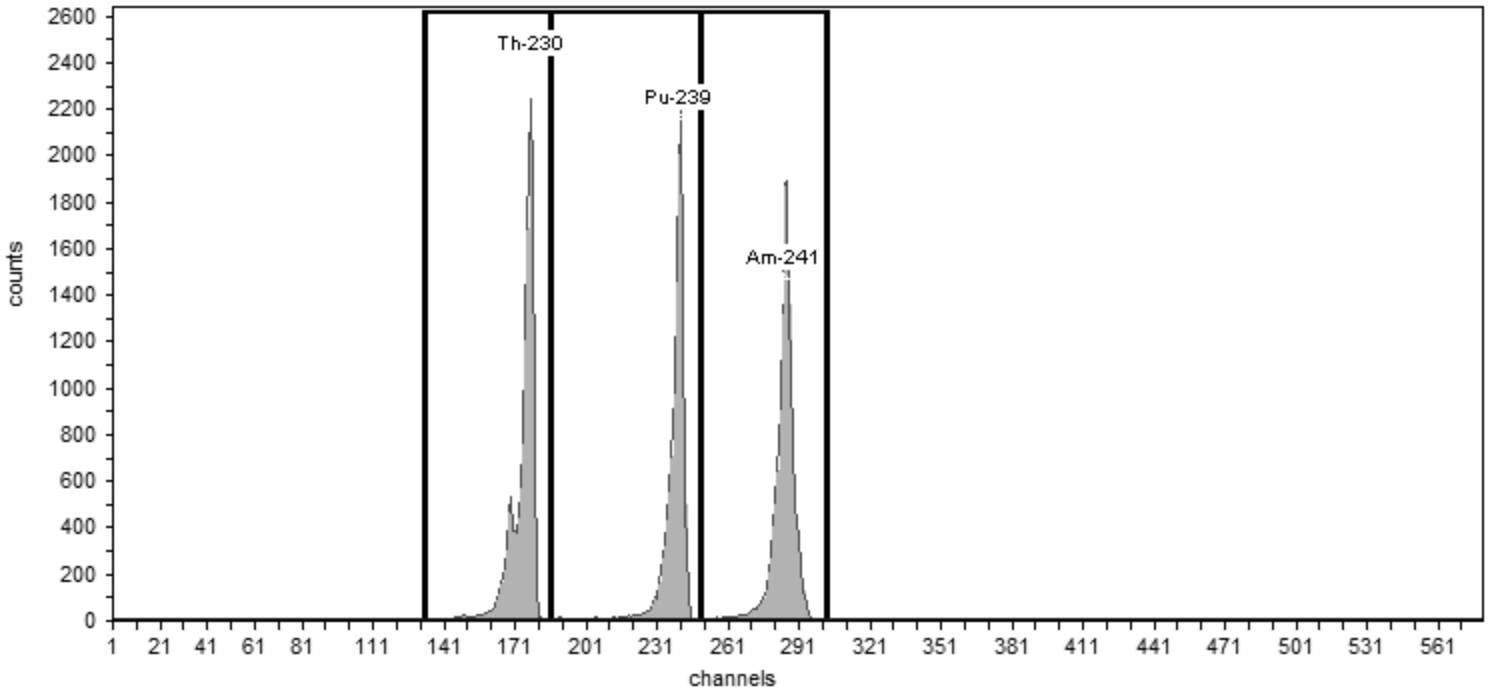
Detector: AV202 , SN: 50-117Z2
Acquisition Start Date: 10/17/2015 6:20:10PM

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

Efficiency Calibration Name: IC-9886;AV202-20151017a

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

Efficiency: 24.16% +/- 0.33% 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	28.79	12,712.00	90.80
Pu-239	240	5,155.40	186	249	29.79	11,775.00	84.11
Am-241	284	5,485.70	249	303	34.28	12,540.00	89.57

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

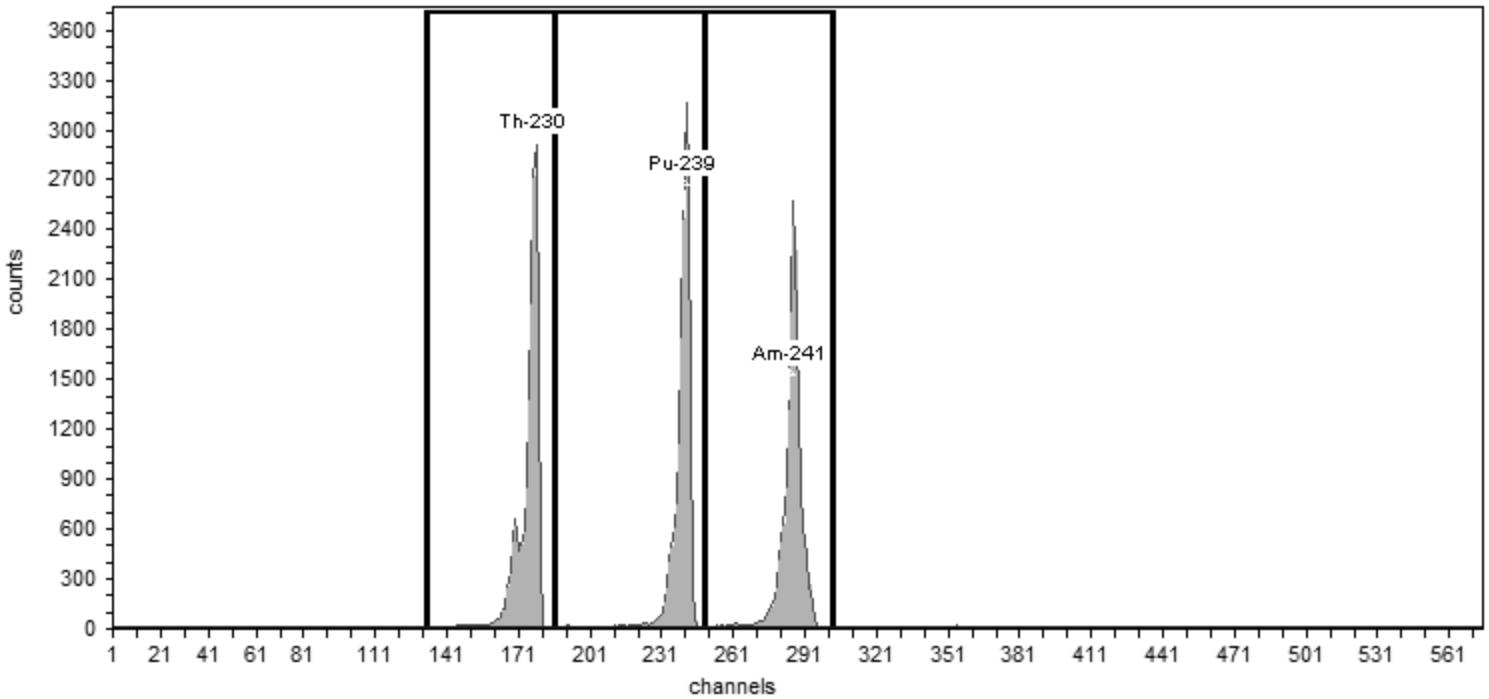
Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 10/18/2015 4:18:34PM

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

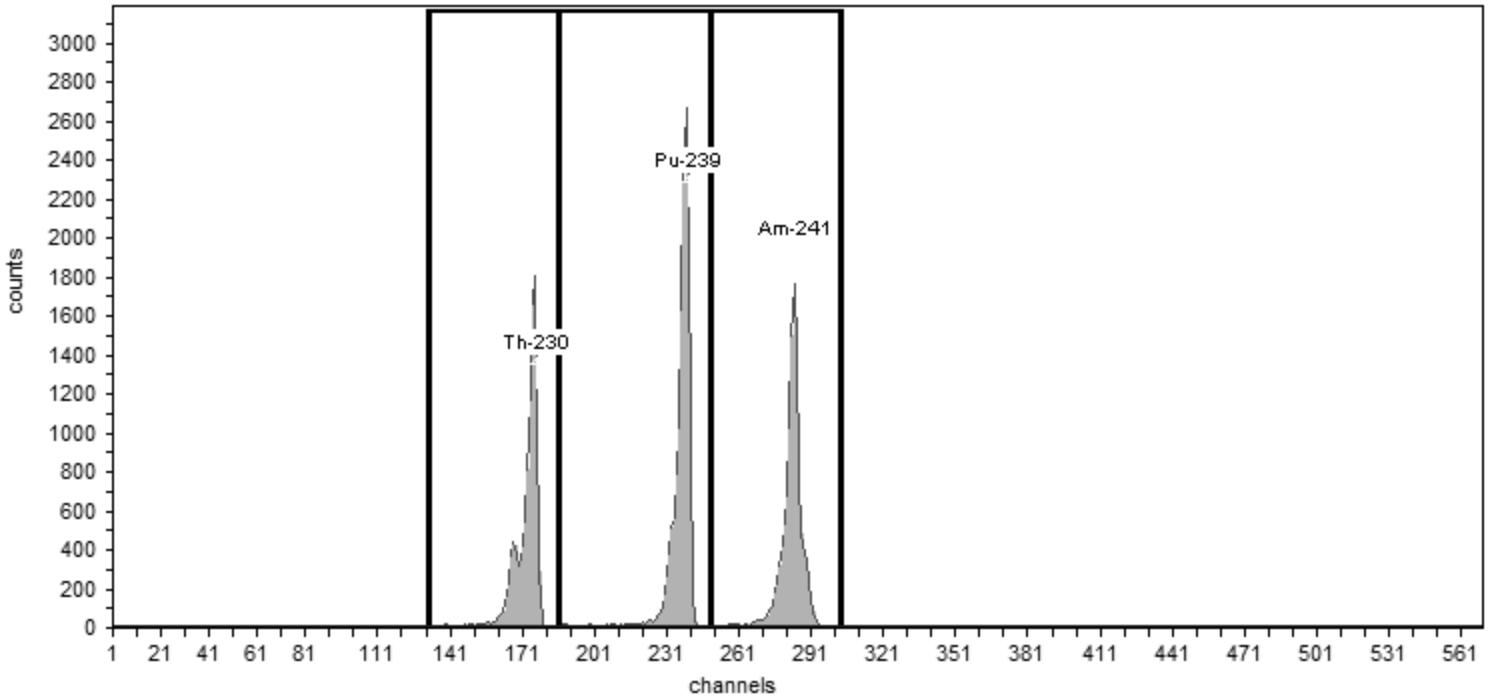
Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 10/18/2015 4:18:47PM

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

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 160-258276/1	06/27/16 10:48	82233-334_00001	0.2679	0.20-0.32	100.3	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 160-258350/1	06/28/16 11:43	82234-334_00001	0.2304	0.20-0.32	95.9	95-105

Detector: AV152

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223449/1	10/16/15 15:52	82237-334_00003	0.2454	0.20-0.32		
ICV 160-223567/1	10/26/15 19:11	82242-334_00001	0.2417	0.20-0.32	98.5	95-105
CCV 160-258280/1	06/27/16 10:49	82237-334_00003	0.2372	0.20-0.32	96.7	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 160-258281/1	06/27/16 10:50	82240-334_00001	0.2605	0.20-0.32	97.9	95-105

Detector: AV154

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223451/1	10/16/15 15:52	82241-334_00001	0.2550	0.20-0.32		
ICV 160-223569/1	10/26/15 19:11	82244-334_00001	0.2459	0.20-0.32	96.4	95-105
CCV 160-258282/1	06/27/16 10:50	82241-334_00001	0.2470	0.20-0.32	96.9	95-105

Detector: AV155

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223452/1	10/16/15 15:52	82242-334_00001	0.2417	0.20-0.32		
ICV 160-223570/1	10/26/15 19:12	82237-334_00003	0.2427	0.20-0.32	100.4	95-105
CCV 160-258283/1	06/27/16 10:50	82242-334_00001	0.2305	0.20-0.32	95.4	95-105

Detector: AV157

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223454/1	10/16/15 15:53	82244-334_00001	0.2478	0.20-0.32		
ICV 160-223572/1	10/26/15 19:12	82241-334_00001	0.2553	0.20-0.32	103.0	95-105
CCV 160-258285/1	06/27/16 10:51	82244-334_00001	0.2419	0.20-0.32	97.6	95-105

Detector: AV160

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223457/1	10/16/15 16:27	82247-334_00001	0.2397	0.20-0.32		
ICV 160-223575/1	10/26/15 19:13	82235-334_00001	0.2420	0.20-0.32	100.9	95-105
CCV 160-258286/1	06/27/16 10:52	82247-334_00001	0.2327	0.20-0.32	97.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV162

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223459/1	10/16/15 18:57	82233-334_00001	0.2638	0.20-0.32		
ICV 160-223577/1	10/26/15 20:26	82232-334_00001	0.2572	0.20-0.32	97.5	95-105
CCV 160-258288/1	06/27/16 12:02	82233-334_00001	0.2649	0.20-0.32	100.4	95-105

Detector: AV165

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223462/1	10/16/15 18:58	82236-334_00001	0.2589	0.20-0.32		
ICV 160-223580/1	10/26/15 20:27	82246-334_00001	0.2628	0.20-0.32	101.5	95-105
CCV 160-258291/1	06/27/16 12:25	82236-334_00001	0.2564	0.20-0.32	99.0	95-105

Detector: AV166

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223463/1	10/16/15 19:04	82237-334_00003	0.2464	0.20-0.32		
ICV 160-223581/1	10/26/15 20:27	82242-334_00001	0.2428	0.20-0.32	98.6	95-105
CCV 160-258292/1	06/27/16 12:25	82237-334_00003	0.2415	0.20-0.32	98.0	95-105

Detector: AV167

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223464/1	10/16/15 19:04	82240-334_00001	0.2560	0.20-0.32		
ICV 160-223582/1	10/26/15 20:27	82243-334_00001	0.2605	0.20-0.32	101.8	95-105
CCV 160-258293/1	06/27/16 12:04	82240-334_00001	0.2529	0.20-0.32	98.8	95-105

Detector: AV170

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223467/1	10/16/15 18:59	82243-334_00001	0.2595	0.20-0.32		
ICV 160-223585/1	10/26/15 20:28	82240-334_00001	0.2539	0.20-0.32	97.8	95-105
CCV 160-258296/1	06/27/16 12:05	82243-334_00001	0.2618	0.20-0.32	100.9	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 160-258297/1	06/27/16 12:05	82244-334_00001	0.2406	0.20-0.32	97.9	95-105

Detector: AV173

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223470/1	10/16/15 19:04	82246-334_00001	0.2559	0.20-0.32		
ICV 160-223588/1	10/26/15 20:29	82236-334_00001	0.2533	0.20-0.32	99.0	95-105
CCV 160-258299/1	06/27/16 12:06	82246-334_00001	0.2520	0.20-0.32	98.5	95-105

Detector: AV191

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223488/1	10/17/15 18:13	82234-334_00001	0.2422	0.20-0.32		
ICV 160-223606/2	11/01/15 18:11	82245-334_00001	0.2464	0.20-0.32	101.7	95-105
CCV 160-258354/1	06/28/16 09:29	82234-334_00001	0.2323	0.20-0.32	95.9	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV194

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223491/1	10/17/15 18:13	82237-334_00003	0.2483	0.20-0.32		
ICV 160-223609/1	11/01/15 14:24	82242-334_00001	0.2443	0.20-0.32	98.4	95-105
CCV 160-258306/1	06/27/16 13:49	82237-334_00003	0.2433	0.20-0.32	98.0	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 160-258307/1	06/27/16 13:50	82243-334_00001	0.2603	0.20-0.32	100.0	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 160-258309/1	06/27/16 13:50	82245-334_00001	0.2330	0.20-0.32	95.5	95-105

Detector: AV202

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-223499/1	10/17/15 18:20	82247-334_00001	0.2416	0.20-0.32		
ICV 160-223617/1	11/01/15 14:26	82235-334_00001	0.2411	0.20-0.32	99.8	95-105
CCV 160-258310/1	06/27/16 13:51	82247-334_00001	0.2316	0.20-0.32	95.8	95-105

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 160-258311/1	06/27/16 15:16	82232-334_00001	0.2590	0.20-0.32	99.7	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 160-258312/1	06/27/16 15:04	82233-334_00001	0.2637	0.20-0.32	100.4	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

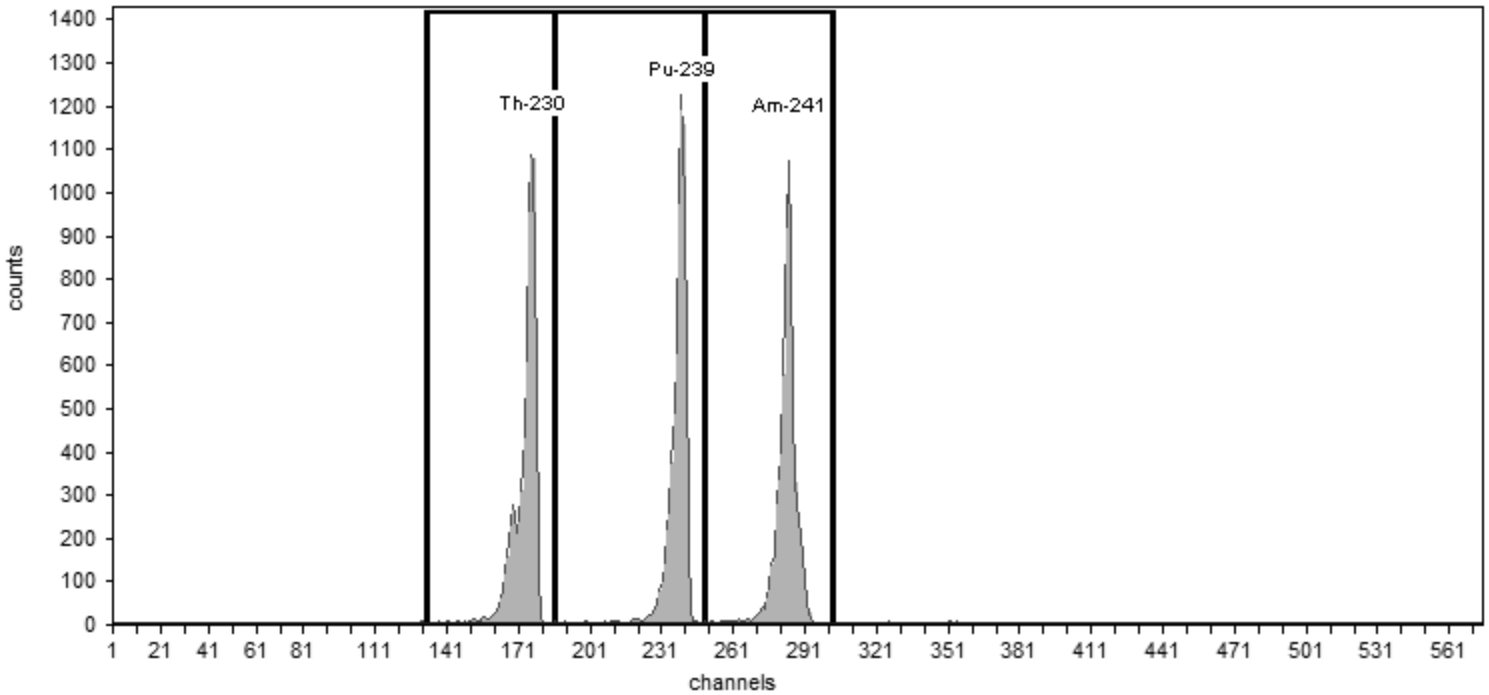
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 10/26/2015 7:10:27PM

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

Efficiency Calibration Name: ICV-7107;AV148-2015102

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

Efficiency: 25.86% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.29	7,000.00	116.67
Pu-239	240	5,155.40	186	249	31.50	6,783.00	113.05
Am-241	284	5,485.70	249	303	30.75	6,700.00	111.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

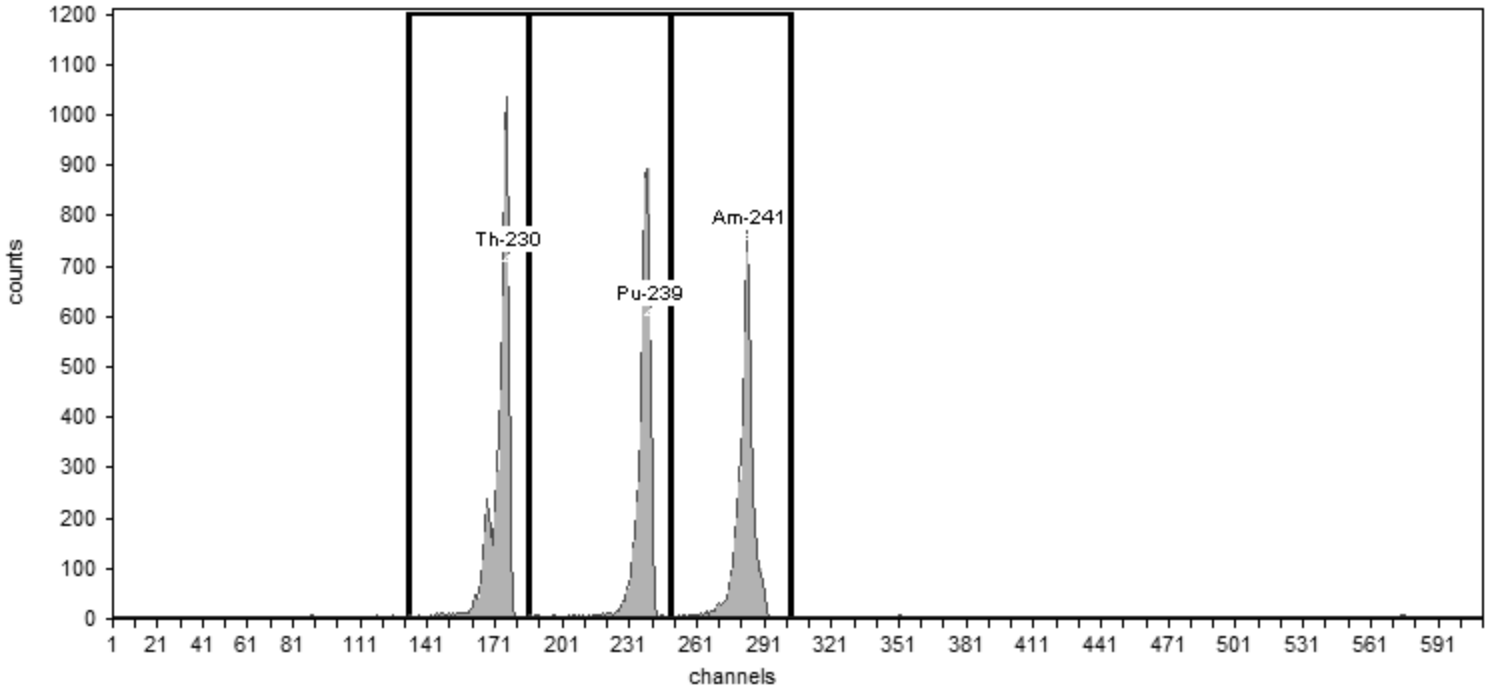
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 10/26/2015 7:10:42PM

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

Efficiency Calibration Name: ICV-9884;AV149-2015102

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

Efficiency: 23.96% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.24	5,784.00	96.40
Pu-239	240	5,155.40	186	249	30.13	4,711.00	78.52
Am-241	284	5,485.70	249	303	31.22	4,732.00	78.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:30:25PM 11/23/2015

Calibration

Sample Name: ICV-9794;AV152-20151026
Description:
Detector: AV152

Analyst: 60040
Analysis Date: 10/26/2015 8:21:03PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

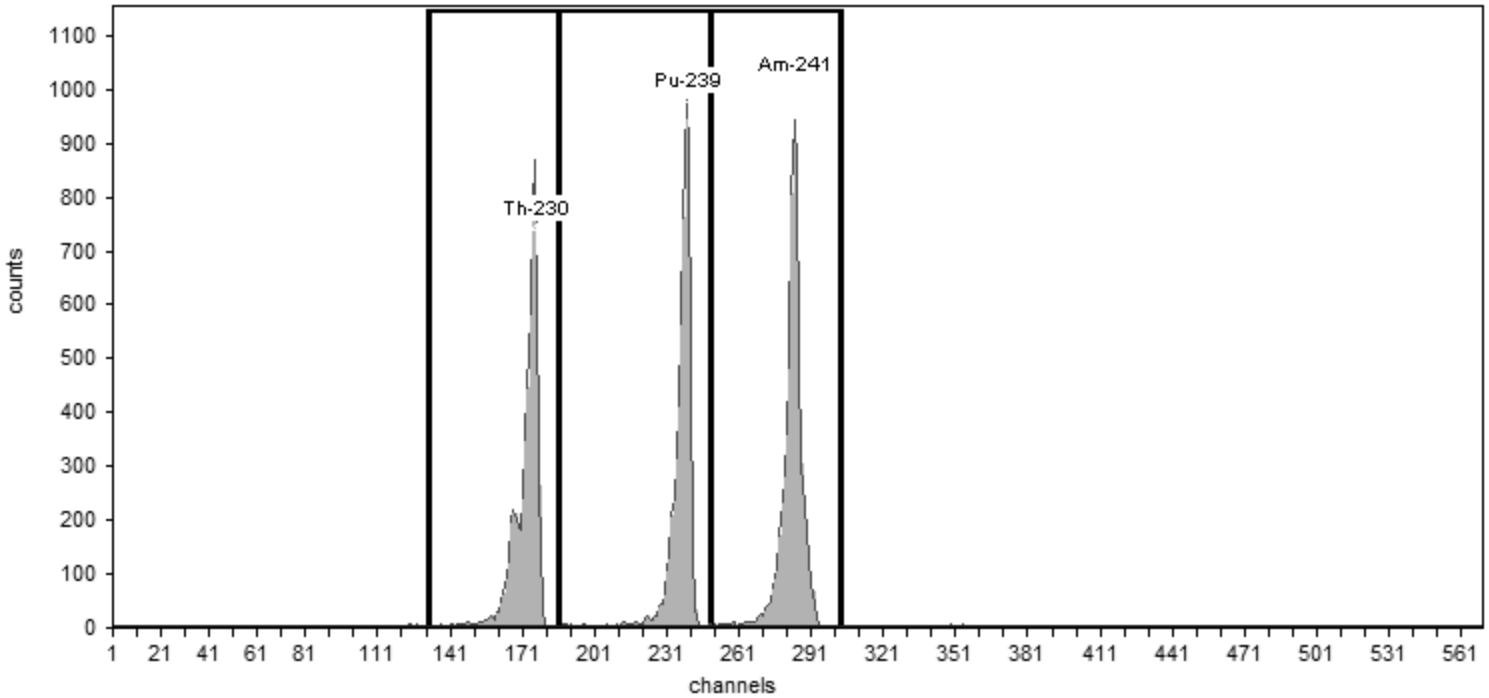
Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 10/26/2015 7:11:27PM

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

Efficiency Calibration Name: ICV-9794;AV152-2015102

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

Efficiency: 24.17% +/- 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	34.77	5,721.00	95.35
Pu-239	240	5,155.40	186	249	33.01	5,586.00	93.10
Am-241	284	5,485.70	249	303	31.64	6,169.00	102.82

TestAmerica
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

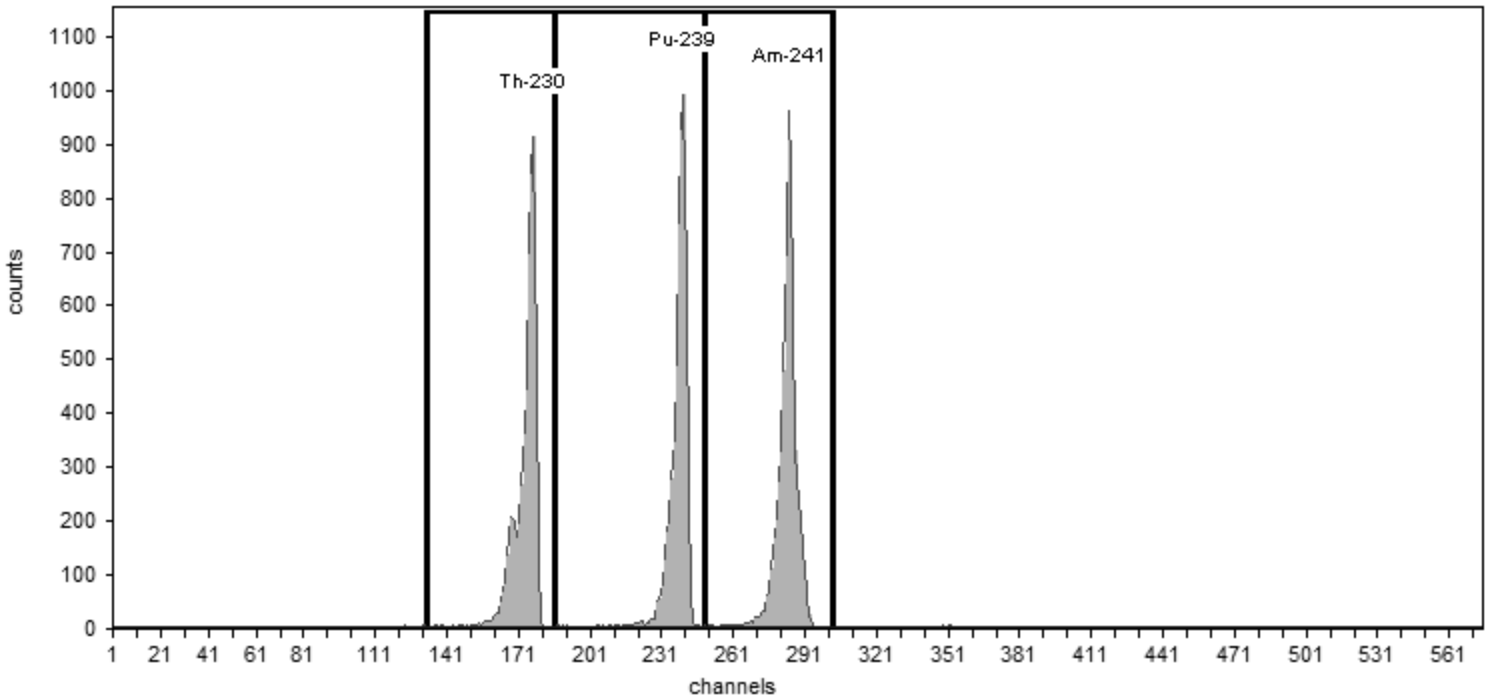
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 10/26/2015 7:11:41PM

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:10PM 10/26/2015

Calibration

Sample Name: ICV-9817;AV154-20151026
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 10/26/2015 8:21:09PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

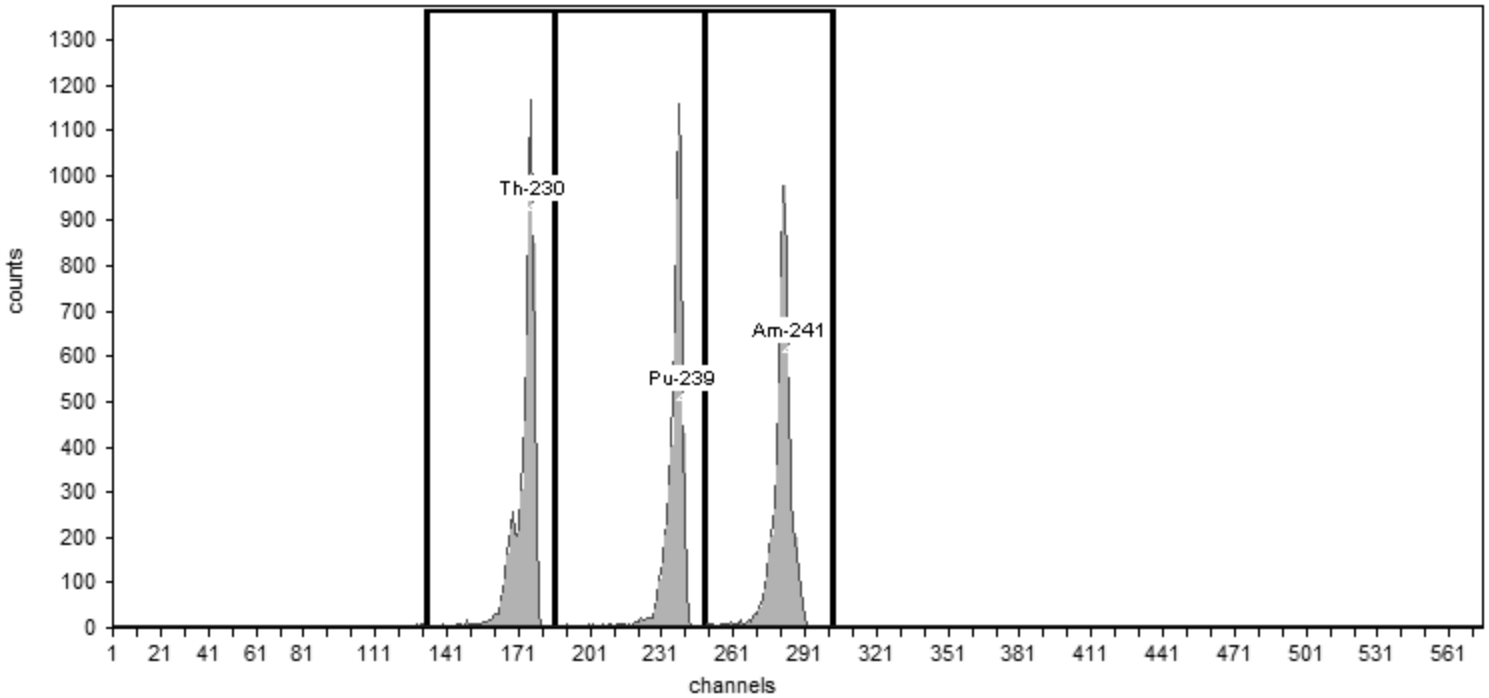
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 10/26/2015 7:11:54PM

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

Efficiency Calibration Name: ICV-9817;AV154-2015102

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

Efficiency: 24.59% +/- 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	28.21	6,412.00	106.87
Pu-239	240	5,155.40	186	249	30.02	6,004.00	100.07
Am-241	284	5,485.70	249	303	33.36	6,101.00	101.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:30:33PM 11/23/2015

Calibration

Sample Name: ICV-9520;AV155-20151026
Description:
Detector: AV155

Analyst: 60040
Analysis Date: 10/26/2015 8:21:13PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

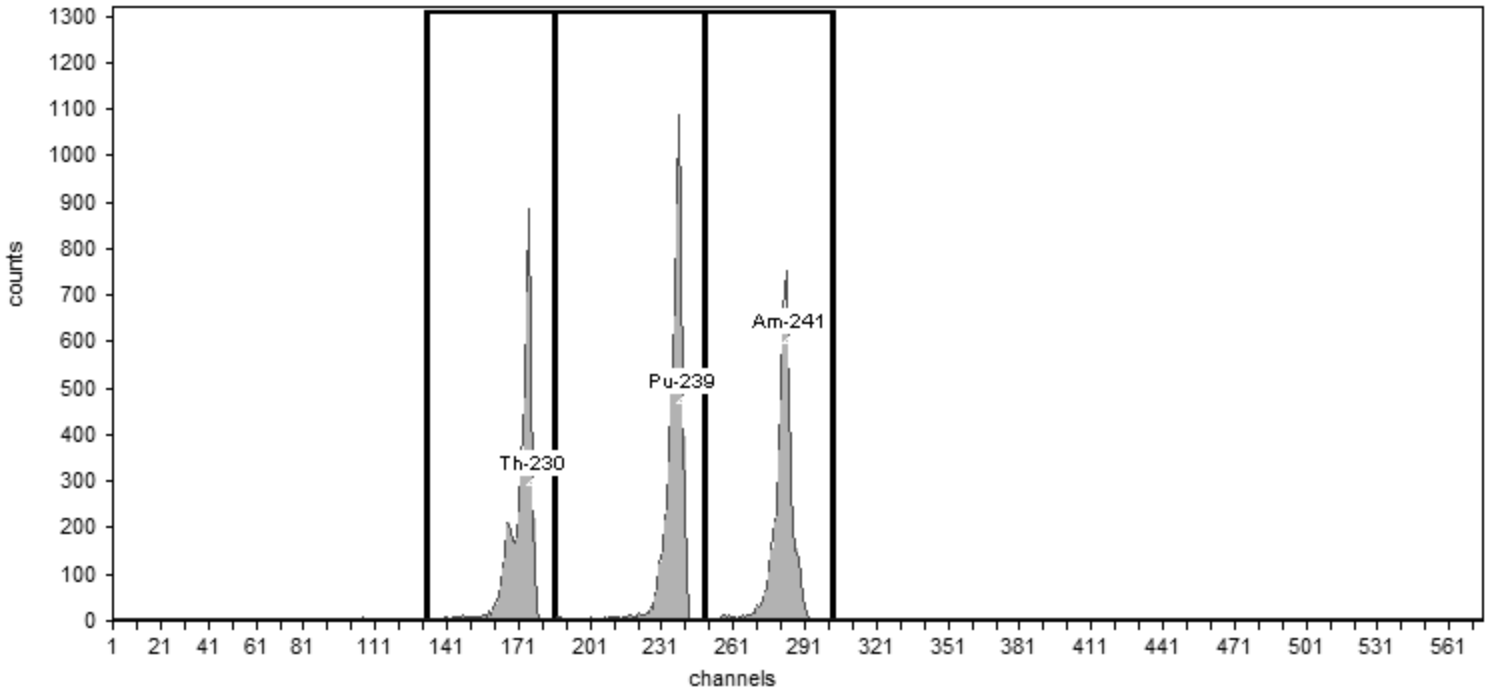
Detector: AV155 , SN: 50-05/II1
Acquisition Start Date: 10/26/2015 7:12:14PM

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

Efficiency Calibration Name: ICV-9520;AV155-2015102

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

Efficiency: 24.27% +/- 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	27.23	4,940.00	82.33
Pu-239	240	5,155.40	186	249	32.51	5,892.00	98.20
Am-241	284	5,485.70	249	303	33.96	4,770.00	79.50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:20PM 10/26/2015

Calibration

Sample Name: ICV-9793;AV157-20151026
Description:
Detector: AV157

Analyst: 60040
Analysis Date: 10/26/2015 8:21:20PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

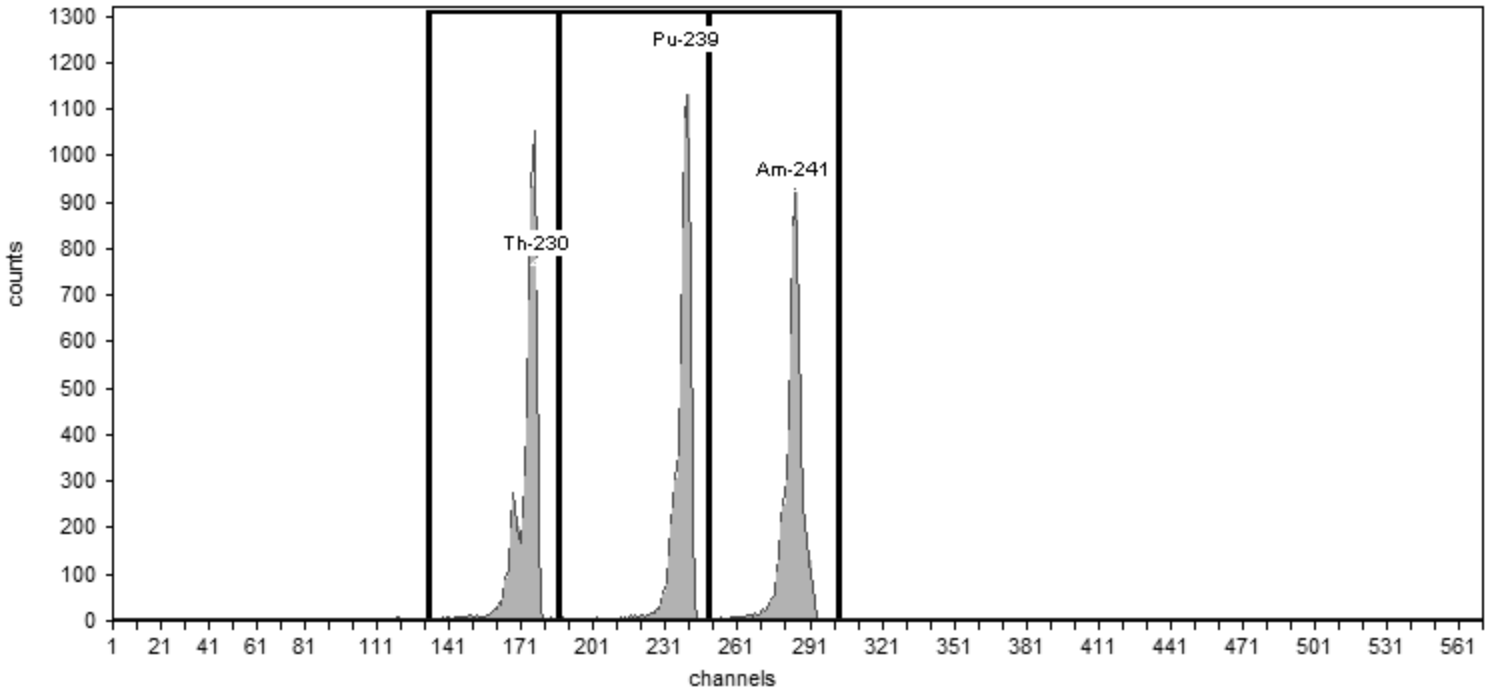
Detector: AV157 , SN: 50-05/II3
Acquisition Start Date: 10/26/2015 7:12:43PM

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

Efficiency Calibration Name: ICV-9793;AV157-2015102

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

Efficiency: 25.53% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.74	6,101.00	101.68
Pu-239	240	5,155.40	186	249	32.30	6,260.00	104.33
Am-241	284	5,485.70	249	303	33.51	6,031.00	100.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:30PM 10/26/2015

Calibration

Sample Name: ICV-8876;AV160-20151026
Description:
Detector: AV160

Analyst: 60040
Analysis Date: 10/26/2015 8:21:29PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

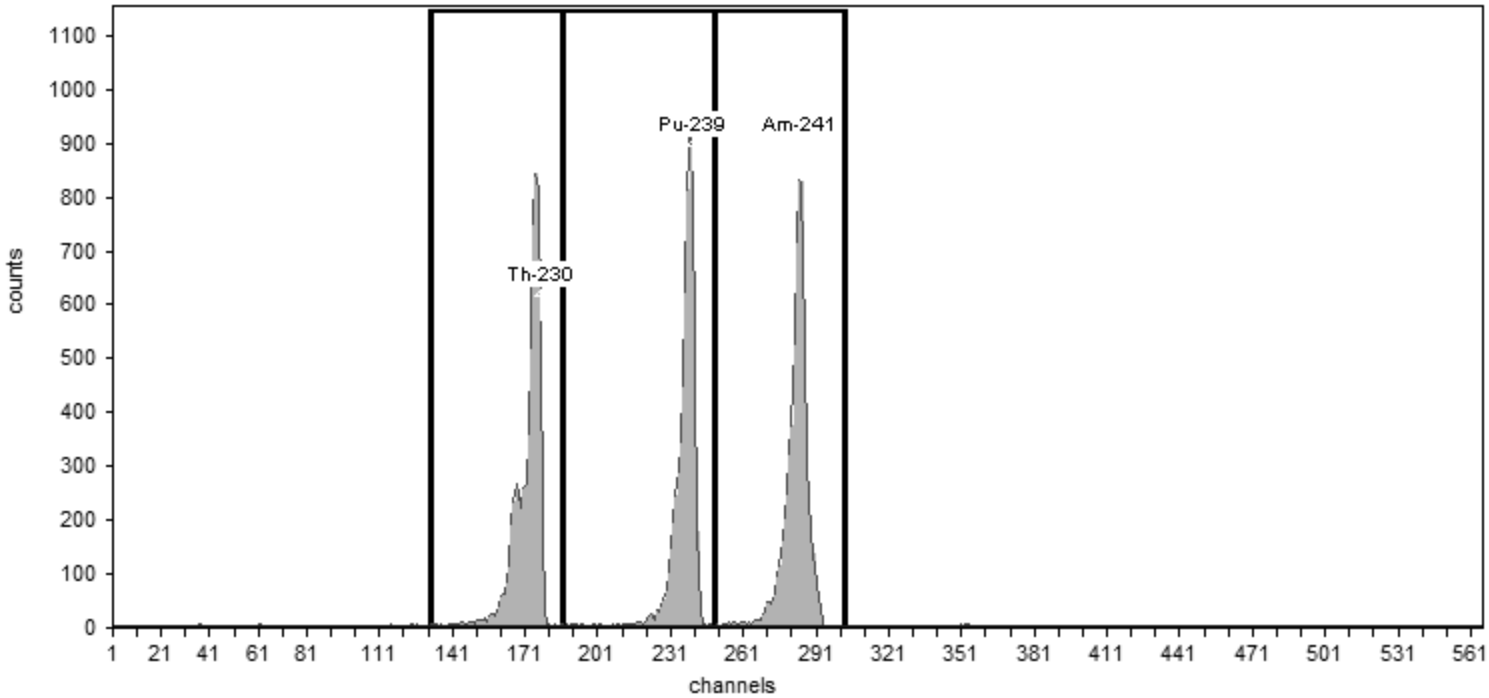
Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 10/26/2015 7:13:36PM

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

Efficiency Calibration Name: ICV-8876;AV160-2015102

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

Efficiency: 24.20% +/- 0.39% 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	36.92	6,309.00	105.15
Pu-239	240	5,155.40	186	249	36.44	6,073.00	101.22
Am-241	284	5,485.70	249	303	38.86	6,332.00	105.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:13:59PM 10/27/2015

Calibration

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

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

Source Info

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

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

Acquisition

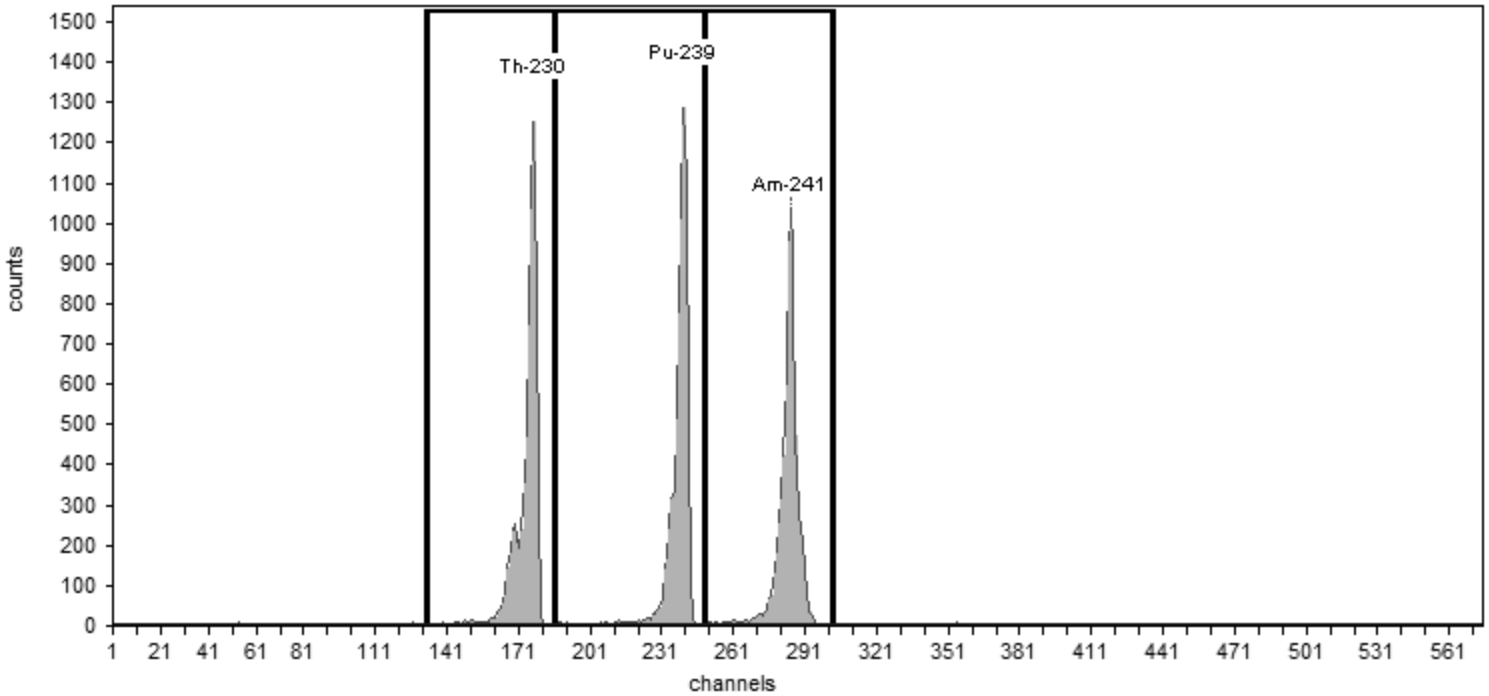
Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 10/26/2015 8:26:40PM

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

Efficiency Calibration Name: ICV-7107;AV162-2015102

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

Efficiency: 25.72% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.67	6,855.00	114.25
Pu-239	240	5,155.40	186	249	31.64	6,850.00	114.17
Am-241	284	5,485.70	249	303	29.54	6,681.00	111.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:30:54PM 11/23/2015

Calibration

Sample Name: ICV-9885;AV165-20151026
Description:
Detector: AV165

Analyst: 60040
Analysis Date: 10/27/2015 2:14:05PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

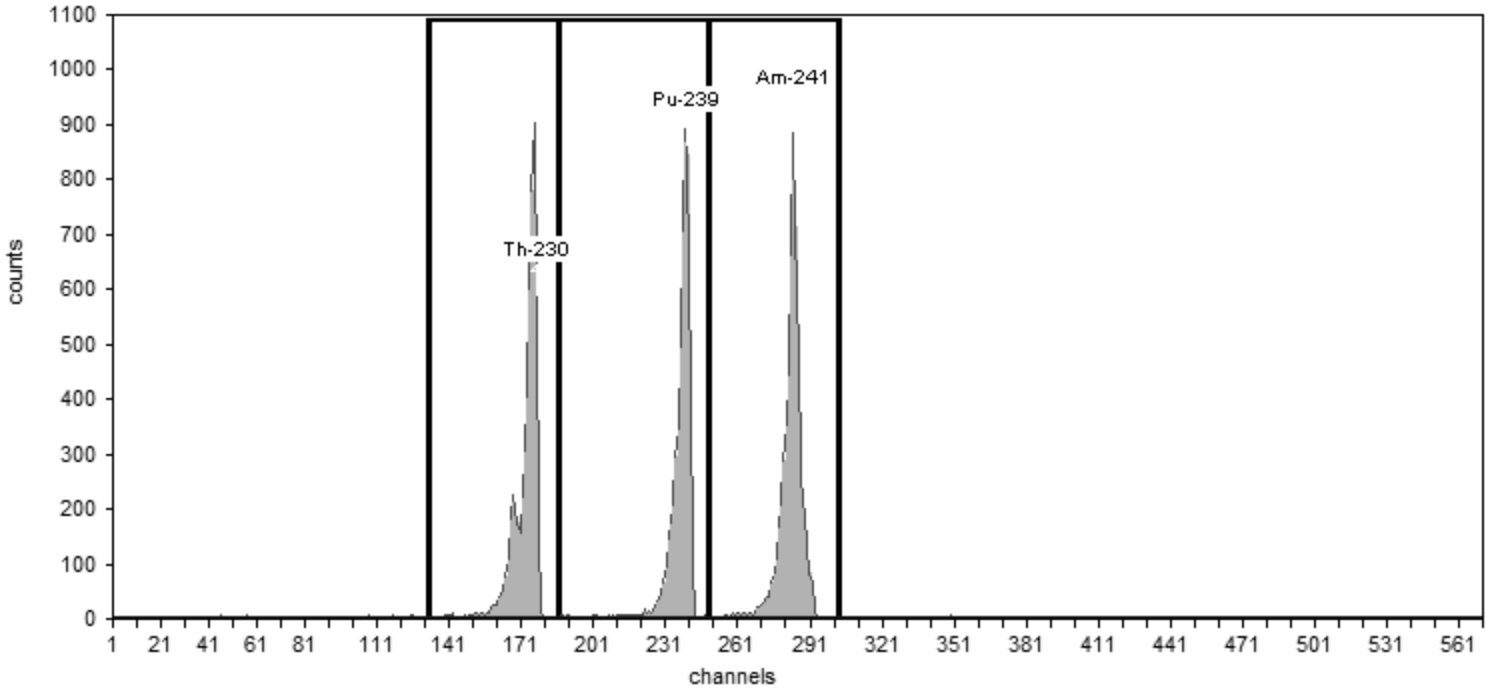
Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 10/26/2015 8:27:21PM

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

Efficiency Calibration Name: ICV-9885;AV165-2015102

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

Efficiency: 26.28% +/- 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	30.05	5,301.00	88.35
Pu-239	240	5,155.40	186	249	31.71	5,011.00	83.52
Am-241	284	5,485.70	249	303	31.12	5,658.00	94.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:09PM 10/27/2015

Calibration

Sample Name: ICV-9794;AV166-20151026
Description:
Detector: AV166

Analyst: 60040
Analysis Date: 10/27/2015 2:14:08PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

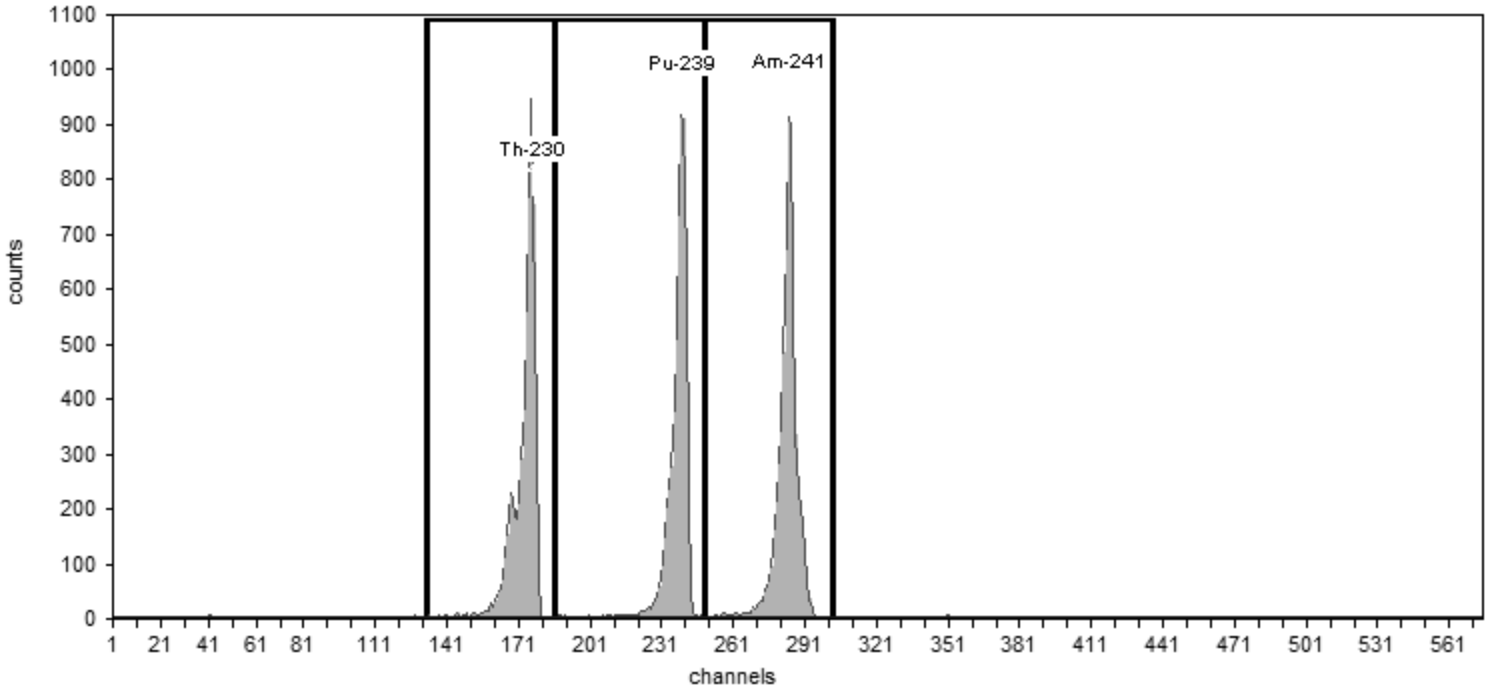
Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 10/26/2015 8:27:35PM

Live Time: 60.00 min.
Real Time: 60.03 min.

Efficiency Calibration Name: ICV-9794;AV166-2015102

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

Efficiency: 24.28% +/- 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	31.03	5,744.00	95.73
Pu-239	240	5,155.40	186	249	35.91	5,610.00	93.50
Am-241	284	5,485.70	249	303	35.38	6,204.00	103.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:16PM 10/27/2015

Calibration

Sample Name: ICV-9795;AV167-20151026
Description:
Detector: AV167

Analyst: 60040
Analysis Date: 10/27/2015 2:14:15PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

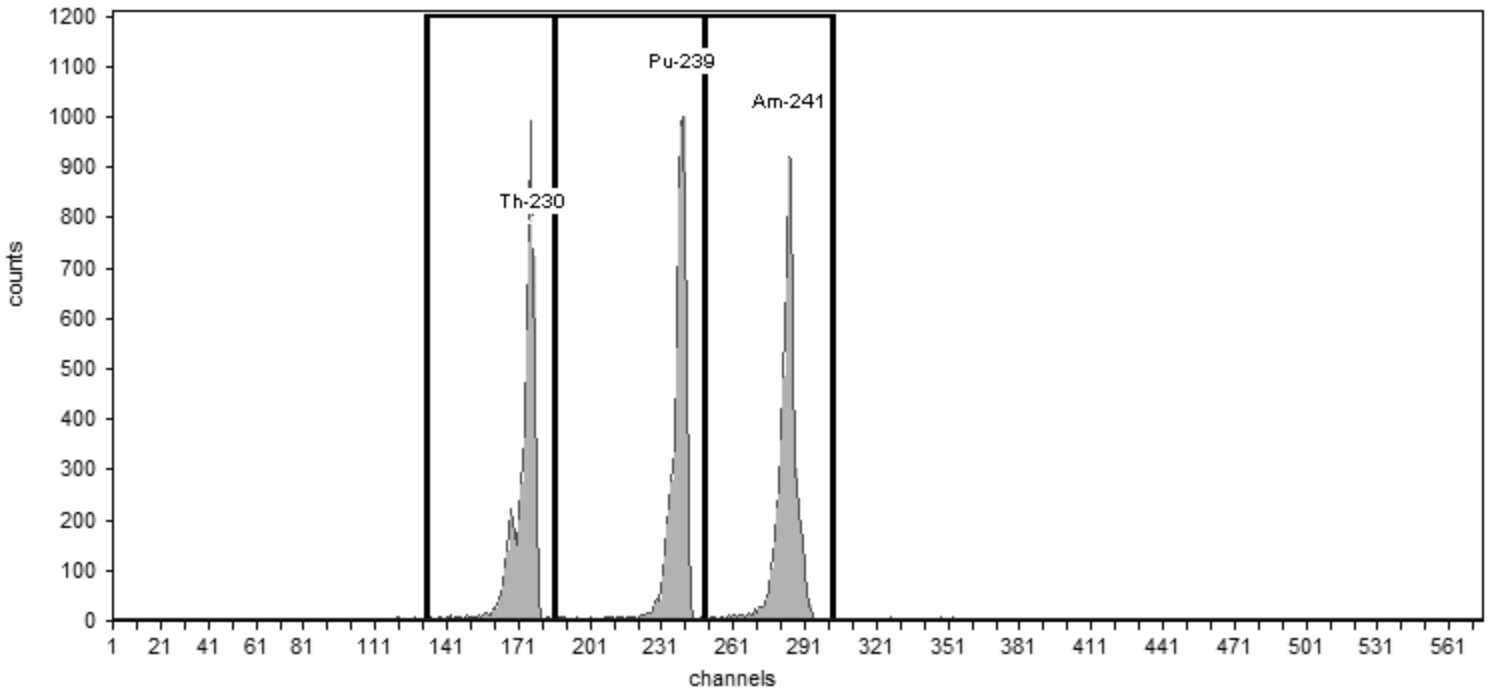
Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 10/26/2015 8:27:53PM

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

Efficiency Calibration Name: ICV-9795;AV167-2015102

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

Efficiency: 26.05% +/- 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	28.75	5,432.00	90.53
Pu-239	240	5,155.40	186	249	32.57	5,647.00	94.12
Am-241	284	5,485.70	249	303	33.56	5,965.00	99.42

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

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

Calibration

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

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

Source Info

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

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

Acquisition

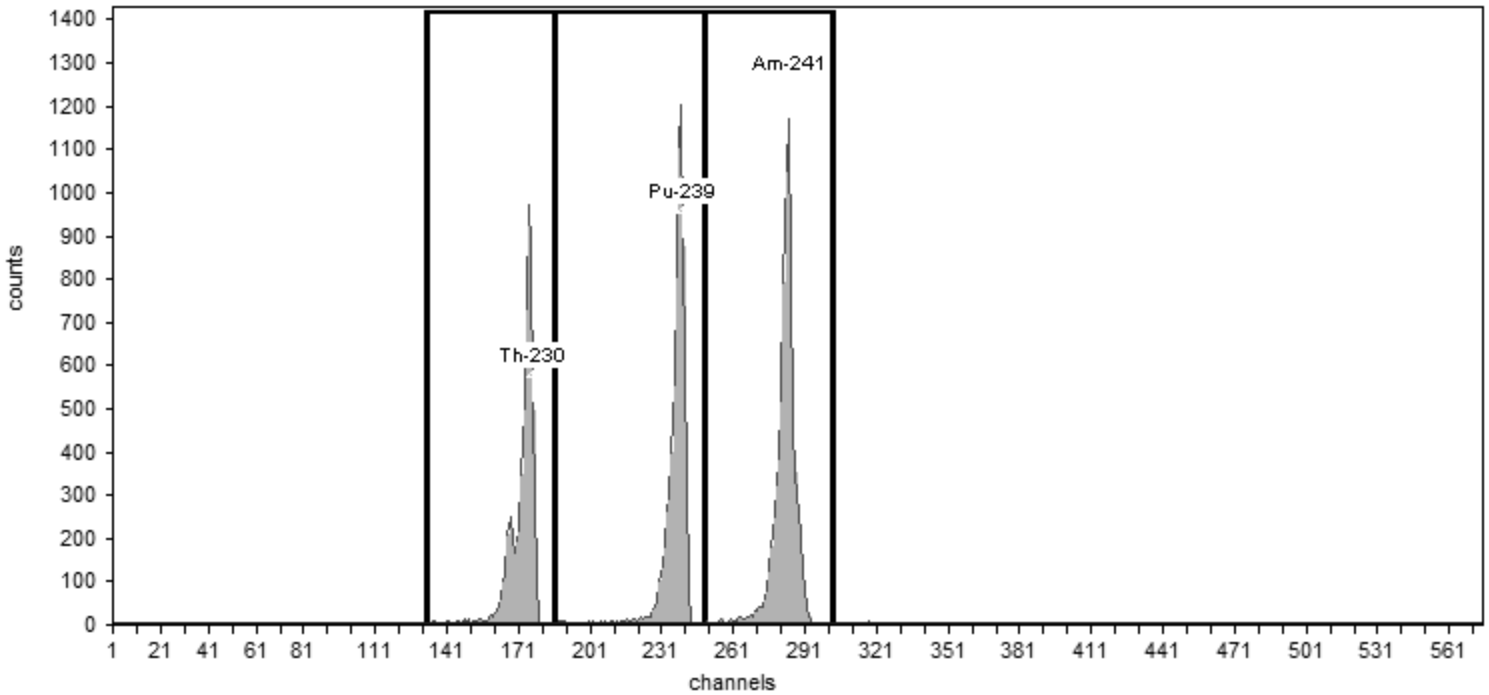
Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 10/26/2015 8:28:34PM

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

Efficiency Calibration Name: ICV-9792;AV170-2015102

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

Efficiency: 25.39% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.57	5,684.00	94.73
Pu-239	240	5,155.40	186	249	32.08	6,617.00	110.28
Am-241	284	5,485.70	249	303	32.83	7,530.00	125.50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:07PM 11/23/2015

Calibration

Sample Name: ICV-9793;AV171-20151026
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 10/27/2015 2:14:25PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

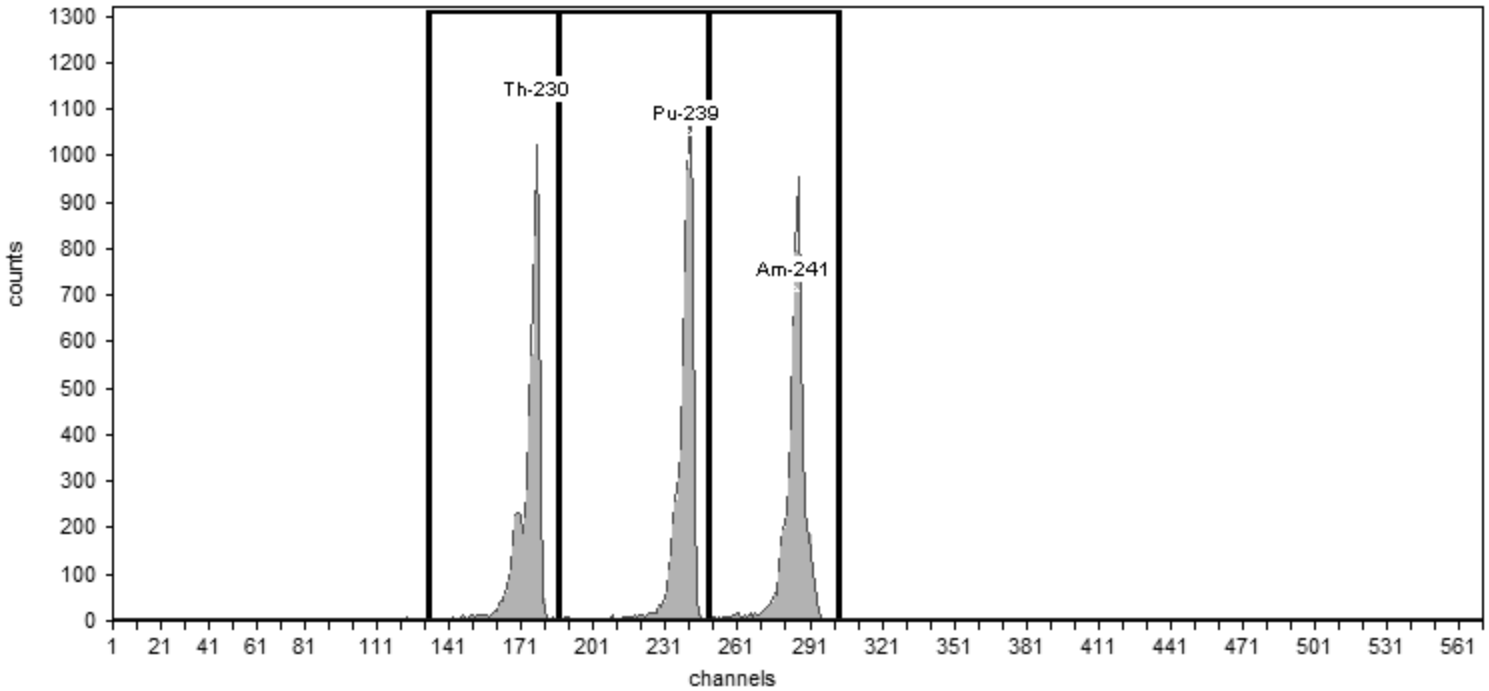
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 10/26/2015 8:28:50PM

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

Efficiency Calibration Name: ICV-9793;AV171-2015102

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

Efficiency: 25.39% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.10	6,053.00	100.88
Pu-239	240	5,155.40	186	249	33.57	6,203.00	103.38
Am-241	284	5,485.70	249	303	32.46	6,038.00	100.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:37PM 10/27/2015

Calibration

Sample Name: ICV-8877;AV173-20151026
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 10/27/2015 2:14:36PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

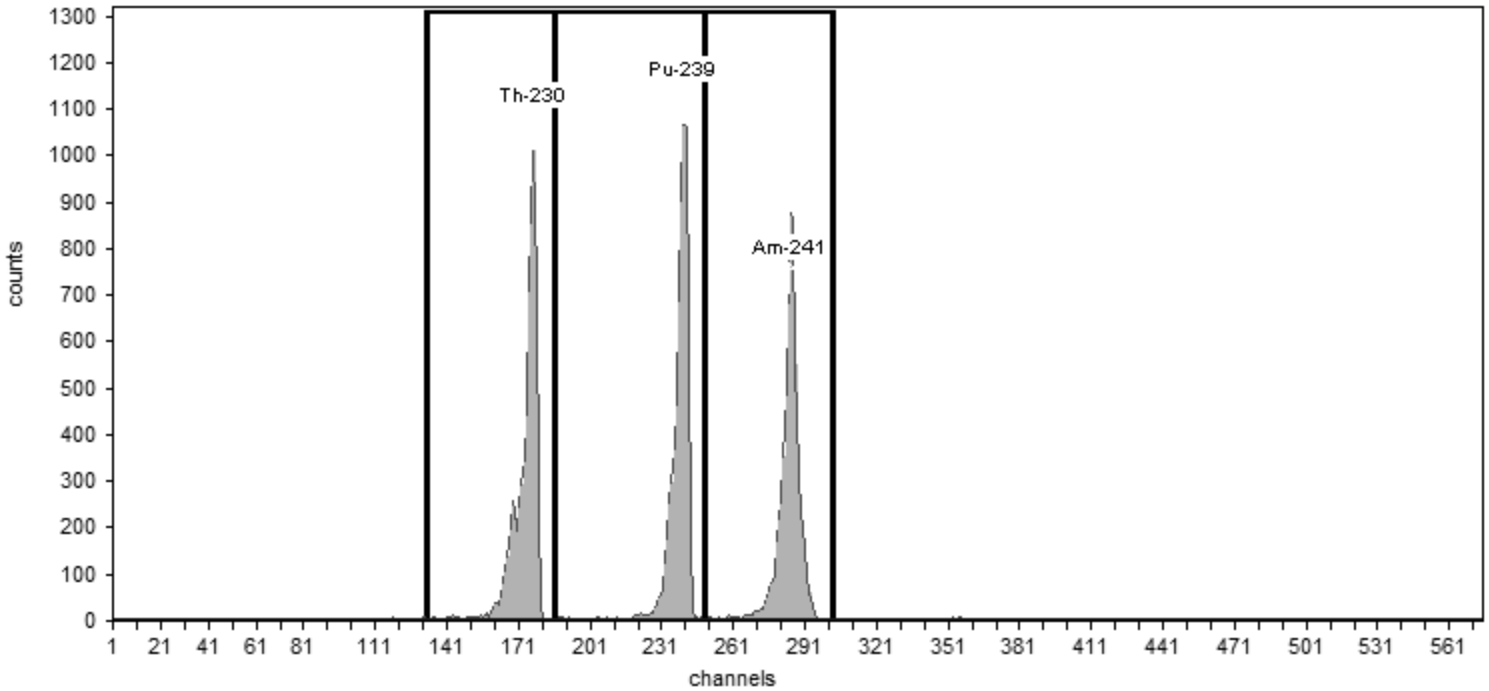
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 10/26/2015 8:29:21PM

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

Efficiency Calibration Name: ICV-8877;AV173-2015102

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

Efficiency: 25.33% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.52	6,350.00	105.83
Pu-239	240	5,155.40	186	249	36.04	6,502.00	108.37
Am-241	284	5,485.70	249	303	35.83	6,001.00	100.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:12:43PM 11/1/2015

Calibration

Sample Name: ICV-9884;AV191-20151101a
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 11/1/2015 7:12:41PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

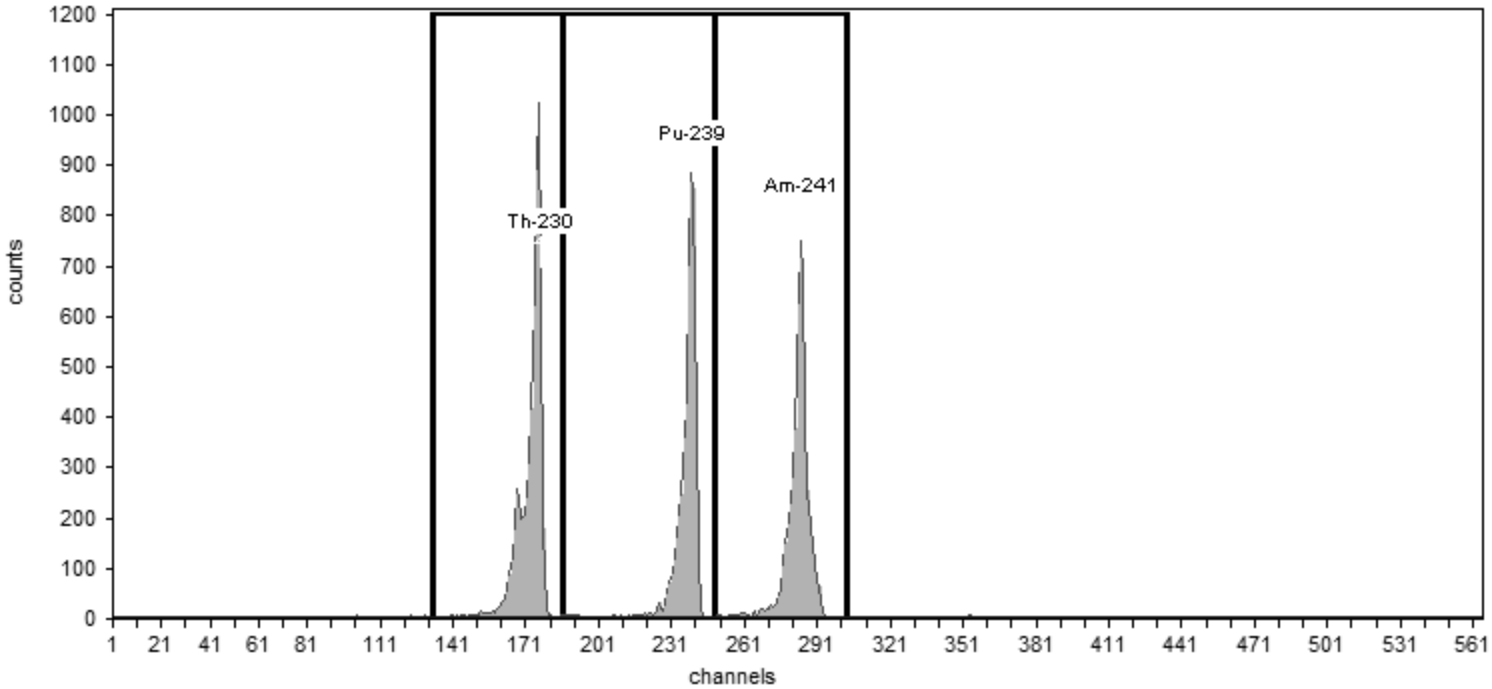
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 11/1/2015 6:11:24PM

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

Efficiency Calibration Name: ICV-9884;AV191-2015110

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

Efficiency: 24.64% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.76	5,906.00	98.43
Pu-239	240	5,155.40	186	249	28.60	4,838.00	80.63
Am-241	284	5,485.70	249	303	31.58	4,920.00	82.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:55:57PM 11/1/2015

Calibration

Sample Name: ICV-9794;AV194-20151101
Description:
Detector: AV194

Analyst: 60040
Analysis Date: 11/1/2015 3:55:56PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

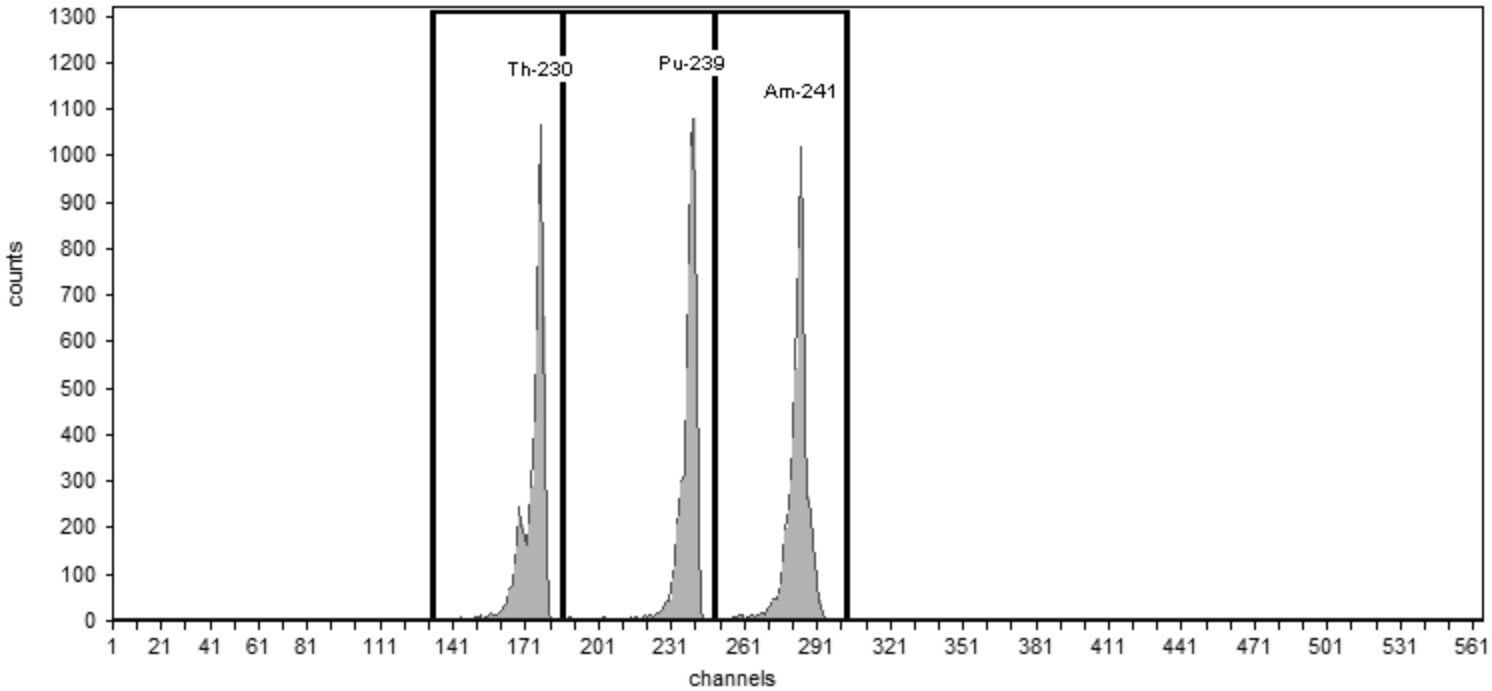
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 11/1/2015 2:24:38PM

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

Efficiency Calibration Name: ICV-9794;AV194-2015110

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

Efficiency: 24.43% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.71	5,730.00	95.50
Pu-239	240	5,155.40	186	249	31.56	5,754.00	95.90
Am-241	284	5,485.70	249	303	29.93	6,187.00	103.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:56:05PM 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

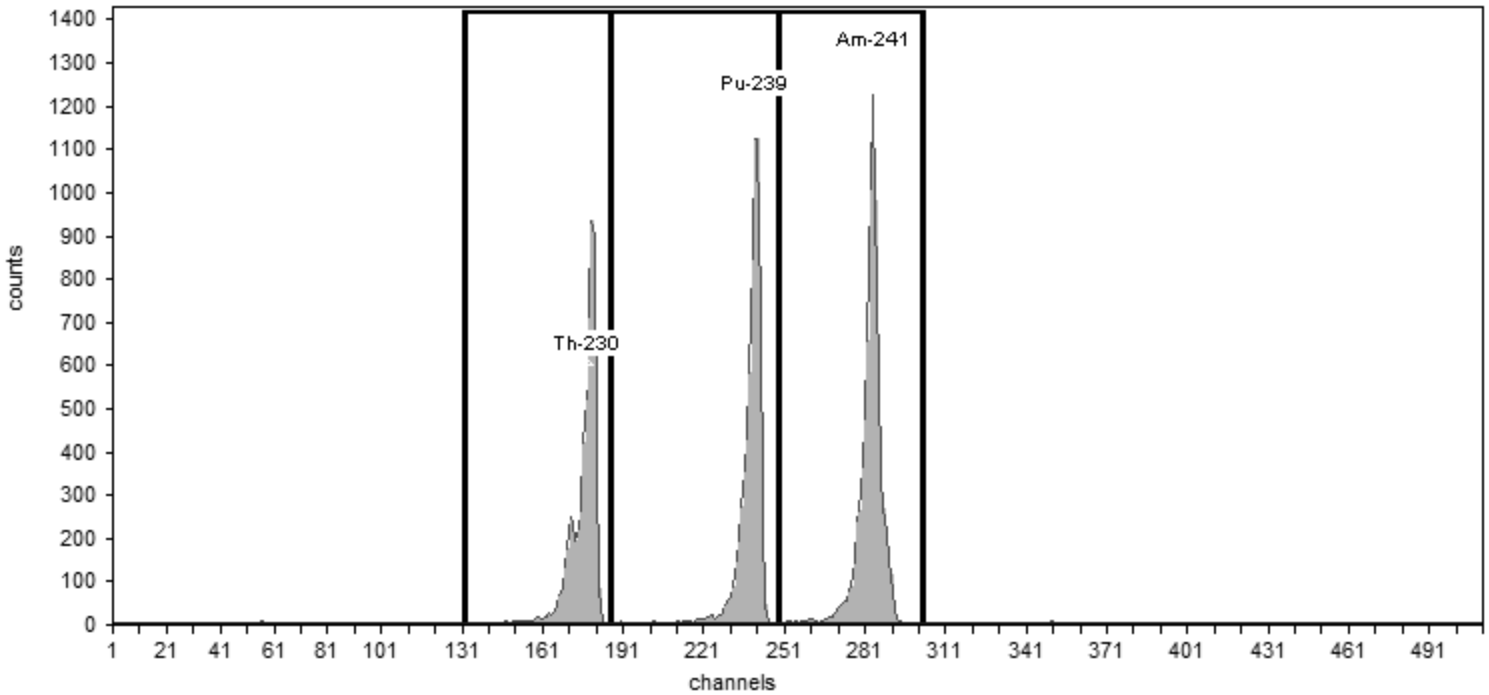
Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 11/1/2015 2:25:40PM

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
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

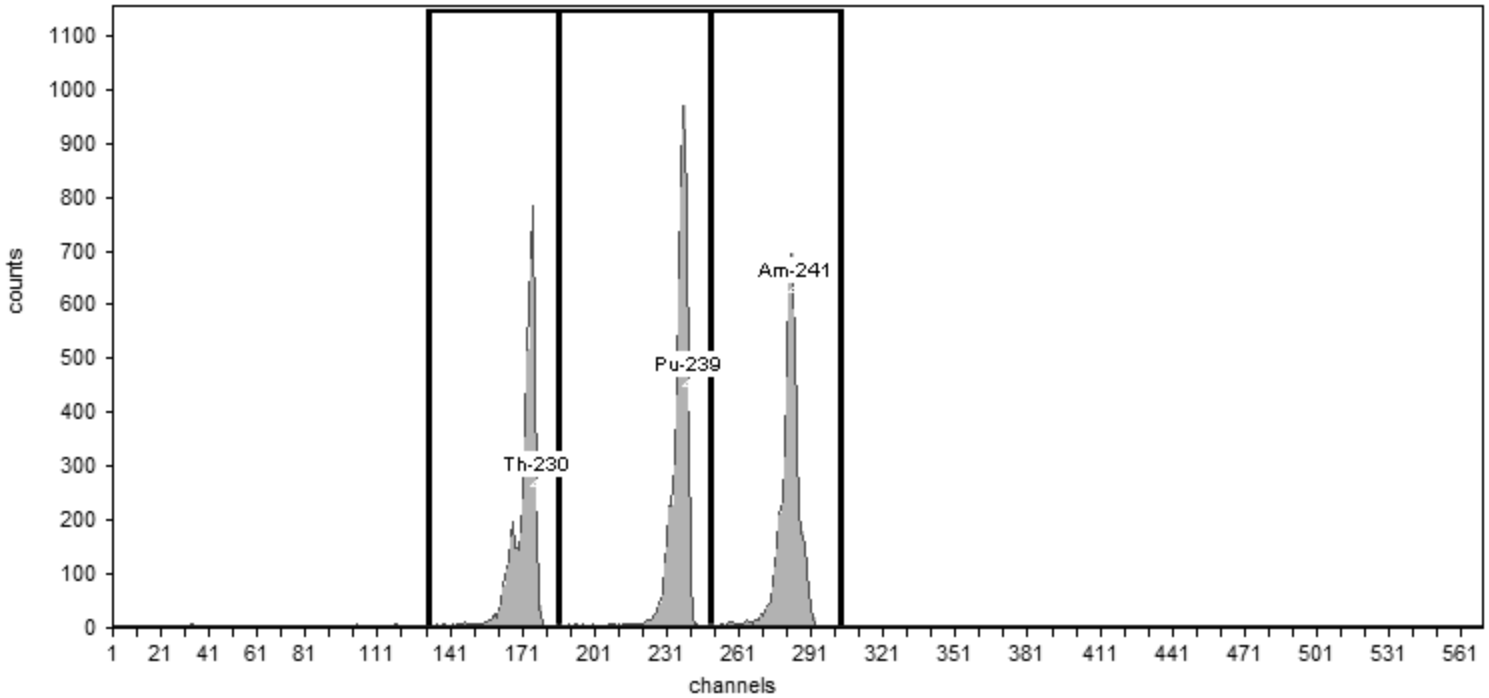
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 11/1/2015 2:26:11PM

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
3:56:17PM 11/1/2015

Calibration

Sample Name: ICV-8876;AV202-20151101
Description:
Detector: AV202

Analyst: 60040
Analysis Date: 11/1/2015 3:56:16PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

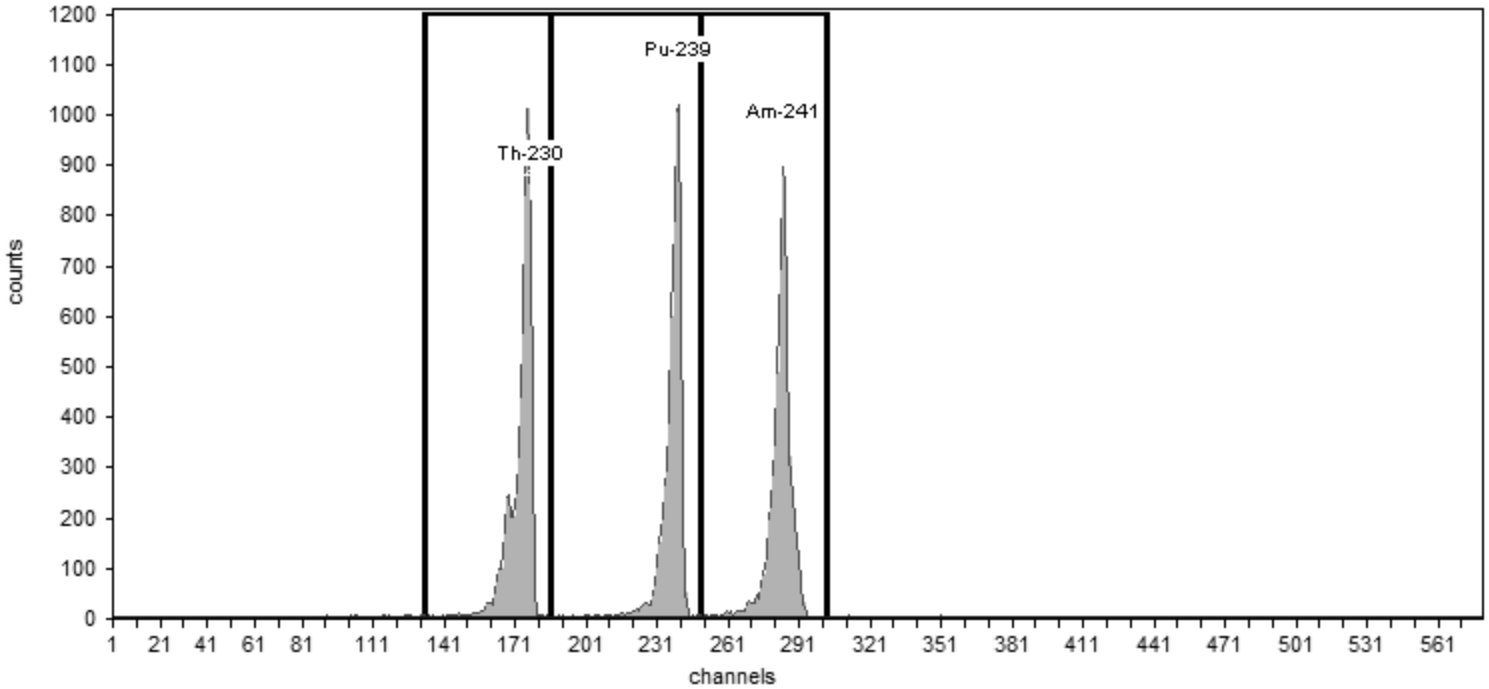
Detector: AV202 , SN: 50-117Z2
Acquisition Start Date: 11/1/2015 2:26:38PM

Live Time: 60.00 min.
Real Time: 60.03 min.

Efficiency Calibration Name: ICV-8876;AV202-2015110

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

Efficiency: 24.11% +/- 0.39% 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	30.86	6,232.00	103.87
Pu-239	240	5,155.40	186	249	36.15	6,174.00	102.90
Am-241	284	5,485.70	249	303	35.42	6,245.00	104.08

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

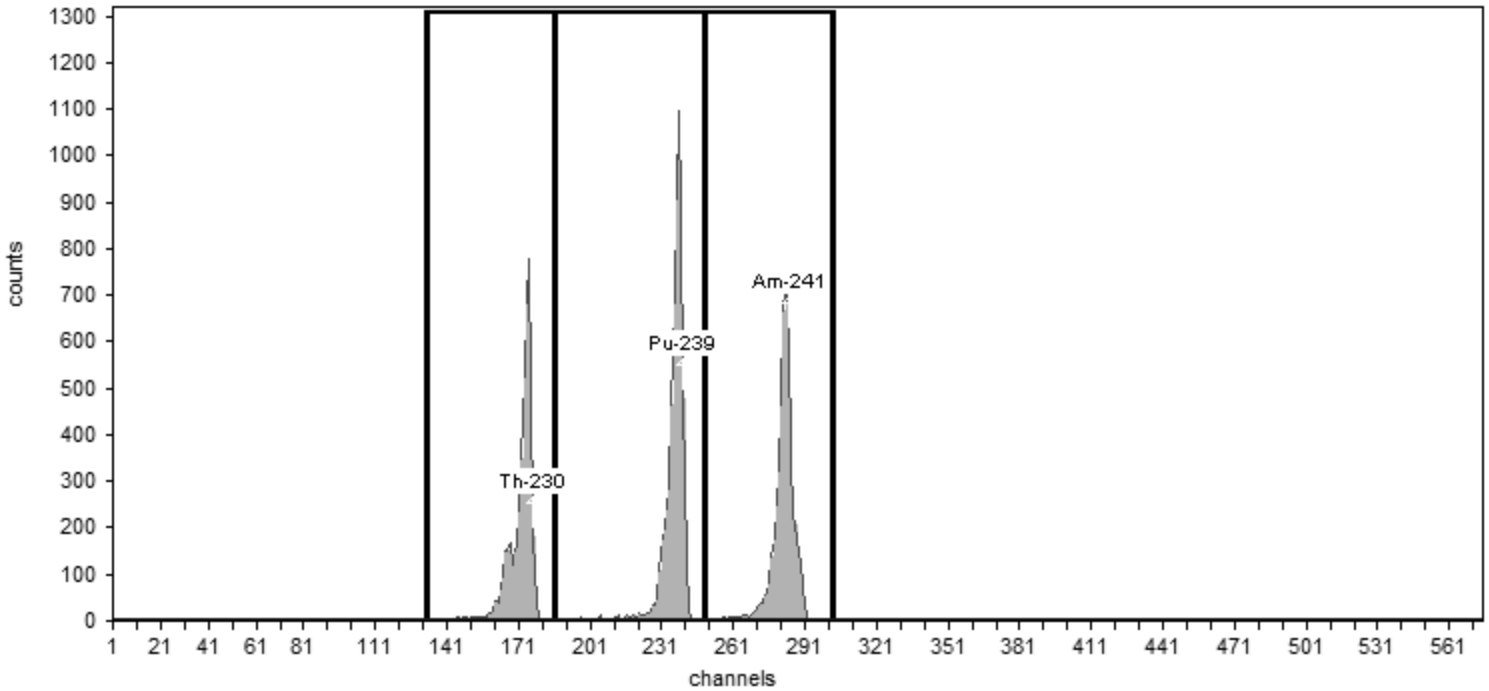
Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 11/1/2015 6:11:42PM

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 / Ch^2

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

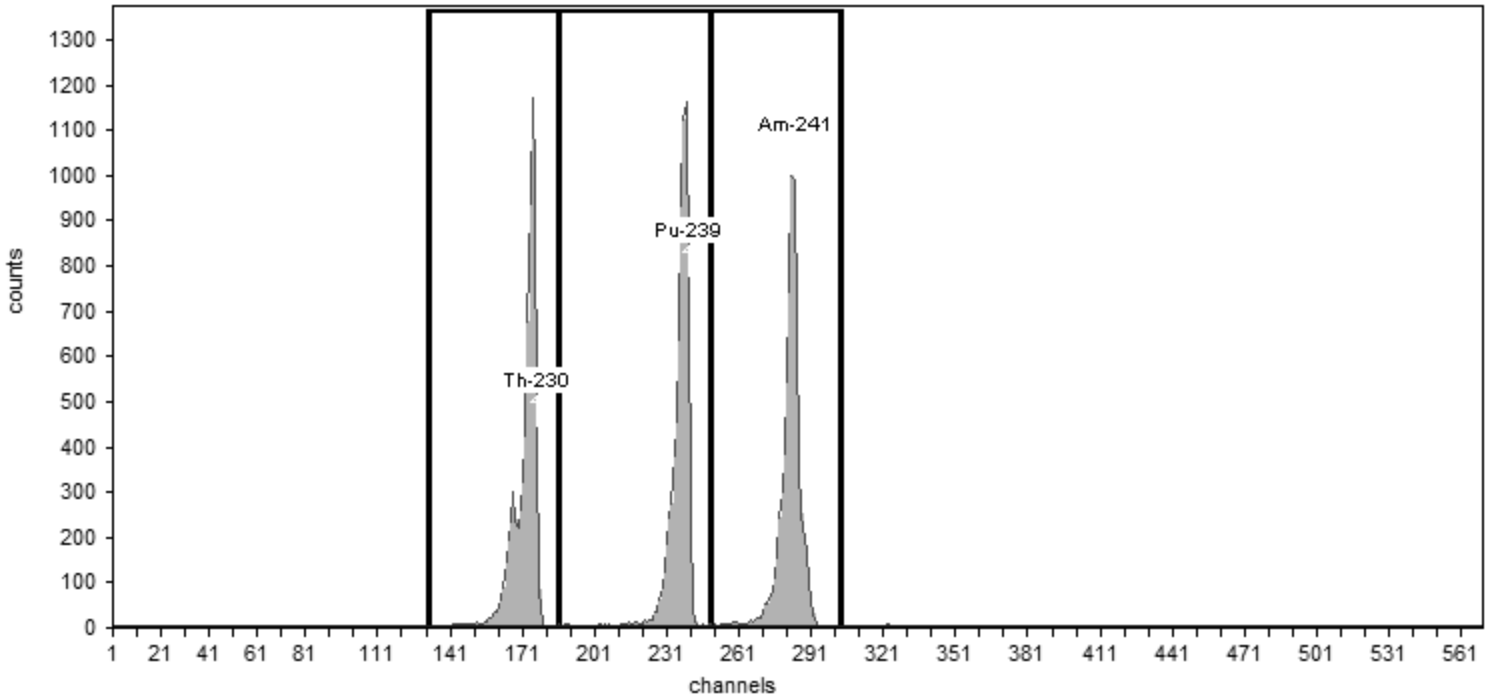
Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 11/1/2015 4:10:37PM

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 / Ch²

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

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:52:51AM 6/27/2016

Calibration

Sample Name: CCV-8874;AV148-20160627
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 6/27/2016 11:52:50AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

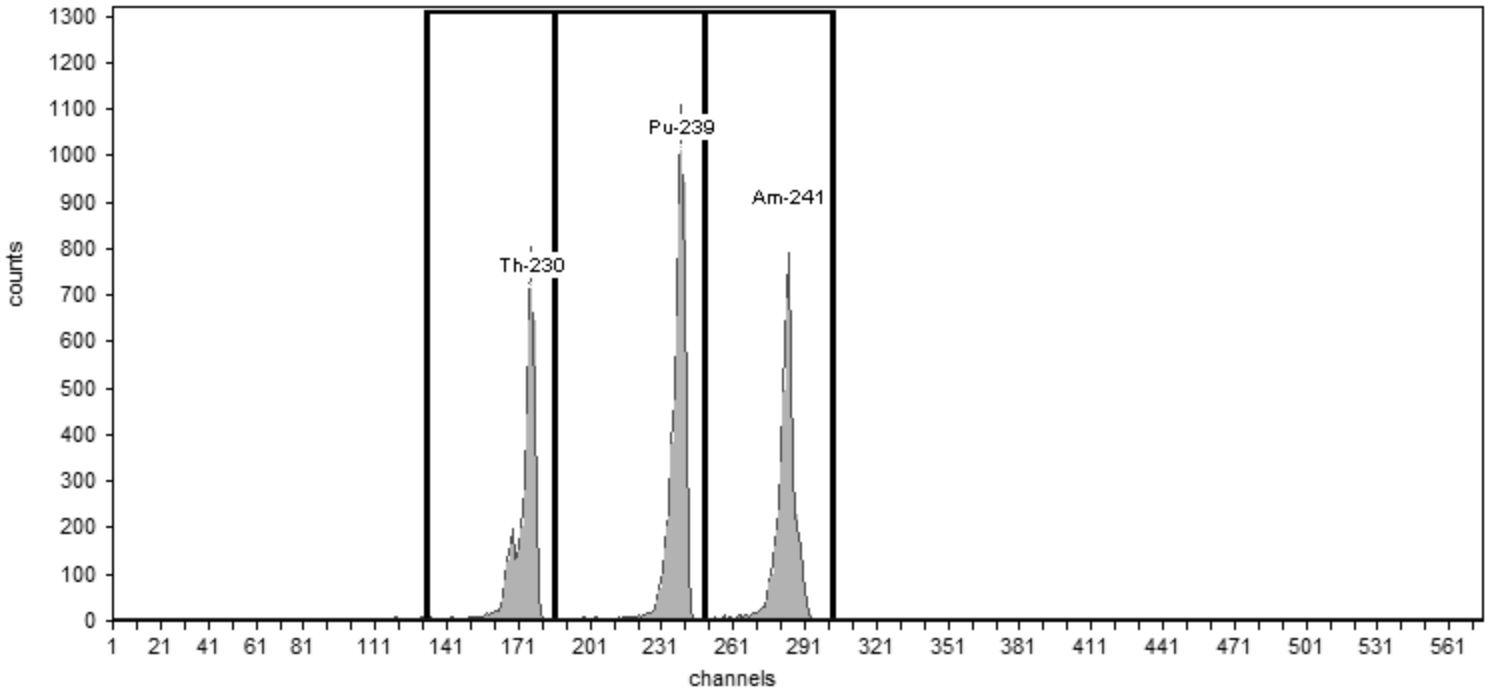
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 6/27/2016 10:48:12AM

Live Time: 60.00 min.
Real Time: 60.02 min.

Efficiency Calibration Name: CCV-8874;AV148-201606

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

Efficiency: 26.79% +/- 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	29.04	4,552.00	75.87
Pu-239	240	5,155.40	186	249	32.45	6,017.00	100.28
Am-241	284	5,485.70	249	303	32.21	4,950.00	82.50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:43:27PM 6/28/2016

Calibration

Sample Name: CCV-8875;AV149-20160628
Description:
Detector: AV149

Analyst: 60040
Analysis Date: 6/28/2016 12:43:24PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

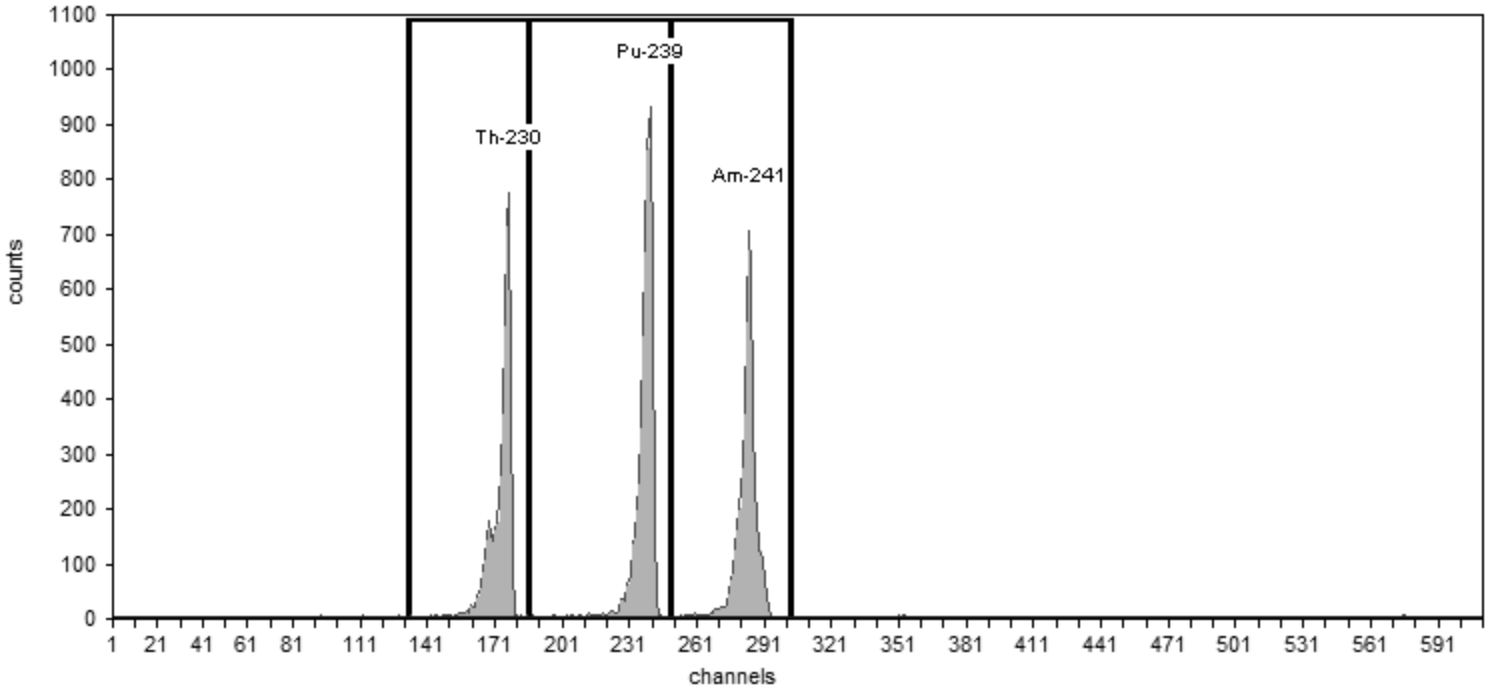
Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 6/28/2016 11:43:17AM

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

Efficiency Calibration Name: CCV-8875;AV149-201606

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

Efficiency: 23.04% +/- 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	30.06	4,572.00	76.20
Pu-239	240	5,155.40	186	249	34.20	5,188.00	86.47
Am-241	284	5,485.70	249	303	32.47	4,546.00	75.77

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:53:56AM 6/27/2016

Calibration

Sample Name: CCV-9520;AV152-20160627
Description:
Detector: AV152

Analyst: 60040
Analysis Date: 6/27/2016 11:53:54AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

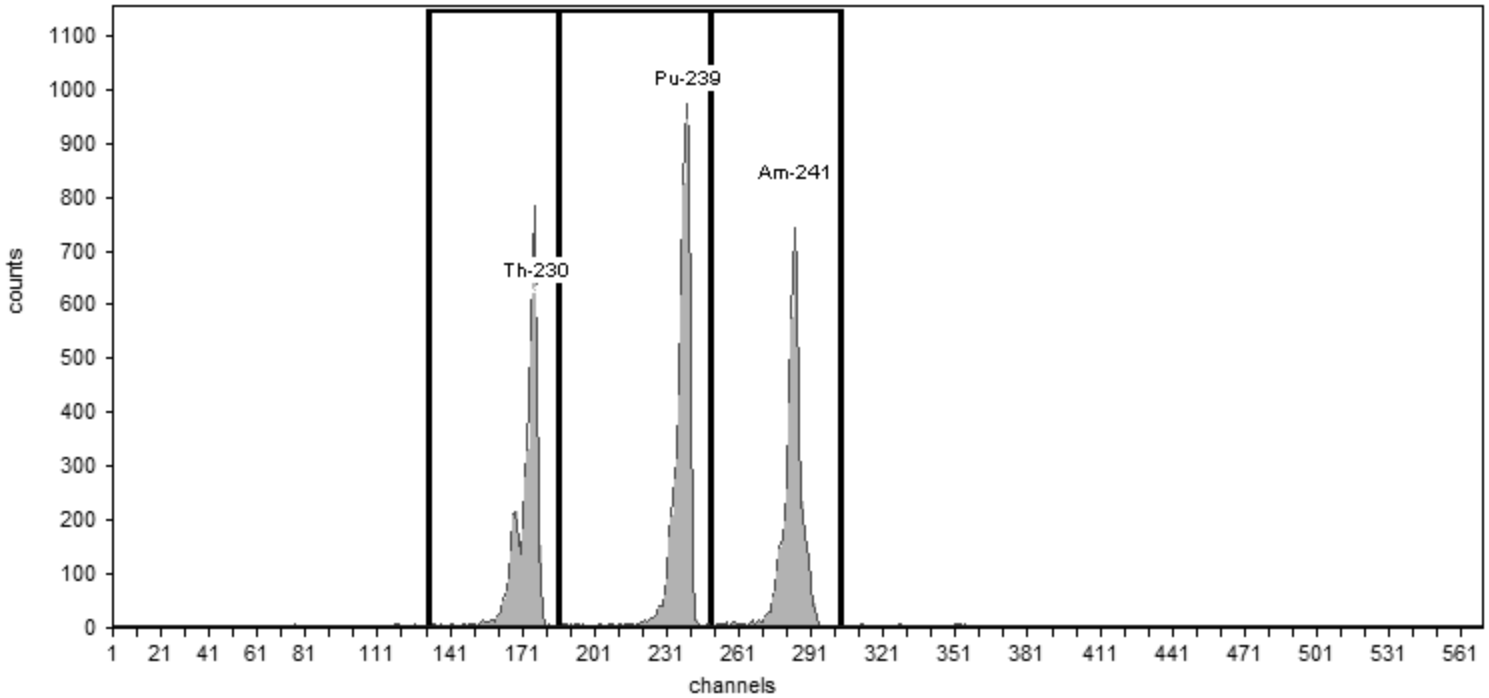
Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 6/27/2016 10:49:44AM

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

Efficiency Calibration Name: CCV-9520;AV152-201606

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

Efficiency: 23.72% +/- 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	30.54	4,771.00	79.52
Pu-239	240	5,155.40	186	249	34.92	5,725.00	95.42
Am-241	284	5,485.70	249	303	32.75	4,753.00	79.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:54:09AM 6/27/2016

Calibration

Sample Name: CCV-9792;AV153-20160627
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 6/27/2016 11:54:07AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

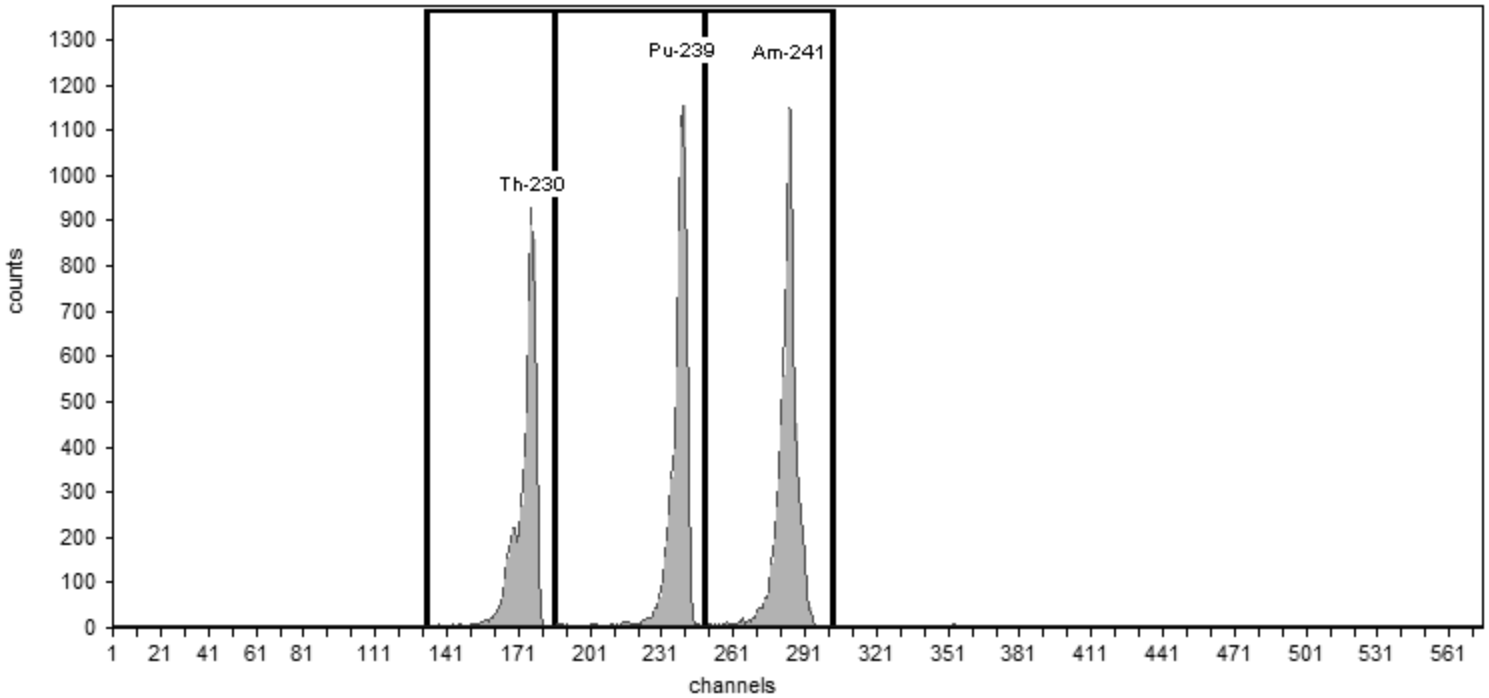
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 6/27/2016 10:50:05AM

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

Efficiency Calibration Name: CCV-9792;AV153-201606

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

Efficiency: 26.05% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.30	5,884.00	98.07
Pu-239	240	5,155.40	186	249	33.65	6,740.00	112.33
Am-241	284	5,485.70	249	303	33.08	7,716.00	128.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:54:20AM 6/27/2016

Calibration

Sample Name: CCV-9793;AV154-20160627
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 6/27/2016 11:54:19AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

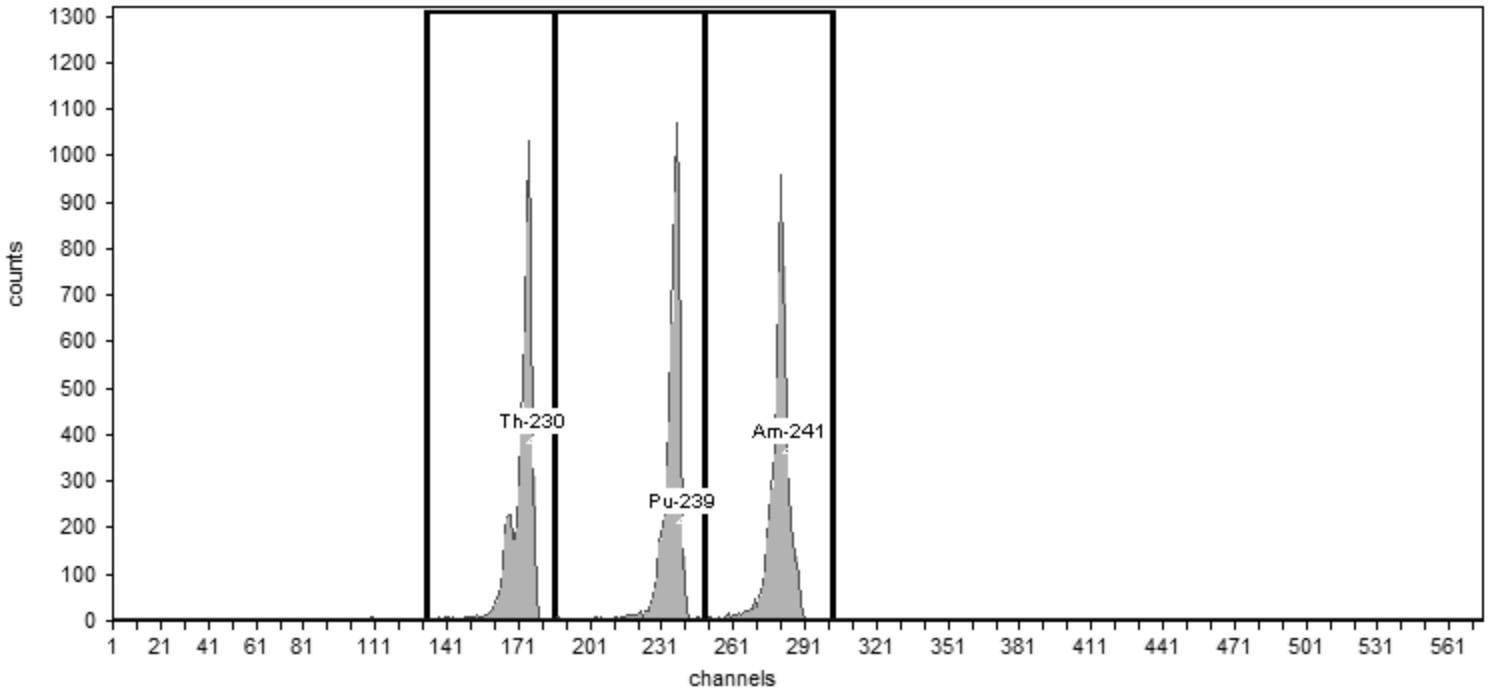
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 6/27/2016 10:50:31AM

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

Efficiency Calibration Name: CCV-9793;AV154-201606

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

Efficiency: 24.70% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.39	5,954.00	99.23
Pu-239	240	5,155.40	186	249	32.45	5,953.00	99.22
Am-241	284	5,485.70	249	303	30.79	5,886.00	98.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:54:31AM 6/27/2016

Calibration

Sample Name: CCV-9794;AV155-20160627
Description:
Detector: AV155

Analyst: 60040
Analysis Date: 6/27/2016 11:54:30AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

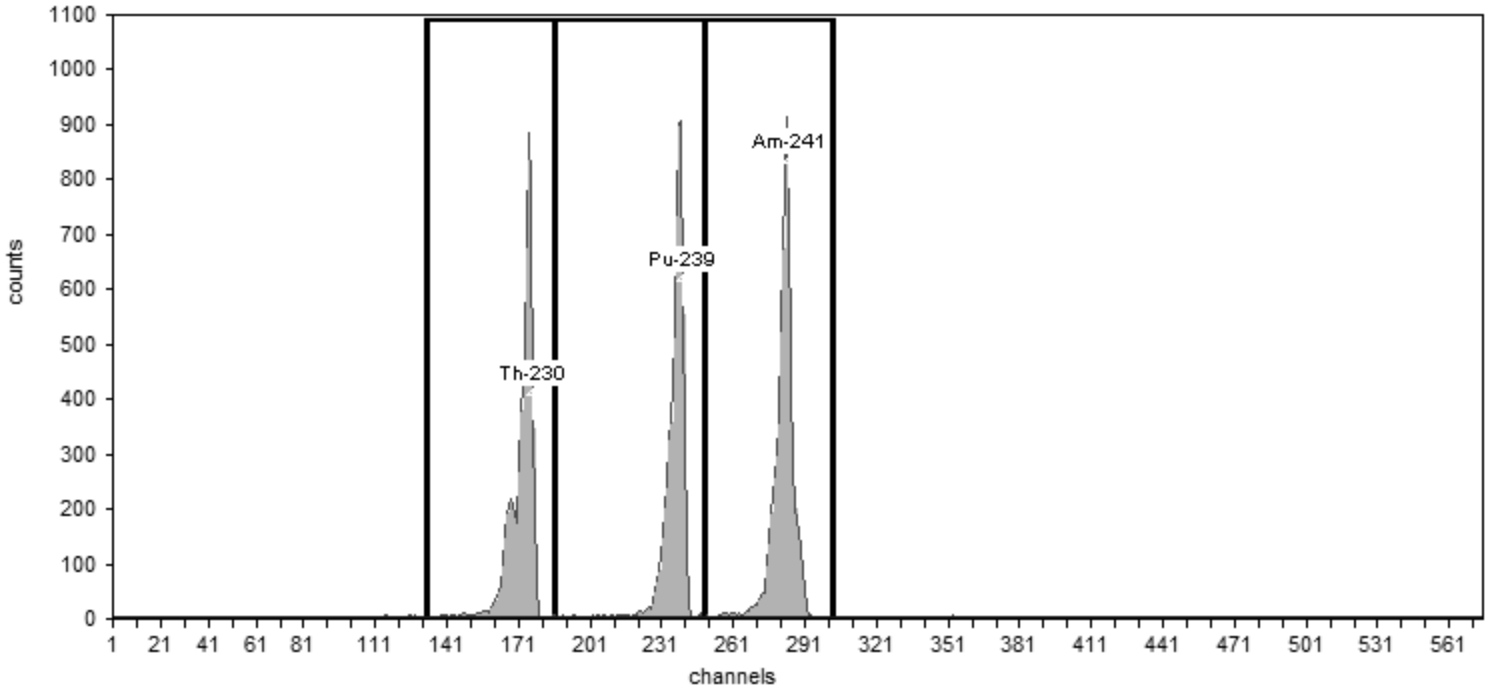
Detector: AV155 , SN: 50-05/II1
Acquisition Start Date: 6/27/2016 10:50:52AM

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

Efficiency Calibration Name: CCV-9794;AV155-201606

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

Efficiency: 23.05% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.46	5,389.00	89.82
Pu-239	240	5,155.40	186	249	34.35	5,412.00	90.20
Am-241	284	5,485.70	249	303	32.27	5,863.00	97.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:55:01AM 6/27/2016

Calibration

Sample Name: CCV-9817;AV157-20160627
Description:
Detector: AV157

Analyst: 60040
Analysis Date: 6/27/2016 11:55:00AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

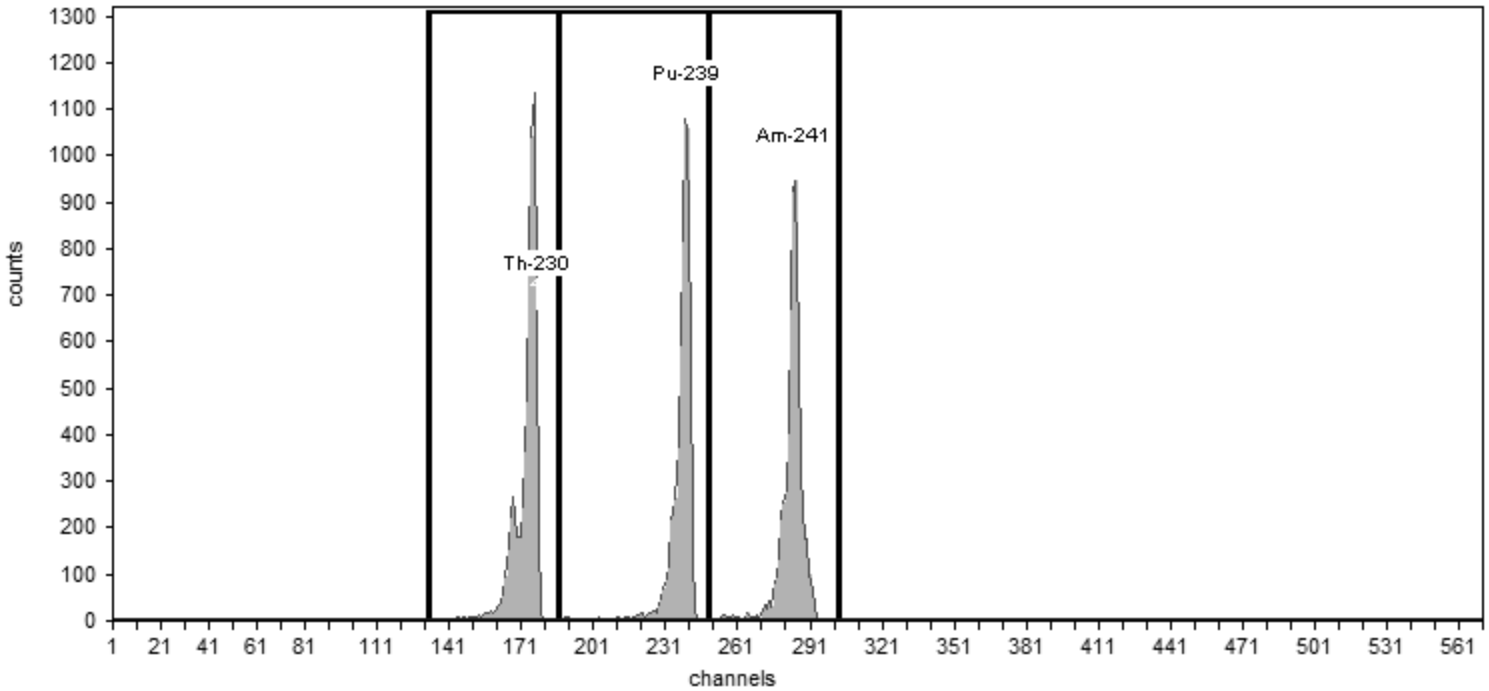
Detector: AV157 , SN: 50-05/II3
Acquisition Start Date: 6/27/2016 10:51:43AM

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

Efficiency Calibration Name: CCV-9817;AV157-201606

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

Efficiency: 24.19% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.43	6,416.00	106.93
Pu-239	240	5,155.40	186	249	32.85	5,903.00	98.38
Am-241	284	5,485.70	249	303	31.09	5,887.00	98.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:55:22AM 6/27/2016

Calibration

Sample Name: CCV-9886;AV160-20160627
Description:
Detector: AV160

Analyst: 60040
Analysis Date: 6/27/2016 11:55:20AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

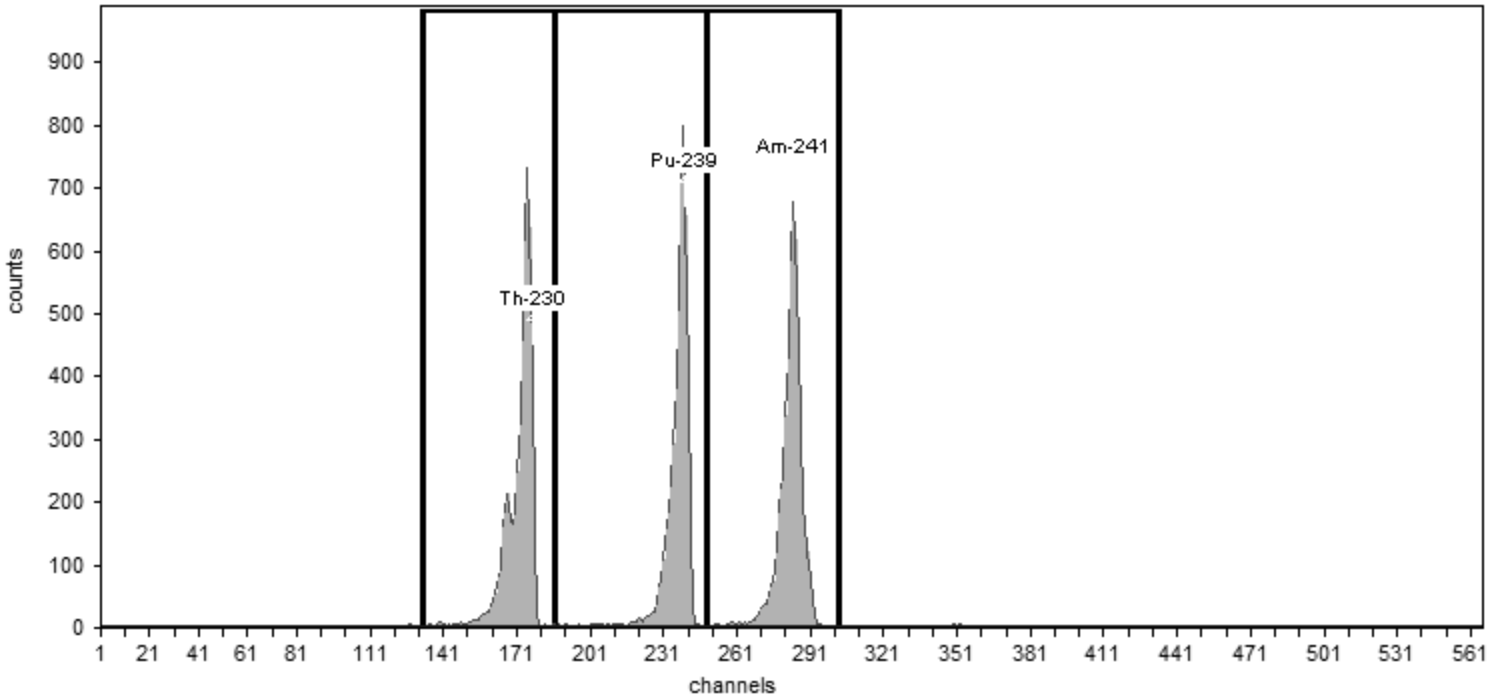
Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 6/27/2016 10:52:02AM

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

Efficiency Calibration Name: CCV-9886;AV160-201606

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

Efficiency: 23.27% +/- 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	36.58	5,148.00	85.80
Pu-239	240	5,155.40	186	249	36.34	4,950.00	82.50
Am-241	284	5,485.70	249	303	43.26	5,185.00	86.42

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:37:42PM 6/27/2016

Calibration

Sample Name: CCV-8874;AV162-20160627
Description:
Detector: AV162

Analyst: 60040
Analysis Date: 6/27/2016 1:37:41PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

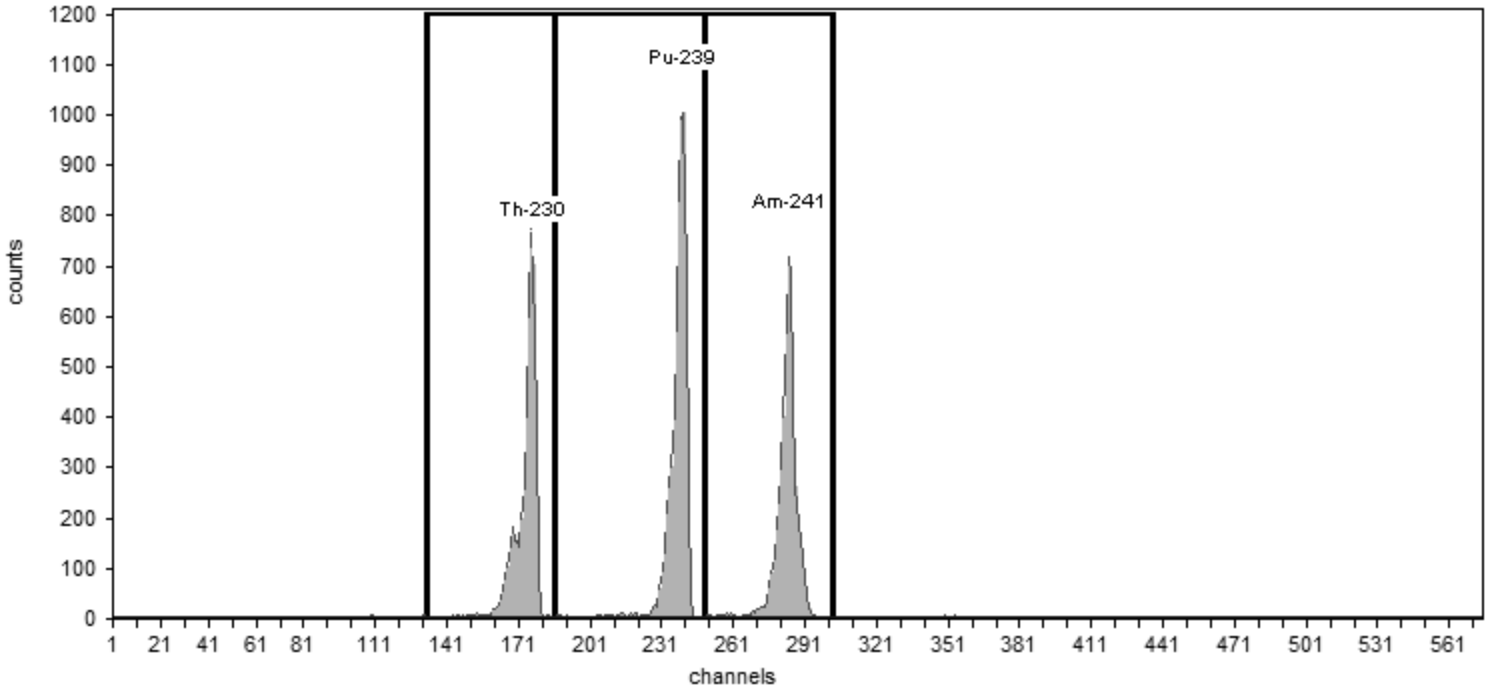
Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 6/27/2016 12:02:51PM

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

Efficiency Calibration Name: CCV-8874;AV162-201606

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

Efficiency: 26.49% +/- 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	30.62	4,559.00	75.98
Pu-239	240	5,155.40	186	249	35.73	5,951.00	99.18
Am-241	284	5,485.70	249	303	36.53	4,829.00	80.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:38:35PM 6/27/2016

Calibration

Sample Name: CCV-8877;AV165-20160627a
Description:
Detector: AV165

Analyst: 60040
Analysis Date: 6/27/2016 1:38:34PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

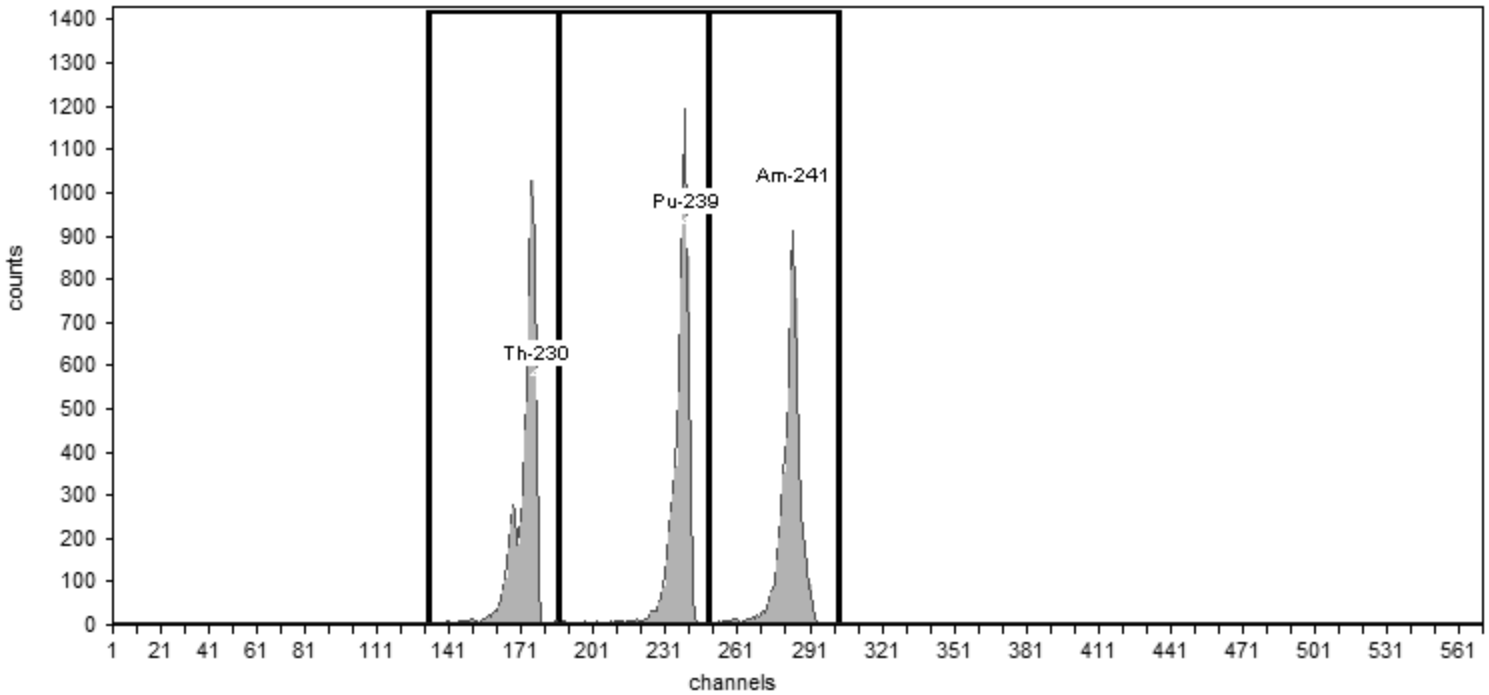
Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 6/27/2016 12:25:25PM

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

Efficiency Calibration Name: CCV-8877;AV165-201606

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

Efficiency: 25.64% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.93	6,383.00	106.38
Pu-239	240	5,155.40	186	249	32.01	6,494.00	108.23
Am-241	284	5,485.70	249	303	34.39	6,180.00	103.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:38:39PM 6/27/2016

Calibration

Sample Name: CCV-9520;AV166-20160627a
Description:
Detector: AV166

Analyst: 60040
Analysis Date: 6/27/2016 1:38:38PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

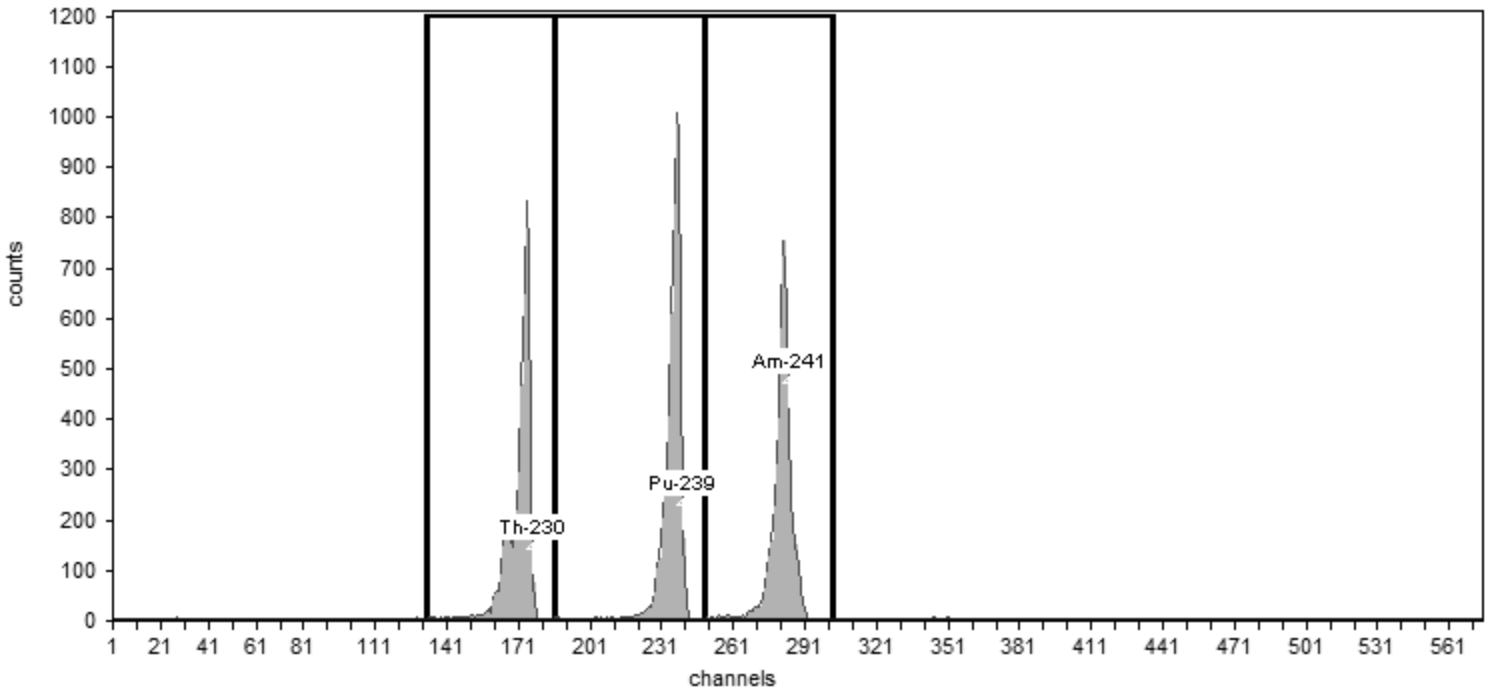
Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 6/27/2016 12:25:46PM

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

Efficiency Calibration Name: CCV-9520;AV166-201606

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

Efficiency: 24.15% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.08	4,920.00	82.00
Pu-239	240	5,155.40	186	249	34.97	5,812.00	96.87
Am-241	284	5,485.70	249	303	33.14	4,782.00	79.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:37:55PM 6/27/2016

Calibration

Sample Name: CCV-9792;AV167-20160627
Description:
Detector: AV167

Analyst: 60040
Analysis Date: 6/27/2016 1:37:54PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

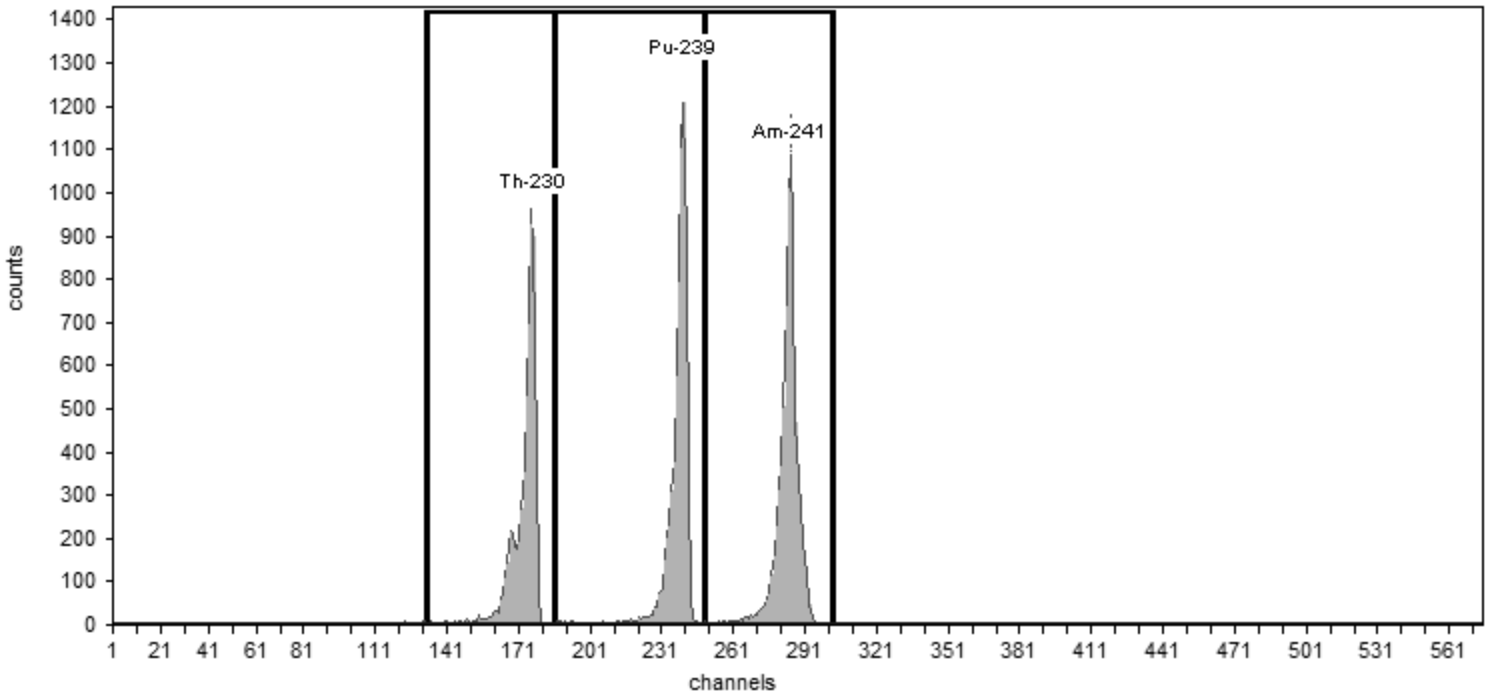
Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 6/27/2016 12:04:25PM

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

Efficiency Calibration Name: CCV-9792;AV167-201606

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

Efficiency: 25.29% +/- 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	30.61	5,708.00	95.13
Pu-239	240	5,155.40	186	249	32.60	6,643.00	110.72
Am-241	284	5,485.70	249	303	31.98	7,400.00	123.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:38:04PM 6/27/2016

Calibration

Sample Name: CCV-9795;AV170-20160627
Description:
Detector: AV170

Analyst: 60040
Analysis Date: 6/27/2016 1:38:03PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

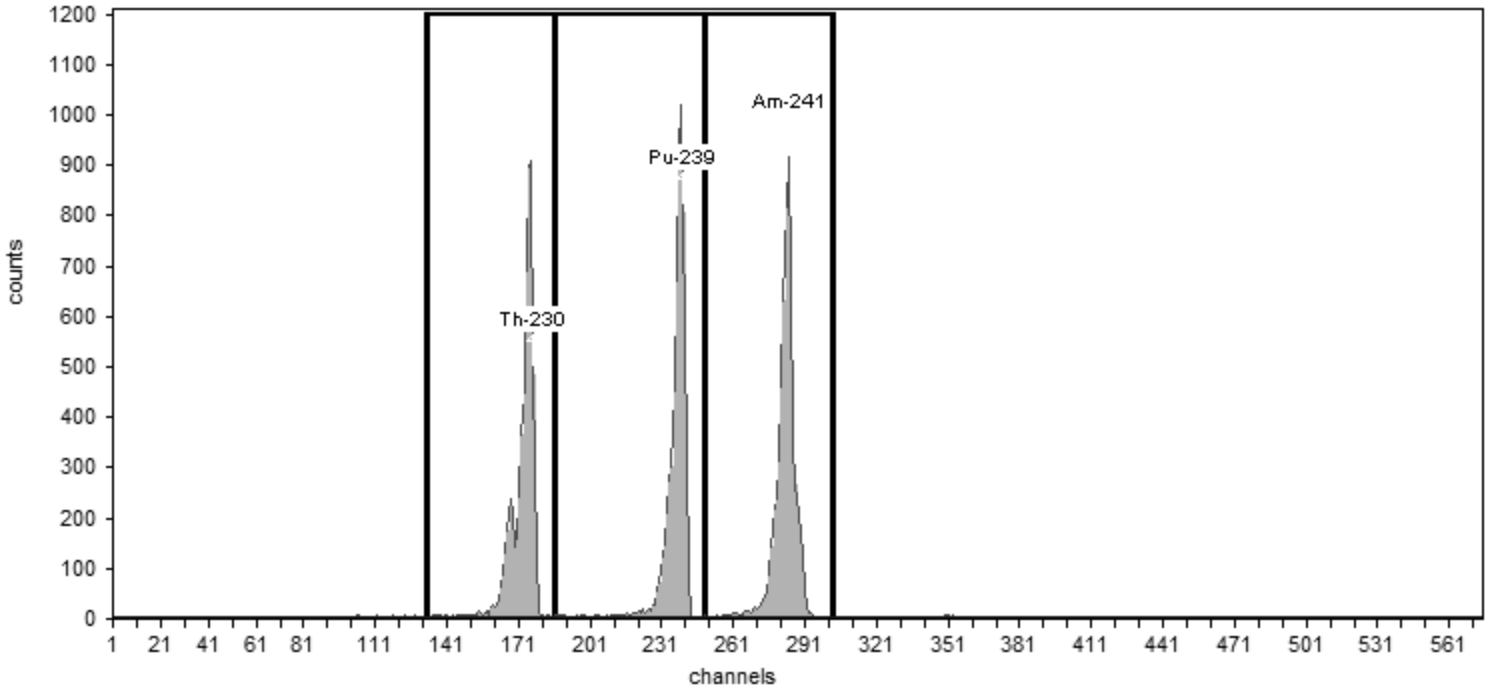
Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 6/27/2016 12:05:31PM

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

Efficiency Calibration Name: CCV-9795;AV170-201606

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

Efficiency: 26.18% +/- 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	30.23	5,531.00	92.18
Pu-239	240	5,155.40	186	249	32.28	5,644.00	94.07
Am-241	284	5,485.70	249	303	34.83	5,949.00	99.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:38:10PM 6/27/2016

Calibration

Sample Name: CCV-9817;AV171-20160627
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 6/27/2016 1:38:09PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

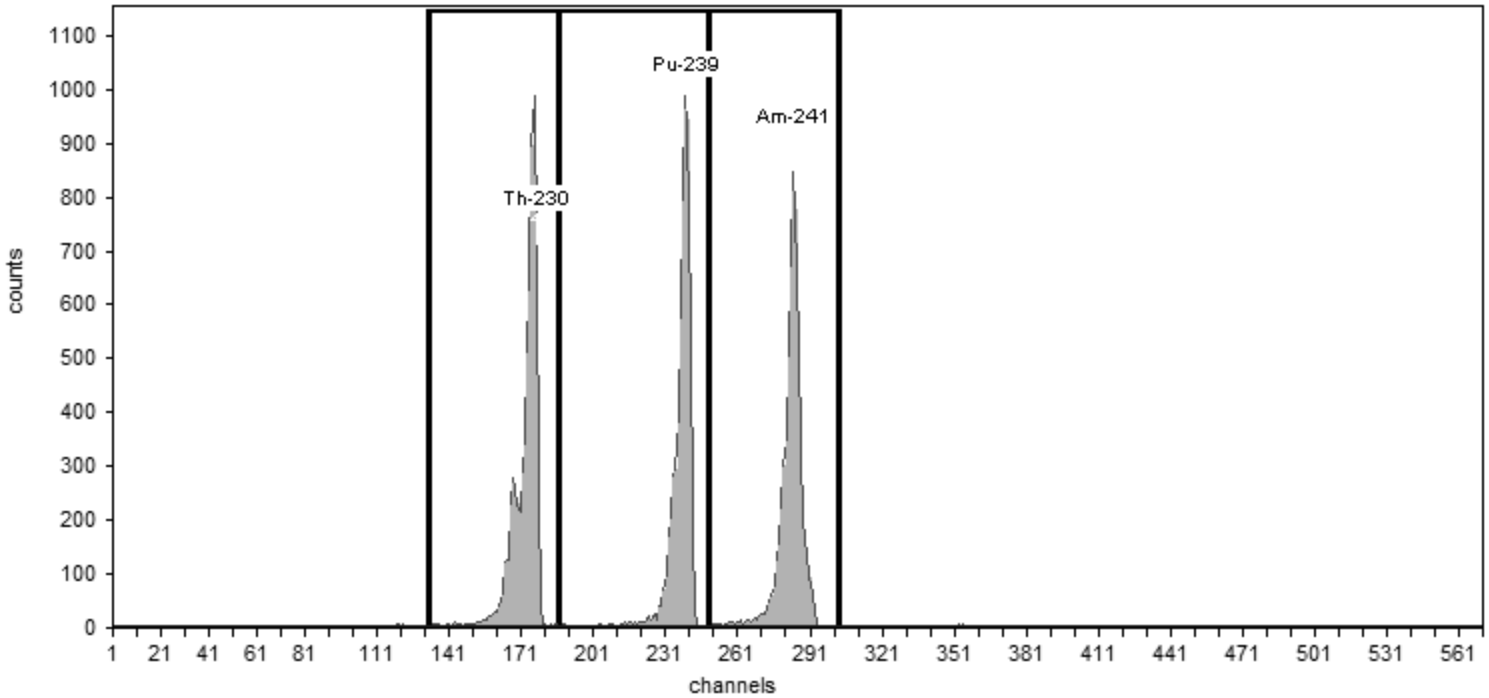
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 6/27/2016 12:05:48PM

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

Efficiency Calibration Name: CCV-9817;AV171-201606

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

Efficiency: 24.06% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.83	6,411.00	106.85
Pu-239	240	5,155.40	186	249	34.34	5,815.00	96.92
Am-241	284	5,485.70	249	303	37.47	5,885.00	98.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:38:21PM 6/27/2016

Calibration

Sample Name: CCV-9885;AV173-20160627
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 6/27/2016 1:38:20PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

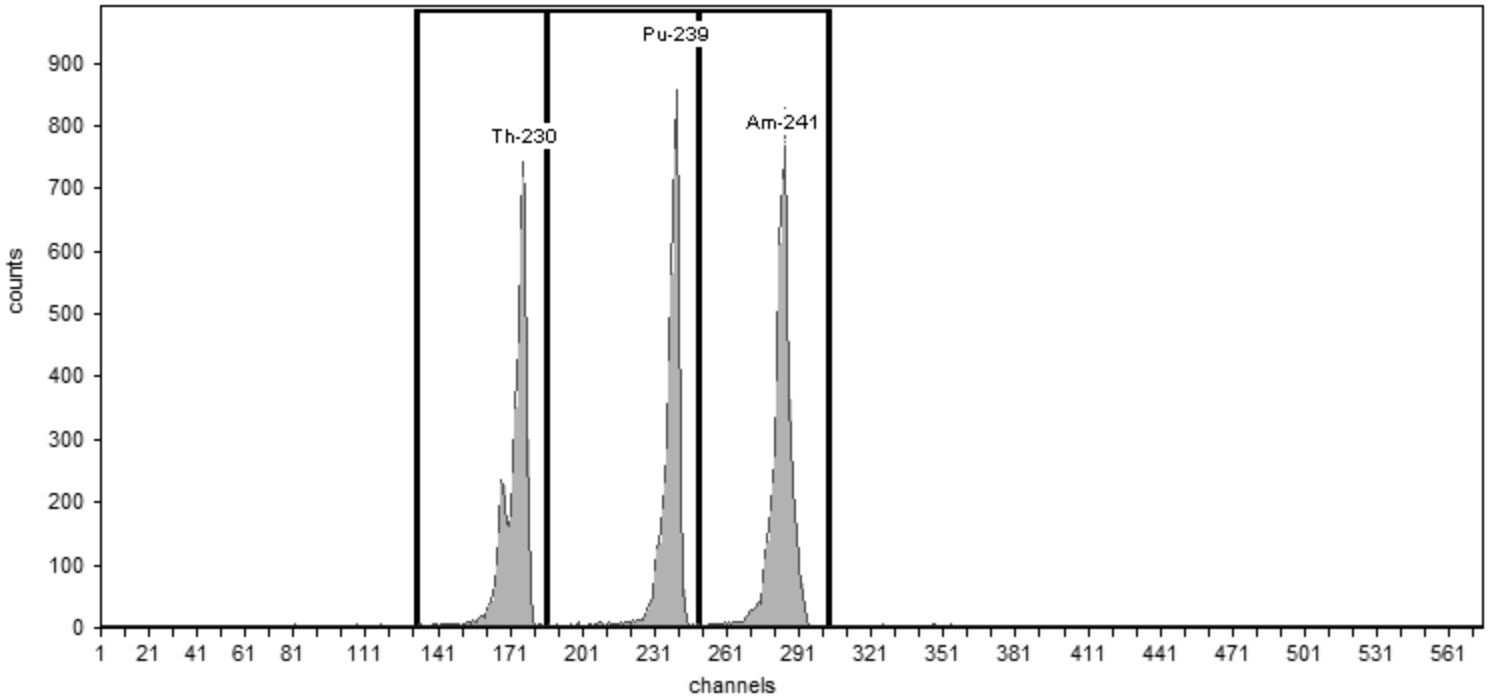
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 6/27/2016 12:06:29PM

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

Efficiency Calibration Name: CCV-9885;AV173-201606

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

Efficiency: 25.20% +/- 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	34.27	4,990.00	83.17
Pu-239	240	5,155.40	186	249	33.06	4,816.00	80.27
Am-241	284	5,485.70	249	303	34.60	5,504.00	91.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:29:38AM 6/28/2016

Calibration

Sample Name: CCV-8875;AV191-20160628
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 6/28/2016 10:29:36AM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

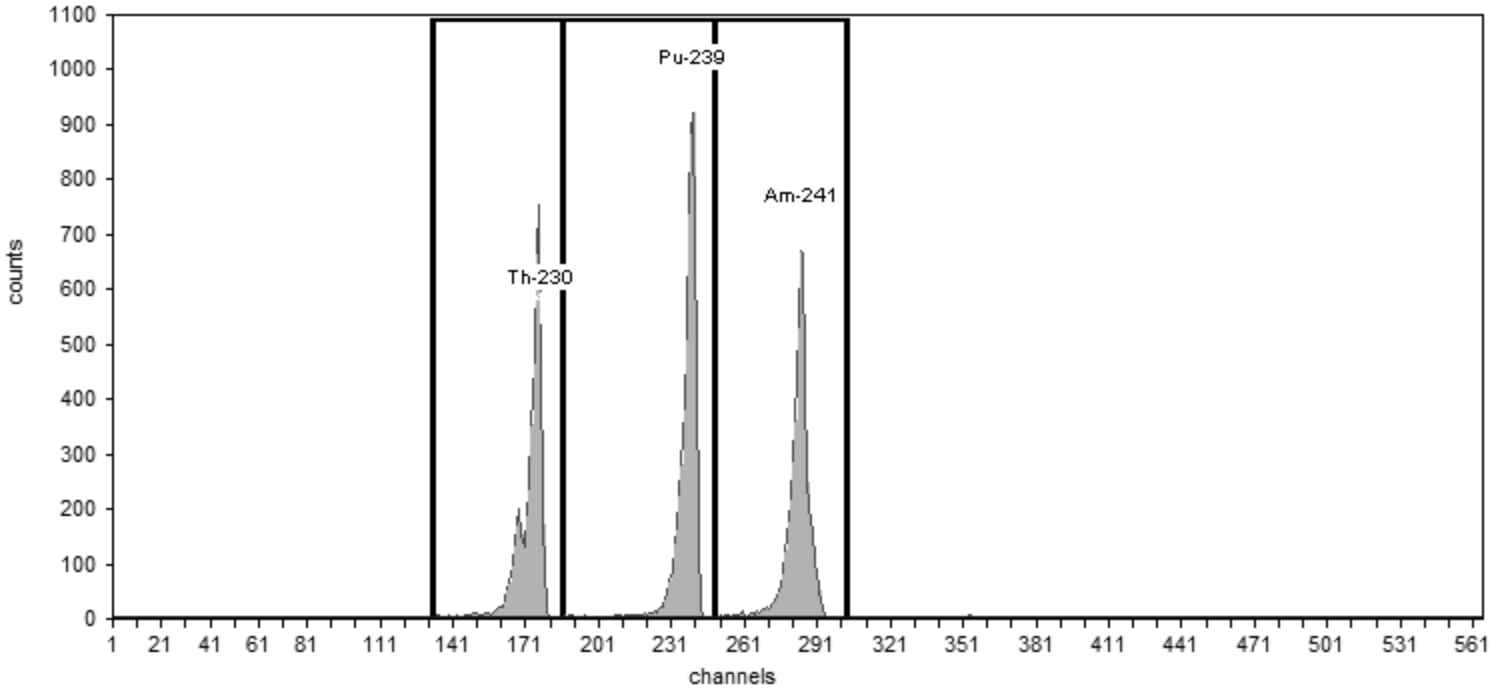
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 6/28/2016 9:29:31AM

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

Efficiency Calibration Name: CCV-8875;AV191-201606

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

Efficiency: 23.23% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.08	4,524.00	75.40
Pu-239	240	5,155.40	186	249	32.78	5,225.00	87.08
Am-241	284	5,485.70	249	303	36.40	4,685.00	78.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:54:33PM 6/27/2016

Calibration

Sample Name: CCV-9520;AV194-20160627
Description:
Detector: AV194

Analyst: 60040
Analysis Date: 6/27/2016 2:54:32PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

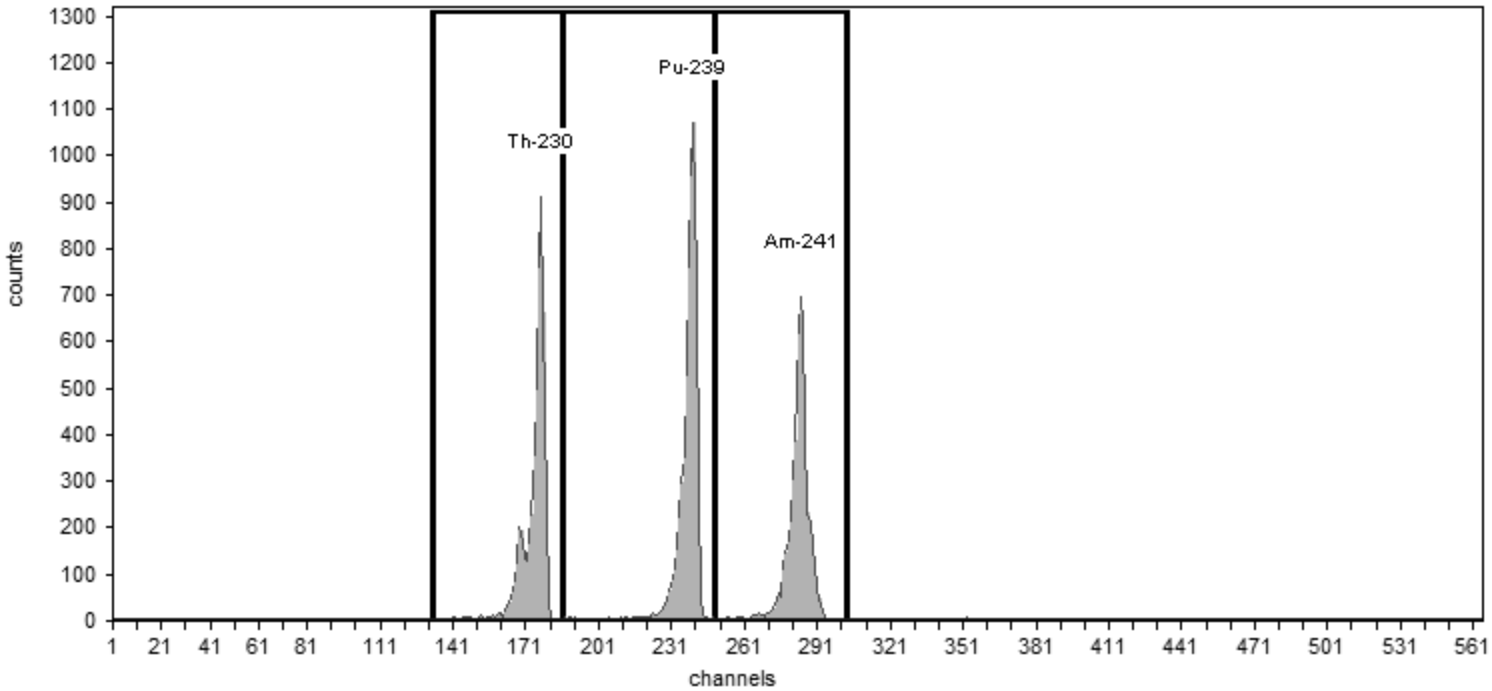
Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 6/27/2016 1:49:36PM

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

Efficiency Calibration Name: CCV-9520;AV194-201606

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

Efficiency: 24.33% +/- 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	28.13	4,939.00	82.32
Pu-239	240	5,155.40	186	249	32.72	5,877.00	97.95
Am-241	284	5,485.70	249	303	35.79	4,816.00	80.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:54:58PM 6/27/2016

Calibration

Sample Name: CCV-9795;AV198-20160627
Description:
Detector: AV198

Analyst: 60040
Analysis Date: 6/27/2016 2:54:56PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

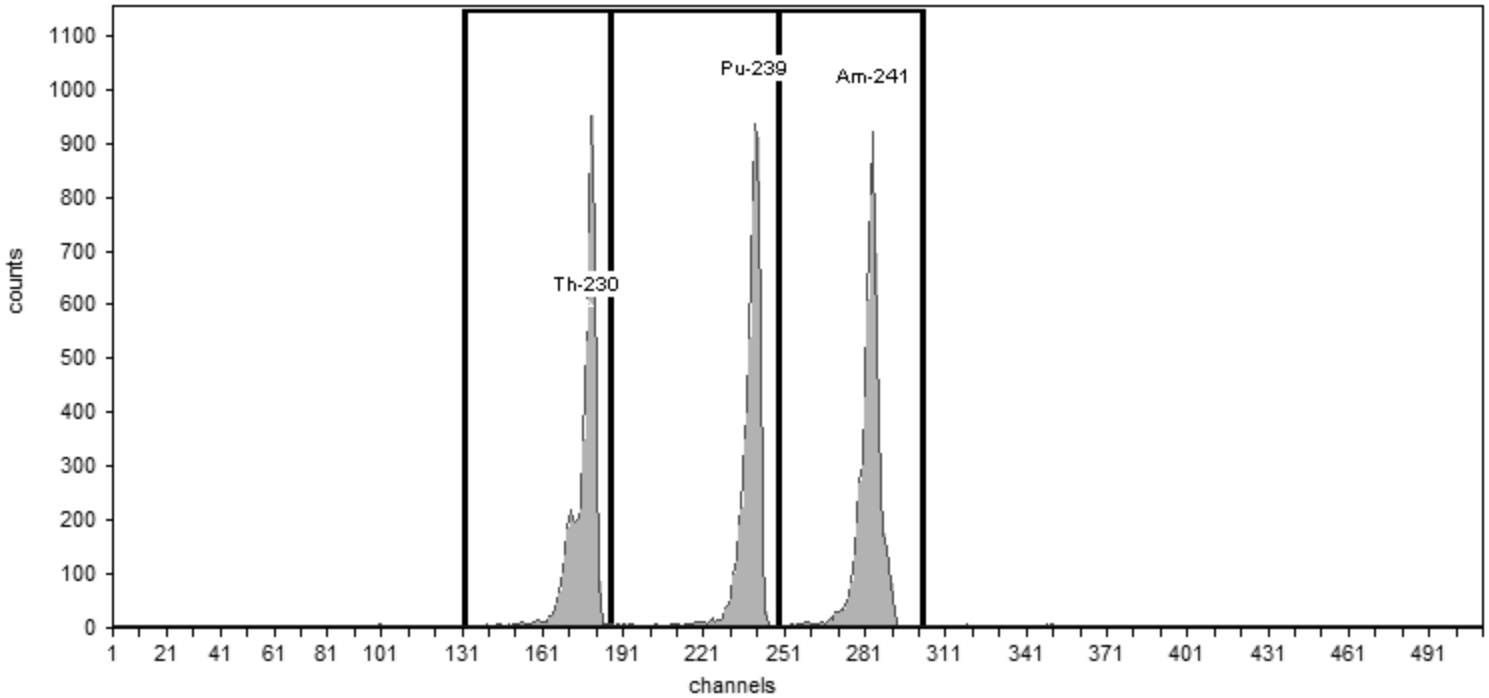
Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 6/27/2016 1:50:02PM

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

Efficiency Calibration Name: CCV-9795;AV198-201606

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

Efficiency: 26.03% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.60	5,463.00	91.05
Pu-239	240	5,155.40	186	249	35.67	5,621.00	93.68
Am-241	284	5,485.70	249	303	34.20	5,942.00	99.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:55:35PM 6/27/2016

Calibration

Sample Name: CCV-9884;AV200-20160627
Description:
Detector: AV200

Analyst: 60040
Analysis Date: 6/27/2016 2:55:34PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

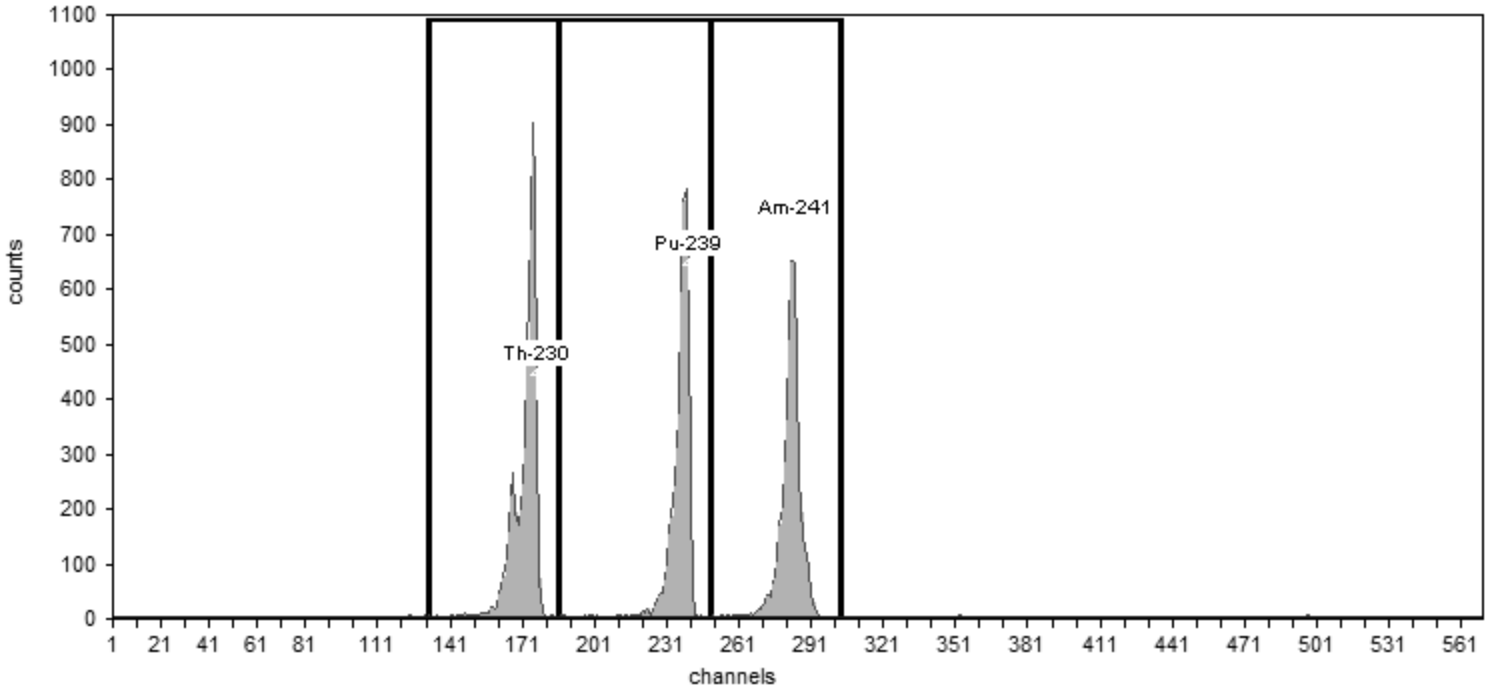
Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 6/27/2016 1:50:40PM

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

Efficiency Calibration Name: CCV-9884;AV200-201606

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

Efficiency: 23.30% +/- 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	29.90	5,537.00	92.28
Pu-239	240	5,155.40	186	249	33.20	4,680.00	78.00
Am-241	284	5,485.70	249	303	38.46	4,598.00	76.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:55:48PM 6/27/2016

Calibration

Sample Name: CCV-9886;AV202-20160627
Description:
Detector: AV202

Analyst: 60040
Analysis Date: 6/27/2016 2:55:47PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

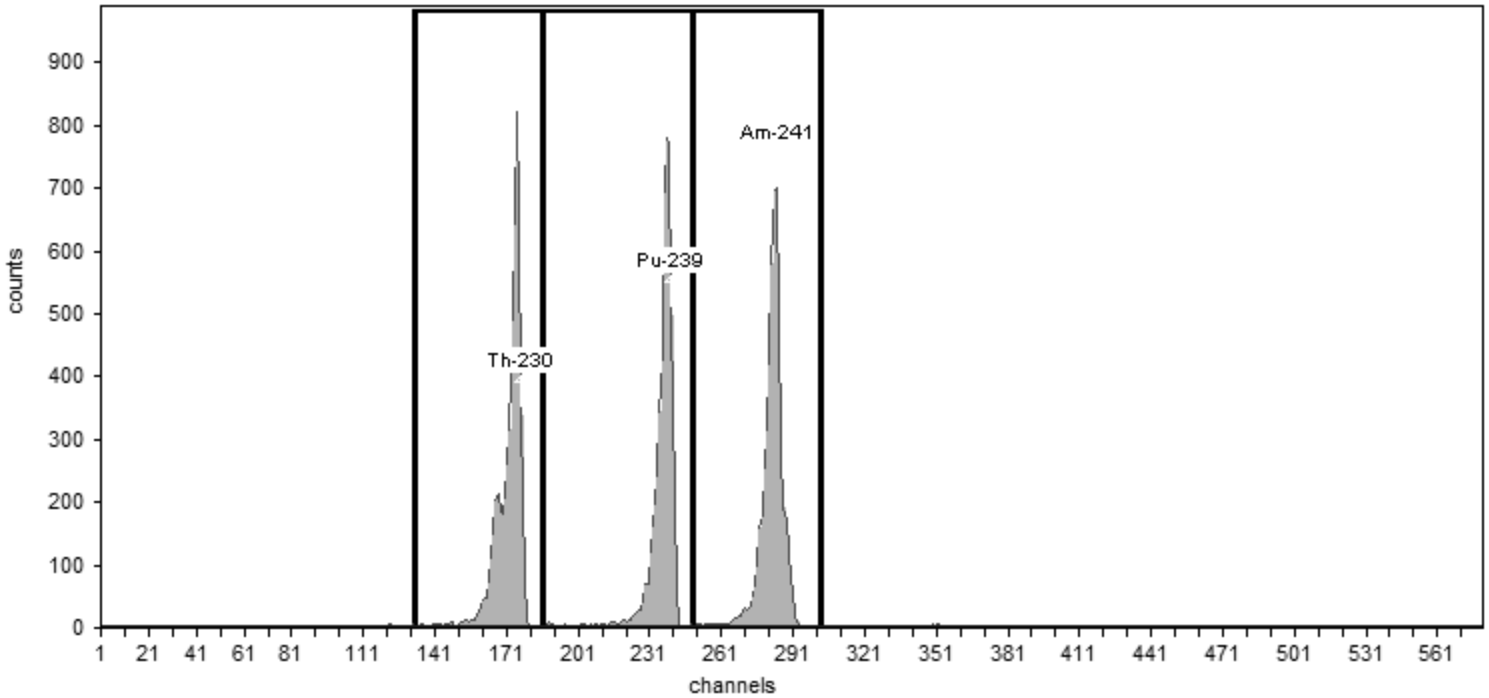
Detector: AV202 , SN: 50-117Z2
Acquisition Start Date: 6/27/2016 1:51:01PM

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

Efficiency Calibration Name: CCV-9886;AV202-201606

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

Efficiency: 23.16% +/- 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	31.50	5,182.00	86.37
Pu-239	240	5,155.40	186	249	35.63	4,868.00	81.13
Am-241	284	5,485.70	249	303	39.86	5,154.00	85.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:41:40PM 6/27/2016

Calibration

Sample Name: CCV-7107;AV203-20160627a
Description:
Detector: AV203

Analyst: 60040
Analysis Date: 6/27/2016 4:41:39PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

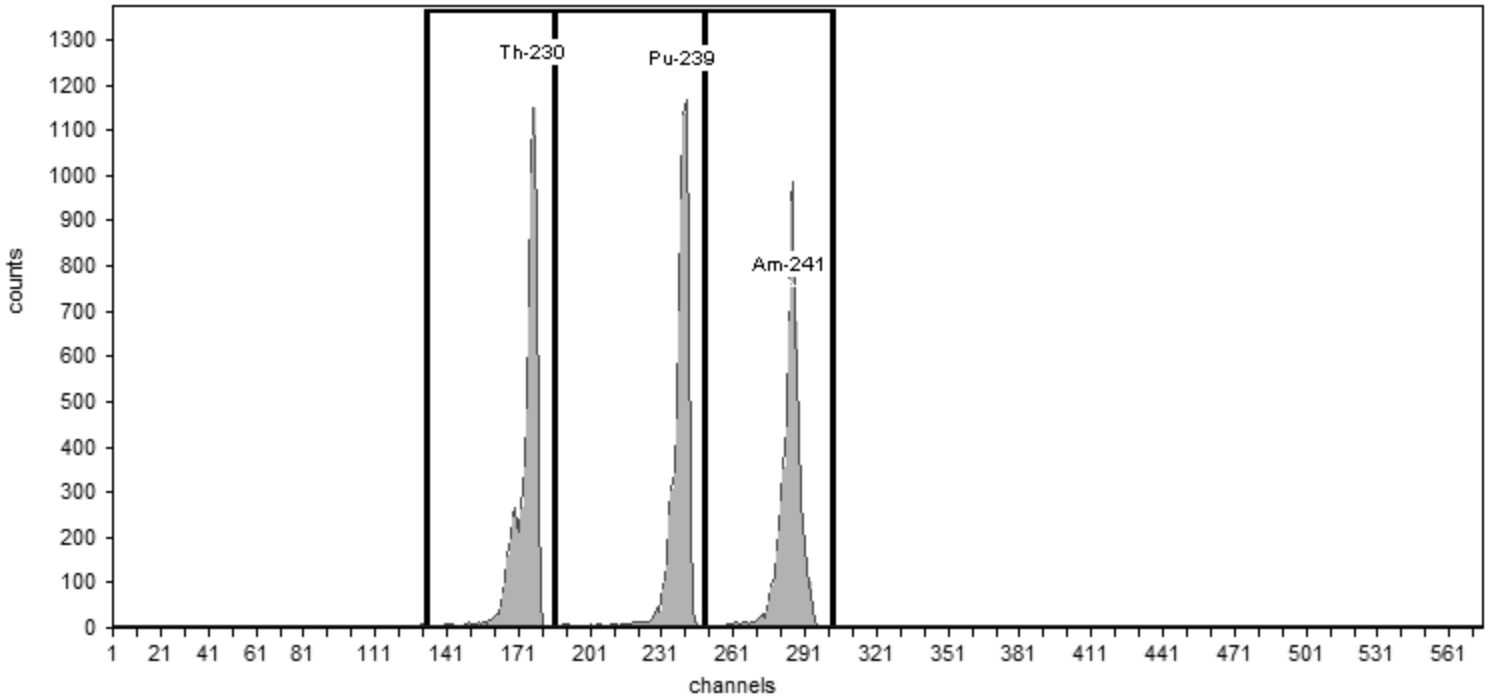
Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 6/27/2016 3:16:25PM

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

Efficiency Calibration Name: CCV-7107;AV203-201606

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

Efficiency: 25.90% +/- 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	30.92	6,938.00	115.63
Pu-239	240	5,155.40	186	249	35.97	6,960.00	116.00
Am-241	284	5,485.70	249	303	34.00	6,624.00	110.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:40:56PM 6/27/2016

Calibration

Sample Name: CCV-8874;AV204-20160627
Description:
Detector: AV204

Analyst: 60040
Analysis Date: 6/27/2016 4:40:55PM
Calibration Type: Energy And Efficiency

Source Info

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

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

Acquisition

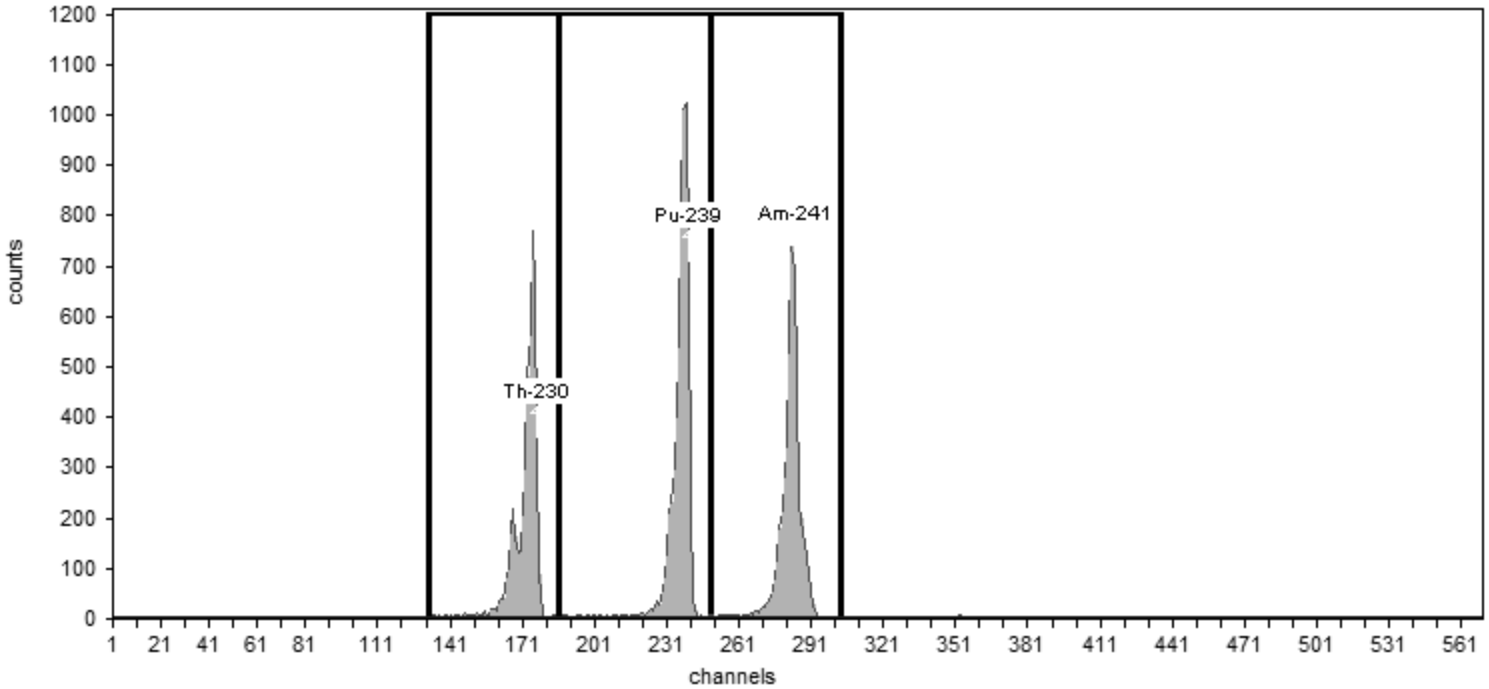
Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 6/27/2016 3:04:13PM

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

Efficiency Calibration Name: CCV-8874;AV204-201606

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

Efficiency: 26.37% +/- 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	32.62	4,598.00	76.63
Pu-239	240	5,155.40	186	249	34.00	5,934.00	98.90
Am-241	284	5,485.70	249	303	31.89	4,737.00	78.95

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:50AM 6/25/2016

Sample

Sample Name: ICB;AV148
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

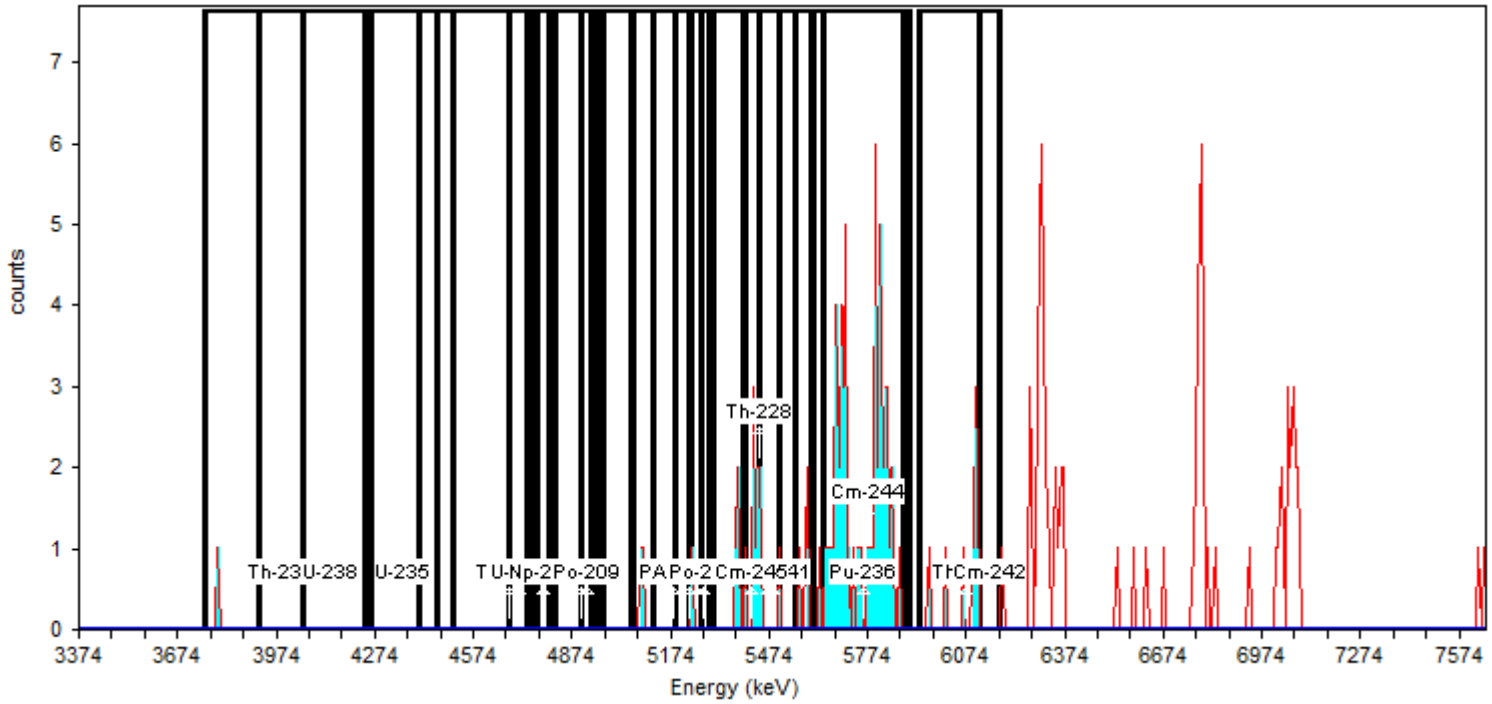
Batch Name: June2016
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 6/24/2016 4:15:34PM
Live Time: 960.00 min.
Real Time: 960.49 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: 162.00

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	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	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	55.00	5.729E-002	7.795E-003
Cm-244	5,775.74	5,641.51	5,902.52	54.00	5.625E-002	7.725E-003
Th-227	6,074.04	5,932.35	6,178.45	9.00	9.375E-003	3.294E-003
Cm-242	6,148.62	6,118.79	6,178.45	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
9:10:57AM 6/27/2016

Sample

Sample Name: ICB;AV149
Comment:

Spectrum #4 Analysis #1
Analyst: 60040

Batch

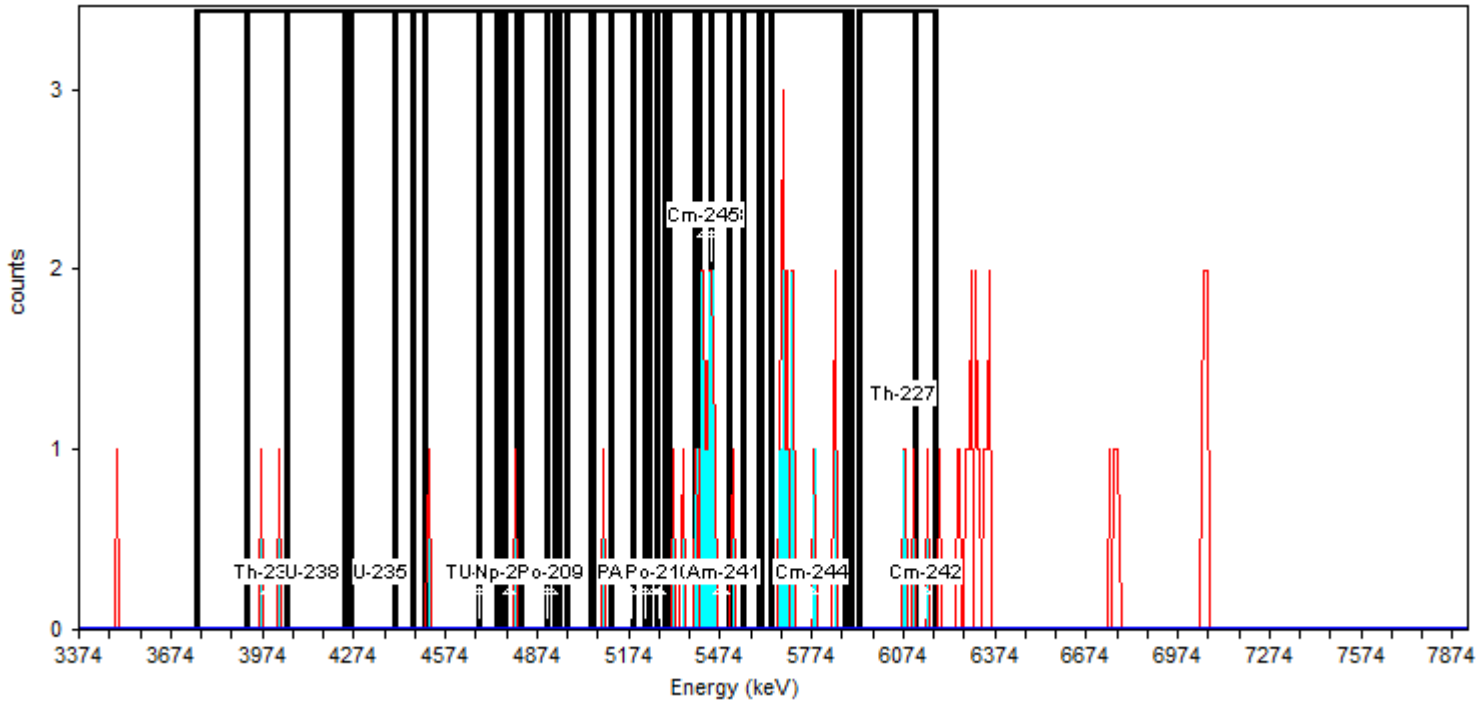
Batch Name: June2016a
Description:

Acquisition

Detector: AV149 , SN: 50-05/R3
Acquisition Start Date: 6/26/2016 5:10:13PM
Live Time: 960.00 min.
Real Time: 960.01 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: 63.00

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	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	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	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	15.00	1.563E-002	4.167E-003
Am-241	5,484.90	5,298.46	5,604.22	15.00	1.563E-002	4.167E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	14.00	1.458E-002	4.034E-003
Cm-244	5,775.74	5,641.51	5,902.52	14.00	1.458E-002	4.034E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:55AM 6/27/2016

Sample

Sample Name: ICB;AV152
Comment:

Spectrum #4 Analysis #1
Analyst: 60040

Batch

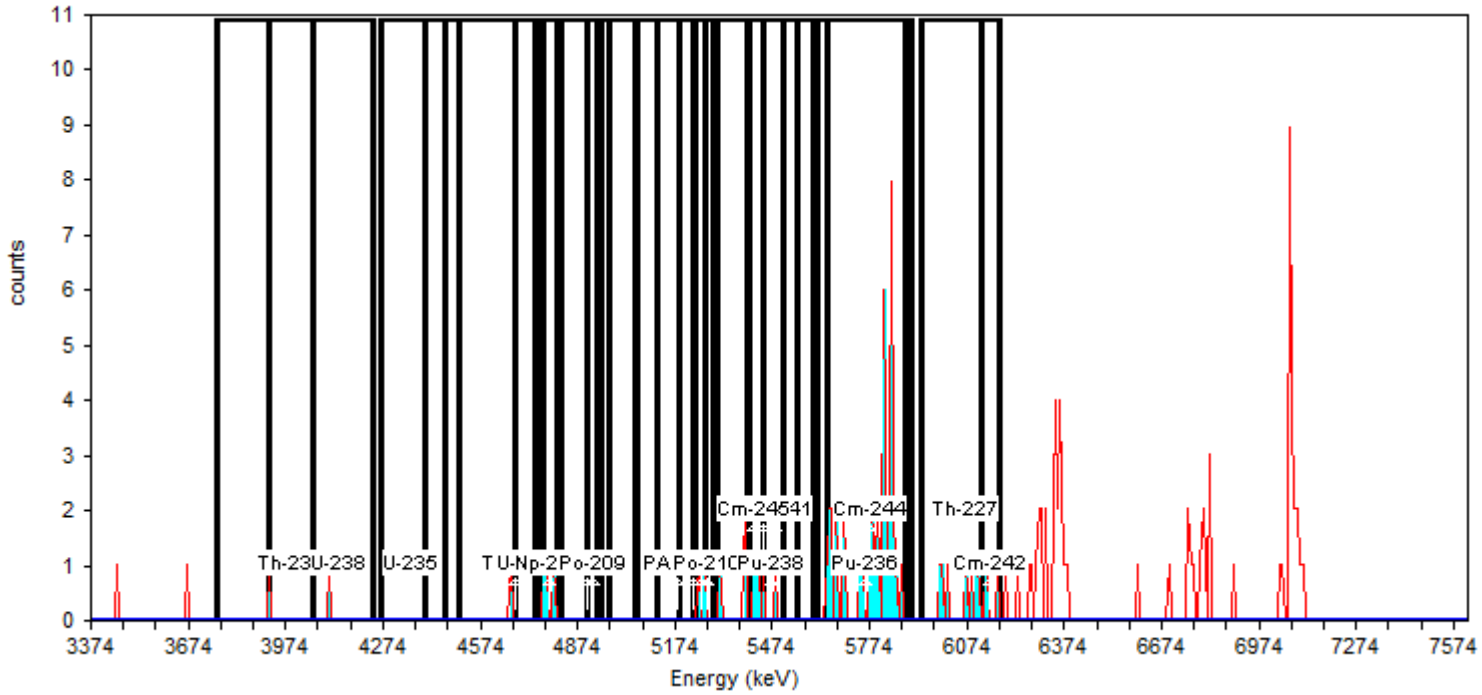
Batch Name: June2016a
Description:

Acquisition

Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 6/26/2016 5:10:10PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9520;AV152-20151016
Calibration Date: 10/16/2015 6:46:53PM

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: 131.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	3.00	3.125E-003	2.083E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	3.00	3.125E-003	2.083E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	8.00	8.333E-003	3.125E-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	40.00	4.167E-002	6.670E-003
Cm-244	5,775.74	5,641.51	5,902.52	40.00	4.167E-002	6.670E-003
Th-227	6,074.04	5,932.35	6,178.45	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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:19:47AM 6/25/2016

Sample

Sample Name: ICB;AV153
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

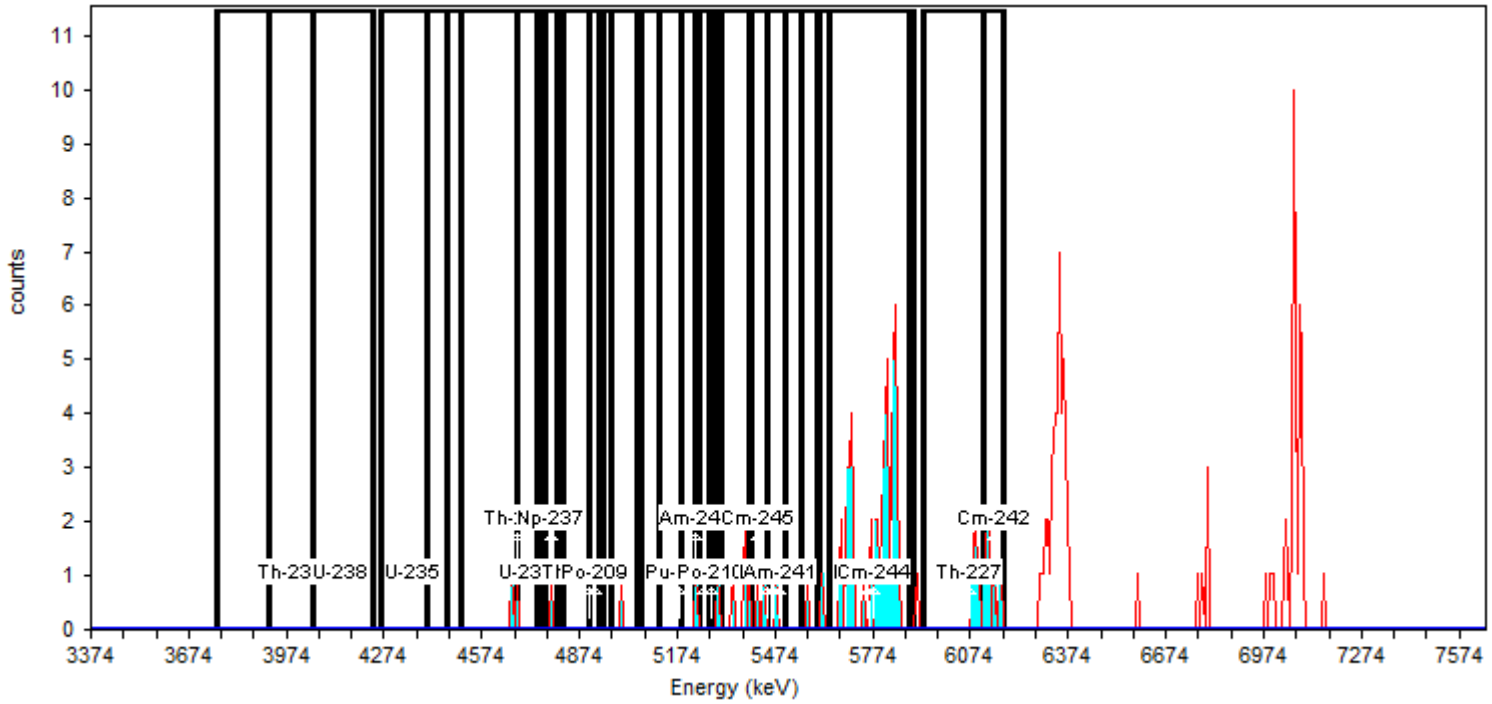
Batch Name: June2016
Description:

Acquisition

Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 6/24/2016 4:15:17PM
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: 155.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	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	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	9.00	9.375E-003	3.294E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	8.00	8.333E-003	3.125E-003
Am-241	5,484.90	5,298.46	5,604.22	9.00	9.375E-003	3.294E-003
Cm-245	5,417.78	5,395.41	5,447.61	3.00	3.125E-003	2.083E-003
Pu-236	5,760.83	5,611.67	5,887.60	52.00	5.417E-002	7.583E-003
Cm-244	5,775.74	5,641.51	5,902.52	51.00	5.313E-002	7.512E-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	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
8:20:05AM 6/25/2016

Sample

Sample Name: ICB;AV154
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

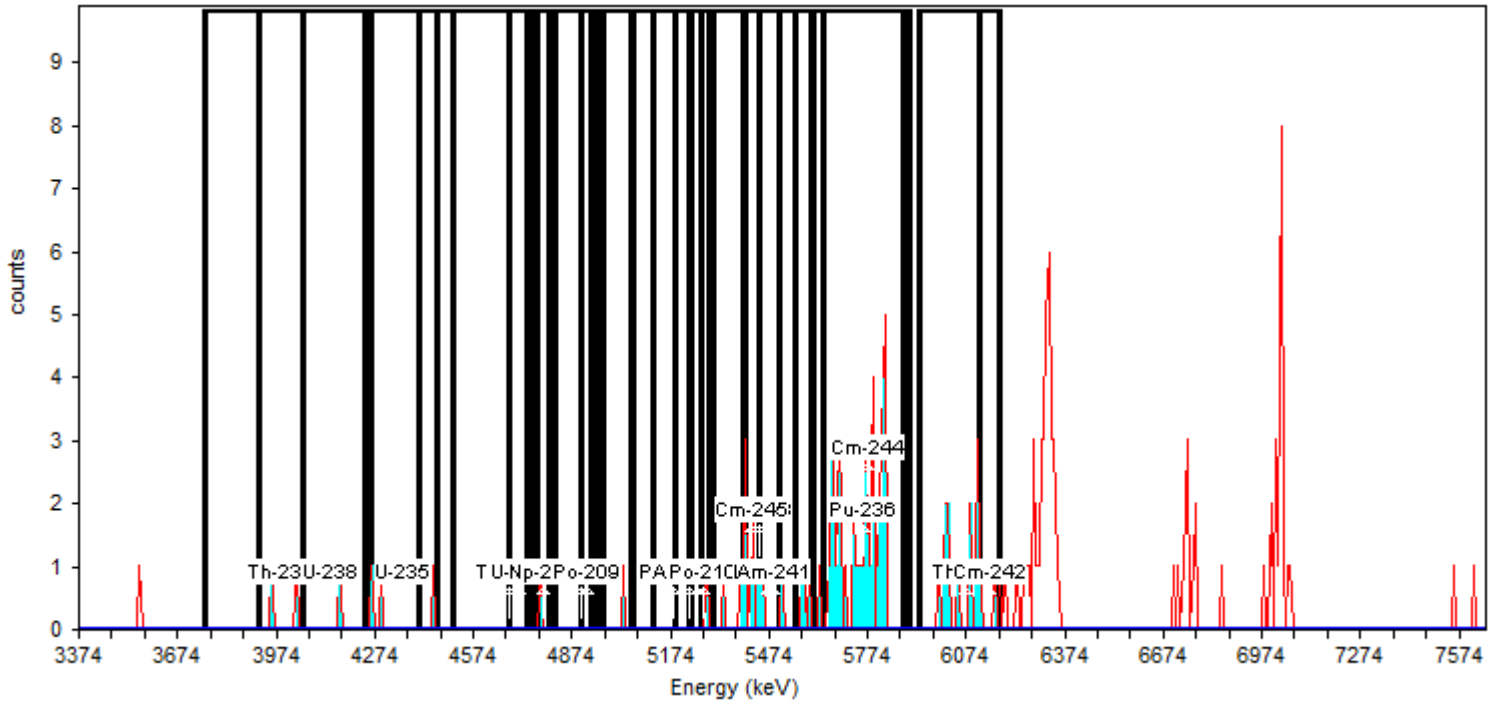
Batch Name: June2016
Description:

Acquisition

Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 6/24/2016 4:15:18PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9793;AV154-20151016
Calibration Date: 10/16/2015 6:47:00PM

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: 153.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	3.00	3.125E-003	2.083E-003
U-235	4,358.81	4,261.86	4,463.21	3.00	3.125E-003	2.083E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	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	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	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	43.00	4.479E-002	6.910E-003
Cm-244	5,775.74	5,641.51	5,902.52	42.00	4.375E-002	6.831E-003
Th-227	6,074.04	5,932.35	6,178.45	16.00	1.667E-002	4.295E-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
9:10:37AM 6/27/2016

Sample

Sample Name: ICB;AV155
Comment:

Spectrum #4 Analysis #1
Analyst: 60040

Batch

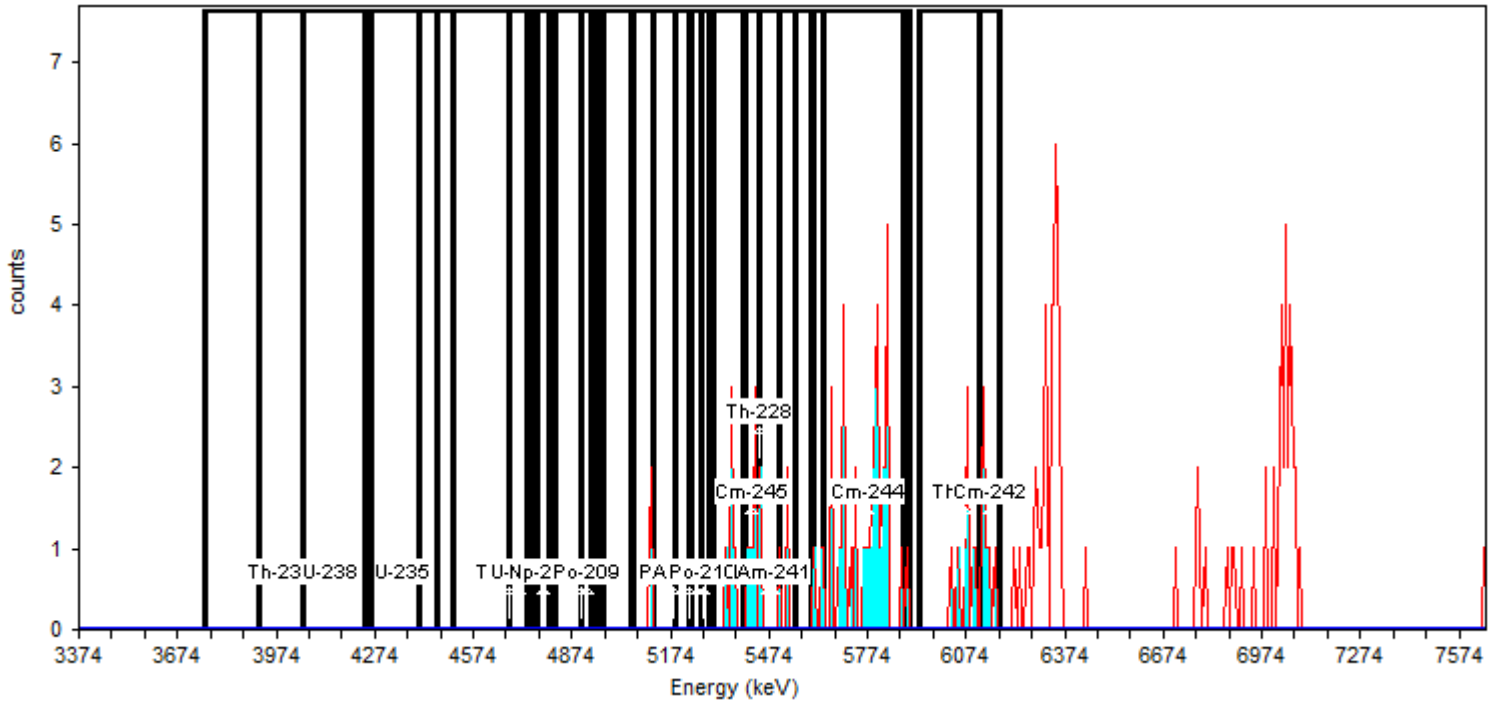
Batch Name: June2016a
Description:

Acquisition

Detector: AV155 , SN: 50-05/II1
Acquisition Start Date: 6/26/2016 5:10:11PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9794;AV155-20151016
Calibration Date: 10/16/2015 6:47:03PM

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: 150.00

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	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	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	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	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	40.00	4.167E-002	6.670E-003
Cm-244	5,775.74	5,641.51	5,902.52	39.00	4.062E-002	6.588E-003
Th-227	6,074.04	5,932.35	6,178.45	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
8:20:29AM 6/25/2016

Sample

Sample Name: ICB;AV157
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

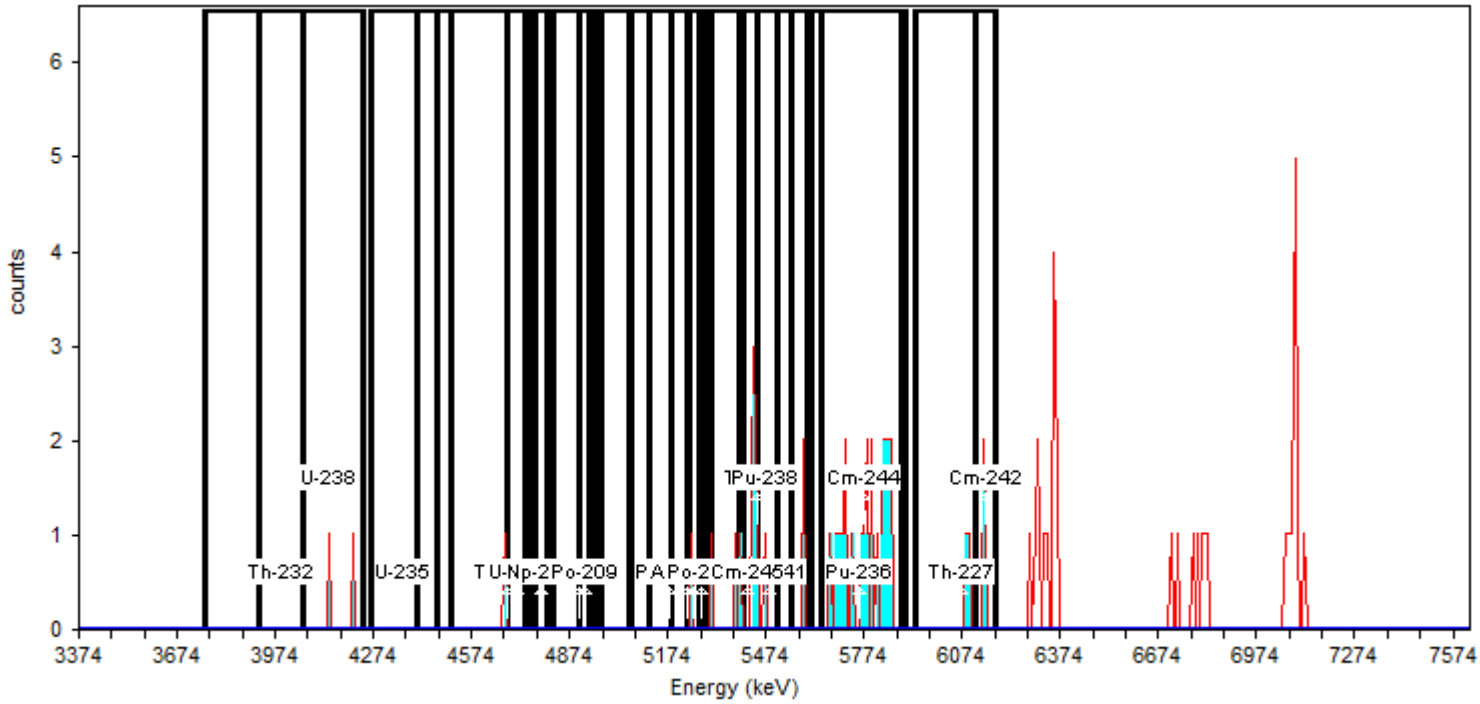
Batch Name: June2016
Description:

Acquisition

Detector: AV157 , SN: 50-05/II3
Acquisition Start Date: 6/24/2016 4:15:18PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV157-20151016
Calibration Date: 10/16/2015 6:47:07PM

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: 77.00

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	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	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	0.00	0.000E+000	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	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	12.00	1.250E-002	3.756E-003
Cm-245	5,417.78	5,395.41	5,447.61	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	24.00	2.500E-002	5.208E-003
Cm-244	5,775.74	5,641.51	5,902.52	24.00	2.500E-002	5.208E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:20:23AM 6/25/2016

Sample

Sample Name: ICB;AV160
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

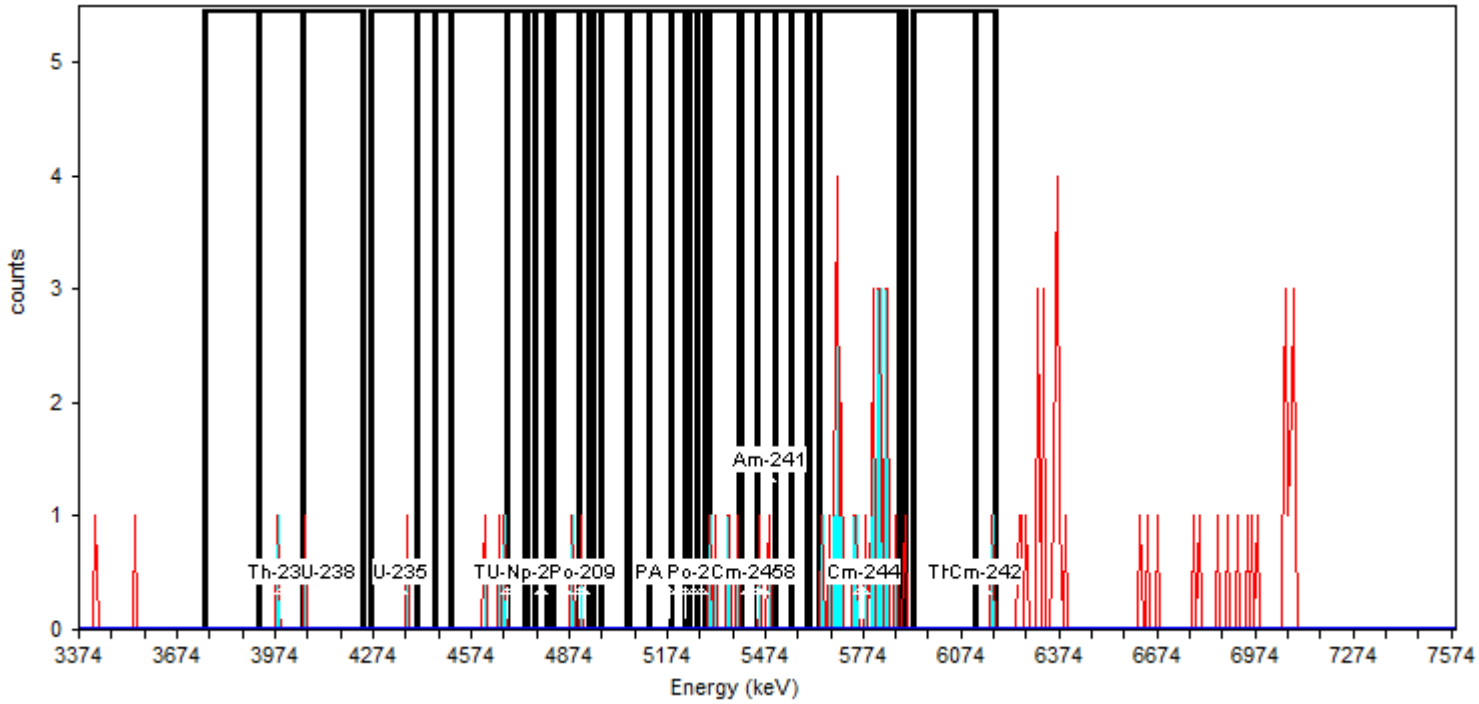
Batch Name: June2016
Description:

Acquisition

Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 6/24/2016 4:15:19PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV160-20151016a
Calibration Date: 10/16/2015 6:47:48PM

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	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	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	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	5.00	5.208E-003	2.552E-003
Th-228	5,447.61	5,186.59	5,507.27	7.00	7.292E-003	2.946E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	7.00	7.292E-003	2.946E-003
Am-241	5,484.90	5,298.46	5,604.22	7.00	7.292E-003	2.946E-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	30.00	3.125E-002	5.800E-003
Cm-244	5,775.74	5,641.51	5,902.52	31.00	3.229E-002	5.893E-003
Th-227	6,074.04	5,932.35	6,178.45	1.00	1.042E-003	1.473E-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
8:20:48AM 6/25/2016

Sample

Sample Name: ICB;AV162
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

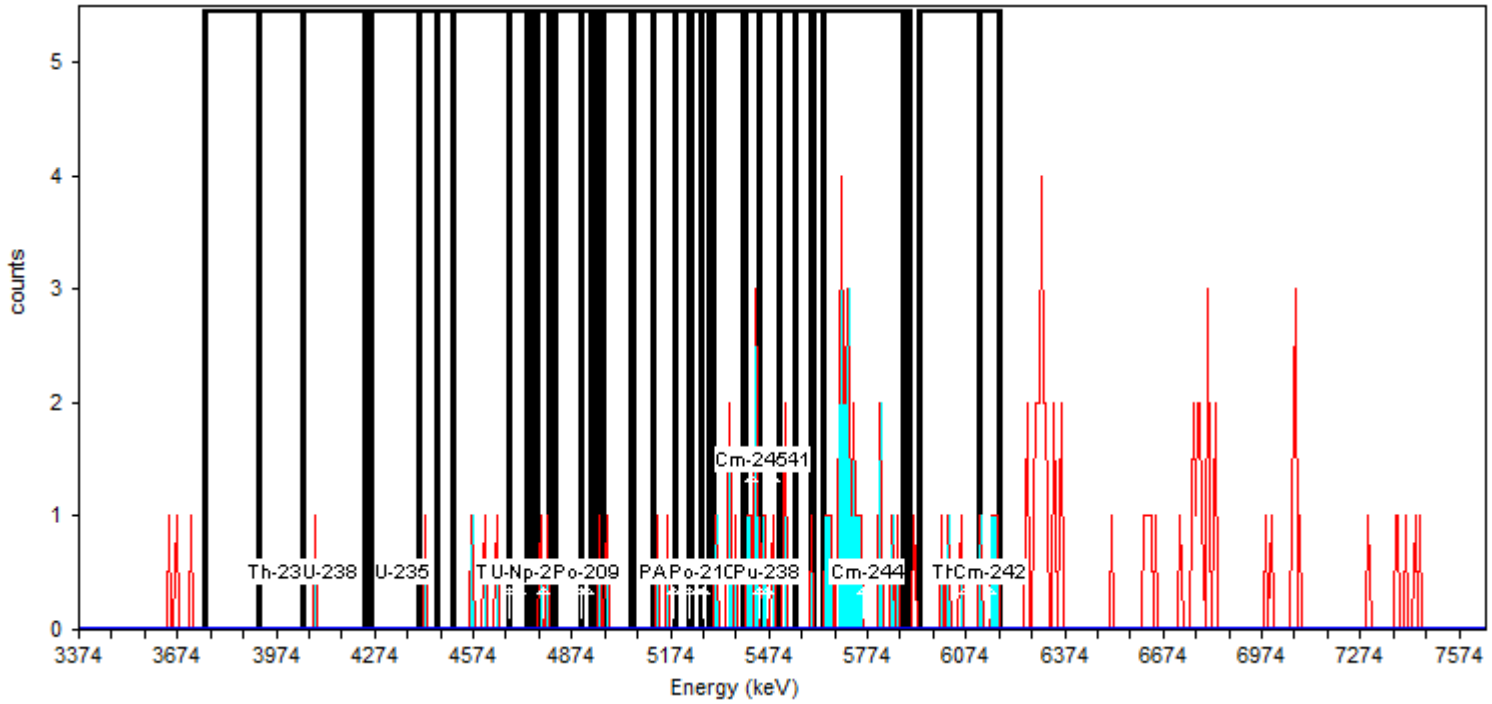
Batch Name: June2016
Description:

Acquisition

Detector: AV162 , SN: 50-05/JJ6
Acquisition Start Date: 6/24/2016 4:15:20PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8874;AV162-20151016
Calibration Date: 10/17/2015 2:36:27PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 121.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	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	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	5.00	5.208E-003	2.552E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	2.00	2.083E-003	1.804E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	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	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	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	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	26.00	2.708E-002	5.413E-003
Cm-244	5,775.74	5,641.51	5,902.52	26.00	2.708E-002	5.413E-003
Th-227	6,074.04	5,932.35	6,178.45	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
8:21:12AM 6/25/2016

Sample

Sample Name: ICB;AV165
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

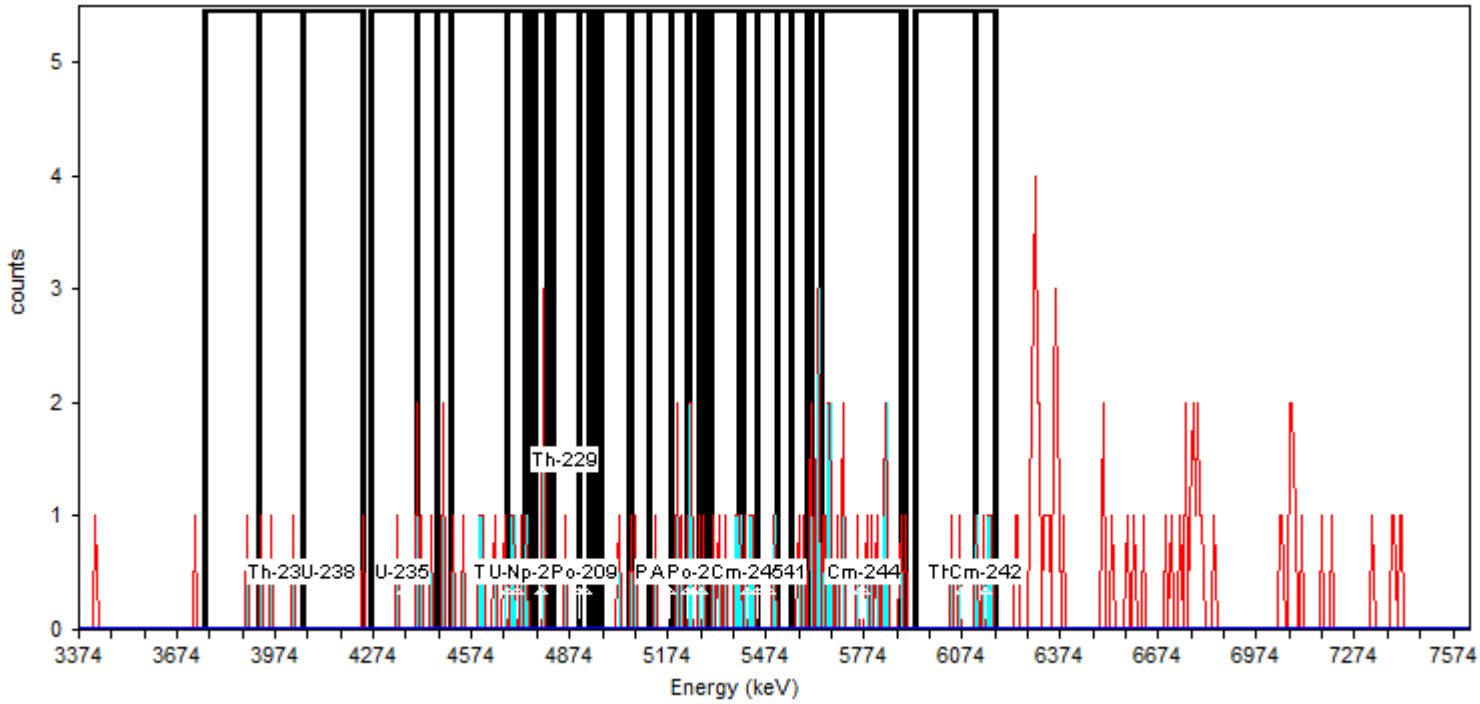
Batch Name: June2016
Description:

Acquisition

Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 6/24/2016 4:15:20PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV165-20151016
Calibration Date: 10/17/2015 2:36:40PM

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: 139.00

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	4.00	4.167E-003	2.329E-003
U-235	4,358.81	4,261.86	4,463.21	5.00	5.208E-003	2.552E-003
Th-230	4,679.48	4,403.55	4,746.60	16.00	1.667E-002	4.295E-003
U-234	4,709.31	4,507.96	4,821.17	13.00	1.354E-002	3.898E-003
Pu-242	4,903.21	4,679.48	4,947.95	8.00	8.333E-003	3.125E-003
Th-229	4,858.46	4,739.14	5,119.48	8.00	8.333E-003	3.125E-003
Np-237	4,783.89	4,768.97	4,806.26	3.00	3.125E-003	2.083E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	9.00	9.375E-003	3.294E-003
Am-243	5,231.34	5,052.36	5,305.92	12.00	1.250E-002	3.756E-003
U-232	5,253.71	5,059.82	5,402.86	18.00	1.875E-002	4.541E-003
Th-228	5,447.61	5,186.59	5,507.27	19.00	1.979E-002	4.658E-003
Po-210	5,276.09	5,231.34	5,291.00	6.00	6.250E-003	2.756E-003
Pu-238	5,469.98	5,268.63	5,552.01	12.00	1.250E-002	3.756E-003
Am-241	5,484.90	5,298.46	5,604.22	12.00	1.250E-002	3.756E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-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	17.00	1.771E-002	4.419E-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	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:00AM 6/25/2016

Sample

Sample Name: ICB;AV166
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

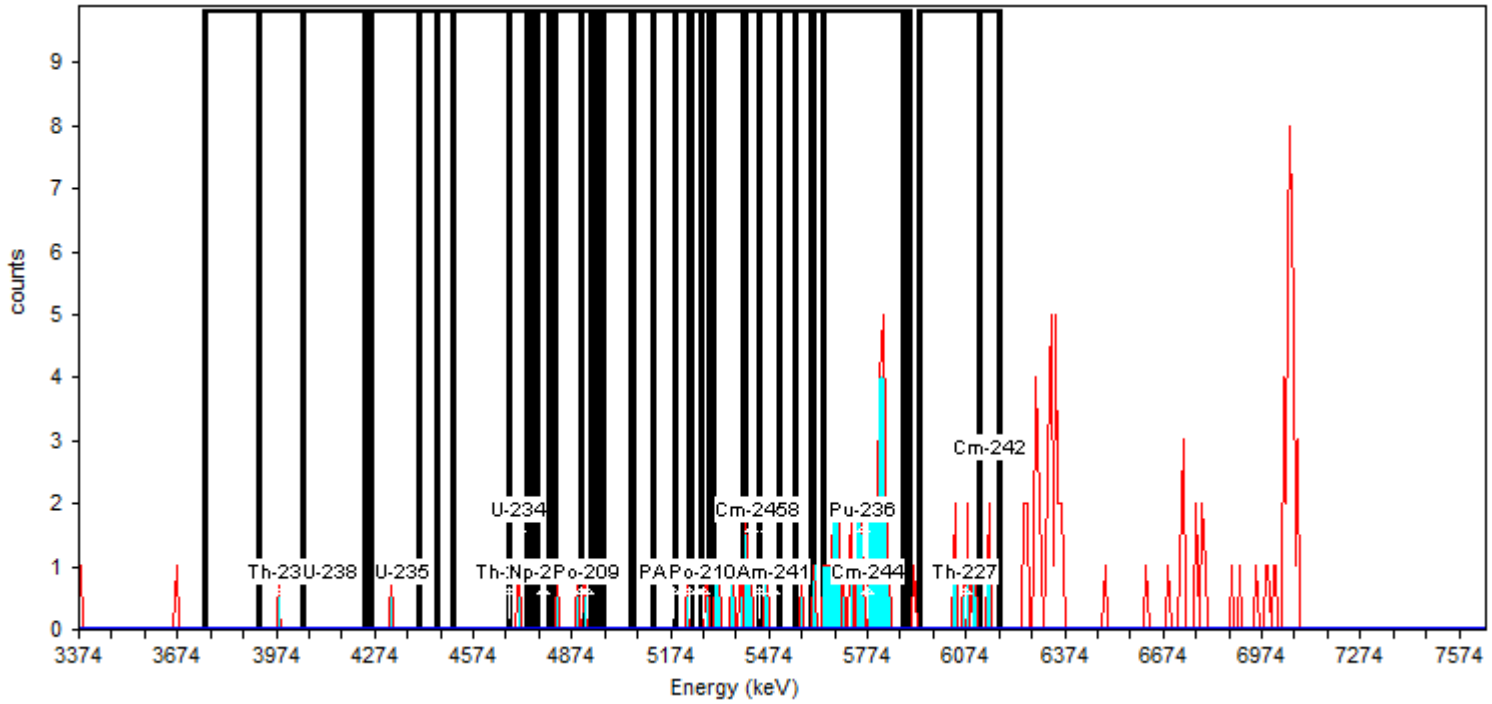
Batch Name: June2016
Description:

Acquisition

Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 6/24/2016 4:15:20PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9520;AV166-20151016a
Calibration Date: 10/17/2015 2:37:00PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 157.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	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	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	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	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	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	12.00	1.250E-002	3.756E-003
Am-241	5,484.90	5,298.46	5,604.22	12.00	1.250E-002	3.756E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	41.00	4.271E-002	6.751E-003
Cm-244	5,775.74	5,641.51	5,902.52	40.00	4.167E-002	6.670E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:24AM 6/25/2016

Sample

Sample Name: ICB;AV167
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

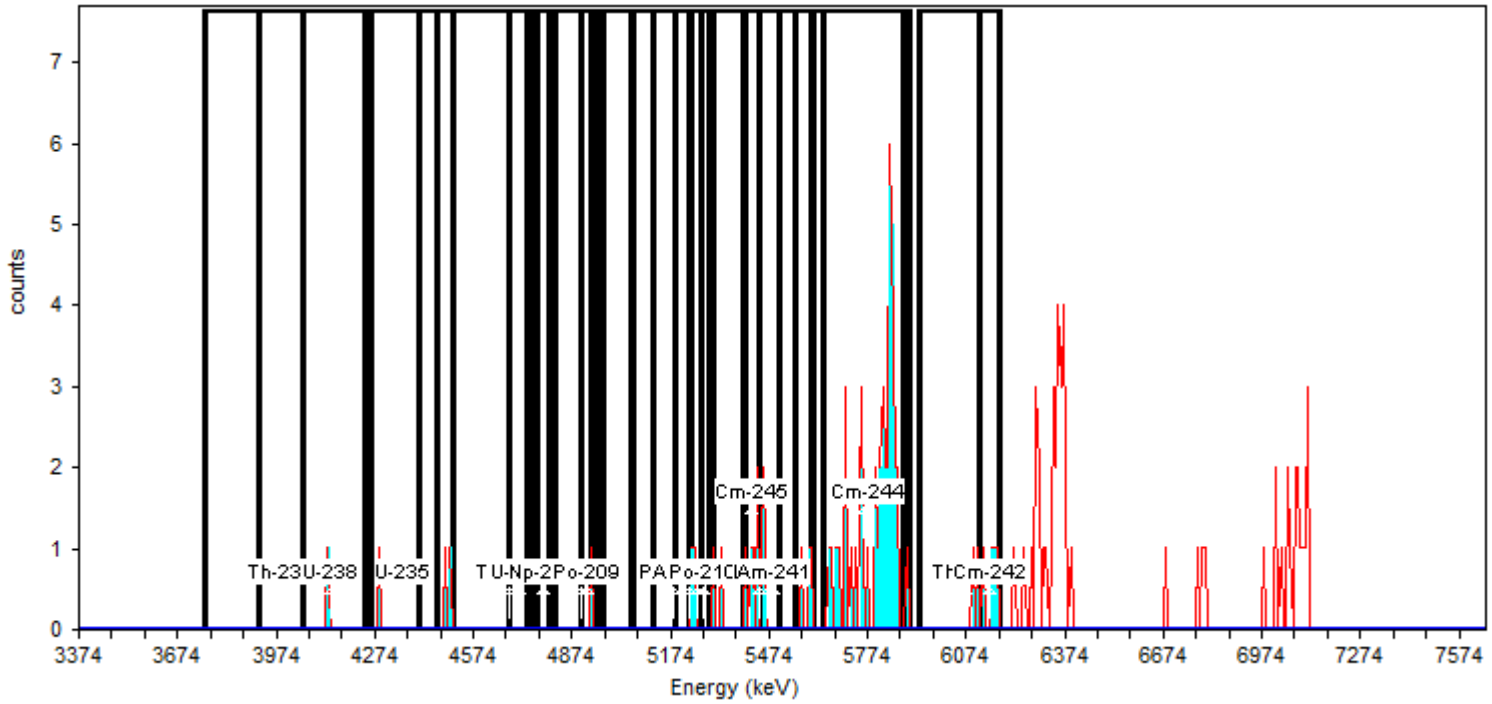
Batch Name: June2016
Description:

Acquisition

Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 6/24/2016 4:15:21PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV167-20151016a
Calibration Date: 10/17/2015 2:37:03PM

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: 119.00

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	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	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	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	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	5.00	5.208E-003	2.552E-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	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	10.00	1.042E-002	3.455E-003
Am-241	5,484.90	5,298.46	5,604.22	13.00	1.354E-002	3.898E-003
Cm-245	5,417.78	5,395.41	5,447.61	5.00	5.208E-003	2.552E-003
Pu-236	5,760.83	5,611.67	5,887.60	41.00	4.271E-002	6.751E-003
Cm-244	5,775.74	5,641.51	5,902.52	42.00	4.375E-002	6.831E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-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
9:10:54AM 6/27/2016

Sample

Sample Name: ICB;AV170
Comment:

Spectrum #4 Analysis #1
Analyst: 60040

Batch

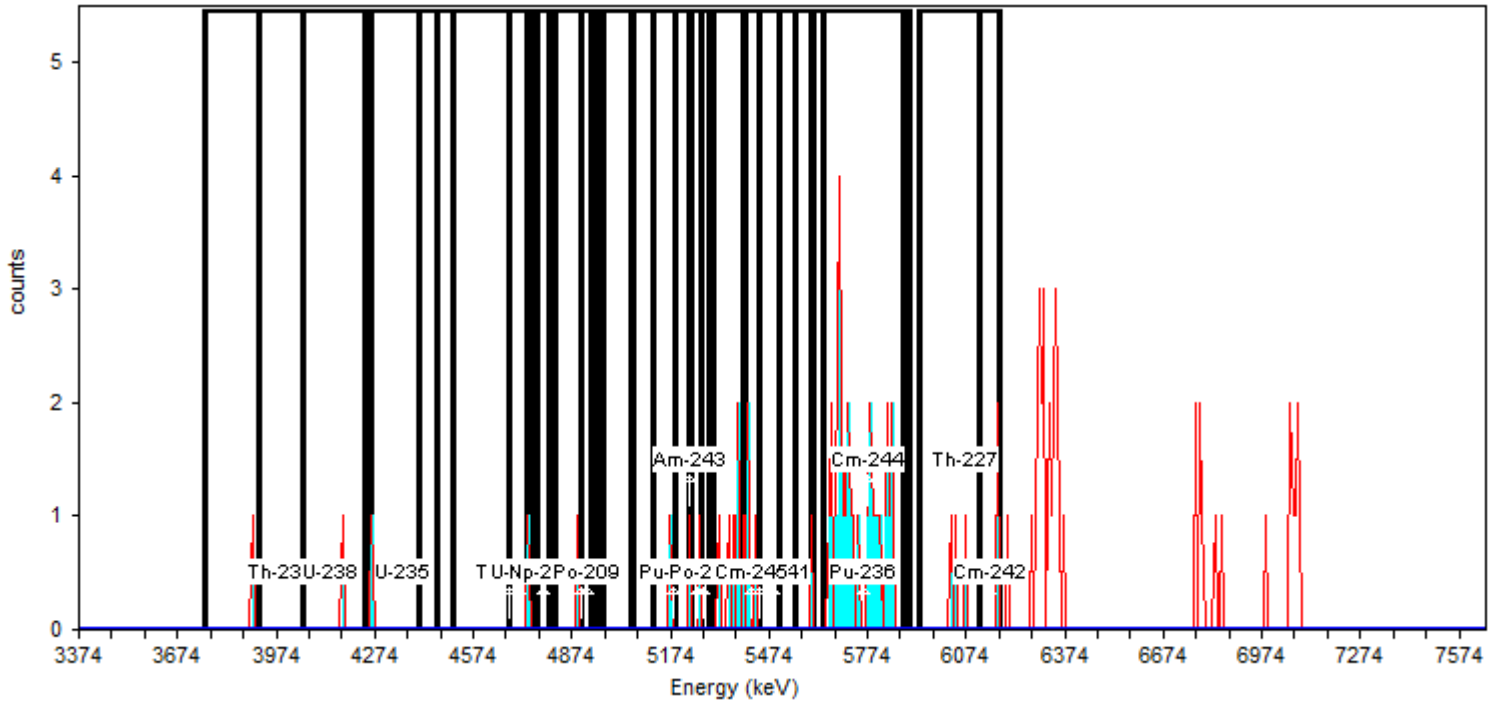
Batch Name: June2016a
Description:

Acquisition

Detector: AV170 , SN: 50-112 G7
Acquisition Start Date: 6/26/2016 5:10:11PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9795;AV170-20151016
Calibration Date: 10/17/2015 2:36:50PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 90.00

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	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	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	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	10.00	1.042E-002	3.455E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	30.00	3.125E-002	5.800E-003
Cm-244	5,775.74	5,641.51	5,902.52	30.00	3.125E-002	5.800E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:55AM 6/25/2016

Sample

Sample Name: ICB;AV171
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

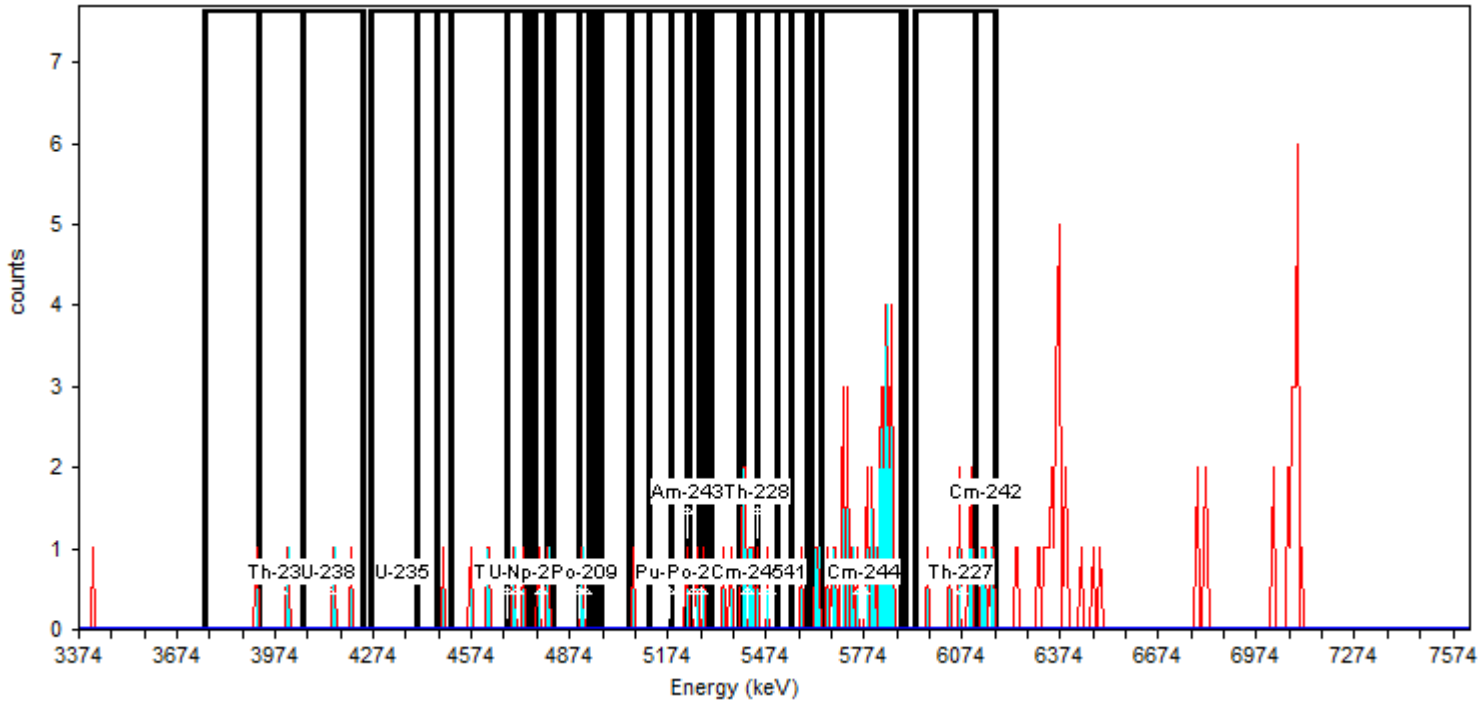
Batch Name: June2016
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 6/24/2016 4:15:21PM
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: 125.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	3.00	3.125E-003	2.083E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	6.00	6.250E-003	2.756E-003
U-234	4,709.31	4,507.96	4,821.17	7.00	7.292E-003	2.946E-003
Pu-242	4,903.21	4,679.48	4,947.95	5.00	5.208E-003	2.552E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	2.00	2.083E-003	1.804E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-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	3.00	3.125E-003	2.083E-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	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	36.00	3.750E-002	6.336E-003
Cm-244	5,775.74	5,641.51	5,902.52	34.00	3.542E-002	6.163E-003
Th-227	6,074.04	5,932.35	6,178.45	12.00	1.250E-002	3.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:37AM 6/25/2016

Sample

Sample Name: ICB;AV173
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

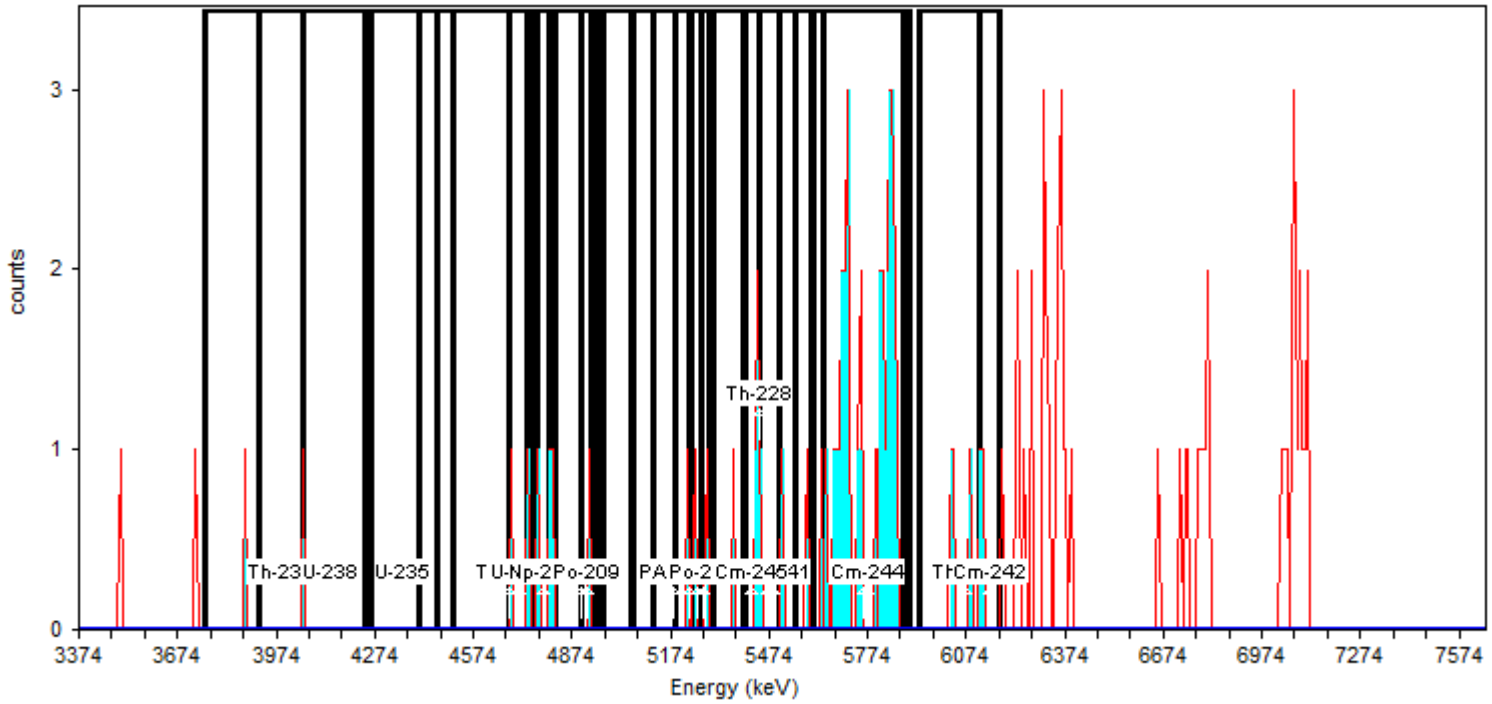
Batch Name: June2016
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 6/24/2016 4:15:22PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9885;AV173-20151016a
Calibration Date: 10/17/2015 2:37:06PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 108.00

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	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	5.00	5.208E-003	2.552E-003
Pu-242	4,903.21	4,679.48	4,947.95	6.00	6.250E-003	2.756E-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	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	8.00	8.333E-003	3.125E-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	7.00	7.292E-003	2.946E-003
Am-241	5,484.90	5,298.46	5,604.22	7.00	7.292E-003	2.946E-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	34.00	3.542E-002	6.163E-003
Cm-244	5,775.74	5,641.51	5,902.52	33.00	3.437E-002	6.074E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:40AM 6/27/2016

Sample

Sample Name: ICB;AV191
Comment:

Spectrum #4 Analysis #1
Analyst: 60040

Batch

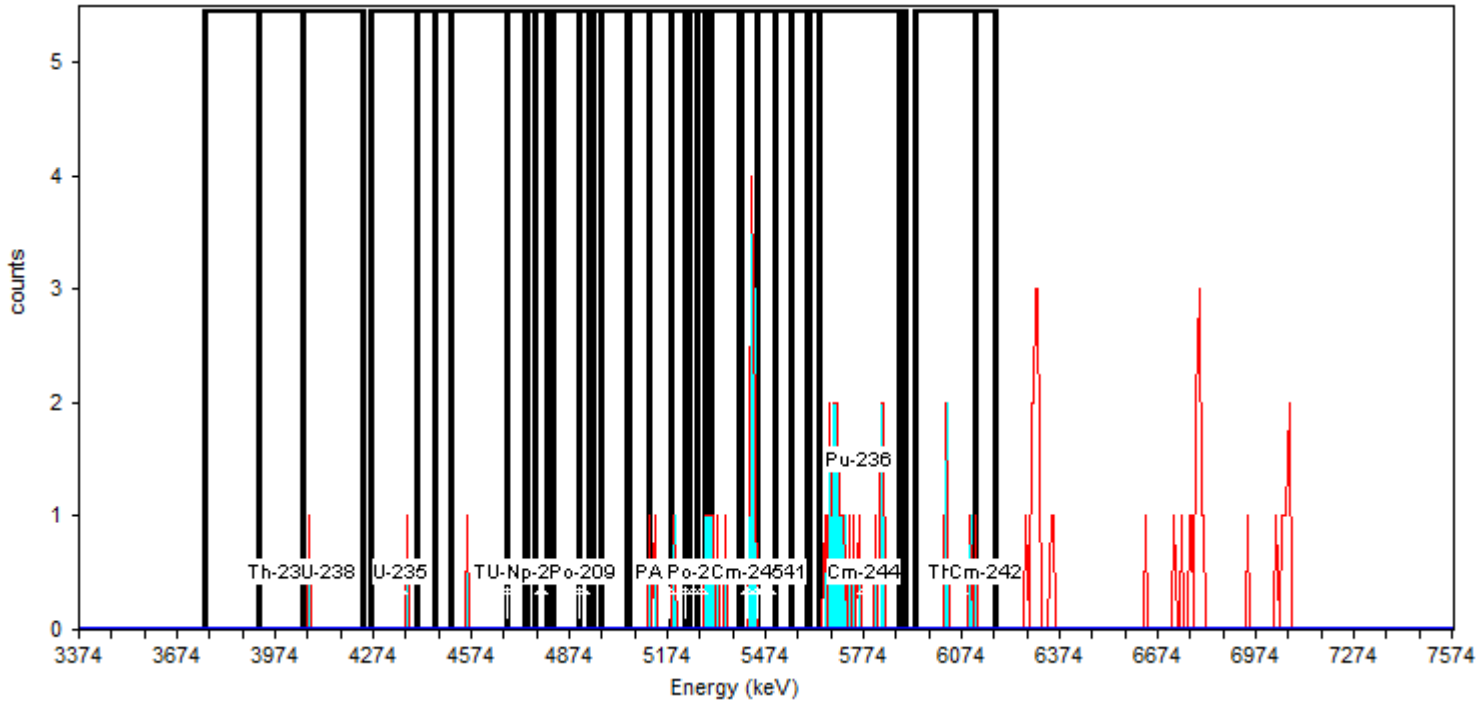
Batch Name: June2016a
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 6/26/2016 5:10:12PM
Live Time: 960.00 min.
Real Time: 960.01 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: 75.00

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	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	6.00	6.250E-003	2.756E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	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	13.00	1.354E-002	3.898E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	19.00	1.979E-002	4.658E-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	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:17AM 6/25/2016

Sample

Sample Name: ICB;AV194
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

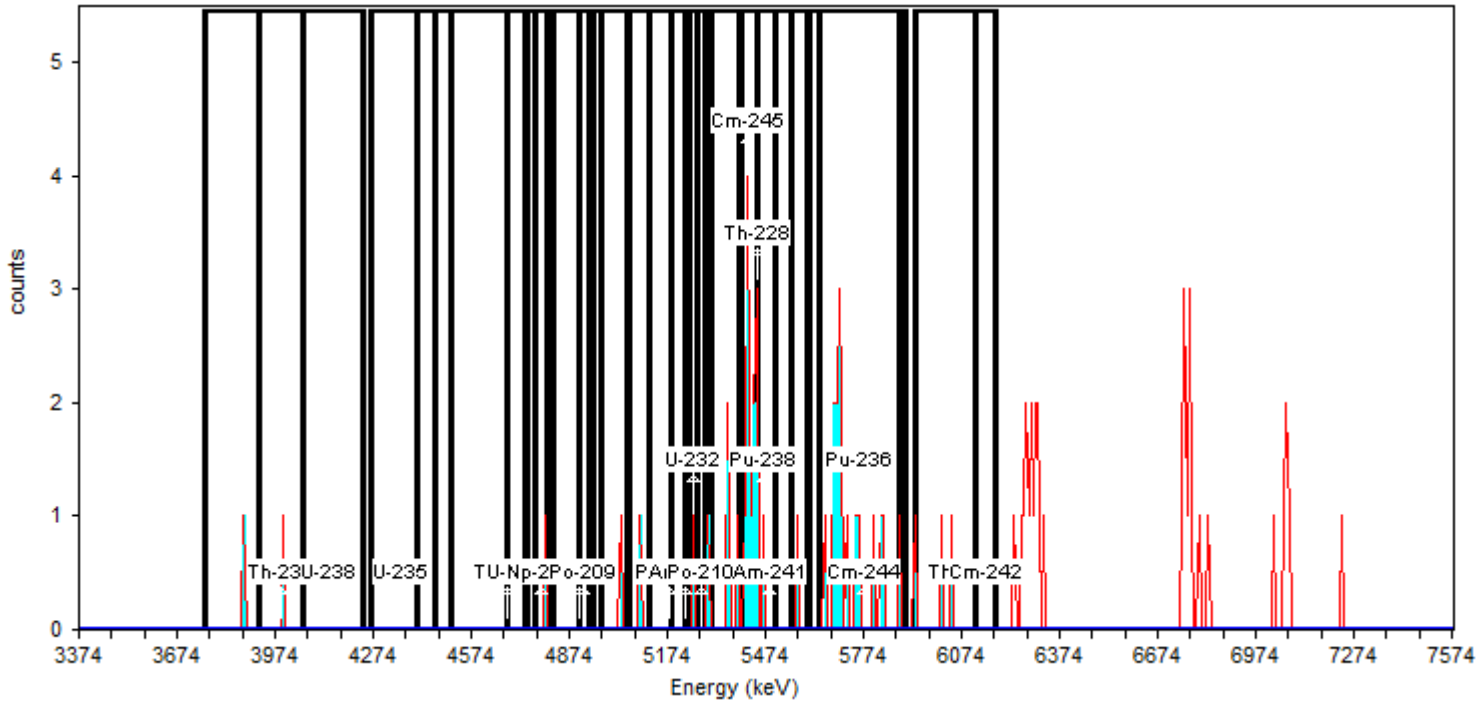
Batch Name: June2016
Description:

Acquisition

Detector: AV194 , SN: 50-119J2
Acquisition Start Date: 6/24/2016 4:15:20PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 77.00

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	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	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	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	20.00	2.083E-002	4.774E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	20.00	2.083E-002	4.774E-003
Cm-245	5,417.78	5,395.41	5,447.61	13.00	1.354E-002	3.898E-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	17.00	1.771E-002	4.419E-003
Th-227	6,074.04	5,932.35	6,178.45	3.00	3.125E-003	2.083E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:16:40AM 6/25/2016

Sample

Sample Name: ICB;AV198
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

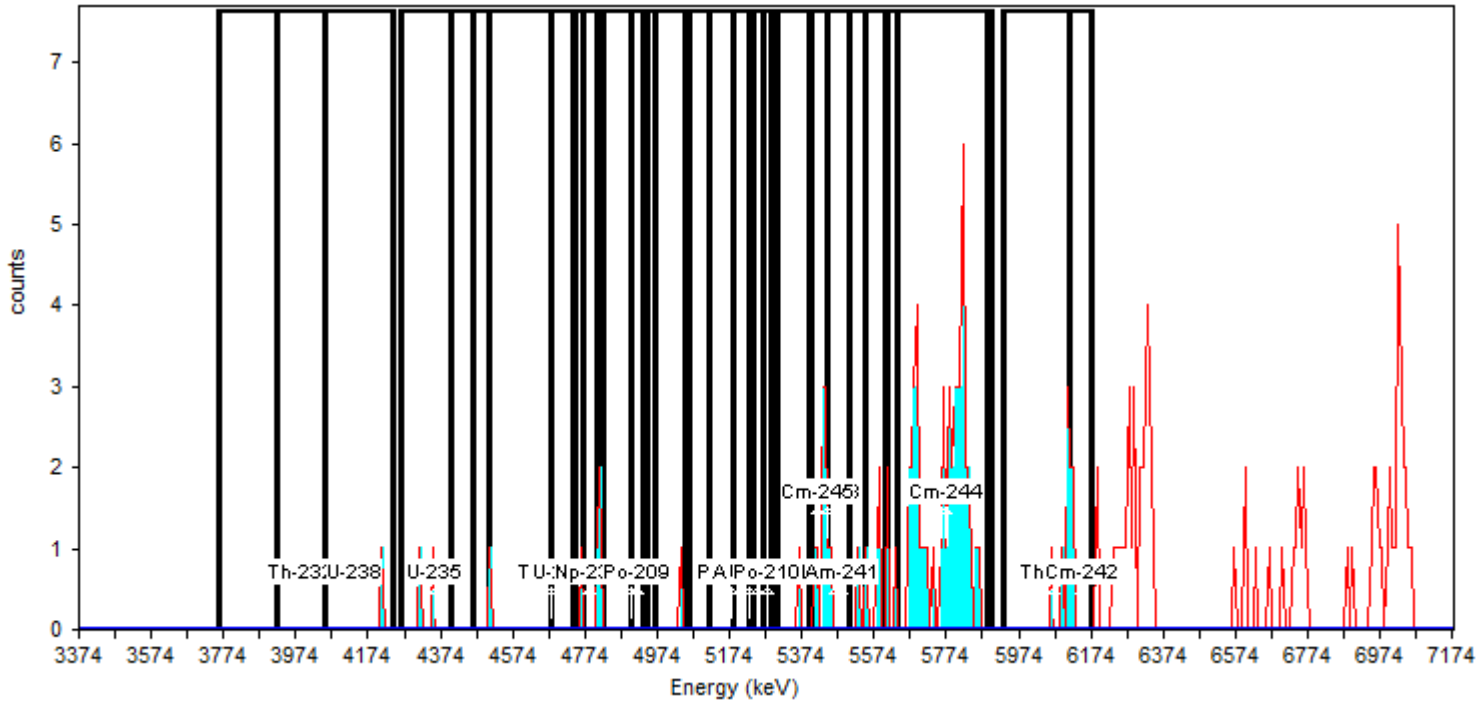
Batch Name: June2016
Description:

Acquisition

Detector: AV198 , SN: 50-117AA7
Acquisition Start Date: 6/24/2016 4:15:21PM
Live Time: 960.00 min.
Real Time: 960.00 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: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 157.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	5.00	5.208E-003	2.552E-003
Pu-242	4,903.21	4,679.48	4,947.95	4.00	4.167E-003	2.329E-003
Th-229	4,858.46	4,739.14	5,119.48	5.00	5.208E-003	2.552E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	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	1.00	1.042E-003	1.473E-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	13.00	1.354E-002	3.898E-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	51.00	5.313E-002	7.512E-003
Cm-244	5,775.74	5,641.51	5,902.52	48.00	5.000E-002	7.292E-003
Th-227	6,074.04	5,932.35	6,178.45	9.00	9.375E-003	3.294E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:16:34AM 6/25/2016

Sample

Sample Name: ICB;AV200
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

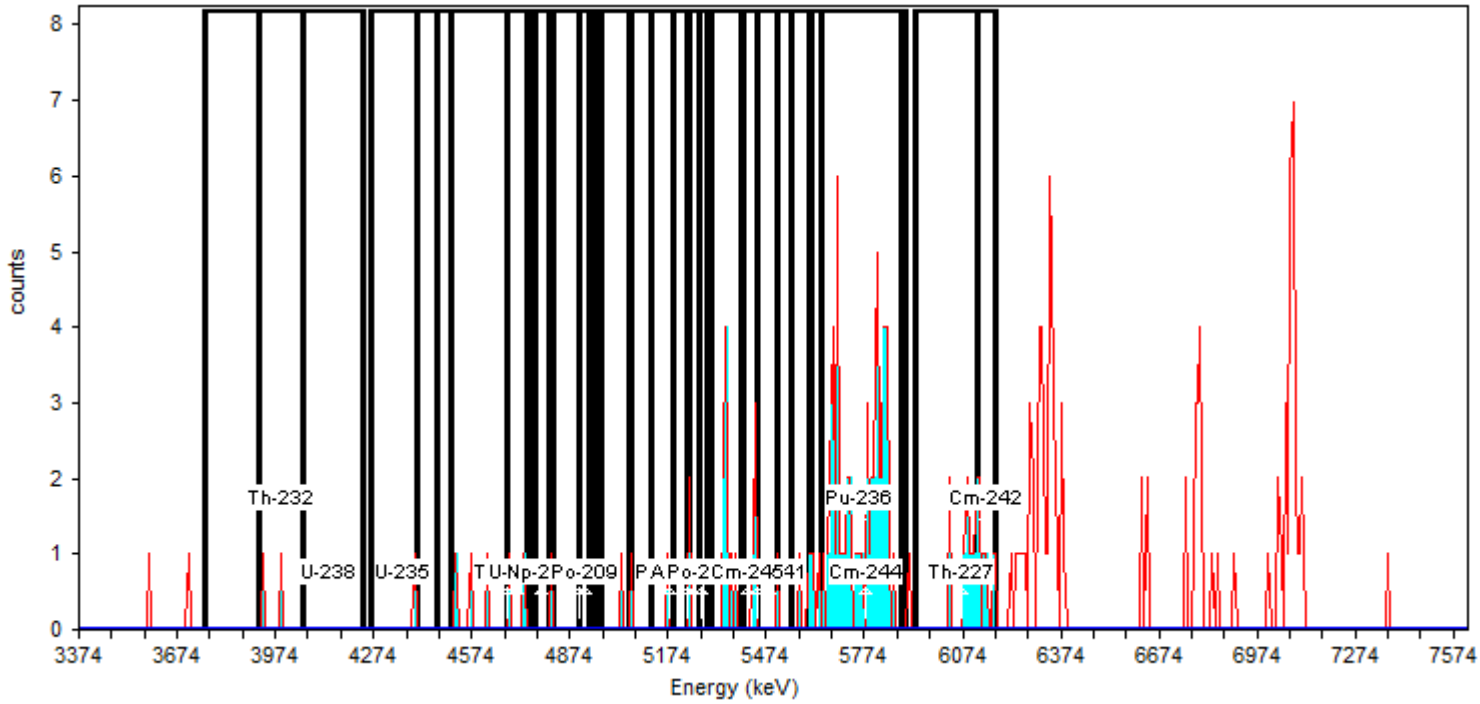
Batch Name: June2016
Description:

Acquisition

Detector: AV200 , SN: 50-117J6
Acquisition Start Date: 6/24/2016 4:15:22PM
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: 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	2.00	2.083E-003	1.804E-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	5.00	5.208E-003	2.552E-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	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	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	5.00	5.208E-003	2.552E-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	12.00	1.250E-002	3.756E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	15.00	1.563E-002	4.167E-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	57.00	5.937E-002	7.933E-003
Cm-244	5,775.74	5,641.51	5,902.52	54.00	5.625E-002	7.725E-003
Th-227	6,074.04	5,932.35	6,178.45	16.00	1.667E-002	4.295E-003
Cm-242	6,148.62	6,118.79	6,178.45	8.00	8.333E-003	3.125E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:44AM 6/27/2016

Sample

Sample Name: ICB;AV202
Comment:

Spectrum #4 Analysis #1
Analyst: 60040

Batch

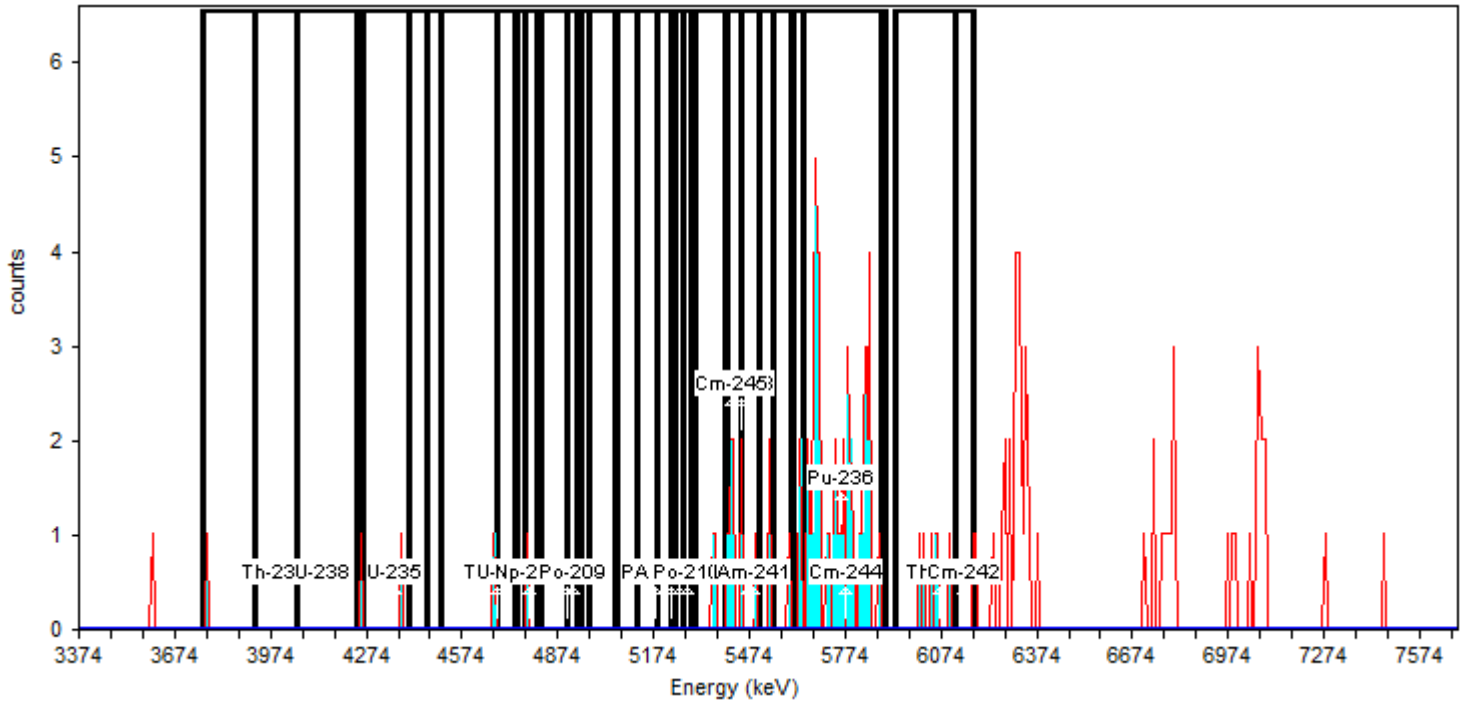
Batch Name: June2016a
Description:

Acquisition

Detector: AV202 , SN: 50-117Z2
Acquisition Start Date: 6/26/2016 5:10:13PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9886;AV202-20151017a
Calibration Date: 10/18/2015 3:55:45PM

Energy Calibration Equation:

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



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 126.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	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	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	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	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	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	46.00	4.792E-002	7.141E-003
Cm-244	5,775.74	5,641.51	5,902.52	44.00	4.583E-002	6.988E-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	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
8:23:04AM 6/25/2016

Sample

Sample Name: ICB;AV203
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

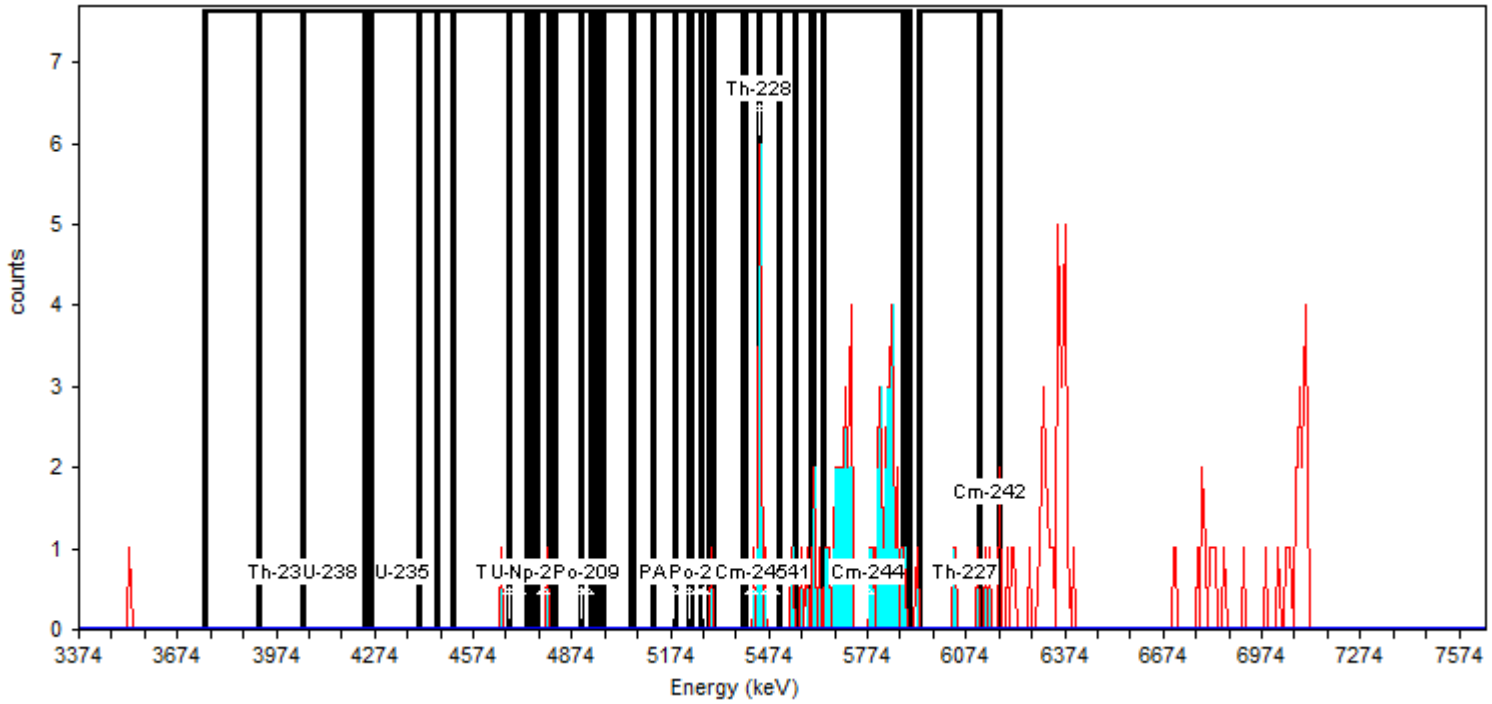
Batch Name: June2016
Description:

Acquisition

Detector: AV203 , SN: 50-117J4
Acquisition Start Date: 6/24/2016 4:15:22PM
Live Time: 960.00 min.
Real Time: 960.03 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: 137.00

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	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	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	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	1.00	1.042E-003	1.473E-003
Th-228	5,447.61	5,186.59	5,507.27	10.00	1.042E-002	3.455E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	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	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	48.00	5.000E-002	7.292E-003
Cm-244	5,775.74	5,641.51	5,902.52	45.00	4.688E-002	7.065E-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
8:22:51AM 6/25/2016

Sample

Sample Name: ICB;AV204
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

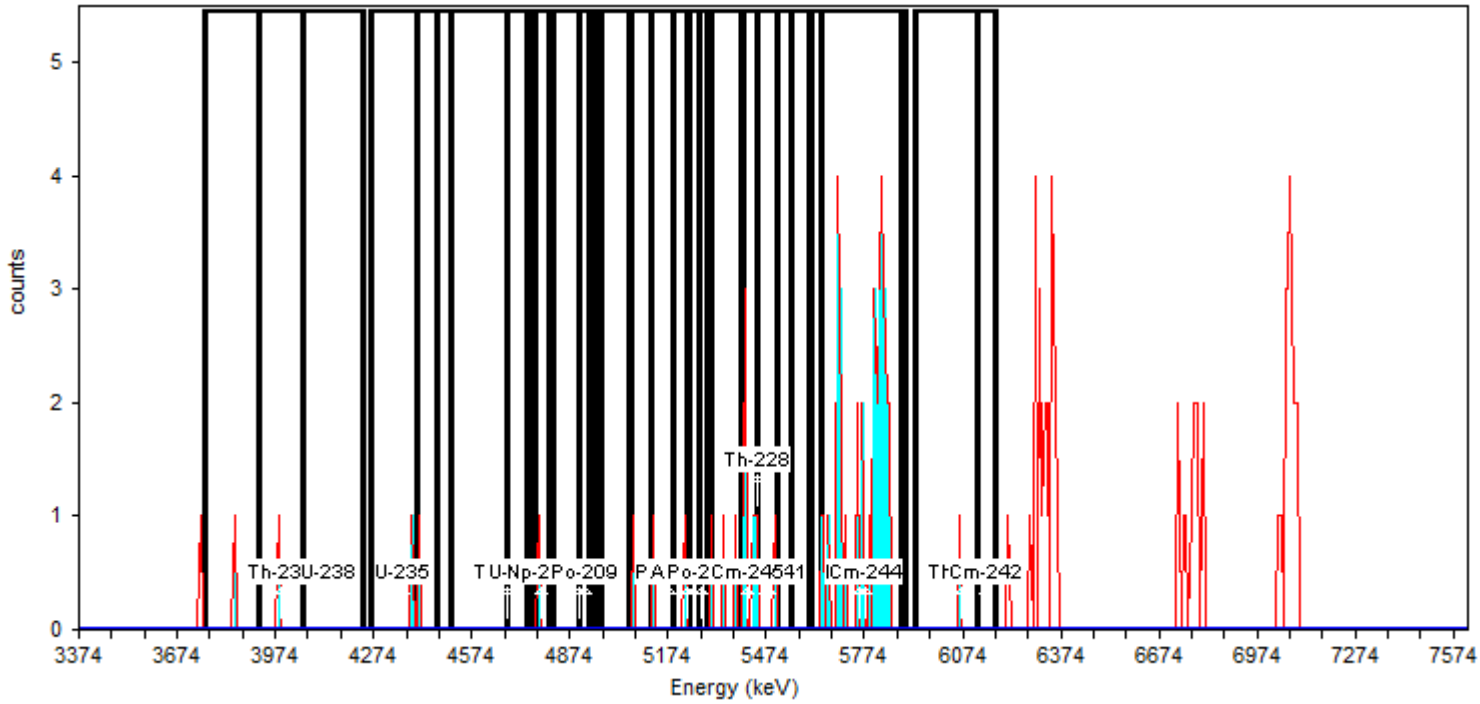
Batch Name: June2016
Description:

Acquisition

Detector: AV204 , SN: 50-117I4
Acquisition Start Date: 6/24/2016 4:15:22PM
Live Time: 960.00 min.
Real Time: 960.02 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: 109.00

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	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	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	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	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	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	35.00	3.646E-002	6.250E-003
Cm-244	5,775.74	5,641.51	5,902.52	35.00	3.646E-002	6.250E-003
Th-227	6,074.04	5,932.35	6,178.45	1.00	1.042E-003	1.473E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV148

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 16:27	140	IC 160-223445/1		223445			PS
10/26/15 19:10	60	ICV 160-223563/1		223563			PS
06/24/16 16:15	960	ICB 160-258037/1		258037			PS
06/27/16 10:48	60	CCV 160-258276/1		258276			PS
07/08/16 08:48	1	PULSER 160-259861/1		259861			ALD
07/08/16 12:38	400	LCS 160-257496/2-A		259861	257496	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
06/26/16 17:10	960	ICB 160-258130/1		258130			PS
06/28/16 11:43	60	CCV 160-258350/1		258350			PS
07/08/16 08:47	1	PULSER 160-259862/1		259862			ALD
07/08/16 12:38	400	160-17797-1	WR111-REF-001-SS-P-0(	259862	257496	A-01-R	ALD

Detector: AV152

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:52	140	IC 160-223449/1		223449			PS
10/26/15 19:11	60	ICV 160-223567/1		223567			PS
06/26/16 17:10	960	ICB 160-258131/1		258131			PS
06/27/16 10:49	60	CCV 160-258280/1		258280			PS
07/08/16 08:47	1	PULSER 160-259865/1		259865			ALD
07/08/16 12:38	400	160-17797-3	WR111-REF-002-SS-P-0(	259865	257496	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
06/24/16 16:15	960	ICB 160-258042/1		258042			PS
06/27/16 10:50	60	CCV 160-258281/1		258281			PS
07/08/16 08:47	1	PULSER 160-259866/1		259866			ALD
07/08/16 12:38	400	160-17797-4	WR111-REF-003-SS-P-0(	259866	257496	A-01-R	ALD

Detector: AV154

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:52	140	IC 160-223451/1		223451			PS
10/26/15 19:11	60	ICV 160-223569/1		223569			PS
06/24/16 16:15	960	ICB 160-258043/1		258043			PS
06/27/16 10:50	60	CCV 160-258282/1		258282			PS
07/08/16 08:47	1	PULSER 160-259867/1		259867			ALD
07/08/16 12:38	400	160-17797-5	WR111-REF-004-SS-P-0(	259867	257496	A-01-R	ALD

Detector: AV155

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:52	140	IC 160-223452/1		223452			PS
10/26/15 19:12	60	ICV 160-223570/1		223570			PS

Alpha Spectroscopy Run Log

Detector: AV155 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/26/16 17:10	960	ICB 160-258132/1		258132			PS
06/27/16 10:50	60	CCV 160-258283/1		258283			PS
07/08/16 08:47	1	PULSER 160-259868/1		259868			ALD
07/08/16 12:38	400	160-17797-6	WR111-REF-005-SS-P-0(	259868	257496	A-01-R	ALD

Detector: AV157

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 15:53	140	IC 160-223454/1		223454			PS
10/26/15 19:12	60	ICV 160-223572/1		223572			PS
06/24/16 16:15	960	ICB 160-258046/1		258046			PS
06/27/16 10:51	60	CCV 160-258285/1		258285			PS
07/08/16 08:47	1	PULSER 160-259870/1		259870			ALD
07/08/16 12:38	400	160-17797-8	WR111-REF-007-SS-P-0(	259870	257496	A-01-R	ALD

Detector: AV160

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 16:27	140	IC 160-223457/1		223457			PS
10/26/15 19:13	60	ICV 160-223575/1		223575			PS
06/24/16 16:15	960	ICB 160-258049/1		258049			PS
06/27/16 10:52	60	CCV 160-258286/1		258286			PS
07/08/16 08:47	1	PULSER 160-259871/1		259871			ALD
07/08/16 12:38	400	160-17797-9	WR111-REF-008-SS-P-0(	259871	257496	A-01-R	ALD

Detector: AV162

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:57	140	IC 160-223459/1		223459			PS
10/26/15 20:26	60	ICV 160-223577/1		223577			PS
06/24/16 16:15	960	ICB 160-258051/1		258051			PS
06/27/16 12:02	60	CCV 160-258288/1		258288			PS
07/08/16 08:47	1	PULSER 160-259873/1		259873			ALD
07/08/16 12:38	400	160-17797-10	WR111-REF-009-SS-P-0(	259873	257496	A-01-R	ALD

Detector: AV165

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:58	140	IC 160-223462/1		223462			PS
10/26/15 20:27	60	ICV 160-223580/1		223580			PS
06/24/16 16:15	960	ICB 160-258054/1		258054			PS
06/27/16 12:25	60	CCV 160-258291/1		258291			PS
07/08/16 08:47	1	PULSER 160-259875/1		259875			ALD
07/08/16 12:38	400	160-17797-12	WR111-REF-011-SS-P-0(	259875	257496	A-01-R	ALD

Detector: AV166

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 19:04	140	IC 160-223463/1		223463			PS
10/26/15 20:27	60	ICV 160-223581/1		223581			PS
06/24/16 16:15	960	ICB 160-258055/1		258055			PS
06/27/16 12:25	60	CCV 160-258292/1		258292			PS

Alpha Spectroscopy Run Log

Detector: AV166 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/08/16 08:47	1	PULSER 160-259876/1		259876			ALD
07/08/16 12:38	400	160-17797-13	WR111-REF-011-SS-DUI -00	259876	257496	A-01-R	ALD

Detector: AV167

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 19:04	140	IC 160-223464/1		223464			PS
10/26/15 20:27	60	ICV 160-223582/1		223582			PS
06/24/16 16:15	960	ICB 160-258056/1		258056			PS
06/27/16 12:04	60	CCV 160-258293/1		258293			PS
07/08/16 08:47	1	PULSER 160-259877/1		259877			ALD
07/08/16 12:38	400	160-17797-14	WR111-REF-012-SS-P-0(	259877	257496	A-01-R	ALD

Detector: AV170

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 18:59	140	IC 160-223467/1		223467			PS
10/26/15 20:28	60	ICV 160-223585/1		223585			PS
06/26/16 17:10	960	ICB 160-258135/1		258135			PS
06/27/16 12:05	60	CCV 160-258296/1		258296			PS
07/08/16 08:47	1	PULSER 160-259880/1		259880			ALD
07/08/16 12:38	400	160-17797-15	WR111-REF-013-SS-P-0(	259880	257496	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
06/24/16 16:15	960	ICB 160-258060/1		258060			PS
06/27/16 12:05	60	CCV 160-258297/1		258297			PS
07/08/16 08:47	1	PULSER 160-259881/1		259881			ALD
07/08/16 12:38	400	160-17797-16	WR111-REF-014-SS-P-0(	259881	257496	A-01-R	ALD

Detector: AV173

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/16/15 19:04	140	IC 160-223470/1		223470			PS
10/26/15 20:29	60	ICV 160-223588/1		223588			PS
06/24/16 16:15	960	ICB 160-258062/1		258062			PS
06/27/16 12:06	60	CCV 160-258299/1		258299			PS
07/08/16 08:47	1	PULSER 160-259883/1		259883			ALD
07/08/16 12:38	400	160-17797-18	WR111-REF-016-SS-P-0(	259883	257496	A-01-R	ALD

Detector: AV191

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223488/1		223488			PS
11/01/15 14:23	60	ICV 160-223606/1		223606			
11/01/15 18:11	60	ICV 160-223606/2		223606			PS
06/26/16 17:10	960	ICB 160-258139/1		258139			PS
06/28/16 09:29	60	CCV 160-258354/1		258354			PS

Alpha Spectroscopy Run Log

Detector: AV191 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/11/16 09:24	1	PULSER 160-260076/1		260076			ALD
07/11/16 11:38	240	ZZZZZ		260076			
07/11/16 19:29	400	MB 160-257496/1-A		260076	257496	A-01-R	ALD

Detector: AV194

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:13	140	IC 160-223491/1		223491			PS
11/01/15 14:24	60	ICV 160-223609/1		223609			PS
06/24/16 16:15	960	ICB 160-258075/1		258075			PS
06/27/16 13:49	60	CCV 160-258306/1		258306			PS
07/11/16 09:24	1	PULSER 160-260077/1		260077			ALD
07/11/16 11:38	240	ZZZZZ		260077			
07/11/16 19:29	400	160-17797-1 DU	WR111-REF-001-SS-P-0(DU	260077	257496	A-01-R	ALD

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
06/24/16 16:15	960	ICB 160-258078/1		258078			PS
06/27/16 13:50	60	CCV 160-258307/1		258307			PS
07/11/16 09:24	1	PULSER 160-260078/1		260078			ALD
07/11/16 11:38	240	ZZZZZ		260078			
07/11/16 19:29	400	160-17797-2	WR111-REF-001-SS-DUI -00	260078	257496	A-01-R	ALD

Detector: AV200

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:15	140	IC 160-223497/1		223497			PS
11/01/15 14:26	60	ICV 160-223615/1		223615			PS
06/24/16 16:15	960	ICB 160-258080/1		258080			PS
06/27/16 13:50	60	CCV 160-258309/1		258309			PS
07/11/16 09:24	1	PULSER 160-260080/1		260080			ALD
07/11/16 11:38	240	ZZZZZ		260080			
07/11/16 19:29	400	160-17797-7	WR111-REF-006-SS-P-0(	260080	257496	A-01-R	ALD

Detector: AV202

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/17/15 18:20	140	IC 160-223499/1		223499			PS
11/01/15 14:26	60	ICV 160-223617/1		223617			PS
06/26/16 17:10	960	ICB 160-258145/1		258145			PS
06/27/16 13:51	60	CCV 160-258310/1		258310			PS
07/11/16 09:24	1	PULSER 160-260081/1		260081			ALD
07/11/16 11:38	240	ZZZZZ		260081			
07/11/16 19:29	400	160-17797-11	WR111-REF-010-SS-P-0(	260081	257496	A-01-R	ALD

Alpha Spectroscopy Run Log

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
06/24/16 16:15	960	ICB 160-258083/1		258083			PS
06/27/16 15:16	60	CCV 160-258311/1		258311			PS
07/11/16 09:24	1	PULSER 160-260082/1		260082			ALD
07/11/16 11:38	240	ZZZZZ		260082			
07/11/16 19:29	400	160-17797-17	WR111-REF-015-SS-P-0(	260082	257496	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
06/24/16 16:15	960	ICB 160-258084/1		258084			PS
06/27/16 15:04	60	CCV 160-258312/1		258312			PS
07/11/16 09:24	1	PULSER 160-260083/1		260083			ALD
07/11/16 11:38	240	ZZZZZ		260083			
07/11/16 19:29	400	160-17797-19	WR111-REF-017-SS-P-0(	260083	257496	A-01-R	ALD

GAMMA SPECTROSCOPY

Method 901.1
Ra-226

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

Prep Batch: 257318

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 257318

Lab ID: MB 160-257318/1-A Analyzed: 07/12/16 10:01 Ts: 30 Sigma: 2
Client ID: Detector: GV12 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	0.009406	0.0172	0.0173	U	pCi/g	0.500	0.284	260174

Lab ID: LCS 160-257318/2-A Analyzed: 07/12/16 09:59 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	99.51	1.56	10.4		pCi/g		1.13	260175
Cesium-137	29.46	0.673	3.14		pCi/g		0.226	260175
Cobalt-60	16.65	0.409	1.72		pCi/g		0.0983	260175

Lab ID: 160-17797-1 Analyzed: 07/12/16 10:00 Ts: 30 Sigma: 2
Client ID: WR111-REF-001-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.30	0.247	0.282		pCi/g	0.500	0.251	260176

Lab ID: 160-17797-1 DU Analyzed: 07/12/16 09:25 Ts: 30 Sigma: 2
Client ID: WR111-REF-001-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.415	0.245	0.286		pCi/g	0.500	0.249	260175

Lab ID: 160-17797-2 Analyzed: 07/12/16 09:56 Ts: 30 Sigma: 2
Client ID: WR111-REF-001-SS-DUP-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.69	0.322	0.367		pCi/g	0.500	0.225	260173

Lab ID: 160-17797-3 Analyzed: 07/12/16 09:58 Ts: 30 Sigma: 2
Client ID: WR111-REF-002-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.24	0.224	0.259		pCi/g	0.500	0.159	260170

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 257318

Lab ID: 160-17797-4 Analyzed: 07/12/16 09:57 Ts: 30 Sigma: 2
Client ID: WR111-REF-003-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.47	0.258	0.300		pCi/g	0.500	0.149	260172

Lab ID: 160-17797-5 Analyzed: 07/12/16 10:33 Ts: 30 Sigma: 2
Client ID: WR111-REF-004-SS-P-00 Detector: GV3 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.30	0.259	0.292		pCi/g	0.500	0.216	260169

Lab ID: 160-17797-6 Analyzed: 07/12/16 10:34 Ts: 30 Sigma: 2
Client ID: WR111-REF-005-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.58	0.297	0.339		pCi/g	0.500	0.209	260172

Lab ID: 160-17797-7 Analyzed: 07/12/16 10:33 Ts: 30 Sigma: 2
Client ID: WR111-REF-006-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.62	0.256	0.306		pCi/g	0.500	0.148	260170

Lab ID: 160-17797-8 Analyzed: 07/12/16 10:39 Ts: 30 Sigma: 2
Client ID: WR111-REF-007-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.74	0.271	0.326		pCi/g	0.500	0.143	260173

Lab ID: 160-17797-9 Analyzed: 07/12/16 11:32 Ts: 30 Sigma: 2
Client ID: WR111-REF-008-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.47	0.247	0.291		pCi/g	0.500	0.231	260174

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 257318

Lab ID: 160-17797-10 Analyzed: 07/12/16 10:40 Ts: 30 Sigma: 2
Client ID: WR111-REF-009-SS-P-00 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.35	0.254	0.290		pCi/g	0.500	0.209	260176

Lab ID: 160-17797-11 Analyzed: 07/12/16 12:20 Ts: 30 Sigma: 2
Client ID: WR111-REF-010-SS-P-00 Detector: GV16 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.62	0.322	0.363		pCi/g	0.500	0.252	260175

Lab ID: 160-17797-12 Analyzed: 07/12/16 11:27 Ts: 30 Sigma: 2
Client ID: WR111-REF-011-SS-P-00 Detector: GV3 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.44	0.234	0.278		pCi/g	0.500	0.179	260169

Lab ID: 160-17797-13 Analyzed: 07/12/16 11:28 Ts: 30 Sigma: 2
Client ID: WR111-REF-011-SS-DUP-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.18	0.292	0.317		pCi/g	0.500	0.255	260172

Lab ID: 160-17797-14 Analyzed: 07/12/16 11:29 Ts: 30 Sigma: 2
Client ID: WR111-REF-012-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.16	0.221	0.252		pCi/g	0.500	0.166	260170

Lab ID: 160-17797-15 Analyzed: 07/12/16 12:18 Ts: 30 Sigma: 2
Client ID: WR111-REF-013-SS-P-00 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.62	0.309	0.351		pCi/g	0.500	0.217	260173

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 257318

Lab ID: 160-17797-16 Analyzed: 07/12/16 12:14 Ts: 30 Sigma: 2
Client ID: WR111-REF-014-SS-P-00 Detector: GV3 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.48	0.321	0.356		pCi/g	0.500	0.277	260169

Lab ID: 160-17797-17 Analyzed: 07/12/16 12:16 Ts: 30 Sigma: 2
Client ID: WR111-REF-015-SS-P-00 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.49	0.367	0.398		pCi/g	0.500	0.312	260172

Lab ID: 160-17797-18 Analyzed: 07/12/16 12:16 Ts: 30 Sigma: 2
Client ID: WR111-REF-016-SS-P-00 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.34	0.230	0.269		pCi/g	0.500	0.155	260170

Lab ID: 160-17797-19 Analyzed: 07/12/16 12:21 Ts: 30 Sigma: 2
Client ID: WR111-REF-017-SS-P-00 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	LOQ	MDC	Anly Batch
Radium-226	1.55	0.305	0.345		pCi/g	0.500	0.249	260174

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 160-257318/1-A	Radium-226			0.009406	U	pCi/g							1.08964166

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-257318/2-A	Americium-241		97.1	99.51		pCi/g	102	87 - 116					.3286939377
LCS 160-257318/2-A	Cesium-137		29.6	29.46		pCi/g	100	87 - 120					-.0594747997
LCS 160-257318/2-A	Cobalt-60		16.9	16.65		pCi/g	98	87 - 115					-.2306063569

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-17797-1	Radium-226	1.30		1.415		pCi/g			9	0.21	0.59	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-17797-1

SDG No.:

Batch Number: 257318 Batch Start Date: 06/21/16 13:11 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 06/21/16 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-257318/1		Fill_Geo-21, 901.1				291.18 g	6/21/2016	7/12/2016	Tuna Can
LCS 160-257318/2		Fill_Geo-21, 901.1				341.9 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-1-A	WR111-REF-001-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	338.6 g	292.5 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-1-A DU	WR111-REF-001-SS-P-00	Fill_Geo-21, 901.1	T	46.1 g	338.6 g	292.5 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-2-A	WR111-REF-001-SS-DUP-00	Fill_Geo-21, 901.1	T	47.0 g	333.2 g	286.2 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-3-A	WR111-REF-002-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	344.4 g	297.7 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-4-A	WR111-REF-003-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	344.0 g	297.4 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-5-A	WR111-REF-004-SS-P-00	Fill_Geo-21, 901.1	T	46.8 g	337.2 g	290.4 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-6-A	WR111-REF-005-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	322.6 g	275.9 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-7-A	WR111-REF-006-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	329.7 g	283.3 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-8-A	WR111-REF-007-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	322.3 g	275.9 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-9-A	WR111-REF-008-SS-P-00	Fill_Geo-21, 901.1	T	46.6 g	304.5 g	257.9 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-10-A	WR111-REF-009-SS-P-00	Fill_Geo-21, 901.1	T	46.2 g	349.1 g	302.9 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-11-A	WR111-REF-010-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	317.5 g	271.1 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-12-A	WR111-REF-011-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	329.8 g	283.5 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-13-A	WR111-REF-011-SS-DUP-00	Fill_Geo-21, 901.1	T	46.5 g	323.6 g	277.1 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-14-A	WR111-REF-012-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	330.4 g	283.7 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-15-A	WR111-REF-013-SS-P-00	Fill_Geo-21, 901.1	T	46.3 g	322.5 g	276.2 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-16-A	WR111-REF-014-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	299.0 g	252.6 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-17-A	WR111-REF-015-SS-P-00	Fill_Geo-21, 901.1	T	46.4 g	341.1 g	294.7 g	6/21/2016	7/12/2016	Tuna Can
160-17797-A-18-A	WR111-REF-016-SS-P-00	Fill_Geo-21, 901.1	T	46.5 g	324.4 g	277.9 g	6/21/2016	7/12/2016	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.: 160-17797-1

SDG No.:

Batch Number: 257318 Batch Start Date: 06/21/16 13:11 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 06/21/16 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
160-17797-A-19-A	WR111-REF-017-SS-P-00	Fill_Geo-21, 901.1	T	46.7 g	298.3 g	251.6 g	6/21/2016	7/12/2016	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
MB 160-257318/1		Fill_Geo-21, 901.1							
LCS 160-257318/2		Fill_Geo-21, 901.1		# g					
160-17797-A-1-A	WR111-REF-001-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-1-A DU	WR111-REF-001-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-2-A	WR111-REF-001-SS-DUP-00	Fill_Geo-21, 901.1	T						
160-17797-A-3-A	WR111-REF-002-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-4-A	WR111-REF-003-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-5-A	WR111-REF-004-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-6-A	WR111-REF-005-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-7-A	WR111-REF-006-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-8-A	WR111-REF-007-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-9-A	WR111-REF-008-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-10-A	WR111-REF-009-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-11-A	WR111-REF-010-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-12-A	WR111-REF-011-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-13-A	WR111-REF-011-SS-DUP-00	Fill_Geo-21, 901.1	T						
160-17797-A-14-A	WR111-REF-012-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-15-A	WR111-REF-013-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.: 160-17797-1

SDG No.:

Batch Number: 257318 Batch Start Date: 06/21/16 13:11 Batch Analyst: Sloan, Robert 1

Batch Method: Fill_Geo-21 Batch End Date: 06/21/16 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00005					
160-17797-A-16-A	WR111-REF-014-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-17-A	WR111-REF-015-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-18-A	WR111-REF-016-SS-P-00	Fill_Geo-21, 901.1	T						
160-17797-A-19-A	WR111-REF-017-SS-P-00	Fill_Geo-21, 901.1	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

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

Test America St. Louis Spectrum ID: 12_Gamma_20161453

Sample Description: 257318_Gamma_MB 160-257318~1-A
Detector: Detector #12
Batch ID: 257318
Work Order Number: Gamma
Lot Number: MB 160-257318~1-A

Decay to Time: 7/12/2016 10:01 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:01:40 Real Time: 1810 sec
Analysis Time: 7/12/2016 10:33 Dead Time: 0.53 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCanCal_90099_100212
Efficiency Cal Date: 10/4/2012 09:05
Energy Cal Date: 2/28/2012 13:26
Library: Client_Long_Rev11.lib
Bkgd Correction File: 12_2016-07-10_1414.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	1.681E+00	110.5	1.857E+00	1.859E+00	6.427E+00
NA-22	-5.823E-01	64.8	3.773E-01	3.785E-01	1.243E+00
K-40	3.246E+00	73.0	2.371E+00	2.376E+00	7.749E+00
Sc-46	-3.562E-01	96.5	3.438E-01	3.443E-01	1.174E+00
CR-51	1.513E+00	180.1	2.725E+00	2.726E+00	9.351E+00
MN-54	-2.804E-02	698.2	1.958E-01	1.958E-01	5.374E-01
FE-59	-1.134E+00	26.5	3.001E-01	3.054E-01	2.226E+00
Co-56	4.335E-03	371.7	1.612E-02	1.612E-02	3.135E-01
CO-57	9.890E-02	190.9	1.888E-01	1.889E-01	4.719E-01
CO-58	-1.861E-01	174.3	3.244E-01	3.245E-01	1.141E+00
CO-60	1.050E-01	44.5	4.671E-02	4.701E-02	8.319E-01
ZN-65	0.000E+00	1.#INF	2.074E-01	2.074E-01	2.442E+00
NB-94	1.285E-01	82.5	1.059E-01	1.061E-01	7.607E-01
ZR-95	5.509E-01	37.8	2.085E-01	2.104E-01	5.287E-01
NB-95	1.975E-01	114.9	2.269E-01	2.271E-01	7.957E-01
RU-103	-2.106E-01	147.7	3.110E-01	3.112E-01	7.707E-01
RH-106	0.000E+00	1.#INF	4.811E-01	4.812E-01	1.380E+01
AG-108M	2.880E-02	562.7	1.621E-01	1.621E-01	4.576E-01
AG-110M	3.507E-02	330.5	1.159E-01	1.159E-01	1.255E+00
SN-113	-3.567E-01	118.6	4.230E-01	4.234E-01	1.443E+00
SB-124	7.453E-02	514.2	3.832E-01	3.832E-01	1.342E+00
SB-125	-1.192E+00	94.5	1.126E+00	1.128E+00	2.805E+00
I-131	3.247E-01	99.9	3.243E-01	3.247E-01	6.644E-01
Gd-153	3.840E-01	103.0	3.954E-01	3.961E-01	1.566E+00
Ga-68	-1.957E+01	89.5	1.751E+01	1.754E+01	3.866E+01
Tc-99m	1.114E-01	196.9	2.194E-01	2.195E-01	7.502E-01
BA-133	1.498E-01	165.9	2.485E-01	2.487E-01	6.638E-01
CS-134	9.229E-01	26.9	2.486E-01	2.532E-01	1.375E+00
CS-137	-2.952E-01	170.7	5.039E-01	5.041E-01	1.042E+00
CE-139	-3.566E-02	487.6	1.739E-01	1.739E-01	6.133E-01
Ba-140	5.283E-01	150.4	7.944E-01	7.948E-01	2.054E+00
La-140	1.422E-01	106.2	1.510E-01	1.512E-01	5.370E-01
CE-141	2.040E-01	208.2	4.247E-01	4.248E-01	1.451E+00

CE-144	9.065E-01	191.4	1.735E+00	1.735E+00	5.919E+00
PM-144	9.893E-02	250.6	2.479E-01	2.480E-01	6.287E-01
EU-152	1.870E+00	22.4	4.181E-01	4.293E-01	2.254E+00
EU-154	-2.009E+00	113.0	2.270E+00	2.273E+00	7.905E+00
EU-155	3.459E-01	140.7	4.866E-01	4.869E-01	2.718E+00
HF-181	1.998E-01	165.3	3.303E-01	3.304E-01	9.075E-01
Ta-182	7.192E-02	639.3	4.598E-01	4.598E-01	3.554E+00
Hg-203	-1.316E-01	101.2	1.331E-01	1.333E-01	6.998E-01
TL-208	3.231E-01	46.1	1.489E-01	1.498E-01	4.997E-01
pm-146	2.521E-01	100.9	2.544E-01	2.548E-01	1.479E+00
y-88	5.451E-01	24.3	1.327E-01	1.356E-01	3.495E-01
Cd-113m	1.640E+03	133.5	2.189E+03	2.192E+03	7.658E+03
Cd-109	-2.468E+00	233.0	5.749E+00	5.750E+00	1.963E+01
Cf-251	-3.330E-01	273.3	9.100E-01	9.104E-01	2.454E+00
Cf-249	9.579E-02	371.9	3.563E-01	3.563E-01	1.257E+00
Sn-126	1.595E+00	132.4	2.112E+00	2.114E+00	7.204E+00
PB-210	-1.118E+01	69.0	7.718E+00	7.745E+00	2.805E+01
PB-212	2.677E-01	101.1	2.706E-01	2.712E-01	8.574E-01
PB-214	-3.290E-02	1263.9	4.158E-01	4.158E-01	1.515E+00
BI-207	-2.660E-02	225.1	5.987E-02	5.989E-02	7.642E-01
BI-212	2.166E+00	164.4	3.560E+00	3.562E+00	1.256E+01
BI-214	1.013E-01	91.6	9.285E-02	9.300E-02	3.058E+00
BI-210M	-3.310E-02	780.7	2.584E-01	2.584E-01	9.805E-01
AC-228	0.000E+00	1.#INF	2.191E-01	2.191E-01	2.703E+00
TH-227	2.587E+00	138.8	3.592E+00	3.595E+00	1.225E+01
TH-229	-2.179E+00	130.9	2.852E+00	2.857E+00	1.152E+01
TH-234	-7.803E+00	92.2	7.197E+00	7.208E+00	2.552E+01
PA-231	0.000E+00	1.#INF	1.991E+00	1.991E+00	3.421E+01
PA-233	0.000E+00	1.#INF	2.439E-01	2.439E-01	2.794E+00
PA-234	6.156E-01	159.0	9.785E-01	9.791E-01	3.336E+00
PA-234M	0.000E+00	1.#INF	5.767E+00	5.767E+00	1.578E+02
U-235	8.163E-01	132.5	1.082E+00	1.083E+00	6.282E+00
AM-241	6.015E-01	125.6	7.553E-01	7.559E-01	2.557E+00
Np-237	9.664E-01	133.2	1.287E+00	1.288E+00	4.386E+00
Ir-192	0.000E+00	1.#INF	6.792E-02	6.792E-02	1.167E+00
Cs-136	3.226E-01	95.6	3.085E-01	3.091E-01	1.055E+00
Np-239	-5.629E-01	158.0	8.891E-01	8.898E-01	3.019E+00
Nd-147	7.721E-02	1811.1	1.398E+00	1.398E+00	3.805E+00
Total	1.666E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_MB 160-257318~1-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161453.An1

Acquisition information
Start time: 7/12/2016 10:01:40 AM
Live time: 1800
Real time: 1810
Dead time: 0.53 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/12/2016 10:01:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2016-07-10_1414.PBC 7/10/2016 2:14:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2819

***** 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	-19.	69.03	0.89	2.229E-02	46.54	4.250	PBC<MDA	PB210
50.14	9.	138.85	0.89	2.496E-02	50.14	8.000	PBC<MDA	TH227
59.54	12.	125.58	0.90	3.122E-02	59.54	35.900	PBC<MDA	AM241
63.29	-18.	92.23	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
64.28	9.	132.42	0.91	3.392E-02	64.28	9.700	PBC<MDA	Sn126
80.99	8.	107.07	0.92	4.091E-02	80.99	34.060	PBC<MDA	BA133
86.49	10.	133.16	0.93	4.242E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.122E-01	EU155
					86.94	9.040	1.397E+00	Sn126
86.54	10.	140.68	0.93	4.243E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.124E-01	EU155
					86.94	9.040	1.397E+00	Sn126
92.59	-21.	60.47	0.93	4.369E-02	92.59	5.584	PBC<MDA	TH234
93.35	6.	118.97	0.93	4.382E-02	93.35	5.561	PBC<MDA	AC228
97.50	8.	137.23	0.94	4.443E-02	97.50	30.000	PBC<MDA	Gd153
99.50	8.	145.78	0.94	4.467E-02	99.50	15.000	PBC<MDA	Np239
103.20	8.	153.55	0.94	4.502E-02	103.20	21.800	PBC<MDA	Gd153
103.70	8.	161.38	0.94	4.505E-02	103.70	24.000	PBC<MDA	Np239
105.31	4.	315.38	0.95	4.516E-02	105.31	21.200	PBC<MDA	EU155
121.78	22.	35.79	0.96	4.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.154E-01	CO57
131.29	9.	158.96	0.97	4.468E-02	131.29	18.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
133.02	9.	165.32	0.97	4.453E-02	133.02	43.300	PBC<MDA	HF181
133.54	8.	191.36	0.97	4.448E-02	133.54	11.090	PBC<MDA	CE144
136.30	9.	177.76	0.98	4.422E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.055E+00	CO57
136.47	8.	190.87	0.98	4.420E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	8.916E-01	CO57
140.51	8.	196.91	0.98	4.377E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	4.	439.63	0.98	4.338E-02	143.79	10.960	PBC<MDA	U235
145.44	8.	208.18	0.98	4.318E-02	145.44	48.200	PBC<MDA	CE141
163.38	6.	132.53	1.00	4.061E-02	163.38	5.080	PBC<MDA	U235
224.72	15.	30.55	0.74	3.351E-02				
238.33	7.	101.10	1.32	3.220E-02	238.63	43.300	PBC<MDA	PB212
242.00	8.	149.96	1.07	3.189E-02	242.00	7.430	PBC<MDA	PB214
263.70	5.	133.46	1.09	3.010E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	12.	46.07	1.11	2.910E-02	277.28	6.310	PBC<MDA	TL208
284.30	7.	121.71	1.11	2.861E-02	284.30	6.140	PBC<MDA	I131
300.03	8.	164.11	1.13	2.757E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
320.08	7.	180.07	1.15	2.638E-02	320.08	9.940	PBC<MDA	CR51
328.76	8.	106.23	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
344.29	4.	195.31	1.17	2.508E-02	344.29	26.500	PBC<MDA	EU152
345.83	2.	503.19	1.17	2.500E-02	345.83	15.070	PBC<MDA	HF181
356.00	4.	165.93	1.18	2.450E-02	356.00	62.050	PBC<MDA	BA133
383.84	8.	109.69	1.20	2.325E-02	383.84	8.940	PBC<MDA	BA133
387.95	3.	371.91	1.21	2.307E-02	387.95	66.000	PBC<MDA	Cf249
433.94	1.	562.73	1.25	2.132E-02	433.94	90.480	PBC<MDA	AG108M
453.88	6.	100.92	1.27	2.065E-02	453.88	65.000	PBC<MDA	pm146
463.37	1.	496.33	1.28	2.035E-02	463.37	10.470	PBC<MDA	SB125
477.60	6.	110.47	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
482.00	1.	716.60	1.29	1.978E-02	482.00	80.500	PBC<MDA	HF181
511.86	31.	51.28	2.57	1.895E-02	511.86	20.000	4.496E+00	RH106
537.26	4.	150.37	1.34	1.829E-02	537.26	24.390	PBC<MDA	Ba140
569.32	4.	136.93	1.37	1.754E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.545E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.02	2.	175.76	1.38	1.724E-02	583.02	84.500	PBC<MDA	TL208
600.50	7.	131.96	1.40	1.687E-02	600.50	17.860	PBC<MDA	SB125
602.73	2.	514.17	1.40	1.683E-02	602.73	98.260	PBC<MDA	SB124
609.31	-6.	189.81	1.41	1.669E-02	609.31	46.090	PBC<MDA	BI214
636.97	7.	99.87	1.43	1.616E-02	636.97	7.170	PBC<MDA	I131
657.76	2.	330.45	1.45	1.578E-02	657.76	94.640	PBC<MDA	AG110M
696.54	3.	250.62	1.48	1.513E-02	696.54	99.000	PBC<MDA	PM144
702.63	1.	800.00	1.49	1.503E-02	702.63	97.900	PBC<MDA	NB94
727.17	4.	164.36	1.51	1.465E-02	727.17	7.550	PBC<MDA	BI212
735.72	5.	146.39	1.51	1.452E-02	735.72	22.500	PBC<MDA	pm146
756.73	8.	37.84	1.53	1.422E-02	756.73	54.460	5.509E-01	ZR95
765.79	5.	114.89	1.54	1.410E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	6.707E+01	PA234M
778.92	4.	184.30	1.55	1.392E-02	778.92	12.940	PBC<MDA	EU152
801.95	24.	26.93	1.57	1.362E-02	801.95	8.690	1.147E+01	CS134
818.50	8.	95.65	1.58	1.341E-02	818.50	100.000	PBC<MDA	Cs136
871.10	5.	82.46	1.63	1.279E-02	871.10	99.890	PBC<MDA	NB94
880.53	5.	107.85	1.63	1.269E-02	880.53	6.000	PBC<MDA	PA234
898.04	10.	33.46	1.65	1.250E-02	898.04	93.700	4.582E-01	y88
964.11	5.	81.01	1.70	1.184E-02	964.11	14.605	PBC<MDA	EU152
1063.66	1.	501.66	1.78	1.099E-02	1063.66	74.500	PBC<MDA	BI207
1112.07	20.	22.36	1.82	1.061E-02	1112.07	13.644	7.672E+00	EU152
1120.29	-4.	106.80	1.83	1.055E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	6.	44.47	1.87	1.018E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	1.	796.87	1.88	1.008E-02	1189.05	16.200	PBC<MDA	Ta182
1238.28	1.	691.09	1.92	9.765E-03	1238.28	66.070	PBC<MDA	Co56
1460.83	5.	73.04	2.08	8.576E-03	1460.83	10.670	PBC<MDA	K40
1764.49	4.	91.63	2.30	7.376E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	8.	35.36	2.35	7.144E-03	1836.06	99.200	6.271E-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
897.97	224.72	2.	15.	4.476E+02	30.55	0.744	- 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	94.	-19.	-0.011	69.03	0.889s
TH-227	200.19	50.14	79.	9.	0.005	138.85	0.893s
AM-241	237.74	59.54	110.	12.	0.007	125.58	0.902s
TH-234	252.73	63.29	143.	-18.	-0.010	92.23	0.905
Sn-126	256.70	64.28	74.	9.	0.005	132.42	0.906
BA-133	323.48	80.99	23.	8.	0.005	107.07	0.922s
Np-237	345.47	86.49	78.	10.	0.005	133.16	0.928s
EU-155	345.68	86.54	88.	10.	0.005	140.68	0.928s
Sn-126	347.27	86.94	150.	-13.	-0.007	137.18	0.928s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	349.78	87.57	142.	-17.	-0.010	96.83	0.929s
Cd-109	351.66	88.04	137.	-7.	-0.004	232.96	0.929s
TH-234	369.85	92.59	88.	-21.	-0.012	60.47	0.934
AC-228	372.88	93.35	27.	6.	0.004	118.97	0.934s
Gd-153	389.47	97.50	56.	8.	0.004	137.23	0.938s
Np-239	397.47	99.50	64.	8.	0.004	145.78	0.940s
Gd-153	412.25	103.20	72.	8.	0.004	153.55	0.944s
Np-239	414.25	103.70	80.	8.	0.004	161.38	0.944s
EU-155	420.70	105.31	90.	4.	0.002	315.38	0.946s
Np-239	423.96	106.13	130.	-10.	-0.006	157.97	0.946s
EU-152	486.50	121.78	20.	22.	0.012	35.79	0.961s
CO-57	487.64	122.06	42.	0.	0.000	1000.00	0.962s
EU-154	491.79	123.10	48.	-8.	-0.005	124.61	0.963s
PA-234	524.55	131.29	96.	9.	0.005	158.96	0.970s
HF-181	531.46	133.02	105.	9.	0.005	165.32	0.972s
CE-144	533.51	133.54	114.	8.	0.004	191.36	0.973s
HF-181	544.55	136.30	122.	9.	0.005	177.76	0.975s
CO-57	545.24	136.47	101.	8.	0.004	190.87	0.975s
Tc-99m	561.38	140.51	108.	8.	0.004	196.91	0.979s
U-235	574.47	143.79	120.	4.	0.002	439.63	0.982
CE-141	581.09	145.44	123.	8.	0.004	208.18	0.984s
Ba-140	649.91	162.66	70.	-12.	-0.006	106.58	1.000s
U-235	652.79	163.38	31.	6.	0.003	132.53	1.001s
CE-139	662.68	165.85	51.	-2.	-0.001	487.64	1.003s
Cf-251	705.64	176.60	33.	-4.	-0.002	273.29	1.013s
TH-229	773.22	193.51	44.	-6.	-0.004	130.87	1.029s
U-235	820.49	205.33	52.	-12.	-0.006	73.15	1.040
TH-229	842.54	210.85	29.	-8.	-0.005	126.43	1.046s
Cf-251	907.10	227.00	42.	-9.	-0.005	106.87	1.061s
PB-212	952.39	238.33	16.	7.	0.004	101.10	1.320s
PB-214	967.05	242.00	60.	8.	0.004	149.96	1.075s
EU-152	977.83	244.69	74.	-7.	-0.004	94.04	1.077s
TH-227	1023.99	256.24	33.	-7.	-0.004	158.11	1.088s
Cd-113m	1053.81	263.70	23.	5.	0.003	133.46	1.095s
BI-210M	1062.33	265.83	26.	-1.	0.000	780.66	1.097s
TL-208	1108.11	277.28	9.	12.	0.007	46.07	1.107s
Hg-203	1115.78	279.20	34.	-6.	-0.003	101.18	1.109s
I-131	1136.16	284.30	19.	7.	0.004	121.71	1.114s
PB-212	1199.05	300.03	88.	8.	0.005	164.11	1.128
PA-233	1199.65	300.18	97.	0.	0.000	1000.00	1.128s
PA-231	1209.52	302.65	97.	0.	0.000	1000.00	1.131s
BA-133	1210.33	302.85	97.	0.	0.000	1000.00	1.131s
Ba-140	1218.32	304.85	97.	0.	0.000	1000.00	1.133s
BI-210M	1218.50	304.90	97.	0.	0.000	1000.00	1.133s
Ir-192	1232.67	308.44	97.	0.	0.000	1000.00	1.136s
PA-233	1246.95	312.01	97.	0.	0.000	1000.00	1.139s
Ir-192	1264.85	316.49	97.	0.	0.000	1000.00	1.143s
CR-51	1279.22	320.08	79.	7.	0.004	180.07	1.147s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1313.91	328.76	29.	8.	0.004	106.23	1.155s
Cf-249	1332.62	333.44	51.	-10.	-0.005	106.89	1.159s
Cs-136	1361.13	340.57	46.	0.	0.000	1000.00	1.165s
EU-152	1375.98	344.29	27.	4.	0.002	195.31	1.169s
HF-181	1382.15	345.83	34.	2.	0.001	503.19	1.170s
BA-133	1422.81	356.00	11.	4.	0.002	165.93	1.180s
I-131	1456.73	364.48	20.	-3.	-0.002	297.52	1.187s
BA-133	1534.13	383.84	38.	8.	0.005	109.69	1.205s
Cf-249	1550.56	387.95	46.	3.	0.001	371.91	1.209s
SN-113	1565.51	391.69	58.	-9.	-0.005	118.58	1.212s
SB-125	1710.19	427.88	40.	-14.	-0.008	94.48	1.245s
AG-108M	1734.43	433.94	8.	1.	0.001	562.73	1.250s
pm-146	1814.18	453.88	8.	6.	0.003	100.92	1.268s
SB-125	1852.11	463.37	23.	1.	0.001	496.33	1.277s
Ir-192	1870.88	468.06	23.	-1.	-0.001	685.57	1.281s
BE-7	1909.00	477.60	21.	6.	0.004	110.47	1.289s
HF-181	1926.61	482.00	25.	1.	0.001	716.60	1.293s
La-140	1946.69	487.02	28.	-1.	-0.001	754.98	1.298s
RU-103	1986.82	497.05	22.	-7.	-0.004	147.69	1.307s
RH-106	2046.04	511.86	33.	31.	0.017	51.28	2.570s
Ba-140	2147.60	537.26	9.	4.	0.002	150.37	1.342s
CS-134	2251.48	563.24	13.	-5.	-0.003	153.84	1.365s
CS-134	2275.81	569.32	13.	4.	0.002	136.93	1.370s
PA-234	2276.41	569.47	17.	0.	0.000	1000.00	1.370s
BI-207	2277.34	569.70	20.	-3.	-0.002	225.12	1.371s
TL-208	2330.60	583.02	5.	2.	0.001	175.76	1.382s
SB-125	2400.51	600.50	38.	7.	0.004	131.96	1.398s
SB-124	2409.43	602.73	64.	2.	0.001	514.17	1.399s
CS-134	2417.34	604.71	66.	0.	0.000	1000.00	1.401s
BI-214	2435.75	609.31	72.	-6.	-0.004	189.81	1.405
RU-103	2439.69	610.30	66.	0.	0.000	1000.00	1.406s
AG-108M	2455.62	614.28	66.	0.	0.000	1000.00	1.410s
PM-144	2470.74	618.06	66.	0.	0.000	1000.00	1.413s
RH-106	2486.16	621.92	66.	0.	0.000	1000.00	1.416s
SB-125	2542.05	635.89	22.	-11.	-0.006	66.46	1.428s
I-131	2546.39	636.97	21.	7.	0.004	99.87	1.429s
AG-110M	2629.52	657.76	14.	2.	0.001	330.45	1.447s
CS-137	2645.12	661.66	23.	-7.	-0.004	170.70	1.451s
PM-144	2784.64	696.54	9.	3.	0.001	250.62	1.481s
NB-94	2808.99	702.63	14.	1.	0.001	800.00	1.486s
SB-124	2889.61	722.79	15.	-4.	-0.002	145.77	1.503s
AG-108M	2890.22	722.94	19.	0.	0.000	1000.00	1.503s
EU-154	2891.89	723.36	19.	0.	0.000	1000.00	1.503s
ZR-95	2895.26	724.20	28.	-11.	-0.006	114.24	1.504s
BI-212	2907.15	727.17	23.	4.	0.002	164.36	1.507s
pm-146	2941.34	735.72	9.	5.	0.003	146.39	1.514s
pm-146	2987.11	747.16	5.	-1.	0.000	821.18	1.524s
ZR-95	3025.38	756.73	0.	8.	0.004	37.84	1.532s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	3054.24	763.94	17.	-2.	-0.001	300.00	1.538s
NB-95	3061.63	765.79	14.	5.	0.003	114.89	1.539s
PA-234M	3064.12	766.41	22.	-6.	-0.003	117.85	1.540s
EU-152	3114.15	778.92	9.	4.	0.002	184.30	1.550s
BI-212	3140.15	785.42	14.	-8.	-0.005	36.84	1.556s
CS-134	3181.95	795.87	21.	-9.	-0.005	76.11	1.565s
CS-134	3206.28	801.95	9.	24.	0.014	26.93	1.570s
CO-58	3241.58	810.78	28.	-4.	-0.002	174.27	1.577s
La-140	3261.56	815.77	33.	0.	0.000	1000.00	1.581s
Cs-136	3272.49	818.50	24.	8.	0.004	95.65	1.583s
MN-54	3337.89	834.85	5.	-1.	0.000	698.21	1.597s
Co-56	3385.58	846.77	1.	-1.	0.000	371.74	1.607s
TL-208	3440.76	860.56	10.	-2.	-0.001	154.94	1.619s
NB-94	3482.90	871.10	6.	5.	0.003	82.46	1.627s
EU-154	3491.44	873.23	18.	-6.	-0.003	113.00	1.629s
PA-234	3520.64	880.53	10.	5.	0.003	107.85	1.635s
PA-234	3531.48	883.24	15.	0.	0.000	1000.00	1.637s
AG-110M	3537.26	884.68	15.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	26.	-8.	-0.004	96.51	1.642s
y-88	3590.70	898.04	0.	10.	0.005	33.46	1.649s
AC-228	3642.83	911.07	10.	0.	0.000	1000.00	1.660s
AG-110M	3748.54	937.49	30.	-14.	-0.008	88.12	1.682s
PA-234	3782.66	946.02	0.	0.	0.000	1000.00	1.688s
EU-152	3855.05	964.11	7.	5.	0.003	81.01	1.703s
AC-228	3874.49	968.97	30.	-10.	-0.006	81.34	1.707s
EU-154	3983.96	996.33	21.	-7.	-0.004	100.00	1.729s
PA-234M	4002.64	1001.00	28.	0.	0.000	1000.00	1.733s
EU-154	4017.76	1004.77	50.	-12.	-0.007	87.41	1.736s
Co-56	4150.07	1037.84	15.	-7.	-0.004	127.38	1.762s
Cs-136	4191.00	1048.07	0.	0.	0.000	1000.00	1.771s
RH-106	4200.17	1050.36	0.	0.	0.000	1000.00	1.772s
BI-207	4253.39	1063.66	5.	1.	0.001	501.66	1.783s
Ga-68	4308.37	1077.40	16.	-11.	-0.006	89.47	1.794s
FE-59	4395.81	1099.25	21.	-12.	-0.007	26.47	1.811s
EU-152	4447.13	1112.07	0.	20.	0.011	22.36	1.821s
ZN-65	4461.03	1115.55	20.	0.	0.000	1000.00	1.824s
BI-214	4480.00	1120.29	24.	-4.	-0.002	106.80	1.827s
Sc-46	4481.05	1120.55	20.	0.	0.000	1000.00	1.828s
Ta-182	4484.05	1121.30	20.	0.	0.000	1000.00	1.828s
CO-60	4691.91	1173.24	0.	6.	0.003	44.47	1.869
Ta-182	4755.20	1189.05	5.	1.	0.000	796.87	1.881s
Ta-182	4884.72	1221.41	11.	-4.	-0.002	209.09	1.906s
Co-56	4952.24	1238.28	6.	1.	0.000	691.09	1.919s
NA-22	5097.34	1274.53	16.	-10.	-0.006	64.81	1.946s
EU-154	5097.39	1274.54	26.	0.	0.000	1000.00	1.946s
CO-60	5329.39	1332.50	6.	-2.	-0.001	343.80	1.990s
AG-110M	5536.74	1384.30	0.	0.	0.000	1000.00	2.029s
EU-152	5631.64	1408.00	6.	-1.	0.000	846.32	2.046s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	5843.15	1460.83	5.	5.	0.003	73.04	2.085s
La-140	6385.21	1596.21	0.	0.	0.000	1000.00	2.182s
SB-124	6764.73	1690.98	0.	0.	0.000	1000.00	2.247s
BI-214	7059.14	1764.49	3.	4.	0.002	91.63	2.297s
Co-56	7086.61	1771.35	29.	-11.	-0.006	73.47	2.302s
y-88	7345.80	1836.06	0.	8.	0.004	35.36	2.345s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.6805E+00				5.31E+01	
			477.60	1.681E+00	?(	6.427E+00 1.10E+02	1.05E+01 G
NA-22	C	-5.8226E-01				9.50E+02	
			1274.53	-5.823E-01	?(	1.243E+00 6.48E+01	9.99E+01 G
K-40	N	3.2457E+00				4.66E+11	
			1460.83	3.246E+00	?(P	7.749E+00 7.30E+01	1.07E+01 G
Sc-46	F	-3.5625E-01				8.38E+01	
			889.28	-3.562E-01	?(	1.174E+00 9.65E+01	1.00E+02 G
			1120.55	0.000E+00	+	1.240E+00 1.00E+03	1.00E+02 G
CR-51	F	1.5134E+00				2.77E+01	
			320.08	1.513E+00	?(P	9.351E+00 1.80E+02	9.94E+00 G
MN-54	C	-2.8041E-02				3.12E+02	
			834.85	-2.804E-02	?(	5.374E-01 6.98E+02	1.00E+02 G
FE-59	F	-1.1337E+00				4.45E+01	
			1099.25	-1.134E+00	?(P	2.226E+00 2.65E+01	5.65E+01 G
			1291.60	-3.729E-02	% P	1.958E+00 2.07E+03	4.32E+01 G
Co-56	C	4.3353E-03				7.73E+01	
			846.77	-3.809E-02	?(P	3.135E-01 3.72E+02	9.99E+01 G
			1238.28	6.851E-02	?(P	1.233E+00 6.91E+02	6.61E+01 G
			1037.84	-2.458E+00	+	7.290E+00 1.27E+02	1.41E+01 G
			1771.35	-5.531E+00	+	1.357E+01 7.35E+01	1.55E+01 A
CO-57	C	9.8903E-02				2.72E+02	
			122.06	0.000E+00	?(	4.719E-01 1.00E+03	8.56E+01 G
			136.47	8.916E-01	?(	5.824E+00 1.91E+02	1.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.8612E-01					7.09E+01	
			810.78	-1.861E-01	?(	1.141E+00	1.74E+02	9.95E+01 G
CO-60	F	1.0503E-01					1.93E+03	
			1332.50	-1.004E-01	?(	8.319E-01	3.44E+02	1.00E+02 G
			1173.24	3.107E-01	?(P	4.025E-01	4.45E+01	9.99E+01 G
NB-94	I	1.2846E-01					7.41E+06	
			702.63	3.776E-02	?(	7.607E-01	8.00E+02	9.79E+01 G
			871.10	2.174E-01	?(	6.140E-01	8.25E+01	9.99E+01 G
ZR-95	I	5.5093E-01					6.40E+01	
			756.73	5.509E-01	?(P	5.287E-01	3.78E+01	5.45E+01 G
			724.20	-9.122E-01	- P	2.326E+00	1.14E+02	4.42E+01 G
NB-95	I	1.9748E-01					6.40E+01	
			765.79	1.975E-01	&(	7.957E-01	1.15E+02	9.98E+01 G
RU-103	I	-2.1056E-01					3.93E+01	
			497.05	-2.106E-01	?(	7.707E-01	1.48E+02	9.09E+01 G
			610.30	0.000E+00	+	2.351E+01	1.00E+03	5.75E+00 GA
AG-108M	C	2.8799E-02					1.53E+05	
			433.94	2.880E-02	?(	4.576E-01	5.63E+02	9.05E+01 G
			722.94	0.000E+00	-	9.569E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	1.512E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.5068E-02					2.50E+02	
			884.68	0.000E+00	?(	1.255E+00	1.00E+03	7.27E+01 G
			657.76	6.200E-02	?(	7.571E-01	3.30E+02	9.46E+01 G
			937.49	-1.914E+00	+	3.773E+00	8.81E+01	3.44E+01 G
			1384.30	0.000E+00	-	1.884E+00	1.00E+03	2.43E+01 G
			763.94	-3.532E-01	+	3.871E+00	3.00E+02	2.23E+01 G
SN-113	F	-3.5674E-01					1.15E+02	
			391.69	-3.567E-01	?(	1.443E+00	1.19E+02	6.40E+01 G
SB-124	F	7.4527E-02					6.02E+01	
			602.73	7.453E-02	?(P	1.342E+00	5.14E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.122E+00	1.00E+03	4.78E+01 G
			722.79	-1.397E+00	+	7.249E+00	1.46E+02	1.08E+01 G
SB-125	I	-1.1922E+00					1.01E+03	
			427.88	-1.192E+00	?(	2.805E+00	9.45E+01	2.96E+01 G
			600.50	1.267E+00	+	5.772E+00	1.32E+02	1.79E+01 G
			635.89	-3.371E+00	+	7.409E+00	6.65E+01	1.13E+01 G
			463.37	3.595E-01	+ P	6.486E+00	4.96E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	3.2470E-01					8.02E+00	
			364.48	-8.464E-02	?(	6.644E-01	2.98E+02	8.17E+01 G
			284.30	2.216E+00	?(P	7.281E+00	1.22E+02	6.14E+00 G
			636.97	3.369E+00	?(	1.157E+01	9.99E+01	7.17E+00 G
Gd-153	F	3.8398E-01					2.42E+02	
			97.50	3.327E-01	&(	1.566E+00	1.37E+02	3.00E+01 G
			103.20	4.545E-01	*(	2.392E+00	1.54E+02	2.18E+01 G
Ga-68	C	-1.9568E+01					4.71E-02	
			1077.40	-1.957E+01	?(	3.866E+01	8.95E+01	3.30E+00 G
Tc-99m	I	1.1141E-01					2.51E-01	
			140.51	1.114E-01	&(	7.502E-01	1.97E+02	8.93E+01 G
BA-133	F	1.4978E-01					3.85E+03	
			356.00	1.498E-01	?(	6.638E-01	1.66E+02	6.20E+01 G
			302.85	0.000E+00	-	5.377E+00	1.00E+03	1.83E+01 G
			383.84	2.239E+00	&	8.403E+00	1.10E+02	8.94E+00 GA
			80.99	3.379E-01	?	1.005E+00	1.07E+02	3.41E+01 GA
CS-134	I	9.2291E-01					7.54E+02	
			604.71	0.000E+00	?(	1.375E+00	1.00E+03	9.76E+01 G
			795.87	-4.469E-01	&	1.141E+00	7.61E+01	8.55E+01 G
			569.32	8.237E-01	?(	4.018E+00	1.37E+02	1.54E+01 G
			801.95	1.147E+01	?(	7.988E+00	2.69E+01	8.69E+00 G
			563.24	-1.882E+00	+	7.343E+00	1.54E+02	8.35E+00 G
CS-137	I	-2.9520E-01					1.10E+04	
			661.66	-2.952E-01	?(P	1.042E+00	1.71E+02	8.52E+01 G
CE-139	F	-3.5662E-02					1.38E+02	
			165.85	-3.566E-02	&(	6.133E-01	4.88E+02	7.99E+01 G
Ba-140	I	5.2828E-01					1.28E+01	
			537.26	5.283E-01	&(P	2.054E+00	1.50E+02	2.44E+01 G
			162.66	-2.528E+00	+	9.126E+00	1.07E+02	6.22E+00 G
			304.85	0.000E+00	-	2.308E+01	1.00E+03	4.29E+00 G
La-140	I	1.4218E-01					1.28E+01	
			1596.21	0.000E+00	?(	5.370E-01	1.00E+03	9.54E+01 G
			487.02	-6.218E-02	+	1.702E+00	7.55E+02	4.55E+01 G
			328.76	8.103E-01	?(	2.954E+00	1.06E+02	2.03E+01 G
			815.77	0.000E+00	-	5.233E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	2.0402E-01					3.25E+01	
			145.44	2.040E-01	?(	1.451E+00	2.08E+02	4.82E+01 G
CE-144	I	9.0650E-01					2.85E+02	
			133.54	9.065E-01	?(P	5.919E+00	1.91E+02	1.11E+01 G
PM-144	C	9.8932E-02					3.63E+02	
			696.54	9.893E-02	?(	6.287E-01	2.51E+02	9.90E+01 G
			618.06	0.000E+00	&	1.377E+00	1.00E+03	9.91E+01 G
EU-152	F	1.8696E+00					4.94E+03	
			344.29	3.268E-01	&(P	2.254E+00	1.95E+02	2.65E+01 G
			1112.07	7.672E+00	?(	2.827E+00	2.24E+01	1.36E+01 G
			121.78	9.445E-01	?(	1.011E+00	3.58E+01	2.86E+01 G
			778.92	1.131E+00	?(	5.228E+00	1.84E+02	1.29E+01 G
			964.11	1.713E+00	?(	4.734E+00	8.10E+01	1.46E+01 G
			244.69	-1.685E+00	+ P	9.925E+00	9.40E+01	7.58E+00 G
			1408.00	-1.997E-01	-	4.135E+00	8.46E+02	2.10E+01 GA
EU-154	I	-2.0091E+00					3.14E+03	
			873.23	-2.009E+00	?(	7.905E+00	1.13E+02	1.23E+01 G
			123.10	-2.467E-01	+	1.054E+00	1.25E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.377E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	4.301E+00	1.00E+03	2.02E+01 G
			1004.77	-3.246E+00	+	9.556E+00	8.74E+01	1.80E+01 G
			996.33	-3.176E+00	+	1.092E+01	1.00E+02	1.06E+01 G
EU-155	I	3.4587E-01					1.81E+03	
			105.31	2.496E-01	?(P	2.718E+00	3.15E+02	2.12E+01 G
			86.54	4.124E-01	?(	1.976E+00	1.41E+02	3.07E+01 G
HF-181	F	1.9977E-01					4.24E+01	
			482.00	3.477E-02	?(	9.075E-01	7.17E+02	8.05E+01 G
			133.02	2.574E-01	?(	1.451E+00	1.65E+02	4.33E+01 G
			345.83	2.458E-01	&(	4.426E+00	5.03E+02	1.51E+01 G
			136.30	1.925E+00	?(	1.166E+01	1.78E+02	5.85E+00 G
Ta-182	F	7.1918E-02					1.14E+02	
			1121.30	0.000E+00	?(	3.554E+00	1.00E+03	3.49E+01 G
			1221.41	-7.644E-01	+	3.738E+00	2.09E+02	2.70E+01 G
			1189.05	2.269E-01	?(	4.584E+00	7.97E+02	1.62E+01 G
Hg-203	F	-1.3158E-01					4.66E+01	
			279.20	-1.316E-01	?(P	6.998E-01	1.01E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	3.2309E-01					6.98E+02	
			583.02	7.723E-02	?(P	4.997E-01	1.76E+02	8.45E+01 G
			277.28	3.616E+00	&(P	5.062E+00	4.61E+01	6.31E+00 G
			860.56	-8.187E-01	+ P	6.136E+00	1.55E+02	1.24E+01 G
pm-146	C	2.5210E-01					2.02E+03	
			747.16	-9.890E-02	?(P	1.479E+00	8.21E+02	3.40E+01 G
			735.72	7.934E-01	?(	2.881E+00	1.46E+02	2.25E+01 G
			453.88	2.483E-01	?(	6.577E-01	1.01E+02	6.50E+01 G
y-88	F	5.4508E-01					1.07E+02	
			898.04	4.582E-01	?(P	3.495E-01	3.35E+01	9.37E+01 G
			1836.06	6.271E-01	?(	5.777E-01	3.54E+01	9.92E+01 G
Cd-113m		1.6404E+03					5.33E+03	
			263.70	1.640E+03	?(	7.658E+03	1.33E+02	6.00E-03 K
Cd-109	F	-2.4677E+00					4.53E+02	
			88.04	-2.468E+00	&(	1.963E+01	2.33E+02	3.79E+00 G
Cf-251	T	-3.3296E-01					3.28E+05	
			176.60	-3.330E-01	&(	2.454E+00	2.73E+02	1.70E+01 G
			227.00	-2.391E+00	+	8.719E+00	1.07E+02	6.30E+00 GA
Cf-249	T	9.5794E-02					1.28E+05	
			387.95	9.579E-02	&(	1.257E+00	3.72E+02	6.60E+01 G
			333.44	-1.378E+00	+	5.012E+00	1.07E+02	1.55E+01 G
Sn-126		1.5950E+00					3.65E+07	
			87.57	-6.034E-01	& P	2.019E+00	9.68E+01	3.75E+01 GA
			64.28	1.595E+00	&(	7.204E+00	1.32E+02	9.70E+00 G
			86.94	-1.863E+00	+	8.639E+00	1.37E+02	9.04E+00 GA
PB-210	N	-1.1180E+01					8.14E+03	
			46.54	-1.118E+01	*(P	2.805E+01	6.90E+01	4.25E+00 G
PB-212	N	2.6767E-01					6.98E+02	
			238.63	2.677E-01	(P	8.574E-01	1.01E+02	4.33E+01 G
			300.03	5.084E+00	P	2.852E+01	1.64E+02	3.28E+00 GA
PB-214	N	-3.2902E-02					5.84E+05	
			351.93	-3.290E-02	%(P	1.515E+00	1.26E+03	3.76E+01 G
			295.09	6.709E-02	% P	2.604E+00	1.34E+03	1.93E+01 G
			242.00	1.758E+00	?	9.062E+00	1.50E+02	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-2.6596E-02					1.18E+04	
			569.70	-9.861E-02	?(P	7.642E-01	2.25E+02	9.77E+01 G
			1063.66	6.788E-02	?(	8.913E-01	5.02E+02	7.45E+01 G
BI-212	N	2.1659E+00					6.98E+02	
			727.17	2.166E+00	?(P	1.256E+01	1.64E+02	7.55E+00 G
			785.42	-2.552E+01	+ P	6.348E+01	3.68E+01	1.28E+00 GA
BI-214	N	1.0134E-01					5.84E+05	
			609.31	-4.585E-01	?(P	3.058E+00	1.90E+02	4.61E+01 G
			1120.29	-1.473E+00	+ P	8.940E+00	1.07E+02	1.51E+01 G
			1764.49	1.777E+00	?(P	5.507E+00	9.16E+01	1.54E+01 G
BI-210M	T	-3.3096E-02					1.10E+09	
			265.83	-3.310E-02	?(P	9.805E-01	7.81E+02	5.00E+01 G
			304.90	0.000E+00	+	3.536E+00	1.00E+03	2.80E+01 G
TH-227	N	2.5869E+00					7.95E+03	
			50.14	2.587E+00	&(	1.225E+01	1.39E+02	8.00E+00 G
			256.24	-1.810E+00	+	7.623E+00	1.58E+02	7.00E+00 G
TH-229	N	-2.1791E+00					2.68E+06	
			193.51	-2.179E+00	?(P	1.152E+01	1.31E+02	4.40E+00 G
			210.85	-4.429E+00	+	1.486E+01	1.26E+02	2.99E+00 G
TH-234	N	-7.8029E+00					1.63E+12	
			63.29	-7.803E+00	(P	2.552E+01	9.22E+01	3.81E+00 G
			92.59	-4.745E+00	+ P	1.058E+01	6.05E+01	5.58E+00 G
PA-234	N	6.1558E-01					1.63E+12	
			131.29	6.156E-01	?(P	3.336E+00	1.59E+02	1.80E+01 G
			946.02	0.000E+00	-	2.543E+00	1.00E+03	1.34E+01 G
			569.47	0.000E+00	-	8.469E+00	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	9.488E+00	1.00E+03	9.60E+00 G
			880.53	3.405E+00	?	1.291E+01	1.08E+02	6.00E+00 GA
U-235	N	8.1631E-01					2.57E+11	
			143.79	4.157E-01	?(P	6.282E+00	4.40E+02	1.10E+01 G
			205.33	-3.585E+00	+ P	1.127E+01	7.31E+01	5.01E+00 G
			163.38	1.681E+00	?(P	7.706E+00	1.33E+02	5.08E+00 G
AM-241	T	6.0147E-01					1.58E+05	
			59.54	6.015E-01	*(	2.557E+00	1.26E+02	3.59E+01 G
Np-237	F	9.6639E-01					2.14E+06	
			86.49	9.664E-01	?(	4.386E+00	1.33E+02	1.31E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   3.2257E-01                                      1.30E+01
                          818.50 3.226E-01 ?(  1.055E+00 9.56E+01 1.00E+02 G
                         1048.07 0.000E+00 -   4.606E-01 1.00E+03 8.00E+01 G
                          340.57 0.000E+00 &   1.609E+00 1.00E+03 4.69E+01 G

Np-239   T  -5.6286E-01                                      2.36E+00
                          103.70 4.128E-01     2.281E+00 1.61E+02 2.40E+01 X
                          106.13-5.629E-01 ?(  3.019E+00 1.58E+02 2.27E+01 G
                           99.50 6.633E-01 ?   3.316E+00 1.46E+02 1.50E+01 X

Nd-147       7.7208E-02                                      1.11E+01
                          531.00 7.721E-02 %(  3.805E+00 1.81E+03 1.30E+01 G
                           91.10-4.313E-08 %   2.654E+00 1.78E+09 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      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	94.	-19.	-0.011	69.03	-1.118E+01	P
TH-227	50.14	79.	9.	0.005	138.85	2.587E+00	
AM-241	59.54	110.	12.	0.007	125.58	6.015E-01	
TH-234	63.29	143.	-18.	-0.010	92.23	-7.803E+00	P
Sn-126	64.28	74.	9.	0.005	132.42	1.595E+00	
BA-133	80.99	23.	8.	0.005	107.07	3.379E-01	
Np-237	86.49	78.	10.	0.005	133.16	9.664E-01	
EU-155	86.54	88.	10.	0.005	140.68	4.124E-01	
Sn-126	86.94	150.	-13.	-0.007	137.18	-1.863E+00	
Sn-126	87.57	142.	-17.	-0.010	96.83	-6.034E-01	P
Cd-109	88.04	137.	-7.	-0.004	232.96	-2.468E+00	
TH-234	92.59	88.	-21.	-0.012	60.47	-4.745E+00	P
AC-228	93.35	27.	6.	0.004	118.97	1.480E+00	
Gd-153	97.50	56.	8.	0.004	137.23	3.327E-01	
Np-239	99.50	64.	8.	0.004	145.78	6.633E-01	
Gd-153	103.20	72.	8.	0.004	153.55	4.545E-01	
Np-239	103.70	80.	8.	0.004	161.38	4.128E-01	
EU-155	105.31	90.	4.	0.002	315.38	2.496E-01	P
Np-239	106.13	130.	-10.	-0.006	157.97	-5.629E-01	
EU-152	121.78	20.	22.	0.012	35.79	9.445E-01	
EU-154	123.10	48.	-8.	-0.005	124.61	-2.467E-01	
PA-234	131.29	96.	9.	0.005	158.96	6.156E-01	P
HF-181	133.02	105.	9.	0.005	165.32	2.574E-01	
CE-144	133.54	114.	8.	0.004	191.36	9.065E-01	P
HF-181	136.30	122.	9.	0.005	177.76	1.925E+00	
CO-57	136.47	101.	8.	0.004	190.87	8.916E-01	
Tc-99m	140.51	108.	8.	0.004	196.91	1.114E-01	
U-235	143.79	120.	4.	0.002	439.63	4.157E-01	P
CE-141	145.44	123.	8.	0.004	208.18	2.040E-01	
Ba-140	162.66	70.	-12.	-0.006	106.58	-2.528E+00	
U-235	163.38	31.	6.	0.003	132.53	1.681E+00	P
CE-139	165.85	51.	-2.	-0.001	487.64	-3.566E-02	
Cf-251	176.60	33.	-4.	-0.002	273.29	-3.330E-01	
TH-229	193.51	44.	-6.	-0.004	130.87	-2.179E+00	P
U-235	205.33	52.	-12.	-0.006	73.15	-3.585E+00	P
TH-229	210.85	29.	-8.	-0.005	126.43	-4.429E+00	
Cf-251	227.00	42.	-9.	-0.005	106.87	-2.391E+00	
PB-214	242.00	60.	8.	0.004	149.96	1.758E+00	
EU-152	244.69	74.	-7.	-0.004	94.04	-1.685E+00	P
TH-227	256.24	33.	-7.	-0.004	158.11	-1.810E+00	
Cd-113m	263.70	23.	5.	0.003	133.46	1.640E+03	
BI-210M	265.83	26.	-1.	0.000	780.66	-3.310E-02	P
TL-208	277.28	9.	12.	0.007	46.07	3.616E+00	P
Hg-203	279.20	34.	-6.	-0.003	101.18	-1.316E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	284.30	19.	7.	0.004	121.71	2.216E+00	P
CR-51	320.08	79.	7.	0.004	180.07	1.513E+00	P
La-140	328.76	29.	8.	0.004	106.23	8.103E-01	
Cf-249	333.44	51.	-10.	-0.005	106.89	-1.378E+00	
EU-152	344.29	27.	4.	0.002	195.31	3.268E-01	P
HF-181	345.83	34.	2.	0.001	503.19	2.458E-01	
BA-133	356.00	11.	4.	0.002	165.93	1.498E-01	
I-131	364.48	20.	-3.	-0.002	297.52	-8.464E-02	
BA-133	383.84	38.	8.	0.005	109.69	2.239E+00	
Cf-249	387.95	46.	3.	0.001	371.91	9.579E-02	
SN-113	391.69	58.	-9.	-0.005	118.58	-3.567E-01	
SB-125	427.88	40.	-14.	-0.008	94.48	-1.192E+00	
AG-108M	433.94	8.	1.	0.001	562.73	2.880E-02	
pm-146	453.88	8.	6.	0.003	100.92	2.483E-01	
SB-125	463.37	23.	1.	0.001	496.33	3.595E-01	P
Ir-192	468.06	23.	-1.	-0.001	685.57	-5.314E-02	
BE-7	477.60	21.	6.	0.004	110.47	1.681E+00	
HF-181	482.00	25.	1.	0.001	716.60	3.477E-02	
La-140	487.02	28.	-1.	-0.001	754.98	-6.218E-02	
RU-103	497.05	22.	-7.	-0.004	147.69	-2.106E-01	
RH-106	511.86	33.	31.	0.017	51.28	4.496E+00	
Ba-140	537.26	9.	4.	0.002	150.37	5.283E-01	P
CS-134	563.24	13.	-5.	-0.003	153.84	-1.882E+00	
CS-134	569.32	13.	4.	0.002	136.93	8.237E-01	
BI-207	569.70	20.	-3.	-0.002	225.12	-9.861E-02	P
TL-208	583.02	5.	2.	0.001	175.76	7.723E-02	P
SB-125	600.50	38.	7.	0.004	131.96	1.267E+00	
SB-124	602.73	64.	2.	0.001	514.17	7.453E-02	P
BI-214	609.31	72.	-6.	-0.004	189.81	-4.585E-01	P
SB-125	635.89	22.	-11.	-0.006	66.46	-3.371E+00	
I-131	636.97	21.	7.	0.004	99.87	3.369E+00	
AG-110M	657.76	14.	2.	0.001	330.45	6.200E-02	
CS-137	661.66	23.	-7.	-0.004	170.70	-2.952E-01	P
PM-144	696.54	9.	3.	0.001	250.62	9.893E-02	
NB-94	702.63	14.	1.	0.001	800.00	3.776E-02	
SB-124	722.79	15.	-4.	-0.002	145.77	-1.397E+00	
BI-212	727.17	23.	4.	0.002	164.36	2.166E+00	P
pm-146	735.72	9.	5.	0.003	146.39	7.934E-01	
pm-146	747.16	5.	-1.	0.000	821.18	-9.890E-02	P
AG-110M	763.94	17.	-2.	-0.001	300.00	-3.532E-01	
NB-95	765.79	14.	5.	0.003	114.89	1.975E-01	
PA-234M	766.41	22.	-6.	-0.003	117.85	-8.048E+01	
EU-152	778.92	9.	4.	0.002	184.30	1.131E+00	
BI-212	785.42	14.	-8.	-0.005	36.84	-2.552E+01	P
CS-134	795.87	21.	-9.	-0.005	76.11	-4.469E-01	
CS-134	801.95	9.	24.	0.014	26.93	1.147E+01	
CO-58	810.78	28.	-4.	-0.002	174.27	-1.861E-01	
Cs-136	818.50	24.	8.	0.004	95.65	3.226E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
MN-54	834.85	5.	-1.	0.000	698.21	-2.804E-02		
Co-56	846.77	1.	-1.	0.000	371.74	-3.809E-02		P
TL-208	860.56	10.	-2.	-0.001	154.94	-8.187E-01		P
NB-94	871.10	6.	5.	0.003	82.46	2.174E-01		
EU-154	873.23	18.	-6.	-0.003	113.00	-2.009E+00		
PA-234	880.53	10.	5.	0.003	107.85	3.405E+00		
Sc-46	889.28	26.	-8.	-0.004	96.51	-3.562E-01		
AG-110M	937.49	30.	-14.	-0.008	88.12	-1.914E+00		
EU-152	964.11	7.	5.	0.003	81.01	1.713E+00		
AC-228	968.97	30.	-10.	-0.006	81.34	-2.773E+00		
EU-154	996.33	21.	-7.	-0.004	100.00	-3.176E+00		
EU-154	1004.77	50.	-12.	-0.007	87.41	-3.246E+00		
Co-56	1037.84	15.	-7.	-0.004	127.38	-2.458E+00		
BI-207	1063.66	5.	1.	0.001	501.66	6.788E-02		
Ga-68	1077.40	16.	-11.	-0.006	89.47	-1.957E+01		
FE-59	1099.25	21.	-12.	-0.007	26.47	-1.134E+00		P
EU-152	1112.07	0.	20.	0.011	22.36	7.672E+00		
BI-214	1120.29	24.	-4.	-0.002	106.80	-1.473E+00		P
CO-60	1173.24	0.	6.	0.003	44.47	3.107E-01		P
Ta-182	1189.05	5.	1.	0.000	796.87	2.269E-01		
Ta-182	1221.41	11.	-4.	-0.002	209.09	-7.644E-01		
Co-56	1238.28	6.	1.	0.000	691.09	6.851E-02		P
NA-22	1274.53	16.	-10.	-0.006	64.81	-5.823E-01		
CO-60	1332.50	6.	-2.	-0.001	343.80	-1.004E-01		
EU-152	1408.00	6.	-1.	0.000	846.32	-1.997E-01		
K-40	1460.83	5.	5.	0.003	73.04	3.246E+00		P
BI-214	1764.49	3.	4.	0.002	91.63	1.777E+00		P
Co-56	1771.35	29.	-11.	-0.006	73.47	-5.531E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	1.6805E+00	1.6805E+00	1.105E+02%		6.43E+00
NA-22	#A	-5.8226E-01	-5.8226E-01	6.481E+01%		1.24E+00
K-40	#A	3.2457E+00	3.2457E+00	7.304E+01%		7.75E+00
Sc-46	#A	-3.5625E-01	-3.5625E-01	9.651E+01%		1.17E+00
CR-51	#A	1.5134E+00	1.5134E+00	1.801E+02%		9.35E+00
MN-54	#A	-2.8041E-02	-2.8041E-02	6.982E+02%		5.37E-01
FE-59	#A	-1.1336E+00	-1.1337E+00	2.647E+01%		2.23E+00
Co-56	#A	4.3353E-03	4.3353E-03	3.717E+02%		3.13E-01
CO-57	#A	9.8903E-02	9.8903E-02	1.909E+02%		4.72E-01
CO-58	#A	-1.8612E-01	-1.8612E-01	1.743E+02%		1.14E+00
CO-60	#A	1.0503E-01	1.0503E-01	4.447E+01%		8.32E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%		2.44E+00

NB-94	#A	1.2846E-01	1.2846E-01	8.246E+01%	7.61E-01
ZR-95	#	5.5092E-01	5.5093E-01	3.784E+01%	5.29E-01
NB-95	#A	1.9748E-01	1.9748E-01	1.149E+02%	7.96E-01
RU-103	#A	-2.1056E-01	-2.1056E-01	1.477E+02%	7.71E-01
RH-106	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.38E+01
AG-108M	#A	2.8799E-02	2.8799E-02	5.627E+02%	4.58E-01
AG-110M	#A	3.5068E-02	3.5068E-02	3.305E+02%	1.25E+00
SN-113	#A	-3.5674E-01	-3.5674E-01	1.186E+02%	1.44E+00
SB-124	#A	7.4526E-02	7.4527E-02	5.142E+02%	1.34E+00
SB-125	#A	-1.1922E+00	-1.1922E+00	9.448E+01%	2.80E+00
I-131	#A	3.2469E-01	3.2470E-01	9.987E+01%	6.64E-01
Gd-153	#A	3.8397E-01	3.8398E-01	1.030E+02%	1.57E+00
Ga-68	#A	-1.9435E+01	-1.9568E+01	8.947E+01%	3.87E+01
Tc-99m	#A	1.1127E-01	1.1141E-01	1.969E+02%	7.50E-01
BA-133	#A	1.4978E-01	1.4978E-01	1.659E+02%	6.64E-01
CS-134	#A	9.2291E-01	9.2291E-01	2.693E+01%	1.38E+00
CS-137	#A	-2.9520E-01	-2.9520E-01	1.707E+02%	1.04E+00
CE-139	#A	-3.5662E-02	-3.5662E-02	4.876E+02%	6.13E-01
Ba-140	#A	5.2826E-01	5.2828E-01	1.504E+02%	2.05E+00
La-140	#A	1.4217E-01	1.4218E-01	1.062E+02%	5.37E-01
CE-141	#A	2.0401E-01	2.0402E-01	2.082E+02%	1.45E+00
CE-144	#A	9.0650E-01	9.0650E-01	1.914E+02%	5.92E+00
PM-144	#A	9.8932E-02	9.8932E-02	2.506E+02%	6.29E-01
EU-152	#A	1.8696E+00	1.8696E+00	2.236E+01%	2.25E+00
EU-154	#A	-2.0091E+00	-2.0091E+00	1.130E+02%	7.91E+00
EU-155	#A	3.4587E-01	3.4587E-01	1.407E+02%	2.72E+00
HF-181	#A	1.9977E-01	1.9977E-01	1.653E+02%	9.07E-01
Ta-182	#A	7.1918E-02	7.1918E-02	6.393E+02%	3.55E+00
Hg-203	#A	-1.3158E-01	-1.3158E-01	1.012E+02%	7.00E-01
TL-208	#A	3.2309E-01	3.2309E-01	4.607E+01%	5.00E-01
pm-146	#A	2.5210E-01	2.5210E-01	1.009E+02%	1.48E+00
y-88	#	5.4508E-01	5.4508E-01	2.434E+01%	3.50E-01
Cd-113m	#A	1.6404E+03	1.6404E+03	1.335E+02%	7.66E+03
Cd-109	#A	-2.4677E+00	-2.4677E+00	2.330E+02%	1.96E+01
Cf-251	#A	-3.3296E-01	-3.3296E-01	2.733E+02%	2.45E+00
Cf-249	#A	9.5794E-02	9.5794E-02	3.719E+02%	1.26E+00
Sn-126	#A	1.5950E+00	1.5950E+00	1.324E+02%	7.20E+00
PB-210	#A	-1.1180E+01	-1.1180E+01	6.903E+01%	2.81E+01
PB-212	A	2.6767E-01	2.6767E-01	1.011E+02%	8.57E-01
PB-214	#A	-3.2902E-02	-3.2902E-02	1.264E+03%	1.51E+00
BI-207	#A	-2.6596E-02	-2.6596E-02	2.251E+02%	7.64E-01
BI-212	#A	2.1659E+00	2.1659E+00	1.644E+02%	1.26E+01
BI-214	#A	1.0134E-01	1.0134E-01	9.163E+01%	3.06E+00
BI-210M	#A	-3.3096E-02	-3.3096E-02	7.807E+02%	9.81E-01
AC-228	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.70E+00
TH-227	#A	2.5869E+00	2.5869E+00	1.388E+02%	1.23E+01
TH-229	#A	-2.1791E+00	-2.1791E+00	1.309E+02%	1.15E+01
TH-234	#A	-7.8029E+00	-7.8029E+00	9.223E+01%	2.55E+01
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.42E+01

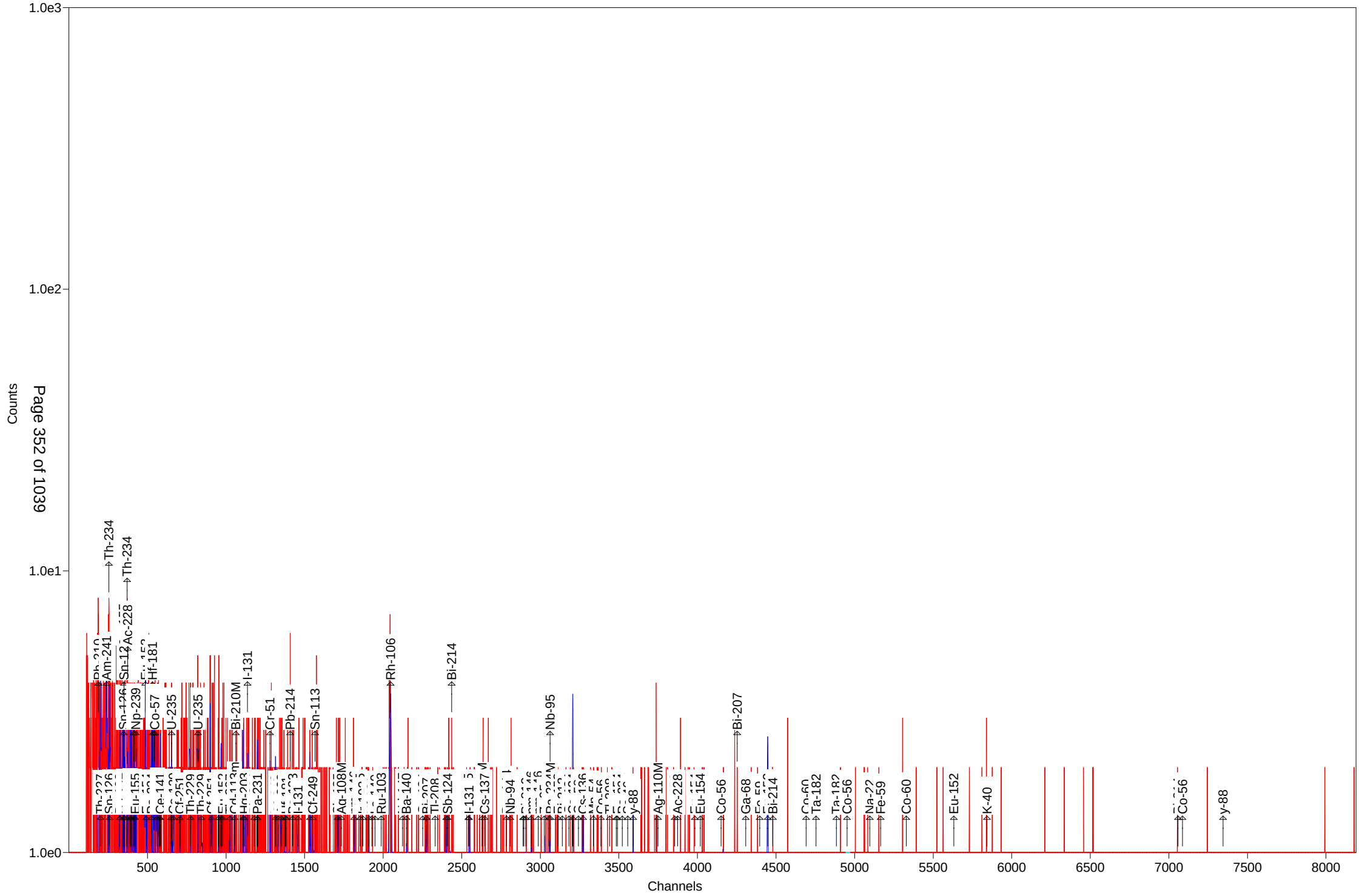
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.79E+00
PA-234 #A	6.1558E-01	6.1558E-01	1.590E+02%		3.34E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		1.58E+02
U-235 #A	8.1631E-01	8.1631E-01	1.325E+02%		6.28E+00
AM-241 #A	6.0147E-01	6.0147E-01	1.256E+02%		2.56E+00
Np-237 #A	9.6639E-01	9.6639E-01	1.332E+02%		4.39E+00
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		1.17E+00
Cs-136 #A	3.2256E-01	3.2257E-01	9.565E+01%		1.05E+00
Np-239 #A	-5.6279E-01	-5.6286E-01	1.580E+02%		3.02E+00
Nd-147 #A	7.7206E-02	7.7208E-02	1.811E+03%		3.81E+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 1999.4 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 0.0000000E+00 Bq/Sample

257318_Gamma_MB 160-257318~1-A. 12_Gamma_20161453.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20161653

Sample Description: 257318_Gamma_LCS 160-257318~2-A
Detector: Detector #16
Batch ID: 257318
Work Order Number: Gamma
Lot Number: LCS 160-257318~2-A

Decay to Time: 7/12/2016 09:59 Live Time: 1800 sec
Acquisition Time: 7/12/2016 09:59:17 Real Time: 1816 sec
Analysis Time: 7/12/2016 10:29 Dead Time: 0.88 %
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_2016-07-10_0627.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	-1.362E+01	110.2	1.501E+01	1.502E+01	4.978E+01
NA-22	7.239E-01	59.0	4.271E-01	4.286E-01	1.391E+00
K-40	-6.894E-01	862.0	5.942E+00	5.942E+00	1.564E+01
Sc-46	-1.856E+00	87.4	1.622E+00	1.625E+00	5.381E+00
CR-51	-1.143E+01	154.0	1.760E+01	1.761E+01	5.835E+01
MN-54	2.951E-01	502.7	1.483E+00	1.483E+00	3.251E+00
FE-59	7.751E-01	416.6	3.229E+00	3.230E+00	6.854E+00
Co-56	-1.892E+00	85.8	1.624E+00	1.627E+00	3.505E+00
CO-57	0.000E+00	1.#INF	8.215E-01	8.215E-01	3.427E+01
CO-58	8.171E-01	165.7	1.354E+00	1.355E+00	4.534E+00
CO-60	2.106E+02	1.2	2.589E+00	1.089E+01	1.243E+00
ZN-65	4.008E+00	65.9	2.642E+00	2.650E+00	8.724E+00
NB-94	-1.604E+00	47.3	7.583E-01	7.629E-01	4.264E+00
ZR-95	-2.493E+00	57.9	1.444E+00	1.449E+00	5.425E+00
NB-95	-7.401E-01	118.1	8.743E-01	8.751E-01	2.933E+00
RU-103	9.562E-01	142.3	1.360E+00	1.361E+00	3.167E+00
RH-106	-1.396E+01	126.7	1.769E+01	1.770E+01	5.876E+01
AG-108M	-3.324E-02	68.7	2.283E-02	2.289E-02	3.482E+00
AG-110M	1.794E+00	115.4	2.070E+00	2.072E+00	6.900E+00
SN-113	1.891E+00	98.0	1.853E+00	1.855E+00	6.144E+00
SB-124	6.723E-01	142.5	9.580E-01	9.587E-01	5.478E+00
SB-125	2.768E+00	160.2	4.434E+00	4.437E+00	1.013E+01
I-131	3.722E-01	354.9	1.321E+00	1.321E+00	3.212E+00
Gd-153	5.120E-01	496.1	2.540E+00	2.540E+00	1.472E+01
Ga-68	-7.351E+01	95.0	6.986E+01	6.999E+01	1.462E+02
Tc-99m	-8.903E-01	146.0	1.300E+00	1.301E+00	4.306E+00
BA-133	-2.533E-01	86.4	2.189E-01	2.193E-01	6.007E+00
CS-134	7.976E-01	103.7	8.272E-01	8.282E-01	5.527E+00
CS-137	3.727E+02	1.1	4.257E+00	1.985E+01	2.859E+00
CE-139	-9.688E-01	160.5	1.555E+00	1.557E+00	2.986E+00
Ba-140	6.474E+00	102.1	6.611E+00	6.619E+00	1.103E+01
La-140	5.863E-01	85.9	5.038E-01	5.048E-01	1.061E+00
CE-141	1.563E+00	147.0	2.298E+00	2.299E+00	7.612E+00

CE-144	-6.775E+00	143.6	9.729E+00	9.735E+00	3.223E+01
PM-144	-1.468E+00	80.0	1.174E+00	1.176E+00	3.891E+00
EU-152	3.806E+00	131.8	5.016E+00	5.020E+00	1.960E+01
EU-154	3.965E+00	83.3	3.302E+00	3.308E+00	3.432E+01
EU-155	-3.487E+00	177.6	6.191E+00	6.194E+00	1.291E+01
HF-181	3.044E-01	265.9	8.095E-01	8.096E-01	6.441E+00
Ta-182	9.470E-01	438.1	4.149E+00	4.149E+00	1.403E+01
Hg-203	0.000E+00	1.#INF	7.964E-01	7.964E-01	3.355E+00
TL-208	3.692E+00	37.6	1.387E+00	1.400E+00	2.765E+00
pm-146	-4.382E+00	89.2	3.910E+00	3.917E+00	8.761E+00
y-88	-1.598E+00	119.5	1.910E+00	1.911E+00	4.136E+00
Cd-113m	9.272E+03	149.0	1.382E+04	1.383E+04	4.602E+04
Cd-109	2.113E+01	173.1	3.657E+01	3.659E+01	1.211E+02
Cf-251	8.217E-01	520.1	4.274E+00	4.274E+00	1.085E+01
Cf-249	0.000E+00	1.#INF	4.095E-01	4.095E-01	5.809E+00
Sn-126	-1.920E+01	223.0	4.282E+01	4.284E+01	1.414E+02
PB-210	9.986E+03	0.9	9.094E+01	5.933E+02	1.733E+02
PB-212	8.141E+00	20.5	1.669E+00	1.750E+00	4.133E+00
PB-214	6.520E+00	31.0	2.018E+00	2.047E+00	5.004E+00
BI-207	1.234E+00	63.9	7.885E-01	7.911E-01	2.601E+00
BI-212	-8.144E+00	169.6	1.381E+01	1.382E+01	4.640E+01
BI-214	6.099E+00	28.7	1.749E+00	1.778E+00	4.495E+00
BI-210M	1.720E+00	129.5	2.227E+00	2.229E+00	5.330E+00
AC-228	-6.289E-01	133.7	8.407E-01	8.413E-01	1.460E+01
TH-227	3.800E+01	61.8	2.348E+01	2.357E+01	7.739E+01
TH-229	1.241E+00	1594.3	1.979E+01	1.979E+01	5.019E+01
TH-234	-6.116E+01	141.7	8.668E+01	8.674E+01	3.635E+02
PA-231	3.622E+01	148.8	5.391E+01	5.394E+01	1.788E+02
PA-233	-3.080E+00	155.3	4.782E+00	4.784E+00	1.585E+01
PA-234	4.015E+00	82.7	3.319E+00	3.325E+00	2.001E+01
PA-234M	-9.997E+00	2034.3	2.034E+02	2.034E+02	6.653E+02
U-235	5.274E+00	153.4	8.089E+00	8.094E+00	3.501E+01
AM-241	1.259E+03	0.8	9.841E+00	6.607E+01	1.426E+01
Np-237	-6.154E+00	175.1	1.078E+01	1.078E+01	3.567E+01
Ir-192	2.772E-01	84.6	2.345E-01	2.350E-01	6.572E+00
Cs-136	1.981E-01	327.9	6.497E-01	6.498E-01	4.626E+00
Np-239	-3.351E+00	114.7	3.843E+00	3.848E+00	1.273E+01
Nd-147	9.010E-01	164.0	1.477E+00	1.478E+00	2.116E+01
Total	2.127E+04				

Analyst: Amanda Dick

Sample description
257318_Gamma_LCS 160-257318~2-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20161653.An1

Acquisition information
Start time: 7/12/2016 9:59:17 AM
Live time: 1800
Real time: 1816
Dead time: 0.88 %
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	7/12/2016 9:59:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-07-10_0627.PBC 7/10/2016 6:27:28 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 32 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1702

***** 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	17969.	0.91	0.96	2.350E-02	46.54	4.250	9.986E+03	PB210
49.82	147.	60.80	0.96	2.616E-02	50.14	8.000	3.863E+01	TH227
59.55	27061.	0.78	0.99	3.327E-02	59.54	35.900	1.259E+03	AM241
80.99	48.	150.26	0.99	4.361E-02	80.99	34.060	PBC<MDA	BA133
88.10	278.	22.59	1.02	4.552E-02	87.57	37.500	9.072E+00	Sn126
					88.04	3.790	8.955E+01	Cd109
91.10	66.	171.70	1.00	4.612E-02	91.10	28.300	PBC<MDA	Nd147
92.59	27.	418.88	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
93.35	38.	293.60	1.00	4.651E-02	93.35	5.561	PBC<MDA	AC228
99.50	66.	169.28	1.01	4.728E-02	99.50	15.000	PBC<MDA	Np239
103.20	23.	496.14	1.01	4.755E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.104E+00	Np239
123.10	59.	88.12	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154
144.14	24.	392.47	1.05	4.466E-02	143.79	10.960	PBC<MDA	U235
145.80	60.	147.00	1.05	4.440E-02	145.44	48.200	PBC<MDA	CE141
176.60	10.	520.10	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
205.64	35.	153.37	1.11	3.577E-02	205.33	5.010	PBC<MDA	U235
227.00	24.	218.22	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.70	204.	20.50	1.02	3.216E-02	238.63	43.300	8.141E+00	PB212
242.00	54.	98.09	1.14	3.185E-02	242.00	7.430	PBC<MDA	PB214
263.70	30.	149.00	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	21.	203.68	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
277.28	23.	184.51	1.17	2.890E-02	277.28	6.310	PBC<MDA	TL208
287.30	42.	51.18	0.38	2.818E-02				
295.07	65.	55.39	0.65	2.765E-02	295.09	19.300	PBC<MDA	PB214
302.65	51.	148.81	1.19	2.715E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	5.694E+00	BA133
302.85	51.	147.46	1.19	2.714E-02	302.65	2.880	3.623E+01	PA231
					302.85	18.330	5.695E+00	BA133
304.85	51.	145.91	1.20	2.701E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	3.752E+00	BI210M
304.90	46.	159.83	1.20	2.701E-02	304.85	4.290	2.214E+01	Ba140
					304.90	28.000	3.392E+00	BI210M
343.02	53.	131.79	1.23	2.475E-02	344.29	26.500	PBC<MDA	EU152
345.83	27.	265.90	1.23	2.467E-02	345.83	15.070	PBC<MDA	HF181
351.75	106.	30.96	0.62	2.437E-02	351.93	37.600	6.419E+00	PB214
363.76	13.	354.93	1.25	2.375E-02	364.48	81.700	PBC<MDA	I131
383.84	6.	800.07	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
391.69	49.	97.99	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	611.27	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
463.37	31.	160.22	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
468.06	54.	84.57	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
489.06	96.	31.86	0.57	1.919E-02				
497.47	30.	142.26	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.86	84.	76.40	2.63	1.856E-02	511.86	20.000	PBC<MDA	RH106
524.22	16.	85.29	0.19	1.824E-02				
537.26	26.	142.89	1.40	1.791E-02	537.26	24.390	PBC<MDA	Ba140
563.24	33.	103.71	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
569.47	13.	197.17	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.131E+00	PA234
571.02	37.	63.88	1.43	1.716E-02	569.70	97.740	PBC<MDA	BI207
583.43	89.	37.56	1.23	1.687E-02	583.02	84.500	3.451E+00	TL208
600.50	15.	307.46	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
609.20	68.	28.68	1.47	1.633E-02	609.31	46.090	5.034E+00	BI214
610.19	28.	167.01	1.47	1.631E-02	610.30	5.750	PBC<MDA	RU103
661.79	8784.	1.14	1.52	1.537E-02	661.66	85.210	3.727E+02	CS137
722.79	19.	142.49	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	8.074E-01	AG108M
					723.36	20.220	3.629E+00	EU154
722.94	30.	79.17	1.57	1.439E-02	722.79	10.810	1.065E+01	SB124
					722.94	90.840	1.268E+00	AG108M
					723.36	20.220	5.698E+00	EU154
723.36	30.	83.28	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.268E+00	AG108M
					723.36	20.220	5.699E+00	EU154
724.20	30.	87.17	1.57	1.437E-02	724.20	44.150	PBC<MDA	ZR95
735.72	18.	160.73	1.58	1.421E-02	735.72	22.500	PBC<MDA	pm146
778.92	8.	398.13	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.42	33.	83.14	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212
795.87	12.	246.10	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
810.78	19.	165.73	1.64	1.322E-02	810.78	99.460	PBC<MDA	CO58
820.88	73.	36.73	0.29	1.310E-02				
834.85	7.	502.66	1.66	1.293E-02	834.85	99.980	PBC<MDA	MN54
860.56	61.	50.02	1.69	1.264E-02	860.56	12.420	PBC<MDA	TL208
871.10	7.	331.05	1.69	1.253E-02	871.10	99.890	PBC<MDA	NB94
880.53	39.	79.63	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
883.24	39.	82.66	1.71	1.240E-02	883.24	9.600	PBC<MDA	PA234
884.68	29.	115.37	1.71	1.238E-02	884.68	72.680	PBC<MDA	AG110M
968.97	17.	200.03	1.78	1.157E-02	968.97	17.460	PBC<MDA	AC228
996.33	27.	124.00	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1004.77	15.	251.25	1.81	1.126E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	7.	327.95	1.84	1.091E-02	1048.07	80.000	PBC<MDA	Cs136
1099.25	8.	416.62	1.89	1.052E-02	1099.25	56.500	PBC<MDA	FE59
1115.55	38.	65.91	1.90	1.041E-02	1115.55	50.600	PBC<MDA	ZN65
1120.29	26.	99.92	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.30	6.	438.09	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	9.470E-01	Ta182
1173.47	3717.	1.76	1.86	1.002E-02	1173.24	99.900	2.064E+02	CO60
1274.53	12.	59.00	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.056E+00	EU154
1274.54	10.	75.59	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.679E+00	EU154
1332.77	3518.	1.71	2.00	9.095E-03	1332.50	99.980	2.149E+02	CO60
1460.81	-1.	861.97	2.19	8.482E-03	1460.83	10.670	PBC<MDA	K40
1596.21	8.	85.93	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1836.06	8.	90.07	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	
1148.35	287.30	275.	57.	2.033E+03	43.02	1.180	-	sD
1955.37	489.06	218.	96.	4.994E+03	31.86	0.571	-	s
2096.00	524.22	74.	16.	8.499E+02	85.29	0.187	-	sc
3282.60	820.88	125.	73.	5.574E+03	36.73	0.294	-	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	4401.	17969.	9.983	0.91	0.959D
TH-227	200.26	50.14	3926.	145.	0.080	61.80	0.962D
AM-241	237.88	59.55	4249.	27061.	15.034	0.78	0.986
TH-234	252.82	63.29	36069.	-149.	-0.083	141.72	0.975s
Sn-126	256.79	64.28	36555.	-121.	-0.067	222.98	0.976
BA-133	323.60	80.99	1448.	48.	0.026	150.26	0.991s
Np-237	345.59	86.49	6546.	-66.	-0.036	175.10	0.996
EU-155	345.80	86.54	6481.	-66.	-0.036	174.23	0.996
Sn-126	347.39	86.94	6386.	-32.	-0.018	351.69	0.997s
Sn-126	349.91	87.57	1076.	17.	0.009	241.38	0.997D
Cd-109	351.79	88.04	6412.	66.	0.036	173.06	0.998A
Nd-147	364.02	91.10	6346.	66.	0.037	171.70	1.001s
TH-234	369.98	92.59	6319.	27.	0.015	418.88	1.002
AC-228	373.02	93.35	6316.	38.	0.021	293.60	1.003s
Np-239	397.61	99.50	6265.	66.	0.037	169.28	1.008s
Gd-153	412.40	103.20	6331.	23.	0.013	496.14	1.012s
Np-239	414.40	103.70	6354.	0.	0.000	1000.00	1.012s
EU-155	420.85	105.31	2482.	-63.	-0.035	177.55	1.014s
Np-239	424.11	106.13	2770.	-65.	-0.036	114.69	1.014s
CO-57	487.81	122.06	1760.	0.	0.000	95.06	1.029A
EU-154	491.96	123.10	1309.	59.	0.033	88.12	1.030s
PA-234	524.73	131.29	4092.	-62.	-0.035	145.88	1.038s
HF-181	531.64	133.02	4029.	-62.	-0.035	144.56	1.039s
CE-144	533.70	133.54	3980.	-62.	-0.035	143.61	1.040
HF-181	544.74	136.30	4042.	-63.	-0.035	144.37	1.042s
CO-57	545.43	136.47	4105.	0.	0.000	145.47	1.042A
Tc-99m	561.57	140.51	4167.	-63.	-0.035	146.02	1.046s
U-235	574.67	143.79	4304.	24.	0.013	392.47	1.049s
CE-141	581.29	145.44	3886.	60.	0.033	147.00	1.050s
Ba-140	650.14	162.66	1027.	-17.	-0.009	272.98	1.066s
U-235	653.01	163.38	1043.	0.	0.000	1000.00	1.067
CE-139	662.90	165.85	1423.	-58.	-0.032	160.48	1.069
Cf-251	705.88	176.60	770.	10.	0.006	520.10	1.079s
U-235	820.76	205.33	827.	35.	0.020	153.37	1.105s
TH-229	842.82	210.85	848.	-14.	-0.008	381.43	1.110s
Cf-251	907.40	227.00	755.	24.	0.013	218.22	1.125s
PB-212	954.18	238.70	469.	204.	0.113	20.50	1.017
PB-214	967.37	242.00	1360.	54.	0.030	98.09	1.139
EU-152	978.14	244.69	1782.	-56.	-0.031	106.99	1.141s
TH-227	1024.32	256.24	776.	-35.	-0.019	156.74	1.152
Cd-113m	1054.15	263.70	984.	30.	0.017	149.00	1.158s
BI-210M	1062.67	265.83	905.	21.	0.012	203.68	1.160s
TL-208	1108.46	277.28	864.	23.	0.013	184.51	1.171
Hg-203	1116.13	279.20	887.	0.	0.000	1000.00	1.173s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.52	284.30	848.	-29.	-0.016	80.62	1.177s
PB-214	1179.61	295.07	349.	65.	0.036	55.39	0.646s
PA-233	1200.02	300.18	3109.	-53.	-0.030	148.43	1.192s
PA-231	1209.90	302.65	2853.	51.	0.028	148.81	1.194s
BA-133	1210.70	302.85	2802.	51.	0.028	147.46	1.194s
Ba-140	1218.69	304.85	2751.	51.	0.028	145.91	1.196s
BI-210M	1218.88	304.90	2700.	46.	0.026	159.83	1.196s
Ir-192	1233.05	308.44	3414.	-53.	-0.029	156.87	1.199
PA-233	1247.34	312.01	3361.	-53.	-0.029	155.25	1.202s
Ir-192	1265.24	316.49	3308.	-53.	-0.030	153.51	1.206
CR-51	1279.62	320.08	3346.	-53.	-0.030	153.97	1.210s
La-140	1314.31	328.76	2559.	-55.	-0.031	64.91	1.217
Cf-249	1333.02	333.44	2531.	-54.	-0.030	133.59	1.222s
AC-228	1352.54	338.32	2584.	-54.	-0.030	134.49	1.226
Cs-136	1361.54	340.57	2345.	-53.	-0.030	128.77	1.228s
EU-152	1376.40	344.29	2407.	53.	0.029	131.79	1.231s
HF-181	1382.56	345.83	2502.	27.	0.015	265.90	1.233s
PB-214	1406.25	351.75	293.	106.	0.059	30.96	0.624s
BA-133	1423.24	356.00	1170.	-54.	-0.030	90.19	1.242s
I-131	1457.16	364.48	552.	13.	0.007	354.93	1.250s
BA-133	1534.57	383.84	1086.	6.	0.003	800.07	1.267s
Cf-249	1551.01	387.95	1092.	0.	0.000	1000.00	1.271s
SN-113	1565.96	391.69	1133.	49.	0.027	97.99	1.274
SB-125	1710.67	427.88	572.	8.	0.004	611.27	1.307s
AG-108M	1734.91	433.94	620.	-46.	-0.025	112.25	1.312s
pm-146	1814.67	453.88	633.	-11.	-0.006	482.31	1.330s
SB-125	1852.61	463.37	1250.	31.	0.017	160.22	1.338s
Ir-192	1871.38	468.06	1008.	54.	0.030	84.57	1.342
BE-7	1909.51	477.60	1514.	-50.	-0.028	110.19	1.351s
HF-181	1927.12	482.00	1464.	-11.	-0.006	501.42	1.355s
La-140	1947.21	487.02	1451.	-47.	-0.026	116.35	1.359s
RU-103	1987.33	497.05	420.	30.	0.016	142.26	1.368s
RH-106	2046.57	511.86	588.	84.	0.047	76.40	2.631s
Nd-147	2123.10	531.00	347.	-14.	-0.008	279.40	1.398s
Ba-140	2148.14	537.26	325.	26.	0.014	142.89	1.404s
CS-134	2252.03	563.24	265.	33.	0.018	103.71	1.427s
CS-134	2276.36	569.32	383.	-16.	-0.009	171.32	1.432s
PA-234	2276.96	569.47	322.	13.	0.007	197.17	1.432s
BI-207	2277.89	569.70	265.	37.	0.021	63.88	1.432s
TL-208	2332.80	583.43	214.	89.	0.049	37.56	1.226
SB-125	2401.07	600.50	1117.	15.	0.009	307.46	1.460s
SB-124	2409.99	602.73	1132.	0.	0.000	1000.00	1.462s
CS-134	2417.91	604.71	1132.	0.	0.000	1000.00	1.463s
BI-214	2436.31	609.31	156.	68.	0.038	28.68	1.467D
RU-103	2440.26	610.30	1104.	28.	0.016	167.01	1.468s
AG-108M	2456.19	614.28	1132.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	1132.	0.	0.000	1000.00	1.475
RH-106	2486.73	621.92	1273.	-40.	-0.022	126.68	1.479s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2542.62	635.89	303.	-37.	-0.021	100.31	1.491s
I-131	2546.96	636.97	400.	-16.	-0.009	174.93	1.492
CS-137	2646.21	661.79	193.	8784.	4.880	1.14	1.525
PM-144	2785.22	696.54	459.	-39.	-0.021	79.95	1.544s
NB-94	2809.57	702.63	535.	-42.	-0.023	47.28	1.549s
SB-124	2890.19	722.79	357.	19.	0.011	142.49	1.567
AG-108M	2890.80	722.94	264.	30.	0.017	79.17	1.567
EU-154	2892.47	723.36	294.	30.	0.017	83.28	1.567
ZR-95	2895.84	724.20	324.	30.	0.017	87.17	1.568s
BI-212	2907.73	727.17	354.	-16.	-0.009	169.61	1.570s
pm-146	2941.93	735.72	182.	18.	0.010	160.73	1.578s
pm-146	2987.69	747.16	243.	-38.	-0.021	89.23	1.588s
ZR-95	3025.97	756.73	234.	-34.	-0.019	57.91	1.596s
NB-95	3062.21	765.79	225.	-18.	-0.010	118.13	1.604s
EU-152	3114.73	778.92	205.	8.	0.004	398.13	1.615
BI-212	3140.74	785.42	163.	33.	0.019	83.14	1.621s
CS-134	3182.53	795.87	406.	12.	0.006	246.10	1.630s
CS-134	3206.86	801.95	489.	-41.	-0.023	77.12	1.635s
CO-58	3242.16	810.78	504.	19.	0.011	165.73	1.643s
La-140	3262.14	815.77	523.	0.	0.000	1000.00	1.647
Cs-136	3273.06	818.50	523.	0.	0.000	1000.00	1.649s
MN-54	3338.46	834.85	245.	7.	0.004	502.66	1.663s
Co-56	3386.15	846.77	280.	-44.	-0.024	85.82	1.674s
TL-208	3441.33	860.56	180.	61.	0.034	50.02	1.685
NB-94	3483.47	871.10	265.	7.	0.004	331.05	1.695s
EU-154	3492.00	873.23	390.	-18.	-0.010	161.47	1.696s
PA-234	3521.21	880.53	469.	39.	0.022	79.63	1.703s
PA-234	3532.05	883.24	509.	39.	0.022	82.66	1.705s
AG-110M	3537.82	884.68	548.	29.	0.016	115.37	1.706s
Sc-46	3556.21	889.28	628.	-41.	-0.023	87.40	1.710
y-88	3591.26	898.04	315.	-33.	-0.018	119.51	1.718s
AC-228	3643.38	911.07	370.	-24.	-0.013	177.38	1.729s
AG-110M	3749.09	937.49	335.	-27.	-0.015	150.27	1.751s
PA-234	3783.21	946.02	365.	-7.	-0.004	476.97	1.759s
EU-152	3855.58	964.11	533.	-28.	-0.015	119.50	1.774s
AC-228	3875.02	968.97	558.	17.	0.009	200.03	1.778s
EU-154	3984.48	996.33	533.	27.	0.015	124.00	1.801s
EU-154	4018.27	1004.77	272.	15.	0.008	251.25	1.808
Co-56	4150.56	1037.84	256.	-34.	-0.019	108.33	1.836s
Cs-136	4191.49	1048.07	260.	7.	0.004	327.95	1.845s
RH-106	4200.65	1050.36	329.	-40.	-0.022	66.05	1.847s
BI-207	4253.86	1063.66	283.	-47.	-0.026	25.35	1.858s
Ga-68	4308.84	1077.40	272.	-40.	-0.022	95.04	1.870s
FE-59	4396.27	1099.25	230.	8.	0.005	416.62	1.888s
ZN-65	4461.46	1115.55	294.	38.	0.021	65.91	1.901s
BI-214	4480.43	1120.29	334.	26.	0.015	99.92	1.906
Ta-182	4484.49	1121.30	362.	6.	0.003	438.09	1.906s
CO-60	4693.23	1173.47	89.	3717.	2.065	1.76	1.861

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4755.57	1189.05	108.	-14.	-0.008	180.10	1.963s
Ta-182	4885.06	1221.41	79.	-4.	-0.002	484.43	1.990s
Co-56	4952.57	1238.28	80.	-23.	-0.013	284.88	2.004
NA-22	5097.62	1274.53	20.	12.	0.007	59.00	2.034s
EU-154	5097.68	1274.54	24.	10.	0.006	75.59	2.034s
FE-59	5165.91	1291.60	57.	-8.	-0.005	773.72	2.048s
CO-60	5330.69	1332.77	14.	3518.	1.954	1.71	1.995
AG-110M	5536.89	1384.30	18.	-4.	-0.002	261.01	2.124s
EU-152	5631.75	1408.00	18.	0.	0.000	1000.00	2.143s
K-40	5843.19	1460.83	24.	-1.	-0.001	861.97	2.186
La-140	6385.02	1596.21	6.	8.	0.004	85.93	2.294s
SB-124	6764.37	1690.98	25.	-13.	-0.007	97.66	2.369s
BI-214	7058.61	1764.49	57.	-22.	-0.012	26.07	2.427s
y-88	7345.12	1836.06	7.	8.	0.004	90.07	2.483s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.3621E+01					5.31E+01
			477.60	-1.362E+01	?(	4.978E+01	1.10E+02 1.05E+01 G
NA-22	C	7.2386E-01					9.50E+02
			1274.53	7.239E-01	&(	1.391E+00	5.90E+01 9.99E+01 G
K-40	N	-6.8935E-01					4.66E+11
			1460.83	-6.894E-01	?(P	1.564E+01	8.62E+02 1.07E+01 G
Sc-46	F	-1.8556E+00					8.38E+01
			889.28	-1.856E+00	?(	5.381E+00	8.74E+01 1.00E+02 G
			1120.55	-7.884E-02	% P	4.892E+00	1.79E+03 1.00E+02 G
CR-51	F	-1.1431E+01					2.77E+01
			320.08	-1.143E+01	?(	5.835E+01	1.54E+02 9.94E+00 G
MN-54	C	2.9508E-01					3.12E+02
			834.85	2.951E-01	?(P	3.251E+00	5.03E+02 1.00E+02 G
FE-59	F	7.7513E-01					4.45E+01
			1099.25	7.751E-01	?(P	6.854E+00	4.17E+02 5.65E+01 G
			1291.60	-1.169E+00	+ P	5.252E+00	7.74E+02 4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C -1.8920E+00					7.73E+01	
		846.77	-1.892E+00	?(	3.505E+00	8.58E+01	9.99E+01 G
		1238.28	-2.011E+00	+ P	3.881E+00	2.85E+02	6.61E+01 G
		1037.84	-1.217E+01	+	2.765E+01	1.08E+02	1.41E+01 G
		1771.35	-2.451E-01	%	2.056E+01	2.38E+03	1.55E+01 A
CO-58	C 8.1707E-01					7.09E+01	
		810.78	8.171E-01	&(	4.534E+00	1.66E+02	9.95E+01 G
CO-60	F 2.1062E+02					1.93E+03	
		1332.50	2.149E+02	(	1.243E+00	1.71E+00	1.00E+02 G
		1173.24	2.064E+02	(P	2.588E+00	1.76E+00	9.99E+01 G
ZN-65	F 4.0084E+00					2.44E+02	
		1115.55	4.008E+00	&(	8.724E+00	6.59E+01	5.06E+01 G
NB-94	I -1.6041E+00					7.41E+06	
		702.63	-1.604E+00	(P	4.264E+00	4.73E+01	9.79E+01 G
		871.10	3.108E-01	+	3.488E+00	3.31E+02	9.99E+01 G
ZR-95	I -2.4929E+00					6.40E+01	
		756.73	-2.493E+00	?(P	5.425E+00	5.79E+01	5.45E+01 G
		724.20	2.614E+00	+	7.577E+00	8.72E+01	4.42E+01 G
NB-95	I -7.4014E-01					6.40E+01	
		765.79	-7.401E-01	&(	2.933E+00	1.18E+02	9.98E+01 G
RU-103	I 9.5618E-01					3.93E+01	
		497.05	9.562E-01	?(	3.167E+00	1.42E+02	9.09E+01 G
		610.30	1.677E+01	?	9.331E+01	1.67E+02	5.75E+00 GA
RH-106	I -1.3961E+01					3.74E+02	
		621.92	-1.396E+01	?(	5.876E+01	1.27E+02	9.93E+00 G
		1050.36	-1.308E+02	+	2.853E+02	6.60E+01	1.56E+00 G
		511.86	1.255E+01	?	1.732E+01	7.64E+01	2.00E+01 GA
AG-108M	C -3.3241E-02					1.53E+05	
		433.94	-1.339E+00	?(	3.482E+00	1.12E+02	9.05E+01 G
		722.94	1.268E+00	&(	3.333E+00	7.92E+01	9.08E+01 G
		614.28	0.000E+00	+	6.075E+00	1.00E+03	8.98E+01 G
AG-110M	F 1.7945E+00					2.50E+02	
		884.68	1.794E+00	&(	6.900E+00	1.15E+02	7.27E+01 G
		657.76	1.395E-01	%	1.703E+01	3.68E+03	9.46E+01 G
		937.49	-3.681E+00	&	1.200E+01	1.50E+02	3.44E+01 G
		1384.30	-1.035E+00	-	5.819E+00	2.61E+02	2.43E+01 G
		763.94	2.407E-01	%	1.281E+01	1.56E+03	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	1.8906E+00					1.15E+02	
			391.69	1.891E+00	?(	6.144E+00	9.80E+01	6.40E+01 G
SB-124	F	6.7232E-01					6.02E+01	
			602.73	0.000E+00	?(	5.478E+00	1.00E+03	9.83E+01 G
			1690.98	-2.043E+00	+	4.010E+00	9.77E+01	4.78E+01 G
			722.79	6.784E+00	(	3.240E+01	1.42E+02	1.08E+01 G
SB-125	I	2.7675E+00					1.01E+03	
			427.88	7.099E-01	(	1.013E+01	6.11E+02	2.96E+01 G
			600.50	2.906E+00	?(	2.985E+01	3.07E+02	1.79E+01 G
			635.89	-1.159E+01	+	2.603E+01	1.00E+02	1.13E+01 G
			463.37	8.348E+00	?(P	4.452E+01	1.60E+02	1.05E+01 G
I-131	I	3.7216E-01					8.02E+00	
			364.48	3.722E-01	&(	3.212E+00	3.55E+02	8.17E+01 G
			284.30	-9.249E+00	& P	4.411E+01	8.06E+01	6.14E+00 G
			636.97	-8.007E+00	+	4.702E+01	1.75E+02	7.17E+00 G
Gd-153	F	5.1198E-01					2.42E+02	
			97.50	-6.003E-07	&(	1.472E+01	7.39E+08	3.00E+01 G
			103.20	1.217E+00	?(	2.002E+01	4.96E+02	2.18E+01 G
Ga-68	C	-7.3508E+01					4.71E-02	
			1077.40	-7.351E+01	?(	1.462E+02	9.50E+01	3.30E+00 G
Tc-99m	I	-8.9032E-01					2.51E-01	
			140.51	-8.903E-01	(	4.306E+00	1.46E+02	8.93E+01 G
BA-133	F	-2.5333E-01					3.85E+03	
			356.00	-2.011E+00	?(	6.007E+00	9.02E+01	6.20E+01 G
			302.85	5.695E+00	?(	2.785E+01	1.47E+02	1.83E+01 G
			383.84	1.584E+00	&	4.245E+01	8.00E+02	8.94E+00 GA
			80.99	1.781E+00	& P	6.734E+00	1.50E+02	3.41E+01 GA
CS-134	I	7.9761E-01					7.54E+02	
			604.71	0.000E+00	&(	5.527E+00	1.00E+03	9.76E+01 G
			795.87	5.655E-01	?(	4.684E+00	2.46E+02	8.55E+01 G
			569.32	-3.437E+00	&	1.977E+01	1.71E+02	1.54E+01 G
			801.95	-1.986E+01	+	5.072E+01	7.71E+01	8.69E+00 G
			563.24	1.250E+01	&(P	3.024E+01	1.04E+02	8.35E+00 G
CS-137	I	3.7268E+02					1.10E+04	
			661.66	3.727E+02	(	2.859E+00	1.14E+00	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-9.6882E-01					1.38E+02	
			165.85	-9.688E-01	&(P	2.986E+00	1.60E+02	7.99E+01 G
Ba-140	I	6.4744E+00					1.28E+01	
			537.26	3.306E+00	&(	1.103E+01	1.43E+02	2.44E+01 G
			162.66	-3.599E+00	+	3.283E+01	2.73E+02	6.22E+00 G
			304.85	2.449E+01	&(	1.185E+02	1.46E+02	4.29E+00 G
La-140	I	5.8632E-01					1.28E+01	
			1596.21	5.863E-01	?(	1.061E+00	8.59E+01	9.54E+01 G
			487.02	-2.961E+00	&	1.143E+01	1.16E+02	4.55E+01 G
			328.76	-5.900E+00	& P	2.551E+01	6.49E+01	2.03E+01 G
			815.77	0.000E+00	-	1.982E+01	1.00E+03	2.33E+01 G
CE-141	I	1.5630E+00					3.25E+01	
			145.44	1.563E+00	&(	7.612E+00	1.47E+02	4.82E+01 G
CE-144	I	-6.7746E+00					2.85E+02	
			133.54	-6.775E+00	(	3.223E+01	1.44E+02	1.11E+01 G
PM-144	C	-1.4679E+00					3.63E+02	
			696.54	-1.468E+00	&(	3.891E+00	8.00E+01	9.90E+01 G
			618.06	0.000E+00	&	5.533E+00	1.00E+03	9.91E+01 G
EU-152	F	3.8058E+00					4.94E+03	
			344.29	4.484E+00	&(	1.960E+01	1.32E+02	2.65E+01 G
			1112.07	1.171E+00	%	4.062E+01	1.03E+03	1.36E+01 G
			121.78	0.000E+00	}	8.044E+00	3.65E+03	2.86E+01 G
			778.92	2.417E+00	(	2.191E+01	3.98E+02	1.29E+01 G
			964.11	-9.063E+00	&	3.612E+01	1.19E+02	1.46E+01 G
			244.69	-1.304E+01	+	4.625E+01	1.07E+02	7.58E+00 G
			1408.00	0.000E+00	&	6.816E+00	1.00E+03	2.10E+01 GA
EU-154	I	3.9652E+00					3.14E+03	
			873.23	-6.336E+00	?(	3.432E+01	1.61E+02	1.23E+01 G
			123.10	1.694E+00	&	4.942E+00	8.81E+01	4.08E+01 G
			1274.54	1.679E+00	&	4.252E+00	7.56E+01	3.52E+01 G
			723.36	5.699E+00	&(	1.577E+01	8.33E+01	2.02E+01 G
			1004.77	4.110E+00	&(	2.180E+01	2.51E+02	1.80E+01 G
			996.33	1.234E+01	(	5.104E+01	1.24E+02	1.06E+01 G
EU-155	I	-3.4867E+00					1.81E+03	
			105.31	-3.487E+00	(P	1.291E+01	1.78E+02	2.12E+01 G
			86.54	-2.625E+00	+	1.514E+01	1.74E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	3.0443E-01					4.24E+01	
			482.00	-3.847E-01	&(	6.441E+00	5.01E+02	8.05E+01 G
			133.02	-1.732E+00	&	8.293E+00	1.45E+02	4.33E+01 G
			345.83	3.986E+00	?(	3.523E+01	2.66E+02	1.51E+01 G
			136.30	-1.298E+01	+	6.205E+01	1.44E+02	5.85E+00 G
Ta-182	F	9.4704E-01					1.14E+02	
			1121.30	9.470E-01	?(	1.403E+01	4.38E+02	3.49E+01 G
			1221.41	-9.176E-01	+	9.363E+00	4.84E+02	2.70E+01 G
			1189.05	-4.726E+00	+	1.766E+01	1.80E+02	1.62E+01 G
TL-208	N	3.6916E+00					6.98E+02	
			583.02	3.451E+00	(P	2.765E+00	3.76E+01	8.45E+01 G
			277.28	6.910E+00	(P	4.256E+01	1.85E+02	6.31E+00 G
			860.56	2.158E+01	+	2.308E+01	5.00E+01	1.24E+01 G
pm-146	C	-4.3822E+00					2.02E+03	
			747.16	-4.382E+00	?(	8.761E+00	8.92E+01	3.40E+01 G
			735.72	3.128E+00	+	1.140E+01	1.61E+02	2.25E+01 G
			453.88	-4.500E-01	+	5.059E+00	4.82E+02	6.50E+01 G
y-88	F	-1.5977E+00					1.07E+02	
			898.04	-1.598E+00	(	4.136E+00	1.20E+02	9.37E+01 G
			1836.06	6.303E-01	+ P	1.182E+00	9.01E+01	9.92E+01 G
Cd-113m		9.2721E+03					5.33E+03	
			263.70	9.272E+03	&(	4.602E+04	1.49E+02	6.00E-03 K
Cd-109	F	2.1133E+01					4.53E+02	
							Derived Ave Activity	
			88.04	2.113E+01	}(	1.211E+02	1.73E+02	3.79E+00 G
Cf-251	T	8.2173E-01					3.28E+05	
			176.60	8.217E-01	(	1.085E+01	5.20E+02	1.70E+01 G
			227.00	6.263E+00	?	3.461E+01	2.18E+02	6.30E+00 GA
Sn-126		-1.9205E+01					3.65E+07	
			87.57	5.417E-01	}	5.076E+00	2.41E+02	3.75E+01 GA
			64.28	-1.920E+01	(	1.414E+02	2.23E+02	9.70E+00 G
			86.94	-4.370E+00	+	5.094E+01	3.52E+02	9.04E+00 GA
PB-210	N	9.9857E+03					8.14E+03	
			46.54	9.986E+03	(P	1.733E+02	9.11E-01	4.25E+00 G
PB-212	N	8.1414E+00					6.98E+02	
			238.63	8.141E+00	(P	4.133E+00	2.05E+01	4.33E+01 G
			300.03	0.000E+00	}	1.614E+02	2.78E+03	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	6.5205E+00					5.84E+05	
			351.93	6.419E+00	(P	5.004E+00	3.10E+01	3.76E+01 G
			295.09	6.718E+00	*(P	9.352E+00	5.54E+01	1.93E+01 G
			242.00	1.260E+01		4.098E+01	9.81E+01	7.43E+00 GA
BI-207	C	1.2344E+00					1.18E+04	
			569.70	1.234E+00	&(	2.601E+00	6.39E+01	9.77E+01 G
			1063.66	-3.228E+00	- P	5.604E+00	2.54E+01	7.45E+01 G
BI-212	N	-8.1438E+00					6.98E+02	
			727.17	-8.144E+00	?(	4.640E+01	1.70E+02	7.55E+00 G
			785.42	1.069E+02	?	1.997E+02	8.31E+01	1.28E+00 GA
BI-214	N	6.0994E+00					5.84E+05	
			609.31	5.034E+00	(P	4.495E+00	2.87E+01	4.61E+01 G
			1120.29	9.351E+00	(P	3.115E+01	9.99E+01	1.51E+01 G
			1764.49	-1.058E+01	- P	1.855E+01	2.61E+01	1.54E+01 G
BI-210M	T	1.7201E+00					1.10E+09	
			265.83	7.837E-01	&(P	5.330E+00	2.04E+02	5.00E+01 G
			304.90	3.392E+00	&(	1.799E+01	1.60E+02	2.80E+01 G
AC-228	N	-6.2889E-01					2.10E+03	
			911.07	-3.795E+00	(	1.460E+01	1.77E+02	2.90E+01 G
			968.97	4.630E+00	*(	3.104E+01	2.00E+02	1.75E+01 G
			338.32	-9.918E+00	+	4.422E+01	1.34E+02	1.20E+01 G
			93.35	8.235E+00	*	8.013E+01	2.94E+02	5.56E+00 XA
TH-227	N	3.8001E+01					7.95E+03	
			50.14	3.800E+01	!(	7.739E+01	6.18E+01	8.00E+00 G
			256.24	-9.085E+00	+	3.440E+01	1.57E+02	7.00E+00 G
TH-229	N	1.2413E+00					2.68E+06	
			193.51	1.241E+00	&(	5.019E+01	1.59E+03	4.40E+00 G
			210.85	-7.511E+00	& P	7.326E+01	3.81E+02	2.99E+00 G
TH-234	N	-6.1161E+01					1.63E+12	
			63.29	-6.116E+01	(P	3.635E+02	1.42E+02	3.81E+00 G
			92.59	5.764E+00	+ P	8.004E+01	4.19E+02	5.58E+00 G
PA-231	N	3.6224E+01					1.20E+07	
			302.65	3.622E+01	?(	1.788E+02	1.49E+02	2.88E+00 G
			300.07	0.000E+00	}	2.148E+02	2.78E+03	2.46E+00 G
PA-233	C	-3.0799E+00					7.82E+08	
			312.01	-3.080E+00	&(	1.585E+01	1.55E+02	3.60E+01 G
			300.18	-1.751E+01	&	8.614E+01	1.48E+02	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   4.0150E+00                                     1.63E+12
                          131.29-4.141E+00  (  2.001E+01 1.46E+02 1.80E+01 G
                          946.02-2.549E+00 + P 3.230E+01 4.77E+02 1.34E+01 G
                          569.47 5.131E+00 &(  3.408E+01 1.97E+02 8.20E+00 G
                          883.24 1.835E+01 ?(  5.032E+01 8.27E+01 9.60E+00 G
                          880.53 2.926E+01 ?   7.724E+01 7.96E+01 6.00E+00 GA

PA-234M  N  -9.9970E+00                                     1.63E+12
                         1001.00-9.997E+00 %(P 6.653E+02 2.03E+03 8.37E-01 G
                          766.41 2.285E+00 &   1.067E+03 1.37E+04 2.94E-01 G

U-235    N   5.2745E+00                                     2.57E+11
                          143.79 2.687E+00 ?(P 3.501E+01 3.92E+02 1.10E+01 G
                          205.33 1.094E+01 ?(P 4.238E+01 1.53E+02 5.01E+00 G
                          163.38 0.000E+00 -   4.065E+01 1.00E+03 5.08E+00 G

AM-241   T   1.2589E+03                                     1.58E+05
                           59.54 1.259E+03  (P 1.426E+01 7.82E-01 3.59E+01 G

Np-237   F  -6.1540E+00                                     2.14E+06
                           86.49-6.154E+00 ?(  3.567E+01 1.75E+02 1.31E+01 G

Ir-192   F   2.7724E-01                                     7.40E+01
                          316.49-1.291E+00 ?(  6.572E+00 1.54E+02 8.70E+01 G
                          468.06 2.915E+00  (  8.165E+00 8.46E+01 5.18E+01 G
                          308.44-3.454E+00 &   1.796E+01 1.57E+02 3.18E+01 G

Cs-136   F   1.9810E-01                                     1.30E+01
                          818.50 0.000E+00 ?(  4.626E+00 1.00E+03 1.00E+02 G
                         1048.07 4.457E-01 ?(  4.957E+00 3.28E+02 8.00E+01 G
                          340.57-2.540E+00 &   1.084E+01 1.29E+02 4.69E+01 G

Np-239   T  -3.3506E+00                                     2.36E+00
                          103.70 0.000E+00 &   1.820E+01 1.00E+03 2.40E+01 X
                          106.13-3.351E+00 ?(  1.273E+01 1.15E+02 2.27E+01 G
                           99.50 5.194E+00 &   2.911E+01 1.69E+02 1.50E+01 X

Nd-147       9.0104E-01                                     1.11E+01
                          531.00-3.233E+00 &(  2.116E+01 2.79E+02 1.30E+01 G
                           91.10 2.800E+00 ?(  1.592E+01 1.72E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
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@ - 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-234	63.29	36069.	-149.	-0.083	141.72	-6.116E+01	P
BA-133	80.99	1448.	48.	0.026	150.26	1.781E+00	P
Np-237	86.49	6546.	-66.	-0.036	175.10	-6.154E+00	
EU-155	86.54	6481.	-66.	-0.036	174.23	-2.625E+00	
Nd-147	91.10	6346.	66.	0.037	171.70	2.800E+00	
TH-234	92.59	6319.	27.	0.015	418.88	5.764E+00	P
AC-228	93.35	6316.	38.	0.021	293.60	8.235E+00	
Np-239	99.50	6265.	66.	0.037	169.28	5.194E+00	
Gd-153	103.20	6331.	23.	0.013	496.14	1.217E+00	
EU-155	105.31	2482.	-63.	-0.035	177.55	-3.487E+00	P
Np-239	106.13	2770.	-65.	-0.036	114.69	-3.351E+00	
EU-154	123.10	1309.	59.	0.033	88.12	1.694E+00	
PA-234	131.29	4092.	-62.	-0.035	145.88	-4.141E+00	
HF-181	133.02	4029.	-62.	-0.035	144.56	-1.732E+00	
CE-144	133.54	3980.	-62.	-0.035	143.61	-6.775E+00	
HF-181	136.30	4042.	-63.	-0.035	144.37	-1.298E+01	
Tc-99m	140.51	4167.	-63.	-0.035	146.02	-8.903E-01	
Ba-140	162.66	1027.	-17.	-0.009	272.98	-3.599E+00	
CE-139	165.85	1423.	-58.	-0.032	160.48	-9.688E-01	P
Cf-251	176.60	770.	10.	0.006	520.10	8.217E-01	
TH-229	210.85	848.	-14.	-0.008	381.43	-7.511E+00	P
Cf-251	227.00	755.	24.	0.013	218.22	6.263E+00	
Cd-113m	263.70	984.	30.	0.017	149.00	9.272E+03	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	905.	21.	0.012	203.68	7.837E-01	P
PA-233	300.18	3109.	-53.	-0.030	148.43	-1.751E+01	
BA-133	302.85	2802.	51.	0.028	147.46	5.695E+00	
Ba-140	304.85	2751.	51.	0.028	145.91	2.449E+01	
BI-210M	304.90	2700.	46.	0.026	159.83	3.392E+00	
Ir-192	308.44	3414.	-53.	-0.029	156.87	-3.454E+00	
PA-233	312.01	3361.	-53.	-0.029	155.25	-3.080E+00	
Ir-192	316.49	3308.	-53.	-0.030	153.51	-1.291E+00	
CR-51	320.08	3346.	-53.	-0.030	153.97	-1.143E+01	
La-140	328.76	2559.	-55.	-0.031	64.91	-5.900E+00	P
Cf-249	333.44	2531.	-54.	-0.030	133.59	-7.572E+00	
AC-228	338.32	2584.	-54.	-0.030	134.49	-9.918E+00	
Cs-136	340.57	2345.	-53.	-0.030	128.77	-2.540E+00	
HF-181	345.83	2502.	27.	0.015	265.90	3.986E+00	
BA-133	356.00	1170.	-54.	-0.030	90.19	-2.011E+00	
BA-133	383.84	1086.	6.	0.003	800.07	1.584E+00	
SN-113	391.69	1133.	49.	0.027	97.99	1.891E+00	
SB-125	427.88	572.	8.	0.004	611.27	7.099E-01	
AG-108M	433.94	620.	-46.	-0.025	112.25	-1.339E+00	
pm-146	453.88	633.	-11.	-0.006	482.31	-4.500E-01	
SB-125	463.37	1250.	31.	0.017	160.22	8.348E+00	P
Ir-192	468.06	1008.	54.	0.030	84.57	2.915E+00	
BE-7	477.60	1514.	-50.	-0.028	110.19	-1.362E+01	
HF-181	482.00	1464.	-11.	-0.006	501.42	-3.847E-01	
La-140	487.02	1451.	-47.	-0.026	116.35	-2.961E+00	
RH-106	511.86	588.	84.	0.047	76.40	1.255E+01	
Nd-147	531.00	347.	-14.	-0.008	279.40	-3.233E+00	
Ba-140	537.26	325.	26.	0.014	142.89	3.306E+00	
CS-134	563.24	265.	33.	0.018	103.71	1.250E+01	P
CS-134	569.32	383.	-16.	-0.009	171.32	-3.437E+00	
PA-234	569.47	322.	13.	0.007	197.17	5.131E+00	
SB-125	600.50	1117.	15.	0.009	307.46	2.906E+00	
RH-106	621.92	1273.	-40.	-0.022	126.68	-1.396E+01	
SB-125	635.89	303.	-37.	-0.021	100.31	-1.159E+01	
PM-144	696.54	459.	-39.	-0.021	79.95	-1.468E+00	
NB-94	702.63	535.	-42.	-0.023	47.28	-1.604E+00	P
AG-108M	722.94	264.	30.	0.017	79.17	1.268E+00	
EU-154	723.36	294.	30.	0.017	83.28	5.699E+00	
ZR-95	724.20	324.	30.	0.017	87.17	2.614E+00	
BI-212	727.17	354.	-16.	-0.009	169.61	-8.144E+00	
pm-146	735.72	182.	18.	0.010	160.73	3.128E+00	
pm-146	747.16	243.	-38.	-0.021	89.23	-4.382E+00	
ZR-95	756.73	234.	-34.	-0.019	57.91	-2.493E+00	P
NB-95	765.79	225.	-18.	-0.010	118.13	-7.401E-01	
BI-212	785.42	163.	33.	0.019	83.14	1.069E+02	
CS-134	795.87	406.	12.	0.006	246.10	5.655E-01	
CS-134	801.95	489.	-41.	-0.023	77.12	-1.986E+01	
CO-58	810.78	504.	19.	0.011	165.73	8.171E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
MN-54	834.85	245.	7.	0.004	502.66	2.951E-01		P
Co-56	846.77	280.	-44.	-0.024	85.82	-1.892E+00		
NB-94	871.10	265.	7.	0.004	331.05	3.108E-01		
EU-154	873.23	390.	-18.	-0.010	161.47	-6.336E+00		
PA-234	880.53	469.	39.	0.022	79.63	2.926E+01		
PA-234	883.24	509.	39.	0.022	82.66	1.835E+01		
AG-110M	884.68	548.	29.	0.016	115.37	1.794E+00		
Sc-46	889.28	628.	-41.	-0.023	87.40	-1.856E+00		
y-88	898.04	315.	-33.	-0.018	119.51	-1.598E+00		
AC-228	911.07	370.	-24.	-0.013	177.38	-3.795E+00		
AG-110M	937.49	335.	-27.	-0.015	150.27	-3.681E+00		
PA-234	946.02	365.	-7.	-0.004	476.97	-2.549E+00		P
AC-228	968.97	558.	17.	0.009	200.03	4.630E+00		
EU-154	996.33	533.	27.	0.015	124.00	1.234E+01		
EU-154	1004.77	272.	15.	0.008	251.25	4.110E+00		
Co-56	1037.84	256.	-34.	-0.019	108.33	-1.217E+01		
Cs-136	1048.07	260.	7.	0.004	327.95	4.457E-01		
RH-106	1050.36	329.	-40.	-0.022	66.05	-1.308E+02		
Ga-68	1077.40	272.	-40.	-0.022	95.04	-7.351E+01		
FE-59	1099.25	230.	8.	0.005	416.62	7.751E-01		P
ZN-65	1115.55	294.	38.	0.021	65.91	4.008E+00		
Ta-182	1121.30	362.	6.	0.003	438.09	9.470E-01		
Ta-182	1189.05	108.	-14.	-0.008	180.10	-4.726E+00		
Ta-182	1221.41	79.	-4.	-0.002	484.43	-9.176E-01		
Co-56	1238.28	80.	-23.	-0.013	284.88	-2.011E+00		P
NA-22	1274.53	20.	12.	0.007	59.00	7.239E-01		
EU-154	1274.54	24.	10.	0.006	75.59	1.679E+00		
FE-59	1291.60	57.	-8.	-0.005	773.72	-1.169E+00		P
AG-110M	1384.30	18.	-4.	-0.002	261.01	-1.035E+00		
K-40	1460.83	24.	-1.	-0.001	861.97	-6.894E-01		P
La-140	1596.21	6.	8.	0.004	85.93	5.863E-01		
y-88	1836.06	7.	8.	0.004	90.07	6.303E-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	-1.3621E+01	-1.3621E+01	1.102E+02%	4.98E+01
NA-22	#A	7.2386E-01	7.2386E-01	5.900E+01%	1.39E+00
K-40	#A	-6.8935E-01	-6.8935E-01	8.620E+02%	1.56E+01
Sc-46	#A	-1.8556E+00	-1.8556E+00	8.740E+01%	5.38E+00
CR-51	#A	-1.1431E+01	-1.1431E+01	1.540E+02%	5.83E+01
MN-54	#A	2.9508E-01	2.9508E-01	5.027E+02%	3.25E+00
FE-59	#A	7.7513E-01	7.7513E-01	4.166E+02%	6.85E+00
Co-56	#A	-1.8920E+00	-1.8920E+00	8.582E+01%	3.51E+00

CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.43E+01
CO-58	#A	8.1707E-01	8.1707E-01	1.657E+02%	4.53E+00
CO-60		2.1062E+02	2.1062E+02	1.229E+00%	1.24E+00
ZN-65	#A	4.0083E+00	4.0084E+00	6.591E+01%	8.72E+00
NB-94	#A	-1.6041E+00	-1.6041E+00	4.728E+01%	4.26E+00
ZR-95	#A	-2.4929E+00	-2.4929E+00	5.791E+01%	5.43E+00
NB-95	#A	-7.4014E-01	-7.4014E-01	1.181E+02%	2.93E+00
RU-103	#A	9.5618E-01	9.5618E-01	1.423E+02%	3.17E+00
RH-106	#A	-1.3961E+01	-1.3961E+01	1.267E+02%	5.88E+01
AG-108M	#A	-3.3241E-02	-3.3241E-02	6.868E+01%	3.48E+00
AG-110M	#A	1.7945E+00	1.7945E+00	1.154E+02%	6.90E+00
SN-113	#A	1.8906E+00	1.8906E+00	9.799E+01%	6.14E+00
SB-124	A	6.7232E-01	6.7232E-01	1.425E+02%	5.48E+00
SB-125	#A	2.7675E+00	2.7675E+00	1.602E+02%	1.01E+01
I-131	#A	3.7215E-01	3.7216E-01	3.549E+02%	3.21E+00
Gd-153	#A	5.1198E-01	5.1198E-01	4.961E+02%	1.47E+01
Ga-68	#A	-7.3295E+01	-7.3508E+01	9.504E+01%	1.46E+02
Tc-99m	#A	-8.8984E-01	-8.9032E-01	1.460E+02%	4.31E+00
BA-133	#A	-2.5333E-01	-2.5333E-01	8.643E+01%	6.01E+00
CS-134	#A	7.9761E-01	7.9761E-01	1.037E+02%	5.53E+00
CS-137		3.7268E+02	3.7268E+02	1.142E+00%	2.86E+00
CE-139	#A	-9.6882E-01	-9.6882E-01	1.605E+02%	2.99E+00
Ba-140	#A	6.4743E+00	6.4744E+00	1.021E+02%	1.10E+01
La-140	#A	5.8631E-01	5.8632E-01	8.593E+01%	1.06E+00
CE-141	#A	1.5630E+00	1.5630E+00	1.470E+02%	7.61E+00
CE-144	#A	-6.7746E+00	-6.7746E+00	1.436E+02%	3.22E+01
PM-144	#A	-1.4679E+00	-1.4679E+00	7.995E+01%	3.89E+00
EU-152	A	3.8058E+00	3.8058E+00	1.318E+02%	1.96E+01
EU-154	#A	3.9652E+00	3.9652E+00	8.328E+01%	3.43E+01
EU-155	#A	-3.4867E+00	-3.4867E+00	1.776E+02%	1.29E+01
HF-181	#A	3.0443E-01	3.0443E-01	2.659E+02%	6.44E+00
Ta-182	#A	9.4704E-01	9.4704E-01	4.381E+02%	1.40E+01
Hg-203	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.36E+00
TL-208		3.6916E+00	3.6916E+00	3.756E+01%	2.77E+00
pm-146	#A	-4.3822E+00	-4.3822E+00	8.923E+01%	8.76E+00
y-88	#A	-1.5977E+00	-1.5977E+00	1.195E+02%	4.14E+00
Cd-113m	#A	9.2721E+03	9.2721E+03	1.490E+02%	4.60E+04
Cd-109	#A	2.1133E+01	2.1133E+01	1.731E+02%	1.21E+02
Cf-251	#A	8.2173E-01	8.2173E-01	5.201E+02%	1.08E+01
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.81E+00
Sn-126	A	-1.9205E+01	-1.9205E+01	2.230E+02%	1.41E+02
PB-210		9.9857E+03	9.9857E+03	9.107E-01%	1.73E+02
PB-212		8.1414E+00	8.1414E+00	2.050E+01%	4.13E+00
PB-214		6.5205E+00	6.5205E+00	3.096E+01%	5.00E+00
BI-207	#A	1.2344E+00	1.2344E+00	6.388E+01%	2.60E+00
BI-212	#A	-8.1438E+00	-8.1438E+00	1.696E+02%	4.64E+01
BI-214		6.0994E+00	6.0994E+00	2.868E+01%	4.49E+00
BI-210M	#A	1.7201E+00	1.7201E+00	1.295E+02%	5.33E+00
AC-228	#A	-6.2889E-01	-6.2889E-01	1.337E+02%	1.46E+01

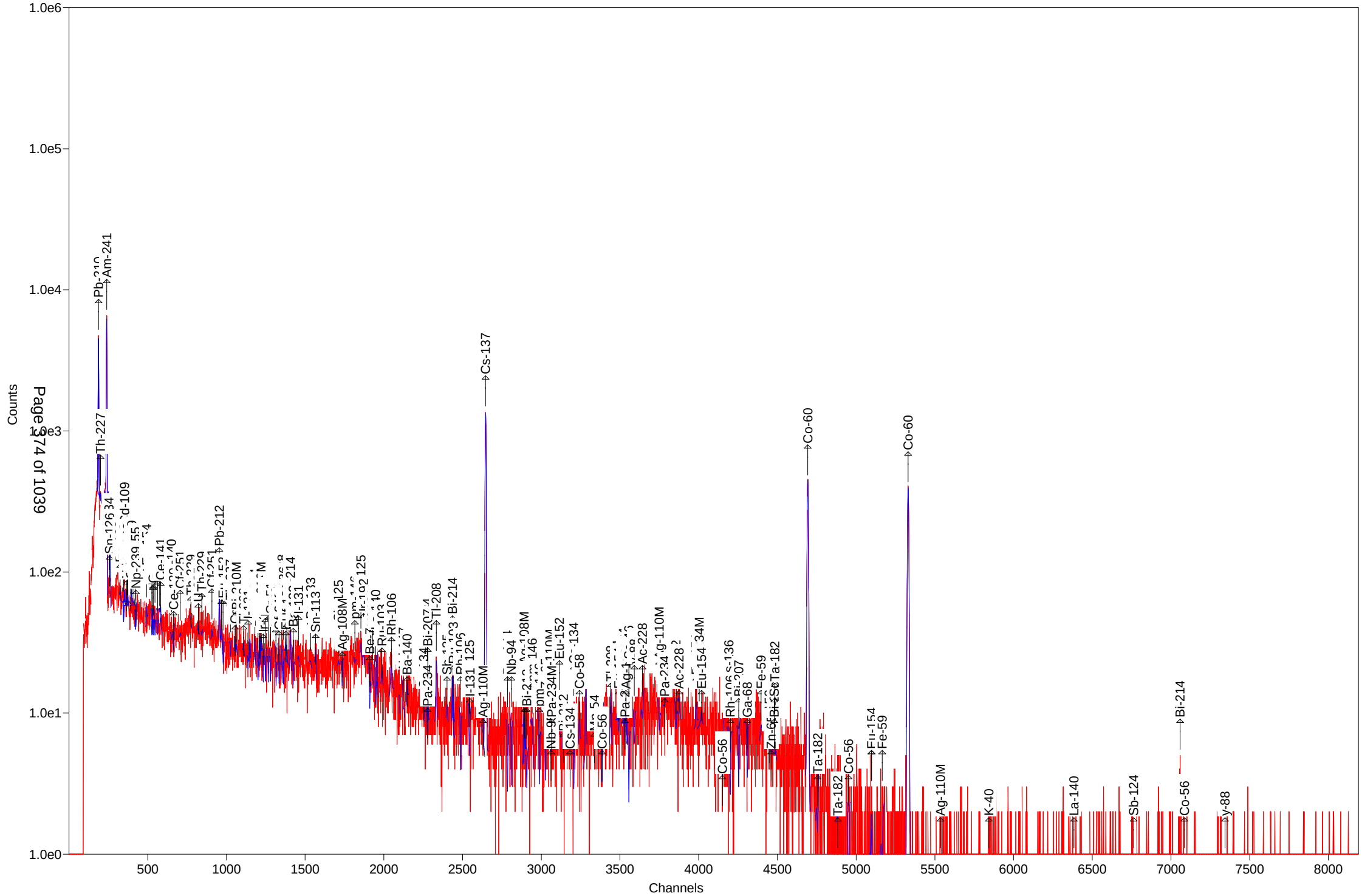
TH-227 #A	3.8001E+01	3.8001E+01	6.180E+01%	7.74E+01
TH-229 #A	1.2413E+00	1.2413E+00	1.594E+03%	5.02E+01
TH-234 #A	-6.1161E+01	-6.1161E+01	1.417E+02%	3.63E+02
PA-231 #A	3.6224E+01	3.6224E+01	1.488E+02%	1.79E+02
PA-233 #A	-3.0799E+00	-3.0799E+00	1.553E+02%	1.59E+01
PA-234 #A	4.0150E+00	4.0150E+00	8.266E+01%	2.00E+01
PA-234M#A	-9.9970E+00	-9.9970E+00	2.034E+03%	6.65E+02
U-235 #A	5.2745E+00	5.2745E+00	1.534E+02%	3.50E+01
AM-241	1.2589E+03	1.2589E+03	7.817E-01%	1.43E+01
Np-237 #A	-6.1540E+00	-6.1540E+00	1.751E+02%	3.57E+01
Ir-192 #A	2.7724E-01	2.7724E-01	8.457E+01%	6.57E+00
Cs-136 #A	1.9810E-01	1.9810E-01	3.279E+02%	4.63E+00
Np-239 #A	-3.3504E+00	-3.3506E+00	1.147E+02%	1.27E+01
Nd-147 #A	9.0103E-01	9.0104E-01	1.640E+02%	2.12E+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) 1.185E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 1.1852344E+04 Bq/Sample

257318_Gamma_LCS 160-257318~2-A. 16_Gamma_20161653.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20161796

Sample Description: 257318_Gamma_160-17797-A-1-B
Detector: Detector #14
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-1-B

Decay to Time: 7/12/2016 09:59 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:00:00 Real Time: 1806 sec
Analysis Time: 7/12/2016 10:30 Dead Time: 0.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev11.lib
Bkgd Correction File: 14_2016-07-10_0624.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	3.801E+00	96.9	3.684E+00	3.689E+00	1.244E+01
NA-22	-1.203E-01	445.0	5.354E-01	5.354E-01	1.933E+00
K-40	2.325E+02	6.0	1.395E+01	1.833E+01	1.309E+01
Sc-46	7.527E-01	67.2	5.056E-01	5.070E-01	1.887E+00
CR-51	-3.892E+00	95.2	3.705E+00	3.711E+00	1.330E+01
MN-54	-4.335E-01	117.5	5.093E-01	5.097E-01	1.515E+00
FE-59	-2.261E-01	496.7	1.123E+00	1.123E+00	2.663E+00
Co-56	1.638E+00	22.5	3.681E-01	3.776E-01	1.303E+00
CO-57	-7.344E-03	4964.9	3.646E-01	3.646E-01	1.132E+00
CO-58	-7.692E-01	88.9	6.841E-01	6.853E-01	2.295E+00
CO-60	9.112E-01	52.5	4.782E-01	4.804E-01	1.045E+00
ZN-65	-1.866E+00	94.7	1.768E+00	1.770E+00	5.945E+00
NB-94	5.454E-01	31.6	1.725E-01	1.748E-01	1.201E+00
ZR-95	1.565E-01	201.9	3.161E-01	3.162E-01	2.616E+00
NB-95	5.315E-01	83.6	4.444E-01	4.452E-01	1.496E+00
RU-103	-2.491E-01	183.3	4.568E-01	4.569E-01	1.254E+00
RH-106	1.707E-01	64.5	1.102E-01	1.105E-01	1.629E+01
AG-108M	-5.321E-01	84.5	4.495E-01	4.503E-01	1.252E+00
AG-110M	4.272E-01	97.9	4.183E-01	4.188E-01	2.789E+00
SN-113	4.350E-01	133.7	5.815E-01	5.819E-01	1.978E+00
SB-124	-6.456E-01	89.1	5.750E-01	5.760E-01	3.768E+00
SB-125	2.701E+00	34.2	9.241E-01	9.343E-01	3.778E+00
I-131	-1.155E-01	105.0	1.213E-01	1.214E-01	1.342E+00
Gd-153	-2.415E-01	405.1	9.785E-01	9.786E-01	3.322E+00
Ga-68	3.576E+01	50.1	1.793E+01	1.804E+01	3.899E+01
Tc-99m	3.114E-01	130.8	4.072E-01	4.076E-01	1.364E+00
BA-133	-7.369E-01	160.5	1.182E+00	1.183E+00	3.966E+00
CS-134	2.989E-01	52.5	1.570E-01	1.578E-01	3.680E+00
CS-137	5.610E+00	10.2	5.726E-01	6.427E-01	5.973E-01
CE-139	-4.213E-01	118.6	4.998E-01	5.014E-01	1.670E+00
Ba-140	-1.951E-01	1711.8	3.340E+00	3.340E+00	4.103E+00
La-140	3.818E-02	93.4	3.567E-02	3.573E-02	1.998E+00
CE-141	5.224E-01	112.6	5.881E-01	5.887E-01	1.583E+00

CE-144	-1.588E+00	182.2	2.893E+00	2.895E+00	1.240E+01
PM-144	5.779E-01	82.5	4.769E-01	4.779E-01	1.179E+00
EU-152	7.946E-01	104.4	8.297E-01	8.307E-01	7.450E+00
EU-154	-6.711E-02	65.4	4.391E-02	4.405E-02	1.312E+01
EU-155	7.944E-01	164.0	1.303E+00	1.303E+00	4.938E+00
HF-181	-6.036E-01	100.6	6.070E-01	6.078E-01	2.043E+00
Ta-182	-1.163E+00	204.1	2.374E+00	2.374E+00	8.174E+00
Hg-203	8.553E-02	520.1	4.449E-01	4.449E-01	1.529E+00
TL-208	7.378E+00	8.8	6.482E-01	7.528E-01	8.496E-01
pm-146	7.089E-01	102.0	7.234E-01	7.243E-01	3.353E+00
y-88	-7.337E-02	821.2	6.026E-01	6.026E-01	1.710E+00
Cd-113m	1.706E+03	309.2	5.275E+03	5.276E+03	1.812E+04
Cd-109	7.804E+00	189.9	1.482E+01	1.483E+01	4.948E+01
Cf-251	1.416E+00	134.0	1.897E+00	1.901E+00	5.121E+00
Cf-249	7.331E-01	78.5	5.755E-01	5.768E-01	1.697E+00
Sn-126	-1.775E+00	260.2	4.619E+00	4.620E+00	1.558E+01
PB-210	2.237E+01	48.2	1.078E+01	1.086E+01	2.981E+01
PB-212	1.805E+01	5.9	1.067E+00	1.582E+00	2.050E+00
PB-214	1.609E+01	8.5	1.360E+00	1.597E+00	2.291E+00
BI-207	7.618E-01	32.0	2.438E-01	2.470E-01	1.959E+00
BI-212	3.436E+01	15.9	5.453E+00	5.737E+00	8.637E+00
BI-214	1.404E+01	9.5	1.339E+00	1.524E+00	2.721E+00
BI-210M	-8.118E-01	96.1	7.800E-01	7.815E-01	2.610E+00
AC-228	2.085E+01	9.4	1.961E+00	2.231E+00	1.393E+00
TH-227	3.701E+00	159.4	5.901E+00	5.904E+00	1.686E+01
TH-229	-5.404E+00	216.8	1.172E+01	1.172E+01	2.053E+01
TH-234	2.204E+00	564.8	1.245E+01	1.245E+01	3.574E+01
PA-231	8.385E+00	145.2	1.217E+01	1.218E+01	6.091E+01
PA-233	1.485E+00	97.1	1.443E+00	1.445E+00	3.382E+00
PA-234	4.244E-01	70.2	2.979E-01	2.987E-01	7.246E+00
PA-234M	7.702E+01	77.6	5.977E+01	5.990E+01	1.944E+02
U-235	1.339E+00	193.7	2.594E+00	2.595E+00	1.120E+01
AM-241	-6.563E-01	206.2	1.353E+00	1.354E+00	3.849E+00
Np-237	2.271E+00	184.0	4.178E+00	4.180E+00	1.395E+01
Ir-192	-1.355E-01	256.9	3.482E-01	3.483E-01	1.203E+00
Cs-136	-3.898E-01	202.2	7.882E-01	7.885E-01	2.692E+00
Np-239	0.000E+00	1.#INF	7.896E-01	7.896E-01	4.521E+00
Nd-147	-4.503E+00	95.2	4.285E+00	4.293E+00	1.059E+01
Total	2.237E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-1-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20161796.An1

Acquisition information
Start time: 7/12/2016 10:00:00 AM
Live time: 1800
Real time: 1806
Dead time: 0.33 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/12/2016 9:59:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2016-07-10_0624.PBC 7/10/2016 6:24:26 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2005

***** 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
46.53	37.	48.20	0.75	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	13.	159.42	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
63.24	5.	564.84	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
74.84	196.	11.89	0.78	3.812E-02				
77.20	307.	8.36	0.78	3.898E-02				
84.52	84.	23.45	1.54	4.116E-02				
86.49	22.	184.01	0.79	4.163E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.687E-01	EU155
86.54	22.	186.37	0.79	4.164E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.690E-01	EU155
86.94	22.	188.70	0.79	4.173E-02	86.94	9.040	PBC<MDA	Sn126
87.57	22.	190.87	0.79	4.186E-02	87.57	37.500	PBC<MDA	Sn126
88.04	22.	189.91	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
92.96	150.	16.69	1.78	4.291E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.500E+01	AC228
99.50	7.	364.35	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
105.31	9.	269.83	0.81	4.403E-02	105.31	21.200	PBC<MDA	EU155
123.10	19.	106.68	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
140.51	20.	130.75	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	19.	112.58	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
176.60	16.	133.95	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
205.33	12.	193.74	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
208.68	74.	24.72	0.92	3.250E-02				
238.20	426.	6.00	1.04	2.935E-02	238.63	43.300	1.825E+01	PB212
241.59	20.	191.00	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	17.	222.58	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
263.70	5.	309.19	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m
276.50	17.	90.19	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
279.20	3.	520.09	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
284.30	2.	913.04	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.80	121.	13.30	1.01	2.489E-02	295.09	19.300	1.347E+01	PB214
299.35	14.	142.59	1.01	2.455E-02	300.03	3.280	PBC<MDA	PB212
300.07	15.	145.18	1.01	2.455E-02	300.07	2.460	PBC<MDA	PA231
					300.18	6.200	5.416E+00	PA233
300.18	15.	149.71	1.01	2.454E-02	300.07	2.460	PBC<MDA	PA231
					300.18	6.200	5.417E+00	PA233
302.65	5.	460.56	1.01	2.438E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	6.117E-01	BA133
312.01	12.	123.77	1.02	2.381E-02	312.01	36.000	PBC<MDA	PA233
328.76	16.	104.52	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	103.03	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
337.96	134.	11.63	1.05	2.237E-02	338.32	12.010	2.778E+01	AC228
351.66	244.	8.07	1.41	2.169E-02	351.93	37.600	1.609E+01	PB214
383.84	12.	130.70	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	10.	118.47	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
391.69	10.	133.68	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
453.88	11.	102.04	1.15	1.774E-02	453.88	65.000	PBC<MDA	pm146
463.37	36.	34.22	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
477.60	12.	96.92	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
487.02	6.	200.00	1.18	1.677E-02	487.02	45.500	PBC<MDA	La140
511.86	72.	31.42	2.46	1.612E-02	511.86	20.000	1.244E+01	RH106
563.24	17.	52.52	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
583.08	163.	8.79	1.68	1.453E-02	583.02	84.500	7.378E+00	TL208
609.05	200.	7.36	1.64	1.403E-02	609.31	46.090	1.645E+01	BI214
					610.30	5.750	1.381E+02	RU103
618.06	16.	135.90	1.30	1.387E-02	618.06	99.100	PBC<MDA	PM144
635.89	10.	77.46	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
636.97	6.	104.97	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
661.08	113.	10.21	1.35	1.313E-02	661.66	85.210	5.610E+00	CS137
696.54	12.	93.66	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
702.63	4.	264.97	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
724.20	6.	209.72	1.40	1.221E-02	724.20	44.150	PBC<MDA	ZR95
727.01	57.	15.87	1.12	1.217E-02	727.17	7.550	3.436E+01	BI212
735.72	5.	247.22	1.41	1.206E-02	735.72	22.500	PBC<MDA	pm146
747.16	6.	156.98	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
763.94	10.	97.90	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M
765.79	11.	83.61	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.805E+02	PA234M
766.41	8.	118.25	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.354E+02	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.08	32.	24.15	0.87	1.144E-02	785.42	1.280	1.221E+02	BI212
795.89	11.	88.87	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
846.77	4.	284.30	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
859.71	30.	28.73	1.51	1.062E-02	860.56	12.420	1.244E+01	TL208
871.10	17.	31.63	1.52	1.052E-02	871.10	99.890	9.021E-01	NB94
889.28	10.	100.14	1.54	1.034E-02	889.28	99.984	PBC<MDA	Sc46
910.77	114.	9.41	1.12	1.014E-02	911.07	29.000	2.149E+01	AC228
937.49	5.	146.39	1.58	9.905E-03	937.49	34.360	PBC<MDA	AG110M
946.02	8.	91.92	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
964.11	8.	160.99	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.74	60.	16.32	1.95	9.642E-03	968.97	17.460	1.978E+01	AC228
996.33	8.	87.41	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1001.00	8.	100.53	1.63	9.389E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	8.	83.01	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	21.	32.00	1.67	8.934E-03	1063.66	74.500	1.753E+00	BI207
1077.40	16.	50.13	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1119.95	12.	121.52	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	15.	89.54	1.72	8.561E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.500E-01	Sc46
					1121.30	34.900	2.723E+00	Ta182
1238.28	36.	22.47	1.80	7.886E-03	1238.28	66.070	3.830E+00	Co56
1332.50	12.	52.48	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	7.	89.07	1.92	7.092E-03	1408.00	21.005	PBC<MDA	EU152
1460.65	307.	6.00	2.32	6.879E-03	1460.83	10.670	2.325E+02	K40
1690.98	1.	427.57	2.10	6.091E-03	1690.98	47.790	PBC<MDA	SB124
1764.60	-2.	371.86	2.14	5.878E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	88.16	2.15	5.859E-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	
298.75	74.81	172.	196.	5.130E+03	11.89	0.777	-	sD
308.16	77.16	175.	307.	7.866E+03	8.36	0.780	-	sD
337.43	84.52	126.	55.	1.344E+03	31.67	0.787	-	sD
833.96	208.68	68.	74.	2.277E+03	24.72	0.917	-	

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	185.52	46.53	101.	37.	0.021	48.20	0.752
TH-227	199.98	50.14	147.	13.	0.007	159.42	0.751s
AM-241	237.55	59.54	249.	-13.	-0.007	206.19	0.761s
TH-234	252.55	63.29	278.	5.	0.003	564.84	0.765
Sn-126	256.52	64.28	356.	-10.	-0.006	260.21	0.766
BA-133	323.33	80.99	232.	-6.	-0.003	491.72	0.784s
Np-237	345.33	86.49	830.	22.	0.012	184.01	0.789s
EU-155	345.54	86.54	852.	22.	0.012	186.37	0.790s
Sn-126	347.13	86.94	874.	22.	0.012	188.70	0.790
Sn-126	349.65	87.57	897.	22.	0.012	190.87	0.791
Cd-109	351.53	88.04	889.	22.	0.012	189.91	0.791s
Nd-147	363.77	91.10	1221.	-25.	-0.014	202.37	0.794s
AC-228	371.20	92.96	131.	150.	0.084	16.69	1.779s
Gd-153	389.36	97.50	261.	-6.	-0.003	405.11	0.801s
Np-239	397.36	99.50	292.	7.	0.004	364.35	0.803s
Gd-153	412.15	103.20	334.	-15.	-0.009	170.57	0.807s
Np-239	414.15	103.70	350.	0.	0.000	1000.00	0.807s
EU-155	420.60	105.31	297.	9.	0.005	269.83	0.809s
Np-239	423.87	106.13	285.	0.	0.000	1000.00	0.810s
EU-152	486.43	121.78	243.	-7.	-0.004	366.85	0.826s
EU-154	491.73	123.10	193.	19.	0.010	106.68	0.828
PA-234	524.50	131.29	445.	-23.	-0.013	106.11	0.836s
HF-181	531.42	133.02	468.	-23.	-0.013	106.26	0.838
CE-144	533.47	133.54	490.	-14.	-0.008	182.17	0.838s
CO-57	545.21	136.47	487.	-25.	-0.014	129.58	0.841s
Tc-99m	561.35	140.51	344.	20.	0.011	130.75	0.845s
CE-141	581.07	145.44	134.	19.	0.010	112.58	0.850s
Ba-140	649.93	162.66	342.	-23.	-0.013	116.70	0.868s
U-235	652.81	163.38	367.	-25.	-0.014	128.23	0.869s
CE-139	662.70	165.85	376.	-23.	-0.013	118.63	0.871s
Cf-251	705.68	176.60	140.	16.	0.009	133.95	0.882s
TH-229	773.30	193.51	131.	-15.	-0.008	216.82	0.899s
U-235	820.58	205.33	271.	12.	0.007	193.74	0.912s
TH-229	842.65	210.85	283.	0.	0.000	1000.00	0.917s
PB-212	953.75	238.63	90.	412.	0.229	5.91	0.945D
PB-214	967.21	242.00	703.	20.	0.011	191.00	0.948s
EU-152	977.99	244.69	696.	17.	0.009	222.58	0.951s
TH-227	1024.17	256.24	90.	0.	0.000	1000.00	0.962
Cd-113m	1054.01	263.70	117.	5.	0.003	309.19	0.970s
BI-210M	1062.53	265.83	169.	-20.	-0.011	96.08	0.972s
TL-208	1108.33	277.28	104.	17.	0.009	90.19	0.983s
Hg-203	1115.99	279.20	142.	3.	0.002	520.09	0.985s
I-131	1136.39	284.30	70.	2.	0.001	913.04	0.990
PB-214	1178.37	294.80	42.	116.	0.065	13.95	1.006

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	1199.30	300.03	204.	14.	0.008	142.59	1.006s
PA-231	1199.46	300.07	224.	15.	0.008	145.18	1.006s
PA-233	1199.90	300.18	239.	15.	0.008	149.71	1.006s
PA-231	1209.78	302.65	254.	5.	0.003	460.56	1.008s
BA-133	1210.59	302.85	259.	0.	0.000	1000.00	1.009
Ir-192	1232.94	308.44	182.	-15.	-0.008	129.79	1.014s
PA-233	1247.22	312.01	113.	12.	0.007	123.77	1.018
Ir-192	1265.13	316.49	80.	-5.	-0.003	256.90	1.022s
CR-51	1279.51	320.08	129.	-16.	-0.009	95.19	1.026s
La-140	1314.21	328.76	74.	16.	0.009	104.52	1.034s
Cf-249	1332.92	333.44	48.	13.	0.007	103.03	1.039
AC-228	1351.01	337.96	25.	134.	0.075	11.67	1.047s
Cs-136	1361.44	340.57	288.	-15.	-0.008	162.12	1.045s
EU-152	1376.30	344.29	264.	-15.	-0.009	150.56	1.049
HF-181	1382.47	345.83	257.	-8.	-0.004	283.93	1.050s
PB-214	1405.78	351.66	44.	236.	0.131	8.45	1.407s
BA-133	1423.15	356.00	394.	-18.	-0.010	160.47	1.060s
I-131	1457.08	364.48	70.	-16.	-0.009	127.17	1.069s
BA-133	1534.50	383.84	117.	12.	0.007	130.70	1.087s
Cf-249	1550.94	387.95	66.	10.	0.006	118.47	1.091s
SN-113	1565.90	391.69	84.	10.	0.006	133.68	1.095s
SB-125	1710.63	427.88	55.	-5.	-0.003	245.53	1.129
AG-108M	1734.87	433.94	56.	-16.	-0.009	84.48	1.135s
pm-146	1814.64	453.88	32.	11.	0.006	102.04	1.154s
SB-125	1852.59	463.37	57.	36.	0.020	34.22	1.163s
BE-7	1909.50	477.60	64.	12.	0.007	96.92	1.176s
HF-181	1927.10	482.00	103.	-15.	-0.008	100.58	1.180s
La-140	1947.19	487.02	36.	6.	0.003	200.00	1.185s
RU-103	1987.33	497.05	45.	-7.	-0.004	183.34	1.194s
RH-106	2046.57	511.86	70.	72.	0.040	31.42	2.458s
Nd-147	2123.11	531.00	60.	-16.	-0.009	95.16	1.225s
CS-134	2252.06	563.24	16.	17.	0.009	52.52	1.255
CS-134	2276.40	569.32	56.	-16.	-0.009	69.12	1.260
PA-234	2276.99	569.47	87.	-17.	-0.010	79.44	1.261s
TL-208	2331.43	583.08	12.	163.	0.091	8.79	1.680s
SB-125	2401.12	600.50	401.	-16.	-0.009	184.31	1.289s
SB-124	2410.04	602.73	386.	-16.	-0.009	89.06	1.291s
CS-134	2417.96	604.71	361.	-16.	-0.009	174.52	1.292s
BI-214	2436.36	609.31	39.	163.	0.091	9.54	1.296D
RU-103	2440.31	610.30	346.	-13.	-0.007	210.85	1.297s
PM-144	2471.37	618.06	220.	16.	0.009	135.90	1.304s
RH-106	2486.79	621.92	65.	-12.	-0.007	98.86	1.308s
SB-125	2542.69	635.89	25.	10.	0.006	77.46	1.320s
I-131	2547.03	636.97	20.	6.	0.004	104.97	1.321s
AG-110M	2630.18	657.76	162.	-13.	-0.007	139.53	1.339s
CS-137	2643.45	661.08	4.	113.	0.063	10.21	1.349
PM-144	2785.32	696.54	26.	12.	0.006	93.66	1.374s
NB-94	2809.67	702.63	26.	4.	0.002	264.97	1.379s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2890.31	722.79	113.	-14.	-0.008	112.75	1.396s
AG-108M	2890.91	722.94	99.	-6.	-0.003	228.31	1.397s
EU-154	2892.59	723.36	93.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	86.	6.	0.004	209.72	1.398s
BI-212	2907.19	727.01	6.	57.	0.032	15.87	1.125
pm-146	2942.05	735.72	30.	5.	0.003	247.22	1.408s
pm-146	2987.81	747.16	22.	6.	0.003	156.98	1.417s
ZR-95	3026.09	756.73	35.	-3.	-0.002	345.06	1.426s
AG-110M	3054.96	763.94	38.	10.	0.005	97.90	1.432s
NB-95	3062.34	765.79	38.	11.	0.006	83.61	1.433s
PA-234M	3064.83	766.41	45.	8.	0.005	118.25	1.434s
EU-152	3114.87	778.92	30.	-6.	-0.004	181.90	1.444s
BI-212	3139.51	785.08	5.	32.	0.018	24.15	0.871s
CS-134	3182.67	795.87	22.	11.	0.006	88.87	1.459s
CS-134	3207.01	801.95	28.	-3.	-0.002	378.59	1.464
CO-58	3242.31	810.77	86.	-15.	-0.009	88.94	1.471s
La-140	3262.30	815.77	101.	-15.	-0.009	95.73	1.475s
Cs-136	3273.22	818.50	119.	-8.	-0.004	202.20	1.478s
MN-54	3338.63	834.85	33.	-8.	-0.005	117.47	1.492s
Co-56	3386.32	846.77	23.	4.	0.002	284.30	1.501s
TL-208	3441.51	860.56	9.	30.	0.016	28.73	1.513s
NB-94	3483.65	871.10	6.	17.	0.009	31.63	1.522s
EU-154	3492.19	873.23	35.	-9.	-0.005	97.40	1.523s
PA-234	3521.39	880.53	61.	-3.	-0.002	372.68	1.529s
PA-234	3532.24	883.24	64.	0.	0.000	1000.00	1.531s
AG-110M	3538.01	884.68	57.	-3.	-0.002	360.56	1.533
Sc-46	3556.40	889.28	48.	10.	0.006	100.14	1.536s
y-88	3591.45	898.04	33.	-1.	-0.001	821.24	1.543s
AC-228	3642.38	910.77	0.	114.	0.063	9.41	1.120s
AG-110M	3749.30	937.49	9.	5.	0.003	146.39	1.576s
PA-234	3783.42	946.02	9.	8.	0.004	91.92	1.582s
EU-152	3855.80	964.11	76.	8.	0.004	160.99	1.597s
AC-228	3874.30	968.74	8.	60.	0.033	16.32	1.951s
EU-154	3984.71	996.33	20.	8.	0.004	87.41	1.622s
PA-234M	4003.39	1001.00	28.	8.	0.004	100.53	1.626
EU-154	4018.51	1004.77	47.	-7.	-0.004	135.38	1.629s
Cs-136	4191.74	1048.07	42.	-6.	-0.003	158.11	1.663s
RH-106	4200.91	1050.36	19.	8.	0.005	83.01	1.665s
BI-207	4254.12	1063.66	5.	21.	0.012	32.00	1.675
Ga-68	4309.10	1077.40	10.	16.	0.009	50.13	1.685s
FE-59	4396.54	1099.25	20.	-2.	-0.001	496.66	1.702s
EU-152	4447.85	1112.07	103.	-15.	-0.008	101.85	1.712s
ZN-65	4461.74	1115.55	88.	-15.	-0.008	94.74	1.714s
BI-214	4480.72	1120.29	96.	12.	0.007	121.52	1.718s
Sc-46	4481.77	1120.55	79.	15.	0.008	89.54	1.718s
Ta-182	4484.77	1121.30	78.	-6.	-0.003	204.06	1.719s
CO-60	4692.60	1173.24	65.	-22.	-0.012	83.20	1.757s
Ta-182	4755.88	1189.05	35.	-10.	-0.006	133.85	1.769s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4952.89	1238.28	6.	36.	0.020	22.47	1.805
NA-22	5097.96	1274.53	27.	-2.	-0.001	444.97	1.831s
EU-154	5098.01	1274.54	28.	0.	0.000	1000.00	1.831s
CO-60	5329.96	1332.50	6.	12.	0.007	52.48	1.871s
AG-110M	5537.26	1384.30	16.	-4.	-0.002	232.74	1.907s
EU-152	5632.13	1408.00	5.	7.	0.004	89.07	1.923s
K-40	5842.85	1460.65	10.	307.	0.171	6.00	2.318
La-140	6385.44	1596.21	17.	-6.	-0.003	166.25	2.044s
SB-124	6764.81	1690.98	6.	1.	0.001	427.57	2.102s
BI-214	7059.07	1764.49	32.	-2.	-0.001	371.86	2.145s
Co-56	7086.53	1771.35	22.	8.	0.005	88.16	2.149s
y-88	7345.59	1836.06	6.	-4.	-0.002	156.12	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.8013E+00				5.31E+01	
			477.60	3.801E+00	?(	1.244E+01 9.69E+01 1.05E+01	G
NA-22	C	-1.2032E-01				9.50E+02	
			1274.53	-1.203E-01	?(	1.933E+00 4.45E+02 9.99E+01	G
K-40	N	2.3253E+02				4.66E+11	
			1460.83	2.325E+02	(P	1.309E+01 6.00E+00 1.07E+01	G
Sc-46	F	7.5275E-01				8.38E+01	
			889.28	5.555E-01	?(P	1.887E+00 1.00E+02 1.00E+02	G
			1120.55	9.500E-01	?(	2.857E+00 8.95E+01 1.00E+02	G
CR-51	F	-3.8921E+00				2.77E+01	
			320.08	-3.892E+00	?(P	1.330E+01 9.52E+01 9.94E+00	G
MN-54	C	-4.3354E-01				3.12E+02	
			834.85	-4.335E-01	?(P	1.515E+00 1.17E+02 1.00E+02	G
FE-59	F	-2.2613E-01				4.45E+01	
			1099.25	-2.261E-01	?(	2.663E+00 4.97E+02 5.65E+01	G
			1291.60	1.126E-01	%	4.092E+00 1.58E+03 4.32E+01	G
Co-56	C	1.6382E+00				7.73E+01	
			846.77	1.894E-01	?(	1.303E+00 2.84E+02 9.99E+01	G
			1238.28	3.830E+00	?(P	1.515E+00 2.25E+01 6.61E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1037.84	-4.313E-01	%	1.122E+01	1.10E+03	1.41E+01 G
			1771.35	5.002E+00	?	1.500E+01	8.82E+01	1.55E+01 A
CO-57	C	-7.3439E-03						2.72E+02
			122.06	-7.344E-03	%(P	1.132E+00	4.96E+03	8.56E+01 G
			136.47	-3.011E+00	+ P	1.294E+01	1.30E+02	1.07E+01 G
CO-58	C	-7.6917E-01						7.09E+01
			810.78	-7.692E-01	?(	2.295E+00	8.89E+01	9.95E+01 G
CO-60	F	9.1123E-01						1.93E+03
			1332.50	9.112E-01	?(P	1.045E+00	5.25E+01	1.00E+02 G
			1173.24	-1.487E+00	-	2.717E+00	8.32E+01	9.99E+01 G
ZN-65	F	-1.8662E+00						2.44E+02
			1115.55	-1.866E+00	?(	5.945E+00	9.47E+01	5.06E+01 G
NB-94	I	5.4537E-01						7.41E+06
			702.63	1.814E-01	?(	1.201E+00	2.65E+02	9.79E+01 G
			871.10	9.021E-01	?(P	7.443E-01	3.16E+01	9.99E+01 G
ZR-95	I	1.5654E-01						6.40E+01
			756.73	-2.478E-01	&(P	2.616E+00	3.45E+02	5.45E+01 G
			724.20	6.553E-01	?(P	4.723E+00	2.10E+02	4.42E+01 G
NB-95	I	5.3148E-01						6.40E+01
			765.79	5.315E-01	?(	1.496E+00	8.36E+01	9.98E+01 G
RU-103	I	-2.4914E-01						3.93E+01
			497.05	-2.491E-01	(P	1.254E+00	1.83E+02	9.09E+01 G
			610.30	-8.676E+00	+	6.160E+01	2.11E+02	5.75E+00 GA
RH-106	I	1.7066E-01						3.74E+02
			621.92	-4.876E+00	?(	1.629E+01	9.89E+01	9.93E+00 G
			1050.36	3.230E+01	?(	9.083E+01	8.30E+01	1.56E+00 G
			511.86	1.244E+01	? P	7.175E+00	3.14E+01	2.00E+01 GA
AG-108M	C	-5.3209E-01						1.53E+05
			433.94	-5.321E-01	?(P	1.252E+00	8.45E+01	9.05E+01 G
			722.94	-3.135E-01	+	2.458E+00	2.28E+02	9.08E+01 G
			614.28	3.384E-07	&	3.892E+00	3.38E+08	8.98E+01 G
AG-110M	F	4.2724E-01						2.50E+02
			884.68	-2.208E-01	?(	2.789E+00	3.61E+02	7.27E+01 G
			657.76	-5.860E-01	+	2.762E+00	1.40E+02	9.46E+01 G
			937.49	7.618E-01	?(	2.766E+00	1.46E+02	3.44E+01 G
			1384.30	-1.272E+00	+	6.789E+00	2.33E+02	2.43E+01 G
			763.94	2.025E+00	&(	6.742E+00	9.79E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	4.3495E-01					1.15E+02	
			391.69	4.350E-01	?(P	1.978E+00	1.34E+02	6.40E+01 G
SB-124	F	-6.4558E-01					6.02E+01	
			602.73	-6.456E-01	?(P	3.768E+00	8.91E+01	9.83E+01 G
			1690.98	2.545E-01	+	2.634E+00	4.28E+02	4.78E+01 G
			722.79	-5.770E+00	&	2.195E+01	1.13E+02	1.08E+01 G
SB-125	I	2.7006E+00					1.01E+03	
			427.88	-5.510E-01	?(P	3.778E+00	2.46E+02	2.96E+01 G
			600.50	-3.401E+00	+	2.105E+01	1.84E+02	1.79E+01 G
			635.89	3.623E+00	?(	9.424E+00	7.75E+01	1.13E+01 G
			463.37	1.090E+01	?(P	1.154E+01	3.42E+01	1.05E+01 G
I-131	I	-1.1552E-01					8.02E+00	
			364.48	-5.063E-01	?(P	1.342E+00	1.27E+02	8.17E+01 G
			284.30	6.086E-01	&(P	1.477E+01	9.13E+02	6.14E+00 G
			636.97	3.718E+00	?(	1.348E+01	1.05E+02	7.17E+00 G
Gd-153	F	-2.4153E-01					2.42E+02	
			97.50	-2.415E-01	?(	3.322E+00	4.05E+02	3.00E+01 G
			103.20	-8.897E-01	+	5.101E+00	1.71E+02	2.18E+01 G
Ga-68	C	3.5759E+01					4.71E-02	
			1077.40	3.576E+01	?(	3.899E+01	5.01E+01	3.30E+00 G
Tc-99m	I	3.1145E-01					2.51E-01	
			140.51	3.114E-01	&(	1.364E+00	1.31E+02	8.93E+01 G
BA-133	F	-7.3687E-01					3.85E+03	
			356.00	-7.369E-01	&(	3.966E+00	1.60E+02	6.20E+01 G
			302.85	0.000E+00	&	9.664E+00	1.00E+03	1.83E+01 G
			383.84	3.683E+00		1.630E+01	1.31E+02	8.94E+00 GA
			80.99	-2.314E-01	+ P	2.988E+00	4.92E+02	3.41E+01 GA
CS-134	I	2.9894E-01					7.54E+02	
			604.71	-6.275E-01	?(	3.680E+00	1.75E+02	9.76E+01 G
			795.87	6.512E-01	?(	1.401E+00	8.89E+01	8.55E+01 G
			569.32	-3.998E+00	+	9.165E+00	6.91E+01	1.54E+01 G
			801.95	-1.706E+00	+	1.556E+01	3.79E+02	8.69E+00 G
			563.24	7.522E+00	(P	9.536E+00	5.25E+01	8.35E+00 G
CS-137	I	5.6102E+00					1.10E+04	
			661.66	5.610E+00	(	5.973E-01	1.02E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-4.2129E-01					1.38E+02	
			165.85	-4.213E-01	(	1.670E+00	1.19E+02	7.99E+01 G
Ba-140	I	-1.9514E-01					1.28E+01	
			537.26	-1.951E-01	%(P	4.103E+00	1.71E+03	2.44E+01 G
			162.66	-5.281E+00	&	2.061E+01	1.17E+02	6.22E+00 G
			304.85	-2.777E-01	& P	4.154E+01	3.13E+03	4.29E+00 G
La-140	I	3.8177E-02					1.28E+01	
			1596.21	-5.468E-01	?(	1.998E+00	1.66E+02	9.54E+01 G
			487.02	4.368E-01	?(	2.233E+00	2.00E+02	4.55E+01 G
			328.76	1.894E+00	?(P	5.110E+00	1.05E+02	2.03E+01 G
			815.77	-3.312E+00	+	1.065E+01	9.57E+01	2.33E+01 G
CE-141	I	5.2239E-01					3.25E+01	
			145.44	5.224E-01	(	1.583E+00	1.13E+02	4.82E+01 G
CE-144	I	-1.5883E+00					2.85E+02	
			133.54	-1.588E+00	?(P	1.240E+01	1.82E+02	1.11E+01 G
PM-144	C	5.7794E-01					3.63E+02	
			696.54	5.210E-01	?(	1.179E+00	9.37E+01	9.90E+01 G
			618.06	6.348E-01	&(	2.903E+00	1.36E+02	9.91E+01 G
EU-152	F	7.9455E-01					4.94E+03	
			344.29	-1.471E+00	?(	7.450E+00	1.51E+02	2.65E+01 G
			1112.07	-6.893E+00	+	2.364E+01	1.02E+02	1.36E+01 G
			121.78	-2.972E-01	+ P	3.342E+00	3.67E+02	2.86E+01 G
			778.92	-2.362E+00	+	1.058E+01	1.82E+02	1.29E+01 G
			964.11	3.086E+00	(	1.703E+01	1.61E+02	1.46E+01 G
			244.69	4.300E+00	?(P	3.204E+01	2.23E+02	7.58E+00 G
			1408.00	2.457E+00	? P	5.062E+00	8.91E+01	2.10E+01 GA
EU-154	I	-6.7111E-02					3.14E+03	
			873.23	-3.958E+00	&(	1.312E+01	9.74E+01	1.23E+01 G
			123.10	5.876E-01	&	2.101E+00	1.07E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.641E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.071E+01	1.00E+03	2.02E+01 G
			1004.77	-2.464E+00	+	1.147E+01	1.35E+02	1.80E+01 G
			996.33	4.437E+00	?(	1.319E+01	8.74E+01	1.06E+01 G
EU-155	I	7.9437E-01					1.81E+03	
			105.31	5.415E-01	?(P	4.938E+00	2.70E+02	2.12E+01 G
			86.54	9.690E-01	&(	6.030E+00	1.86E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	-6.0356E-01					4.24E+01	
			482.00	-6.036E-01	(	2.043E+00	1.01E+02	8.05E+01 G
			133.02	-6.958E-01	& P	3.100E+00	1.06E+02	4.33E+01 G
			345.83	-1.350E+00	&	1.299E+01	2.84E+02	1.51E+01 G
			136.30	-2.617E-01	% P	2.403E+01	2.71E+03	5.85E+00 G
Ta-182	F	-1.1632E+00					1.14E+02	
			1121.30	-1.163E+00	?(	8.174E+00	2.04E+02	3.49E+01 G
			1221.41	2.580E-01	%	7.500E+00	1.29E+03	2.70E+01 G
			1189.05	-4.206E+00	&	1.274E+01	1.34E+02	1.62E+01 G
Hg-203	F	8.5535E-02					4.66E+01	
			279.20	8.553E-02	?(	1.529E+00	5.20E+02	8.15E+01 G
TL-208	N	7.3781E+00					6.98E+02	
			583.02	7.378E+00	(P	8.496E-01	8.79E+00	8.45E+01 G
			277.28	5.613E+00	& P	1.695E+01	9.02E+01	6.31E+00 G
			860.56	1.244E+01	& P	7.184E+00	2.87E+01	1.24E+01 G
pm-146	C	7.0891E-01					2.02E+03	
			747.16	8.602E-01	(P	3.353E+00	1.57E+02	3.40E+01 G
			735.72	9.491E-01	&(P	5.814E+00	2.47E+02	2.25E+01 G
			453.88	5.467E-01	&(	1.401E+00	1.02E+02	6.50E+01 G
y-88	F	-7.3374E-02					1.07E+02	
			898.04	-7.337E-02	?(P	1.710E+00	8.21E+02	9.37E+01 G
			1836.06	-3.940E-01	+	1.391E+00	1.56E+02	9.92E+01 G
Cd-113m		1.7061E+03					5.33E+03	
			263.70	1.706E+03	?(	1.812E+04	3.09E+02	6.00E-03 K
Cd-109	F	7.8039E+00					4.53E+02	
			88.04	7.804E+00	?(	4.948E+01	1.90E+02	3.79E+00 G
Cf-251	T	1.4164E+00					3.28E+05	
			176.60	1.416E+00	&(	5.121E+00	1.34E+02	1.70E+01 G
			227.00	-1.930E-01	&	1.472E+01	2.76E+03	6.30E+00 GA
Cf-249	T	7.3310E-01					1.28E+05	
			387.95	4.208E-01	&(	1.697E+00	1.18E+02	6.60E+01 G
			333.44	2.062E+00	&(	5.527E+00	1.03E+02	1.55E+01 G
Sn-126		-1.7750E+00					3.65E+07	
			87.57	7.901E-01		5.034E+00	1.91E+02	3.75E+01 GA
			64.28	-1.775E+00	(	1.558E+01	2.60E+02	9.70E+00 G
			86.94	3.285E+00		2.069E+01	1.89E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	2.2370E+01					8.14E+03	
			46.54	2.237E+01	(P	2.981E+01	4.82E+01	4.25E+00 G
PB-212	N	1.8049E+01					6.98E+02	
			238.63	1.805E+01	(P	2.050E+00	5.91E+00	4.33E+01 G
			300.03	9.945E+00	&	4.779E+01	1.43E+02	3.28E+00 GA
PB-214	N	1.6092E+01					5.84E+05	
			351.93	1.609E+01	*(P	2.291E+00	8.45E+00	3.76E+01 G
			295.09	1.347E+01	- P	3.794E+00	1.39E+01	1.93E+01 G
			242.00	5.099E+00	&	3.257E+01	1.91E+02	7.43E+00 GA
BI-207	C	7.6177E-01					1.18E+04	
			569.70	6.399E-03	%(	1.959E+00	8.80E+03	9.77E+01 G
			1063.66	1.753E+00	?(	1.096E+00	3.20E+01	7.45E+01 G
BI-212	N	3.4359E+01					6.98E+02	
			727.17	3.436E+01	(P	8.637E+00	1.59E+01	7.55E+00 G
			785.42	1.221E+02	+	4.917E+01	2.42E+01	1.28E+00 GA
BI-214	N	1.4036E+01					5.84E+05	
			609.31	1.404E+01	(P	2.721E+00	9.54E+00	4.61E+01 G
			1120.29	5.053E+00	- P	2.079E+01	1.22E+02	1.51E+01 G
			1764.49	-1.304E+00	- P	1.787E+01	3.72E+02	1.54E+01 G
BI-210M	T	-8.1182E-01					1.10E+09	
			265.83	-8.118E-01	@(	2.610E+00	9.61E+01	5.00E+01 G
			304.90	-8.511E-02	& P	6.372E+00	1.58E+03	2.80E+01 G
AC-228	N	2.0850E+01					2.10E+03	
			911.07	2.149E+01	(P	1.393E+00	9.41E+00	2.90E+01 G
			968.97	1.978E+01	(P	5.258E+00	1.63E+01	1.75E+01 G
			338.32	2.778E+01	+ P	5.361E+00	1.17E+01	1.20E+01 G
			93.35	3.500E+01	+	1.303E+01	1.67E+01	5.56E+00 XA
TH-227	N	3.7015E+00					7.95E+03	
			50.14	3.701E+00	?(	1.686E+01	1.59E+02	8.00E+00 G
			256.24	0.000E+00	-	1.342E+01	1.00E+03	7.00E+00 G
TH-229	N	-5.4035E+00					2.68E+06	
			193.51	-5.404E+00	(P	2.053E+01	2.17E+02	4.40E+00 G
			210.85	0.000E+00	+	4.674E+01	1.00E+03	2.99E+00 G
TH-234	N	2.2038E+00					1.63E+12	
			63.29	2.204E+00	(P	3.574E+01	5.65E+02	3.81E+00 G
			92.59	3.712E-01	% P	3.698E+01	2.98E+03	5.58E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-231   N   8.3849E+00                                     1.20E+07
                          302.65 3.891E+00 ?(  6.091E+01 4.61E+02 2.88E+00 G
                          300.07 1.365E+01 ?(  6.672E+01 1.45E+02 2.46E+00 G

PA-233   C   1.4853E+00                                     7.82E+08
                          312.01 8.081E-01 &(P 3.382E+00 1.24E+02 3.60E+01 G
                          300.18 5.417E+00 ?(  2.731E+01 1.50E+02 6.20E+00 G

PA-234   N   4.2443E-01                                     1.63E+12
                          131.29-1.666E+00 ?(P 7.246E+00 1.06E+02 1.80E+01 G
                          946.02 3.233E+00 ?(  7.146E+00 9.19E+01 1.34E+01 G
                          569.47-7.978E+00 +   2.115E+01 7.94E+01 8.20E+00 G
                          883.24 0.000E+00 -   2.226E+01 1.00E+03 9.60E+00 G
                          880.53-2.665E+00 +   3.474E+01 3.73E+02 6.00E+00 GA

PA-234M  N   7.7025E+01                                     1.63E+12
                         1001.00 5.653E+01 ?(  1.944E+02 1.01E+02 8.37E-01 G
                          766.41 1.354E+02 ?(  5.483E+02 1.18E+02 2.94E-01 G

U-235    N   1.3390E+00                                     2.57E+11
                          143.79 7.880E-02 %(  1.120E+01 4.19E+03 1.10E+01 G
                          205.33 4.096E+00 ?(P 2.676E+01 1.94E+02 5.01E+00 G
                          163.38-7.086E+00 + P 2.619E+01 1.28E+02 5.08E+00 G

AM-241   T  -6.5634E-01                                     1.58E+05
                           59.54-6.563E-01 &(  3.849E+00 2.06E+02 3.59E+01 G

Np-237   F   2.2708E+00                                     2.14E+06
                           86.49 2.271E+00 &(  1.395E+01 1.84E+02 1.31E+01 G

Ir-192   F  -1.3553E-01                                     7.40E+01
                          316.49-1.355E-01 ?(  1.203E+00 2.57E+02 8.70E+01 G
                          468.06-2.067E-02 &   3.148E+00 4.38E+03 5.18E+01 G
                          308.44-1.092E+00 +   4.776E+00 1.30E+02 3.18E+01 G

Cs-136   F  -3.8982E-01                                     1.30E+01
                          818.50-3.898E-01 ?(  2.692E+00 2.02E+02 1.00E+02 G
                         1048.07-4.608E-01 +   2.527E+00 1.58E+02 8.00E+01 G
                          340.57-7.981E-01 +   4.354E+00 1.62E+02 4.69E+01 G

Nd-147      -4.5028E+00                                     1.11E+01
                          531.00-4.503E+00  (  1.059E+01 9.52E+01 1.30E+01 G
                           91.10-1.132E+00 +   7.638E+00 2.02E+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	147.	13.	0.007	159.42	3.701E+00	
AM-241	59.54	249.	-13.	-0.007	206.19	-6.563E-01	
TH-234	63.29	278.	5.	0.003	564.84	2.204E+00	P
BA-133	80.99	232.	-6.	-0.003	491.72	-2.314E-01	P
EU-155	86.54	852.	22.	0.012	186.37	9.690E-01	
Nd-147	91.10	1221.	-25.	-0.014	202.37	-1.132E+00	
Gd-153	97.50	261.	-6.	-0.003	405.11	-2.415E-01	
Np-239	99.50	292.	7.	0.004	364.35	5.658E-01	
Gd-153	103.20	334.	-15.	-0.009	170.57	-8.897E-01	
EU-155	105.31	297.	9.	0.005	269.83	5.415E-01	P
EU-152	121.78	243.	-7.	-0.004	366.85	-2.972E-01	P
EU-154	123.10	193.	19.	0.010	106.68	5.876E-01	
PA-234	131.29	445.	-23.	-0.013	106.11	-1.666E+00	P
HF-181	133.02	468.	-23.	-0.013	106.26	-6.958E-01	P
CE-144	133.54	490.	-14.	-0.008	182.17	-1.588E+00	P
CO-57	136.47	487.	-25.	-0.014	129.58	-3.011E+00	P
Tc-99m	140.51	344.	20.	0.011	130.75	3.114E-01	
CE-141	145.44	134.	19.	0.010	112.58	5.224E-01	
Ba-140	162.66	342.	-23.	-0.013	116.70	-5.281E+00	
U-235	163.38	367.	-25.	-0.014	128.23	-7.086E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CE-139	165.85	376.	-23.	-0.013	118.63	-4.213E-01		
Cf-251	176.60	140.	16.	0.009	133.95	1.416E+00		
TH-229	193.51	131.	-15.	-0.008	216.82	-5.404E+00		P
U-235	205.33	271.	12.	0.007	193.74	4.096E+00		P
EU-152	244.69	696.	17.	0.009	222.58	4.300E+00		P
Cd-113m	263.70	117.	5.	0.003	309.19	1.706E+03		
BI-210M	265.83	169.	-20.	-0.011	96.08	-8.118E-01		
Hg-203	279.20	142.	3.	0.002	520.09	8.553E-02		
I-131	284.30	70.	2.	0.001	913.04	6.086E-01		P
PA-231	300.07	224.	15.	0.008	145.18	1.365E+01		
PA-233	300.18	239.	15.	0.008	149.71	5.417E+00		
PA-231	302.65	254.	5.	0.003	460.56	3.891E+00		
Ir-192	308.44	182.	-15.	-0.008	129.79	-1.092E+00		
PA-233	312.01	113.	12.	0.007	123.77	8.081E-01		P
Ir-192	316.49	80.	-5.	-0.003	256.90	-1.355E-01		
CR-51	320.08	129.	-16.	-0.009	95.19	-3.892E+00		P
La-140	328.76	74.	16.	0.009	104.52	1.894E+00		P
Cf-249	333.44	48.	13.	0.007	103.03	2.062E+00		
Cs-136	340.57	288.	-15.	-0.008	162.12	-7.981E-01		
EU-152	344.29	264.	-15.	-0.009	150.56	-1.471E+00		
HF-181	345.83	257.	-8.	-0.004	283.93	-1.350E+00		
BA-133	356.00	394.	-18.	-0.010	160.47	-7.369E-01		
I-131	364.48	70.	-16.	-0.009	127.17	-5.063E-01		P
BA-133	383.84	117.	12.	0.007	130.70	3.683E+00		
Cf-249	387.95	66.	10.	0.006	118.47	4.208E-01		
SN-113	391.69	84.	10.	0.006	133.68	4.350E-01		P
SB-125	427.88	55.	-5.	-0.003	245.53	-5.510E-01		P
AG-108M	433.94	56.	-16.	-0.009	84.48	-5.321E-01		P
pm-146	453.88	32.	11.	0.006	102.04	5.467E-01		
SB-125	463.37	57.	36.	0.020	34.22	1.090E+01		P
BE-7	477.60	64.	12.	0.007	96.92	3.801E+00		
HF-181	482.00	103.	-15.	-0.008	100.58	-6.036E-01		
La-140	487.02	36.	6.	0.003	200.00	4.368E-01		
RU-103	497.05	45.	-7.	-0.004	183.34	-2.491E-01		P
RH-106	511.86	70.	72.	0.040	31.42	1.244E+01		P
Nd-147	531.00	60.	-16.	-0.009	95.16	-4.503E+00		
PA-234	569.47	87.	-17.	-0.010	79.44	-7.978E+00		
SB-125	600.50	401.	-16.	-0.009	184.31	-3.401E+00		
SB-124	602.73	386.	-16.	-0.009	89.06	-6.456E-01		P
RU-103	610.30	346.	-13.	-0.007	210.85	-8.676E+00		
PM-144	618.06	220.	16.	0.009	135.90	6.348E-01		
RH-106	621.92	65.	-12.	-0.007	98.86	-4.876E+00		
SB-125	635.89	25.	10.	0.006	77.46	3.623E+00		
I-131	636.97	20.	6.	0.004	104.97	3.718E+00		
AG-110M	657.76	162.	-13.	-0.007	139.53	-5.860E-01		
PM-144	696.54	26.	12.	0.006	93.66	5.210E-01		
NB-94	702.63	26.	4.	0.002	264.97	1.814E-01		
SB-124	722.79	113.	-14.	-0.008	112.75	-5.770E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	722.94	99.	-6.	-0.003	228.31	-3.135E-01	
ZR-95	724.20	86.	6.	0.004	209.72	6.553E-01	P
pm-146	735.72	30.	5.	0.003	247.22	9.491E-01	P
pm-146	747.16	22.	6.	0.003	156.98	8.602E-01	P
ZR-95	756.73	35.	-3.	-0.002	345.06	-2.478E-01	P
AG-110M	763.94	38.	10.	0.005	97.90	2.025E+00	
NB-95	765.79	38.	11.	0.006	83.61	5.315E-01	
PA-234M	766.41	45.	8.	0.005	118.25	1.354E+02	
EU-152	778.92	30.	-6.	-0.004	181.90	-2.362E+00	
CO-58	810.77	86.	-15.	-0.009	88.94	-7.692E-01	
La-140	815.77	101.	-15.	-0.009	95.73	-3.312E+00	
Cs-136	818.50	119.	-8.	-0.004	202.20	-3.898E-01	
MN-54	834.85	33.	-8.	-0.005	117.47	-4.335E-01	P
NB-94	871.10	6.	17.	0.009	31.63	9.021E-01	P
EU-154	873.23	35.	-9.	-0.005	97.40	-3.958E+00	
PA-234	880.53	61.	-3.	-0.002	372.68	-2.665E+00	
AG-110M	884.68	57.	-3.	-0.002	360.56	-2.208E-01	
Sc-46	889.28	48.	10.	0.006	100.14	5.555E-01	P
y-88	898.04	33.	-1.	-0.001	821.24	-7.337E-02	P
AG-110M	937.49	9.	5.	0.003	146.39	7.618E-01	
PA-234	946.02	9.	8.	0.004	91.92	3.233E+00	
EU-152	964.11	76.	8.	0.004	160.99	3.086E+00	
EU-154	996.33	20.	8.	0.004	87.41	4.437E+00	
PA-234M	1001.00	28.	8.	0.004	100.53	5.653E+01	
EU-154	1004.77	47.	-7.	-0.004	135.38	-2.464E+00	
Cs-136	1048.07	42.	-6.	-0.003	158.11	-4.608E-01	
RH-106	1050.36	19.	8.	0.005	83.01	3.230E+01	
BI-207	1063.66	5.	21.	0.012	32.00	1.753E+00	
Ga-68	1077.40	10.	16.	0.009	50.13	3.576E+01	
FE-59	1099.25	20.	-2.	-0.001	496.66	-2.261E-01	
EU-152	1112.07	103.	-15.	-0.008	101.85	-6.893E+00	
ZN-65	1115.55	88.	-15.	-0.008	94.74	-1.866E+00	
Sc-46	1120.55	79.	15.	0.008	89.54	9.500E-01	
Ta-182	1121.30	78.	-6.	-0.003	204.06	-1.163E+00	
CO-60	1173.24	65.	-22.	-0.012	83.20	-1.487E+00	
Ta-182	1189.05	35.	-10.	-0.006	133.85	-4.206E+00	
NA-22	1274.53	27.	-2.	-0.001	444.97	-1.203E-01	
CO-60	1332.50	6.	12.	0.007	52.48	9.112E-01	P
AG-110M	1384.30	16.	-4.	-0.002	232.74	-1.272E+00	
EU-152	1408.00	5.	7.	0.004	89.07	2.457E+00	P
La-140	1596.21	17.	-6.	-0.003	166.25	-5.468E-01	
SB-124	1690.98	6.	1.	0.001	427.57	2.545E-01	
y-88	1836.06	6.	-4.	-0.002	156.12	-3.940E-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	3.8013E+00	3.8013E+00	9.692E+01%	1.24E+01
NA-22	#A	-1.2032E-01	-1.2032E-01	4.450E+02%	1.93E+00
K-40		2.3253E+02	2.3253E+02	5.998E+00%	1.31E+01
Sc-46	#A	7.5275E-01	7.5275E-01	6.716E+01%	1.89E+00
CR-51	#A	-3.8920E+00	-3.8921E+00	9.519E+01%	1.33E+01
MN-54	#A	-4.3354E-01	-4.3354E-01	1.175E+02%	1.52E+00
FE-59	#A	-2.2613E-01	-2.2613E-01	4.967E+02%	2.66E+00
Co-56	#C	1.6382E+00	1.6382E+00	2.247E+01%	1.30E+00
CO-57	#A	-7.3438E-03	-7.3439E-03	4.965E+03%	1.13E+00
CO-58	#A	-7.6916E-01	-7.6917E-01	8.894E+01%	2.30E+00
CO-60	#A	9.1123E-01	9.1123E-01	5.248E+01%	1.05E+00
ZN-65	#A	-1.8662E+00	-1.8662E+00	9.474E+01%	5.95E+00
NB-94	#A	5.4537E-01	5.4537E-01	3.163E+01%	1.20E+00
ZR-95	#A	1.5654E-01	1.5654E-01	2.019E+02%	2.62E+00
NB-95	#A	5.3147E-01	5.3148E-01	8.361E+01%	1.50E+00
RU-103	#A	-2.4913E-01	-2.4914E-01	1.833E+02%	1.25E+00
RH-106	#A	1.7066E-01	1.7066E-01	6.455E+01%	1.63E+01
AG-108M	#A	-5.3209E-01	-5.3209E-01	8.448E+01%	1.25E+00
AG-110M	#A	4.2724E-01	4.2724E-01	9.790E+01%	2.79E+00
SN-113	#A	4.3495E-01	4.3495E-01	1.337E+02%	1.98E+00
SB-124	#A	-6.4557E-01	-6.4558E-01	8.906E+01%	3.77E+00
SB-125	#A	2.7006E+00	2.7006E+00	3.422E+01%	3.78E+00
I-131	#A	-1.1551E-01	-1.1552E-01	1.050E+02%	1.34E+00
Gd-153	#A	-2.4153E-01	-2.4153E-01	4.051E+02%	3.32E+00
Ga-68	#A	3.5395E+01	3.5759E+01	5.013E+01%	3.90E+01
Tc-99m	#A	3.1085E-01	3.1145E-01	1.308E+02%	1.36E+00
BA-133	#A	-7.3687E-01	-7.3687E-01	1.605E+02%	3.97E+00
CS-134	A	2.9894E-01	2.9894E-01	5.252E+01%	3.68E+00
CS-137		5.6102E+00	5.6102E+00	1.021E+01%	5.97E-01
CE-139	#A	-4.2129E-01	-4.2129E-01	1.186E+02%	1.67E+00
Ba-140	#A	-1.9513E-01	-1.9514E-01	1.712E+03%	4.10E+00
La-140	#A	3.8175E-02	3.8177E-02	9.343E+01%	2.00E+00
CE-141	#A	5.2238E-01	5.2239E-01	1.126E+02%	1.58E+00
CE-144	#A	-1.5883E+00	-1.5883E+00	1.822E+02%	1.24E+01
PM-144	#A	5.7794E-01	5.7794E-01	8.253E+01%	1.18E+00
EU-152	#A	7.9455E-01	7.9455E-01	1.044E+02%	7.45E+00
EU-154	#A	-6.7111E-02	-6.7111E-02	6.543E+01%	1.31E+01
EU-155	#A	7.9437E-01	7.9437E-01	1.640E+02%	4.94E+00
HF-181	#A	-6.0355E-01	-6.0356E-01	1.006E+02%	2.04E+00
Ta-182	#A	-1.1632E+00	-1.1632E+00	2.041E+02%	8.17E+00
Hg-203	#A	8.5534E-02	8.5535E-02	5.201E+02%	1.53E+00
TL-208		7.3781E+00	7.3781E+00	8.786E+00%	8.50E-01
pm-146	#A	7.0891E-01	7.0891E-01	1.020E+02%	3.35E+00

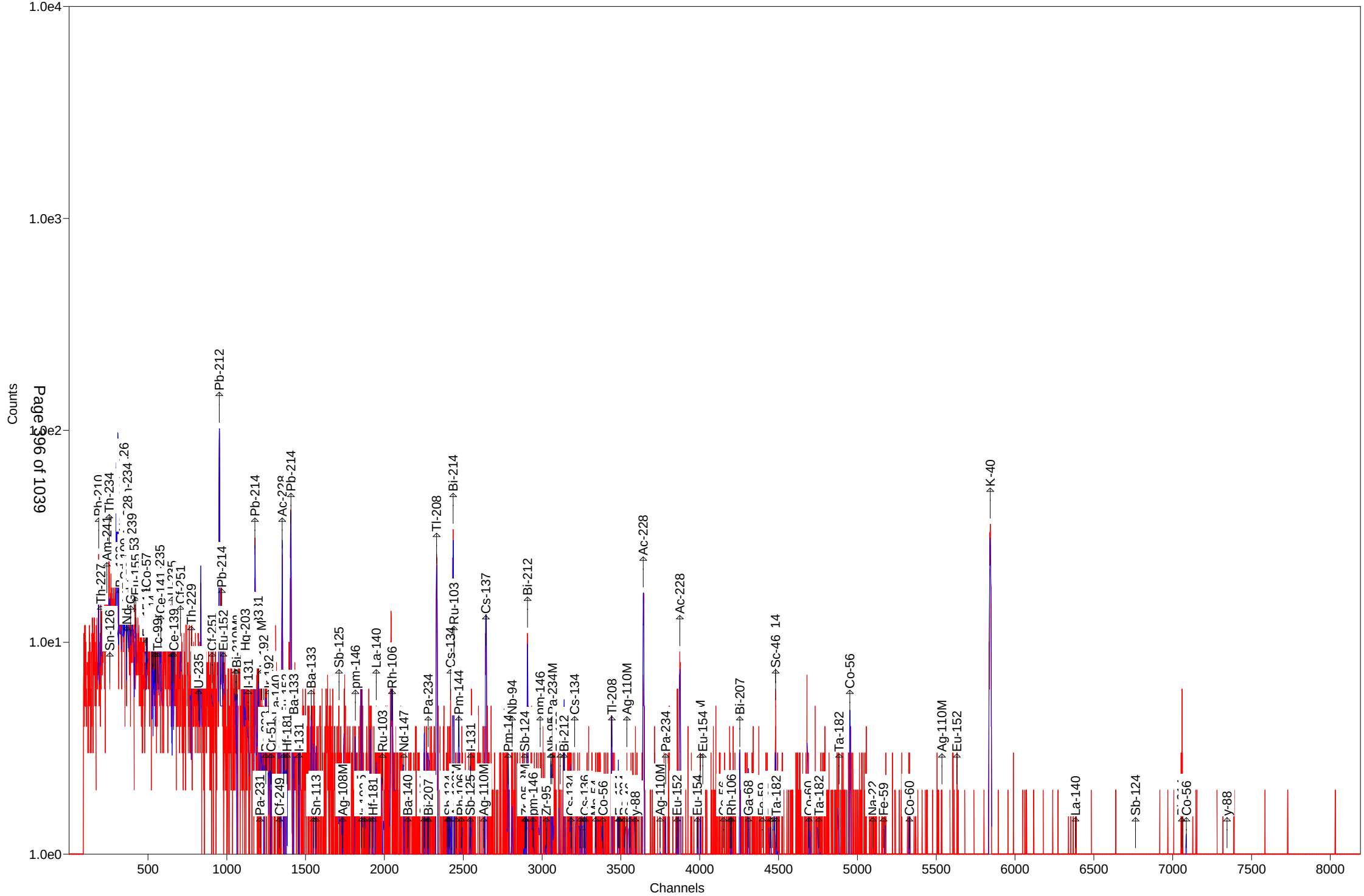
y-88	#A	-7.3373E-02	-7.3374E-02	8.212E+02%	1.71E+00
Cd-113m	#A	1.7061E+03	1.7061E+03	3.092E+02%	1.81E+04
Cd-109	#A	7.8039E+00	7.8039E+00	1.899E+02%	4.95E+01
Cf-251	#A	1.4164E+00	1.4164E+00	1.340E+02%	5.12E+00
Cf-249	#A	7.3310E-01	7.3310E-01	7.851E+01%	1.70E+00
Sn-126	A	-1.7750E+00	-1.7750E+00	2.602E+02%	1.56E+01
PB-210	A	2.2370E+01	2.2370E+01	4.820E+01%	2.98E+01
PB-212		1.8049E+01	1.8049E+01	5.913E+00%	2.05E+00
PB-214		1.6092E+01	1.6092E+01	8.453E+00%	2.29E+00
BI-207	#A	7.6177E-01	7.6177E-01	3.200E+01%	1.96E+00
BI-212		3.4359E+01	3.4359E+01	1.587E+01%	8.64E+00
BI-214		1.4036E+01	1.4036E+01	9.537E+00%	2.72E+00
BI-210M	#A	-8.1182E-01	-8.1182E-01	9.608E+01%	2.61E+00
AC-228		2.0850E+01	2.0850E+01	9.405E+00%	1.39E+00
TH-227	#A	3.7015E+00	3.7015E+00	1.594E+02%	1.69E+01
TH-229	#A	-5.4035E+00	-5.4035E+00	2.168E+02%	2.05E+01
TH-234	#A	2.2038E+00	2.2038E+00	5.648E+02%	3.57E+01
PA-231	#A	8.3849E+00	8.3849E+00	1.452E+02%	6.09E+01
PA-233	#A	1.4853E+00	1.4853E+00	9.712E+01%	3.38E+00
PA-234	#A	4.2443E-01	4.2443E-01	7.019E+01%	7.25E+00
PA-234M	#A	7.7025E+01	7.7025E+01	7.760E+01%	1.94E+02
U-235	#A	1.3390E+00	1.3390E+00	1.937E+02%	1.12E+01
AM-241	#A	-6.5634E-01	-6.5634E-01	2.062E+02%	3.85E+00
Np-237	#A	2.2708E+00	2.2708E+00	1.840E+02%	1.40E+01
Ir-192	#A	-1.3553E-01	-1.3553E-01	2.569E+02%	1.20E+00
Cs-136	#A	-3.8981E-01	-3.8982E-01	2.022E+02%	2.69E+00
Np-239	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.52E+00
Nd-147	#A	-4.5026E+00	-4.5028E+00	9.516E+01%	1.06E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 3.713E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 3.7127261E+02 Bq/Sample

257318_Gamma_160-17797-A-1-B. 14_Gamma_20161796.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20161652

Sample Description: 257318_Gamma_160-17797-A-1-C DU
Detector: Detector #16
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-1-C DU

Decay to Time: 7/12/2016 09:25 Live Time: 1800 sec
Acquisition Time: 7/12/2016 09:25:18 Real Time: 1810 sec
Analysis Time: 7/12/2016 09:55 Dead Time: 0.54 %
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_2016-07-10_0627.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	-3.111E+00	152.2	4.736E+00	4.738E+00	1.604E+01
NA-22	9.847E-02	458.3	4.513E-01	4.513E-01	1.626E+00
K-40	2.585E+02	5.0	1.296E+01	1.852E+01	1.152E+01
Sc-46	-7.582E-02	130.0	9.856E-02	9.863E-02	1.897E+00
CR-51	-5.000E-01	1554.1	7.771E+00	7.771E+00	2.616E+01
MN-54	-7.362E-01	73.8	5.436E-01	5.449E-01	1.534E+00
FE-59	-1.219E+00	73.2	8.918E-01	8.939E-01	3.110E+00
Co-56	8.176E-01	86.4	7.060E-01	7.073E-01	1.398E+00
CO-57	0.000E+00	1.#INF	2.321E-01	2.321E-01	1.208E+00
CO-58	-6.386E-01	82.4	5.264E-01	5.274E-01	1.762E+00
CO-60	-3.869E-01	201.1	7.779E-01	7.781E-01	1.681E+00
ZN-65	6.978E-01	208.5	1.455E+00	1.455E+00	4.996E+00
NB-94	-7.979E-01	85.9	6.855E-01	6.867E-01	2.173E+00
ZR-95	7.822E-01	118.3	9.253E-01	9.262E-01	2.171E+00
NB-95	0.000E+00	1.#INF	9.889E-02	9.889E-02	1.749E+00
RU-103	4.335E-01	93.4	4.050E-01	4.056E-01	9.717E-01
RH-106	1.093E+00	78.2	8.555E-01	8.573E-01	3.571E+01
AG-108M	6.342E-02	284.4	1.804E-01	1.804E-01	1.218E+00
AG-110M	5.977E-01	86.9	5.192E-01	5.201E-01	2.395E+00
SN-113	1.347E-01	563.6	7.594E-01	7.595E-01	2.595E+00
SB-124	9.579E-01	78.6	7.526E-01	7.543E-01	3.337E+00
SB-125	3.561E+00	27.2	9.680E-01	9.849E-01	3.790E+00
I-131	1.525E-01	118.2	1.801E-01	1.803E-01	1.329E+00
Gd-153	-1.469E+00	138.7	2.038E+00	2.040E+00	6.776E+00
Ga-68	1.225E+01	162.2	1.986E+01	1.987E+01	4.452E+01
Tc-99m	0.000E+00	1.#INF	2.085E-01	2.085E-01	1.949E+00
BA-133	-7.503E-01	147.1	1.104E+00	1.105E+00	3.696E+00
CS-134	5.404E-01	78.5	4.244E-01	4.253E-01	3.407E+00
CS-137	4.879E+00	15.2	7.424E-01	7.845E-01	1.216E+00
CE-139	2.808E-01	144.2	4.050E-01	4.059E-01	1.360E+00
Ba-140	-8.056E-01	167.4	1.349E+00	1.349E+00	5.279E+00
La-140	2.324E-01	105.4	2.449E-01	2.452E-01	1.691E+00
CE-141	-3.894E-01	195.7	7.622E-01	7.625E-01	1.952E+00

CE-144	3.874E+00	52.2	2.023E+00	2.033E+00	5.185E+00
PM-144	6.107E-01	82.2	5.019E-01	5.029E-01	1.679E+00
EU-152	1.213E+00	72.8	8.833E-01	8.856E-01	8.948E+00
EU-154	-2.474E+00	181.1	4.481E+00	4.483E+00	1.541E+01
EU-155	-2.049E+00	33.0	6.758E-01	6.851E-01	1.115E+01
HF-181	0.000E+00	1.#INF	2.566E-01	2.566E-01	2.188E+00
Ta-182	-1.296E-01	1889.9	2.450E+00	2.450E+00	8.476E+00
Hg-203	-5.634E-01	89.0	5.014E-01	5.024E-01	1.672E+00
TL-208	6.452E+00	9.8	6.318E-01	7.150E-01	9.850E-01
pm-146	-6.205E-01	246.9	1.532E+00	1.532E+00	3.628E+00
y-88	5.223E-01	37.8	1.976E-01	1.994E-01	1.005E+00
Cd-113m	1.751E+03	321.7	5.634E+03	5.635E+03	1.924E+04
Cd-109	0.000E+00	1.#INF	1.523E+01	1.523E+01	5.104E+01
Cf-251	1.849E+00	97.8	1.809E+00	1.816E+00	4.622E+00
Cf-249	0.000E+00	1.#INF	1.284E-01	1.284E-01	2.558E+00
Sn-126	-1.624E+00	356.6	5.790E+00	5.791E+00	1.943E+01
PB-210	2.787E+01	47.9	1.335E+01	1.345E+01	3.435E+01
PB-212	1.971E+01	5.4	1.059E+00	1.657E+00	1.995E+00
PB-214	1.652E+01	7.7	1.278E+00	1.539E+00	2.074E+00
BI-207	2.117E-01	136.0	2.879E-01	2.881E-01	1.222E+00
BI-212	-2.910E+00	271.7	7.905E+00	7.906E+00	2.713E+01
BI-214	1.531E+01	8.7	1.327E+00	1.547E+00	2.700E+00
BI-210M	6.033E-01	89.7	5.412E-01	5.423E-01	2.061E+00
AC-228	1.835E+01	8.2	1.512E+00	1.779E+00	2.331E+00
TH-227	5.625E+00	125.5	7.060E+00	7.067E+00	2.363E+01
TH-229	8.041E+00	96.4	7.751E+00	7.778E+00	1.978E+01
TH-234	1.378E+01	64.9	8.939E+00	8.968E+00	2.939E+01
PA-231	0.000E+00	1.#INF	4.922E+00	4.922E+00	4.921E+01
PA-233	-1.238E+00	173.1	2.142E+00	2.144E+00	7.162E+00
PA-234	7.460E-01	141.6	1.056E+00	1.057E+00	9.207E+00
PA-234M	-1.144E+02	66.0	7.551E+01	7.574E+01	2.710E+02
U-235	1.774E+00	105.9	1.878E+00	1.880E+00	1.560E+01
AM-241	-5.172E-01	220.2	1.139E+00	1.139E+00	5.419E+00
Np-237	-2.745E+00	164.9	4.526E+00	4.529E+00	1.508E+01
Ir-192	3.733E-04	115.2	4.302E-04	4.308E-04	2.937E+00
Cs-136	3.810E-01	144.4	5.503E-01	5.508E-01	1.879E+00
Np-239	8.205E-01	374.4	3.072E+00	3.072E+00	1.024E+01
Nd-147	-1.183E+00	297.8	3.522E+00	3.522E+00	8.589E+00
Total	2.182E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-1-C DU

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20161652.An1

Acquisition information

Start time:	7/12/2016 9:25:18 AM
Live time:	1800
Real time:	1810
Dead time:	0.54 %
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	7/12/2016 9:25:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-07-10_0627.PBC 7/10/2016 6:27:28 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 31 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1581

***** 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
46.34	91.	25.32	0.63	2.336E-02	46.54	4.250	PBC<MDA	PB210
50.14	21.	125.52	0.96	2.644E-02	50.14	8.000	PBC<MDA	TH227
63.20	34.	64.89	0.97	3.561E-02	63.29	3.810	PBC<MDA	TH234
74.73	190.	14.03	0.99	4.136E-02				
77.21	323.	8.76	0.99	4.233E-02				
87.02	117.	18.52	1.00	4.530E-02	86.49	13.100	1.103E+01	Np237
					86.54	30.700	4.705E+00	EU155
					86.94	9.040	1.595E+01	Sn126
					87.57	37.500	3.832E+00	Sn126
					88.04	3.790	3.782E+01	Cd109
90.05	102.	19.63	1.00	4.595E-02				
93.06	124.	17.23	1.00	4.648E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.657E+01	AC228
106.13	16.	374.43	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
121.78	15.	170.62	1.03	4.731E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.059E-01	CO57
133.61	36.	52.21	0.57	4.612E-02	133.54	11.090	PBC<MDA	CE144
162.66	6.	470.10	1.07	4.136E-02	162.66	6.220	PBC<MDA	Ba140
163.38	22.	105.86	1.07	4.123E-02	163.38	5.080	PBC<MDA	U235
165.85	17.	144.24	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
176.60	23.	97.83	1.08	3.977E-02	176.60	17.000	PBC<MDA	Cf251
193.56	24.	96.40	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
209.00	59.	32.86	0.63	3.533E-02				
227.00	9.	266.84	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.62	494.	5.37	1.14	3.217E-02	238.63	43.300	1.971E+01	PB212
241.69	86.	18.98	1.14	3.188E-02	242.00	7.430	2.025E+01	PB214
244.69	20.	211.94	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
263.70	6.	321.71	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	18.	89.70	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
277.16	36.	37.26	0.41	2.890E-02	277.28	6.310	1.087E+01	TL208
284.30	8.	234.92	1.18	2.839E-02	284.30	6.140	PBC<MDA	I131
295.00	135.	14.55	1.11	2.765E-02	295.09	19.300	1.406E+01	PB214
300.40	30.	43.46	0.88	2.732E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.480E+01	PA231
					300.18	6.200	9.843E+00	PA233
304.90	6.	311.01	1.20	2.701E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.530E-01	BI210M
328.76	14.	223.10	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
338.36	114.	14.00	1.16	2.506E-02	338.32	12.010	2.107E+01	AC228
351.85	272.	7.74	1.22	2.437E-02	351.93	37.600	1.652E+01	PB214
391.69	4.	563.64	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
427.88	6.	279.47	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
453.88	3.	640.31	1.33	2.026E-02	453.88	65.000	PBC<MDA	pm146
463.37	50.	27.18	1.34	1.996E-02	463.37	10.470	1.322E+01	SB125
468.57	14.	115.31	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
487.02	15.	105.40	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
498.20	13.	93.42	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.86	106.	26.27	2.63	1.856E-02	511.86	20.000	1.586E+01	RH106
563.24	13.	98.29	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
569.47	5.	189.98	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
583.41	166.	9.79	1.60	1.687E-02	583.02	84.500	6.452E+00	TL208
600.50	15.	186.53	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	279.93	1.46	1.646E-02	602.73	98.260	PBC<MDA	SB124
609.42	228.	9.50	0.91	1.633E-02	609.31	46.090	1.682E+01	BI214
					610.30	5.750	1.350E+02	RU103
636.97	6.	189.00	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
657.76	9.	203.97	1.51	1.543E-02	657.76	94.640	PBC<MDA	AG110M
661.78	115.	15.22	1.75	1.537E-02	661.66	85.210	4.879E+00	CS137
696.54	16.	82.19	1.54	1.479E-02	696.54	99.000	PBC<MDA	PM144
722.79	18.	78.57	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.675E-01	AG108M
					723.36	20.220	3.450E+00	EU154
722.94	5.	284.43	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.240E-01	AG108M
					723.36	20.220	1.007E+00	EU154
756.73	11.	118.29	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
778.92	7.	198.24	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.42	2.	915.20	1.62	1.353E-02	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
795.87	15.	78.54	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
818.50	9.	144.44	1.65	1.312E-02	818.50	100.000	PBC<MDA	Cs136
860.75	40.	18.54	3.88	1.264E-02	860.56	12.420	1.403E+01	TL208
880.53	12.	83.26	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
883.24	5.	194.81	1.71	1.240E-02	883.24	9.600	PBC<MDA	PA234
898.04	9.	100.31	1.72	1.225E-02	898.04	93.700	PBC<MDA	y88
911.34	103.	11.13	1.65	1.211E-02	911.07	29.000	1.634E+01	AC228
937.49	12.	86.87	1.75	1.186E-02	937.49	34.360	PBC<MDA	AG110M
964.11	12.	123.19	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152
969.28	72.	17.09	2.02	1.157E-02	968.97	17.460	1.980E+01	AC228
1037.84	14.	86.35	1.84	1.099E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	14.	78.25	1.85	1.089E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	7.	135.97	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	7.	162.17	1.87	1.068E-02	1077.40	3.300	PBC<MDA	Ga68
1112.07	7.	201.43	1.90	1.043E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	7.	208.52	1.90	1.041E-02	1115.55	50.600	PBC<MDA	ZN65
1120.55	5.	277.81	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1121.13	72.	14.22	1.62	1.037E-02	1120.29	15.100	2.549E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.103E+01	Ta182
1238.28	16.	102.09	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	2.	458.26	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.797E-01	EU154
1384.30	7.	88.14	2.12	8.837E-03	1384.30	24.290	PBC<MDA	AG110M
1461.03	421.	5.01	2.19	8.481E-03	1460.83	10.670	2.585E+02	K40
1764.76	33.	24.32	2.43	7.342E-03	1764.49	15.400	1.611E+01	BI214
1836.06	8.	37.84	2.48	7.121E-03	1836.06	99.200	6.041E-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	
298.55	74.76	257.	190.	4.582E+03	14.03	0.985	-	sD
308.47	77.24	238.	323.	7.623E+03	8.76	0.988	-	D
359.71	90.19	155.	103.	2.236E+03	19.77	1.000	-	sD
835.75	209.00	81.	57.	1.624E+03	25.85	1.109	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.08	46.34	161.	50.	0.028	47.91	0.627s
TH-227	200.26	50.14	351.	21.	0.012	125.52	0.963s
AM-241	237.83	59.54	596.	-11.	-0.006	220.23	0.971
TH-234	252.82	63.29	220.	34.	0.019	64.89	0.975D
Sn-126	256.79	64.28	664.	-10.	-0.006	356.56	0.976s
BA-133	323.60	80.99	1313.	-18.	-0.010	147.18	0.991
Np-237	345.59	86.49	1146.	-29.	-0.016	164.87	0.996s
EU-155	345.80	86.54	1117.	0.	0.000	1000.00	0.996
Sn-126	347.39	86.94	1117.	0.	0.000	1000.00	0.997
Sn-126	349.91	87.57	1004.	30.	0.017	79.27	0.997D
Cd-109	351.79	88.04	1117.	0.	0.000	1000.00	0.998A
Nd-147	364.02	91.10	1223.	-34.	-0.019	144.68	1.001s
TH-234	369.98	92.59	1161.	-73.	-0.041	34.98	1.002s
AC-228	373.02	93.35	998.	34.	0.019	130.67	1.003s
Gd-153	389.61	97.50	1323.	-37.	-0.021	138.72	1.007s
Np-239	397.61	99.50	1707.	-37.	-0.021	158.43	1.008
Gd-153	412.40	103.20	1670.	-37.	-0.021	156.22	1.012s
Np-239	414.40	103.70	1723.	-37.	-0.021	157.89	1.012s
EU-155	420.85	105.31	1843.	-37.	-0.021	32.98	1.014s
Np-239	424.11	106.13	1783.	16.	0.009	374.43	1.014
EU-152	486.67	121.78	320.	15.	0.008	170.62	1.029s
CO-57	487.81	122.06	335.	0.	0.000	1000.00	1.029
EU-154	491.96	123.10	334.	-30.	-0.017	87.67	1.030
PA-234	524.73	131.29	848.	-13.	-0.007	326.27	1.038s
HF-181	531.64	133.02	835.	0.	0.000	1000.00	1.039s
CE-144	533.98	133.61	93.	36.	0.020	52.21	0.566s
HF-181	544.74	136.30	835.	0.	0.000	1000.00	1.042s
CO-57	545.43	136.47	835.	0.	0.000	1000.00	1.042s
Tc-99m	561.57	140.51	835.	0.	0.000	1000.00	1.046
CE-141	581.29	145.44	242.	-15.	-0.008	195.73	1.050s
Ba-140	650.14	162.66	332.	6.	0.003	470.10	1.066s
U-235	653.01	163.38	256.	22.	0.012	105.86	1.067s
CE-139	662.90	165.85	284.	17.	0.009	144.24	1.069s
Cf-251	705.88	176.60	132.	23.	0.013	97.83	1.079s
TH-229	773.49	193.51	143.	24.	0.013	96.40	1.094s
U-235	820.76	205.33	341.	-28.	-0.015	87.50	1.105s
TH-229	842.82	210.85	370.	-19.	-0.010	65.44	1.110s
Cf-251	907.40	227.00	150.	9.	0.005	266.84	1.125s
PB-212	953.91	238.63	103.	494.	0.274	5.37	1.136D
PB-214	967.37	242.00	91.	84.	0.047	19.45	1.139D
EU-152	978.14	244.69	880.	20.	0.011	211.94	1.141
TH-227	1024.32	256.24	128.	-8.	-0.004	279.14	1.152s
Cd-113m	1054.15	263.70	163.	6.	0.003	321.71	1.158s
BI-210M	1062.67	265.83	127.	18.	0.010	89.70	1.160s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1107.98	277.16	42.	36.	0.020	37.26	0.408s
Hg-203	1116.13	279.20	212.	-24.	-0.013	88.99	1.173s
I-131	1136.52	284.30	97.	8.	0.005	234.92	1.177s
PB-214	1179.30	295.00	69.	135.	0.075	14.55	1.112
PB-212	1200.90	300.40	42.	30.	0.017	43.46	0.875s
PA-231	1199.58	300.07	218.	-14.	-0.008	151.52	1.192s
PA-233	1200.02	300.18	204.	0.	0.000	1000.00	1.192s
PA-231	1209.90	302.65	204.	0.	0.000	1000.00	1.194s
BA-133	1210.70	302.85	204.	0.	0.000	1000.00	1.194s
Ba-140	1218.69	304.85	204.	0.	0.000	1000.00	1.196
BI-210M	1218.88	304.90	181.	6.	0.003	311.01	1.196
Ir-192	1233.05	308.44	691.	-21.	-0.012	176.25	1.199
PA-233	1247.34	312.01	669.	-21.	-0.012	173.11	1.202
Ir-192	1265.24	316.49	644.	-18.	-0.010	199.54	1.206s
La-140	1314.31	328.76	448.	14.	0.008	223.10	1.217s
Cf-249	1333.02	333.44	462.	0.	0.000	1000.00	1.222s
AC-228	1352.71	338.36	37.	114.	0.063	14.00	1.160
Cs-136	1361.54	340.57	462.	0.	0.000	1000.00	1.228s
EU-152	1376.40	344.29	488.	-21.	-0.012	147.57	1.231
HF-181	1382.56	345.83	496.	-21.	-0.012	148.53	1.233s
PB-214	1406.65	351.85	46.	272.	0.151	7.74	1.216
BA-133	1423.24	356.00	434.	-20.	-0.011	147.13	1.242
I-131	1457.16	364.48	88.	-10.	-0.006	186.37	1.250s
BA-133	1534.57	383.84	184.	-19.	-0.010	105.25	1.267s
Cf-249	1551.01	387.95	202.	0.	0.000	1000.00	1.271s
SN-113	1565.96	391.69	193.	4.	0.002	563.64	1.274s
SB-125	1710.67	427.88	74.	6.	0.004	279.47	1.307s
AG-108M	1734.91	433.94	69.	-3.	-0.002	512.83	1.312s
pm-146	1814.67	453.88	69.	3.	0.001	640.31	1.330
SB-125	1852.61	463.37	66.	50.	0.028	27.18	1.338
Ir-192	1871.38	468.06	117.	14.	0.008	115.31	1.342s
BE-7	1909.51	477.60	148.	-12.	-0.006	152.24	1.351
HF-181	1927.12	482.00	159.	0.	0.000	1000.00	1.355s
La-140	1947.21	487.02	116.	15.	0.008	105.40	1.359s
RU-103	1987.33	497.05	35.	13.	0.007	93.42	1.368s
RH-106	2046.57	511.86	98.	106.	0.059	26.27	2.631s
Nd-147	2123.10	531.00	52.	-5.	-0.003	297.77	1.398s
Ba-140	2148.14	537.26	69.	-10.	-0.006	167.40	1.404s
CS-134	2252.03	563.24	36.	13.	0.007	98.29	1.427
PA-234	2276.96	569.47	49.	5.	0.003	189.98	1.432s
TL-208	2332.72	583.41	23.	166.	0.092	9.79	1.595
SB-125	2401.07	600.50	395.	15.	0.008	186.53	1.460s
SB-124	2409.99	602.73	411.	10.	0.006	279.93	1.462s
CS-134	2417.91	604.71	421.	0.	0.000	1000.00	1.463s
BI-214	2436.31	609.31	53.	204.	0.113	8.67	1.467D
RU-103	2440.26	610.30	409.	12.	0.006	247.79	1.468s
AG-108M	2456.19	614.28	421.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	421.	0.	0.000	1000.00	1.475s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2486.73	621.92	460.	-17.	-0.009	179.61	1.479s
SB-125	2542.62	635.89	60.	-12.	-0.006	100.09	1.491s
I-131	2546.96	636.97	65.	6.	0.003	189.00	1.492s
AG-110M	2630.10	657.76	164.	9.	0.005	203.97	1.510s
CS-137	2646.17	661.78	31.	115.	0.064	15.22	1.750
PM-144	2785.22	696.54	80.	16.	0.009	82.19	1.544s
NB-94	2809.57	702.63	132.	-21.	-0.011	85.91	1.549s
SB-124	2890.19	722.79	92.	18.	0.010	78.57	1.567s
AG-108M	2890.80	722.94	110.	5.	0.003	284.43	1.567s
EU-154	2892.47	723.36	115.	0.	0.000	1000.00	1.567s
ZR-95	2895.84	724.20	121.	-7.	-0.004	215.61	1.568s
BI-212	2907.73	727.17	116.	-6.	-0.003	271.67	1.570s
pm-146	2941.93	735.72	47.	-6.	-0.003	259.16	1.578s
pm-146	2987.69	747.16	37.	-5.	-0.003	246.86	1.588s
ZR-95	3025.97	756.73	33.	11.	0.006	118.29	1.596s
AG-110M	3054.82	763.94	74.	-2.	-0.001	612.37	1.602s
NB-95	3062.21	765.79	76.	0.	0.000	1000.00	1.604s
EU-152	3114.73	778.92	37.	7.	0.004	198.24	1.615s
BI-212	3140.74	785.42	51.	2.	0.001	915.20	1.621
CS-134	3182.53	795.87	62.	15.	0.008	78.54	1.630s
CS-134	3206.86	801.95	105.	-11.	-0.006	135.22	1.635s
CO-58	3242.16	810.78	70.	-15.	-0.008	82.42	1.643s
La-140	3262.14	815.77	85.	-4.	-0.002	339.30	1.647s
Cs-136	3273.06	818.50	80.	9.	0.005	144.44	1.649s
MN-54	3338.46	834.85	50.	-17.	-0.010	73.83	1.663s
Co-56	3386.15	846.77	40.	-4.	-0.002	351.19	1.674s
TL-208	3442.08	860.75	3.	40.	0.022	18.54	3.879s
NB-94	3483.47	871.10	51.	-15.	-0.008	73.43	1.695s
EU-154	3492.00	873.23	73.	-7.	-0.004	181.11	1.696s
PA-234	3521.21	880.53	43.	12.	0.007	83.26	1.703s
PA-234	3532.05	883.24	55.	5.	0.003	194.81	1.705s
AG-110M	3537.82	884.68	60.	0.	0.000	1000.00	1.706
Sc-46	3556.21	889.28	72.	-10.	-0.005	129.99	1.710s
y-88	3591.26	898.04	15.	9.	0.005	100.31	1.718s
AC-228	3644.46	911.34	7.	103.	0.057	11.13	1.646
AG-110M	3749.09	937.49	20.	12.	0.007	86.87	1.751s
PA-234	3783.21	946.02	50.	-20.	-0.011	64.81	1.759s
EU-152	3855.58	964.11	109.	12.	0.007	123.19	1.774s
AC-228	3876.26	969.28	14.	72.	0.040	17.09	2.022
PA-234M	4003.15	1001.00	87.	-19.	-0.011	66.02	1.805s
EU-154	4018.27	1004.77	95.	-6.	-0.003	250.83	1.808s
Co-56	4150.56	1037.84	27.	14.	0.008	86.35	1.836s
Cs-136	4191.49	1048.07	52.	-11.	-0.006	97.49	1.845s
RH-106	4200.65	1050.36	53.	14.	0.008	78.25	1.847s
BI-207	4253.86	1063.66	16.	7.	0.004	135.97	1.858s
Ga-68	4308.84	1077.40	21.	7.	0.004	162.17	1.870s
FE-59	4396.27	1099.25	43.	-13.	-0.007	73.18	1.888
EU-152	4447.58	1112.07	85.	7.	0.004	201.43	1.899s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.46	1115.55	92.	7.	0.004	208.52	1.901s
BI-214	4483.83	1121.13	6.	72.	0.040	14.22	1.617
Sc-46	4481.49	1120.55	100.	5.	0.003	277.81	1.906
CO-60	4692.30	1173.24	40.	-10.	-0.006	138.09	1.950s
Ta-182	4755.57	1189.05	45.	-6.	-0.004	252.47	1.963
Co-56	4952.57	1238.28	46.	16.	0.009	102.09	2.004s
NA-22	5097.62	1274.53	28.	2.	0.001	458.26	2.034s
EU-154	5097.68	1274.54	30.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	29.	-8.	-0.005	201.50	2.048s
CO-60	5329.61	1332.50	28.	-6.	-0.004	201.07	2.081s
AG-110M	5536.89	1384.30	6.	7.	0.004	88.14	2.124s
EU-152	5631.75	1408.00	18.	-2.	-0.001	517.20	2.143s
K-40	5843.97	1461.03	12.	421.	0.234	5.01	2.187
La-140	6385.02	1596.21	19.	-5.	-0.003	221.06	2.294s
SB-124	6764.37	1690.98	13.	-8.	-0.004	120.80	2.369s
BI-214	7058.61	1764.49	15.	33.	0.018	24.32	2.427s
y-88	7345.12	1836.06	0.	8.	0.004	37.84	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	-3.1107E+00				5.31E+01	
			477.60	-3.111E+00	(	1.604E+01 1.52E+02 1.05E+01	G
NA-22	C	9.8471E-02				9.50E+02	
			1274.53	9.847E-02	?(	1.626E+00 4.58E+02 9.99E+01	G
K-40	N	2.5850E+02				4.66E+11	
			1460.83	2.585E+02	(P	1.152E+01 5.01E+00 1.07E+01	G
Sc-46	F	-7.5819E-02				8.38E+01	
			889.28	-4.279E-01	?(	1.897E+00 1.30E+02 1.00E+02	G
			1120.55	2.763E-01	(P	2.640E+00 2.78E+02 1.00E+02	G
CR-51	F	-5.0002E-01				2.77E+01	
			320.08	-5.000E-01	%(	2.616E+01 1.55E+03 9.94E+00	G
MN-54	C	-7.3618E-01				3.12E+02	
			834.85	-7.362E-01	?(P	1.534E+00 7.38E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	-1.2185E+00					4.45E+01	
			1099.25	-1.219E+00	?(P	3.110E+00	7.32E+01	5.65E+01 G
			1291.60	-1.123E+00	+ P	3.847E+00	2.01E+02	4.32E+01 G
Co-56	C	8.1761E-01					7.73E+01	
			846.77	-1.738E-01	?(	1.398E+00	3.51E+02	9.99E+01 G
			1238.28	1.399E+00	(P	3.000E+00	1.02E+02	6.61E+01 G
			1037.84	5.110E+00	&(	9.581E+00	8.64E+01	1.41E+01 G
			1771.35	-2.451E-01	%	1.724E+01	1.97E+03	1.55E+01 A
CO-58	C	-6.3863E-01					7.09E+01	
			810.78	-6.386E-01	?(	1.762E+00	8.24E+01	9.95E+01 G
CO-60	F	-3.8687E-01					1.93E+03	
			1332.50	-3.869E-01	?(	1.681E+00	2.01E+02	1.00E+02 G
			1173.24	-5.787E-01	+ P	1.795E+00	1.38E+02	9.99E+01 G
ZN-65	F	6.9776E-01					2.44E+02	
			1115.55	6.978E-01	?(	4.996E+00	2.09E+02	5.06E+01 G
NB-94	I	-7.9788E-01					7.41E+06	
			702.63	-7.979E-01	&(P	2.173E+00	8.59E+01	9.79E+01 G
			871.10	-6.511E-01	+	1.593E+00	7.34E+01	9.99E+01 G
ZR-95	I	7.8219E-01					6.40E+01	
			756.73	7.822E-01	&(P	2.171E+00	1.18E+02	5.45E+01 G
			724.20	-6.420E-01	+	4.731E+00	2.16E+02	4.42E+01 G
RU-103	I	4.3351E-01					3.93E+01	
			497.05	4.335E-01	&(	9.717E-01	9.34E+01	9.09E+01 G
			610.30	6.888E+00	?	5.745E+01	2.48E+02	5.75E+00 GA
RH-106	I	1.0933E+00					3.74E+02	
			621.92	-5.929E+00	?(	3.571E+01	1.80E+02	9.93E+00 G
			1050.36	4.579E+01	?(	1.198E+02	7.82E+01	1.56E+00 G
			511.86	1.586E+01	?	7.310E+00	2.63E+01	2.00E+01 GA
AG-108M	C	6.3417E-02					1.53E+05	
			433.94	-9.777E-02	?(	1.218E+00	5.13E+02	9.05E+01 G
			722.94	2.240E-01	?(	2.189E+00	2.84E+02	9.08E+01 G
			614.28	0.000E+00	&	3.745E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.9766E-01					2.50E+02	
			884.68	0.000E+00	?(	2.395E+00	1.00E+03	7.27E+01 G
			657.76	3.423E-01	?(	2.373E+00	2.04E+02	9.46E+01 G
			937.49	1.636E+00	?(	3.211E+00	8.69E+01	3.44E+01 G
			1384.30	1.912E+00	?(	3.656E+00	8.81E+01	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	-3.610E-01	&	7.725E+00	6.12E+02	2.23E+01 G
SN-113	F	1.3474E-01					1.15E+02	
			391.69	1.347E-01	?(	2.595E+00	5.64E+02	6.40E+01 G
SB-124	F	9.5793E-01					6.02E+01	
			602.73	3.538E-01	(	3.337E+00	2.80E+02	9.83E+01 G
			1690.98	-1.175E+00	+	2.957E+00	1.21E+02	4.78E+01 G
			722.79	6.449E+00	?(	1.690E+01	7.86E+01	1.08E+01 G
SB-125	I	3.5612E+00					1.01E+03	
			427.88	5.620E-01	&(	3.790E+00	2.79E+02	2.96E+01 G
			600.50	2.868E+00	?(	1.797E+01	1.87E+02	1.79E+01 G
			635.89	-3.570E+00	+	1.209E+01	1.00E+02	1.13E+01 G
			463.37	1.322E+01	?(P	1.081E+01	2.72E+01	1.05E+01 G
I-131	I	1.5246E-01					8.02E+00	
			364.48	-2.863E-01	&(	1.329E+00	1.86E+02	8.17E+01 G
			284.30	2.638E+00	?(P	1.547E+01	2.35E+02	6.14E+00 G
			636.97	3.023E+00	?(	1.972E+01	1.89E+02	7.17E+00 G
Gd-153	F	-1.4692E+00					2.42E+02	
			97.50	-1.469E+00	?(	6.776E+00	1.39E+02	3.00E+01 G
			103.20	-1.994E+00	+	1.035E+01	1.56E+02	2.18E+01 G
Ga-68	C	1.2247E+01					4.71E-02	
			1077.40	1.225E+01	?(	4.452E+01	1.62E+02	3.30E+00 G
BA-133	F	-7.5026E-01					3.85E+03	
			356.00	-7.503E-01	&(	3.696E+00	1.47E+02	6.20E+01 G
			302.85	0.000E+00	+	7.736E+00	1.00E+03	1.83E+01 G
			383.84	-5.069E+00	+	1.789E+01	1.05E+02	8.94E+00 GA
			80.99	-6.764E-01	+ P	6.417E+00	1.47E+02	3.41E+01 GA
CS-134	I	5.4037E-01					7.54E+02	
			604.71	0.000E+00	?(	3.407E+00	1.00E+03	9.76E+01 G
			795.87	7.268E-01	&(	1.908E+00	7.85E+01	8.55E+01 G
			569.32	-2.104E-01	%	7.641E+00	1.02E+03	1.54E+01 G
			801.95	-5.275E+00	&	2.421E+01	1.35E+02	8.69E+00 G
			563.24	4.949E+00	?(P	1.177E+01	9.83E+01	8.35E+00 G
CS-137	I	4.8790E+00					1.10E+04	
			661.66	4.879E+00	(	1.216E+00	1.52E+01	8.52E+01 G
CE-139	F	2.8081E-01					1.38E+02	
			165.85	2.808E-01	(P	1.360E+00	1.44E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-8.0564E-01					1.28E+01	
			537.26	-1.314E+00	&(	5.279E+00	1.67E+02	2.44E+01 G
			162.66	1.188E+00	&(	1.891E+01	4.70E+02	6.22E+00 G
			304.85	0.000E+00	&	3.321E+01	1.00E+03	4.29E+00 G
La-140	I	2.3238E-01					1.28E+01	
			1596.21	-3.673E-01	?(	1.691E+00	2.21E+02	9.54E+01 G
			487.02	9.478E-01	(	3.363E+00	1.05E+02	4.55E+01 G
			328.76	1.447E+00	?(P	1.085E+01	2.23E+02	2.03E+01 G
			815.77	-7.054E-01	+	8.290E+00	3.39E+02	2.33E+01 G
CE-141	I	-3.8941E-01					3.25E+01	
			145.44	-3.894E-01	?(	1.952E+00	1.96E+02	4.82E+01 G
CE-144	I	3.8742E+00					2.85E+02	
			133.54	3.874E+00	(	5.185E+00	5.22E+01	1.11E+01 G
PM-144	C	6.1067E-01					3.63E+02	
			696.54	6.107E-01	?(	1.679E+00	8.22E+01	9.90E+01 G
			618.06	0.000E+00	-	3.411E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2132E+00					4.94E+03	
			344.29	-1.812E+00	?(	8.948E+00	1.48E+02	2.65E+01 G
			1112.07	2.578E+00	?(	1.785E+01	2.01E+02	1.36E+01 G
			121.78	6.163E-01	?(	3.537E+00	1.71E+02	2.86E+01 G
			778.92	2.102E+00	?(	9.832E+00	1.98E+02	1.29E+01 G
			964.11	4.042E+00	&(	1.685E+01	1.23E+02	1.46E+01 G
			244.69	4.618E+00	?(	3.270E+01	2.12E+02	7.58E+00 G
			1408.00	-6.064E-01	-	6.816E+00	5.17E+02	2.10E+01 GA
EU-154	I	-2.4742E+00					3.14E+03	
			873.23	-2.474E+00	?(	1.541E+01	1.81E+02	1.23E+01 G
			123.10	-8.701E-01	&	2.537E+00	8.77E+01	4.08E+01 G
			1274.54	0.000E+00	+	4.738E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.006E+01	1.00E+03	2.02E+01 G
			1004.77	-1.528E+00	+	1.319E+01	2.51E+02	1.80E+01 G
			996.33	4.626E-01	%	1.850E+01	1.14E+03	1.06E+01 G
EU-155	I	-2.0495E+00					1.81E+03	
			105.31	-2.049E+00	&(P	1.115E+01	3.30E+01	2.12E+01 G
			86.54	0.000E+00	+	6.350E+00	1.00E+03	3.07E+01 G
Ta-182	F	-1.2965E-01					1.14E+02	
			1121.30	-1.296E-01	%(	8.476E+00	1.89E+03	3.49E+01 G
			1221.41	-1.412E-01	%	6.789E+00	2.22E+03	2.70E+01 G
			1189.05	-2.190E+00	+	1.179E+01	2.52E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-5.6341E-01					4.66E+01	
			279.20	-5.634E-01	?(	1.672E+00	8.90E+01	8.15E+01 G
TL-208	N	6.4521E+00					6.98E+02	
			583.02	6.452E+00	(P	9.850E-01	9.79E+00	8.45E+01 G
			277.28	1.087E+01	+ P	1.006E+01	3.73E+01	6.31E+00 G
			860.56	1.403E+01	+	3.969E+00	1.85E+01	1.24E+01 G
pm-146	C	-6.2049E-01					2.02E+03	
			747.16	-6.205E-01	&(	3.628E+00	2.47E+02	3.40E+01 G
			735.72	-9.849E-01	+	6.004E+00	2.59E+02	2.25E+01 G
			453.88	1.125E-01	+	1.751E+00	6.40E+02	6.50E+01 G
y-88	F	5.2234E-01					1.07E+02	
			898.04	4.357E-01	&(	1.005E+00	1.00E+02	9.37E+01 G
			1836.06	6.041E-01	?(P	5.796E-01	3.78E+01	9.92E+01 G
Cd-113m		1.7514E+03					5.33E+03	
			263.70	1.751E+03	*(	1.924E+04	3.22E+02	6.00E-03 K
Cf-251	T	1.8489E+00					3.28E+05	
			176.60	1.849E+00	&(	4.622E+00	9.78E+01	1.70E+01 G
			227.00	2.293E+00	?	1.584E+01	2.67E+02	6.30E+00 GA
Sn-126		-1.6239E+00					3.65E+07	
			87.57	9.794E-01	}	4.907E+00	7.93E+01	3.75E+01 GA
			64.28	-1.624E+00	?(	1.943E+01	3.57E+02	9.70E+00 G
			86.94	0.000E+00	+	2.152E+01	1.00E+03	9.04E+00 GA
PB-210	N	2.7872E+01					8.14E+03	
			46.54	2.787E+01	(P	3.435E+01	4.79E+01	4.25E+00 G
PB-212	N	1.9705E+01					6.98E+02	
			238.63	1.971E+01	(P	1.995E+00	5.37E+00	4.33E+01 G
			300.03	1.860E+01		2.040E+01	4.35E+01	3.28E+00 GA
PB-214	N	1.6517E+01					5.84E+05	
			351.93	1.652E+01	(P	2.074E+00	7.74E+00	3.76E+01 G
			295.09	1.406E+01	- P	4.312E+00	1.45E+01	1.93E+01 G
			242.00	1.969E+01	+	1.108E+01	1.94E+01	7.43E+00 GA
BI-207	C	2.1173E-01					1.18E+04	
			569.70	5.521E-03	&(	1.222E+00	6.23E+03	9.77E+01 G
			1063.66	4.823E-01	?(P	1.477E+00	1.36E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	-2.9097E+00					6.98E+02	
			727.17	-2.910E+00	*(	2.713E+01	2.72E+02	7.55E+00 G
			785.42	5.345E+00		1.158E+02	9.15E+02	1.28E+00 GA
BI-214	N	1.5309E+01					5.84E+05	
			609.31	1.504E+01	(P	2.700E+00	8.67E+00	4.61E+01 G
			1120.29	2.549E+01	+ P	5.059E+00	1.42E+01	1.51E+01 G
			1764.49	1.611E+01	?(P	1.026E+01	2.43E+01	1.54E+01 G
BI-210M	T	6.0328E-01					1.10E+09	
			265.83	6.874E-01	?(P	2.061E+00	8.97E+01	5.00E+01 G
			304.90	4.530E-01	&(	4.803E+00	3.11E+02	2.80E+01 G
AC-228	N	1.8346E+01					2.10E+03	
			911.07	1.634E+01	(	2.331E+00	1.11E+01	2.90E+01 G
			968.97	1.980E+01	(	5.541E+00	1.71E+01	1.75E+01 G
			338.32	2.107E+01	(	5.720E+00	1.40E+01	1.20E+01 G
			93.35	7.409E+00	-	3.221E+01	1.31E+02	5.56E+00 XA
TH-227	N	5.6247E+00					7.95E+03	
			50.14	5.625E+00	(	2.363E+01	1.26E+02	8.00E+00 G
			256.24	-2.076E+00	-	1.439E+01	2.79E+02	7.00E+00 G
TH-229	N	8.0410E+00					2.68E+06	
			193.51	8.041E+00	?(	1.978E+01	9.64E+01	4.40E+00 G
			210.85	-9.979E+00	& P	4.886E+01	6.54E+01	2.99E+00 G
TH-234	N	1.3776E+01					1.63E+12	
			63.29	1.378E+01	(P	2.939E+01	6.49E+01	3.81E+00 G
			92.59	-1.576E+01	& P	3.463E+01	3.50E+01	5.58E+00 G
PA-233	C	-1.2377E+00					7.82E+08	
			312.01	-1.238E+00	?(	7.162E+00	1.73E+02	3.60E+01 G
			300.18	0.000E+00	+	2.273E+01	1.00E+03	6.20E+00 G
PA-234	N	7.4597E-01					1.63E+12	
			131.29	-8.427E-01	?(	9.207E+00	3.26E+02	1.80E+01 G
			946.02	-6.891E+00	+ P	1.258E+01	6.48E+01	1.34E+01 G
			569.47	2.105E+00	(	1.390E+01	1.90E+02	8.20E+00 G
			883.24	2.564E+00	?(	1.732E+01	1.95E+02	9.60E+00 G
			880.53	8.822E+00	?	2.470E+01	8.33E+01	6.00E+00 GA
PA-234M	N	-1.1439E+02					1.63E+12	
			1001.00	-1.144E+02	&(P	2.710E+02	6.60E+01	8.37E-01 G
			766.41	1.371E+01	%	6.015E+02	1.25E+03	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N   1.7740E+00                                      2.57E+11
                          143.79-8.825E-02 &(P 1.560E+01 1.60E+03 1.10E+01 G
                          205.33-8.612E+00 & P 2.750E+01 8.75E+01 5.01E+00 G
                          163.38 5.792E+00  (  2.050E+01 1.06E+02 5.08E+00 G

AM-241   T  -5.1725E-01                                      1.58E+05
                           59.54-5.172E-01 ?(P 5.419E+00 2.20E+02 3.59E+01 G

Np-237   F  -2.7454E+00                                      2.14E+06
                           86.49-2.745E+00 ?(  1.508E+01 1.65E+02 1.31E+01 G

Ir-192   F   3.7333E-04                                      7.40E+01
                          316.49-4.397E-01 ?(  2.937E+00 2.00E+02 8.70E+01 G
                          468.06 7.405E-01 ?(  2.882E+00 1.15E+02 5.18E+01 G
                          308.44-1.388E+00 +   8.178E+00 1.76E+02 3.18E+01 G

Cs-136   F   3.8099E-01                                      1.30E+01
                          818.50 3.810E-01 ?(  1.879E+00 1.44E+02 1.00E+02 G
                         1048.07-7.004E-01 +   2.312E+00 9.75E+01 8.00E+01 G
                          340.57 0.000E+00 -   4.885E+00 1.00E+03 4.69E+01 G

Np-239   T   8.2046E-01                                      2.36E+00
                          103.70-1.819E+00 +   9.544E+00 1.58E+02 2.40E+01 X
                          106.13 8.205E-01  (  1.024E+01 3.74E+02 2.27E+01 G
                           99.50-2.905E+00 +   1.530E+01 1.58E+02 1.50E+01 X

Nd-147      -1.1827E+00                                      1.11E+01
                          531.00-1.183E+00 ?(  8.589E+00 2.98E+02 1.30E+01 G
                           91.10-1.465E+00 +   7.050E+00 1.45E+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
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} - 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	351.	21.	0.012	125.52	5.625E+00	
AM-241	59.54	596.	-11.	-0.006	220.23	-5.172E-01	P
BA-133	80.99	1313.	-18.	-0.010	147.18	-6.764E-01	P
Np-237	86.49	1146.	-29.	-0.016	164.87	-2.745E+00	
Nd-147	91.10	1223.	-34.	-0.019	144.68	-1.465E+00	
Gd-153	97.50	1323.	-37.	-0.021	138.72	-1.469E+00	
Gd-153	103.20	1670.	-37.	-0.021	156.22	-1.994E+00	
EU-155	105.31	1843.	-37.	-0.021	32.98	-2.049E+00	P
EU-152	121.78	320.	15.	0.008	170.62	6.163E-01	
EU-154	123.10	334.	-30.	-0.017	87.67	-8.701E-01	
PA-234	131.29	848.	-13.	-0.007	326.27	-8.427E-01	
CE-141	145.44	242.	-15.	-0.008	195.73	-3.894E-01	
Ba-140	162.66	332.	6.	0.003	470.10	1.188E+00	
U-235	163.38	256.	22.	0.012	105.86	5.792E+00	
CE-139	165.85	284.	17.	0.009	144.24	2.808E-01	P
Cf-251	176.60	132.	23.	0.013	97.83	1.849E+00	
U-235	205.33	341.	-28.	-0.015	87.50	-8.612E+00	P
Cf-251	227.00	150.	9.	0.005	266.84	2.293E+00	
EU-152	244.69	880.	20.	0.011	211.94	4.618E+00	
TH-227	256.24	128.	-8.	-0.004	279.14	-2.076E+00	
Cd-113m	263.70	163.	6.	0.003	321.71	1.751E+03	
BI-210M	265.83	127.	18.	0.010	89.70	6.874E-01	P
Hg-203	279.20	212.	-24.	-0.013	88.99	-5.634E-01	
I-131	284.30	97.	8.	0.005	234.92	2.638E+00	P
PA-231	300.07	218.	-14.	-0.008	151.52	-1.157E+01	
BI-210M	304.90	181.	6.	0.003	311.01	4.530E-01	
PA-233	312.01	669.	-21.	-0.012	173.11	-1.238E+00	
La-140	328.76	448.	14.	0.008	223.10	1.447E+00	P
EU-152	344.29	488.	-21.	-0.012	147.57	-1.812E+00	
HF-181	345.83	496.	-21.	-0.012	148.53	-3.202E+00	
BA-133	356.00	434.	-20.	-0.011	147.13	-7.503E-01	
I-131	364.48	88.	-10.	-0.006	186.37	-2.863E-01	
BA-133	383.84	184.	-19.	-0.010	105.25	-5.069E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	193.	4.	0.002	563.64	1.347E-01	
SB-125	427.88	74.	6.	0.004	279.47	5.620E-01	
AG-108M	433.94	69.	-3.	-0.002	512.83	-9.777E-02	
pm-146	453.88	69.	3.	0.001	640.31	1.125E-01	
SB-125	463.37	66.	50.	0.028	27.18	1.322E+01	P
BE-7	477.60	148.	-12.	-0.006	152.24	-3.111E+00	
La-140	487.02	116.	15.	0.008	105.40	9.478E-01	
RH-106	511.86	98.	106.	0.059	26.27	1.586E+01	
Nd-147	531.00	52.	-5.	-0.003	297.77	-1.183E+00	
Ba-140	537.26	69.	-10.	-0.006	167.40	-1.314E+00	
CS-134	563.24	36.	13.	0.007	98.29	4.949E+00	P
PA-234	569.47	49.	5.	0.003	189.98	2.105E+00	
SB-125	600.50	395.	15.	0.008	186.53	2.868E+00	
SB-124	602.73	411.	10.	0.006	279.93	3.538E-01	
RH-106	621.92	460.	-17.	-0.009	179.61	-5.929E+00	
SB-125	635.89	60.	-12.	-0.006	100.09	-3.570E+00	
I-131	636.97	65.	6.	0.003	189.00	3.023E+00	
AG-110M	657.76	164.	9.	0.005	203.97	3.423E-01	
PM-144	696.54	80.	16.	0.009	82.19	6.107E-01	
NB-94	702.63	132.	-21.	-0.011	85.91	-7.979E-01	P
SB-124	722.79	92.	18.	0.010	78.57	6.449E+00	
AG-108M	722.94	110.	5.	0.003	284.43	2.240E-01	
ZR-95	724.20	121.	-7.	-0.004	215.61	-6.420E-01	
BI-212	727.17	116.	-6.	-0.003	271.67	-2.910E+00	
pm-146	735.72	47.	-6.	-0.003	259.16	-9.849E-01	
pm-146	747.16	37.	-5.	-0.003	246.86	-6.205E-01	
ZR-95	756.73	33.	11.	0.006	118.29	7.822E-01	P
AG-110M	763.94	74.	-2.	-0.001	612.37	-3.610E-01	
EU-152	778.92	37.	7.	0.004	198.24	2.102E+00	
BI-212	785.42	51.	2.	0.001	915.20	5.345E+00	
CS-134	795.87	62.	15.	0.008	78.54	7.268E-01	
CS-134	801.95	105.	-11.	-0.006	135.22	-5.275E+00	
CO-58	810.78	70.	-15.	-0.008	82.42	-6.386E-01	
La-140	815.77	85.	-4.	-0.002	339.30	-7.054E-01	
Cs-136	818.50	80.	9.	0.005	144.44	3.810E-01	
MN-54	834.85	50.	-17.	-0.010	73.83	-7.362E-01	P
Co-56	846.77	40.	-4.	-0.002	351.19	-1.738E-01	
NB-94	871.10	51.	-15.	-0.008	73.43	-6.511E-01	
EU-154	873.23	73.	-7.	-0.004	181.11	-2.474E+00	
PA-234	880.53	43.	12.	0.007	83.26	8.822E+00	
PA-234	883.24	55.	5.	0.003	194.81	2.564E+00	
Sc-46	889.28	72.	-10.	-0.005	129.99	-4.279E-01	
y-88	898.04	15.	9.	0.005	100.31	4.357E-01	
AG-110M	937.49	20.	12.	0.007	86.87	1.636E+00	
PA-234	946.02	50.	-20.	-0.011	64.81	-6.891E+00	P
EU-152	964.11	109.	12.	0.007	123.19	4.042E+00	
PA-234M	1001.00	87.	-19.	-0.011	66.02	-1.144E+02	P
EU-154	1004.77	95.	-6.	-0.003	250.83	-1.528E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1037.84	27.	14.	0.008	86.35	5.110E+00		
Cs-136	1048.07	52.	-11.	-0.006	97.49	-7.004E-01		
RH-106	1050.36	53.	14.	0.008	78.25	4.579E+01		
BI-207	1063.66	16.	7.	0.004	135.97	4.823E-01		P
Ga-68	1077.40	21.	7.	0.004	162.17	1.225E+01		
FE-59	1099.25	43.	-13.	-0.007	73.18	-1.219E+00		P
EU-152	1112.07	85.	7.	0.004	201.43	2.578E+00		
ZN-65	1115.55	92.	7.	0.004	208.52	6.978E-01		
Sc-46	1120.55	100.	5.	0.003	277.81	2.763E-01		P
CO-60	1173.24	40.	-10.	-0.006	138.09	-5.787E-01		P
Ta-182	1189.05	45.	-6.	-0.004	252.47	-2.190E+00		
Co-56	1238.28	46.	16.	0.009	102.09	1.399E+00		P
NA-22	1274.53	28.	2.	0.001	458.26	9.847E-02		
FE-59	1291.60	29.	-8.	-0.005	201.50	-1.123E+00		P
CO-60	1332.50	28.	-6.	-0.004	201.07	-3.869E-01		
AG-110M	1384.30	6.	7.	0.004	88.14	1.912E+00		
EU-152	1408.00	18.	-2.	-0.001	517.20	-6.064E-01		
La-140	1596.21	19.	-5.	-0.003	221.06	-3.673E-01		
SB-124	1690.98	13.	-8.	-0.004	120.80	-1.175E+00		
y-88	1836.06	0.	8.	0.004	37.84	6.041E-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	-3.1107E+00	-3.1107E+00	1.522E+02%	1.60E+01
NA-22	#A	9.8471E-02	9.8471E-02	4.583E+02%	1.63E+00
K-40		2.5850E+02	2.5850E+02	5.015E+00%	1.15E+01
Sc-46	#A	-7.5819E-02	-7.5819E-02	1.300E+02%	1.90E+00
CR-51	#A	-5.0002E-01	-5.0002E-01	1.554E+03%	2.62E+01
MN-54	#A	-7.3618E-01	-7.3618E-01	7.383E+01%	1.53E+00
FE-59	#A	-1.2185E+00	-1.2185E+00	7.318E+01%	3.11E+00
Co-56	#A	8.1760E-01	8.1761E-01	8.635E+01%	1.40E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.21E+00
CO-58	#A	-6.3863E-01	-6.3863E-01	8.242E+01%	1.76E+00
CO-60	#A	-3.8687E-01	-3.8687E-01	2.011E+02%	1.68E+00
ZN-65	#A	6.9776E-01	6.9776E-01	2.085E+02%	5.00E+00
NB-94	#A	-7.9788E-01	-7.9788E-01	8.591E+01%	2.17E+00
ZR-95	#A	7.8218E-01	7.8219E-01	1.183E+02%	2.17E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.75E+00
RU-103	#A	4.3351E-01	4.3351E-01	9.342E+01%	9.72E-01
RH-106	#A	1.0933E+00	1.0933E+00	7.825E+01%	3.57E+01
AG-108M	#A	6.3417E-02	6.3417E-02	2.844E+02%	1.22E+00
AG-110M	#A	5.9766E-01	5.9766E-01	8.687E+01%	2.40E+00
SN-113	#A	1.3474E-01	1.3474E-01	5.636E+02%	2.60E+00

SB-124 #A	9.5792E-01	9.5793E-01	7.857E+01%		3.34E+00
SB-125 #A	3.5612E+00	3.5612E+00	2.718E+01%		3.79E+00
I-131 #A	1.5246E-01	1.5246E-01	1.182E+02%		1.33E+00
Gd-153 #A	-1.4692E+00	-1.4692E+00	1.387E+02%		6.78E+00
Ga-68 #A	1.2210E+01	1.2247E+01	1.622E+02%		4.45E+01
Tc-99m #A	0.0000E+00	0.0000E+00	1.000E+03%		1.95E+00
BA-133 #A	-7.5026E-01	-7.5026E-01	1.471E+02%		3.70E+00
CS-134 #A	5.4037E-01	5.4037E-01	7.854E+01%		3.41E+00
CS-137	4.8790E+00	4.8790E+00	1.522E+01%		1.22E+00
CE-139 #A	2.8081E-01	2.8081E-01	1.442E+02%		1.36E+00
Ba-140 #A	-8.0563E-01	-8.0564E-01	1.674E+02%		5.28E+00
La-140 #A	2.3238E-01	2.3238E-01	1.054E+02%		1.69E+00
CE-141 #A	-3.8941E-01	-3.8941E-01	1.957E+02%		1.95E+00
CE-144 A	3.8742E+00	3.8742E+00	5.221E+01%		5.18E+00
PM-144 #A	6.1067E-01	6.1067E-01	8.219E+01%		1.68E+00
EU-152 #A	1.2132E+00	1.2132E+00	7.281E+01%		8.95E+00
EU-154 #A	-2.4742E+00	-2.4742E+00	1.811E+02%		1.54E+01
EU-155 #A	-2.0495E+00	-2.0495E+00	3.298E+01%		1.11E+01
HF-181 #A	0.0000E+00	0.0000E+00	5.774E+02%		2.19E+00
Ta-182 #A	-1.2964E-01	-1.2965E-01	1.890E+03%		8.48E+00
Hg-203 #A	-5.6341E-01	-5.6341E-01	8.899E+01%		1.67E+00
TL-208	6.4521E+00	6.4521E+00	9.792E+00%		9.85E-01
pm-146 #A	-6.2049E-01	-6.2049E-01	2.469E+02%		3.63E+00
y-88 #A	5.2234E-01	5.2234E-01	3.784E+01%		1.01E+00
Cd-113m#A	1.7514E+03	1.7514E+03	3.217E+02%		1.92E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.10E+01
Cf-251 #A	1.8489E+00	1.8489E+00	9.783E+01%		4.62E+00
Cf-249 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.56E+00
Sn-126 #A	-1.6239E+00	-1.6239E+00	3.566E+02%		1.94E+01
PB-210 A	2.7872E+01	2.7872E+01	4.791E+01%		3.44E+01
PB-212	1.9705E+01	1.9705E+01	5.374E+00%		1.99E+00
PB-214	1.6517E+01	1.6517E+01	7.736E+00%		2.07E+00
BI-207 #A	2.1173E-01	2.1173E-01	1.360E+02%		1.22E+00
BI-212 #A	-2.9097E+00	-2.9097E+00	2.717E+02%		2.71E+01
BI-214	1.5309E+01	1.5309E+01	8.669E+00%		2.70E+00
BI-210M#A	6.0328E-01	6.0328E-01	8.970E+01%		2.06E+00
AC-228	1.8346E+01	1.8346E+01	8.244E+00%		2.33E+00
TH-227 #A	5.6247E+00	5.6247E+00	1.255E+02%		2.36E+01
TH-229 #A	8.0410E+00	8.0410E+00	9.640E+01%		1.98E+01
TH-234 #A	1.3776E+01	1.3776E+01	6.489E+01%		2.94E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.92E+01
PA-233 #A	-1.2377E+00	-1.2377E+00	1.731E+02%		7.16E+00
PA-234 #A	7.4597E-01	7.4597E-01	1.416E+02%		9.21E+00
PA-234M#A	-1.1439E+02	-1.1439E+02	6.602E+01%		2.71E+02
U-235 #A	1.7740E+00	1.7740E+00	1.059E+02%		1.56E+01
AM-241 #A	-5.1725E-01	-5.1725E-01	2.202E+02%		5.42E+00
Np-237 #A	-2.7454E+00	-2.7454E+00	1.649E+02%		1.51E+01
Ir-192 #A	3.7333E-04	3.7333E-04	1.152E+02%		2.94E+00
Cs-136 #A	3.8099E-01	3.8099E-01	1.444E+02%		1.88E+00

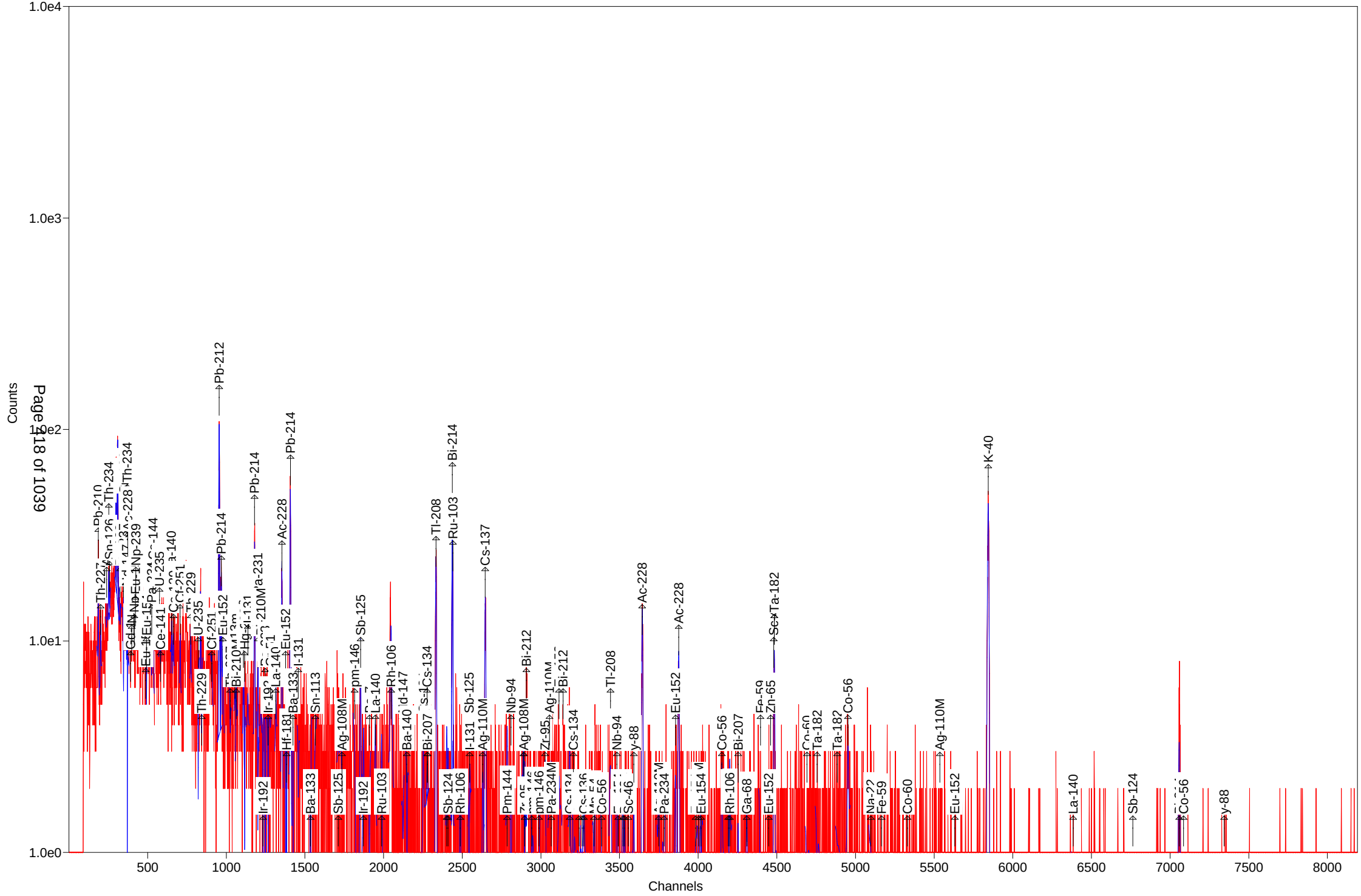
Np-239	A	8.2041E-01	8.2046E-01	3.744E+02%	1.02E+01
Nd-147	#A	-1.1826E+00	-1.1827E+00	2.978E+02%	8.59E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 3.715E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 3.7145724E+02 Bq/Sample

257318_Gamma_160-17797-A-1-C DU. 16_Gamma_20161652.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161002

Sample Description: 257318_Gamma_160-17797-A-2-B
Detector: Detector # 8
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-2-B

Decay to Time: 7/12/2016 09:56 Live Time: 1800 sec
Acquisition Time: 7/12/2016 09:56:27 Real Time: 1854 sec
Analysis Time: 7/12/2016 10:28 Dead Time: 2.94 %
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_2016-07-10_1451.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	4.456E-01	991.2	4.416E+00	4.416E+00	1.540E+01
NA-22	4.005E-01	121.7	4.873E-01	4.877E-01	1.710E+00
K-40	2.726E+02	5.6	1.528E+01	2.069E+01	8.115E+00
Sc-46	2.106E-01	113.2	2.383E-01	2.385E-01	2.855E+00
CR-51	-4.509E+00	58.1	2.619E+00	2.630E+00	1.372E+01
MN-54	3.535E-01	150.1	5.305E-01	5.308E-01	1.275E+00
FE-59	-1.185E+00	118.0	1.399E+00	1.400E+00	3.549E+00
Co-56	1.807E+00	32.6	5.891E-01	5.963E-01	9.686E-01
CO-57	3.015E-01	107.6	3.243E-01	3.247E-01	1.087E+00
CO-58	-5.475E-01	113.1	6.194E-01	6.200E-01	2.108E+00
CO-60	4.184E-01	106.6	4.459E-01	4.464E-01	1.656E+00
ZN-65	1.434E-01	1217.1	1.745E+00	1.745E+00	6.113E+00
NB-94	-1.645E-02	3079.0	5.064E-01	5.064E-01	1.244E+00
ZR-95	1.384E+00	51.3	7.104E-01	7.140E-01	1.599E+00
NB-95	-1.068E+00	71.2	7.607E-01	7.627E-01	2.524E+00
RU-103	-5.607E-01	94.7	5.308E-01	5.316E-01	1.271E+00
RH-106	6.020E+00	102.2	6.150E+00	6.158E+00	3.738E+01
AG-108M	3.191E-01	99.0	3.159E-01	3.163E-01	1.021E+00
AG-110M	8.710E-01	67.3	5.864E-01	5.881E-01	3.926E+00
SN-113	6.540E-01	111.6	7.299E-01	7.307E-01	2.462E+00
SB-124	4.268E-01	241.3	1.030E+00	1.030E+00	3.481E+00
SB-125	3.971E+00	26.0	1.031E+00	1.050E+00	3.653E+00
I-131	6.296E-01	41.2	2.594E-01	2.614E-01	1.257E+00
Gd-153	-3.208E-02	113.3	3.635E-02	3.640E-02	7.831E+00
Ga-68	-1.968E+01	154.6	3.043E+01	3.045E+01	6.946E+01
Tc-99m	0.000E+00	1.#INF	2.611E-01	2.611E-01	2.193E+00
BA-133	-6.707E-01	174.6	1.171E+00	1.172E+00	3.938E+00
CS-134	4.425E-01	147.7	6.534E-01	6.538E-01	3.573E+00
CS-137	3.665E+00	15.7	5.769E-01	6.076E-01	1.088E+00
CE-139	4.096E-01	93.4	3.824E-01	3.844E-01	1.278E+00
Ba-140	1.620E-01	284.7	4.611E-01	4.612E-01	4.791E+00
La-140	5.440E-01	102.6	5.579E-01	5.586E-01	1.896E+00
CE-141	-3.620E-01	331.9	1.201E+00	1.201E+00	4.024E+00

CE-144	-3.424E+00	140.4	4.807E+00	4.810E+00	1.603E+01
PM-144	-1.453E-01	461.9	6.712E-01	6.713E-01	1.594E+00
EU-152	2.371E+00	92.0	2.182E+00	2.185E+00	9.669E+00
EU-154	4.723E-02	115.2	5.443E-02	5.449E-02	1.486E+01
EU-155	1.819E+00	53.1	9.653E-01	9.704E-01	3.150E+00
HF-181	2.377E-01	193.4	4.597E-01	4.599E-01	2.043E+00
Ta-182	2.061E+00	80.2	1.654E+00	1.657E+00	5.811E+00
Hg-203	4.189E-01	91.3	3.824E-01	3.832E-01	1.284E+00
TL-208	7.318E+00	9.9	7.249E-01	8.183E-01	1.047E+00
pm-146	2.419E+00	43.7	1.058E+00	1.065E+00	2.534E+00
y-88	1.686E-01	390.1	6.576E-01	6.577E-01	1.598E+00
Cd-113m	5.107E+03	144.3	7.368E+03	7.375E+03	2.485E+04
Cd-109	-1.185E+01	173.2	2.052E+01	2.053E+01	6.827E+01
Cf-251	9.445E-02	2151.7	2.032E+00	2.032E+00	5.313E+00
Cf-249	6.947E-01	179.6	1.248E+00	1.248E+00	2.618E+00
Sn-126	4.988E+00	114.6	5.715E+00	5.721E+00	1.906E+01
PB-210	-1.750E+01	80.5	1.408E+01	1.412E+01	6.297E+01
PB-212	2.092E+01	5.2	1.091E+00	1.738E+00	1.634E+00
PB-214	1.771E+01	6.1	1.081E+00	1.420E+00	1.747E+00
BI-207	-9.833E-02	335.3	3.297E-01	3.298E-01	1.259E+00
BI-212	2.741E+01	15.7	4.291E+00	4.521E+00	4.852E+00
BI-214	1.788E+01	9.5	1.704E+00	1.941E+00	2.383E+00
BI-210M	1.976E-01	500.3	9.884E-01	9.885E-01	3.101E+00
AC-228	1.844E+01	12.3	2.260E+00	2.448E+00	2.720E+00
TH-227	7.088E+00	105.2	7.459E+00	7.469E+00	2.492E+01
TH-229	-1.061E+01	93.6	9.925E+00	9.961E+00	2.525E+01
TH-234	1.397E+01	41.7	5.828E+00	5.874E+00	2.928E+01
PA-231	-1.628E+01	179.6	2.923E+01	2.925E+01	9.784E+01
PA-233	-2.986E-02	2368.3	7.071E-01	7.071E-01	7.401E+00
PA-234	2.273E+00	53.1	1.206E+00	1.212E+00	9.428E+00
PA-234M	3.202E+01	84.3	2.701E+01	2.706E+01	2.793E+02
U-235	-7.933E-01	396.8	3.148E+00	3.148E+00	1.761E+01
AM-241	3.753E-01	417.3	1.566E+00	1.566E+00	5.281E+00
Np-237	0.000E+00	1.#INF	6.375E+00	6.375E+00	2.120E+01
Ir-192	3.193E-01	107.9	3.447E-01	3.452E-01	1.169E+00
Cs-136	5.949E-01	89.5	5.327E-01	5.338E-01	1.800E+00
Np-239	-1.888E+00	158.4	2.990E+00	2.993E+00	9.951E+00
Nd-147	-1.966E-01	1806.9	3.552E+00	3.552E+00	8.889E+00
Total	5.585E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-2-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161002.An1

Acquisition information
Start time: 7/12/2016 9:56:27 AM
Live time: 1800
Real time: 1854
Dead time: 2.94 %
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	7/12/2016 9:56:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-07-10_1451.PBC 7/10/2016 2:51:27 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1844

***** 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	23.	105.23	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
59.54	7.	417.26	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
62.89	58.	36.98	0.75	3.072E-02	63.29	3.810	PBC<MDA	TH234
64.28	27.	114.59	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
74.87	187.	11.99	1.03	3.620E-02				
77.11	283.	8.38	1.04	3.700E-02				
86.53	40.	53.17	1.04	3.961E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.819E+00	EU155
					86.94	9.040	6.165E+00	Sn126
89.96	67.	25.16	1.05	4.031E-02				
92.91	151.	13.14	1.05	4.078E-02	92.59	5.584	2.466E+01	TH234
					93.35	5.561	3.701E+01	AC228
103.20	32.	158.90	1.06	4.176E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.750E+00	Np239
103.44	32.	157.15	1.06	4.178E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.751E+00	Np239
105.05	29.	53.06	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
122.06	19.	107.57	1.07	4.146E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.015E-01	CO57
123.10	2.	893.86	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
162.66	8.	284.67	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
163.38	-3.	747.98	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	21.	93.37	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
210.85	18.	126.87	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
238.70	411.	6.16	1.07	2.744E-02	238.63	43.300	1.921E+01	PB212
242.07	80.	19.60	1.16	2.714E-02	242.00	7.430	2.212E+01	PB214
263.70	14.	144.28	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
270.28	56.	25.00	0.85	2.494E-02				
277.04	18.	57.86	1.08	2.440E-02	277.28	6.310	PBC<MDA	TL208
279.20	15.	91.29	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203
284.30	36.	41.20	1.19	2.393E-02	284.30	6.140	1.361E+01	I131
295.40	152.	9.80	0.94	2.322E-02	295.09	19.300	1.883E+01	PB214
300.24	35.	29.34	1.20	2.294E-02	300.03	3.280	2.580E+01	PB212
					300.07	2.460	3.440E+01	PA231
					300.18	6.200	1.365E+01	PA233
304.90	6.	500.34	1.21	2.265E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	5.503E-01	BI210M
316.49	11.	107.95	1.22	2.199E-02	316.49	87.040	PBC<MDA	Ir192
328.76	17.	164.25	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	15.	180.63	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.47	117.	15.98	1.17	2.085E-02	338.32	12.010	2.588E+01	AC228
345.83	12.	193.42	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
351.88	240.	7.51	1.36	2.021E-02	351.93	37.600	1.757E+01	PB214
383.84	16.	104.88	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	5.	310.55	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
391.69	14.	111.61	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	166.15	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
433.94	12.	98.97	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
463.37	46.	25.96	1.32	1.620E-02	463.37	10.470	1.505E+01	SB125
477.60	1.	991.21	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
487.02	11.	104.56	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
511.86	87.	29.55	2.61	1.494E-02	511.86	20.000	1.618E+01	RH106
563.24	2.	319.35	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
583.08	151.	9.90	1.00	1.342E-02	583.02	84.500	7.393E+00	TL208
600.50	11.	220.09	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	241.27	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
604.71	10.	245.21	1.42	1.303E-02	604.71	97.620	PBC<MDA	CS134
609.35	189.	9.53	1.29	1.294E-02	609.31	46.090	1.759E+01	BI214
					610.30	5.750	1.412E+02	RU103
614.28	4.	570.25	1.43	1.286E-02	614.28	89.850	PBC<MDA	AG108M
661.80	68.	15.74	1.44	1.209E-02	661.66	85.210	3.665E+00	CS137
727.48	42.	15.65	1.82	1.118E-02	727.17	7.550	2.741E+01	BI212
735.72	9.	103.51	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
747.16	18.	43.72	1.51	1.093E-02	747.16	34.000	2.642E+00	pm146
756.73	15.	51.33	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	9.	67.32	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
766.41	12.	84.35	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	9.	92.03	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152
795.87	6.	184.77	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
815.77	8.	102.56	1.56	1.015E-02	815.77	23.280	PBC<MDA	La140
818.50	11.	89.54	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
834.85	6.	150.07	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
846.77	7.	94.37	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.45	11.	88.44	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
898.04	3.	390.07	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.56	89.	12.26	1.33	9.247E-03	911.07	29.000	1.844E+01	AC228
946.02	15.	53.05	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
964.11	8.	167.40	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.49	71.	16.12	1.32	8.776E-03	968.97	17.460	2.574E+01	AC228
996.33	5.	188.68	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1001.00	-4.	284.18	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	10.	102.15	1.70	8.193E-03	1050.36	1.560	PBC<MDA	RH106
1112.07	9.	140.68	1.74	7.803E-03	1112.07	13.644	PBC<MDA	EU152
1120.43	6.	106.89	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	113.16	1.74	7.752E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.337E-01	Sc46
1121.45	10.	80.22	1.74	7.748E-03	1121.30	34.900	PBC<MDA	Ta182
1173.24	5.	150.10	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1188.94	4.	250.83	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	33.	32.59	1.81	7.114E-03	1238.28	66.070	3.900E+00	Co56
1274.53	5.	121.66	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.138E+00	EU154
1332.50	5.	151.38	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	7.	89.15	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1461.10	323.	5.61	1.95	6.165E-03	1460.83	10.670	2.726E+02	K40
1764.42	27.	25.19	2.07	5.226E-03	1764.49	15.400	1.875E+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	
299.30	74.89	158.	187.	5.174E+03	11.99	1.034	-	sD
308.25	77.13	139.	283.	7.647E+03	8.38	1.036	-	D
360.08	90.08	131.	82.	2.037E+03	22.62	1.046	-	sD
1080.98	269.77	42.	56.	2.246E+03	25.00	0.851	-	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	406.	-27.	-0.015	80.48	1.012s
TH-227	200.37	50.14	285.	23.	0.013	105.23	1.015s
AM-241	237.95	59.54	421.	7.	0.004	417.26	1.022s
TH-234	251.38	62.89	162.	30.	0.016	75.04	0.745s
Sn-126	256.93	64.28	479.	27.	0.015	114.59	1.026
Np-237	345.77	86.49	1755.	0.	0.000	184.63	1.043A
EU-155	345.98	86.54	1695.	40.	0.022	53.17	1.043D
Sn-126	347.57	86.94	1663.	-32.	-0.018	179.68	1.044
Sn-126	350.09	87.57	1631.	-32.	-0.018	177.88	1.044D
Cd-109	351.97	88.04	1546.	-32.	-0.018	173.17	1.044s
Nd-147	364.21	91.10	1514.	-32.	-0.018	171.00	1.047s
TH-234	370.17	92.59	256.	57.	0.032	41.73	1.048D
AC-228	373.21	93.35	1396.	-32.	-0.018	164.01	1.049s
Gd-153	389.81	97.50	1363.	-33.	-0.018	161.61	1.052s
Np-239	397.81	99.50	1371.	-33.	-0.018	161.79	1.053s
Gd-153	412.62	103.20	1244.	32.	0.018	158.90	1.056
Np-239	414.62	103.70	1218.	32.	0.018	157.15	1.057
EU-155	421.07	105.31	104.	29.	0.016	53.06	1.058D
Np-239	424.34	106.13	1292.	-32.	-0.018	158.43	1.058s
EU-152	486.92	121.78	324.	-29.	-0.016	91.05	1.071
CO-57	488.06	122.06	205.	19.	0.011	107.57	1.071
EU-154	492.22	123.10	216.	2.	0.001	893.86	1.072s
PA-234	525.00	131.29	678.	-16.	-0.009	233.90	1.078
HF-181	531.92	133.02	694.	0.	0.000	1000.00	1.079s
CE-144	533.98	133.54	736.	-28.	-0.015	140.38	1.080s
HF-181	545.02	136.30	763.	-28.	-0.015	142.66	1.082s
CO-57	545.72	136.47	791.	-14.	-0.008	286.42	1.082s
Tc-99m	561.86	140.51	805.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	811.	-6.	-0.003	396.78	1.087s
CE-141	581.59	145.44	809.	-12.	-0.007	331.89	1.089
Ba-140	650.47	162.66	234.	8.	0.004	284.67	1.102s
U-235	653.35	163.38	245.	-3.	-0.002	747.98	1.102
CE-139	663.24	165.85	188.	21.	0.012	93.37	1.104s
TH-229	773.87	193.51	176.	-27.	-0.015	93.56	1.125s
U-235	821.17	205.33	142.	-13.	-0.007	184.70	1.134s
TH-229	843.24	210.85	128.	18.	0.010	126.87	1.138s
Cf-251	907.84	227.00	136.	-5.	-0.003	458.84	1.151s
PB-212	954.37	238.63	48.	447.	0.249	5.22	1.159D
PB-214	967.84	242.00	84.	80.	0.045	19.60	1.162D
TH-227	1024.81	256.24	100.	-8.	-0.004	247.28	1.172s
Cd-113m	1054.65	263.70	197.	14.	0.008	144.28	1.178s
BI-210M	1063.18	265.83	211.	0.	0.000	1000.00	1.179s
TL-208	1108.02	277.04	28.	18.	0.010	57.86	1.081
Hg-203	1116.66	279.20	85.	15.	0.008	91.29	1.189s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1137.05	284.30	48.	36.	0.020	41.20	1.193s
PB-214	1180.22	295.09	25.	145.	0.081	9.63	1.201D
PB-212	1199.98	300.03	35.	35.	0.019	29.34	1.205D
PA-231	1200.14	300.07	625.	-19.	-0.011	185.56	1.205s
PA-233	1200.58	300.18	605.	-19.	-0.011	182.71	1.205s
PA-231	1210.46	302.65	586.	-19.	-0.011	179.59	1.207s
BA-133	1211.27	302.85	567.	-19.	-0.011	176.64	1.207s
Ba-140	1219.26	304.85	548.	-19.	-0.011	173.46	1.208
BI-210M	1219.45	304.90	491.	6.	0.003	500.34	1.208
Ir-192	1233.62	308.44	497.	0.	0.000	1000.00	1.211s
Ir-192	1265.82	316.49	65.	11.	0.006	107.95	1.217
CR-51	1280.20	320.08	119.	-18.	-0.010	58.09	1.219s
La-140	1314.91	328.76	359.	17.	0.009	164.25	1.226s
Cf-249	1333.63	333.44	376.	15.	0.009	180.63	1.229s
AC-228	1353.73	338.47	43.	117.	0.065	15.98	1.168s
Cs-136	1362.15	340.57	391.	0.	0.000	1000.00	1.234s
EU-152	1377.01	344.29	391.	0.	0.000	1000.00	1.237
HF-181	1383.19	345.83	271.	12.	0.007	193.42	1.238s
PB-214	1407.38	351.88	21.	240.	0.134	7.51	1.361
BA-133	1423.87	356.00	336.	-15.	-0.008	174.61	1.245s
I-131	1457.81	364.48	52.	-10.	-0.006	144.68	1.252s
BA-133	1535.24	383.84	126.	16.	0.009	104.88	1.266
Cf-249	1551.68	387.95	142.	5.	0.003	310.55	1.269s
SN-113	1566.64	391.69	115.	14.	0.008	111.61	1.271s
SB-125	1711.39	427.88	44.	8.	0.004	166.15	1.297s
AG-108M	1735.64	433.94	30.	12.	0.007	98.97	1.301s
pm-146	1815.41	453.88	61.	-9.	-0.005	124.87	1.315s
SB-125	1853.36	463.37	48.	46.	0.026	25.96	1.322
Ir-192	1872.14	468.06	136.	-16.	-0.009	106.32	1.325s
BE-7	1910.28	477.60	87.	1.	0.001	991.21	1.332s
HF-181	1927.89	482.00	88.	0.	0.000	1000.00	1.335s
La-140	1947.98	487.02	65.	11.	0.006	104.56	1.339s
RU-103	1988.12	497.05	39.	-14.	-0.008	94.67	1.346s
RH-106	2047.36	511.86	84.	87.	0.048	29.55	2.606s
Ba-140	2148.95	537.26	35.	-2.	-0.001	670.46	1.373s
CS-134	2252.86	563.24	14.	2.	0.001	319.35	1.391s
PA-234	2277.80	569.47	31.	-1.	-0.001	789.51	1.395s
BI-207	2278.73	569.70	35.	-2.	-0.001	335.35	1.396s
TL-208	2332.22	583.08	16.	151.	0.084	9.90	0.997s
SB-125	2401.92	600.50	288.	11.	0.006	220.09	1.416s
SB-124	2410.85	602.73	278.	10.	0.005	241.27	1.418s
CS-134	2418.76	604.71	288.	10.	0.005	245.21	1.419s
BI-214	2437.33	609.35	24.	189.	0.105	9.53	1.289
RU-103	2441.12	610.30	298.	10.	0.005	248.66	1.423s
AG-108M	2457.05	614.28	308.	4.	0.002	570.25	1.426s
PM-144	2472.18	618.06	312.	0.	0.000	1000.00	1.428
RH-106	2487.60	621.92	312.	0.	0.000	1000.00	1.431s
SB-125	2543.49	635.89	50.	-14.	-0.007	78.57	1.440s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2547.83	636.97	70.	-8.	-0.005	146.48	1.441s
AG-110M	2630.98	657.76	111.	-9.	-0.005	171.87	1.455s
CS-137	2647.12	661.80	14.	68.	0.038	15.74	1.440
PM-144	2786.11	696.54	42.	-3.	-0.002	461.88	1.480s
SB-124	2891.09	722.79	80.	-12.	-0.006	112.76	1.497s
EU-154	2893.37	723.36	68.	0.	0.000	1000.00	1.498
BI-212	2909.86	727.48	0.	42.	0.023	15.65	1.823s
pm-146	2942.83	735.72	19.	9.	0.005	103.51	1.506s
pm-146	2988.59	747.16	9.	18.	0.010	43.72	1.513s
ZR-95	3026.87	756.73	9.	15.	0.008	51.33	1.519s
AG-110M	3055.73	763.94	14.	9.	0.005	67.32	1.524s
NB-95	3063.11	765.79	97.	-21.	-0.011	71.21	1.525s
PA-234M	3065.60	766.41	43.	12.	0.007	84.35	1.526s
EU-152	3115.64	778.92	14.	9.	0.005	92.03	1.534s
BI-212	3141.64	785.42	42.	-11.	-0.006	128.56	1.538s
CS-134	3183.43	795.87	62.	6.	0.003	184.77	1.544s
CS-134	3207.77	801.95	86.	-15.	-0.008	92.99	1.548s
CO-58	3243.06	810.78	59.	-10.	-0.006	113.14	1.554s
La-140	3263.04	815.77	27.	8.	0.004	102.56	1.557s
Cs-136	3273.97	818.50	42.	11.	0.006	89.54	1.559s
MN-54	3339.36	834.85	19.	6.	0.004	150.07	1.569s
Co-56	3387.05	846.77	10.	7.	0.004	94.37	1.577s
TL-208	3442.23	860.56	19.	11.	0.006	88.44	1.585s
NB-94	3484.36	871.10	31.	-1.	-0.001	704.58	1.592s
EU-154	3492.89	873.23	38.	-5.	-0.003	132.40	1.593s
PA-234	3522.10	880.53	75.	-15.	-0.008	87.15	1.598s
PA-234	3532.94	883.24	89.	-8.	-0.004	171.41	1.599s
AG-110M	3538.71	884.68	97.	0.	0.000	1000.00	1.600s
y-88	3592.14	898.04	23.	3.	0.001	390.07	1.608
AC-228	3646.22	911.56	5.	89.	0.049	12.26	1.332
AG-110M	3749.96	937.49	25.	-5.	-0.003	224.35	1.633s
PA-234	3784.07	946.02	10.	15.	0.008	53.05	1.638s
EU-152	3856.43	964.11	88.	8.	0.005	167.40	1.649s
AC-228	3877.97	969.49	12.	71.	0.039	16.12	1.319
EU-154	3985.31	996.33	42.	5.	0.003	188.68	1.668s
PA-234M	4003.99	1001.00	51.	-4.	-0.002	284.18	1.671s
Co-56	4151.36	1037.84	25.	-6.	-0.003	176.18	1.693s
Cs-136	4192.29	1048.07	40.	-17.	-0.009	58.88	1.698s
RH-106	4201.45	1050.36	49.	10.	0.006	102.15	1.700s
BI-207	4254.65	1063.66	28.	-10.	-0.006	110.75	1.708s
Ga-68	4309.61	1077.40	30.	-8.	-0.004	154.62	1.716
FE-59	4397.02	1099.25	31.	-10.	-0.005	118.04	1.728s
EU-152	4448.32	1112.07	68.	9.	0.005	140.68	1.736s
BI-214	4481.17	1120.29	15.	6.	0.003	106.89	1.740
Sc-46	4482.22	1120.55	20.	6.	0.003	113.16	1.740
Ta-182	4485.22	1121.30	30.	10.	0.006	80.22	1.741s
CO-60	4692.97	1173.24	14.	5.	0.003	150.10	1.770s
Ta-182	4756.23	1189.05	20.	4.	0.002	250.83	1.779s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4885.67	1221.41	27.	-5.	-0.003	255.75	1.797s
Co-56	4953.16	1238.28	16.	33.	0.018	32.59	1.806s
NA-22	5098.16	1274.53	16.	5.	0.003	121.66	1.826s
EU-154	5098.22	1274.54	21.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	43.	-18.	-0.010	85.58	1.835s
CO-60	5330.06	1332.50	14.	5.	0.003	151.38	1.857s
AG-110M	5537.25	1384.30	5.	7.	0.004	89.15	1.884s
EU-152	5632.07	1408.00	21.	-1.	-0.001	792.15	1.896s
K-40	5844.48	1461.10	2.	323.	0.179	5.61	1.950
La-140	6384.93	1596.21	12.	-3.	-0.001	698.36	1.990s
SB-124	6764.03	1690.98	6.	-3.	-0.001	218.12	2.034s
BI-214	7058.07	1764.49	10.	27.	0.015	25.19	2.067
Co-56	7085.51	1771.35	48.	-10.	-0.005	104.45	2.070s
y-88	7344.36	1836.06	6.	-3.	-0.001	218.12	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	4.4555E-01					5.31E+01	
			477.60	4.456E-01	?(	1.540E+01	9.91E+02	1.05E+01 G
NA-22	C	4.0053E-01					9.50E+02	
			1274.53	4.005E-01	?(	1.710E+00	1.22E+02	9.99E+01 G
K-40	N	2.7262E+02					4.66E+11	
			1460.83	2.726E+02	(P	8.115E+00	5.61E+00	1.07E+01 G
Sc-46	F	2.1057E-01					8.38E+01	
			889.28	-1.253E-02	%(P	2.855E+00	6.52E+03	1.00E+02 G
			1120.55	4.337E-01	?(	1.703E+00	1.13E+02	1.00E+02 G
CR-51	F	-4.5092E+00					2.77E+01	
			320.08	-4.509E+00	&(P	1.372E+01	5.81E+01	9.94E+00 G
MN-54	C	3.5353E-01					3.12E+02	
			834.85	3.535E-01	?(	1.275E+00	1.50E+02	1.00E+02 G
FE-59	F	-1.1853E+00					4.45E+01	
			1099.25	-1.185E+00	?(P	3.549E+00	1.18E+02	5.65E+01 G
			1291.60	-3.383E+00	+	6.214E+00	8.56E+01	4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 1.8075E+00					7.73E+01	
		846.77	4.238E-01	?(P	9.686E-01	9.44E+01	9.99E+01 G
		1238.28	3.900E+00	?(	2.523E+00	3.26E+01	6.61E+01 G
		1037.84	-2.924E+00	+ P	1.239E+01	1.76E+02	1.41E+01 G
		1771.35	-6.777E+00	+	2.408E+01	1.04E+02	1.55E+01 A
CO-57	C 3.0147E-01					2.72E+02	
		122.06	3.015E-01	?(	1.087E+00	1.08E+02	8.56E+01 G
		136.47	-1.814E+00	&	1.740E+01	2.86E+02	1.07E+01 G
CO-58	C -5.4748E-01					7.09E+01	
		810.78	-5.475E-01	?(	2.108E+00	1.13E+02	9.95E+01 G
CO-60	F 4.1836E-01					1.93E+03	
		1332.50	4.490E-01	?(P	1.656E+00	1.51E+02	1.00E+02 G
		1173.24	3.877E-01	?(P	1.480E+00	1.50E+02	9.99E+01 G
ZN-65	F 1.4338E-01					2.44E+02	
		1115.55	1.434E-01	%(	6.113E+00	1.22E+03	5.06E+01 G
NB-94	I -1.6447E-02					7.41E+06	
		702.63	-1.645E-02	%(	1.244E+00	3.08E+03	9.79E+01 G
		871.10	-5.845E-02	+ P	1.660E+00	7.05E+02	9.99E+01 G
ZR-95	I 1.3840E+00					6.40E+01	
		756.73	1.384E+00	?(	1.599E+00	5.13E+01	5.45E+01 G
		724.20	7.480E-02	&	4.563E+00	1.73E+03	4.42E+01 G
NB-95	I -1.0683E+00					6.40E+01	
		765.79	-1.068E+00	?(	2.524E+00	7.12E+01	9.98E+01 G
RU-103	I -5.6068E-01					3.93E+01	
		497.05	-5.607E-01	?(	1.271E+00	9.47E+01	9.09E+01 G
		610.30	7.396E+00	?	6.213E+01	2.49E+02	5.75E+00 GA
RH-106	I 6.0203E+00					3.74E+02	
		621.92	0.000E+00	?(	3.738E+01	1.00E+03	9.93E+00 G
		1050.36	4.434E+01	?(	1.539E+02	1.02E+02	1.56E+00 G
		511.86	1.618E+01	?	8.447E+00	2.96E+01	2.00E+01 GA
AG-108M	C 3.1914E-01					1.53E+05	
		433.94	4.276E-01	(P	1.021E+00	9.90E+01	9.05E+01 G
		722.94	-3.769E-02	%	2.251E+00	1.70E+03	9.08E+01 G
		614.28	2.099E-01	?(	4.061E+00	5.70E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	8.7105E-01					2.50E+02	
			884.68	0.000E+00	?(	3.926E+00	1.00E+03	7.27E+01 G
			657.76	-4.268E-01	+	2.501E+00	1.72E+02	9.46E+01 G
			937.49	-8.957E-01	+	4.660E+00	2.24E+02	3.44E+01 G
			1384.30	2.319E+00	?(	4.769E+00	8.92E+01	2.43E+01 G
			763.94	2.134E+00	?(	4.756E+00	6.73E+01	2.23E+01 G
SN-113	F	6.5403E-01					1.15E+02	
			391.69	6.540E-01	?(	2.462E+00	1.12E+02	6.40E+01 G
SB-124	F	4.2683E-01					6.02E+01	
			602.73	4.268E-01	?(	3.481E+00	2.41E+02	9.83E+01 G
			1690.98	-5.715E-01	+	2.958E+00	2.18E+02	4.78E+01 G
			722.79	-5.326E+00	+	2.035E+01	1.13E+02	1.08E+01 G
SB-125	I	3.9705E+00					1.01E+03	
			427.88	8.691E-01	?(	3.653E+00	1.66E+02	2.96E+01 G
			600.50	2.615E+00	(	1.943E+01	2.20E+02	1.79E+01 G
			635.89	-5.307E+00	+	1.395E+01	7.86E+01	1.13E+01 G
			463.37	1.505E+01	(P	1.147E+01	2.60E+01	1.05E+01 G
I-131	I	6.2963E-01					8.02E+00	
			364.48	-3.460E-01	?(	1.257E+00	1.45E+02	8.17E+01 G
			284.30	1.361E+01	*(	1.323E+01	4.12E+01	6.14E+00 G
			636.97	-5.175E+00	+	2.595E+01	1.46E+02	7.17E+00 G
Gd-153	F	-3.2079E-02					2.42E+02	
			97.50	-1.456E+00	?(	7.831E+00	1.62E+02	3.00E+01 G
			103.20	1.928E+00	?(	1.020E+01	1.59E+02	2.18E+01 G
Ga-68	C	-1.9682E+01					4.71E-02	
			1077.40	-1.968E+01	?(	6.946E+01	1.55E+02	3.30E+00 G
BA-133	F	-6.7070E-01					3.85E+03	
			356.00	-6.707E-01	?(	3.938E+00	1.75E+02	6.20E+01 G
			302.85	-2.559E+00	+	1.513E+01	1.77E+02	1.83E+01 G
			383.84	5.141E+00	? P	1.813E+01	1.05E+02	8.94E+00 GA
			80.99	-1.192E-02	&	6.569E+00	1.64E+04	3.41E+01 GA
CS-134	I	4.4247E-01					7.54E+02	
			604.71	4.312E-01	?(	3.573E+00	2.45E+02	9.76E+01 G
			795.87	3.865E-01	?(	2.467E+00	1.85E+02	8.55E+01 G
			569.32	-8.796E-02	%	7.488E+00	2.34E+03	1.54E+01 G
			801.95	-9.106E+00	+	2.846E+01	9.30E+01	8.69E+00 G
			563.24	1.147E+00	?(P	9.579E+00	3.19E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	3.6645E+00					1.10E+04	
			661.66	3.665E+00	(P	1.088E+00	1.57E+01	8.52E+01 G
CE-139	F	4.0955E-01					1.38E+02	
			165.85	4.096E-01	(	1.278E+00	9.34E+01	7.99E+01 G
Ba-140	I	1.6197E-01					1.28E+01	
			537.26	-2.828E-01	?(P	4.791E+00	6.70E+02	2.44E+01 G
			162.66	1.906E+00	&(	1.841E+01	2.85E+02	6.22E+00 G
			304.85	-1.101E+01	+	6.391E+01	1.73E+02	4.29E+00 G
La-140	I	5.4395E-01					1.28E+01	
			1596.21	-2.647E-01	?(P	1.896E+00	6.98E+02	9.54E+01 G
			487.02	8.949E-01	(	3.170E+00	1.05E+02	4.55E+01 G
			328.76	2.117E+00	*(	1.168E+01	1.64E+02	2.03E+01 G
			815.77	1.800E+00	&(	6.330E+00	1.03E+02	2.33E+01 G
CE-141	I	-3.6197E-01					3.25E+01	
			145.44	-3.620E-01	&(	4.024E+00	3.32E+02	4.82E+01 G
CE-144	I	-3.4244E+00					2.85E+02	
			133.54	-3.424E+00	?(	1.603E+01	1.40E+02	1.11E+01 G
PM-144	C	-1.4532E-01					3.63E+02	
			696.54	-1.453E-01	?(	1.594E+00	4.62E+02	9.90E+01 G
			618.06	0.000E+00	&	3.726E+00	1.00E+03	9.91E+01 G
EU-152	F	2.3707E+00					4.94E+03	
			344.29	0.000E+00	(	9.669E+00	1.00E+03	2.65E+01 G
			1112.07	4.453E+00	?(	2.143E+01	1.41E+02	1.36E+01 G
			121.78	-1.340E+00	+	4.061E+00	9.10E+01	2.86E+01 G
			778.92	3.758E+00	&(	8.197E+00	9.20E+01	1.29E+01 G
			964.11	3.498E+00	?(	2.004E+01	1.67E+02	1.46E+01 G
			244.69	-3.602E-01	%	3.451E+01	2.85E+03	7.58E+00 G
			1408.00	-5.540E-01	+	1.007E+01	7.92E+02	2.10E+01 GA
EU-154	I	4.7230E-02					3.14E+03	
			873.23	-2.553E+00	?(P	1.486E+01	1.32E+02	1.23E+01 G
			123.10	7.680E-02	+	2.345E+00	8.94E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.475E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.007E+01	1.00E+03	2.02E+01 G
			1004.77	-2.417E-01	%	1.265E+01	1.47E+03	1.80E+01 G
			996.33	3.058E+00	?(	2.012E+01	1.89E+02	1.06E+01 G
EU-155	I	1.8192E+00					1.81E+03	
			105.31	1.819E+00	(	3.150E+00	5.31E+01	2.12E+01 G
			86.54	1.819E+00	}	8.890E+00	5.32E+01	3.07E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F 2.3767E-01					4.24E+01	
		482.00	0.000E+00	?(	2.043E+00	1.00E+03	8.05E+01 G
		133.02	0.000E+00	?(	3.983E+00	1.00E+03	4.33E+01 G
		345.83	2.190E+00	&(	1.429E+01	1.93E+02	1.51E+01 G
		136.30	-6.559E+00	&	3.120E+01	1.43E+02	5.85E+00 G
Ta-182	F 2.0612E+00					1.14E+02	
		1121.30	2.154E+00	?(	5.811E+00	8.02E+01	3.49E+01 G
		1221.41	-1.334E+00	-	7.653E+00	2.56E+02	2.70E+01 G
		1189.05	1.862E+00	?(	1.096E+01	2.51E+02	1.62E+01 G
Hg-203	F 4.1891E-01					4.66E+01	
		279.20	4.189E-01	?(	1.284E+00	9.13E+01	8.15E+01 G
TL-208	N 7.3182E+00					6.98E+02	
		583.02	7.393E+00	(P	1.047E+00	9.90E+00	8.45E+01 G
		277.28	6.317E+00	(P	9.951E+00	5.79E+01	6.31E+00 G
		860.56	5.081E+00	-	1.053E+01	8.84E+01	1.24E+01 G
pm-146	C 2.4191E+00					2.02E+03	
		747.16	2.642E+00	(	2.534E+00	4.37E+01	3.40E+01 G
		735.72	2.082E+00	*(	5.096E+00	1.04E+02	2.25E+01 G
		453.88	-4.928E-01	- P	2.037E+00	1.25E+02	6.50E+01 G
y-88	F 1.6859E-01					1.07E+02	
		898.04	1.686E-01	?(P	1.598E+00	3.90E+02	9.37E+01 G
		1836.06	-2.960E-01	+	1.532E+00	2.18E+02	9.92E+01 G
Cd-113m	5.1065E+03					5.33E+03	
		263.70	5.107E+03	&(	2.485E+04	1.44E+02	6.00E-03 K
Cd-109	F -1.1852E+01					4.53E+02	
		88.04	-1.185E+01	?(	6.827E+01	1.73E+02	3.79E+00 G
Cf-251	T 9.4454E-02					3.28E+05	
		176.60	9.445E-02	%(	5.313E+00	2.15E+03	1.70E+01 G
		227.00	-1.546E+00	+	1.764E+01	4.59E+02	6.30E+00 GA
Cf-249	T 6.9468E-01					1.28E+05	
		387.95	2.463E-01	?(	2.618E+00	3.11E+02	6.60E+01 G
		333.44	2.603E+00	?(	1.580E+01	1.81E+02	1.55E+01 G
Sn-126	4.9876E+00					3.65E+07	
		87.57	-1.200E+00	-	7.101E+00	1.78E+02	3.75E+01 GA
		64.28	4.988E+00	(	1.906E+01	1.15E+02	9.70E+00 G
		86.94	-4.994E+00	+	2.984E+01	1.80E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	-1.7499E+01					8.14E+03	
			46.54	-1.750E+01	?(P	6.297E+01	8.05E+01	4.25E+00 G
PB-212	N	2.0916E+01					6.98E+02	
			238.63	2.092E+01	(P	1.634E+00	5.22E+00	4.33E+01 G
			300.03	2.580E+01	+	2.238E+01	2.93E+01	3.28E+00 GA
PB-214	N	1.7712E+01					5.84E+05	
			351.93	1.757E+01	(P	1.747E+00	7.51E+00	3.76E+01 G
			295.09	1.799E+01	(	3.226E+00	9.63E+00	1.93E+01 G
			242.00	2.212E+01	+	1.249E+01	1.96E+01	7.43E+00 GA
BI-207	C	-9.8326E-02					1.18E+04	
			569.70	-9.833E-02	?(P	1.259E+00	3.35E+02	9.77E+01 G
			1063.66	-9.272E-01	+ P	2.521E+00	1.11E+02	7.45E+01 G
BI-212	N	2.7411E+01					6.98E+02	
			727.17	2.741E+01	(P	4.852E+00	1.57E+01	7.55E+00 G
			785.42	-4.556E+01	-	1.363E+02	1.29E+02	1.28E+00 GA
BI-214	N	1.7881E+01					5.84E+05	
			609.31	1.759E+01	(P	2.383E+00	9.53E+00	4.61E+01 G
			1120.29	2.640E+00	- P	9.807E+00	1.07E+02	1.51E+01 G
			1764.49	1.875E+01	?(	1.196E+01	2.52E+01	1.54E+01 G
BI-210M	T	1.9755E-01					1.10E+09	
			265.83	0.000E+00	?(	3.101E+00	1.00E+03	5.00E+01 G
			304.90	5.503E-01	?(	9.282E+00	5.00E+02	2.80E+01 G
AC-228	N	1.8439E+01					2.10E+03	
			911.07	1.844E+01	(	2.720E+00	1.23E+01	2.90E+01 G
			968.97	2.574E+01	+	6.835E+00	1.61E+01	1.75E+01 G
			338.32	2.588E+01	+	7.406E+00	1.60E+01	1.20E+01 G
			93.35	-7.929E+00	-	4.326E+01	1.64E+02	5.56E+00 XA
TH-227	N	7.0882E+00					7.95E+03	
			50.14	7.088E+00	(	2.492E+01	1.05E+02	8.00E+00 G
			256.24	-2.446E+00	-	1.507E+01	2.47E+02	7.00E+00 G
TH-229	N	-1.0608E+01					2.68E+06	
			193.51	-1.061E+01	?(	2.525E+01	9.36E+01	4.40E+00 G
			210.85	1.093E+01	&	3.410E+01	1.27E+02	2.99E+00 G
TH-234	N	1.3965E+01					1.63E+12	
			63.29	1.391E+01	(P	2.928E+01	7.50E+01	3.81E+00 G
			92.59	1.401E+01	(P	1.887E+01	4.17E+01	5.58E+00 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
PA-231	N	-1.6278E+01						1.20E+07	
			302.65	-1.628E+01	&(	9.784E+01	1.80E+02	2.88E+00	G
			300.07	-1.890E+01	+	1.174E+02	1.86E+02	2.46E+00	G
PA-233	C	-2.9856E-02						7.82E+08	
			312.01	-2.986E-02	%(P	7.401E+00	2.37E+03	3.60E+01	G
			300.18	-7.502E+00	+	4.587E+01	1.83E+02	6.20E+00	G
PA-234	N	2.2732E+00						1.63E+12	
			131.29	-1.203E+00	?(	9.428E+00	2.34E+02	1.80E+01	G
			946.02	6.943E+00	?(	8.076E+00	5.31E+01	1.34E+01	G
			569.47	-4.950E-01	-	1.412E+01	7.90E+02	8.20E+00	G
			883.24	-4.860E+00	+	2.851E+01	1.71E+02	9.60E+00	G
			880.53	-1.430E+01	+	4.181E+01	8.72E+01	6.00E+00	GA
PA-234M	N	3.2023E+01						1.63E+12	
			1001.00	-2.961E+01	?(P	2.793E+02	2.84E+02	8.37E-01	G
			766.41	2.075E+02	?(P	5.886E+02	8.43E+01	2.94E-01	G
U-235	N	-7.9328E-01						2.57E+11	
			143.79	-7.933E-01	(P	1.761E+01	3.97E+02	1.10E+01	G
			205.33	-4.789E+00	+ P	2.097E+01	1.85E+02	5.01E+00	G
			163.38	-9.965E-01	+ P	2.312E+01	7.48E+02	5.08E+00	G
AM-241	T	3.7533E-01						1.58E+05	
			59.54	3.753E-01	?(P	5.281E+00	4.17E+02	3.59E+01	G
Ir-192	F	3.1932E-01						7.40E+01	
			316.49	3.193E-01	?(	1.169E+00	1.08E+02	8.70E+01	G
			468.06	-1.067E+00	+	3.813E+00	1.06E+02	5.18E+01	G
			308.44	0.000E+00	-	8.312E+00	1.00E+03	3.18E+01	G
Cs-136	F	5.9494E-01						1.30E+01	
			818.50	5.949E-01	?(	1.800E+00	8.95E+01	1.00E+02	G
			1048.07	-1.413E+00	&	2.723E+00	5.89E+01	8.00E+01	G
			340.57	0.000E+00	-	5.417E+00	1.00E+03	4.69E+01	G
Np-239	T	-1.8875E+00						2.36E+00	
			103.70	1.751E+00	&	9.159E+00	1.57E+02	2.40E+01	X
			106.13	-1.888E+00	?(	9.951E+00	1.58E+02	2.27E+01	G
			99.50	-2.904E+00	&	1.563E+01	1.62E+02	1.50E+01	X
Nd-147		-1.9657E-01						1.11E+01	
			531.00	-1.966E-01	%(	8.889E+00	1.81E+03	1.30E+01	G
			91.10	-1.569E+00	+	8.924E+00	1.71E+02	2.83E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	406.	-27.	-0.015	80.48	-1.750E+01	P
TH-227	50.14	285.	23.	0.013	105.23	7.088E+00	
AM-241	59.54	421.	7.	0.004	417.26	3.753E-01	P
Cd-109	88.04	1546.	-32.	-0.018	173.17	-1.185E+01	
Nd-147	91.10	1514.	-32.	-0.018	171.00	-1.569E+00	
Gd-153	97.50	1363.	-33.	-0.018	161.61	-1.456E+00	
Gd-153	103.20	1244.	32.	0.018	158.90	1.928E+00	
EU-152	121.78	324.	-29.	-0.016	91.05	-1.340E+00	
CO-57	122.06	205.	19.	0.011	107.57	3.015E-01	
EU-154	123.10	216.	2.	0.001	893.86	7.680E-02	
PA-234	131.29	678.	-16.	-0.009	233.90	-1.203E+00	
CE-144	133.54	736.	-28.	-0.015	140.38	-3.424E+00	
HF-181	136.30	763.	-28.	-0.015	142.66	-6.559E+00	
CO-57	136.47	791.	-14.	-0.008	286.42	-1.814E+00	
U-235	143.79	811.	-6.	-0.003	396.78	-7.933E-01	P
CE-141	145.44	809.	-12.	-0.007	331.89	-3.620E-01	
Ba-140	162.66	234.	8.	0.004	284.67	1.906E+00	
U-235	163.38	245.	-3.	-0.002	747.98	-9.965E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CE-139	165.85	188.	21.	0.012	93.37	4.096E-01		
TH-229	193.51	176.	-27.	-0.015	93.56	-1.061E+01		
U-235	205.33	142.	-13.	-0.007	184.70	-4.789E+00		P
TH-229	210.85	128.	18.	0.010	126.87	1.093E+01		
Cf-251	227.00	136.	-5.	-0.003	458.84	-1.546E+00		
TH-227	256.24	100.	-8.	-0.004	247.28	-2.446E+00		
Cd-113m	263.70	197.	14.	0.008	144.28	5.107E+03		
Hg-203	279.20	85.	15.	0.008	91.29	4.189E-01		
I-131	284.30	48.	36.	0.020	41.20	1.361E+01		
PA-231	300.07	625.	-19.	-0.011	185.56	-1.890E+01		
PA-233	300.18	605.	-19.	-0.011	182.71	-7.502E+00		
PA-231	302.65	586.	-19.	-0.011	179.59	-1.628E+01		
BA-133	302.85	567.	-19.	-0.011	176.64	-2.559E+00		
Ba-140	304.85	548.	-19.	-0.011	173.46	-1.101E+01		
BI-210M	304.90	491.	6.	0.003	500.34	5.503E-01		
Ir-192	316.49	65.	11.	0.006	107.95	3.193E-01		
CR-51	320.08	119.	-18.	-0.010	58.09	-4.509E+00		P
La-140	328.76	359.	17.	0.009	164.25	2.117E+00		
Cf-249	333.44	376.	15.	0.009	180.63	2.603E+00		
HF-181	345.83	271.	12.	0.007	193.42	2.190E+00		
BA-133	356.00	336.	-15.	-0.008	174.61	-6.707E-01		
I-131	364.48	52.	-10.	-0.006	144.68	-3.460E-01		
BA-133	383.84	126.	16.	0.009	104.88	5.141E+00		P
Cf-249	387.95	142.	5.	0.003	310.55	2.463E-01		
SN-113	391.69	115.	14.	0.008	111.61	6.540E-01		
AG-108M	433.94	30.	12.	0.007	98.97	4.276E-01		P
pm-146	453.88	61.	-9.	-0.005	124.87	-4.928E-01		P
Ir-192	468.06	136.	-16.	-0.009	106.32	-1.067E+00		
BE-7	477.60	87.	1.	0.001	991.21	4.456E-01		
La-140	487.02	65.	11.	0.006	104.56	8.949E-01		
RU-103	497.05	39.	-14.	-0.008	94.67	-5.607E-01		
RH-106	511.86	84.	87.	0.048	29.55	1.618E+01		
Ba-140	537.26	35.	-2.	-0.001	670.46	-2.828E-01		P
CS-134	563.24	14.	2.	0.001	319.35	1.147E+00		P
PA-234	569.47	31.	-1.	-0.001	789.51	-4.950E-01		
BI-207	569.70	35.	-2.	-0.001	335.35	-9.833E-02		P
SB-124	602.73	278.	10.	0.005	241.27	4.268E-01		
CS-134	604.71	288.	10.	0.005	245.21	4.312E-01		
RU-103	610.30	298.	10.	0.005	248.66	7.396E+00		
AG-108M	614.28	308.	4.	0.002	570.25	2.099E-01		
I-131	636.97	70.	-8.	-0.005	146.48	-5.175E+00		
AG-110M	657.76	111.	-9.	-0.005	171.87	-4.268E-01		
PM-144	696.54	42.	-3.	-0.002	461.88	-1.453E-01		
SB-124	722.79	80.	-12.	-0.006	112.76	-5.326E+00		
pm-146	735.72	19.	9.	0.005	103.51	2.082E+00		
pm-146	747.16	9.	18.	0.010	43.72	2.642E+00		
ZR-95	756.73	9.	15.	0.008	51.33	1.384E+00		
AG-110M	763.94	14.	9.	0.005	67.32	2.134E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-95	765.79	97.	-21.	-0.011	71.21	-1.068E+00		
PA-234M	766.41	43.	12.	0.007	84.35	2.075E+02		P
EU-152	778.92	14.	9.	0.005	92.03	3.758E+00		
CS-134	795.87	62.	6.	0.003	184.77	3.865E-01		
CS-134	801.95	86.	-15.	-0.008	92.99	-9.106E+00		
CO-58	810.78	59.	-10.	-0.006	113.14	-5.475E-01		
La-140	815.77	27.	8.	0.004	102.56	1.800E+00		
Cs-136	818.50	42.	11.	0.006	89.54	5.949E-01		
MN-54	834.85	19.	6.	0.004	150.07	3.535E-01		
NB-94	871.10	31.	-1.	-0.001	704.58	-5.845E-02		P
EU-154	873.23	38.	-5.	-0.003	132.40	-2.553E+00		P
PA-234	880.53	75.	-15.	-0.008	87.15	-1.430E+01		
PA-234	883.24	89.	-8.	-0.004	171.41	-4.860E+00		
y-88	898.04	23.	3.	0.001	390.07	1.686E-01		P
AG-110M	937.49	25.	-5.	-0.003	224.35	-8.957E-01		
PA-234	946.02	10.	15.	0.008	53.05	6.943E+00		
EU-152	964.11	88.	8.	0.005	167.40	3.498E+00		
EU-154	996.33	42.	5.	0.003	188.68	3.058E+00		
PA-234M	1001.00	51.	-4.	-0.002	284.18	-2.961E+01		P
Cs-136	1048.07	40.	-17.	-0.009	58.88	-1.413E+00		
RH-106	1050.36	49.	10.	0.006	102.15	4.434E+01		
BI-207	1063.66	28.	-10.	-0.006	110.75	-9.272E-01		P
Ga-68	1077.40	30.	-8.	-0.004	154.62	-1.968E+01		
FE-59	1099.25	31.	-10.	-0.005	118.04	-1.185E+00		P
EU-152	1112.07	68.	9.	0.005	140.68	4.453E+00		
Sc-46	1120.55	20.	6.	0.003	113.16	4.337E-01		
CO-60	1173.24	14.	5.	0.003	150.10	3.877E-01		P
NA-22	1274.53	16.	5.	0.003	121.66	4.005E-01		
FE-59	1291.60	43.	-18.	-0.010	85.58	-3.383E+00		
CO-60	1332.50	14.	5.	0.003	151.38	4.490E-01		P
AG-110M	1384.30	5.	7.	0.004	89.15	2.319E+00		
EU-152	1408.00	21.	-1.	-0.001	792.15	-5.540E-01		
La-140	1596.21	12.	-3.	-0.001	698.36	-2.647E-01		P
SB-124	1690.98	6.	-3.	-0.001	218.12	-5.715E-01		
y-88	1836.06	6.	-3.	-0.001	218.12	-2.960E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	4.4555E-01	4.4555E-01	9.912E+02%		1.54E+01
NA-22	#A	4.0053E-01	4.0053E-01	1.217E+02%		1.71E+00
K-40		2.7262E+02	2.7262E+02	5.606E+00%		8.12E+00
Sc-46	#A	2.1057E-01	2.1057E-01	1.132E+02%		2.86E+00
CR-51	#A	-4.5092E+00	-4.5092E+00	5.809E+01%		1.37E+01

MN-54	#A	3.5353E-01	3.5353E-01	1.501E+02%	1.28E+00
FE-59	#A	-1.1853E+00	-1.1853E+00	1.180E+02%	3.55E+00
Co-56	#	1.8075E+00	1.8075E+00	3.259E+01%	9.69E-01
CO-57	#A	3.0147E-01	3.0147E-01	1.076E+02%	1.09E+00
CO-58	#A	-5.4748E-01	-5.4748E-01	1.131E+02%	2.11E+00
CO-60	#A	4.1836E-01	4.1836E-01	1.066E+02%	1.66E+00
ZN-65	#A	1.4338E-01	1.4338E-01	1.217E+03%	6.11E+00
NB-94	#A	-1.6447E-02	-1.6447E-02	3.079E+03%	1.24E+00
ZR-95	#A	1.3840E+00	1.3840E+00	5.133E+01%	1.60E+00
NB-95	#A	-1.0682E+00	-1.0683E+00	7.121E+01%	2.52E+00
RU-103	#A	-5.6068E-01	-5.6068E-01	9.467E+01%	1.27E+00
RH-106	#A	6.0203E+00	6.0203E+00	1.022E+02%	3.74E+01
AG-108M	#A	3.1914E-01	3.1914E-01	9.897E+01%	1.02E+00
AG-110M	#A	8.7105E-01	8.7105E-01	6.732E+01%	3.93E+00
SN-113	#A	6.5403E-01	6.5403E-01	1.116E+02%	2.46E+00
SB-124	#A	4.2682E-01	4.2683E-01	2.413E+02%	3.48E+00
SB-125	#C	3.9705E+00	3.9705E+00	2.596E+01%	3.65E+00
I-131	#A	6.2961E-01	6.2963E-01	4.120E+01%	1.26E+00
Gd-153	#A	-3.2079E-02	-3.2079E-02	1.133E+02%	7.83E+00
Ga-68	#A	-1.9592E+01	-1.9682E+01	1.546E+02%	6.95E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.19E+00
BA-133	#A	-6.7070E-01	-6.7070E-01	1.746E+02%	3.94E+00
CS-134	#A	4.4247E-01	4.4247E-01	1.477E+02%	3.57E+00
CS-137		3.6645E+00	3.6645E+00	1.574E+01%	1.09E+00
CE-139	#A	4.0955E-01	4.0955E-01	9.337E+01%	1.28E+00
Ba-140	#A	1.6197E-01	1.6197E-01	2.847E+02%	4.79E+00
La-140	#A	5.4395E-01	5.4395E-01	1.026E+02%	1.90E+00
CE-141	#A	-3.6196E-01	-3.6197E-01	3.319E+02%	4.02E+00
CE-144	#A	-3.4244E+00	-3.4244E+00	1.404E+02%	1.60E+01
PM-144	#A	-1.4532E-01	-1.4532E-01	4.619E+02%	1.59E+00
EU-152	#A	2.3707E+00	2.3707E+00	9.203E+01%	9.67E+00
EU-154	#A	4.7230E-02	4.7230E-02	1.152E+02%	1.49E+01
EU-155	A	1.8192E+00	1.8192E+00	5.306E+01%	3.15E+00
HF-181	#A	2.3767E-01	2.3767E-01	1.934E+02%	2.04E+00
Ta-182	#A	2.0612E+00	2.0612E+00	8.022E+01%	5.81E+00
Hg-203	#A	4.1891E-01	4.1891E-01	9.129E+01%	1.28E+00
TL-208		7.3182E+00	7.3182E+00	9.905E+00%	1.05E+00
pm-146	#A	2.4191E+00	2.4191E+00	4.372E+01%	2.53E+00
y-88	#A	1.6859E-01	1.6859E-01	3.901E+02%	1.60E+00
Cd-113m	#A	5.1065E+03	5.1065E+03	1.443E+02%	2.48E+04
Cd-109	#A	-1.1852E+01	-1.1852E+01	1.732E+02%	6.83E+01
Cf-251	#A	9.4454E-02	9.4454E-02	2.152E+03%	5.31E+00
Cf-249	#A	6.9468E-01	6.9468E-01	1.796E+02%	2.62E+00
Sn-126	A	4.9876E+00	4.9876E+00	1.146E+02%	1.91E+01
PB-210	#A	-1.7499E+01	-1.7499E+01	8.048E+01%	6.30E+01
PB-212		2.0916E+01	2.0916E+01	5.218E+00%	1.63E+00
PB-214		1.7712E+01	1.7712E+01	6.105E+00%	1.75E+00
BI-207	#A	-9.8326E-02	-9.8326E-02	3.353E+02%	1.26E+00
BI-212	#	2.7411E+01	2.7411E+01	1.565E+01%	4.85E+00

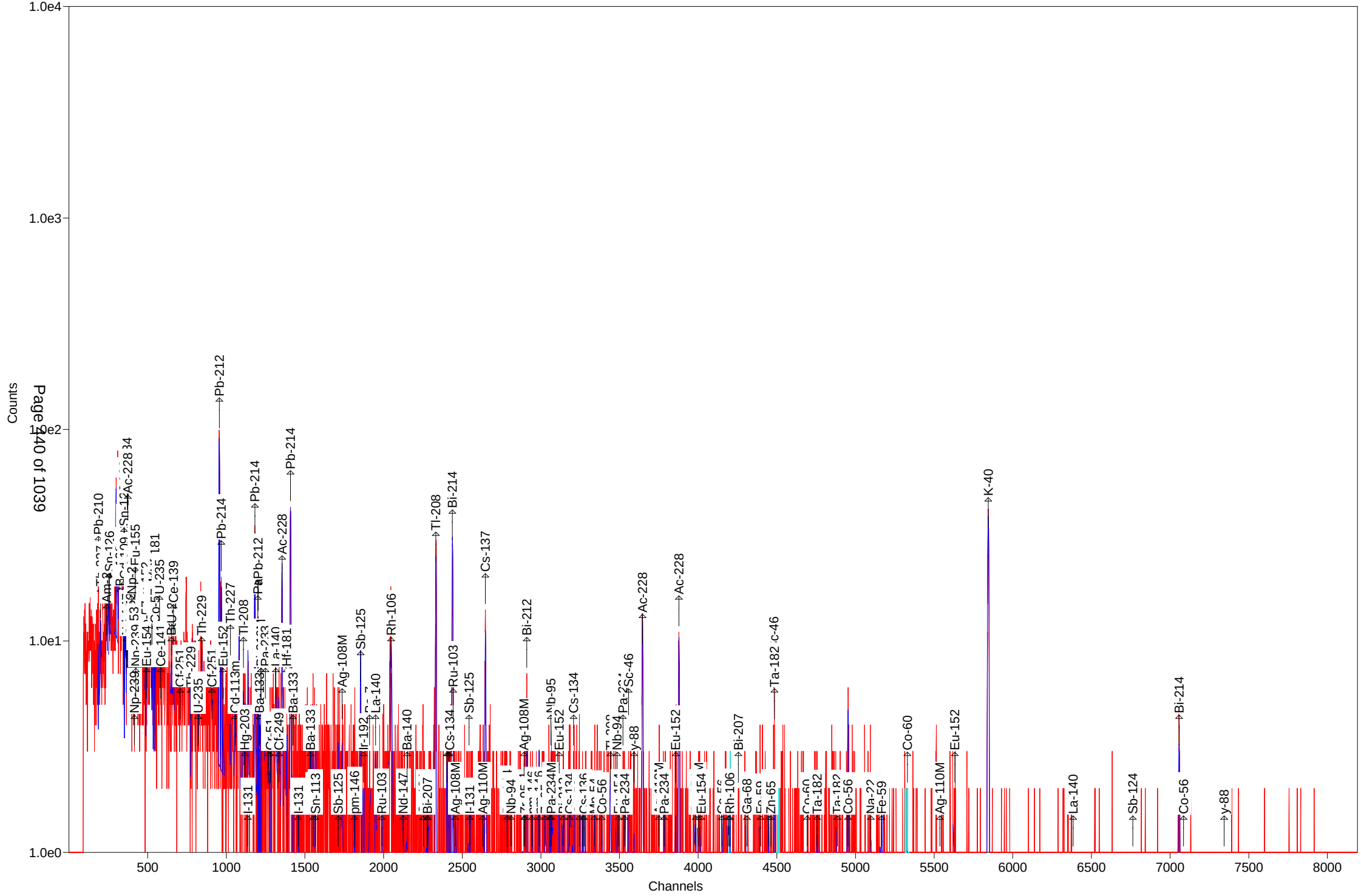
BI-214	1.7881E+01	1.7881E+01	9.530E+00%	2.38E+00
BI-210M#A	1.9755E-01	1.9755E-01	5.003E+02%	3.10E+00
AC-228	1.8439E+01	1.8439E+01	1.226E+01%	2.72E+00
TH-227 #A	7.0882E+00	7.0882E+00	1.052E+02%	2.49E+01
TH-229 #A	-1.0608E+01	-1.0608E+01	9.356E+01%	2.53E+01
TH-234 A	1.3965E+01	1.3965E+01	4.173E+01%	2.93E+01
PA-231 #A	-1.6278E+01	-1.6278E+01	1.796E+02%	9.78E+01
PA-233 #A	-2.9856E-02	-2.9856E-02	2.368E+03%	7.40E+00
PA-234 #A	2.2732E+00	2.2732E+00	5.305E+01%	9.43E+00
PA-234M#A	3.2023E+01	3.2023E+01	8.435E+01%	2.79E+02
U-235 #A	-7.9328E-01	-7.9328E-01	3.968E+02%	1.76E+01
AM-241 #A	3.7533E-01	3.7533E-01	4.173E+02%	5.28E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.12E+01
Ir-192 #A	3.1932E-01	3.1932E-01	1.079E+02%	1.17E+00
Cs-136 #A	5.9493E-01	5.9494E-01	8.954E+01%	1.80E+00
Np-239 #A	-1.8874E+00	-1.8875E+00	1.584E+02%	9.95E+00
Nd-147 #A	-1.9656E-01	-1.9657E-01	1.807E+03%	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) 3.878E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 3.8778470E+02 Bq/Sample

257318_Gamma_160-17797-A-2-B. 8_Gamma_20161002.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20161697

Sample Description: 257318_Gamma_160-17797-A-3-B
Detector: Detector # 7
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-3-B

Decay to Time: 7/12/2016 09:58 Live Time: 1800 sec
Acquisition Time: 7/12/2016 09:58:33 Real Time: 1831 sec
Analysis Time: 7/12/2016 10:29 Dead Time: 1.69 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-10_0612.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	3.133E+00	106.1	3.324E+00	3.328E+00	1.125E+01
NA-22	-1.119E-01	411.3	4.602E-01	4.603E-01	1.671E+00
K-40	2.582E+02	5.3	1.366E+01	1.901E+01	7.230E+00
Sc-46	-8.825E-01	91.9	8.111E-01	8.124E-01	2.716E+00
CR-51	3.304E+00	157.9	5.216E+00	5.219E+00	1.752E+01
MN-54	-2.940E-01	32.9	9.673E-02	9.790E-02	1.654E+00
FE-59	-3.114E-01	432.5	1.347E+00	1.347E+00	3.018E+00
Co-56	8.635E-01	60.7	5.242E-01	5.261E-01	7.863E-01
CO-57	7.333E-02	328.0	2.405E-01	2.406E-01	8.182E-01
CO-58	3.587E-01	139.2	4.993E-01	4.997E-01	1.713E+00
CO-60	-5.358E-01	150.0	8.040E-01	8.044E-01	1.740E+00
ZN-65	1.682E+00	88.6	1.490E+00	1.492E+00	5.005E+00
NB-94	0.000E+00	1.#INF	9.823E-02	9.824E-02	1.320E+00
ZR-95	-6.161E-01	175.4	1.081E+00	1.081E+00	2.534E+00
NB-95	5.805E-01	98.4	5.714E-01	5.722E-01	1.926E+00
RU-103	-1.062E-01	462.9	4.914E-01	4.914E-01	1.200E+00
RH-106	1.038E+01	78.8	8.173E+00	8.191E+00	3.094E+01
AG-108M	-5.420E-01	112.3	6.086E-01	6.092E-01	1.234E+00
AG-110M	9.281E-01	28.6	2.651E-01	2.693E-01	2.663E+00
SN-113	-3.185E-01	246.9	7.866E-01	7.868E-01	2.619E+00
SB-124	-4.233E-02	1228.6	5.200E-01	5.200E-01	3.142E+00
SB-125	1.229E+00	84.2	1.035E+00	1.037E+00	3.433E+00
I-131	-4.333E-01	114.9	4.979E-01	4.984E-01	1.230E+00
Gd-153	-9.078E-01	144.3	1.310E+00	1.311E+00	4.369E+00
Ga-68	-3.860E+01	86.5	3.338E+01	3.345E+01	7.150E+01
Tc-99m	2.743E-01	120.6	3.308E-01	3.312E-01	1.106E+00
BA-133	-2.213E-01	439.0	9.714E-01	9.715E-01	3.283E+00
CS-134	1.257E+00	25.0	3.139E-01	3.207E-01	3.166E+00
CS-137	3.104E+00	18.5	5.749E-01	5.971E-01	1.050E+00
CE-139	-5.018E-02	673.3	3.379E-01	3.379E-01	1.148E+00
Ba-140	1.830E+00	65.9	1.206E+00	1.209E+00	3.844E+00
La-140	-1.609E+00	81.3	1.307E+00	1.310E+00	2.651E+00
CE-141	-6.332E-01	158.7	1.005E+00	1.005E+00	3.348E+00

CE-144	1.969E+00	129.1	2.542E+00	2.544E+00	8.506E+00
PM-144	-2.557E-02	2031.4	5.194E-01	5.194E-01	1.232E+00
EU-152	2.641E+00	64.0	1.691E+00	1.697E+00	5.858E+00
EU-154	-7.017E+00	68.3	4.790E+00	4.804E+00	1.587E+01
EU-155	-1.683E-01	617.7	1.040E+00	1.040E+00	6.504E+00
HF-181	6.176E-01	113.3	6.999E-01	7.006E-01	1.591E+00
Ta-182	7.739E-01	83.4	6.456E-01	6.468E-01	9.235E+00
Hg-203	-2.061E-01	183.7	3.787E-01	3.788E-01	1.287E+00
TL-208	7.205E+00	8.1	5.866E-01	6.955E-01	6.683E-01
pm-146	9.757E-01	144.7	1.412E+00	1.413E+00	3.338E+00
y-88	3.193E-01	44.7	1.428E-01	1.437E-01	1.357E+00
Cd-113m	2.098E+03	215.2	4.515E+03	4.517E+03	1.542E+04
Cd-109	0.000E+00	1.#INF	5.865E+00	5.865E+00	3.950E+01
Cf-251	-5.407E-01	319.0	1.725E+00	1.725E+00	4.460E+00
Cf-249	2.920E-01	105.4	3.078E-01	3.082E-01	2.457E+00
Sn-126	3.314E+00	18.0	5.950E-01	6.232E-01	1.761E+00
PB-210	1.627E+01	64.0	1.041E+01	1.046E+01	2.820E+01
PB-212	1.946E+01	5.0	9.665E-01	1.587E+00	1.705E+00
PB-214	1.609E+01	6.9	1.113E+00	1.392E+00	1.959E+00
BI-207	4.206E-01	71.8	3.021E-01	3.029E-01	1.006E+00
BI-212	3.056E+01	17.3	5.280E+00	5.514E+00	8.519E+00
BI-214	1.370E+01	9.0	1.236E+00	1.426E+00	1.751E+00
BI-210M	2.052E-01	154.4	3.168E-01	3.170E-01	1.934E+00
AC-228	6.205E+00	19.3	1.197E+00	1.238E+00	9.269E+00
TH-227	4.842E+00	130.5	6.319E+00	6.324E+00	2.117E+01
TH-229	2.548E+00	266.8	6.800E+00	6.803E+00	1.760E+01
TH-234	1.288E+01	63.6	8.187E+00	8.214E+00	2.315E+01
PA-231	0.000E+00	1.#INF	5.786E+00	5.786E+00	6.206E+01
PA-233	8.862E-01	161.0	1.427E+00	1.428E+00	4.793E+00
PA-234	2.738E+00	77.8	2.129E+00	2.134E+00	4.908E+00
PA-234M	-1.331E+02	58.3	7.763E+01	7.792E+01	3.431E+02
U-235	-2.812E+00	76.7	2.157E+00	2.162E+00	1.492E+01
AM-241	-5.575E-01	234.1	1.305E+00	1.305E+00	3.507E+00
Np-237	-2.576E+00	65.3	1.683E+00	1.689E+00	1.241E+01
Ir-192	2.046E-01	81.0	1.657E-01	1.662E-01	2.115E+00
Cs-136	4.991E-01	92.7	4.626E-01	4.635E-01	1.564E+00
Np-239	-1.223E+00	146.7	1.794E+00	1.796E+00	5.980E+00
Nd-147	4.561E+00	54.2	2.470E+00	2.484E+00	5.757E+00
Total	2.535E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-3-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20161697.An1

Acquisition information
Start time: 7/12/2016 9:58:33 AM
Live time: 1800
Real time: 1831
Dead time: 1.69 %
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	7/12/2016 9:58:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-10_0612.PBC 7/10/2016 6:12:03 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1799

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.22	31.	63.99	0.67	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	20.	130.49	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
63.21	35.	63.56	1.00	4.005E-02	63.29	3.810	PBC<MDA	TH234
74.85	254.	10.48	0.87	4.768E-02				
77.14	410.	6.96	0.87	4.888E-02				
87.22	132.	18.56	1.02	5.303E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.523E+00	EU155
					86.94	9.040	1.532E+01	Sn126
					87.57	37.500	3.680E+00	Sn126
					88.04	3.790	3.631E+01	Cd109
92.97	116.	19.28	1.35	5.461E-02	92.59	5.584	1.645E+01	TH234
					93.35	5.561	2.119E+01	AC228
121.78	24.	101.20	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.740E-01	CO57
122.06	6.	328.04	0.92	5.606E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	7.333E-02	CO57
131.29	21.	121.96	0.93	5.493E-02	131.29	18.000	PBC<MDA	PA234
133.02	21.	125.49	0.93	5.467E-02	133.02	43.300	PBC<MDA	HF181
133.54	21.	129.07	0.93	5.459E-02	133.54	11.090	PBC<MDA	CE144
136.30	22.	132.22	0.93	5.413E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.070E+00	CO57
140.51	23.	120.60	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
162.60	14.	88.64	1.10	4.843E-02	162.66	6.220	PBC<MDA	Ba140
163.38	23.	107.58	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
193.51	9.	266.84	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	19.	113.72	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
227.00	19.	102.75	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.67	541.	5.68	1.14	3.601E-02	238.63	43.300	1.927E+01	PB212
242.04	99.	18.02	1.04	3.560E-02	242.00	7.430	2.088E+01	PB214
244.69	19.	217.44	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
263.70	8.	215.20	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
277.44	18.	84.60	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208
295.45	177.	11.11	0.89	3.006E-02	295.09	19.300	1.652E+01	PB214
304.90	16.	154.37	1.11	2.926E-02	304.85	4.290	7.243E+00	Ba140
					304.90	28.000	1.110E+00	BI210M
308.44	16.	157.78	1.11	2.897E-02	308.44	31.750	PBC<MDA	Ir192
312.01	16.	161.04	1.12	2.869E-02	312.01	36.000	PBC<MDA	PA233
319.17	17.	157.86	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	18.	87.43	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	16.	105.40	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.50	115.	14.15	1.31	2.676E-02	338.32	12.010	1.985E+01	AC228
344.29	12.	181.81	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
345.83	6.	399.19	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.10	278.	7.68	1.11	2.587E-02	351.93	37.600	1.587E+01	PB214
463.37	15.	84.17	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	14.	97.98	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
477.60	12.	106.10	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	113.44	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
487.02	12.	120.22	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
511.86	55.	44.95	2.56	1.870E-02	511.86	20.000	8.217E+00	RH106
531.00	19.	54.15	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
537.44	13.	97.54	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
563.24	11.	97.83	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.32	5.	162.02	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.121E+00	PA234
					569.70	97.740	1.780E-01	BI207
569.70	13.	71.83	1.37	1.703E-02	569.32	15.380	2.671E+00	CS134
					569.47	8.200	5.012E+00	PA234
					569.70	97.740	4.206E-01	BI207
583.33	182.	8.11	1.29	1.668E-02	583.02	84.500	7.157E+00	TL208
609.54	182.	9.02	1.13	1.605E-02	609.31	46.090	1.370E+01	BI214
					610.30	5.750	1.100E+02	RU103
621.92	14.	185.68	1.42	1.576E-02	621.92	9.930	PBC<MDA	RH106
635.89	6.	113.59	1.43	1.546E-02	635.89	11.310	PBC<MDA	SB125
661.77	71.	18.52	1.34	1.492E-02	661.66	85.210	3.104E+00	CS137
727.36	57.	17.28	0.36	1.373E-02	727.17	7.550	3.056E+01	BI212
747.16	8.	144.70	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
765.79	14.	98.44	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.972E+02	PA234M
766.41	13.	73.93	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	1.904E+02	PA234M
785.39	21.	27.36	2.31	1.281E-02	785.42	1.280	7.113E+01	BI212
795.87	42.	24.97	1.58	1.266E-02	795.87	85.530	2.154E+00	CS134
801.95	8.	160.28	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	139.19	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
818.50	11.	92.69	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
846.77	8.	88.73	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
860.72	20.	41.64	1.63	1.181E-02	860.56	12.420	7.532E+00	TL208
880.53	11.	84.61	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
883.24	11.	96.50	1.65	1.154E-02	883.24	9.600	PBC<MDA	PA234
898.04	3.	370.93	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.41	101.	11.61	1.29	1.122E-02	911.07	29.000	1.721E+01	AC228
964.11	15.	73.76	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.62	62.	19.29	1.72	1.062E-02	968.97	17.460	1.864E+01	AC228
1004.77	15.	100.16	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1050.36	12.	78.78	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	1.	897.88	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	14.	80.46	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	14.	88.60	1.84	9.347E-03	1115.55	50.600	PBC<MDA	ZN65
1120.55	9.	158.33	1.85	9.309E-03	1120.29	15.100	3.573E+00	BI214
					1120.55	99.987	5.397E-01	Sc46
					1121.30	34.900	1.547E+00	Ta182
1120.91	14.	93.93	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.563E-01	Sc46
					1121.30	34.900	2.455E+00	Ta182
1221.41	15.	83.43	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	16.	82.88	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1384.30	13.	28.57	2.04	7.678E-03	1384.30	24.290	3.803E+00	AG110M
1408.00	4.	221.56	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.15	362.	5.29	2.17	7.309E-03	1460.83	10.670	2.582E+02	K40
1764.04	9.	35.60	2.29	6.141E-03	1764.49	15.400	5.344E+00	BI214
1771.35	8.	87.91	2.29	6.119E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	5.	44.72	2.33	5.919E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.95	74.83	228.	254.	5.331E+03	10.48	0.867	- D
308.12	77.12	202.	410.	8.389E+03	6.96	0.869	- D
372.38	92.97	196.	76.	1.386E+03	28.60	0.887	- sD
1353.65	338.50	40.	116.	4.335E+03	13.97	1.310	-
3645.37	911.41	7.	102.	9.064E+03	11.47	1.293	- 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	184.43	46.22	119.	31.	0.017	63.99	0.674s
TH-227	200.12	50.14	324.	20.	0.011	130.49	0.840s
AM-241	237.70	59.54	303.	-13.	-0.007	234.05	0.850s
TH-234	252.42	63.21	171.	35.	0.020	63.56	0.999
Sn-126	256.68	64.28	496.	-32.	-0.018	100.36	0.856
BA-133	323.52	80.99	318.	-26.	-0.014	88.36	0.874s
Np-237	345.53	86.49	1061.	-32.	-0.018	65.35	0.880
EU-155	345.74	86.54	924.	-10.	-0.005	446.95	0.880s
Sn-126	347.33	86.94	914.	0.	0.000	1000.00	0.880
Sn-126	349.85	87.57	168.	119.	0.066	17.96	0.881D
Cd-109	351.73	88.04	914.	0.	0.000	1000.00	0.881s
Nd-147	363.97	91.10	914.	0.	0.000	1000.00	0.885s
TH-234	369.93	92.59	245.	5.	0.003	415.58	0.887D
AC-228	372.97	93.35	914.	0.	0.000	1000.00	0.887
Gd-153	389.57	97.50	757.	-27.	-0.015	144.32	0.892s
Np-239	397.57	99.50	784.	-27.	-0.015	146.49	0.894s
Gd-153	412.38	103.20	812.	-27.	-0.015	148.35	0.898s
Np-239	414.38	103.70	839.	-27.	-0.015	150.70	0.898s
EU-155	420.83	105.31	867.	-4.	-0.002	617.74	0.900
Np-239	424.10	106.13	841.	-28.	-0.016	146.71	0.901
EU-152	486.69	121.78	275.	24.	0.013	101.20	0.918s
CO-57	487.83	122.06	213.	6.	0.004	328.04	0.918s
EU-154	491.98	123.10	259.	-4.	-0.002	530.26	0.919s
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.	21.	0.012	129.07	0.930s
HF-181	544.79	136.30	394.	22.	0.012	132.22	0.933s
CO-57	545.48	136.47	566.	-28.	-0.015	123.64	0.933s
Tc-99m	561.63	140.51	368.	23.	0.013	120.60	0.938s
U-235	574.73	143.79	1070.	-29.	-0.016	76.72	0.941s
CE-141	581.35	145.44	1028.	-29.	-0.016	158.70	0.943s
Ba-140	650.00	162.60	60.	14.	0.008	88.64	1.102
U-235	653.11	163.38	282.	23.	0.013	107.58	0.962s
CE-139	663.01	165.85	280.	-4.	-0.002	673.35	0.965s
Cf-251	706.00	176.60	169.	-8.	-0.004	318.97	0.976s
TH-229	773.64	193.51	150.	9.	0.005	266.84	0.994s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	820.94	205.33	126.	19.	0.010	113.72	1.007s
TH-229	843.01	210.85	205.	-3.	-0.002	806.10	1.012
Cf-251	907.62	227.00	99.	19.	0.010	102.75	1.029s
PB-212	954.15	238.63	94.	546.	0.303	4.97	1.041D
PB-214	967.61	242.00	111.	99.	0.055	18.02	1.045D
EU-152	978.39	244.69	868.	19.	0.011	217.44	1.048s
TH-227	1024.59	256.24	88.	-6.	-0.003	437.93	1.060s
Cd-113m	1054.43	263.70	126.	8.	0.004	215.20	1.067s
BI-210M	1062.96	265.83	137.	-9.	-0.005	304.67	1.070s
TL-208	1108.77	277.28	107.	18.	0.010	84.60	1.081s
Hg-203	1116.44	279.20	149.	-10.	-0.005	183.71	1.083s
I-131	1136.83	284.30	89.	-4.	-0.002	725.35	1.089s
PB-214	1181.43	295.45	55.	173.	0.096	11.50	0.890s
PB-212	1199.76	300.03	393.	-3.	-0.002	319.03	1.105s
PA-231	1199.92	300.07	390.	0.	0.000	1000.00	1.105s
PA-233	1200.36	300.18	390.	0.	0.000	1000.00	1.105s
PA-231	1210.24	302.65	390.	0.	0.000	1000.00	1.107
BA-133	1211.05	302.85	390.	0.	0.000	1000.00	1.108
Ba-140	1219.04	304.85	390.	0.	0.000	1000.00	1.110s
BI-210M	1219.23	304.90	311.	16.	0.009	154.37	1.110s
Ir-192	1233.41	308.44	327.	16.	0.009	157.78	1.113s
PA-233	1247.69	312.01	344.	16.	0.009	161.04	1.117s
Ir-192	1265.61	316.49	383.	-18.	-0.010	156.73	1.122s
CR-51	1279.99	320.08	335.	17.	0.009	157.86	1.125s
La-140	1314.69	328.76	110.	18.	0.010	87.43	1.134s
Cf-249	1333.41	333.44	141.	16.	0.009	105.40	1.139s
AC-228	1352.93	338.32	282.	-13.	-0.007	76.30	1.144
Cs-136	1361.93	340.57	269.	0.	0.000	1000.00	1.146
EU-152	1376.80	344.29	232.	12.	0.007	181.81	1.150
HF-181	1382.97	345.83	260.	6.	0.003	399.19	1.151s
PB-214	1408.04	352.10	46.	278.	0.154	7.68	1.107
BA-133	1423.66	356.00	383.	-6.	-0.004	438.99	1.162s
I-131	1457.59	364.48	84.	-16.	-0.009	114.90	1.170s
BA-133	1535.03	383.84	187.	-18.	-0.010	107.04	1.189s
Cf-249	1551.47	387.95	205.	-4.	-0.002	487.75	1.193s
SN-113	1566.43	391.69	216.	-9.	-0.005	246.95	1.197s
SB-125	1711.18	427.88	64.	0.	0.000	1000.00	1.233
AG-108M	1735.43	433.94	76.	-19.	-0.011	112.28	1.239
SB-125	1853.15	463.37	70.	15.	0.008	84.17	1.268s
Ir-192	1871.93	468.06	87.	14.	0.008	97.98	1.272s
BE-7	1910.07	477.60	72.	12.	0.007	106.10	1.282s
HF-181	1927.68	482.00	84.	12.	0.007	113.44	1.286s
La-140	1947.77	487.02	96.	12.	0.007	120.22	1.291s
RU-103	1987.91	497.05	56.	-3.	-0.002	462.87	1.301s
RH-106	2047.15	511.86	87.	55.	0.031	44.95	2.565s
Nd-147	2123.70	531.00	22.	19.	0.011	54.15	1.333s
Ba-140	2148.74	537.26	35.	13.	0.007	97.54	1.339s
CS-134	2252.65	563.24	26.	11.	0.006	97.83	1.364s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2276.99	569.32	35.	5.	0.003	162.02	1.369s
PA-234	2277.59	569.47	50.	-7.	-0.004	141.71	1.370s
BI-207	2278.51	569.70	35.	13.	0.007	71.83	1.370s
TL-208	2333.02	583.33	9.	182.	0.101	8.14	1.286
SB-125	2401.71	600.50	353.	-3.	-0.002	462.85	1.399s
CS-134	2418.55	604.71	350.	0.	0.000	1000.00	1.403s
BI-214	2437.86	609.54	20.	182.	0.101	9.02	1.129
RU-103	2440.91	610.30	350.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	350.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	350.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	328.	14.	0.008	185.68	1.419s
SB-125	2543.28	635.89	23.	6.	0.004	113.59	1.432s
I-131	2547.62	636.97	49.	-11.	-0.006	97.43	1.433s
AG-110M	2630.77	657.76	170.	-20.	-0.011	36.73	1.452s
CS-137	2646.79	661.77	21.	71.	0.039	18.52	1.339
NB-94	2810.25	702.63	42.	0.	0.000	1000.00	1.493s
SB-124	2890.87	722.79	147.	-17.	-0.010	101.24	1.511s
AG-108M	2891.48	722.94	129.	-17.	-0.010	95.40	1.511s
EU-154	2893.15	723.36	112.	-11.	-0.006	139.50	1.511s
ZR-95	2896.52	724.20	107.	-6.	-0.003	240.80	1.512s
BI-212	2909.17	727.36	8.	57.	0.032	17.28	0.364s
pm-146	2988.37	747.16	28.	8.	0.004	144.70	1.533s
ZR-95	3026.65	756.73	42.	-8.	-0.004	175.45	1.541s
AG-110M	3055.51	763.94	74.	-18.	-0.010	71.86	1.548s
NB-95	3062.89	765.79	84.	14.	0.008	98.44	1.549s
PA-234M	3065.38	766.41	41.	13.	0.007	73.93	1.550s
EU-152	3115.41	778.92	28.	0.	0.000	1000.00	1.561s
BI-212	3141.29	785.39	3.	21.	0.012	27.36	2.308s
CS-134	3183.20	795.87	34.	42.	0.023	24.97	1.576s
CS-134	3207.54	801.95	68.	8.	0.004	160.28	1.581s
CO-58	3242.84	810.78	58.	8.	0.004	139.19	1.589s
La-140	3262.82	815.77	66.	0.	0.000	1000.00	1.593s
Cs-136	3273.74	818.50	47.	11.	0.006	92.69	1.596s
MN-54	3339.13	834.85	51.	-6.	-0.004	32.90	1.610s
Co-56	3386.82	846.77	9.	8.	0.004	88.73	1.620s
TL-208	3442.00	860.56	10.	20.	0.011	41.64	1.632s
NB-94	3484.13	871.10	36.	-2.	-0.001	430.12	1.641s
EU-154	3492.66	873.23	67.	-18.	-0.010	68.27	1.643
PA-234	3521.86	880.53	41.	11.	0.006	84.61	1.649s
PA-234	3532.70	883.24	53.	11.	0.006	96.50	1.652s
Sc-46	3556.86	889.28	131.	-18.	-0.010	91.91	1.657s
y-88	3591.90	898.04	25.	3.	0.002	370.93	1.664s
AC-228	3644.02	911.07	123.	-8.	-0.004	112.93	1.675
AG-110M	3749.71	937.49	40.	-6.	-0.003	140.13	1.697s
PA-234	3783.82	946.02	40.	-12.	-0.007	119.41	1.704s
EU-152	3856.18	964.11	51.	15.	0.008	73.76	1.719
AC-228	3875.62	968.97	41.	62.	0.035	19.29	1.724s
EU-154	3985.06	996.33	97.	-20.	-0.011	72.74	1.746s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	4003.73	1001.00	118.	-21.	-0.011	58.30	1.750s
EU-154	4018.84	1004.77	104.	15.	0.008	100.16	1.753s
Co-56	4151.10	1037.84	40.	-12.	-0.007	97.18	1.780s
Cs-136	4192.02	1048.07	46.	-14.	-0.008	70.84	1.788s
RH-106	4201.18	1050.36	42.	12.	0.007	78.78	1.790s
BI-207	4254.38	1063.66	22.	1.	0.001	897.88	1.801s
Ga-68	4309.34	1077.40	48.	-19.	-0.010	86.47	1.812s
FE-59	4396.74	1099.25	32.	-3.	-0.002	432.48	1.829s
EU-152	4448.04	1112.07	59.	14.	0.008	80.46	1.839s
ZN-65	4461.92	1115.55	73.	14.	0.008	88.60	1.842s
BI-214	4480.88	1120.29	84.	14.	0.008	93.93	1.845s
Sc-46	4481.94	1120.55	98.	9.	0.005	158.33	1.846s
Ta-182	4484.94	1121.30	121.	-8.	-0.004	197.64	1.846
CO-60	4692.68	1173.24	27.	-1.	-0.001	829.97	1.886s
Ta-182	4755.93	1189.05	38.	-5.	-0.003	236.27	1.899
Ta-182	4885.37	1221.41	27.	15.	0.008	83.43	1.923
Co-56	4952.84	1238.28	32.	16.	0.009	82.88	1.936s
NA-22	5097.84	1274.53	23.	-2.	-0.001	411.34	1.963s
EU-154	5097.89	1274.54	24.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	34.	-11.	-0.006	127.92	1.975s
CO-60	5329.71	1332.50	23.	-8.	-0.004	150.05	2.005s
AG-110M	5536.89	1384.30	0.	13.	0.007	28.57	2.042s
EU-152	5631.70	1408.00	11.	4.	0.002	221.56	2.059s
K-40	5844.27	1461.15	3.	362.	0.201	5.29	2.171
La-140	6384.49	1596.21	36.	-19.	-0.010	81.26	2.185s
SB-124	6763.55	1690.98	12.	-9.	-0.005	98.76	2.245s
BI-214	7057.56	1764.49	1.	9.	0.005	35.60	2.290s
Co-56	7084.99	1771.35	21.	8.	0.004	87.91	2.294s
y-88	7343.81	1836.06	0.	5.	0.003	44.72	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	3.1331E+00				5.31E+01	
			477.60	3.133E+00	?(	1.125E+01 1.06E+02 1.05E+01	G
NA-22	C	-1.1189E-01				9.50E+02	
			1274.53	-1.119E-01	?(	1.671E+00 4.11E+02 9.99E+01	G
K-40	N	2.5821E+02				4.66E+11	
			1460.83	2.582E+02	(P	7.230E+00 5.29E+00 1.07E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F -8.8252E-01					8.38E+01	
		889.28	-8.825E-01	?(	2.716E+00	9.19E+01	1.00E+02 G
		1120.55	5.397E-01	+	2.915E+00	1.58E+02	1.00E+02 G
CR-51	F 3.3045E+00					2.77E+01	
		320.08	3.304E+00	&(	1.752E+01	1.58E+02	9.94E+00 G
MN-54	C -2.9399E-01					3.12E+02	
		834.85	-2.940E-01	?(P	1.654E+00	3.29E+01	1.00E+02 G
FE-59	F -3.1142E-01					4.45E+01	
		1099.25	-3.114E-01	?(	3.018E+00	4.32E+02	5.65E+01 G
		1291.60	-1.729E+00	+	4.698E+00	1.28E+02	4.32E+01 G
Co-56	C 8.6355E-01					7.73E+01	
		846.77	3.696E-01	?(	7.863E-01	8.87E+01	9.99E+01 G
		1238.28	1.611E+00	(P	2.884E+00	8.29E+01	6.61E+01 G
		1037.84	-4.909E+00	+ P	1.275E+01	9.72E+01	1.41E+01 G
		1771.35	4.676E+00	?	1.399E+01	8.79E+01	1.55E+01 A
CO-57	C 7.3329E-02					2.72E+02	
		122.06	7.333E-02	(	8.182E-01	3.28E+02	8.56E+01 G
		136.47	-2.648E+00	+	1.092E+01	1.24E+02	1.07E+01 G
CO-58	C 3.5874E-01					7.09E+01	
		810.78	3.587E-01	?(	1.713E+00	1.39E+02	9.95E+01 G
CO-60	F -5.3581E-01					1.93E+03	
		1332.50	-5.358E-01	?(	1.740E+00	1.50E+02	1.00E+02 G
		1173.24	-8.015E-02	+ P	1.685E+00	8.30E+02	9.99E+01 G
ZN-65	F 1.6817E+00					2.44E+02	
		1115.55	1.682E+00	?(	5.005E+00	8.86E+01	5.06E+01 G
ZR-95	I -6.1606E-01					6.40E+01	
		756.73	-6.161E-01	?(	2.534E+00	1.75E+02	5.45E+01 G
		724.20	-5.633E-01	+	4.654E+00	2.41E+02	4.42E+01 G
NB-95	I 5.8049E-01					6.40E+01	
		765.79	5.805E-01	?(	1.926E+00	9.84E+01	9.98E+01 G
RU-103	I -1.0616E-01					3.93E+01	
		497.05	-1.062E-01	?(	1.200E+00	4.63E+02	9.09E+01 G
		610.30	0.000E+00	+	5.419E+01	1.00E+03	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	1.0375E+01					3.74E+02	
			621.92	4.951E+00	?(	3.094E+01	1.86E+02	9.93E+00 G
			1050.36	4.490E+01	?(	1.185E+02	7.88E+01	1.56E+00 G
			511.86	8.217E+00	?	6.845E+00	4.50E+01	2.00E+01 GA
AG-108M	C	-5.4200E-01					1.53E+05	
			433.94	-5.420E-01	(P	1.234E+00	1.12E+02	9.05E+01 G
			722.94	-7.723E-01	+	2.470E+00	9.54E+01	9.08E+01 G
			614.28	0.000E+00	+	3.488E+00	1.00E+03	8.98E+01 G
AG-110M	F	9.2807E-01					2.50E+02	
			884.68	-3.277E-02	%(P	2.663E+00	1.69E+03	7.27E+01 G
			657.76	-7.721E-01	+ P	2.481E+00	3.67E+01	9.46E+01 G
			937.49	-8.976E-01	+ P	4.762E+00	1.40E+02	3.44E+01 G
			1384.30	3.803E+00	?(P	2.195E+00	2.86E+01	2.43E+01 G
			763.94	-3.505E+00	& P	8.148E+00	7.19E+01	2.23E+01 G
SN-113	F	-3.1853E-01					1.15E+02	
			391.69	-3.185E-01	?(P	2.619E+00	2.47E+02	6.40E+01 G
SB-124	F	-4.2326E-02					6.02E+01	
			602.73	-4.233E-02	%(P	3.142E+00	1.23E+03	9.83E+01 G
			1690.98	-1.638E+00	+	3.431E+00	9.88E+01	4.78E+01 G
			722.79	-6.489E+00	+	2.204E+01	1.01E+02	1.08E+01 G
SB-125	I	1.2295E+00					1.01E+03	
			427.88	0.000E+00	?(	3.433E+00	1.00E+03	2.96E+01 G
			600.50	-6.121E-01	+ P	1.727E+01	4.63E+02	1.79E+01 G
			635.89	2.014E+00	?(P	7.911E+00	1.14E+02	1.13E+01 G
			463.37	3.858E+00	(P	1.088E+01	8.42E+01	1.05E+01 G
I-131	I	-4.3328E-01					8.02E+00	
			364.48	-4.333E-01	&(	1.230E+00	1.15E+02	8.17E+01 G
			284.30	-1.093E+00	+ P	1.358E+01	7.25E+02	6.14E+00 G
			636.97	-5.355E+00	+	1.768E+01	9.74E+01	7.17E+00 G
Gd-153	F	-9.0779E-01					2.42E+02	
			97.50	-9.078E-01	?(	4.369E+00	1.44E+02	3.00E+01 G
			103.20	-1.242E+00	&	6.141E+00	1.48E+02	2.18E+01 G
Ga-68	C	-3.8599E+01					4.71E-02	
			1077.40	-3.860E+01	?(	7.150E+01	8.65E+01	3.30E+00 G
Tc-99m	I	2.7432E-01					2.51E-01	
			140.51	2.743E-01	?(	1.106E+00	1.21E+02	8.93E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F -2.2129E-01					3.85E+03	
		356.00	-2.213E-01	?(	3.283E+00	4.39E+02	6.20E+01 G
		302.85	0.000E+00	+	9.757E+00	1.00E+03	1.83E+01 G
		383.84	-4.785E+00	+	1.718E+01	1.07E+02	8.94E+00 GA
		80.99	-8.208E-01	& P	2.759E+00	8.84E+01	3.41E+01 GA
CS-134	I 1.2571E+00					7.54E+02	
		604.71	0.000E+00	&(	3.166E+00	1.00E+03	9.76E+01 G
		795.87	2.154E+00	?(	1.533E+00	2.50E+01	8.55E+01 G
		569.32	1.131E+00	(	6.391E+00	1.62E+02	1.54E+01 G
		801.95	3.812E+00	?(	2.098E+01	1.60E+02	8.69E+00 G
		563.24	4.341E+00	&(P	1.031E+01	9.78E+01	8.35E+00 G
CS-137	I 3.1041E+00					1.10E+04	
		661.66	3.104E+00	(P	1.050E+00	1.85E+01	8.52E+01 G
CE-139	F -5.0178E-02					1.38E+02	
		165.85	-5.018E-02	?(	1.148E+00	6.73E+02	7.99E+01 G
Ba-140	I 1.8296E+00					1.28E+01	
		537.26	1.638E+00	?(P	3.844E+00	9.75E+01	2.44E+01 G
		162.66	2.582E+00	(	7.156E+00	8.86E+01	6.22E+00 G
		304.85	0.000E+00	-	4.192E+01	1.00E+03	4.29E+00 G
La-140	I -1.6085E+00					1.28E+01	
		1596.21	-1.609E+00	?(	2.651E+00	8.13E+01	9.54E+01 G
		487.02	7.422E-01	+	3.022E+00	1.20E+02	4.55E+01 G
		328.76	1.759E+00	+	5.146E+00	8.74E+01	2.03E+01 G
		815.77	0.000E+00	+	7.815E+00	1.00E+03	2.33E+01 G
CE-141	I -6.3318E-01					3.25E+01	
		145.44	-6.332E-01	&(	3.348E+00	1.59E+02	4.82E+01 G
CE-144	I 1.9693E+00					2.85E+02	
		133.54	1.969E+00	(	8.506E+00	1.29E+02	1.11E+01 G
PM-144	C -2.5569E-02					3.63E+02	
		696.54	-2.557E-02	&(P	1.232E+00	2.03E+03	9.90E+01 G
		618.06	0.000E+00	+	3.179E+00	1.00E+03	9.91E+01 G
EU-152	F 2.6411E+00					4.94E+03	
		344.29	9.539E-01	&(	5.858E+00	1.82E+02	2.65E+01 G
		1112.07	6.210E+00	?(	1.673E+01	8.05E+01	1.36E+01 G
		121.78	8.203E-01	*(	2.772E+00	1.01E+02	2.86E+01 G
		778.92	0.000E+00	-	9.101E+00	1.00E+03	1.29E+01 G
		964.11	5.223E+00	&(	1.284E+01	7.38E+01	1.46E+01 G
		244.69	4.005E+00	?(	2.910E+01	2.17E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	1.283E+00	?	6.437E+00	2.22E+02	2.10E+01 GA
EU-154	I	-7.0166E+00					3.14E+03	
			873.23	-7.017E+00	&(	1.587E+01	6.83E+01	1.23E+01 G
			123.10	-1.027E-01	+ P	1.892E+00	5.30E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.899E+00	1.00E+03	3.52E+01 G
			723.36	-2.189E+00	+	1.037E+01	1.39E+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	+	2.463E+01	7.27E+01	1.06E+01 G
EU-155	I	-1.6829E-01					1.81E+03	
			105.31	-1.683E-01	(P	6.504E+00	6.18E+02	2.12E+01 G
			86.54	-3.304E-01	+	4.946E+00	4.47E+02	3.07E+01 G
HF-181	F	6.1763E-01					4.24E+01	
			482.00	4.141E-01	?(	1.591E+00	1.13E+02	8.05E+01 G
			133.02	5.033E-01	(	2.114E+00	1.25E+02	4.33E+01 G
			345.83	8.066E-01	?(P	1.093E+01	3.99E+02	1.51E+01 G
			136.30	3.777E+00	?(	1.671E+01	1.32E+02	5.85E+00 G
Ta-182	F	7.7385E-01					1.14E+02	
			1121.30	-1.369E+00	(	9.235E+00	1.98E+02	3.49E+01 G
			1221.41	3.543E+00	(P	6.414E+00	8.34E+01	2.70E+01 G
			1189.05	-1.762E+00	+ P	1.215E+01	2.36E+02	1.62E+01 G
Hg-203	F	-2.0611E-01					4.66E+01	
			279.20	-2.061E-01	?(	1.287E+00	1.84E+02	8.15E+01 G
TL-208	N	7.2051E+00					6.98E+02	
			583.02	7.157E+00	(P	6.683E-01	8.14E+00	8.45E+01 G
			277.28	5.004E+00	-	1.415E+01	8.46E+01	6.31E+00 G
			860.56	7.532E+00	?(P	6.640E+00	4.16E+01	1.24E+01 G
pm-146	C	9.7567E-01					2.02E+03	
			747.16	9.757E-01	?(	3.338E+00	1.45E+02	3.40E+01 G
			735.72	6.059E-02	%	6.279E+00	4.35E+03	2.25E+01 G
			453.88	4.115E-02	%	1.494E+00	1.42E+03	6.50E+01 G
y-88	F	3.1930E-01					1.07E+02	
			898.04	1.565E-01	?(	1.357E+00	3.71E+02	9.37E+01 G
			1836.06	4.731E-01	?(	6.973E-01	4.47E+01	9.92E+01 G
Cd-113m		2.0978E+03					5.33E+03	
			263.70	2.098E+03	?(	1.542E+04	2.15E+02	6.00E-03 K
Cf-251	T	-5.4073E-01					3.28E+05	
			176.60	-5.407E-01	(	4.460E+00	3.19E+02	1.70E+01 G
			227.00	4.365E+00	?	1.152E+01	1.03E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	2.9202E-01					1.28E+05	
			387.95	-1.476E-01	?(	2.457E+00	4.88E+02	6.60E+01 G
			333.44	2.163E+00	?(	7.661E+00	1.05E+02	1.55E+01 G
Sn-126		3.3136E+00					3.65E+07	
			87.57	3.314E+00	+	1.761E+00	1.80E+01	3.75E+01 GA
			64.28	-4.478E+00	(	1.496E+01	1.00E+02	9.70E+00 G
			86.94	0.000E+00	+	1.667E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.6270E+01					8.14E+03	
			46.54	1.627E+01	*(P	2.820E+01	6.40E+01	4.25E+00 G
PB-212	N	1.9455E+01					6.98E+02	
			238.63	1.946E+01	(P	1.705E+00	4.97E+00	4.33E+01 G
			300.03	-1.767E+00	& P	5.430E+01	3.19E+02	3.28E+00 GA
PB-214	N	1.6092E+01					5.84E+05	
			351.93	1.587E+01	(P	1.959E+00	7.68E+00	3.76E+01 G
			295.09	1.652E+01	@(P	3.574E+00	1.15E+01	1.93E+01 G
			242.00	2.088E+01	+	1.086E+01	1.80E+01	7.43E+00 GA
BI-207	C	4.2061E-01					1.18E+04	
			569.70	4.206E-01	&(	1.006E+00	7.18E+01	9.77E+01 G
			1063.66	9.028E-02	- P	1.870E+00	8.98E+02	7.45E+01 G
BI-212	N	3.0559E+01					6.98E+02	
			727.17	3.056E+01	(	8.519E+00	1.73E+01	7.55E+00 G
			785.42	7.113E+01	+	3.652E+01	2.74E+01	1.28E+00 GA
BI-214	N	1.3701E+01					5.84E+05	
			609.31	1.370E+01	(P	1.751E+00	9.02E+00	4.61E+01 G
			1120.29	5.669E+00	-	1.791E+01	9.39E+01	1.51E+01 G
			1764.49	5.344E+00	- P	4.329E+00	3.56E+01	1.54E+01 G
BI-210M	T	2.0522E-01					1.10E+09	
			265.83	-3.014E-01	?(P	1.934E+00	3.05E+02	5.00E+01 G
			304.90	1.110E+00	?(	5.756E+00	1.54E+02	2.80E+01 G
AC-228	N	6.2048E+00					2.10E+03	
			911.07	-1.283E+00	(P	9.269E+00	1.13E+02	2.90E+01 G
			968.97	1.864E+01	?(P	9.735E+00	1.93E+01	1.75E+01 G
			338.32	-2.268E+00	- P	1.399E+01	7.63E+01	1.20E+01 G
			93.35	0.000E+00	-	2.623E+01	1.00E+03	5.56E+00 XA
TH-227	N	4.8423E+00					7.95E+03	
			50.14	4.842E+00	?(	2.117E+01	1.30E+02	8.00E+00 G
			256.24	-1.451E+00	- P	1.087E+01	4.38E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	2.5484E+00					2.68E+06	
			193.51	2.548E+00	&(	1.760E+01	2.67E+02	4.40E+00 G
			210.85	-1.550E+00	+	3.230E+01	8.06E+02	2.99E+00 G
TH-234	N	1.2881E+01					1.63E+12	
			63.29	1.288E+01	(P	2.315E+01	6.36E+01	3.81E+00 G
			92.59	9.799E-01	- P	1.379E+01	4.16E+02	5.58E+00 G
PA-233	C	8.8624E-01					7.82E+08	
			312.01	8.862E-01	?(	4.793E+00	1.61E+02	3.60E+01 G
			300.18	0.000E+00	-	2.863E+01	1.00E+03	6.20E+00 G
PA-234	N	2.7381E+00					1.63E+12	
			131.29	1.202E+00	?(	4.908E+00	1.22E+02	1.80E+01 G
			946.02	-4.587E+00	+	1.230E+01	1.19E+02	1.34E+01 G
			569.47	-2.917E+00	&	1.423E+01	1.42E+02	8.20E+00 G
			883.24	5.617E+00	?(	1.834E+01	9.65E+01	9.60E+00 G
			880.53	9.177E+00	?	2.615E+01	8.46E+01	6.00E+00 GA
PA-234M	N	-1.3315E+02					1.63E+12	
			1001.00	-1.331E+02	?(P	3.431E+02	5.83E+01	8.37E-01 G
			766.41	1.904E+02	+	4.696E+02	7.39E+01	2.94E-01 G
U-235	N	-2.8121E+00					2.57E+11	
			143.79	-2.812E+00	&(P	1.492E+01	7.67E+01	1.10E+01 G
			205.33	5.110E+00	+ P	1.494E+01	1.14E+02	5.01E+00 G
			163.38	5.107E+00	+ P	1.836E+01	1.08E+02	5.08E+00 G
AM-241	T	-5.5747E-01					1.58E+05	
			59.54	-5.575E-01	?(	3.507E+00	2.34E+02	3.59E+01 G
Np-237	F	-2.5756E+00					2.14E+06	
			86.49	-2.576E+00	&(P	1.241E+01	6.53E+01	1.31E+01 G
Ir-192	F	2.0458E-01					7.40E+01	
			316.49	-4.024E-01	&(	2.115E+00	1.57E+02	8.70E+01 G
			468.06	7.426E-01	?(	2.450E+00	9.80E+01	5.18E+01 G
			308.44	9.916E-01	?(	5.256E+00	1.58E+02	3.18E+01 G
Cs-136	F	4.9908E-01					1.30E+01	
			818.50	4.991E-01	&(	1.564E+00	9.27E+01	1.00E+02 G
			1048.07	-1.018E+00	+	2.397E+00	7.08E+01	8.00E+01 G
			340.57	0.000E+00	&	3.522E+00	1.00E+03	4.69E+01 G
Np-239	T	-1.2228E+00					2.36E+00	
			103.70	-1.128E+00	+	5.666E+00	1.51E+02	2.40E+01 X
			106.13	-1.223E+00	&(	5.980E+00	1.47E+02	2.27E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                            99.50-1.810E+00 +   8.844E+00 1.46E+02 1.50E+01 X

Nd-147       4.5614E+00                                        1.11E+01
                           531.00 4.561E+00 ?(  5.757E+00 5.42E+01 1.30E+01 G
                            91.10 0.000E+00 -   5.205E+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	
TH-227	50.14	324.	20.	0.011	130.49	4.842E+00	
AM-241	59.54	303.	-13.	-0.007	234.05	-5.575E-01	
BA-133	80.99	318.	-26.	-0.014	88.36	-8.208E-01	P
Np-237	86.49	1061.	-32.	-0.018	65.35	-2.576E+00	P
EU-155	86.54	924.	-10.	-0.005	446.95	-3.304E-01	
Gd-153	97.50	757.	-27.	-0.015	144.32	-9.078E-01	
Np-239	99.50	784.	-27.	-0.015	146.49	-1.810E+00	
Gd-153	103.20	812.	-27.	-0.015	148.35	-1.242E+00	
Np-239	103.70	839.	-27.	-0.015	150.70	-1.128E+00	
EU-155	105.31	867.	-4.	-0.002	617.74	-1.683E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	106.13	841.	-28.	-0.016	146.71	-1.223E+00	
EU-152	121.78	275.	24.	0.013	101.20	8.203E-01	
CO-57	122.06	213.	6.	0.004	328.04	7.333E-02	
EU-154	123.10	259.	-4.	-0.002	530.26	-1.027E-01	P
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.	21.	0.012	129.07	1.969E+00	
HF-181	136.30	394.	22.	0.012	132.22	3.777E+00	
CO-57	136.47	566.	-28.	-0.015	123.64	-2.648E+00	
Tc-99m	140.51	368.	23.	0.013	120.60	2.743E-01	
U-235	143.79	1070.	-29.	-0.016	76.72	-2.812E+00	P
CE-141	145.44	1028.	-29.	-0.016	158.70	-6.332E-01	
U-235	163.38	282.	23.	0.013	107.58	5.107E+00	P
CE-139	165.85	280.	-4.	-0.002	673.35	-5.018E-02	
Cf-251	176.60	169.	-8.	-0.004	318.97	-5.407E-01	
TH-229	193.51	150.	9.	0.005	266.84	2.548E+00	
U-235	205.33	126.	19.	0.010	113.72	5.110E+00	P
TH-229	210.85	205.	-3.	-0.002	806.10	-1.550E+00	
Cf-251	227.00	99.	19.	0.010	102.75	4.365E+00	
EU-152	244.69	868.	19.	0.011	217.44	4.005E+00	
TH-227	256.24	88.	-6.	-0.003	437.93	-1.451E+00	P
Cd-113m	263.70	126.	8.	0.004	215.20	2.098E+03	
BI-210M	265.83	137.	-9.	-0.005	304.67	-3.014E-01	P
Hg-203	279.20	149.	-10.	-0.005	183.71	-2.061E-01	
I-131	284.30	89.	-4.	-0.002	725.35	-1.093E+00	P
BI-210M	304.90	311.	16.	0.009	154.37	1.110E+00	
Ir-192	308.44	327.	16.	0.009	157.78	9.916E-01	
PA-233	312.01	344.	16.	0.009	161.04	8.862E-01	
Ir-192	316.49	383.	-18.	-0.010	156.73	-4.024E-01	
La-140	328.76	110.	18.	0.010	87.43	1.759E+00	
Cf-249	333.44	141.	16.	0.009	105.40	2.163E+00	
AC-228	338.32	282.	-13.	-0.007	76.30	-2.268E+00	P
EU-152	344.29	232.	12.	0.007	181.81	9.539E-01	
HF-181	345.83	260.	6.	0.003	399.19	8.066E-01	P
BA-133	356.00	383.	-6.	-0.004	438.99	-2.213E-01	
I-131	364.48	84.	-16.	-0.009	114.90	-4.333E-01	
BA-133	383.84	187.	-18.	-0.010	107.04	-4.785E+00	
Cf-249	387.95	205.	-4.	-0.002	487.75	-1.476E-01	
SN-113	391.69	216.	-9.	-0.005	246.95	-3.185E-01	P
AG-108M	433.94	76.	-19.	-0.011	112.28	-5.420E-01	P
SB-125	463.37	70.	15.	0.008	84.17	3.858E+00	P
Ir-192	468.06	87.	14.	0.008	97.98	7.426E-01	
BE-7	477.60	72.	12.	0.007	106.10	3.133E+00	
HF-181	482.00	84.	12.	0.007	113.44	4.141E-01	
La-140	487.02	96.	12.	0.007	120.22	7.422E-01	
RU-103	497.05	56.	-3.	-0.002	462.87	-1.062E-01	
RH-106	511.86	87.	55.	0.031	44.95	8.217E+00	
Nd-147	531.00	22.	19.	0.011	54.15	4.561E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	26.	11.	0.006	97.83	4.341E+00	P
CS-134	569.32	35.	5.	0.003	162.02	1.131E+00	
PA-234	569.47	50.	-7.	-0.004	141.71	-2.917E+00	
BI-207	569.70	35.	13.	0.007	71.83	4.206E-01	
SB-125	600.50	353.	-3.	-0.002	462.85	-6.121E-01	P
RH-106	621.92	328.	14.	0.008	185.68	4.951E+00	
SB-125	635.89	23.	6.	0.004	113.59	2.014E+00	P
I-131	636.97	49.	-11.	-0.006	97.43	-5.355E+00	
AG-110M	657.76	170.	-20.	-0.011	36.73	-7.721E-01	P
SB-124	722.79	147.	-17.	-0.010	101.24	-6.489E+00	
AG-108M	722.94	129.	-17.	-0.010	95.40	-7.723E-01	
EU-154	723.36	112.	-11.	-0.006	139.50	-2.189E+00	
ZR-95	724.20	107.	-6.	-0.003	240.80	-5.633E-01	
pm-146	747.16	28.	8.	0.004	144.70	9.757E-01	
ZR-95	756.73	42.	-8.	-0.004	175.45	-6.161E-01	
AG-110M	763.94	74.	-18.	-0.010	71.86	-3.505E+00	P
NB-95	765.79	84.	14.	0.008	98.44	5.805E-01	
PA-234M	766.41	41.	13.	0.007	73.93	1.904E+02	
CS-134	795.87	34.	42.	0.023	24.97	2.154E+00	
CS-134	801.95	68.	8.	0.004	160.28	3.812E+00	
CO-58	810.78	58.	8.	0.004	139.19	3.587E-01	
Cs-136	818.50	47.	11.	0.006	92.69	4.991E-01	
MN-54	834.85	51.	-6.	-0.004	32.90	-2.940E-01	P
NB-94	871.10	36.	-2.	-0.001	430.12	-9.522E-02	
EU-154	873.23	67.	-18.	-0.010	68.27	-7.017E+00	
PA-234	880.53	41.	11.	0.006	84.61	9.177E+00	
PA-234	883.24	53.	11.	0.006	96.50	5.617E+00	
Sc-46	889.28	131.	-18.	-0.010	91.91	-8.825E-01	
y-88	898.04	25.	3.	0.002	370.93	1.565E-01	
AC-228	911.07	123.	-8.	-0.004	112.93	-1.283E+00	P
AG-110M	937.49	40.	-6.	-0.003	140.13	-8.976E-01	P
PA-234	946.02	40.	-12.	-0.007	119.41	-4.587E+00	
EU-152	964.11	51.	15.	0.008	73.76	5.223E+00	
AC-228	968.97	41.	62.	0.035	19.29	1.864E+01	P
EU-154	996.33	97.	-20.	-0.011	72.74	-1.019E+01	
PA-234M	1001.00	118.	-21.	-0.011	58.30	-1.331E+02	P
EU-154	1004.77	104.	15.	0.008	100.16	4.482E+00	
Cs-136	1048.07	46.	-14.	-0.008	70.84	-1.018E+00	
RH-106	1050.36	42.	12.	0.007	78.78	4.490E+01	
BI-207	1063.66	22.	1.	0.001	897.88	9.028E-02	P
Ga-68	1077.40	48.	-19.	-0.010	86.47	-3.860E+01	
FE-59	1099.25	32.	-3.	-0.002	432.48	-3.114E-01	
EU-152	1112.07	59.	14.	0.008	80.46	6.210E+00	
ZN-65	1115.55	73.	14.	0.008	88.60	1.682E+00	
Sc-46	1120.55	98.	9.	0.005	158.33	5.397E-01	
Ta-182	1121.30	121.	-8.	-0.004	197.64	-1.369E+00	
CO-60	1173.24	27.	-1.	-0.001	829.97	-8.015E-02	P
Ta-182	1189.05	38.	-5.	-0.003	236.27	-1.762E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	1221.41	27.	15.	0.008	83.43	3.543E+00	P
NA-22	1274.53	23.	-2.	-0.001	411.34	-1.119E-01	
FE-59	1291.60	34.	-11.	-0.006	127.92	-1.729E+00	
CO-60	1332.50	23.	-8.	-0.004	150.05	-5.358E-01	
AG-110M	1384.30	0.	13.	0.007	28.57	3.803E+00	P
EU-152	1408.00	11.	4.	0.002	221.56	1.283E+00	
La-140	1596.21	36.	-19.	-0.010	81.26	-1.609E+00	
SB-124	1690.98	12.	-9.	-0.005	98.76	-1.638E+00	
y-88	1836.06	0.	5.	0.003	44.72	4.731E-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	3.1331E+00	3.1331E+00	1.061E+02%	1.13E+01
NA-22	#A	-1.1189E-01	-1.1189E-01	4.113E+02%	1.67E+00
K-40		2.5821E+02	2.5821E+02	5.292E+00%	7.23E+00
Sc-46	#A	-8.8252E-01	-8.8252E-01	9.191E+01%	2.72E+00
CR-51	A	3.3045E+00	3.3045E+00	1.579E+02%	1.75E+01
MN-54	#A	-2.9399E-01	-2.9399E-01	3.290E+01%	1.65E+00
FE-59	#A	-3.1142E-01	-3.1142E-01	4.325E+02%	3.02E+00
Co-56	#	8.6354E-01	8.6355E-01	6.071E+01%	7.86E-01
CO-57	#A	7.3329E-02	7.3329E-02	3.280E+02%	8.18E-01
CO-58	#A	3.5874E-01	3.5874E-01	1.392E+02%	1.71E+00
CO-60	#A	-5.3581E-01	-5.3581E-01	1.500E+02%	1.74E+00
ZN-65	#A	1.6817E+00	1.6817E+00	8.860E+01%	5.00E+00
NB-94	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+00
ZR-95	#A	-6.1606E-01	-6.1606E-01	1.754E+02%	2.53E+00
NB-95	#A	5.8048E-01	5.8049E-01	9.844E+01%	1.93E+00
RU-103	#A	-1.0616E-01	-1.0616E-01	4.629E+02%	1.20E+00
RH-106	#A	1.0375E+01	1.0375E+01	7.878E+01%	3.09E+01
AG-108M	#A	-5.4200E-01	-5.4200E-01	1.123E+02%	1.23E+00
AG-110M	#A	9.2807E-01	9.2807E-01	2.857E+01%	2.66E+00
SN-113	#A	-3.1853E-01	-3.1853E-01	2.469E+02%	2.62E+00
SB-124	#A	-4.2326E-02	-4.2326E-02	1.229E+03%	3.14E+00
SB-125	#A	1.2295E+00	1.2295E+00	8.417E+01%	3.43E+00
I-131	#A	-4.3327E-01	-4.3328E-01	1.149E+02%	1.23E+00
Gd-153	#A	-9.0779E-01	-9.0779E-01	1.443E+02%	4.37E+00
Ga-68	#A	-3.8383E+01	-3.8599E+01	8.647E+01%	7.15E+01
Tc-99m	#A	2.7403E-01	2.7432E-01	1.206E+02%	1.11E+00
BA-133	#A	-2.2129E-01	-2.2129E-01	4.390E+02%	3.28E+00
CS-134	#A	1.2571E+00	1.2571E+00	2.497E+01%	3.17E+00
CS-137		3.1041E+00	3.1041E+00	1.852E+01%	1.05E+00
CE-139	#A	-5.0178E-02	-5.0178E-02	6.733E+02%	1.15E+00
Ba-140	A	1.8296E+00	1.8296E+00	6.590E+01%	3.84E+00

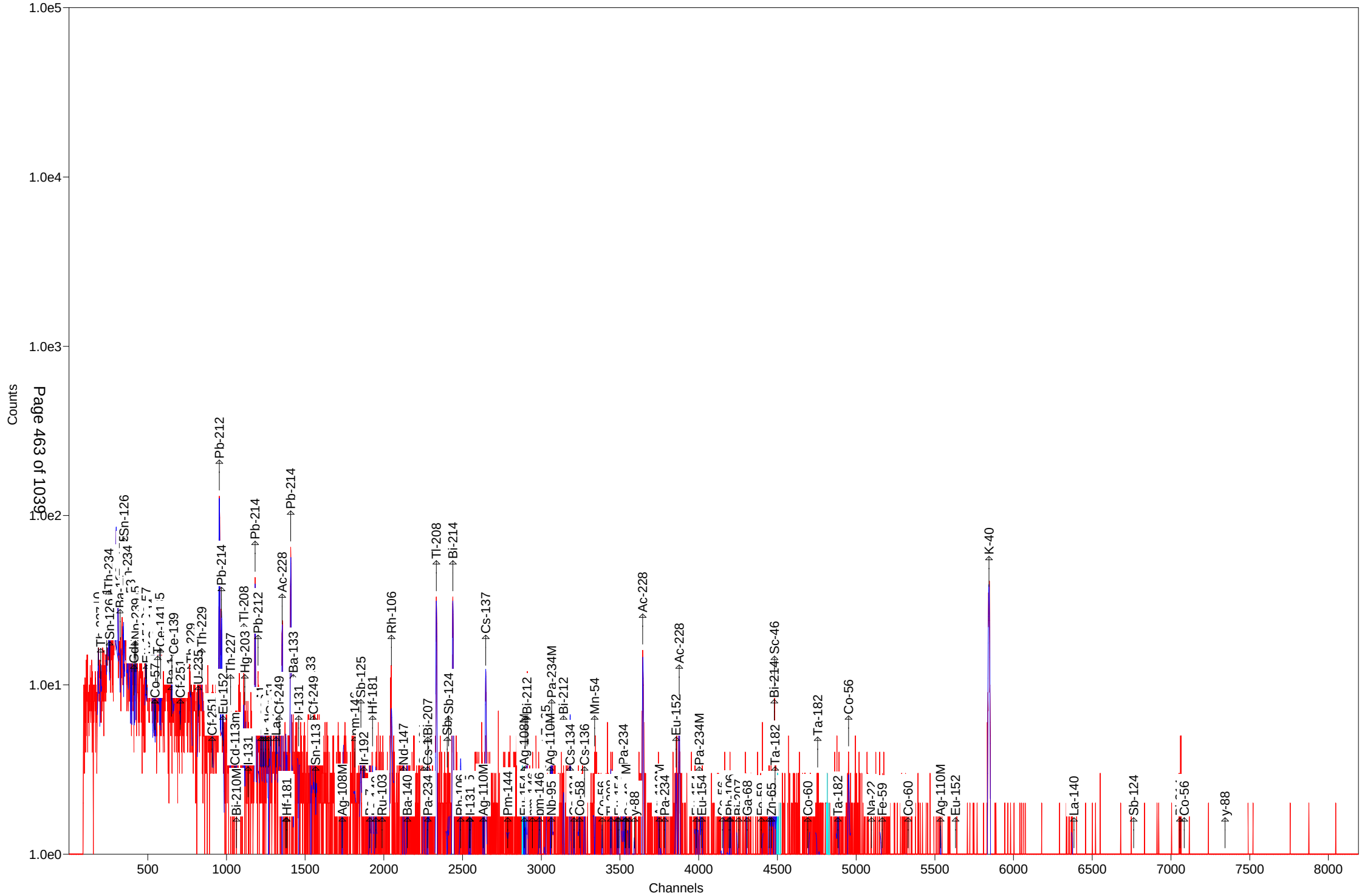
La-140 #A	-1.6085E+00	-1.6085E+00	8.126E+01%	2.65E+00
CE-141 #A	-6.3318E-01	-6.3318E-01	1.587E+02%	3.35E+00
CE-144 #A	1.9693E+00	1.9693E+00	1.291E+02%	8.51E+00
PM-144 #A	-2.5569E-02	-2.5569E-02	2.031E+03%	1.23E+00
EU-152 #A	2.6411E+00	2.6411E+00	6.403E+01%	5.86E+00
EU-154 #A	-7.0166E+00	-7.0166E+00	6.827E+01%	1.59E+01
EU-155 #A	-1.6829E-01	-1.6829E-01	6.177E+02%	6.50E+00
HF-181 #A	6.1762E-01	6.1763E-01	1.133E+02%	1.59E+00
Ta-182 #A	7.7385E-01	7.7385E-01	8.343E+01%	9.23E+00
Hg-203 #A	-2.0611E-01	-2.0611E-01	1.837E+02%	1.29E+00
TL-208	7.2051E+00	7.2051E+00	8.141E+00%	6.68E-01
pm-146 #A	9.7567E-01	9.7567E-01	1.447E+02%	3.34E+00
y-88 #A	3.1930E-01	3.1930E-01	4.472E+01%	1.36E+00
Cd-113m#A	2.0978E+03	2.0978E+03	2.152E+02%	1.54E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.95E+01
Cf-251 #A	-5.4073E-01	-5.4073E-01	3.190E+02%	4.46E+00
Cf-249 #A	2.9202E-01	2.9202E-01	1.054E+02%	2.46E+00
Sn-126 #	3.3136E+00	3.3136E+00	1.796E+01%	1.76E+00
PB-210 #A	1.6270E+01	1.6270E+01	6.399E+01%	2.82E+01
PB-212	1.9455E+01	1.9455E+01	4.968E+00%	1.70E+00
PB-214	1.6092E+01	1.6092E+01	6.914E+00%	1.96E+00
BI-207 #A	4.2061E-01	4.2061E-01	7.183E+01%	1.01E+00
BI-212	3.0559E+01	3.0559E+01	1.728E+01%	8.52E+00
BI-214	1.3701E+01	1.3701E+01	9.020E+00%	1.75E+00
BI-210M#A	2.0522E-01	2.0522E-01	1.544E+02%	1.93E+00
AC-228 #A	6.2048E+00	6.2048E+00	1.929E+01%	9.27E+00
TH-227 #A	4.8423E+00	4.8423E+00	1.305E+02%	2.12E+01
TH-229 #A	2.5484E+00	2.5484E+00	2.668E+02%	1.76E+01
TH-234 A	1.2881E+01	1.2881E+01	6.356E+01%	2.32E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.21E+01
PA-233 #A	8.8624E-01	8.8624E-01	1.610E+02%	4.79E+00
PA-234 #A	2.7381E+00	2.7381E+00	7.776E+01%	4.91E+00
PA-234M#A	-1.3315E+02	-1.3315E+02	5.830E+01%	3.43E+02
U-235 #A	-2.8121E+00	-2.8121E+00	7.672E+01%	1.49E+01
AM-241 #A	-5.5747E-01	-5.5747E-01	2.341E+02%	3.51E+00
Np-237 #A	-2.5756E+00	-2.5756E+00	6.535E+01%	1.24E+01
Ir-192 #A	2.0458E-01	2.0458E-01	8.101E+01%	2.12E+00
Cs-136 #A	4.9907E-01	4.9908E-01	9.269E+01%	1.56E+00
Np-239 #A	-1.2227E+00	-1.2228E+00	1.467E+02%	5.98E+00
Nd-147 #A	4.5613E+00	4.5614E+00	5.415E+01%	5.76E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 3.808E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.8079175E+02 Bq/Sample

257318_Gamma_160-17797-A-3-B. 7_Gamma_20161697.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161269

Sample Description: 257318_Gamma_160-17797-A-4-B
Detector: Detector # 5
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-4-B

Decay to Time: 7/12/2016 09:57 Live Time: 1800 sec
Acquisition Time: 7/12/2016 09:57:25 Real Time: 1807 sec
Analysis Time: 7/12/2016 10:28 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_2016-07-10_0601.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	2.432E+00	187.1	4.549E+00	4.551E+00	1.573E+01
NA-22	4.531E-01	83.9	3.802E-01	3.809E-01	1.308E+00
K-40	2.779E+02	6.1	1.707E+01	2.222E+01	1.187E+01
Sc-46	-3.778E-01	212.0	8.010E-01	8.013E-01	2.778E+00
CR-51	3.197E+00	110.1	3.520E+00	3.524E+00	1.196E+01
MN-54	-1.924E-01	324.3	6.239E-01	6.240E-01	1.732E+00
FE-59	3.070E+00	23.1	7.092E-01	7.257E-01	1.118E+00
Co-56	7.895E-01	89.4	7.056E-01	7.068E-01	1.885E+00
CO-57	0.000E+00	1.#INF	9.924E-02	9.924E-02	1.278E+00
CO-58	-2.302E-01	263.9	6.074E-01	6.075E-01	2.345E+00
CO-60	5.412E-01	108.0	5.844E-01	5.850E-01	1.387E+00
ZN-65	-1.642E+00	133.2	2.187E+00	2.189E+00	7.456E+00
NB-94	2.606E-01	224.5	5.848E-01	5.850E-01	1.467E+00
ZR-95	1.074E+00	97.2	1.044E+00	1.045E+00	2.564E+00
NB-95	-1.012E+00	71.0	7.190E-01	7.210E-01	2.389E+00
RU-103	4.606E-01	97.7	4.501E-01	4.508E-01	1.142E+00
RH-106	-1.074E+00	85.7	9.201E-01	9.218E-01	4.254E+01
AG-108M	6.400E-01	74.1	4.744E-01	4.755E-01	1.400E+00
AG-110M	9.087E-02	31.6	2.873E-02	2.911E-02	4.064E+00
SN-113	-5.436E-02	1545.0	8.399E-01	8.399E-01	2.925E+00
SB-124	1.194E+00	44.7	5.339E-01	5.375E-01	3.896E+00
SB-125	-1.763E+00	111.2	1.960E+00	1.962E+00	4.790E+00
I-131	2.643E-01	98.0	2.590E-01	2.593E-01	1.401E+00
Gd-153	-1.127E+00	112.6	1.268E+00	1.270E+00	4.244E+00
Ga-68	2.383E+01	112.2	2.673E+01	2.676E+01	6.184E+01
Tc-99m	-3.901E-01	119.7	4.671E-01	4.676E-01	1.564E+00
BA-133	6.456E-01	194.3	1.254E+00	1.255E+00	4.232E+00
CS-134	8.052E-01	94.1	7.577E-01	7.589E-01	4.015E+00
CS-137	3.643E+00	18.1	6.602E-01	6.869E-01	1.262E+00
CE-139	1.110E-01	367.2	4.074E-01	4.075E-01	1.393E+00
Ba-140	-1.104E+00	261.5	2.888E+00	2.888E+00	6.258E+00
La-140	-6.813E-01	74.0	5.044E-01	5.057E-01	3.061E+00
CE-141	-7.183E-01	107.8	7.743E-01	7.752E-01	2.079E+00

CE-144	-3.351E+00	134.3	4.501E+00	4.505E+00	1.504E+01
PM-144	5.760E-02	1072.8	6.179E-01	6.179E-01	1.563E+00
EU-152	1.902E+00	144.9	2.756E+00	2.757E+00	5.052E+00
EU-154	6.577E+00	63.6	4.185E+00	4.199E+00	1.604E+01
EU-155	8.453E-01	161.7	1.366E+00	1.367E+00	7.352E+00
HF-181	-3.876E-01	90.1	3.492E-01	3.498E-01	2.411E+00
Ta-182	2.394E+00	118.2	2.829E+00	2.832E+00	9.644E+00
Hg-203	4.591E-01	101.3	4.651E-01	4.658E-01	1.568E+00
TL-208	8.403E+00	10.5	8.860E-01	9.874E-01	1.272E+00
pm-146	-8.685E-01	236.2	2.051E+00	2.052E+00	5.502E+00
y-88	4.156E-01	155.1	6.446E-01	6.449E-01	1.584E+00
Cd-113m	7.228E+02	857.7	6.199E+03	6.199E+03	2.152E+04
Cd-109	8.851E+00	179.6	1.590E+01	1.590E+01	5.314E+01
Cf-251	1.679E+00	105.1	1.765E+00	1.771E+00	4.780E+00
Cf-249	7.757E-02	609.6	4.729E-01	4.729E-01	2.886E+00
Sn-126	5.540E-01	838.0	4.643E+00	4.643E+00	1.582E+01
PB-210	2.434E+01	64.5	1.571E+01	1.577E+01	4.063E+01
PB-212	1.870E+01	6.1	1.136E+00	1.660E+00	1.820E+00
PB-214	1.633E+01	9.8	1.607E+00	1.817E+00	2.776E+00
BI-207	0.000E+00	1.#INF	1.238E-01	1.238E-01	1.589E+00
BI-212	9.544E+00	93.9	8.967E+00	8.980E+00	3.026E+01
BI-214	1.617E+01	8.8	1.421E+00	1.651E+00	1.637E+00
BI-210M	-9.154E-01	95.6	8.753E-01	8.770E-01	2.934E+00
AC-228	2.183E+01	8.3	1.811E+00	2.126E+00	1.860E+00
TH-227	-1.094E+00	678.4	7.423E+00	7.423E+00	1.964E+01
TH-229	-3.815E+00	219.8	8.385E+00	8.391E+00	2.292E+01
TH-234	2.901E+00	447.5	1.298E+01	1.298E+01	3.755E+01
PA-231	-3.444E+00	628.2	2.163E+01	2.163E+01	7.377E+01
PA-233	1.050E+00	144.4	1.516E+00	1.518E+00	5.126E+00
PA-234	7.058E-02	83.0	5.855E-02	5.867E-02	8.764E+00
PA-234M	6.322E+01	88.0	5.567E+01	5.576E+01	3.436E+02
U-235	1.448E-02	25618.0	3.710E+00	3.710E+00	1.263E+01
AM-241	-1.553E+00	86.2	1.338E+00	1.340E+00	4.175E+00
Np-237	0.000E+00	1.#INF	4.972E+00	4.972E+00	1.660E+01
Ir-192	3.823E-01	102.9	3.935E-01	3.942E-01	1.334E+00
Cs-136	4.718E-01	92.7	4.375E-01	4.383E-01	1.926E+00
Np-239	1.303E+00	150.8	1.966E+00	1.967E+00	6.586E+00
Nd-147	3.120E+00	96.1	2.999E+00	3.004E+00	7.650E+00
Total	1.256E+03				

Analyst: Amanda Dick

TestAmerica Inc Spectrum name: 5_Gamma_20161269.An1

Sample description
257318_Gamma_160-17797-A-4-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161269.An1

Acquisition information
Start time: 7/12/2016 9:57:25 AM
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	7/12/2016 9:57:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-10_0601.PBC 7/10/2016 6:01:50 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1602

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.63	33.	64.54	0.72	1.794E-02	46.54	4.250	PBC<MDA	PB210
63.29	5.	447.54	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.28	3.	837.97	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.79	164.	13.10	0.81	3.151E-02				
77.12	233.	9.54	0.82	3.220E-02				
87.13	104.	23.84	0.46	3.446E-02	86.49	13.100	1.290E+01	Np237
					86.54	30.700	5.504E+00	EU155
					86.94	9.040	1.865E+01	Sn126
					87.57	37.500	4.482E+00	Sn126
87.98	21.	179.60	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
91.10	13.	299.13	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.95	150.	17.20	1.98	3.536E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	4.238E+01	AC228
99.50	15.	148.08	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
105.31	19.	161.65	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
106.13	19.	150.85	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
165.85	5.	367.15	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
176.60	15.	105.09	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
227.00	15.	99.95	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.72	342.	6.70	1.16	2.319E-02	238.63	43.300	1.895E+01	PB212
242.07	61.	23.24	0.98	2.293E-02	242.00	7.430	1.974E+01	PB214
244.69	15.	227.36	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
263.70	2.	857.67	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
277.91	15.	82.65	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
279.20	14.	101.31	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
295.21	87.	18.33	1.23	1.945E-02	295.09	19.300	1.283E+01	PB214
300.43	49.	30.10	1.81	1.918E-02	300.03	3.280	4.356E+01	PB212
					300.07	2.460	5.809E+01	PA231
					300.18	6.200	2.305E+01	PA233
312.01	13.	144.36	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.	110.09	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	100.13	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
333.44	2.	697.32	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.40	80.	17.08	1.08	1.736E-02	338.32	12.010	2.123E+01	AC228
345.83	7.	152.31	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
351.90	186.	9.84	1.02	1.680E-02	351.93	37.600	1.633E+01	PB214
356.00	12.	194.25	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
383.84	12.	119.06	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
433.94	11.	116.54	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
463.37	1.	902.08	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
477.60	6.	187.08	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
487.02	9.	127.50	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	9.	97.73	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	62.	32.77	2.48	1.230E-02	511.86	20.000	1.393E+01	RH106
531.00	9.	96.12	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
563.24	9.	94.11	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	1.	854.40	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.022E-01	PA234
					569.70	97.740	5.054E-02	BI207
569.47	8.	105.40	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
583.39	141.	10.54	0.95	1.103E-02	583.02	84.500	8.403E+00	TL208
602.73	10.	213.72	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	8.	274.64	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.44	143.	8.79	1.53	1.063E-02	609.31	46.090	1.617E+01	BI214
					610.30	5.750	1.298E+02	RU103
636.97	8.	97.98	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	5.	248.95	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.75	55.	18.12	1.46	9.924E-03	661.66	85.210	3.643E+00	CS137
702.63	4.	224.47	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	12.	82.06	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	8.009E-01	AG108M
					723.36	20.220	3.600E+00	EU154
722.94	12.	91.60	1.42	9.215E-03	722.79	10.810	6.729E+00	SB124
					722.94	90.840	8.009E-01	AG108M
					723.36	20.220	3.600E+00	EU154
723.36	4.	304.20	1.42	9.211E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.564E-01	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	1.153E+00	EU154
727.17	12.	93.95	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
756.73	9.	97.19	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
763.94	1.	466.37	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
766.41	11.	88.05	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.432E+02	PA234M
785.42	3.	378.59	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	8.	105.33	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
801.95	5.	224.40	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
815.77	2.	631.87	1.49	8.328E-03	815.77	23.280	PBC<MDA	La140
818.50	9.	94.03	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
846.77	7.	164.75	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.53	20.	39.93	1.53	7.963E-03	860.56	12.420	1.105E+01	TL208
873.23	9.	94.78	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
880.53	7.	118.67	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
898.04	5.	155.09	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.39	90.	10.64	0.94	7.591E-03	911.07	29.000	2.275E+01	AC228
964.11	8.	144.88	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.10	47.	14.63	2.38	7.209E-03	968.97	17.460	2.072E+01	AC228
996.33	11.	84.94	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1037.84	5.	185.98	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	3.	159.86	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	85.69	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	8.	112.15	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	20.	23.10	1.71	6.484E-03	1099.25	56.500	3.070E+00	FE59
1120.29	23.	34.87	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.30	10.	118.19	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.394E+00	Ta182
1238.28	6.	100.80	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	5.	83.91	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.287E+00	EU154
1291.60	3.	311.31	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	5.	107.99	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	10.	31.62	1.90	5.340E-03	1384.30	24.290	4.283E+00	AG110M
1408.00	3.	206.16	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.07	272.	6.14	2.06	5.103E-03	1460.83	10.670	2.779E+02	K40
1690.98	5.	44.72	2.08	4.511E-03	1690.98	47.790	PBC<MDA	SB124
1764.81	5.	99.17	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	7.	89.23	2.12	4.337E-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
298.79	74.82	147.	164.	5.195E+03	13.10	0.813	- D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
308.10	77.14	129.	233.	7.231E+03	9.54	0.815	- 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	186.04	46.63	129.	33.	0.018	64.54	0.722
TH-227	200.11	50.14	135.	-3.	-0.002	678.44	0.787s
AM-241	237.72	59.54	198.	-25.	-0.014	86.17	0.797
TH-234	252.74	63.29	208.	5.	0.003	447.54	0.801s
Sn-126	256.71	64.28	248.	3.	0.001	837.97	0.802
BA-133	323.61	80.99	250.	-25.	-0.014	115.76	0.819s
Np-237	345.63	86.49	800.	0.	0.000	177.88	0.825A
EU-155	345.84	86.54	750.	9.	0.005	416.16	0.825s
Sn-126	347.43	86.94	725.	3.	0.002	654.63	0.825D
Sn-126	349.95	87.57	671.	13.	0.007	155.05	0.826D
Cd-109	351.83	88.04	694.	21.	0.012	179.60	0.826A
Nd-147	364.08	91.10	717.	13.	0.007	299.13	0.829s
TH-234	370.05	92.59	752.	-22.	-0.012	106.17	0.831s
AC-228	371.51	92.95	129.	150.	0.083	17.20	1.981s
Gd-153	389.70	97.50	289.	-22.	-0.012	112.56	0.836
Np-239	397.71	99.50	232.	15.	0.008	148.08	0.838s
Gd-153	412.52	103.20	298.	-21.	-0.012	118.63	0.842s
Np-239	414.52	103.70	318.	-18.	-0.010	145.52	0.842s
EU-155	420.98	105.31	450.	19.	0.010	161.65	0.844s
Np-239	424.25	106.13	413.	19.	0.011	150.85	0.845
EU-152	486.88	121.78	208.	-4.	-0.002	534.31	0.861s
CO-57	488.03	122.06	212.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	222.	-23.	-0.013	132.99	0.862
PA-234	524.99	131.29	433.	-23.	-0.013	128.13	0.871s
HF-181	531.91	133.02	456.	-23.	-0.013	131.18	0.872
CE-144	533.97	133.54	479.	-23.	-0.013	134.34	0.873s
HF-181	545.02	136.30	503.	-23.	-0.013	137.06	0.876
CO-57	545.72	136.47	503.	-24.	-0.013	135.98	0.876
Tc-99m	561.88	140.51	299.	-21.	-0.012	119.74	0.880s
CE-141	581.61	145.44	153.	-21.	-0.012	107.80	0.885
U-235	653.42	163.38	199.	0.	0.000	1000.00	0.903
CE-139	663.32	165.85	166.	5.	0.003	367.15	0.905s
Cf-251	706.34	176.60	77.	15.	0.008	105.09	0.916s
TH-229	774.03	193.51	103.	-8.	-0.005	219.82	0.933s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	821.35	205.33	105.	-5.	-0.003	664.04	0.945s
TH-229	843.44	210.85	114.	-5.	-0.003	639.34	0.950s
Cf-251	908.08	227.00	70.	15.	0.009	99.95	0.966s
PB-212	954.64	238.63	42.	338.	0.188	6.08	0.978D
PB-214	968.10	242.00	68.	61.	0.034	23.24	0.981D
EU-152	978.89	244.69	560.	15.	0.008	227.36	0.984
TH-227	1025.11	256.24	103.	-19.	-0.010	76.15	0.995s
Cd-113m	1054.97	263.70	101.	2.	0.001	857.67	1.002
BI-210M	1063.50	265.83	131.	-17.	-0.010	95.62	1.005s
TL-208	1109.33	277.28	65.	15.	0.008	82.65	1.016s
Hg-203	1117.00	279.20	90.	14.	0.008	101.31	1.017s
I-131	1137.41	284.30	73.	-9.	-0.005	174.74	1.022s
PB-214	1181.09	295.21	43.	87.	0.048	18.33	1.226
PB-212	1201.99	300.43	37.	49.	0.027	30.10	1.811s
PA-231	1200.53	300.07	256.	-15.	-0.008	154.27	1.038s
PA-233	1200.97	300.18	241.	-15.	-0.008	149.86	1.038s
PA-231	1210.86	302.65	226.	-3.	-0.002	628.20	1.040s
BA-133	1211.66	302.85	223.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	223.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	223.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	223.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	160.	13.	0.007	144.36	1.049s
Ir-192	1266.25	316.49	58.	11.	0.006	102.92	1.053s
CR-51	1280.63	320.08	60.	10.	0.006	110.09	1.057
La-140	1315.35	328.76	59.	15.	0.008	100.13	1.065s
Cf-249	1334.08	333.44	55.	2.	0.001	697.32	1.070s
AC-228	1353.92	338.40	25.	80.	0.044	17.08	1.084s
EU-152	1377.49	344.29	68.	-1.	-0.001	881.05	1.080
HF-181	1383.66	345.83	53.	7.	0.004	152.31	1.082s
PB-214	1407.97	351.90	38.	186.	0.103	9.84	1.019s
BA-133	1424.36	356.00	266.	12.	0.007	194.25	1.091s
I-131	1458.32	364.48	44.	-6.	-0.003	210.82	1.099s
BA-133	1535.78	383.84	104.	12.	0.007	119.06	1.117
Cf-249	1552.22	387.95	117.	0.	0.000	1000.00	1.121s
SB-125	1711.99	427.88	52.	-13.	-0.007	111.19	1.158s
AG-108M	1736.25	433.94	40.	11.	0.006	116.54	1.164s
pm-146	1816.05	453.88	40.	-2.	-0.001	623.16	1.182s
SB-125	1854.01	463.37	72.	1.	0.001	902.08	1.191s
Ir-192	1872.79	468.06	87.	-11.	-0.006	120.34	1.195
BE-7	1910.94	477.59	60.	6.	0.003	187.08	1.204s
HF-181	1928.56	482.00	83.	-14.	-0.008	96.28	1.208s
La-140	1948.65	487.02	32.	9.	0.005	127.50	1.212s
RU-103	1988.80	497.05	20.	9.	0.005	97.73	1.221s
RH-106	2048.06	511.86	53.	62.	0.034	32.77	2.485s
Nd-147	2124.62	531.00	16.	9.	0.005	96.12	1.252s
Ba-140	2149.67	537.26	41.	-6.	-0.003	261.47	1.258s
CS-134	2253.60	563.24	16.	9.	0.005	94.11	1.280s
CS-134	2277.94	569.32	36.	1.	0.001	854.40	1.286s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	2278.54	569.47	30.	8.	0.004	105.40	1.286s
BI-207	2279.47	569.70	38.	0.	0.000	1000.00	1.286s
TL-208	2334.24	583.39	16.	141.	0.078	10.54	0.951s
SB-125	2402.69	600.50	260.	-7.	-0.004	327.95	1.313s
SB-124	2411.61	602.73	234.	10.	0.006	213.72	1.315s
CS-134	2419.53	604.71	244.	8.	0.005	274.64	1.317
BI-214	2438.44	609.44	6.	143.	0.079	8.79	1.527
RU-103	2441.89	610.30	252.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	252.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	252.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	271.	-11.	-0.006	207.55	1.332s
I-131	2548.61	636.97	13.	8.	0.004	97.98	1.345s
AG-110M	2631.76	657.76	67.	5.	0.003	248.95	1.362s
CS-137	2647.72	661.75	13.	55.	0.031	18.12	1.458
NB-94	2811.25	702.63	22.	4.	0.002	224.47	1.400s
SB-124	2891.88	722.79	43.	12.	0.007	82.06	1.417s
AG-108M	2892.48	722.94	55.	12.	0.007	91.60	1.417s
EU-154	2894.16	723.36	67.	4.	0.002	304.20	1.418s
ZR-95	2897.53	724.20	76.	-15.	-0.008	87.30	1.418s
BI-212	2909.41	727.17	56.	12.	0.007	93.95	1.421
pm-146	2943.61	735.72	26.	-7.	-0.004	150.16	1.428s
pm-146	2989.37	747.16	35.	-5.	-0.003	236.20	1.437s
ZR-95	3027.65	756.73	18.	9.	0.005	97.19	1.445s
AG-110M	3056.50	763.94	19.	1.	0.001	466.37	1.451
NB-95	3063.89	765.79	56.	-16.	-0.009	71.02	1.453s
PA-234M	3066.38	766.41	44.	11.	0.006	88.05	1.453s
EU-152	3116.41	778.92	28.	-9.	-0.005	129.10	1.463s
BI-212	3142.41	785.42	28.	3.	0.002	378.59	1.468
CS-134	3184.19	795.87	14.	8.	0.004	105.33	1.477s
CS-134	3208.53	801.95	23.	5.	0.003	224.40	1.482s
CO-58	3243.82	810.78	48.	-3.	-0.002	263.85	1.489s
La-140	3263.80	815.77	44.	2.	0.001	631.87	1.493s
Cs-136	3274.72	818.50	31.	9.	0.005	94.03	1.495s
MN-54	3340.10	834.85	24.	-3.	-0.002	324.29	1.508s
Co-56	3387.78	846.77	28.	7.	0.004	164.75	1.518s
TL-208	3442.95	860.56	9.	20.	0.011	39.93	1.529s
NB-94	3485.08	871.10	35.	-10.	-0.006	89.02	1.537s
EU-154	3493.61	873.23	29.	9.	0.005	94.78	1.539s
PA-234	3522.80	880.53	31.	7.	0.004	118.67	1.544s
PA-234	3533.64	883.24	38.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	69.	-14.	-0.008	86.60	1.547s
Sc-46	3557.79	889.28	60.	-5.	-0.003	212.01	1.551s
y-88	3592.83	898.04	15.	5.	0.003	155.09	1.558s
AC-228	3646.22	911.39	1.	90.	0.050	10.64	0.938s
AG-110M	3750.60	937.49	47.	-17.	-0.010	86.38	1.589s
PA-234	3784.70	946.02	47.	-18.	-0.010	86.04	1.595s
EU-152	3857.05	964.11	62.	8.	0.004	144.88	1.609s
AC-228	3877.00	969.10	0.	47.	0.026	14.63	2.376s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3985.88	996.33	41.	11.	0.006	84.94	1.633s
PA-234M	4004.55	1001.00	52.	0.	0.000	1000.00	1.636s
Co-56	4151.87	1037.84	15.	5.	0.003	185.98	1.664s
Cs-136	4192.77	1048.07	10.	3.	0.002	159.86	1.671s
RH-106	4201.93	1050.36	10.	6.	0.003	85.69	1.673s
BI-207	4255.11	1063.66	25.	-2.	-0.001	554.15	1.682s
Ga-68	4310.04	1077.40	15.	8.	0.004	112.15	1.692s
FE-59	4397.41	1099.25	1.	20.	0.011	23.10	1.708
EU-152	4448.68	1112.07	90.	-13.	-0.007	104.16	1.717
ZN-65	4462.56	1115.55	77.	-10.	-0.005	133.22	1.720s
BI-214	4481.51	1120.29	21.	23.	0.013	34.87	1.723D
Ta-182	4485.56	1121.30	59.	10.	0.005	118.19	1.724s
CO-60	4693.21	1173.24	16.	-2.	-0.001	396.72	1.760
Ta-182	4756.42	1189.05	25.	-7.	-0.004	161.52	1.771s
Ta-182	4885.79	1221.41	32.	-3.	-0.002	432.48	1.793s
Co-56	4953.23	1238.28	6.	6.	0.003	100.80	1.804s
NA-22	5098.13	1274.53	5.	5.	0.003	83.91	1.828s
EU-154	5098.19	1274.54	10.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	16.	3.	0.002	311.31	1.840s
CO-60	5329.85	1332.50	6.	5.	0.003	107.99	1.866s
AG-110M	5536.88	1384.30	0.	10.	0.006	31.62	1.899s
EU-152	5631.62	1408.00	5.	3.	0.001	206.16	1.914s
K-40	5843.69	1461.07	4.	272.	0.151	6.14	2.055
La-140	6383.73	1596.21	23.	-11.	-0.006	109.06	2.024s
SB-124	6762.39	1690.98	0.	5.	0.003	44.72	2.076s
BI-214	7056.06	1764.49	12.	5.	0.003	99.17	2.114s
Co-56	7083.46	1771.35	18.	7.	0.004	89.23	2.117s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.4317E+00				5.31E+01	
			477.60	2.432E+00	&(	1.573E+01 1.87E+02 1.05E+01	G
NA-22	C	4.5314E-01				9.50E+02	
			1274.53	4.531E-01	?(	1.308E+00 8.39E+01 9.99E+01	G
K-40	N	2.7785E+02				4.66E+11	
			1460.83	2.779E+02	(P	1.187E+01 6.14E+00 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F	-3.7783E-01					8.38E+01	
			889.28	-3.778E-01	?(	2.778E+00	2.12E+02	1.00E+02 G
			1120.55	8.306E-08	%	3.558E+00	1.21E+09	1.00E+02 G
CR-51	F	3.1970E+00					2.77E+01	
			320.08	3.197E+00	?(	1.196E+01	1.10E+02	9.94E+00 G
MN-54	C	-1.9238E-01					3.12E+02	
			834.85	-1.924E-01	&(P	1.732E+00	3.24E+02	1.00E+02 G
FE-59	F	3.0698E+00					4.45E+01	
			1099.25	3.070E+00	?(P	1.118E+00	2.31E+01	5.65E+01 G
			1291.60	6.759E-01	- P	4.853E+00	3.11E+02	4.32E+01 G
Co-56	C	7.8949E-01					7.73E+01	
			846.77	4.821E-01	&(	1.885E+00	1.65E+02	9.99E+01 G
			1238.28	8.371E-01	?(P	2.010E+00	1.01E+02	6.61E+01 G
			1037.84	2.741E+00	&(P	1.208E+01	1.86E+02	1.41E+01 G
			1771.35	6.083E+00	?	1.853E+01	8.92E+01	1.55E+01 A
CO-58	C	-2.3020E-01					7.09E+01	
			810.78	-2.302E-01	?(P	2.345E+00	2.64E+02	9.95E+01 G
CO-60	F	5.4119E-01					1.93E+03	
			1332.50	5.412E-01	?(P	1.387E+00	1.08E+02	1.00E+02 G
			1173.24	-1.906E-01	- P	1.940E+00	3.97E+02	9.99E+01 G
ZN-65	F	-1.6417E+00					2.44E+02	
			1115.55	-1.642E+00	&(	7.456E+00	1.33E+02	5.06E+01 G
NB-94	I	2.6055E-01					7.41E+06	
			702.63	2.606E-01	&(	1.467E+00	2.24E+02	9.79E+01 G
			871.10	-7.313E-01	+ P	2.147E+00	8.90E+01	9.99E+01 G
ZR-95	I	1.0740E+00					6.40E+01	
			756.73	1.074E+00	?(P	2.564E+00	9.72E+01	5.45E+01 G
			724.20	-2.023E+00	+	5.926E+00	8.73E+01	4.42E+01 G
NB-95	I	-1.0124E+00					6.40E+01	
			765.79	-1.012E+00	?(	2.389E+00	7.10E+01	9.98E+01 G
RU-103	I	4.6060E-01					3.93E+01	
			497.05	4.606E-01	?(	1.142E+00	9.77E+01	9.09E+01 G
			610.30	0.000E+00	-	6.978E+01	1.00E+03	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-1.0737E+00					3.74E+02	
			621.92	-6.070E+00	?(	4.254E+01	2.08E+02	9.93E+00 G
			1050.36	3.073E+01	?(	9.026E+01	8.57E+01	1.56E+00 G
			511.86	1.393E+01	?	8.299E+00	3.28E+01	2.00E+01 GA
AG-108M	C	6.4004E-01					1.53E+05	
			433.94	4.785E-01	(	1.400E+00	1.17E+02	9.05E+01 G
			722.94	8.009E-01	?(	2.475E+00	9.16E+01	9.08E+01 G
			614.28	0.000E+00	-	4.490E+00	1.00E+03	8.98E+01 G
AG-110M	F	9.0866E-02					2.50E+02	
			884.68	-1.398E+00	?(	4.064E+00	8.66E+01	7.27E+01 G
			657.76	2.788E-01	+	2.407E+00	2.49E+02	9.46E+01 G
			937.49	-3.809E+00	+	7.536E+00	8.64E+01	3.44E+01 G
			1384.30	4.283E+00	?(	3.157E+00	3.16E+01	2.43E+01 G
			763.94	3.778E-01	?(	6.473E+00	4.66E+02	2.23E+01 G
SN-113	F	-5.4363E-02					1.15E+02	
			391.69	-5.436E-02	&(P	2.925E+00	1.55E+03	6.40E+01 G
SB-124	F	1.1939E+00					6.02E+01	
			602.73	5.388E-01	?(	3.896E+00	2.14E+02	9.83E+01 G
			1690.98	1.289E+00	?(	1.899E+00	4.47E+01	4.78E+01 G
			722.79	6.729E+00	?(	1.855E+01	8.21E+01	1.08E+01 G
SB-125	I	-1.7625E+00					1.01E+03	
			427.88	-1.763E+00	(P	4.790E+00	1.11E+02	2.96E+01 G
			600.50	-2.023E+00	+	2.250E+01	3.28E+02	1.79E+01 G
			635.89	7.980E-02	%	1.427E+01	4.94E+03	1.13E+01 G
			463.37	5.294E-01	&	1.674E+01	9.02E+02	1.05E+01 G
I-131	I	2.6429E-01					8.02E+00	
			364.48	-2.500E-01	*(	1.401E+00	2.11E+02	8.17E+01 G
			284.30	-4.210E+00	+	1.922E+01	1.75E+02	6.14E+00 G
			636.97	6.125E+00	&(	1.484E+01	9.80E+01	7.17E+00 G
Gd-153	F	-1.1269E+00					2.42E+02	
			97.50	-1.127E+00	?(	4.244E+00	1.13E+02	3.00E+01 G
			103.20	-1.476E+00	+	5.863E+00	1.19E+02	2.18E+01 G
Ga-68	C	2.3832E+01					4.71E-02	
			1077.40	2.383E+01	?(	6.184E+01	1.12E+02	3.30E+00 G
Tc-99m	I	-3.9006E-01					2.51E-01	
			140.51	-3.901E-01	?(	1.564E+00	1.20E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	6.4558E-01					3.85E+03	
			356.00	6.456E-01	(	4.232E+00	1.94E+02	6.20E+01 G
			302.85	0.000E+00	-	1.151E+01	1.00E+03	1.83E+01 G
			383.84	4.969E+00	?	2.002E+01	1.19E+02	8.94E+00 GA
			80.99	-1.213E+00	+	3.753E+00	1.16E+02	3.41E+01 GA
CS-134	I	8.0516E-01					7.54E+02	
			604.71	4.313E-01	?(	4.015E+00	2.75E+02	9.76E+01 G
			795.87	6.112E-01	?(	1.539E+00	1.05E+02	8.55E+01 G
			569.32	3.210E-01	?(	9.845E+00	8.54E+02	1.54E+01 G
			801.95	3.531E+00	?(	1.908E+01	2.24E+02	8.69E+00 G
			563.24	5.218E+00	&(	1.251E+01	9.41E+01	8.35E+00 G
CS-137	I	3.6433E+00					1.10E+04	
			661.66	3.643E+00	(P	1.262E+00	1.81E+01	8.52E+01 G
CE-139	F	1.1097E-01					1.38E+02	
			165.85	1.110E-01	?(	1.393E+00	3.67E+02	7.99E+01 G
Ba-140	I	-1.1044E+00					1.28E+01	
			537.26	-1.104E+00	&(P	6.258E+00	2.61E+02	2.44E+01 G
			162.66	-2.869E-01	%	1.959E+01	1.99E+03	6.22E+00 G
			304.85	0.000E+00	+	4.946E+01	1.00E+03	4.29E+00 G
La-140	I	-6.8135E-01					1.28E+01	
			1596.21	-1.312E+00	?(	3.061E+00	1.09E+02	9.54E+01 G
			487.02	8.572E-01	+	2.769E+00	1.27E+02	4.55E+01 G
			328.76	2.281E+00	(	5.911E+00	1.00E+02	2.03E+01 G
			815.77	4.298E-01	+	9.651E+00	6.32E+02	2.33E+01 G
CE-141	I	-7.1832E-01					3.25E+01	
			145.44	-7.183E-01	?(	2.079E+00	1.08E+02	4.82E+01 G
CE-144	I	-3.3507E+00					2.85E+02	
			133.54	-3.351E+00	?(	1.504E+01	1.34E+02	1.11E+01 G
PM-144	C	5.7598E-02					3.63E+02	
			696.54	5.760E-02	%(P	1.563E+00	1.07E+03	9.90E+01 G
			618.06	0.000E+00	-	4.092E+00	1.00E+03	9.91E+01 G
EU-152	F	1.9019E+00					4.94E+03	
			344.29	-1.634E-01	?(	5.052E+00	8.81E+02	2.65E+01 G
			1112.07	-8.462E+00	+	2.974E+01	1.04E+02	1.36E+01 G
			121.78	-2.079E-01	+	3.791E+00	5.34E+02	2.86E+01 G
			778.92	-4.463E+00	+	1.357E+01	1.29E+02	1.29E+01 G
			964.11	4.155E+00	?(	2.065E+01	1.45E+02	1.46E+01 G
			244.69	4.781E+00	(	3.646E+01	2.27E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	1.340E+00	?	6.769E+00	2.06E+02	2.10E+01 GA
EU-154	I	6.5767E+00					3.14E+03	
			873.23	4.971E+00	?(P	1.604E+01	9.48E+01	1.23E+01 G
			123.10	-8.695E-01	- P	2.746E+00	1.33E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.811E+00	1.00E+03	3.52E+01 G
			723.36	1.153E+00	-	1.220E+01	3.04E+02	2.02E+01 G
			1004.77	-4.412E-01	%	1.630E+01	1.04E+03	1.80E+01 G
			996.33	8.435E+00	?(	2.413E+01	8.49E+01	1.06E+01 G
EU-155	I	8.4531E-01					1.81E+03	
			105.31	1.358E+00	*(P	7.352E+00	1.62E+02	2.12E+01 G
			86.54	4.916E-01	?(	6.863E+00	4.16E+02	3.07E+01 G
HF-181	F	-3.8762E-01					4.24E+01	
			482.00	-7.436E-01	&(	2.411E+00	9.63E+01	8.05E+01 G
			133.02	-8.564E-01	+	3.755E+00	1.31E+02	4.33E+01 G
			345.83	1.514E+00	?(	7.945E+00	1.52E+02	1.51E+01 G
			136.30	-6.425E+00	&	2.943E+01	1.37E+02	5.85E+00 G
Ta-182	F	2.3937E+00					1.14E+02	
			1121.30	2.394E+00	?(	9.644E+00	1.18E+02	3.49E+01 G
			1221.41	-1.040E+00	-	1.008E+01	4.32E+02	2.70E+01 G
			1189.05	-3.955E+00	+	1.470E+01	1.62E+02	1.62E+01 G
Hg-203	F	4.5910E-01					4.66E+01	
			279.20	4.591E-01	&(	1.568E+00	1.01E+02	8.15E+01 G
TL-208	N	8.4032E+00					6.98E+02	
			583.02	8.403E+00	(	1.272E+00	1.05E+01	8.45E+01 G
			277.28	6.262E+00	&	1.734E+01	8.26E+01	6.31E+00 G
			860.56	1.105E+01	+	9.519E+00	3.99E+01	1.24E+01 G
pm-146	C	-8.6851E-01					2.02E+03	
			747.16	-8.685E-01	?(P	5.502E+00	2.36E+02	3.40E+01 G
			735.72	-2.034E+00	+ P	7.257E+00	1.50E+02	2.25E+01 G
			453.88	-1.257E-01	+	2.023E+00	6.23E+02	6.50E+01 G
y-88	F	4.1560E-01					1.07E+02	
			898.04	4.156E-01	?(P	1.584E+00	1.55E+02	9.37E+01 G
			1836.06	-4.150E-02	% P	9.809E-01	1.75E+03	9.92E+01 G
Cd-113m		7.2280E+02					5.33E+03	
			263.70	7.228E+02	(	2.152E+04	8.58E+02	6.00E-03 K
Cd-109	F	8.8510E+00					4.53E+02	
							Derived Ave Activity	
			88.04	8.851E+00	}(	5.314E+01	1.80E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.6793E+00					3.28E+05	
			176.60	1.679E+00	&(	4.780E+00	1.05E+02	1.70E+01 G
			227.00	5.620E+00	&	1.521E+01	9.99E+01	6.30E+00 GA
Cf-249	T	7.7574E-02					1.28E+05	
			387.95	0.000E+00	?(	2.886E+00	1.00E+03	6.60E+01 G
			333.44	4.077E-01	*(	7.597E+00	6.97E+02	1.55E+01 G
Sn-126		5.5404E-01					3.65E+07	
			87.57	5.540E-01	}	5.295E+00	1.55E+02	3.75E+01 GA
			64.28	5.540E-01	(	1.582E+01	8.38E+02	9.70E+00 G
			86.94	5.540E-01	}	2.288E+01	6.55E+02	9.04E+00 GA
PB-210	N	2.4337E+01					8.14E+03	
			46.54	2.434E+01	(P	4.063E+01	6.45E+01	4.25E+00 G
PB-212	N	1.8699E+01					6.98E+02	
			238.63	1.870E+01	(	1.820E+00	6.08E+00	4.33E+01 G
			300.03	4.356E+01	+	2.731E+01	3.01E+01	3.28E+00 GA
PB-214	N	1.6326E+01					5.84E+05	
			351.93	1.633E+01	@(P	2.776E+00	9.84E+00	3.76E+01 G
			295.09	1.283E+01	- P	4.941E+00	1.83E+01	1.93E+01 G
			242.00	1.974E+01	P	1.346E+01	2.32E+01	7.43E+00 GA
BI-212	N	9.5443E+00					6.98E+02	
			727.17	9.544E+00	(P	3.026E+01	9.39E+01	7.55E+00 G
			785.42	1.515E+01		1.382E+02	3.79E+02	1.28E+00 GA
BI-214	N	1.6174E+01					5.84E+05	
			609.31	1.617E+01	(P	1.637E+00	8.79E+00	4.61E+01 G
			1120.29	1.355E+01	- P	1.400E+01	3.49E+01	1.51E+01 G
			1764.49	4.513E+00	- P	1.548E+01	9.92E+01	1.54E+01 G
BI-210M	T	-9.1539E-01					1.10E+09	
			265.83	-9.154E-01	?(	2.934E+00	9.56E+01	5.00E+01 G
			304.90	0.000E+00	+	7.579E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1833E+01					2.10E+03	
			911.07	2.275E+01	(P	1.860E+00	1.06E+01	2.90E+01 G
			968.97	2.072E+01	(P	3.253E+00	1.46E+01	1.75E+01 G
			338.32	2.123E+01	@(	6.971E+00	1.71E+01	1.20E+01 G
			93.35	4.238E+01	+	1.572E+01	1.72E+01	5.56E+00 XA
TH-227	N	-1.0941E+00					7.95E+03	
			50.14	-1.094E+00	?(P	1.964E+01	6.78E+02	8.00E+00 G
			256.24	-6.722E+00	+ P	1.814E+01	7.61E+01	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-3.8145E+00					2.68E+06	
			193.51	-3.815E+00	?(	2.292E+01	2.20E+02	4.40E+00 G
			210.85	-3.442E+00	+ P	3.790E+01	6.39E+02	2.99E+00 G
TH-234	N	2.9008E+00					1.63E+12	
			63.29	2.901E+00	@(P	3.755E+01	4.48E+02	3.81E+00 G
			92.59	-6.194E+00	+ P	3.681E+01	1.06E+02	5.58E+00 G
PA-231	N	-3.4438E+00					1.20E+07	
			302.65	-3.444E+00	&(	7.377E+01	6.28E+02	2.88E+00 G
			300.07	-1.752E+01	+	9.101E+01	1.54E+02	2.46E+00 G
PA-233	C	1.0505E+00					7.82E+08	
			312.01	1.050E+00	*(	5.126E+00	1.44E+02	3.60E+01 G
			300.18	-6.955E+00	+	3.509E+01	1.50E+02	6.20E+00 G
PA-234	N	7.0582E-02					1.63E+12	
			131.29	-2.046E+00	(	8.764E+00	1.28E+02	1.80E+01 G
			946.02	-9.882E+00	+	1.947E+01	8.60E+01	1.34E+01 G
			569.47	4.717E+00	?(	1.704E+01	1.05E+02	8.20E+00 G
			883.24	0.000E+00	-	2.335E+01	1.00E+03	9.60E+00 G
			880.53	8.297E+00	?	3.397E+01	1.19E+02	6.00E+00 GA
PA-234M	N	6.3224E+01					1.63E+12	
			1001.00	0.000E+00	?(	3.436E+02	1.00E+03	8.37E-01 G
			766.41	2.432E+02	?(	7.225E+02	8.80E+01	2.94E-01 G
U-235	N	1.4483E-02					2.57E+11	
			143.79	1.448E-02	%(	1.263E+01	2.56E+04	1.10E+01 G
			205.33	-1.934E+00	+ P	2.126E+01	6.64E+02	5.01E+00 G
			163.38	0.000E+00	-	2.413E+01	1.00E+03	5.08E+00 G
AM-241	T	-1.5526E+00					1.58E+05	
			59.54	-1.553E+00	?(P	4.175E+00	8.62E+01	3.59E+01 G
Ir-192	F	3.8232E-01					7.40E+01	
			316.49	3.823E-01	?(	1.334E+00	1.03E+02	8.70E+01 G
			468.06	-9.182E-01	+	3.748E+00	1.20E+02	5.18E+01 G
			308.44	0.000E+00	-	6.748E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.7180E-01					1.30E+01	
			818.50	6.023E-01	?(	1.926E+00	9.40E+01	1.00E+02 G
			1048.07	3.087E-01	?(	1.795E+00	1.60E+02	8.00E+01 G
			340.57	8.004E-02	%	4.437E+00	1.61E+03	4.69E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-239 T	1.3031E+00					2.36E+00	
		103.70	-1.126E+00	+	5.501E+00	1.46E+02	2.40E+01 X
		106.13	1.303E+00	&(	6.586E+00	1.51E+02	2.27E+01 G
		99.50	1.523E+00	@	7.595E+00	1.48E+02	1.50E+01 X
Nd-147	3.1198E+00					1.11E+01	
		531.00	3.120E+00	?(	7.650E+00	9.61E+01	1.30E+01 G
		91.10	7.117E-01	-	7.136E+00	2.99E+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	135.	-3.	-0.002	678.44	-1.094E+00	P
AM-241	59.54	198.	-25.	-0.014	86.17	-1.553E+00	P
TH-234	63.29	208.	5.	0.003	447.54	2.901E+00	P
BA-133	80.99	250.	-25.	-0.014	115.76	-1.213E+00	
EU-155	86.54	750.	9.	0.005	416.16	4.916E-01	
Nd-147	91.10	717.	13.	0.007	299.13	7.117E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	92.59	752.	-22.	-0.012	106.17	-6.194E+00	P
Gd-153	97.50	289.	-22.	-0.012	112.56	-1.127E+00	
Np-239	99.50	232.	15.	0.008	148.08	1.523E+00	
Gd-153	103.20	298.	-21.	-0.012	118.63	-1.476E+00	
Np-239	103.70	318.	-18.	-0.010	145.52	-1.126E+00	
EU-155	105.31	450.	19.	0.010	161.65	1.358E+00	P
Np-239	106.13	413.	19.	0.011	150.85	1.303E+00	
EU-152	121.78	208.	-4.	-0.002	534.31	-2.079E-01	
EU-154	123.10	222.	-23.	-0.013	132.99	-8.695E-01	P
PA-234	131.29	433.	-23.	-0.013	128.13	-2.046E+00	
HF-181	133.02	456.	-23.	-0.013	131.18	-8.564E-01	
CE-144	133.54	479.	-23.	-0.013	134.34	-3.351E+00	
HF-181	136.30	503.	-23.	-0.013	137.06	-6.425E+00	
CO-57	136.47	503.	-24.	-0.013	135.98	-3.552E+00	
Tc-99m	140.51	299.	-21.	-0.012	119.74	-3.901E-01	
CE-141	145.44	153.	-21.	-0.012	107.80	-7.183E-01	
CE-139	165.85	166.	5.	0.003	367.15	1.110E-01	
Cf-251	176.60	77.	15.	0.008	105.09	1.679E+00	
TH-229	193.51	103.	-8.	-0.005	219.82	-3.815E+00	
U-235	205.33	105.	-5.	-0.003	664.04	-1.934E+00	P
TH-229	210.85	114.	-5.	-0.003	639.34	-3.442E+00	P
Cf-251	227.00	70.	15.	0.009	99.95	5.620E+00	
EU-152	244.69	560.	15.	0.008	227.36	4.781E+00	
TH-227	256.24	103.	-19.	-0.010	76.15	-6.722E+00	P
Cd-113m	263.70	101.	2.	0.001	857.67	7.228E+02	
BI-210M	265.83	131.	-17.	-0.010	95.62	-9.154E-01	
Hg-203	279.20	90.	14.	0.008	101.31	4.591E-01	
I-131	284.30	73.	-9.	-0.005	174.74	-4.210E+00	
PA-231	300.07	256.	-15.	-0.008	154.27	-1.752E+01	
PA-233	300.18	241.	-15.	-0.008	149.86	-6.955E+00	
PA-231	302.65	226.	-3.	-0.002	628.20	-3.444E+00	
PA-233	312.01	160.	13.	0.007	144.36	1.050E+00	
Ir-192	316.49	58.	11.	0.006	102.92	3.823E-01	
CR-51	320.08	60.	10.	0.006	110.09	3.197E+00	
La-140	328.76	59.	15.	0.008	100.13	2.281E+00	
Cf-249	333.44	55.	2.	0.001	697.32	4.077E-01	
EU-152	344.29	68.	-1.	-0.001	881.05	-1.634E-01	
HF-181	345.83	53.	7.	0.004	152.31	1.514E+00	
BA-133	356.00	266.	12.	0.007	194.25	6.456E-01	
I-131	364.48	44.	-6.	-0.003	210.82	-2.500E-01	
BA-133	383.84	104.	12.	0.007	119.06	4.969E+00	
SB-125	427.88	52.	-13.	-0.007	111.19	-1.763E+00	P
AG-108M	433.94	40.	11.	0.006	116.54	4.785E-01	
pm-146	453.88	40.	-2.	-0.001	623.16	-1.257E-01	
SB-125	463.37	72.	1.	0.001	902.08	5.294E-01	
Ir-192	468.06	87.	-11.	-0.006	120.34	-9.182E-01	
BE-7	477.59	60.	6.	0.003	187.08	2.432E+00	
HF-181	482.00	83.	-14.	-0.008	96.28	-7.436E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	487.02	32.	9.	0.005	127.50	8.572E-01	
RU-103	497.05	20.	9.	0.005	97.73	4.606E-01	
RH-106	511.86	53.	62.	0.034	32.77	1.393E+01	
Nd-147	531.00	16.	9.	0.005	96.12	3.120E+00	
Ba-140	537.26	41.	-6.	-0.003	261.47	-1.104E+00	P
CS-134	563.24	16.	9.	0.005	94.11	5.218E+00	
CS-134	569.32	36.	1.	0.001	854.40	3.210E-01	
PA-234	569.47	30.	8.	0.004	105.40	4.717E+00	
SB-125	600.50	260.	-7.	-0.004	327.95	-2.023E+00	
SB-124	602.73	234.	10.	0.006	213.72	5.388E-01	
CS-134	604.71	244.	8.	0.005	274.64	4.313E-01	
RH-106	621.92	271.	-11.	-0.006	207.55	-6.070E+00	
I-131	636.97	13.	8.	0.004	97.98	6.125E+00	
AG-110M	657.76	67.	5.	0.003	248.95	2.788E-01	
NB-94	702.63	22.	4.	0.002	224.47	2.606E-01	
SB-124	722.79	43.	12.	0.007	82.06	6.729E+00	
AG-108M	722.94	55.	12.	0.007	91.60	8.009E-01	
EU-154	723.36	67.	4.	0.002	304.20	1.153E+00	
ZR-95	724.20	76.	-15.	-0.008	87.30	-2.023E+00	
pm-146	735.72	26.	-7.	-0.004	150.16	-2.034E+00	P
pm-146	747.16	35.	-5.	-0.003	236.20	-8.685E-01	P
ZR-95	756.73	18.	9.	0.005	97.19	1.074E+00	P
AG-110M	763.94	19.	1.	0.001	466.37	3.778E-01	
NB-95	765.79	56.	-16.	-0.009	71.02	-1.012E+00	
PA-234M	766.41	44.	11.	0.006	88.05	2.432E+02	
EU-152	778.92	28.	-9.	-0.005	129.10	-4.463E+00	
CS-134	795.87	14.	8.	0.004	105.33	6.112E-01	
CS-134	801.95	23.	5.	0.003	224.40	3.531E+00	
CO-58	810.78	48.	-3.	-0.002	263.85	-2.302E-01	P
La-140	815.77	44.	2.	0.001	631.87	4.298E-01	
Cs-136	818.50	31.	9.	0.005	94.03	6.023E-01	
MN-54	834.85	24.	-3.	-0.002	324.29	-1.924E-01	P
Co-56	846.77	28.	7.	0.004	164.75	4.821E-01	
NB-94	871.10	35.	-10.	-0.006	89.02	-7.313E-01	P
EU-154	873.23	29.	9.	0.005	94.78	4.971E+00	P
PA-234	880.53	31.	7.	0.004	118.67	8.297E+00	
AG-110M	884.68	69.	-14.	-0.008	86.60	-1.398E+00	
Sc-46	889.28	60.	-5.	-0.003	212.01	-3.778E-01	
y-88	898.04	15.	5.	0.003	155.09	4.156E-01	P
AG-110M	937.49	47.	-17.	-0.010	86.38	-3.809E+00	
PA-234	946.02	47.	-18.	-0.010	86.04	-9.882E+00	
EU-152	964.11	62.	8.	0.004	144.88	4.155E+00	
EU-154	996.33	41.	11.	0.006	84.94	8.435E+00	
Co-56	1037.84	15.	5.	0.003	185.98	2.741E+00	P
Cs-136	1048.07	10.	3.	0.002	159.86	3.087E-01	
RH-106	1050.36	10.	6.	0.003	85.69	3.073E+01	
BI-207	1063.66	25.	-2.	-0.001	554.15	-2.238E-01	
Ga-68	1077.40	15.	8.	0.004	112.15	2.383E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	1112.07	90.	-13.	-0.007	104.16	-8.462E+00		
ZN-65	1115.55	77.	-10.	-0.005	133.22	-1.642E+00		
CO-60	1173.24	16.	-2.	-0.001	396.72	-1.906E-01		P
Co-56	1238.28	6.	6.	0.003	100.80	8.371E-01		P
NA-22	1274.53	5.	5.	0.003	83.91	4.531E-01		
CO-60	1332.50	6.	5.	0.003	107.99	5.412E-01		P
AG-110M	1384.30	0.	10.	0.006	31.62	4.283E+00		
EU-152	1408.00	5.	3.	0.001	206.16	1.340E+00		
La-140	1596.21	23.	-11.	-0.006	109.06	-1.312E+00		
SB-124	1690.98	0.	5.	0.003	44.72	1.289E+00		
Co-56	1771.35	18.	7.	0.004	89.23	6.083E+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 *****

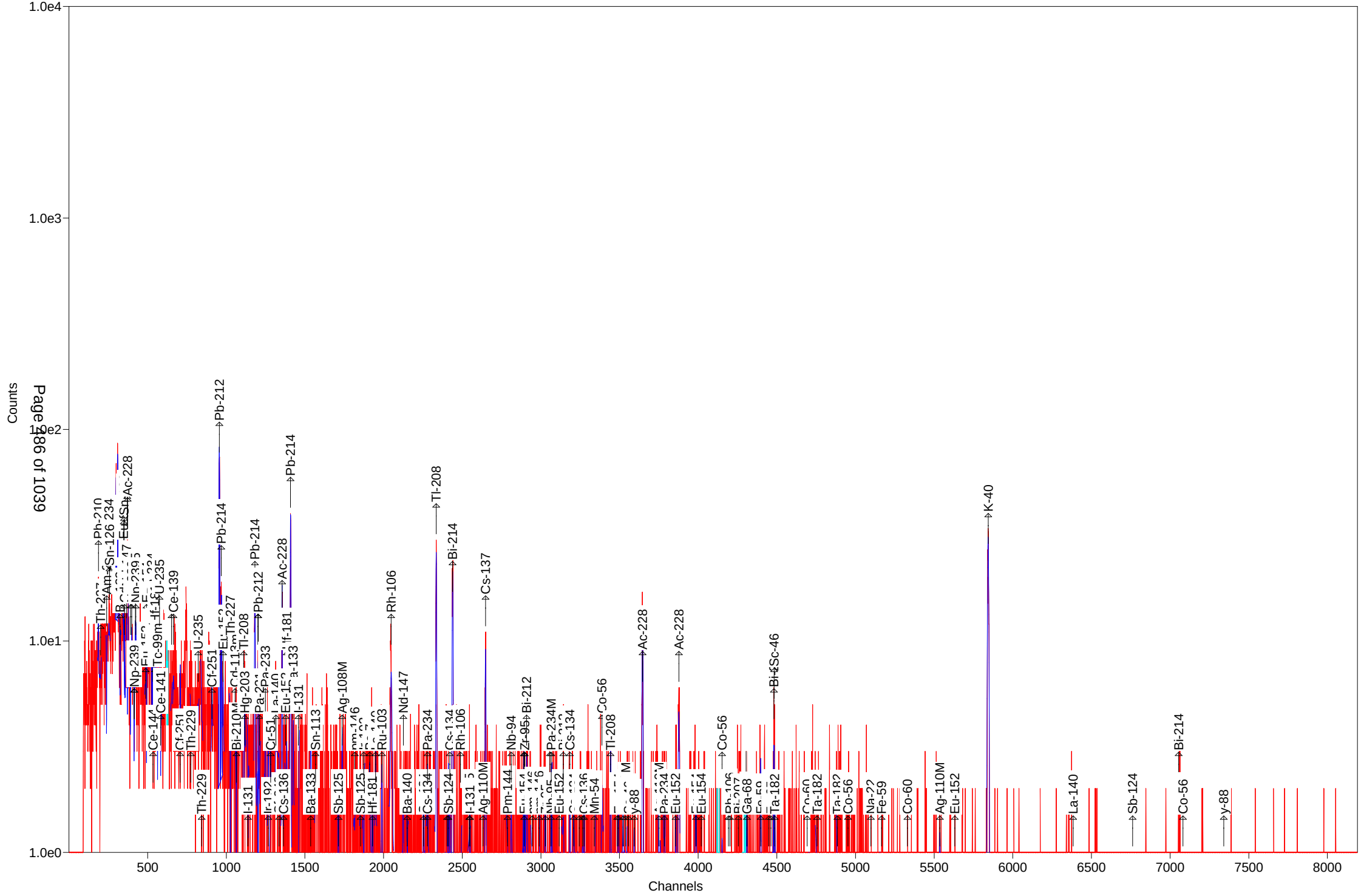
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	2.4317E+00	2.4317E+00	1.871E+02%	1.57E+01
NA-22	#A	4.5314E-01	4.5314E-01	8.391E+01%	1.31E+00
K-40		2.7785E+02	2.7785E+02	6.145E+00%	1.19E+01
Sc-46	#A	-3.7783E-01	-3.7783E-01	2.120E+02%	2.78E+00
CR-51	#A	3.1969E+00	3.1970E+00	1.101E+02%	1.20E+01
MN-54	#A	-1.9238E-01	-1.9238E-01	3.243E+02%	1.73E+00
FE-59	#	3.0698E+00	3.0698E+00	2.310E+01%	1.12E+00
Co-56	#A	7.8949E-01	7.8949E-01	8.938E+01%	1.88E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.28E+00
CO-58	#A	-2.3020E-01	-2.3020E-01	2.639E+02%	2.35E+00
CO-60	#A	5.4119E-01	5.4119E-01	1.080E+02%	1.39E+00
ZN-65	#A	-1.6417E+00	-1.6417E+00	1.332E+02%	7.46E+00
NB-94	#A	2.6055E-01	2.6055E-01	2.245E+02%	1.47E+00
ZR-95	#A	1.0740E+00	1.0740E+00	9.719E+01%	2.56E+00
NB-95	#A	-1.0124E+00	-1.0124E+00	7.102E+01%	2.39E+00
RU-103	#A	4.6060E-01	4.6060E-01	9.773E+01%	1.14E+00
RH-106	#A	-1.0737E+00	-1.0737E+00	8.569E+01%	4.25E+01
AG-108M	#A	6.4004E-01	6.4004E-01	7.411E+01%	1.40E+00
AG-110M	#A	9.0865E-02	9.0866E-02	3.162E+01%	4.06E+00
SN-113	#A	-5.4363E-02	-5.4363E-02	1.545E+03%	2.93E+00
SB-124	#A	1.1938E+00	1.1939E+00	4.472E+01%	3.90E+00
SB-125	#A	-1.7625E+00	-1.7625E+00	1.112E+02%	4.79E+00
I-131	#A	2.6428E-01	2.6429E-01	9.798E+01%	1.40E+00
Gd-153	#A	-1.1269E+00	-1.1269E+00	1.126E+02%	4.24E+00
Ga-68	#A	2.3731E+01	2.3832E+01	1.122E+02%	6.18E+01
Tc-99m	#A	-3.8974E-01	-3.9006E-01	1.197E+02%	1.56E+00
BA-133	#A	6.4558E-01	6.4558E-01	1.943E+02%	4.23E+00
CS-134	#A	8.0516E-01	8.0516E-01	9.411E+01%	4.01E+00
CS-137		3.6433E+00	3.6433E+00	1.812E+01%	1.26E+00

CE-139 #A	1.1097E-01	1.1097E-01	3.672E+02%		1.39E+00
Ba-140 #A	-1.1044E+00	-1.1044E+00	2.615E+02%		6.26E+00
La-140 #A	-6.8134E-01	-6.8135E-01	7.403E+01%		3.06E+00
CE-141 #A	-7.1832E-01	-7.1832E-01	1.078E+02%		2.08E+00
CE-144 #A	-3.3507E+00	-3.3507E+00	1.343E+02%		1.50E+01
PM-144 #A	5.7598E-02	5.7598E-02	1.073E+03%		1.56E+00
EU-152 #A	1.9019E+00	1.9019E+00	1.449E+02%		5.05E+00
EU-154 #A	6.5767E+00	6.5767E+00	6.363E+01%		1.60E+01
EU-155 #A	8.4531E-01	8.4531E-01	1.617E+02%		7.35E+00
HF-181 #A	-3.8762E-01	-3.8762E-01	9.009E+01%		2.41E+00
Ta-182 #A	2.3937E+00	2.3937E+00	1.182E+02%		9.64E+00
Hg-203 #A	4.5909E-01	4.5910E-01	1.013E+02%		1.57E+00
TL-208	8.4032E+00	8.4032E+00	1.054E+01%		1.27E+00
pm-146 #A	-8.6851E-01	-8.6851E-01	2.362E+02%		5.50E+00
y-88 #A	4.1560E-01	4.1560E-01	1.551E+02%		1.58E+00
Cd-113m#A	7.2280E+02	7.2280E+02	8.577E+02%		2.15E+04
Cd-109 #A	8.8510E+00	8.8510E+00	1.796E+02%		5.31E+01
Cf-251 #A	1.6793E+00	1.6793E+00	1.051E+02%		4.78E+00
Cf-249 #A	7.7574E-02	7.7574E-02	6.096E+02%		2.89E+00
Sn-126 A	5.5404E-01	5.5404E-01	8.380E+02%		1.58E+01
PB-210 A	2.4337E+01	2.4337E+01	6.454E+01%		4.06E+01
PB-212	1.8699E+01	1.8699E+01	6.077E+00%		1.82E+00
PB-214	1.6326E+01	1.6326E+01	9.844E+00%		2.78E+00
BI-207 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.59E+00
BI-212 A	9.5443E+00	9.5443E+00	9.395E+01%		3.03E+01
BI-214	1.6174E+01	1.6174E+01	8.788E+00%		1.64E+00
BI-210M#A	-9.1539E-01	-9.1539E-01	9.562E+01%		2.93E+00
AC-228	2.1833E+01	2.1833E+01	8.293E+00%		1.86E+00
TH-227 #A	-1.0941E+00	-1.0941E+00	6.784E+02%		1.96E+01
TH-229 #A	-3.8145E+00	-3.8145E+00	2.198E+02%		2.29E+01
TH-234 #A	2.9008E+00	2.9008E+00	4.475E+02%		3.76E+01
PA-231 #A	-3.4438E+00	-3.4438E+00	6.282E+02%		7.38E+01
PA-233 #A	1.0505E+00	1.0505E+00	1.444E+02%		5.13E+00
PA-234 #A	7.0582E-02	7.0582E-02	8.296E+01%		8.76E+00
PA-234M#A	6.3224E+01	6.3224E+01	8.805E+01%		3.44E+02
U-235 #A	1.4483E-02	1.4483E-02	2.562E+04%		1.26E+01
AM-241 #A	-1.5526E+00	-1.5526E+00	8.617E+01%		4.18E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.66E+01
Ir-192 #A	3.8232E-01	3.8232E-01	1.029E+02%		1.33E+00
Cs-136 #A	4.7179E-01	4.7180E-01	9.273E+01%		1.93E+00
Np-239 #A	1.3029E+00	1.3031E+00	1.508E+02%		6.59E+00
Nd-147 #A	3.1197E+00	3.1198E+00	9.612E+01%		7.65E+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)     3.873E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 3.8727130E+02  Bq/Sample
```

257318_Gamma_160-17797-A-4-B. 5_Gamma_20161269.spc.



Test America St. Louis Spectrum ID: 3_Gamma_20161205

Sample Description: 257318_Gamma_160-17797-A-5-B
Detector: Detector # 3
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-5-B

Decay to Time: 7/12/2016 10:33 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:33:13 Real Time: 1803 sec
Analysis Time: 7/12/2016 11:03 Dead Time: 0.17 %
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_2016-07-10_0602.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	0.000E+00	1.#INF	1.174E+00	1.174E+00	1.511E+01
NA-22	-2.635E-01	180.2	4.749E-01	4.751E-01	1.673E+00
K-40	2.658E+02	5.0	1.325E+01	1.899E+01	1.037E+01
Sc-46	6.959E-01	91.8	6.387E-01	6.397E-01	2.145E+00
CR-51	-1.681E-01	2754.6	4.630E+00	4.630E+00	2.098E+01
MN-54	1.117E-01	323.1	3.611E-01	3.611E-01	9.084E-01
FE-59	1.558E-01	246.9	3.845E-01	3.846E-01	2.568E+00
Co-56	4.652E-01	102.7	4.779E-01	4.785E-01	1.217E+00
CO-57	0.000E+00	1.#INF	9.217E-02	9.217E-02	1.033E+00
CO-58	-2.017E-01	253.5	5.114E-01	5.115E-01	1.774E+00
CO-60	1.613E-01	315.1	5.083E-01	5.084E-01	1.162E+00
ZN-65	-2.331E-02	6106.5	1.423E+00	1.423E+00	4.981E+00
NB-94	-7.102E-01	101.4	7.200E-01	7.209E-01	1.645E+00
ZR-95	-1.099E+00	102.2	1.124E+00	1.125E+00	2.589E+00
NB-95	-7.154E-01	73.4	5.253E-01	5.266E-01	1.748E+00
RU-103	1.842E-01	226.4	4.171E-01	4.172E-01	1.066E+00
RH-106	2.728E+00	103.9	2.835E+00	2.838E+00	7.095E+00
AG-108M	6.647E-02	81.2	5.398E-02	5.408E-02	1.239E+00
AG-110M	1.275E+00	72.0	9.172E-01	9.195E-01	3.202E+00
SN-113	-1.795E-01	458.1	8.224E-01	8.224E-01	2.632E+00
SB-124	-8.470E-03	71.2	6.026E-03	6.043E-03	3.303E+00
SB-125	3.651E-01	106.6	3.893E-01	3.897E-01	3.938E+00
I-131	-4.389E-01	96.0	4.215E-01	4.221E-01	1.509E+00
Gd-153	-1.081E+00	146.3	1.582E+00	1.583E+00	5.276E+00
Ga-68	-3.742E+01	86.5	3.236E+01	3.242E+01	6.916E+01
Tc-99m	3.049E-01	120.9	3.685E-01	3.689E-01	1.234E+00
BA-133	-2.536E-01	411.9	1.045E+00	1.045E+00	3.530E+00
CS-134	4.745E-01	81.0	3.845E-01	3.853E-01	3.265E+00
CS-137	3.061E+00	13.5	4.145E-01	4.440E-01	7.689E-01
CE-139	3.856E-01	102.3	3.943E-01	3.960E-01	1.318E+00
Ba-140	2.259E+00	76.6	1.730E+00	1.733E+00	3.938E+00
La-140	2.831E-01	109.5	3.101E-01	3.105E-01	1.710E+00
CE-141	-6.491E-01	120.1	7.793E-01	7.800E-01	2.604E+00

CE-144	-2.985E+00	127.4	3.804E+00	3.807E+00	1.269E+01
PM-144	-4.579E-01	68.4	3.134E-01	3.143E-01	1.570E+00
EU-152	1.778E+00	103.5	1.841E+00	1.843E+00	6.787E+00
EU-154	3.432E+00	64.3	2.207E+00	2.214E+00	1.315E+01
EU-155	4.394E-01	439.1	1.930E+00	1.930E+00	6.489E+00
HF-181	0.000E+00	1.#INF	2.522E-01	2.522E-01	1.988E+00
Ta-182	3.915E-01	106.4	4.165E-01	4.169E-01	6.565E+00
Hg-203	-1.329E-01	220.1	2.925E-01	2.926E-01	1.436E+00
TL-208	8.524E+00	8.9	7.545E-01	8.746E-01	1.041E+00
pm-146	2.975E-01	158.8	4.723E-01	4.726E-01	3.925E+00
y-88	-4.461E-01	148.3	6.616E-01	6.619E-01	1.501E+00
Cd-113m	5.109E+03	101.9	5.208E+03	5.218E+03	1.750E+04
Cd-109	-3.555E+00	377.3	1.341E+01	1.341E+01	4.495E+01
Cf-251	3.725E-01	482.5	1.797E+00	1.798E+00	4.916E+00
Cf-249	9.324E-01	78.3	7.298E-01	7.314E-01	2.400E+00
Sn-126	-4.109E-01	1105.6	4.543E+00	4.543E+00	1.539E+01
PB-210	2.912E+01	31.5	9.166E+00	9.324E+00	2.489E+01
PB-212	2.097E+01	5.2	1.082E+00	1.736E+00	1.914E+00
PB-214	1.676E+01	7.5	1.251E+00	1.524E+00	2.124E+00
BI-207	-1.796E-02	136.0	2.444E-02	2.445E-02	1.271E+00
BI-212	3.738E+00	202.1	7.554E+00	7.557E+00	2.586E+01
BI-214	1.400E+01	9.9	1.393E+00	1.571E+00	2.324E+00
BI-210M	2.723E-01	235.6	6.417E-01	6.419E-01	2.190E+00
AC-228	2.083E+01	7.9	1.653E+00	1.965E+00	2.761E+00
TH-227	-8.194E-01	84.9	6.957E-01	6.972E-01	2.493E+01
TH-229	1.461E-01	89.6	1.309E-01	1.314E-01	2.019E+01
TH-234	8.161E+00	41.5	3.387E+00	3.414E+00	3.529E+01
PA-231	6.579E+00	164.3	1.081E+01	1.082E+01	7.018E+01
PA-233	8.235E-01	234.6	1.932E+00	1.933E+00	5.654E+00
PA-234	-3.263E-01	87.4	2.851E-01	2.856E-01	7.399E+00
PA-234M	-3.794E+01	59.5	2.256E+01	2.264E+01	3.249E+02
U-235	6.616E-01	457.7	3.028E+00	3.028E+00	1.025E+01
AM-241	-9.564E-01	149.5	1.430E+00	1.430E+00	3.833E+00
Np-237	-2.630E+00	163.0	4.288E+00	4.290E+00	1.429E+01
Ir-192	0.000E+00	1.#INF	1.540E-01	1.540E-01	2.375E+00
Cs-136	3.753E-01	134.6	5.049E-01	5.054E-01	1.727E+00
Np-239	-1.299E+00	149.0	1.935E+00	1.937E+00	6.462E+00
Nd-147	-4.836E-01	739.4	3.575E+00	3.576E+00	8.780E+00
Total	5.526E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-5-B

Spectrum Filename: C:\User\SPC\Det3\3_Gamma_20161205.An1

Acquisition information
Start time: 7/12/2016 10:33:13 AM
Live time: 1800
Real time: 1803
Dead time: 0.17 %
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	7/12/2016 10:33:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	3_2016-07-10_0602.PBC 7/10/2016 6:02:16 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 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
46.13	49.	31.48	1.00	2.214E-02	46.54	4.250	2.912E+01	PB210
63.18	28.	61.90	0.68	3.410E-02	63.29	3.810	PBC<MDA	TH234
74.82	211.	12.32	0.85	3.992E-02				
77.02	314.	8.07	0.85	4.078E-02				
87.14	90.	20.57	0.86	4.384E-02	86.49	13.100	8.707E+00	Np237
					86.54	30.700	3.714E+00	EU155
					86.94	9.040	1.259E+01	Sn126
					87.57	37.500	3.024E+00	Sn126
89.81	68.	25.73	0.86	4.441E-02				
92.57	51.	41.50	0.87	4.491E-02	92.59	5.584	PBC<MDA	TH234
93.33	27.	144.30	0.87	4.503E-02	93.35	5.561	PBC<MDA	AC228
105.31	8.	439.12	0.88	4.612E-02	105.31	21.200	PBC<MDA	EU155
140.51	21.	120.86	0.92	4.337E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	6.	457.70	0.92	4.285E-02	143.79	10.960	PBC<MDA	U235
162.66	21.	115.61	0.94	3.943E-02	162.66	6.220	PBC<MDA	Ba140
165.10	22.	102.25	0.94	3.963E-02	165.85	79.900	PBC<MDA	CE139
176.60	4.	482.47	0.95	3.802E-02	176.60	17.000	PBC<MDA	Cf251
210.85	17.	132.90	0.99	3.376E-02	210.85	2.990	PBC<MDA	TH229
227.00	4.	580.36	1.00	3.212E-02	227.00	6.300	PBC<MDA	Cf251
238.67	479.	5.88	0.87	3.105E-02	238.63	43.300	1.980E+01	PB212
242.05	91.	16.25	1.02	3.075E-02	242.00	7.430	2.222E+01	PB214
256.24	17.	102.55	1.03	2.957E-02	256.24	7.000	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
263.70	16.	101.93	1.04	2.900E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	7.	235.64	1.04	2.884E-02	265.83	50.000	PBC<MDA	BI210M
277.37	31.	38.02	1.30	2.801E-02	277.28	6.310	9.823E+00	TL208
284.30	7.	260.60	1.06	2.753E-02	284.30	6.140	PBC<MDA	I131
295.18	166.	12.63	1.01	2.683E-02	295.09	19.300	1.780E+01	PB214
300.07	17.	164.31	1.08	2.652E-02				
300.18	12.	234.64	1.08	2.651E-02				
300.75	17.	160.68	1.08	2.652E-02	300.03	3.280	PBC<MDA	PB212
312.03	4.	621.23	1.09	2.581E-02	312.01	36.000	PBC<MDA	PA233
328.76	15.	109.55	1.11	2.489E-02	328.76	20.300	PBC<MDA	La140
333.44	16.	105.34	1.11	2.464E-02	333.44	15.510	PBC<MDA	Cf249
338.36	106.	15.53	1.20	2.439E-02	338.32	12.010	2.008E+01	AC228
352.01	261.	7.96	1.11	2.372E-02	351.93	37.600	1.623E+01	PB214
383.84	16.	110.73	1.16	2.231E-02	383.84	8.940	PBC<MDA	BA133
387.95	16.	115.80	1.17	2.215E-02	387.95	66.000	PBC<MDA	Cf249
453.88	8.	158.77	1.23	1.980E-02	453.88	65.000	PBC<MDA	pm146
463.37	4.	385.09	1.24	1.951E-02	463.37	10.470	PBC<MDA	SB125
497.05	6.	226.42	1.27	1.854E-02	497.05	90.900	PBC<MDA	RU103
511.86	75.	38.15	2.54	1.815E-02	511.86	20.000	1.143E+01	RH106
537.26	13.	100.46	1.31	1.752E-02	537.26	24.390	PBC<MDA	Ba140
563.24	3.	428.82	1.34	1.693E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	354.44	1.34	1.680E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.076E+00	PA234
					569.70	97.740	PBC<MDA	BI207
569.47	7.	125.47	1.34	1.679E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.958E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.33	214.	8.54	1.43	1.650E-02	583.02	84.500	8.312E+00	TL208
609.57	186.	9.95	1.12	1.598E-02	609.31	46.090	1.400E+01	BI214
					610.30	5.750	1.124E+02	RU103
621.92	8.	103.90	1.39	1.574E-02	621.92	9.930	PBC<MDA	RH106
635.89	8.	106.63	1.41	1.549E-02	635.89	11.310	PBC<MDA	SB125
661.79	71.	13.54	1.43	1.504E-02	661.66	85.210	3.061E+00	CS137
722.79	14.	81.49	1.49	1.408E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.944E-01	AG108M
					723.36	20.220	2.671E+00	EU154
722.94	14.	89.99	1.49	1.408E-02	722.79	10.810	4.995E+00	SB124
					722.94	90.840	5.945E-01	AG108M
					723.36	20.220	2.672E+00	EU154
723.36	14.	97.76	1.49	1.408E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.946E-01	AG108M
					723.36	20.220	2.672E+00	EU154
726.54	7.	202.08	1.49	1.402E-02	727.17	7.550	PBC<MDA	BI212
747.16	2.	799.26	1.51	1.374E-02	747.16	34.000	PBC<MDA	pm146
763.71	2.	401.27	1.53	1.351E-02	763.94	22.280	PBC<MDA	AG110M
766.41	13.	83.81	1.53	1.348E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.825E+02	PA234M
778.92	9.	103.51	1.54	1.332E-02	778.92	12.940	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.42	11.	90.55	1.55	1.323E-02	785.42	1.280	PBC<MDA	BI212
795.87	13.	81.04	1.56	1.310E-02	795.87	85.530	PBC<MDA	CS134
801.95	8.	158.74	1.56	1.303E-02	801.95	8.690	PBC<MDA	CS134
818.50	9.	134.56	1.58	1.283E-02	818.50	100.000	PBC<MDA	Cs136
834.85	3.	323.13	1.59	1.264E-02	834.85	99.980	PBC<MDA	MN54
860.63	26.	25.58	1.25	1.236E-02	860.56	12.420	9.307E+00	TL208
873.23	13.	83.53	1.63	1.222E-02	873.23	12.270	PBC<MDA	EU154
882.41	16.	93.83	1.64	1.210E-02	884.68	72.680	PBC<MDA	AG110M
889.28	15.	91.78	1.64	1.205E-02	889.28	99.984	PBC<MDA	Sc46
911.39	128.	9.99	1.56	1.183E-02	911.07	29.000	2.065E+01	AC228
946.02	2.	354.73	1.69	1.150E-02	946.02	13.400	PBC<MDA	PA234
964.11	12.	144.53	1.71	1.133E-02	964.11	14.605	PBC<MDA	EU152
969.46	77.	15.02	1.85	1.129E-02	968.97	17.460	2.165E+01	AC228
1037.84	3.	332.78	1.77	1.071E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	4.	216.59	1.80	1.051E-02	1063.66	74.500	PBC<MDA	BI207
1120.86	53.	16.72	1.95	1.010E-02	1120.29	15.100	1.923E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.327E+00	Ta182
1189.05	9.	106.38	1.91	9.648E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	13.	102.72	1.95	9.349E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	4.	246.86	1.99	9.048E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	315.09	2.03	8.830E-03	1332.50	99.980	PBC<MDA	CO60
1383.81	8.	109.13	2.07	8.571E-03	1384.30	24.290	PBC<MDA	AG110M
1461.05	419.	4.99	1.72	8.216E-03	1460.83	10.670	2.658E+02	K40
1690.98	1.	945.38	2.32	7.319E-03	1690.98	47.790	PBC<MDA	SB124
1764.56	42.	17.12	2.37	7.075E-03	1764.49	15.400	2.153E+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	
299.04	74.78	229.	211.	5.276E+03	12.32	0.848	-	D
307.83	76.98	165.	314.	7.708E+03	8.07	0.850	-	D
348.18	87.12	126.	89.	2.037E+03	20.68	0.861	-	D
358.86	89.79	125.	74.	1.667E+03	24.31	0.863	-	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	184.17	46.13	72.	49.	0.027	31.48	1.003s
TH-227	200.24	50.14	350.	-20.	-0.011	135.34	0.822s
AM-241	237.85	59.54	267.	-20.	-0.011	149.47	0.832
TH-234	252.87	63.29	295.	9.	0.005	353.82	0.836
BA-133	323.73	80.99	361.	-32.	-0.018	81.27	0.854s
Np-237	345.75	86.49	962.	-27.	-0.015	163.04	0.860
EU-155	345.96	86.54	890.	-28.	-0.016	152.40	0.860s
Sn-126	347.55	86.94	863.	-28.	-0.016	149.94	0.860
Sn-126	350.08	87.57	835.	-28.	-0.016	147.44	0.861
Cd-109	351.96	88.04	807.	-11.	-0.006	377.27	0.862
Nd-147	364.21	91.10	796.	0.	0.000	1000.00	0.865s
TH-234	370.17	92.59	193.	51.	0.028	41.50	0.866D
AC-228	373.21	93.35	772.	27.	0.015	144.30	0.867s
Gd-153	389.83	97.50	744.	-27.	-0.015	146.33	0.871
Np-239	397.83	99.50	279.	-6.	-0.004	371.07	0.873s
Gd-153	412.64	103.20	777.	-27.	-0.015	148.48	0.877
Np-239	414.64	103.70	804.	-27.	-0.015	150.88	0.878s
EU-155	421.10	105.31	572.	8.	0.004	439.12	0.879s
Np-239	424.37	106.13	654.	-24.	-0.014	148.95	0.880s
EU-152	487.00	121.78	215.	-11.	-0.006	196.65	0.896s
CO-57	488.14	122.06	225.	0.	0.000	1000.00	0.897s
EU-154	492.30	123.10	211.	-5.	-0.003	387.30	0.898s
PA-234	525.11	131.29	502.	-26.	-0.015	121.65	0.906s
HF-181	532.03	133.02	528.	-26.	-0.015	124.48	0.908s
CE-144	534.09	133.54	554.	-26.	-0.015	127.42	0.909s
HF-181	545.14	136.30	581.	-27.	-0.015	129.95	0.911s
CO-57	545.83	136.47	639.	-28.	-0.016	129.00	0.912s
Tc-99m	561.99	140.51	301.	21.	0.011	120.86	0.916s
U-235	575.10	143.79	324.	6.	0.003	457.70	0.919s
CE-141	581.73	145.44	402.	-24.	-0.013	120.07	0.921s
Ba-140	650.65	162.66	282.	21.	0.012	115.61	0.939s
U-235	653.53	163.38	249.	-25.	-0.014	104.31	0.939s
CE-139	663.43	165.85	241.	22.	0.012	102.25	0.942
Cf-251	706.45	176.60	137.	4.	0.002	482.47	0.953s
TH-229	774.13	193.51	137.	-18.	-0.010	120.13	0.970s
U-235	821.46	205.33	170.	-8.	-0.004	327.89	0.982s
TH-229	843.54	210.85	147.	17.	0.010	132.90	0.988s
Cf-251	908.18	227.00	128.	4.	0.002	580.36	1.004s
PB-212	954.74	238.63	88.	508.	0.282	5.16	1.016D
PB-214	968.20	242.00	65.	91.	0.051	16.25	1.019D
EU-152	978.99	244.69	932.	-23.	-0.013	188.56	1.022s
TH-227	1025.21	256.24	81.	17.	0.009	102.55	1.034s
Cd-113m	1055.07	263.70	125.	16.	0.009	101.93	1.041s
BI-210M	1063.60	265.83	135.	7.	0.004	235.64	1.044s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1109.78	277.37	37.	31.	0.017	38.02	1.299s
Hg-203	1117.10	279.20	144.	-5.	-0.003	220.10	1.057s
I-131	1137.51	284.30	84.	7.	0.004	260.60	1.062s
PB-214	1181.06	295.18	67.	166.	0.092	12.63	1.012
PB-212	1200.47	300.03	354.	17.	0.009	160.68	1.078s
PA-231	1200.63	300.07	371.	17.	0.009	164.31	1.078s
PA-233	1201.07	300.18	388.	12.	0.007	234.64	1.078
PA-231	1210.95	302.65	400.	0.	0.000	1000.00	1.081s
Ba-140	1219.75	304.85	393.	0.	0.000	1000.00	1.083s
BI-210M	1219.94	304.90	393.	0.	0.000	1000.00	1.083s
Ir-192	1234.12	308.44	393.	0.	0.000	1000.00	1.086
PA-233	1248.42	312.01	388.	4.	0.002	621.23	1.090s
Ir-192	1266.34	316.49	393.	0.	0.000	1000.00	1.094s
La-140	1315.45	328.76	72.	15.	0.008	109.55	1.107s
Cf-249	1334.18	333.44	73.	16.	0.009	105.34	1.111s
AC-228	1353.87	338.36	43.	106.	0.059	15.53	1.197
Cs-136	1362.71	340.57	265.	-4.	-0.002	554.86	1.119s
EU-152	1377.58	344.29	261.	0.	0.000	1000.00	1.122s
HF-181	1383.75	345.83	261.	0.	0.000	1000.00	1.124s
PB-214	1408.50	352.01	45.	261.	0.145	7.96	1.110
BA-133	1424.46	356.00	374.	-7.	-0.004	411.89	1.134s
I-131	1458.41	364.48	109.	-22.	-0.012	96.04	1.142s
BA-133	1535.87	383.84	152.	16.	0.009	110.73	1.162s
Cf-249	1552.32	387.95	168.	16.	0.009	115.80	1.165s
SN-113	1567.28	391.69	189.	-5.	-0.003	458.09	1.169s
SB-125	1712.08	427.88	76.	-8.	-0.004	216.27	1.205s
AG-108M	1736.34	433.94	68.	-15.	-0.009	135.21	1.211s
pm-146	1816.14	453.88	40.	8.	0.004	158.77	1.230s
SB-125	1854.10	463.37	108.	4.	0.002	385.09	1.240s
Ir-192	1872.88	468.06	126.	-17.	-0.010	94.80	1.244s
BE-7	1911.04	477.60	124.	0.	0.000	1000.00	1.254s
HF-181	1928.65	482.00	124.	0.	0.000	1000.00	1.258
La-140	1948.75	487.02	155.	-17.	-0.009	106.32	1.263s
RU-103	1988.90	497.05	40.	6.	0.003	226.42	1.273s
RH-106	2048.16	511.86	113.	75.	0.041	38.15	2.537
Nd-147	2124.72	531.00	52.	-2.	-0.001	739.37	1.306s
Ba-140	2149.77	537.26	35.	13.	0.007	100.46	1.312s
CS-134	2253.70	563.24	39.	3.	0.002	428.82	1.337s
CS-134	2278.04	569.32	43.	3.	0.001	354.44	1.342s
PA-234	2278.64	569.47	39.	7.	0.004	125.47	1.343s
BI-207	2279.57	569.70	56.	-8.	-0.004	164.66	1.343s
TL-208	2334.08	583.33	25.	209.	0.116	8.85	1.426
SB-125	2402.79	600.50	401.	-17.	-0.009	111.38	1.372s
SB-124	2411.71	602.73	385.	-16.	-0.009	116.67	1.374s
BI-214	2439.06	609.57	36.	186.	0.103	9.95	1.119
RU-103	2441.99	610.30	399.	-16.	-0.009	178.99	1.382s
AG-108M	2457.92	614.28	383.	-16.	-0.009	177.54	1.385
RH-106	2488.47	621.92	14.	8.	0.004	103.90	1.392s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2544.37	635.89	34.	8.	0.005	106.63	1.406s
AG-110M	2631.87	657.76	137.	-13.	-0.007	134.13	1.427s
CS-137	2647.47	661.66	10.	71.	0.039	13.54	1.430D
PM-144	2787.02	696.54	66.	-12.	-0.007	68.45	1.463s
NB-94	2811.37	702.63	70.	-18.	-0.010	101.38	1.469
SB-124	2892.00	722.79	55.	14.	0.008	81.49	1.488s
AG-108M	2892.61	722.94	69.	14.	0.008	89.99	1.488s
EU-154	2894.28	723.36	83.	14.	0.008	97.76	1.488s
ZR-95	2897.65	724.20	198.	-27.	-0.015	29.99	1.489s
BI-212	2909.54	727.17	100.	7.	0.004	202.08	1.492s
pm-146	2943.74	735.72	37.	-5.	-0.003	246.86	1.500s
pm-146	2989.50	747.16	42.	2.	0.001	799.26	1.510s
ZR-95	3027.78	756.73	47.	-15.	-0.008	102.20	1.519s
AG-110M	3056.63	763.94	43.	2.	0.001	401.27	1.526s
NB-95	3064.02	765.79	72.	-17.	-0.010	73.43	1.528s
PA-234M	3066.51	766.41	53.	13.	0.007	83.81	1.528s
EU-152	3116.54	778.92	19.	9.	0.005	103.51	1.540s
BI-212	3142.54	785.42	19.	11.	0.006	90.55	1.546
CS-134	3184.33	795.87	51.	13.	0.007	81.04	1.556s
CS-134	3208.67	801.95	75.	8.	0.004	158.74	1.561s
CO-58	3243.96	810.78	68.	-5.	-0.003	253.55	1.569s
La-140	3263.94	815.77	72.	0.	0.000	1000.00	1.574s
Cs-136	3274.86	818.50	64.	9.	0.005	134.56	1.576s
MN-54	3340.25	834.85	15.	3.	0.001	323.13	1.591s
Co-56	3387.93	846.77	28.	-2.	-0.001	407.10	1.602s
TL-208	3443.37	860.63	4.	26.	0.014	25.58	1.252
NB-94	3485.23	871.10	56.	-17.	-0.009	66.76	1.625s
EU-154	3493.77	873.23	49.	13.	0.007	83.53	1.627s
PA-234	3522.96	880.53	104.	-16.	-0.009	93.22	1.633s
PA-234	3533.80	883.24	83.	-13.	-0.007	105.76	1.636s
AG-110M	3539.58	884.68	106.	16.	0.009	93.83	1.637s
Sc-46	3557.96	889.28	88.	15.	0.008	91.78	1.641s
y-88	3593.00	898.04	35.	-9.	-0.005	148.31	1.649s
AC-228	3646.40	911.39	9.	128.	0.071	9.99	1.563
AG-110M	3750.78	937.49	55.	-19.	-0.011	88.83	1.685s
PA-234	3784.89	946.02	10.	2.	0.001	354.73	1.692s
EU-152	3857.23	964.11	136.	12.	0.006	144.53	1.709s
AC-228	3878.65	969.46	13.	77.	0.043	15.02	1.851s
EU-154	3986.08	996.33	102.	-19.	-0.011	78.10	1.737s
PA-234M	4004.75	1001.00	121.	-19.	-0.011	84.34	1.742
EU-154	4019.86	1004.77	134.	-6.	-0.003	287.41	1.745s
Co-56	4152.08	1037.84	20.	3.	0.002	332.78	1.774s
Cs-136	4192.99	1048.07	50.	-20.	-0.011	55.80	1.783s
RH-106	4202.15	1050.36	98.	-21.	-0.012	68.49	1.785s
BI-207	4255.33	1063.66	17.	4.	0.002	216.59	1.797
Ga-68	4310.28	1077.40	53.	-20.	-0.011	86.45	1.809s
FE-59	4397.65	1099.25	27.	-2.	-0.001	708.52	1.828s
EU-152	4448.93	1112.07	99.	-13.	-0.007	113.56	1.839s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4484.07	1120.86	5.	53.	0.029	16.72	1.948
Sc-46	4482.82	1120.55	76.	-13.	-0.007	100.09	1.847
Ta-182	4485.82	1121.30	70.	-6.	-0.003	208.51	1.847
CO-60	4693.48	1173.24	37.	-1.	-0.001	640.31	1.892s
Ta-182	4756.71	1189.05	16.	9.	0.005	106.38	1.906
Co-56	4953.53	1238.28	32.	13.	0.007	102.72	1.948s
NA-22	5098.46	1274.53	28.	-4.	-0.002	180.24	1.979s
EU-154	5098.51	1274.54	39.	-6.	-0.003	162.06	1.979s
FE-59	5166.69	1291.60	17.	4.	0.002	246.86	1.993s
CO-60	5330.21	1332.50	11.	3.	0.001	315.09	2.028
AG-110M	5537.27	1384.30	11.	8.	0.004	109.13	2.071s
EU-152	5632.02	1408.00	23.	-12.	-0.006	100.08	2.090s
K-40	5844.07	1461.05	9.	419.	0.233	4.99	1.719
SB-124	6763.00	1690.98	6.	1.	0.000	945.38	2.317s
BI-214	7056.73	1764.49	5.	42.	0.023	17.12	2.373s
Co-56	7084.14	1771.35	47.	0.	0.000	1000.00	2.379s

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
NA-22	C	-2.6350E-01				9.50E+02	
			1274.53	-2.635E-01	?(	1.673E+00 1.80E+02 9.99E+01	G
K-40	N	2.6578E+02				4.66E+11	
			1460.83	2.658E+02	(P	1.037E+01 4.99E+00 1.07E+01	G
Sc-46	F	6.9587E-01				8.38E+01	
			889.28	6.959E-01	?(	2.145E+00 9.18E+01 1.00E+02	G
			1120.55	-7.061E-01	-	2.386E+00 1.00E+02 1.00E+02	G
CR-51	F	-1.6808E-01				2.77E+01	
			320.08	-1.681E-01	%(P	2.098E+01 2.75E+03 9.94E+00	G
MN-54	C	1.1174E-01				3.12E+02	
			834.85	1.117E-01	?(P	9.084E-01 3.23E+02 1.00E+02	G
FE-59	F	1.5576E-01				4.45E+01	
			1099.25	-1.599E-01	?(	2.568E+00 7.09E+02 5.65E+01	G
			1291.60	5.686E-01	?(	3.116E+00 2.47E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 4.6524E-01					7.73E+01	
		846.77	-9.005E-02	?(P	1.217E+00	4.07E+02	9.99E+01 G
		1238.28	1.169E+00	?(	2.615E+00	1.03E+02	6.61E+01 G
		1037.84	1.101E+00	?(	8.642E+00	3.33E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.763E+01	1.00E+03	1.55E+01 A
CO-58	C -2.0171E-01					7.09E+01	
		810.78	-2.017E-01	?(	1.774E+00	2.54E+02	9.95E+01 G
CO-60	F 1.6132E-01					1.93E+03	
		1332.50	1.613E-01	?(P	1.162E+00	3.15E+02	1.00E+02 G
		1173.24	-7.890E-02	+ P	1.780E+00	6.40E+02	9.99E+01 G
ZN-65	F -2.3309E-02					2.44E+02	
		1115.55	-2.331E-02	%(	4.981E+00	6.11E+03	5.06E+01 G
NB-94	I -7.1016E-01					7.41E+06	
		702.63	-7.102E-01	?(	1.645E+00	1.01E+02	9.79E+01 G
		871.10	-7.697E-01	+	1.700E+00	6.68E+01	9.99E+01 G
ZR-95	I -1.0994E+00					6.40E+01	
		756.73	-1.099E+00	&(	2.589E+00	1.02E+02	5.45E+01 G
		724.20	-2.432E+00	+ P	6.115E+00	3.00E+01	4.42E+01 G
NB-95	I -7.1542E-01					6.40E+01	
		765.79	-7.154E-01	?(	1.748E+00	7.34E+01	9.98E+01 G
RU-103	I 1.8420E-01					3.93E+01	
		497.05	1.842E-01	(P	1.066E+00	2.26E+02	9.09E+01 G
		610.30	-9.643E+00	+	5.796E+01	1.79E+02	5.75E+00 GA
RH-106	I 2.7281E+00					3.74E+02	
		621.92	2.728E+00	&(P	7.095E+00	1.04E+02	9.93E+00 G
		1050.36	-7.210E+01	+	1.635E+02	6.85E+01	1.56E+00 G
		511.86	1.143E+01		8.006E+00	3.81E+01	2.00E+01 GA
AG-108M	C 6.6466E-02					1.53E+05	
		433.94	-4.636E-01	&(P	1.239E+00	1.35E+02	9.05E+01 G
		722.94	5.945E-01	?(	1.799E+00	9.00E+01	9.08E+01 G
		614.28	-6.127E-01	+	3.654E+00	1.78E+02	8.98E+01 G
AG-110M	F 1.2746E+00					2.50E+02	
		884.68	1.017E+00	&(	3.202E+00	9.38E+01	7.27E+01 G
		657.76	-4.898E-01	-	2.222E+00	1.34E+02	9.46E+01 G
		937.49	-2.653E+00	+	5.204E+00	8.88E+01	3.44E+01 G
		1384.30	2.046E+00	?(	4.910E+00	1.09E+02	2.43E+01 G
		763.94	4.306E-01	-	6.117E+00	4.01E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-1.7953E-01					1.15E+02	
			391.69	-1.795E-01	&(P	2.632E+00	4.58E+02	6.40E+01 G
SB-124	F	-8.4697E-03					6.02E+01	
			602.73	-5.588E-01	?(P	3.303E+00	1.17E+02	9.83E+01 G
			1690.98	1.059E-01	+	2.293E+00	9.45E+02	4.78E+01 G
			722.79	4.994E+00	?(	1.364E+01	8.15E+01	1.08E+01 G
SB-125	I	3.6505E-01					1.01E+03	
			427.88	-7.270E-01	?(	3.938E+00	2.16E+02	2.96E+01 G
			600.50	-3.206E+00	& P	1.850E+01	1.11E+02	1.79E+01 G
			635.89	2.590E+00	(	9.457E+00	1.07E+02	1.13E+01 G
			463.37	1.049E+00	&(P	1.392E+01	3.85E+02	1.05E+01 G
I-131	I	-4.3885E-01					8.02E+00	
			364.48	-6.365E-01	*(P	1.509E+00	9.60E+01	8.17E+01 G
			284.30	2.191E+00	&(	1.495E+01	2.61E+02	6.14E+00 G
			636.97	-1.670E-01	%	1.690E+01	2.83E+03	7.17E+00 G
Gd-153	F	-1.0810E+00					2.42E+02	
			97.50	-1.081E+00	(	5.276E+00	1.46E+02	3.00E+01 G
			103.20	-1.483E+00	+	7.343E+00	1.48E+02	2.18E+01 G
Ga-68	C	-3.7424E+01					4.71E-02	
			1077.40	-3.742E+01	?(	6.916E+01	8.65E+01	3.30E+00 G
Tc-99m	I	3.0492E-01					2.51E-01	
			140.51	3.049E-01	(	1.234E+00	1.21E+02	8.93E+01 G
BA-133	F	-2.5364E-01					3.85E+03	
			356.00	-2.536E-01	?(	3.530E+00	4.12E+02	6.20E+01 G
			302.85	-3.834E-02	%	1.094E+01	8.42E+03	1.83E+01 G
			383.84	4.500E+00	?	1.676E+01	1.11E+02	8.94E+00 GA
			80.99	-1.239E+00	+ P	3.530E+00	8.13E+01	3.41E+01 GA
CS-134	I	4.7449E-01					7.54E+02	
			604.71	-6.460E-02	%(	3.265E+00	1.49E+03	9.76E+01 G
			795.87	6.566E-01	?(	1.784E+00	8.10E+01	8.55E+01 G
			569.32	5.734E-01	?(	7.179E+00	3.54E+02	1.54E+01 G
			801.95	3.886E+00	?(	2.114E+01	1.59E+02	8.69E+00 G
			563.24	1.179E+00	?(	1.250E+01	4.29E+02	8.35E+00 G
CS-137	I	3.0609E+00					1.10E+04	
			661.66	3.061E+00	(	7.689E-01	1.35E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.8558E-01					1.38E+02	
			165.85	3.856E-01	&(	1.318E+00	1.02E+02	7.99E+01 G
Ba-140	I	2.2585E+00					1.28E+01	
			537.26	1.627E+00	?(P	3.938E+00	1.00E+02	2.44E+01 G
			162.66	4.736E+00	(	1.833E+01	1.16E+02	6.22E+00 G
			304.85	0.000E+00	-	4.694E+01	1.00E+03	4.29E+00 G
La-140	I	2.8308E-01					1.28E+01	
			1596.21	-3.099E-03	%(P	1.710E+00	5.13E+04	9.54E+01 G
			487.02	-1.104E+00	+	3.940E+00	1.06E+02	4.55E+01 G
			328.76	1.628E+00	&(P	4.636E+00	1.10E+02	2.03E+01 G
			815.77	0.000E+00	-	7.856E+00	1.00E+03	2.33E+01 G
CE-141	I	-6.4908E-01					3.25E+01	
			145.44	-6.491E-01	&(	2.604E+00	1.20E+02	4.82E+01 G
CE-144	I	-2.9851E+00					2.85E+02	
			133.54	-2.985E+00	?(	1.269E+01	1.27E+02	1.11E+01 G
PM-144	C	-4.5789E-01					3.63E+02	
			696.54	-4.579E-01	?(P	1.570E+00	6.84E+01	9.90E+01 G
			618.06	-3.455E-02	% P	3.265E+00	1.90E+03	9.91E+01 G
EU-152	F	1.7785E+00					4.94E+03	
			344.29	0.000E+00	?(	6.787E+00	1.00E+03	2.65E+01 G
			1112.07	-5.124E+00	&	1.967E+01	1.14E+02	1.36E+01 G
			121.78	-4.541E-01	+	3.022E+00	1.97E+02	2.86E+01 G
			778.92	3.009E+00	?(	7.364E+00	1.04E+02	1.29E+01 G
			964.11	3.915E+00	?(	1.917E+01	1.45E+02	1.46E+01 G
			244.69	-5.533E+00	+	3.482E+01	1.89E+02	7.58E+00 G
			1408.00	-3.648E+00	+	7.786E+00	1.00E+02	2.10E+01 GA
EU-154	I	3.4323E+00					3.14E+03	
			873.23	4.685E+00	&(	1.315E+01	8.35E+01	1.23E+01 G
			123.10	-1.595E-01	-	2.104E+00	3.87E+02	4.08E+01 G
			1274.54	-9.786E-01	-	5.515E+00	1.62E+02	3.52E+01 G
			723.36	2.672E+00	?(	8.802E+00	9.78E+01	2.02E+01 G
			1004.77	-1.618E+00	-	1.593E+01	2.87E+02	1.80E+01 G
			996.33	-9.054E+00	+	2.356E+01	7.81E+01	1.06E+01 G
EU-155	I	4.3942E-01					1.81E+03	
			105.31	4.394E-01	(P	6.489E+00	4.39E+02	2.12E+01 G
			86.54	-1.156E+00	+	5.870E+00	1.52E+02	3.07E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F 3.9150E-01					1.14E+02	
		1121.30	-9.117E-01	(	6.565E+00	2.09E+02	3.49E+01 G
		1221.41	7.258E-02	%	5.830E+00	3.53E+03	2.70E+01 G
		1189.05	3.199E+00	(	7.589E+00	1.06E+02	1.62E+01 G
Hg-203	F -1.3288E-01					4.66E+01	
		279.20	-1.329E-01	?(P	1.436E+00	2.20E+02	8.15E+01 G
TL-208	N 8.5242E+00					6.98E+02	
		583.02	8.312E+00	(P	1.041E+00	8.85E+00	8.45E+01 G
		277.28	9.823E+00	(P	9.731E+00	3.80E+01	6.31E+00 G
		860.56	9.307E+00	(P	4.476E+00	2.56E+01	1.24E+01 G
pm-146	C 2.9748E-01					2.02E+03	
		747.16	2.059E-01	?(P	3.925E+00	7.99E+02	3.40E+01 G
		735.72	-9.475E-01	+	5.540E+00	2.47E+02	2.25E+01 G
		453.88	3.454E-01	?(	1.389E+00	1.59E+02	6.50E+01 G
y-88	F -4.4606E-01					1.07E+02	
		898.04	-4.461E-01	?(	1.501E+00	1.48E+02	9.37E+01 G
		1836.06	-5.548E-03	% P	6.022E-01	1.07E+04	9.92E+01 G
Cd-113m	5.1090E+03					5.33E+03	
		263.70	5.109E+03	?(	1.750E+04	1.02E+02	6.00E-03 K
Cd-109	F -3.5551E+00					4.53E+02	
		88.04	-3.555E+00	(	4.495E+01	3.77E+02	3.79E+00 G
Cf-251	T 3.7251E-01					3.28E+05	
		176.60	3.725E-01	&(	4.916E+00	4.82E+02	1.70E+01 G
		227.00	1.007E+00	&	1.524E+01	5.80E+02	6.30E+00 GA
Cf-249	T 9.3238E-01					1.28E+05	
		387.95	6.163E-01	?(	2.400E+00	1.16E+02	6.60E+01 G
		333.44	2.277E+00	@(	6.195E+00	1.05E+02	1.55E+01 G
Sn-126	-4.1087E-01					3.65E+07	
		87.57	-9.421E-01	+	4.631E+00	1.47E+02	3.75E+01 GA
		64.28	-4.109E-01	%(	1.539E+01	1.11E+03	9.70E+00 G
		86.94	-3.918E+00	+	1.959E+01	1.50E+02	9.04E+00 GA
PB-210	N 2.9115E+01					8.14E+03	
		46.54	2.912E+01	(P	2.489E+01	3.15E+01	4.25E+00 G
PB-212	N 2.0973E+01					6.98E+02	
		238.63	2.097E+01	(P	1.914E+00	5.16E+00	4.33E+01 G
		300.03	1.071E+01	&	5.776E+01	1.61E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.6762E+01					5.84E+05	
			351.93	1.623E+01	(P	2.124E+00	7.96E+00	3.76E+01 G
			295.09	1.780E+01	(P	4.387E+00	1.26E+01	1.93E+01 G
			242.00	2.222E+01	+	9.767E+00	1.63E+01	7.43E+00 GA
BI-207	C	-1.7963E-02					1.18E+04	
			569.70	-2.666E-01	?(P	1.271E+00	1.65E+02	9.77E+01 G
			1063.66	3.082E-01	?(P	1.541E+00	2.17E+02	7.45E+01 G
BI-212	N	3.7384E+00					6.98E+02	
			727.17	3.738E+00	?(P	2.586E+01	2.02E+02	7.55E+00 G
			785.42	3.525E+01		7.491E+01	9.05E+01	1.28E+00 GA
BI-214	N	1.4000E+01					5.84E+05	
			609.31	1.400E+01	(P	2.324E+00	9.95E+00	4.61E+01 G
			1120.29	1.923E+01	+ P	4.854E+00	1.67E+01	1.51E+01 G
			1764.49	2.153E+01	+ P	6.568E+00	1.71E+01	1.54E+01 G
BI-210M	T	2.7232E-01					1.10E+09	
			265.83	2.723E-01	*(P	2.190E+00	2.36E+02	5.00E+01 G
			304.90	0.000E+00	-	7.193E+00	1.00E+03	2.80E+01 G
AC-228	N	2.0830E+01					2.10E+03	
			911.07	2.065E+01	(P	2.761E+00	9.99E+00	2.90E+01 G
			968.97	2.165E+01	@(P	5.531E+00	1.50E+01	1.75E+01 G
			338.32	2.008E+01	(P	6.317E+00	1.55E+01	1.20E+01 G
			93.35	6.097E+00	-	2.933E+01	1.44E+02	5.56E+00 XA
TH-227	N	-8.1943E-01					7.95E+03	
			50.14	-5.497E+00	?(	2.493E+01	1.35E+02	8.00E+00 G
			256.24	4.526E+00	@(	1.196E+01	1.03E+02	7.00E+00 G
TH-229	N	1.4610E-01					2.68E+06	
			193.51	-6.236E+00	&(	2.019E+01	1.20E+02	4.40E+00 G
			210.85	9.538E+00	?(	3.255E+01	1.33E+02	2.99E+00 G
TH-234	N	8.1613E+00					1.63E+12	
			63.29	3.672E+00	?(P	3.529E+01	3.54E+02	3.81E+00 G
			92.59	1.122E+01	(P	1.495E+01	4.15E+01	5.58E+00 G
PA-231	N	6.5785E+00					1.20E+07	
			302.65	0.000E+00	?(	7.018E+01	1.00E+03	2.88E+00 G
			300.07	1.428E+01	@(	7.877E+01	1.64E+02	2.46E+00 G
PA-233	C	8.2353E-01					7.82E+08	
			312.01	2.690E-01	?(	5.654E+00	6.21E+02	3.60E+01 G
			300.18	4.043E+00	(	3.194E+01	2.35E+02	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -3.2630E-01                                     1.63E+12
                         131.29-1.823E+00 &(  7.399E+00 1.22E+02 1.80E+01 G
                         946.02 7.211E-01 +   6.290E+00 3.55E+02 1.34E+01 G
                         569.47 2.958E+00 ?(  1.278E+01 1.25E+02 8.20E+00 G
                         883.24-6.023E+00 +   2.153E+01 1.06E+02 9.60E+00 G
                         880.53-1.224E+01 &   3.830E+01 9.32E+01 6.00E+00 GA

PA-234M  N  -3.7939E+01                                     1.63E+12
                        1001.00-1.154E+02 ?(  3.249E+02 8.43E+01 8.37E-01 G
                         766.41 1.825E+02 ?(  5.136E+02 8.38E+01 2.94E-01 G

U-235    N   6.6157E-01                                     2.57E+11
                         143.79 6.616E-01 &(P 1.025E+01 4.58E+02 1.10E+01 G
                         205.33-2.536E+00 + P 2.047E+01 3.28E+02 5.01E+00 G
                         163.38-6.860E+00 + P 2.121E+01 1.04E+02 5.08E+00 G

AM-241   T  -9.5643E-01                                     1.58E+05
                          59.54-9.564E-01 &(  3.833E+00 1.49E+02 3.59E+01 G

Np-237   F  -2.6300E+00                                     2.14E+06
                          86.49-2.630E+00  (  1.429E+01 1.63E+02 1.31E+01 G

Cs-136   F   3.7525E-01                                     1.30E+01
                         818.50 3.753E-01 ?(  1.727E+00 1.35E+02 1.00E+02 G
                        1048.07-1.280E+00 +   2.329E+00 5.58E+01 8.00E+01 G
                         340.57-2.033E-01 -   3.835E+00 5.55E+02 4.69E+01 G

Np-239   T  -1.2993E+00                                     2.36E+00
                         103.70-1.347E+00 +   6.778E+00 1.51E+02 2.40E+01 X
                         106.13-1.299E+00 &(  6.462E+00 1.49E+02 2.27E+01 G
                          99.50-5.177E-01 &   6.514E+00 3.71E+02 1.50E+01 X

Nd-147      -4.8359E-01                                     1.11E+01
                         531.00-4.836E-01 &(  8.780E+00 7.39E+02 1.30E+01 G
                          91.10 0.000E+00 +   5.899E+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.
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- - 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	350.	-20.	-0.011	135.34	-5.497E+00	
AM-241	59.54	267.	-20.	-0.011	149.47	-9.564E-01	
BA-133	80.99	361.	-32.	-0.018	81.27	-1.239E+00	P
Np-237	86.49	962.	-27.	-0.015	163.04	-2.630E+00	
EU-155	86.54	890.	-28.	-0.016	152.40	-1.156E+00	
Sn-126	86.94	863.	-28.	-0.016	149.94	-3.918E+00	
Sn-126	87.57	835.	-28.	-0.016	147.44	-9.421E-01	
Cd-109	88.04	807.	-11.	-0.006	377.27	-3.555E+00	
Gd-153	97.50	744.	-27.	-0.015	146.33	-1.081E+00	
Np-239	99.50	279.	-6.	-0.004	371.07	-5.177E-01	
Gd-153	103.20	777.	-27.	-0.015	148.48	-1.483E+00	
Np-239	103.70	804.	-27.	-0.015	150.88	-1.347E+00	
EU-155	105.31	572.	8.	0.004	439.12	4.394E-01	P
Np-239	106.13	654.	-24.	-0.014	148.95	-1.299E+00	
EU-152	121.78	215.	-11.	-0.006	196.65	-4.541E-01	
EU-154	123.10	211.	-5.	-0.003	387.30	-1.595E-01	
PA-234	131.29	502.	-26.	-0.015	121.65	-1.823E+00	
HF-181	133.02	528.	-26.	-0.015	124.48	-7.630E-01	
CE-144	133.54	554.	-26.	-0.015	127.42	-2.985E+00	
HF-181	136.30	581.	-27.	-0.015	129.95	-5.726E+00	
CO-57	136.47	639.	-28.	-0.016	129.00	-3.313E+00	
Tc-99m	140.51	301.	21.	0.011	120.86	3.049E-01	
U-235	143.79	324.	6.	0.003	457.70	6.616E-01	P
CE-141	145.44	402.	-24.	-0.013	120.07	-6.491E-01	
Ba-140	162.66	282.	21.	0.012	115.61	4.736E+00	
U-235	163.38	249.	-25.	-0.014	104.31	-6.860E+00	P
Cf-251	176.60	137.	4.	0.002	482.47	3.725E-01	
TH-229	193.51	137.	-18.	-0.010	120.13	-6.236E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	205.33	170.	-8.	-0.004	327.89	-2.536E+00	P
TH-229	210.85	147.	17.	0.010	132.90	9.538E+00	
Cf-251	227.00	128.	4.	0.002	580.36	1.007E+00	
EU-152	244.69	932.	-23.	-0.013	188.56	-5.533E+00	
TH-227	256.24	81.	17.	0.009	102.55	4.526E+00	
Cd-113m	263.70	125.	16.	0.009	101.93	5.109E+03	
BI-210M	265.83	135.	7.	0.004	235.64	2.723E-01	P
Hg-203	279.20	144.	-5.	-0.003	220.10	-1.329E-01	P
I-131	284.30	84.	7.	0.004	260.60	2.191E+00	
PA-231	300.07	371.	17.	0.009	164.31	1.428E+01	
La-140	328.76	72.	15.	0.008	109.55	1.628E+00	P
Cf-249	333.44	73.	16.	0.009	105.34	2.277E+00	
Cs-136	340.57	265.	-4.	-0.002	554.86	-2.033E-01	
BA-133	356.00	374.	-7.	-0.004	411.89	-2.536E-01	
I-131	364.48	109.	-22.	-0.012	96.04	-6.365E-01	P
BA-133	383.84	152.	16.	0.009	110.73	4.500E+00	
Cf-249	387.95	168.	16.	0.009	115.80	6.163E-01	
SN-113	391.69	189.	-5.	-0.003	458.09	-1.795E-01	P
SB-125	427.88	76.	-8.	-0.004	216.27	-7.270E-01	
AG-108M	433.94	68.	-15.	-0.009	135.21	-4.636E-01	P
pm-146	453.88	40.	8.	0.004	158.77	3.454E-01	
SB-125	463.37	108.	4.	0.002	385.09	1.049E+00	P
Ir-192	468.06	126.	-17.	-0.010	94.80	-9.609E-01	
La-140	487.02	155.	-17.	-0.009	106.32	-1.104E+00	
RU-103	497.05	40.	6.	0.003	226.42	1.842E-01	P
RH-106	511.86	113.	75.	0.041	38.15	1.143E+01	
Nd-147	531.00	52.	-2.	-0.001	739.37	-4.836E-01	
Ba-140	537.26	35.	13.	0.007	100.46	1.627E+00	P
CS-134	563.24	39.	3.	0.002	428.82	1.179E+00	
CS-134	569.32	43.	3.	0.001	354.44	5.734E-01	
PA-234	569.47	39.	7.	0.004	125.47	2.958E+00	
BI-207	569.70	56.	-8.	-0.004	164.66	-2.666E-01	P
SB-125	600.50	401.	-17.	-0.009	111.38	-3.206E+00	P
SB-124	602.73	385.	-16.	-0.009	116.67	-5.588E-01	P
RU-103	610.30	399.	-16.	-0.009	178.99	-9.643E+00	
AG-108M	614.28	383.	-16.	-0.009	177.54	-6.127E-01	
RH-106	621.92	14.	8.	0.004	103.90	2.728E+00	P
SB-125	635.89	34.	8.	0.005	106.63	2.590E+00	
PM-144	696.54	66.	-12.	-0.007	68.45	-4.579E-01	P
NB-94	702.63	70.	-18.	-0.010	101.38	-7.102E-01	
SB-124	722.79	55.	14.	0.008	81.49	4.994E+00	
AG-108M	722.94	69.	14.	0.008	89.99	5.945E-01	
EU-154	723.36	83.	14.	0.008	97.76	2.672E+00	
ZR-95	724.20	198.	-27.	-0.015	29.99	-2.432E+00	P
pm-146	735.72	37.	-5.	-0.003	246.86	-9.475E-01	
pm-146	747.16	42.	2.	0.001	799.26	2.059E-01	P
ZR-95	756.73	47.	-15.	-0.008	102.20	-1.099E+00	
NB-95	765.79	72.	-17.	-0.010	73.43	-7.154E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234M	766.41	53.	13.	0.007	83.81	1.825E+02		
EU-152	778.92	19.	9.	0.005	103.51	3.009E+00		
CS-134	795.87	51.	13.	0.007	81.04	6.566E-01		
CS-134	801.95	75.	8.	0.004	158.74	3.886E+00		
CO-58	810.78	68.	-5.	-0.003	253.55	-2.017E-01		
Cs-136	818.50	64.	9.	0.005	134.56	3.753E-01		
MN-54	834.85	15.	3.	0.001	323.13	1.117E-01		P
Co-56	846.77	28.	-2.	-0.001	407.10	-9.005E-02		P
NB-94	871.10	56.	-17.	-0.009	66.76	-7.697E-01		
EU-154	873.23	49.	13.	0.007	83.53	4.685E+00		
PA-234	880.53	104.	-16.	-0.009	93.22	-1.224E+01		
PA-234	883.24	83.	-13.	-0.007	105.76	-6.023E+00		
Sc-46	889.28	88.	15.	0.008	91.78	6.959E-01		
y-88	898.04	35.	-9.	-0.005	148.31	-4.461E-01		
PA-234	946.02	10.	2.	0.001	354.73	7.211E-01		
EU-152	964.11	136.	12.	0.006	144.53	3.915E+00		
EU-154	996.33	102.	-19.	-0.011	78.10	-9.054E+00		
PA-234M	1001.00	121.	-19.	-0.011	84.34	-1.154E+02		
EU-154	1004.77	134.	-6.	-0.003	287.41	-1.618E+00		
Co-56	1037.84	20.	3.	0.002	332.78	1.101E+00		
Cs-136	1048.07	50.	-20.	-0.011	55.80	-1.280E+00		
RH-106	1050.36	98.	-21.	-0.012	68.49	-7.210E+01		
BI-207	1063.66	17.	4.	0.002	216.59	3.082E-01		P
Ga-68	1077.40	53.	-20.	-0.011	86.45	-3.742E+01		
FE-59	1099.25	27.	-2.	-0.001	708.52	-1.599E-01		
EU-152	1112.07	99.	-13.	-0.007	113.56	-5.124E+00		
Sc-46	1120.55	76.	-13.	-0.007	100.09	-7.061E-01		
Ta-182	1121.30	70.	-6.	-0.003	208.51	-9.117E-01		
CO-60	1173.24	37.	-1.	-0.001	640.31	-7.890E-02		P
Ta-182	1189.05	16.	9.	0.005	106.38	3.199E+00		
Co-56	1238.28	32.	13.	0.007	102.72	1.169E+00		
NA-22	1274.53	28.	-4.	-0.002	180.24	-2.635E-01		
EU-154	1274.54	39.	-6.	-0.003	162.06	-9.786E-01		
FE-59	1291.60	17.	4.	0.002	246.86	5.686E-01		
CO-60	1332.50	11.	3.	0.001	315.09	1.613E-01		P
EU-152	1408.00	23.	-12.	-0.006	100.08	-3.648E+00		
SB-124	1690.98	6.	1.	0.000	945.38	1.059E-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	0.0000E+00	0.0000E+00	1.000E+03%	1.51E+01
NA-22	#A	-2.6350E-01	-2.6350E-01	1.802E+02%	1.67E+00
K-40		2.6578E+02	2.6578E+02	4.986E+00%	1.04E+01
Sc-46	#A	6.9587E-01	6.9587E-01	9.178E+01%	2.14E+00
CR-51	#A	-1.6808E-01	-1.6808E-01	2.755E+03%	2.10E+01
MN-54	#A	1.1174E-01	1.1174E-01	3.231E+02%	9.08E-01
FE-59	#A	1.5575E-01	1.5576E-01	2.469E+02%	2.57E+00
Co-56	#A	4.6524E-01	4.6524E-01	1.027E+02%	1.22E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.03E+00
CO-58	#A	-2.0171E-01	-2.0171E-01	2.535E+02%	1.77E+00
CO-60	#A	1.6132E-01	1.6132E-01	3.151E+02%	1.16E+00
ZN-65	#A	-2.3309E-02	-2.3309E-02	6.106E+03%	4.98E+00
NB-94	#A	-7.1016E-01	-7.1016E-01	1.014E+02%	1.65E+00
ZR-95	#A	-1.0994E+00	-1.0994E+00	1.022E+02%	2.59E+00
NB-95	#A	-7.1542E-01	-7.1542E-01	7.343E+01%	1.75E+00
RU-103	#A	1.8420E-01	1.8420E-01	2.264E+02%	1.07E+00
RH-106	#A	2.7281E+00	2.7281E+00	1.039E+02%	7.09E+00
AG-108M	#A	6.6466E-02	6.6466E-02	8.121E+01%	1.24E+00
AG-110M	#A	1.2746E+00	1.2746E+00	7.196E+01%	3.20E+00
SN-113	#A	-1.7952E-01	-1.7953E-01	4.581E+02%	2.63E+00
SB-124	#A	-8.4697E-03	-8.4697E-03	7.115E+01%	3.30E+00
SB-125	#A	3.6505E-01	3.6505E-01	1.066E+02%	3.94E+00
I-131	#A	-4.3884E-01	-4.3885E-01	9.604E+01%	1.51E+00
Gd-153	#A	-1.0810E+00	-1.0810E+00	1.463E+02%	5.28E+00
Ga-68	#A	-3.7342E+01	-3.7424E+01	8.645E+01%	6.92E+01
Tc-99m	#A	3.0479E-01	3.0492E-01	1.209E+02%	1.23E+00
BA-133	#A	-2.5364E-01	-2.5364E-01	4.119E+02%	3.53E+00
CS-134	#A	4.7449E-01	4.7449E-01	8.104E+01%	3.27E+00
CS-137		3.0609E+00	3.0609E+00	1.354E+01%	7.69E-01
CE-139	A	3.8558E-01	3.8558E-01	1.023E+02%	1.32E+00
Ba-140	#A	2.2585E+00	2.2585E+00	7.658E+01%	3.94E+00
La-140	#A	2.8308E-01	2.8308E-01	1.095E+02%	1.71E+00
CE-141	#A	-6.4908E-01	-6.4908E-01	1.201E+02%	2.60E+00
CE-144	#A	-2.9851E+00	-2.9851E+00	1.274E+02%	1.27E+01
PM-144	#A	-4.5789E-01	-4.5789E-01	6.845E+01%	1.57E+00
EU-152	#A	1.7785E+00	1.7785E+00	1.035E+02%	6.79E+00
EU-154	#A	3.4323E+00	3.4323E+00	6.429E+01%	1.31E+01
EU-155	#A	4.3942E-01	4.3942E-01	4.391E+02%	6.49E+00
HF-181	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.99E+00
Ta-182	#A	3.9150E-01	3.9150E-01	1.064E+02%	6.57E+00
Hg-203	#A	-1.3288E-01	-1.3288E-01	2.201E+02%	1.44E+00
TL-208		8.5242E+00	8.5242E+00	8.852E+00%	1.04E+00
pm-146	#A	2.9748E-01	2.9748E-01	1.588E+02%	3.93E+00

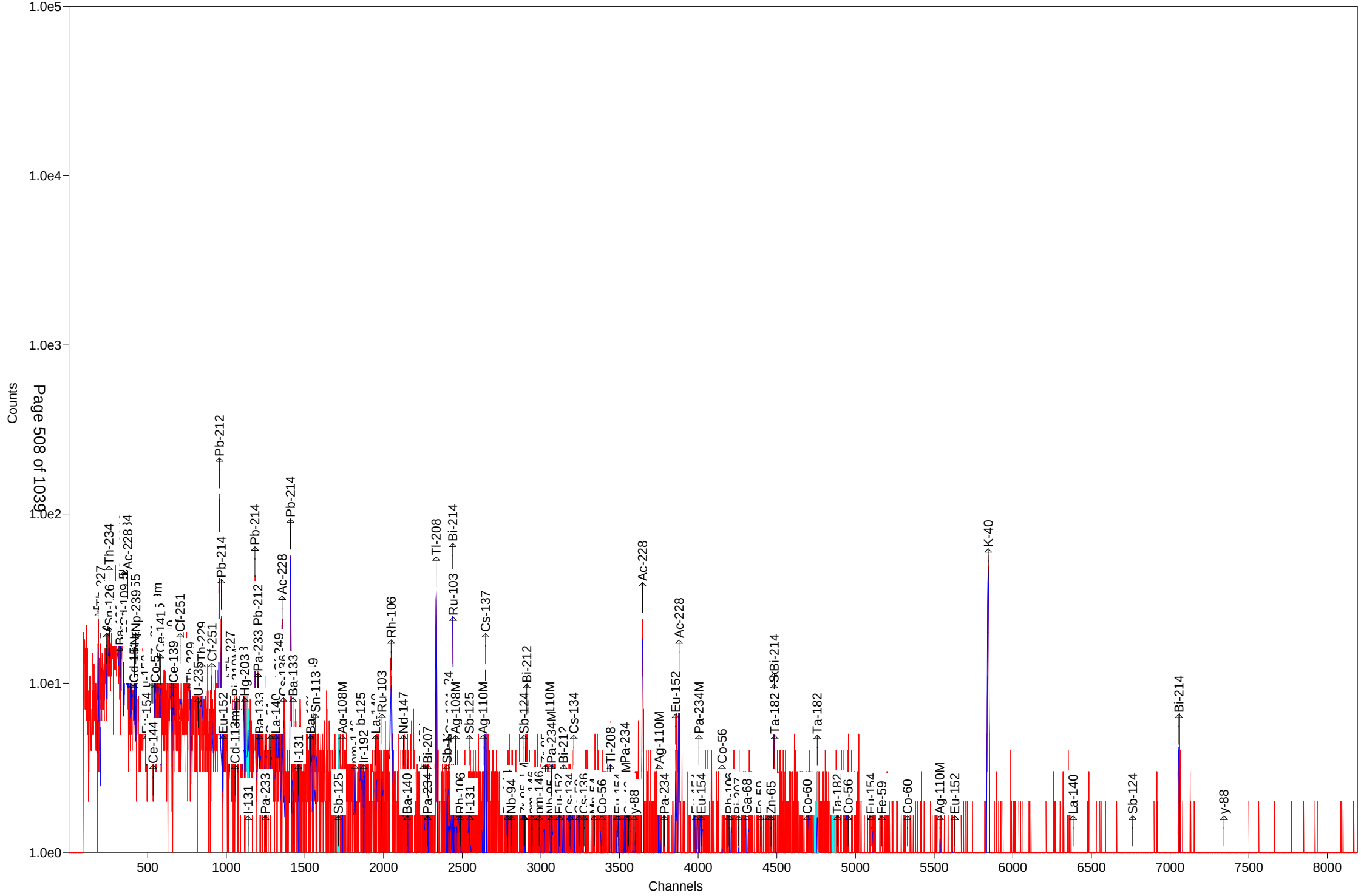
y-88 #A	-4.4606E-01	-4.4606E-01	1.483E+02%		1.50E+00
Cd-113m#A	5.1090E+03	5.1090E+03	1.019E+02%		1.75E+04
Cd-109 #A	-3.5551E+00	-3.5551E+00	3.773E+02%		4.50E+01
Cf-251 #A	3.7251E-01	3.7251E-01	4.825E+02%		4.92E+00
Cf-249 #A	9.3238E-01	9.3238E-01	7.827E+01%		2.40E+00
Sn-126 #A	-4.1087E-01	-4.1087E-01	1.106E+03%		1.54E+01
PB-210 #	2.9115E+01	2.9115E+01	3.148E+01%		2.49E+01
PB-212	2.0973E+01	2.0973E+01	5.161E+00%		1.91E+00
PB-214	1.6762E+01	1.6762E+01	7.464E+00%		2.12E+00
BI-207 #A	-1.7963E-02	-1.7963E-02	1.360E+02%		1.27E+00
BI-212 A	3.7384E+00	3.7384E+00	2.021E+02%		2.59E+01
BI-214	1.4000E+01	1.4000E+01	9.948E+00%		2.32E+00
BI-210M#A	2.7232E-01	2.7232E-01	2.356E+02%		2.19E+00
AC-228	2.0830E+01	2.0830E+01	7.935E+00%		2.76E+00
TH-227 #A	-8.1943E-01	-8.1943E-01	8.490E+01%		2.49E+01
TH-229 #A	1.4610E-01	1.4610E-01	8.958E+01%		2.02E+01
TH-234 A	8.1613E+00	8.1613E+00	4.150E+01%		3.53E+01
PA-231 #A	6.5785E+00	6.5785E+00	1.643E+02%		7.02E+01
PA-233 A	8.2353E-01	8.2353E-01	2.346E+02%		5.65E+00
PA-234 #A	-3.2630E-01	-3.2630E-01	8.738E+01%		7.40E+00
PA-234M#A	-3.7939E+01	-3.7939E+01	5.945E+01%		3.25E+02
U-235 #A	6.6157E-01	6.6157E-01	4.577E+02%		1.02E+01
AM-241 #A	-9.5643E-01	-9.5643E-01	1.495E+02%		3.83E+00
Np-237 #A	-2.6300E+00	-2.6300E+00	1.630E+02%		1.43E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.37E+00
Cs-136 #A	3.7525E-01	3.7525E-01	1.346E+02%		1.73E+00
Np-239 #A	-1.2993E+00	-1.2993E+00	1.490E+02%		6.46E+00
Nd-147 #A	-4.8358E-01	-4.8359E-01	7.394E+02%		8.78E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.6 keV) 3.790E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.6 keV) 3.7904553E+02 Bq/Sample

257318_Gamma_160-17797-A-5-B. 3_Gamma_20161205.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161270

Sample Description: 257318_Gamma_160-17797-A-6-B
Detector: Detector # 5
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-6-B

Decay to Time: 7/12/2016 10:34 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:34:45 Real Time: 1807 sec
Analysis Time: 7/12/2016 11:05 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_2016-07-10_0601.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	-1.824E+00	256.8	4.683E+00	4.684E+00	1.627E+01
NA-22	-9.386E-01	82.1	7.707E-01	7.721E-01	2.600E+00
K-40	2.697E+02	6.2	1.683E+01	2.176E+01	1.187E+01
Sc-46	2.391E-01	295.0	7.052E-01	7.053E-01	2.478E+00
CR-51	3.031E+00	147.3	4.465E+00	4.468E+00	1.520E+01
MN-54	-2.831E-01	160.1	4.532E-01	4.534E-01	2.010E+00
FE-59	6.433E-01	208.7	1.343E+00	1.343E+00	3.216E+00
Co-56	9.928E-01	66.1	6.564E-01	6.584E-01	1.167E+00
CO-57	1.577E-01	205.9	3.248E-01	3.249E-01	1.105E+00
CO-58	-3.002E-02	1459.6	4.382E-01	4.382E-01	2.345E+00
CO-60	1.381E-01	397.2	5.486E-01	5.486E-01	1.387E+00
ZN-65	6.540E-07	279893195.3	1.831E+00	1.831E+00	6.497E+00
NB-94	5.248E-01	71.9	3.772E-01	3.781E-01	1.467E+00
ZR-95	-2.678E-01	280.5	7.511E-01	7.512E-01	3.062E+00
NB-95	-6.551E-01	99.2	6.496E-01	6.505E-01	2.204E+00
RU-103	3.880E-01	134.2	5.208E-01	5.212E-01	1.327E+00
RH-106	5.681E-01	868.4	4.933E+00	4.933E+00	1.760E+01
AG-108M	4.357E-01	90.5	3.943E-01	3.949E-01	1.191E+00
AG-110M	-1.034E+00	100.3	1.038E+00	1.039E+00	3.520E+00
SN-113	-1.010E+00	92.5	9.349E-01	9.364E-01	3.821E+00
SB-124	-1.797E-01	84.1	1.511E-01	1.514E-01	4.393E+00
SB-125	-2.422E+00	90.0	2.180E+00	2.184E+00	5.848E+00
I-131	3.388E-01	84.5	2.862E-01	2.867E-01	1.401E+00
Gd-153	9.759E-01	112.9	1.102E+00	1.103E+00	3.694E+00
Ga-68	2.989E+00	857.3	2.563E+01	2.563E+01	6.205E+01
Tc-99m	-3.352E-01	147.5	4.943E-01	4.947E-01	1.659E+00
BA-133	2.152E-01	567.9	1.222E+00	1.222E+00	4.157E+00
CS-134	7.940E-01	39.9	3.167E-01	3.194E-01	4.335E+00
CS-137	4.662E+00	13.6	6.340E-01	6.788E-01	1.046E+00
CE-139	-4.476E-01	107.0	4.789E-01	4.808E-01	1.604E+00
Ba-140	-1.693E+00	74.6	1.263E+00	1.266E+00	7.291E+00
La-140	-4.204E-02	30.7	1.292E-02	1.311E-02	3.062E+00
CE-141	6.614E-01	124.7	8.248E-01	8.255E-01	2.765E+00

CE-144	-3.085E+00	135.0	4.165E+00	4.168E+00	1.394E+01
PM-144	5.915E-01	73.8	4.368E-01	4.378E-01	9.709E-01
EU-152	5.778E-01	76.9	4.446E-01	4.456E-01	8.625E+00
EU-154	2.380E+00	83.9	1.997E+00	2.001E+00	1.324E+01
EU-155	-5.311E-02	2598.1	1.380E+00	1.380E+00	5.677E+00
HF-181	5.932E-01	97.8	5.800E-01	5.808E-01	1.964E+00
Ta-182	3.344E+00	67.8	2.266E+00	2.272E+00	7.510E+00
Hg-203	-5.807E-01	97.9	5.685E-01	5.695E-01	1.907E+00
TL-208	6.486E+00	11.9	7.701E-01	8.404E-01	1.176E+00
pm-146	6.579E-01	91.1	5.997E-01	6.006E-01	3.009E+00
y-88	8.272E-01	53.7	4.440E-01	4.460E-01	1.035E+00
Cd-113m	5.452E+03	97.8	5.333E+03	5.345E+03	1.800E+04
Cd-109	9.739E+00	158.3	1.541E+01	1.542E+01	5.150E+01
Cf-251	-2.158E+00	104.4	2.253E+00	2.262E+00	6.059E+00
Cf-249	-4.762E-01	105.7	5.034E-01	5.040E-01	3.376E+00
Sn-126	-4.320E-02	11609.7	5.015E+00	5.015E+00	1.708E+01
PB-210	1.739E+01	73.3	1.275E+01	1.279E+01	3.574E+01
PB-212	2.106E+01	5.6	1.183E+00	1.804E+00	1.746E+00
PB-214	1.602E+01	9.0	1.444E+00	1.667E+00	2.420E+00
BI-207	0.000E+00	1.#INF	1.011E-01	1.011E-01	1.663E+00
BI-212	-2.014E+00	264.1	5.320E+00	5.321E+00	2.822E+01
BI-214	1.610E+01	9.4	1.514E+00	1.729E+00	2.137E+00
BI-210M	-8.390E-01	100.3	8.418E-01	8.432E-01	2.828E+00
AC-228	1.649E+01	15.3	2.522E+00	2.658E+00	6.999E+00
TH-227	5.132E+00	78.1	4.007E+00	4.017E+00	1.812E+01
TH-229	1.404E+01	49.6	6.960E+00	7.051E+00	1.822E+01
TH-234	2.452E+01	37.7	9.233E+00	9.321E+00	2.929E+01
PA-231	0.000E+00	1.#INF	4.530E+00	4.530E+00	7.433E+01
PA-233	1.174E+00	139.0	1.633E+00	1.634E+00	5.507E+00
PA-234	7.356E-01	83.0	6.105E-01	6.116E-01	8.087E+00
PA-234M	5.382E+01	104.9	5.646E+01	5.653E+01	1.962E+02
U-235	0.000E+00	1.#INF	2.179E+00	2.179E+00	1.360E+01
AM-241	8.057E-01	161.4	1.300E+00	1.301E+00	3.726E+00
Np-237	0.000E+00	1.#INF	4.663E+00	4.663E+00	1.568E+01
Ir-192	8.751E-02	70.5	6.171E-02	6.193E-02	1.615E+00
Cs-136	6.023E-01	77.5	4.667E-01	4.680E-01	1.570E+00
Np-239	2.028E-01	698.4	1.417E+00	1.417E+00	4.835E+00
Nd-147	-5.624E+00	93.4	5.254E+00	5.264E+00	1.301E+01
Total	5.953E+03				

Analyst: Amanda Dick

TestAmerica Inc Spectrum name: 5_Gamma_20161270.An1

Sample description
257318_Gamma_160-17797-A-6-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161270.An1

Acquisition information
Start time: 7/12/2016 10:34:45 AM
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	7/12/2016 10:34:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-10_0601.PBC 7/10/2016 6:01:50 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1909

***** 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	24.	73.33	0.34	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	17.	110.38	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.54	13.	161.42	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.06	87.	22.98	1.17	2.702E-02	63.29	3.810	3.856E+01	TH234
74.79	175.	12.05	0.81	3.150E-02				
77.10	270.	8.21	0.81	3.219E-02				
87.22	99.	16.45	0.83	3.448E-02	86.49	13.100	1.226E+01	Np237
					86.54	30.700	5.230E+00	EU155
					86.94	9.040	1.772E+01	Sn126
					87.57	37.500	4.259E+00	Sn126
88.08	23.	158.27	0.83	3.462E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	9.739E+00	Cd109
89.79	63.	25.18	0.83	3.489E-02				
92.91	62.	28.14	0.83	3.531E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.745E+01	AC228
97.50	19.	112.88	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	15.	114.92	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
106.13	3.	698.41	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
121.78	16.	106.75	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.922E-01	CO57
122.06	9.	205.94	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.577E-01	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	19.	124.70	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
162.66	16.	113.14	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
193.51	31.	49.58	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
227.00	6.	249.21	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.69	377.	6.23	0.90	2.319E-02	238.63	43.300	2.086E+01	PB212
242.05	64.	22.63	0.98	2.293E-02	242.00	7.430	2.098E+01	PB214
256.24	12.	110.49	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
263.70	13.	97.82	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
277.37	15.	94.50	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
284.30	8.	177.00	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.38	112.	15.91	0.86	1.943E-02	295.09	19.300	1.594E+01	PB214
312.01	14.	139.04	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
319.88	10.	147.33	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	46.	30.74	1.07	1.778E-02	328.76	20.300	7.081E+00	La140
333.44	7.	181.27	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.45	92.	16.56	1.17	1.736E-02	338.32	12.010	2.451E+01	AC228
351.93	183.	9.01	1.14	1.680E-02	351.93	37.600	1.606E+01	PB214
356.00	4.	567.89	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
433.94	7.	152.75	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	134.24	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
468.06	13.	102.21	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
482.00	11.	97.79	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	4.	281.37	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	8.	134.24	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	105.	17.13	2.48	1.230E-02	511.86	20.000	2.364E+01	RH106
563.24	10.	93.48	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	256.04	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.807E+00	PA234
					569.70	97.740	1.516E-01	BI207
583.37	109.	11.87	1.31	1.103E-02	583.02	84.500	6.476E+00	TL208
609.40	142.	9.40	1.12	1.063E-02	609.31	46.090	1.610E+01	BI214
					610.30	5.750	1.292E+02	RU103
618.06	15.	112.07	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
621.92	1.	868.38	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
636.97	8.	113.01	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	203.05	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.69	71.	13.60	1.01	9.924E-03	661.66	85.210	4.662E+00	CS137
696.54	7.	96.17	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
702.63	11.	92.40	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	9.	84.12	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.663E-01	AG108M
					723.36	20.220	2.545E+00	EU154
722.94	9.	97.06	1.42	9.215E-03	722.79	10.810	4.758E+00	SB124
					722.94	90.840	5.663E-01	AG108M
					723.36	20.220	2.545E+00	EU154
723.36	6.	142.10	1.42	9.211E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.269E-01	AG108M
					723.36	20.220	1.919E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
747.16	5.	123.32	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
763.94	3.	204.94	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
785.42	9.	95.86	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	26.	39.89	1.48	8.503E-03	795.87	85.530	2.012E+00	CS134
818.50	9.	77.49	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
846.77	7.	94.25	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
861.22	19.	29.30	0.48	7.963E-03	860.56	12.420	1.067E+01	TL208
871.10	6.	110.11	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	5.	130.24	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	8.	105.33	1.55	7.791E-03	883.24	9.600	PBC<MDA	PA234
889.28	3.	294.96	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
898.04	11.	53.68	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.46	70.	13.06	0.90	7.589E-03	911.07	29.000	1.771E+01	AC228
964.11	8.	140.02	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.14	12.	82.84	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	88.25	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	104.92	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	3.	260.28	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1077.40	1.	857.32	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	4.	208.70	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1120.34	13.	67.77	1.72	6.376E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.166E+00	Sc46
					1121.30	34.900	3.344E+00	Ta182
1221.71	2.	646.79	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	12.	92.75	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	1.	397.16	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	12.	28.87	1.91	5.264E-03	1408.00	21.005	6.029E+00	EU152
1461.10	264.	6.24	1.75	5.103E-03	1460.83	10.670	2.697E+02	K40
1763.73	5.	99.17	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.79	74.78	135.	175.	5.567E+03	12.05	0.813	-	D
308.05	77.09	109.	270.	8.375E+03	8.21	0.815	-	sD
359.18	89.76	129.	45.	1.303E+03	38.28	0.828	-	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	186.39	46.71	98.	24.	0.013	73.33	0.335s
TH-227	200.11	50.14	114.	17.	0.009	110.38	0.787s
AM-241	237.72	59.54	156.	13.	0.007	161.42	0.797s
TH-234	252.74	63.29	123.	46.	0.025	37.66	0.801D
BA-133	323.61	80.99	207.	-22.	-0.012	115.94	0.819s
EU-155	345.84	86.54	705.	-23.	-0.013	164.85	0.825s
Sn-126	347.43	86.94	620.	23.	0.013	80.18	0.825D
Sn-126	349.95	87.57	628.	23.	0.013	80.10	0.826D
Cd-109	351.83	88.04	651.	23.	0.013	158.27	0.826A
Nd-147	364.08	91.10	696.	-24.	-0.014	154.75	0.829s
TH-234	370.05	92.59	165.	28.	0.016	67.82	0.831D
AC-228	373.09	93.35	610.	23.	0.013	154.75	0.832s
Gd-153	389.70	97.50	217.	19.	0.010	112.88	0.836s
Np-239	397.71	99.50	150.	15.	0.009	114.92	0.838
Np-239	414.52	103.70	263.	0.	0.000	1000.00	0.842s
Np-239	424.25	106.13	218.	3.	0.002	698.41	0.845
EU-152	486.88	121.78	140.	16.	0.009	106.75	0.861s
CO-57	488.03	122.06	156.	9.	0.005	205.94	0.861s
EU-154	492.18	123.10	164.	-14.	-0.008	141.46	0.862s
PA-234	524.99	131.29	367.	-21.	-0.012	128.28	0.871
HF-181	531.91	133.02	388.	-21.	-0.012	131.60	0.872s
CE-144	533.97	133.54	410.	-21.	-0.012	135.02	0.873s
HF-181	545.02	136.30	431.	-10.	-0.006	286.26	0.876
CO-57	545.72	136.47	437.	-22.	-0.012	134.92	0.876
Tc-99m	561.88	140.51	337.	-18.	-0.010	147.46	0.880
U-235	574.99	143.79	355.	0.	0.000	1000.00	0.883s
CE-141	581.61	145.44	278.	19.	0.011	124.70	0.885
Ba-140	650.54	162.66	156.	16.	0.009	113.14	0.902s
U-235	653.42	163.38	242.	-20.	-0.011	111.52	0.903s
CE-139	663.32	165.85	223.	-20.	-0.011	107.00	0.905s
Cf-251	706.34	176.60	127.	-20.	-0.011	104.40	0.916
TH-229	774.03	193.51	63.	31.	0.017	49.58	0.933s
U-235	821.35	205.33	111.	-20.	-0.011	95.50	0.945s
Cf-251	908.08	227.00	77.	6.	0.004	249.21	0.966
PB-212	954.64	238.63	38.	381.	0.211	5.62	0.978D
PB-214	968.10	242.00	74.	64.	0.036	22.63	0.981D
EU-152	978.89	244.69	704.	-20.	-0.011	192.21	0.984s
TH-227	1025.11	256.24	48.	12.	0.007	110.49	0.995s
Cd-113m	1054.97	263.70	69.	13.	0.007	97.82	1.002s
BI-210M	1063.50	265.83	121.	-16.	-0.009	100.33	1.005s
TL-208	1109.33	277.28	98.	15.	0.009	94.50	1.016s
Hg-203	1117.00	279.20	135.	-17.	-0.010	97.90	1.017s
I-131	1137.41	284.30	55.	8.	0.004	177.00	1.022s
PB-214	1181.75	295.38	48.	108.	0.060	16.68	0.865

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	1200.37	300.03	219.	-11.	-0.006	192.63	1.038s
PA-231	1200.53	300.07	230.	0.	0.000	1000.00	1.038s
PA-233	1200.97	300.18	230.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	230.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	230.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	230.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	230.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	230.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	186.	14.	0.008	139.04	1.049s
Ir-192	1266.25	316.49	88.	-14.	-0.008	97.18	1.053
CR-51	1280.63	320.08	101.	10.	0.005	147.33	1.057s
La-140	1315.35	328.76	44.	46.	0.026	30.74	1.065s
Cf-249	1334.08	333.44	44.	7.	0.004	181.27	1.070
AC-228	1354.14	338.45	28.	92.	0.051	16.56	1.172s
Cs-136	1362.62	340.57	225.	-14.	-0.008	153.75	1.077s
EU-152	1377.49	344.29	211.	-14.	-0.008	149.25	1.080s
HF-181	1383.66	345.83	197.	0.	0.000	1000.00	1.082s
PB-214	1408.07	351.93	28.	183.	0.101	9.01	1.145
BA-133	1424.36	356.00	256.	4.	0.002	567.89	1.091s
I-131	1458.32	364.48	44.	-9.	-0.005	141.86	1.099s
BA-133	1535.78	383.84	146.	-17.	-0.009	103.65	1.117s
Cf-249	1552.22	387.95	163.	-17.	-0.009	108.84	1.121s
SN-113	1567.19	391.69	194.	-18.	-0.010	92.53	1.125s
SB-125	1711.99	427.88	80.	-18.	-0.010	90.04	1.158s
AG-108M	1736.25	433.94	28.	7.	0.004	152.75	1.164s
pm-146	1816.05	453.88	28.	8.	0.004	134.24	1.182s
SB-125	1854.01	463.37	86.	-12.	-0.007	113.04	1.191
Ir-192	1872.79	468.06	84.	13.	0.007	102.21	1.195s
BE-7	1910.94	477.59	64.	-4.	-0.002	256.76	1.204s
HF-181	1928.56	482.00	54.	11.	0.006	97.79	1.208s
La-140	1948.65	487.02	32.	4.	0.002	281.37	1.212s
RU-103	1988.80	497.05	28.	8.	0.004	134.24	1.221s
RH-106	2048.06	511.86	33.	105.	0.058	17.13	2.485s
Nd-147	2124.62	531.00	52.	-16.	-0.009	93.42	1.252
Ba-140	2149.67	537.26	57.	-17.	-0.009	97.41	1.258s
CS-134	2253.60	563.24	20.	10.	0.006	93.48	1.280s
CS-134	2277.94	569.32	28.	3.	0.002	256.04	1.286s
PA-234	2278.54	569.47	40.	-8.	-0.004	125.43	1.286s
BI-207	2279.47	569.70	42.	0.	0.000	1000.00	1.286s
TL-208	2334.14	583.37	13.	109.	0.060	11.87	1.310
SB-125	2402.69	600.50	313.	-14.	-0.008	184.74	1.313s
SB-124	2411.61	602.73	300.	-14.	-0.008	180.48	1.315s
CS-134	2419.53	604.71	286.	-14.	-0.008	176.16	1.317s
BI-214	2438.29	609.40	12.	142.	0.079	9.40	1.116
RU-103	2441.89	610.30	272.	-3.	-0.002	735.64	1.322s
PM-144	2472.94	618.06	127.	15.	0.008	112.07	1.328s
RH-106	2488.37	621.92	42.	1.	0.001	868.38	1.332s
SB-125	2544.26	635.89	30.	-6.	-0.004	129.24	1.344s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2548.61	636.97	32.	8.	0.004	113.01	1.345s
AG-110M	2631.76	657.76	89.	7.	0.004	203.05	1.362s
CS-137	2647.49	661.69	8.	71.	0.039	13.60	1.013s
PM-144	2786.90	696.54	9.	7.	0.004	96.17	1.395s
NB-94	2811.25	702.63	22.	11.	0.006	92.40	1.400s
SB-124	2891.88	722.79	22.	9.	0.005	84.12	1.417
AG-108M	2892.48	722.94	30.	9.	0.005	97.06	1.417
EU-154	2894.16	723.36	39.	6.	0.004	142.10	1.418
ZR-95	2897.53	724.20	58.	-11.	-0.006	102.62	1.418s
BI-212	2909.41	727.17	49.	-3.	-0.001	264.07	1.421s
pm-146	2943.61	735.72	31.	-8.	-0.004	86.11	1.428s
pm-146	2989.37	747.16	9.	5.	0.003	123.32	1.437s
ZR-95	3027.65	756.73	26.	-2.	-0.001	280.47	1.445s
AG-110M	3056.50	763.94	22.	3.	0.002	204.94	1.451s
NB-95	3063.89	765.79	47.	-10.	-0.006	99.16	1.453s
PA-234M	3066.38	766.41	77.	-17.	-0.010	74.84	1.453s
EU-152	3116.41	778.92	28.	-2.	-0.001	565.69	1.463s
BI-212	3142.41	785.42	14.	9.	0.005	95.86	1.468s
CS-134	3184.19	795.87	19.	26.	0.015	39.89	1.477s
CS-134	3208.53	801.95	42.	-15.	-0.009	92.51	1.482s
La-140	3263.80	815.77	49.	0.	0.000	1000.00	1.493s
Cs-136	3274.72	818.50	20.	9.	0.005	77.49	1.495s
MN-54	3340.10	834.85	33.	-4.	-0.002	160.09	1.508s
Co-56	3387.78	846.77	9.	7.	0.004	94.25	1.518s
TL-208	3445.58	861.22	3.	19.	0.011	29.30	0.476s
NB-94	3485.08	871.10	16.	6.	0.003	110.11	1.537s
EU-154	3493.61	873.23	19.	5.	0.003	130.24	1.539s
PA-234	3522.80	880.53	21.	8.	0.004	92.13	1.544s
PA-234	3533.64	883.24	28.	8.	0.004	105.33	1.547s
AG-110M	3539.41	884.68	51.	-11.	-0.006	100.34	1.547s
Sc-46	3557.79	889.28	47.	3.	0.002	294.96	1.551s
y-88	3592.83	898.04	5.	11.	0.006	53.68	1.558s
AC-228	3644.94	911.07	29.	52.	0.029	25.72	1.568s
PA-234	3784.70	946.02	33.	-13.	-0.007	99.76	1.595s
EU-152	3857.05	964.11	57.	8.	0.004	140.02	1.609s
AC-228	3876.48	968.97	47.	12.	0.007	82.84	1.612s
EU-154	3985.88	996.33	10.	6.	0.003	88.25	1.633s
PA-234M	4004.55	1001.00	15.	6.	0.003	104.92	1.636s
EU-154	4019.65	1004.77	33.	3.	0.002	260.28	1.639s
Co-56	4151.87	1037.84	20.	-5.	-0.003	197.23	1.664
Cs-136	4192.77	1048.07	30.	-8.	-0.004	103.08	1.671s
RH-106	4201.93	1050.36	47.	-5.	-0.003	199.00	1.673s
BI-207	4255.11	1063.66	35.	-13.	-0.007	103.82	1.682
Ga-68	4310.04	1077.40	15.	1.	0.001	857.32	1.692s
FE-59	4397.41	1099.25	16.	4.	0.002	208.70	1.708s
EU-152	4448.68	1112.07	61.	-4.	-0.002	318.18	1.717s
BI-214	4481.51	1120.29	47.	-9.	-0.005	68.71	1.723s
Sc-46	4482.57	1120.55	38.	0.	0.000	1000.00	1.723s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4485.56	1121.30	34.	13.	0.007	67.77	1.724s
CO-60	4693.21	1173.24	46.	-19.	-0.011	33.41	1.760s
Ta-182	4756.42	1189.05	20.	-1.	-0.001	988.26	1.771s
Ta-182	4885.79	1221.41	32.	2.	0.001	646.79	1.793s
Co-56	4953.23	1238.28	22.	12.	0.007	92.75	1.804s
NA-22	5098.13	1274.53	27.	-10.	-0.005	82.11	1.828s
EU-154	5098.19	1274.54	36.	0.	0.000	1000.00	1.828s
CO-60	5329.85	1332.50	6.	1.	0.001	397.16	1.866s
EU-152	5631.62	1408.00	0.	12.	0.007	28.87	1.914s
K-40	5843.84	1461.10	4.	264.	0.147	6.24	1.752
La-140	6383.73	1596.21	23.	-13.	-0.007	92.52	2.024s
SB-124	6762.39	1690.98	0.	0.	0.000	1000.00	2.076s
BI-214	7056.06	1764.49	12.	5.	0.003	99.17	2.114s
Co-56	7083.46	1771.35	28.	-4.	-0.002	180.00	2.117s
y-88	7341.96	1836.06	6.	-3.	-0.002	164.97	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.8238E+00				5.31E+01	
			477.60	-1.824E+00	?(	1.627E+01 2.57E+02 1.05E+01	G
NA-22	C	-9.3865E-01				9.50E+02	
			1274.53	-9.386E-01	?(	2.600E+00 8.21E+01 9.99E+01	G
K-40	N	2.6969E+02				4.66E+11	
			1460.83	2.697E+02	(P	1.187E+01 6.24E+00 1.07E+01	G
Sc-46	F	2.3908E-01				8.38E+01	
			889.28	2.391E-01	?(	2.478E+00 2.95E+02 1.00E+02	G
			1120.55	0.000E+00	-	2.738E+00 1.00E+03 1.00E+02	G
CR-51	F	3.0305E+00				2.77E+01	
			320.08	3.031E+00	?(	1.520E+01 1.47E+02 9.94E+00	G
MN-54	C	-2.8308E-01				3.12E+02	
			834.85	-2.831E-01	?(P	2.010E+00 1.60E+02 1.00E+02	G
FE-59	F	6.4330E-01				4.45E+01	
			1099.25	6.433E-01	?(P	3.216E+00 2.09E+02 5.65E+01	G
			1291.60	-5.565E-03	% P	4.853E+00 4.54E+04 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 9.9283E-01					7.73E+01	
		846.77	5.139E-01	&(	1.167E+00	9.43E+01	9.99E+01 G
		1238.28	1.717E+00	&(P	3.514E+00	9.28E+01	6.61E+01 G
		1037.84	-3.037E+00	+ P	1.368E+01	1.97E+02	1.41E+01 G
		1771.35	-3.591E+00	+	2.277E+01	1.80E+02	1.55E+01 A
CO-57	C 1.5771E-01					2.72E+02	
		122.06	1.577E-01	&(	1.105E+00	2.06E+02	8.56E+01 G
		136.47	-3.339E+00	&	1.507E+01	1.35E+02	1.07E+01 G
CO-58	C -3.0024E-02					7.09E+01	
		810.78	-3.002E-02	%(P	2.345E+00	1.46E+03	9.95E+01 G
CO-60	F 1.3812E-01					1.93E+03	
		1332.50	1.381E-01	?(P	1.387E+00	3.97E+02	1.00E+02 G
		1173.24	-1.762E+00	& P	3.112E+00	3.34E+01	9.99E+01 G
ZN-65	F 6.5402E-07					2.44E+02	
		1115.55	6.540E-07	%(	6.497E+00	2.80E+08	5.06E+01 G
NB-94	I 5.2479E-01					7.41E+06	
		702.63	6.545E-01	?(	1.467E+00	9.24E+01	9.79E+01 G
		871.10	3.977E-01	?(P	1.521E+00	1.10E+02	9.99E+01 G
ZR-95	I -2.6779E-01					6.40E+01	
		756.73	-2.678E-01	?(P	3.062E+00	2.80E+02	5.45E+01 G
		724.20	-1.508E+00	+	5.245E+00	1.03E+02	4.42E+01 G
NB-95	I -6.5511E-01					6.40E+01	
		765.79	-6.551E-01	?(	2.204E+00	9.92E+01	9.98E+01 G
RU-103	I 3.8795E-01					3.93E+01	
		497.05	3.880E-01	&(	1.327E+00	1.34E+02	9.09E+01 G
		610.30	-2.894E+00	+	7.242E+01	7.36E+02	5.75E+00 GA
RH-106	I 5.6809E-01					3.74E+02	
		621.92	5.681E-01	?(	1.760E+01	8.68E+02	9.93E+00 G
		1050.36	-2.643E+01	+	1.832E+02	1.99E+02	1.56E+00 G
		511.86	2.364E+01	?	6.689E+00	1.71E+01	2.00E+01 GA
AG-108M	C 4.3569E-01					1.53E+05	
		433.94	3.045E-01	?(	1.191E+00	1.53E+02	9.05E+01 G
		722.94	5.663E-01	?(	1.875E+00	9.71E+01	9.08E+01 G
		614.28	4.467E-07	%	4.634E+00	3.04E+08	8.98E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F -1.0343E+00					2.50E+02	
		884.68	-1.034E+00	?(	3.520E+00	1.00E+02	7.27E+01 G
		657.76	3.943E-01	+	2.749E+00	2.03E+02	9.46E+01 G
		937.49	-1.454E-01	%	4.984E+00	1.38E+03	3.44E+01 G
		1384.30	-2.855E-01	%	7.679E+00	1.12E+03	2.43E+01 G
		763.94	9.446E-01	&	6.915E+00	2.05E+02	2.23E+01 G
SN-113	F -1.0104E+00					1.15E+02	
		391.69	-1.010E+00	?(P	3.821E+00	9.25E+01	6.40E+01 G
SB-124	F -1.7966E-01					6.02E+01	
		602.73	-7.229E-01	?(	4.393E+00	1.80E+02	9.83E+01 G
		1690.98	0.000E+00	+	1.899E+00	1.00E+03	4.78E+01 G
		722.79	4.758E+00	?(	1.356E+01	8.41E+01	1.08E+01 G
SB-125	I -2.4216E+00					1.01E+03	
		427.88	-2.422E+00	?(P	5.848E+00	9.00E+01	2.96E+01 G
		600.50	-3.959E+00	+	2.462E+01	1.85E+02	1.79E+01 G
		635.89	-3.032E+00	&	1.359E+01	1.29E+02	1.13E+01 G
		463.37	-4.765E+00	&	1.824E+01	1.13E+02	1.05E+01 G
I-131	I 3.3879E-01					8.02E+00	
		364.48	-3.750E-01	?(	1.401E+00	1.42E+02	8.17E+01 G
		284.30	3.609E+00	(	1.681E+01	1.77E+02	6.14E+00 G
		636.97	5.672E+00	?(	2.204E+01	1.13E+02	7.17E+00 G
Gd-153	F 9.7592E-01					2.42E+02	
		97.50	9.759E-01	?(	3.694E+00	1.13E+02	3.00E+01 G
		103.20	-3.528E-02	%	5.519E+00	4.58E+03	2.18E+01 G
Ga-68	C 2.9892E+00					4.71E-02	
		1077.40	2.989E+00	?(	6.205E+01	8.57E+02	3.30E+00 G
Tc-99m	I -3.3523E-01					2.51E-01	
		140.51	-3.352E-01	&(	1.659E+00	1.47E+02	8.93E+01 G
BA-133	F 2.1520E-01					3.85E+03	
		356.00	2.152E-01	?(	4.157E+00	5.68E+02	6.20E+01 G
		302.85	0.000E+00	-	1.168E+01	1.00E+03	1.83E+01 G
		383.84	-6.734E+00	+	2.344E+01	1.04E+02	8.94E+00 GA
		80.99	-1.102E+00	+	3.424E+00	1.16E+02	3.41E+01 GA
CS-134	I 7.9403E-01					7.54E+02	
		604.71	-7.306E-01	&(	4.335E+00	1.76E+02	9.76E+01 G
		795.87	2.012E+00	?(	1.745E+00	3.99E+01	8.55E+01 G
		569.32	9.630E-01	&(	8.785E+00	2.56E+02	1.54E+01 G
		801.95	-1.170E+01	&	2.490E+01	9.25E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	5.834E+00	?(	1.380E+01	9.35E+01	8.35E+00 G
CS-137	I	4.6616E+00					1.10E+04	
			661.66	4.662E+00	(P	1.046E+00	1.36E+01	8.52E+01 G
CE-139	F	-4.4761E-01					1.38E+02	
			165.85	-4.476E-01	(	1.604E+00	1.07E+02	7.99E+01 G
Ba-140	I	-1.6925E+00					1.28E+01	
			537.26	-3.296E+00	?(P	7.291E+00	9.74E+01	2.44E+01 G
			162.66	4.593E+00	&(	1.748E+01	1.13E+02	6.22E+00 G
			304.85	0.000E+00	&	5.020E+01	1.00E+03	4.29E+00 G
La-140	I	-4.2037E-02					1.28E+01	
			1596.21	-1.558E+00	?(	3.062E+00	9.25E+01	9.54E+01 G
			487.02	3.810E-01	+	2.769E+00	2.81E+02	4.55E+01 G
			328.76	7.081E+00	*(	5.175E+00	3.07E+01	2.03E+01 G
			815.77	0.000E+00	+	1.009E+01	1.00E+03	2.33E+01 G
CE-141	I	6.6142E-01					3.25E+01	
			145.44	6.614E-01	&(	2.765E+00	1.25E+02	4.82E+01 G
CE-144	I	-3.0846E+00					2.85E+02	
			133.54	-3.085E+00	?(	1.394E+01	1.35E+02	1.11E+01 G
PM-144	C	5.9150E-01					3.63E+02	
			696.54	4.035E-01	?(P	9.709E-01	9.62E+01	9.90E+01 G
			618.06	7.793E-01	?(	2.943E+00	1.12E+02	9.91E+01 G
EU-152	F	5.7780E-01					4.94E+03	
			344.29	-1.714E+00	?(	8.625E+00	1.49E+02	2.65E+01 G
			1112.07	-2.224E+00	+	2.471E+01	3.18E+02	1.36E+01 G
			121.78	8.749E-01	?(	3.140E+00	1.07E+02	2.86E+01 G
			778.92	-9.918E-01	+	1.357E+01	5.66E+02	1.29E+01 G
			964.11	4.155E+00	?(	1.996E+01	1.40E+02	1.46E+01 G
			244.69	-6.343E+00	+	4.077E+01	1.92E+02	7.58E+00 G
			1408.00	6.029E+00	?	3.703E+00	2.89E+01	2.10E+01 GA
EU-154	I	2.3799E+00					3.14E+03	
			873.23	2.901E+00	&(P	1.324E+01	1.30E+02	1.23E+01 G
			123.10	-5.154E-01	& P	2.373E+00	1.41E+02	4.08E+01 G
			1274.54	0.000E+00	-	8.494E+00	1.00E+03	3.52E+01 G
			723.36	1.919E+00	?(	9.441E+00	1.42E+02	2.02E+01 G
			1004.77	1.406E+00	?(	1.297E+01	2.60E+02	1.80E+01 G
			996.33	4.311E+00	&(	1.308E+01	8.82E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-5.3109E-02					1.81E+03	
			105.31	-5.311E-02	%(P	5.677E+00	2.60E+03	2.12E+01 G
			86.54	-1.209E+00	+	6.658E+00	1.65E+02	3.07E+01 G
HF-181	F	5.9316E-01					4.24E+01	
			482.00	5.932E-01	?(	1.964E+00	9.78E+01	8.05E+01 G
			133.02	-7.884E-01	+	3.472E+00	1.32E+02	4.33E+01 G
			345.83	0.000E+00	-	1.473E+01	1.00E+03	1.51E+01 G
			136.30	-2.833E+00	+	2.731E+01	2.86E+02	5.85E+00 G
Ta-182	F	3.3438E+00					1.14E+02	
			1121.30	3.344E+00	&(	7.510E+00	6.78E+01	3.49E+01 G
			1221.41	6.935E-01	-	1.008E+01	6.47E+02	2.70E+01 G
			1189.05	-5.650E-01	-	1.331E+01	9.88E+02	1.62E+01 G
Hg-203	F	-5.8072E-01					4.66E+01	
			279.20	-5.807E-01	?(	1.907E+00	9.79E+01	8.15E+01 G
TL-208	N	6.4862E+00					6.98E+02	
			583.02	6.476E+00	(	1.176E+00	1.19E+01	8.45E+01 G
			277.28	6.620E+00	?(	2.101E+01	9.45E+01	6.31E+00 G
			860.56	1.067E+01	+	6.056E+00	2.93E+01	1.24E+01 G
pm-146	C	6.5793E-01					2.02E+03	
			747.16	9.542E-01	?(P	3.009E+00	1.23E+02	3.40E+01 G
			735.72	-2.125E+00	& P	7.770E+00	8.61E+01	2.25E+01 G
			453.88	5.029E-01	?(	1.721E+00	1.34E+02	6.50E+01 G
y-88	F	8.2715E-01					1.07E+02	
			898.04	8.272E-01	?(P	1.035E+00	5.37E+01	9.37E+01 G
			1836.06	-4.408E-01	- P	1.919E+00	1.65E+02	9.92E+01 G
Cd-113m		5.4523E+03					5.33E+03	
			263.70	5.452E+03	?(	1.800E+04	9.78E+01	6.00E-03 K
Cd-109	F	9.7391E+00					4.53E+02	
							Derived Ave Activity	
			88.04	9.739E+00	}(	5.150E+01	1.58E+02	3.79E+00 G
Cf-251	T	-2.1585E+00					3.28E+05	
			176.60	-2.158E+00	?(	6.059E+00	1.04E+02	1.70E+01 G
			227.00	2.310E+00	&	1.587E+01	2.49E+02	6.30E+00 GA
Cf-249	T	-4.7616E-01					1.28E+05	
			387.95	-9.234E-01	?(	3.376E+00	1.09E+02	6.60E+01 G
			333.44	1.427E+00	&(	6.853E+00	1.81E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-4.3196E-02					3.65E+07	
			87.57	9.859E-01	}	5.126E+00	8.01E+01	3.75E+01 GA
			64.28	-4.320E-02	%(	1.708E+01	1.16E+04	9.70E+00 G
			86.94	4.099E+00	}	2.120E+01	8.02E+01	9.04E+00 GA
PB-210	N	1.7392E+01					8.14E+03	
			46.54	1.739E+01	(P	3.574E+01	7.33E+01	4.25E+00 G
PB-212	N	2.1058E+01					6.98E+02	
			238.63	2.106E+01	(	1.746E+00	5.62E+00	4.33E+01 G
			300.03	-9.713E+00	-	6.328E+01	1.93E+02	3.28E+00 GA
PB-214	N	1.6020E+01					5.84E+05	
			351.93	1.606E+01	(P	2.420E+00	9.01E+00	3.76E+01 G
			295.09	1.594E+01	(P	5.196E+00	1.67E+01	1.93E+01 G
			242.00	2.098E+01	+ P	1.393E+01	2.26E+01	7.43E+00 GA
BI-212	N	-2.0144E+00					6.98E+02	
			727.17	-2.014E+00	&(P	2.822E+01	2.64E+02	7.55E+00 G
			785.42	4.464E+01	?	1.017E+02	9.59E+01	1.28E+00 GA
BI-214	N	1.6098E+01					5.84E+05	
			609.31	1.610E+01	(P	2.137E+00	9.40E+00	4.61E+01 G
			1120.29	-5.285E+00	- P	2.001E+01	6.87E+01	1.51E+01 G
			1764.49	4.513E+00	- P	1.548E+01	9.92E+01	1.54E+01 G
BI-210M	T	-8.3897E-01					1.10E+09	
			265.83	-8.390E-01	&(	2.828E+00	1.00E+02	5.00E+01 G
			304.90	0.000E+00	&	7.692E+00	1.00E+03	2.80E+01 G
AC-228	N	1.6487E+01					2.10E+03	
			911.07	1.316E+01	?(P	6.999E+00	2.57E+01	2.90E+01 G
			968.97	5.508E+00	- P	1.532E+01	8.28E+01	1.75E+01 G
			338.32	2.451E+01	*(	7.292E+00	1.66E+01	1.20E+01 G
			93.35	6.437E+00	-	3.329E+01	1.55E+02	5.56E+00 XA
TH-227	N	5.1316E+00					7.95E+03	
			50.14	5.769E+00	?(P	1.812E+01	1.10E+02	8.00E+00 G
			256.24	4.404E+00	?(P	1.269E+01	1.10E+02	7.00E+00 G
TH-229	N	1.4037E+01					2.68E+06	
			193.51	1.404E+01	?(	1.822E+01	4.96E+01	4.40E+00 G
			210.85	1.733E-01	% P	3.945E+01	8.26E+03	2.99E+00 G
TH-234	N	2.4517E+01					1.63E+12	
			63.29	2.452E+01	(P	2.929E+01	3.77E+01	3.81E+00 G
			92.59	7.900E+00	- P	1.763E+01	6.78E+01	5.58E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C   1.1745E+00                                      7.82E+08
                          312.01 1.174E+00 ?(  5.507E+00 1.39E+02 3.60E+01 G
                          300.18 0.000E+00 -   3.429E+01 1.00E+03 6.20E+00 G

PA-234   N   7.3560E-01                                      1.63E+12
                          131.29-1.884E+00 &(  8.087E+00 1.28E+02 1.80E+01 G
                          946.02-7.140E+00 +   1.654E+01 9.98E+01 1.34E+01 G
                          569.47-4.516E+00 +   1.949E+01 1.25E+02 8.20E+00 G
                          883.24 5.647E+00 ?(  2.041E+01 1.05E+02 9.60E+00 G
                          880.53 8.999E+00 ?   2.832E+01 9.21E+01 6.00E+00 GA

PA-234M  N   5.3818E+01                                      1.63E+12
                         1001.00 5.382E+01 &(  1.962E+02 1.05E+02 8.37E-01 G
                          766.41-3.768E+02 +   9.389E+02 7.48E+01 2.94E-01 G

AM-241   T   8.0566E-01                                      1.58E+05
                           59.54 8.057E-01 @(P 3.726E+00 1.61E+02 3.59E+01 G

Ir-192   F   8.7511E-02                                      7.40E+01
                          316.49-4.936E-01 ?(  1.615E+00 9.72E+01 8.70E+01 G
                          468.06 1.065E+00 ?(  3.673E+00 1.02E+02 5.18E+01 G
                          308.44 0.000E+00 -   6.849E+00 1.00E+03 3.18E+01 G

Cs-136   F   6.0228E-01                                      1.30E+01
                          818.50 6.023E-01 ?(  1.570E+00 7.75E+01 1.00E+02 G
                         1048.07-8.232E-01 &   2.905E+00 1.03E+02 8.00E+01 G
                          340.57-9.612E-01 -   4.982E+00 1.54E+02 4.69E+01 G

Np-239   T   2.0283E-01                                      2.36E+00
                          103.70 0.000E+00 &   5.016E+00 1.00E+03 2.40E+01 X
                          106.13 2.028E-01 ?(  4.835E+00 6.98E+02 2.27E+01 G
                           99.50 1.591E+00     6.156E+00 1.15E+02 1.50E+01 X

Nd-147      -5.6244E+00                                      1.11E+01
                          531.00-5.624E+00 ?(  1.301E+01 9.34E+01 1.30E+01 G
                           91.10-1.361E+00 +   7.031E+00 1.55E+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	114.	17.	0.009	110.38	5.769E+00	P
AM-241	59.54	156.	13.	0.007	161.42	8.057E-01	P
BA-133	80.99	207.	-22.	-0.012	115.94	-1.102E+00	
EU-155	86.54	705.	-23.	-0.013	164.85	-1.209E+00	
Nd-147	91.10	696.	-24.	-0.014	154.75	-1.361E+00	
Gd-153	97.50	217.	19.	0.010	112.88	9.759E-01	
Np-239	99.50	150.	15.	0.009	114.92	1.591E+00	
Np-239	106.13	218.	3.	0.002	698.41	2.028E-01	
EU-152	121.78	140.	16.	0.009	106.75	8.749E-01	
CO-57	122.06	156.	9.	0.005	205.94	1.577E-01	
EU-154	123.10	164.	-14.	-0.008	141.46	-5.154E-01	P
PA-234	131.29	367.	-21.	-0.012	128.28	-1.884E+00	
HF-181	133.02	388.	-21.	-0.012	131.60	-7.884E-01	
CE-144	133.54	410.	-21.	-0.012	135.02	-3.085E+00	
HF-181	136.30	431.	-10.	-0.006	286.26	-2.833E+00	
CO-57	136.47	437.	-22.	-0.012	134.92	-3.339E+00	
Tc-99m	140.51	337.	-18.	-0.010	147.46	-3.352E-01	
CE-141	145.44	278.	19.	0.011	124.70	6.614E-01	
Ba-140	162.66	156.	16.	0.009	113.14	4.593E+00	
U-235	163.38	242.	-20.	-0.011	111.52	-7.090E+00	
CE-139	165.85	223.	-20.	-0.011	107.00	-4.476E-01	
Cf-251	176.60	127.	-20.	-0.011	104.40	-2.158E+00	
TH-229	193.51	63.	31.	0.017	49.58	1.404E+01	
U-235	205.33	111.	-20.	-0.011	95.50	-8.498E+00	P
Cf-251	227.00	77.	6.	0.004	249.21	2.310E+00	
EU-152	244.69	704.	-20.	-0.011	192.21	-6.343E+00	
TH-227	256.24	48.	12.	0.007	110.49	4.404E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cd-113m	263.70	69.	13.	0.007	97.82	5.452E+03		
BI-210M	265.83	121.	-16.	-0.009	100.33	-8.390E-01		
Hg-203	279.20	135.	-17.	-0.010	97.90	-5.807E-01		
I-131	284.30	55.	8.	0.004	177.00	3.609E+00		
PA-233	312.01	186.	14.	0.008	139.04	1.174E+00		
Ir-192	316.49	88.	-14.	-0.008	97.18	-4.936E-01		
La-140	328.76	44.	46.	0.026	30.74	7.081E+00		
Cf-249	333.44	44.	7.	0.004	181.27	1.427E+00		
Cs-136	340.57	225.	-14.	-0.008	153.75	-9.612E-01		
EU-152	344.29	211.	-14.	-0.008	149.25	-1.714E+00		
BA-133	356.00	256.	4.	0.002	567.89	2.152E-01		
I-131	364.48	44.	-9.	-0.005	141.86	-3.750E-01		
BA-133	383.84	146.	-17.	-0.009	103.65	-6.734E+00		
Cf-249	387.95	163.	-17.	-0.009	108.84	-9.234E-01		
SN-113	391.69	194.	-18.	-0.010	92.53	-1.010E+00		P
SB-125	427.88	80.	-18.	-0.010	90.04	-2.422E+00		P
AG-108M	433.94	28.	7.	0.004	152.75	3.045E-01		
pm-146	453.88	28.	8.	0.004	134.24	5.029E-01		
SB-125	463.37	86.	-12.	-0.007	113.04	-4.765E+00		
Ir-192	468.06	84.	13.	0.007	102.21	1.065E+00		
BE-7	477.59	64.	-4.	-0.002	256.76	-1.824E+00		
HF-181	482.00	54.	11.	0.006	97.79	5.932E-01		
La-140	487.02	32.	4.	0.002	281.37	3.810E-01		
RU-103	497.05	28.	8.	0.004	134.24	3.880E-01		
RH-106	511.86	33.	105.	0.058	17.13	2.364E+01		
Nd-147	531.00	52.	-16.	-0.009	93.42	-5.624E+00		
Ba-140	537.26	57.	-17.	-0.009	97.41	-3.296E+00		P
CS-134	563.24	20.	10.	0.006	93.48	5.834E+00		
CS-134	569.32	28.	3.	0.002	256.04	9.630E-01		
PA-234	569.47	40.	-8.	-0.004	125.43	-4.516E+00		
SB-125	600.50	313.	-14.	-0.008	184.74	-3.959E+00		
SB-124	602.73	300.	-14.	-0.008	180.48	-7.229E-01		
CS-134	604.71	286.	-14.	-0.008	176.16	-7.306E-01		
RU-103	610.30	272.	-3.	-0.002	735.64	-2.894E+00		
PM-144	618.06	127.	15.	0.008	112.07	7.793E-01		
RH-106	621.92	42.	1.	0.001	868.38	5.681E-01		
SB-125	635.89	30.	-6.	-0.004	129.24	-3.032E+00		
I-131	636.97	32.	8.	0.004	113.01	5.672E+00		
AG-110M	657.76	89.	7.	0.004	203.05	3.943E-01		
PM-144	696.54	9.	7.	0.004	96.17	4.035E-01		P
NB-94	702.63	22.	11.	0.006	92.40	6.545E-01		
SB-124	722.79	22.	9.	0.005	84.12	4.758E+00		
AG-108M	722.94	30.	9.	0.005	97.06	5.663E-01		
EU-154	723.36	39.	6.	0.004	142.10	1.919E+00		
ZR-95	724.20	58.	-11.	-0.006	102.62	-1.508E+00		
BI-212	727.17	49.	-3.	-0.001	264.07	-2.014E+00		P
pm-146	735.72	31.	-8.	-0.004	86.11	-2.125E+00		P
pm-146	747.16	9.	5.	0.003	123.32	9.542E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZR-95	756.73	26.	-2.	-0.001	280.47	-2.678E-01		P
AG-110M	763.94	22.	3.	0.002	204.94	9.446E-01		
NB-95	765.79	47.	-10.	-0.006	99.16	-6.551E-01		
PA-234M	766.41	77.	-17.	-0.010	74.84	-3.768E+02		
EU-152	778.92	28.	-2.	-0.001	565.69	-9.918E-01		
BI-212	785.42	14.	9.	0.005	95.86	4.464E+01		
CS-134	795.87	19.	26.	0.015	39.89	2.012E+00		
CS-134	801.95	42.	-15.	-0.009	92.51	-1.170E+01		
Cs-136	818.50	20.	9.	0.005	77.49	6.023E-01		
MN-54	834.85	33.	-4.	-0.002	160.09	-2.831E-01		P
Co-56	846.77	9.	7.	0.004	94.25	5.139E-01		
NB-94	871.10	16.	6.	0.003	110.11	3.977E-01		P
EU-154	873.23	19.	5.	0.003	130.24	2.901E+00		P
PA-234	880.53	21.	8.	0.004	92.13	8.999E+00		
PA-234	883.24	28.	8.	0.004	105.33	5.647E+00		
AG-110M	884.68	51.	-11.	-0.006	100.34	-1.034E+00		
Sc-46	889.28	47.	3.	0.002	294.96	2.391E-01		
y-88	898.04	5.	11.	0.006	53.68	8.272E-01		P
PA-234	946.02	33.	-13.	-0.007	99.76	-7.140E+00		
EU-152	964.11	57.	8.	0.004	140.02	4.155E+00		
EU-154	996.33	10.	6.	0.003	88.25	4.311E+00		
PA-234M	1001.00	15.	6.	0.003	104.92	5.382E+01		
EU-154	1004.77	33.	3.	0.002	260.28	1.406E+00		
Co-56	1037.84	20.	-5.	-0.003	197.23	-3.037E+00		P
Cs-136	1048.07	30.	-8.	-0.004	103.08	-8.232E-01		
RH-106	1050.36	47.	-5.	-0.003	199.00	-2.643E+01		
BI-207	1063.66	35.	-13.	-0.007	103.82	-1.454E+00		
Ga-68	1077.40	15.	1.	0.001	857.32	2.989E+00		
FE-59	1099.25	16.	4.	0.002	208.70	6.433E-01		P
EU-152	1112.07	61.	-4.	-0.002	318.18	-2.224E+00		
CO-60	1173.24	46.	-19.	-0.011	33.41	-1.762E+00		P
Co-56	1238.28	22.	12.	0.007	92.75	1.717E+00		P
NA-22	1274.53	27.	-10.	-0.005	82.11	-9.386E-01		
CO-60	1332.50	6.	1.	0.001	397.16	1.381E-01		P
EU-152	1408.00	0.	12.	0.007	28.87	6.029E+00		
La-140	1596.21	23.	-13.	-0.007	92.52	-1.558E+00		
Co-56	1771.35	28.	-4.	-0.002	180.00	-3.591E+00		
y-88	1836.06	6.	-3.	-0.002	164.97	-4.408E-01		P

P - Peakbackground subtraction

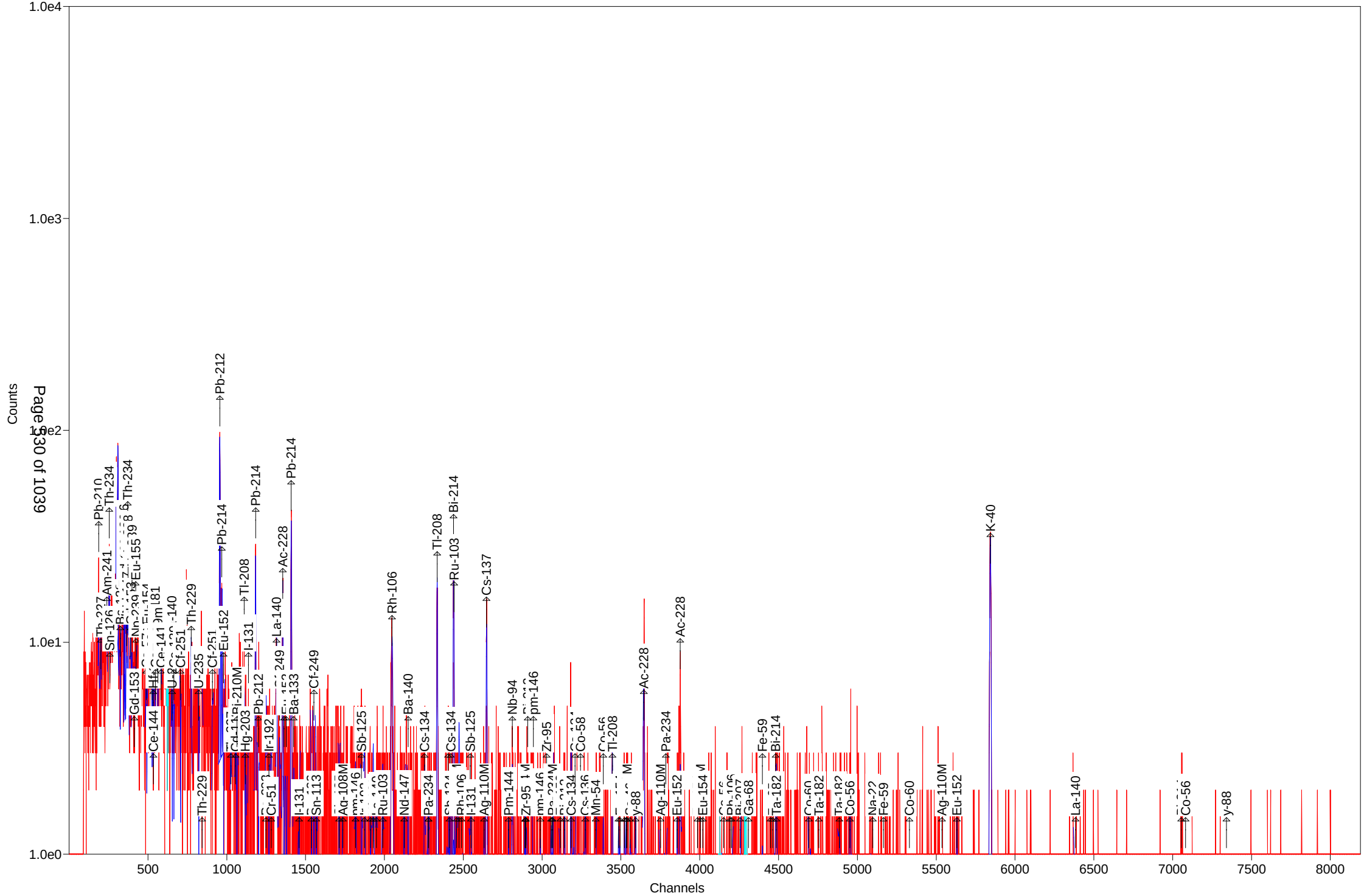
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.8238E+00	-1.8238E+00	2.568E+02%	1.63E+01
NA-22	#A	-9.3865E-01	-9.3865E-01	8.211E+01%	2.60E+00
K-40		2.6969E+02	2.6969E+02	6.240E+00%	1.19E+01
Sc-46	#A	2.3908E-01	2.3908E-01	2.950E+02%	2.48E+00
CR-51	#A	3.0305E+00	3.0305E+00	1.473E+02%	1.52E+01
MN-54	#A	-2.8308E-01	-2.8308E-01	1.601E+02%	2.01E+00
FE-59	#A	6.4329E-01	6.4330E-01	2.087E+02%	3.22E+00
Co-56	#A	9.9283E-01	9.9283E-01	6.612E+01%	1.17E+00
CO-57	#A	1.5771E-01	1.5771E-01	2.059E+02%	1.10E+00
CO-58	#A	-3.0023E-02	-3.0024E-02	1.460E+03%	2.35E+00
CO-60	#A	1.3812E-01	1.3812E-01	3.972E+02%	1.39E+00
ZN-65	#A	6.5402E-07	6.5402E-07	2.799E+08%	6.50E+00
NB-94	#A	5.2479E-01	5.2479E-01	7.187E+01%	1.47E+00
ZR-95	#A	-2.6779E-01	-2.6779E-01	2.805E+02%	3.06E+00
NB-95	#A	-6.5511E-01	-6.5511E-01	9.916E+01%	2.20E+00
RU-103	#A	3.8795E-01	3.8795E-01	1.342E+02%	1.33E+00
RH-106	#A	5.6809E-01	5.6809E-01	8.684E+02%	1.76E+01
AG-108M	#A	4.3569E-01	4.3569E-01	9.049E+01%	1.19E+00
AG-110M	#A	-1.0343E+00	-1.0343E+00	1.003E+02%	3.52E+00
SN-113	#A	-1.0104E+00	-1.0104E+00	9.253E+01%	3.82E+00
SB-124	#A	-1.7966E-01	-1.7966E-01	8.412E+01%	4.39E+00
SB-125	#A	-2.4216E+00	-2.4216E+00	9.004E+01%	5.85E+00
I-131	#A	3.3878E-01	3.3879E-01	8.447E+01%	1.40E+00
Gd-153	#A	9.7592E-01	9.7592E-01	1.129E+02%	3.69E+00
Ga-68	#A	2.9663E+00	2.9892E+00	8.573E+02%	6.20E+01
Tc-99m	#A	-3.3475E-01	-3.3523E-01	1.475E+02%	1.66E+00
BA-133	#A	2.1520E-01	2.1520E-01	5.679E+02%	4.16E+00
CS-134	#A	7.9403E-01	7.9403E-01	3.989E+01%	4.34E+00
CS-137		4.6616E+00	4.6616E+00	1.360E+01%	1.05E+00
CE-139	#A	-4.4761E-01	-4.4761E-01	1.070E+02%	1.60E+00
Ba-140	#A	-1.6925E+00	-1.6925E+00	7.465E+01%	7.29E+00
La-140	#A	-4.2036E-02	-4.2037E-02	3.074E+01%	3.06E+00
CE-141	#A	6.6141E-01	6.6142E-01	1.247E+02%	2.77E+00
CE-144	#A	-3.0846E+00	-3.0846E+00	1.350E+02%	1.39E+01
PM-144	#A	5.9149E-01	5.9150E-01	7.384E+01%	9.71E-01
EU-152	#A	5.7780E-01	5.7780E-01	7.694E+01%	8.63E+00
EU-154	#A	2.3799E+00	2.3799E+00	8.392E+01%	1.32E+01
EU-155	#A	-5.3109E-02	-5.3109E-02	2.598E+03%	5.68E+00
HF-181	#A	5.9316E-01	5.9316E-01	9.779E+01%	1.96E+00
Ta-182	#A	3.3438E+00	3.3438E+00	6.777E+01%	7.51E+00
Hg-203	#A	-5.8071E-01	-5.8072E-01	9.790E+01%	1.91E+00
TL-208		6.4862E+00	6.4862E+00	1.187E+01%	1.18E+00
pm-146	#A	6.5792E-01	6.5793E-01	9.114E+01%	3.01E+00

y-88 #A	8.2715E-01	8.2715E-01	5.368E+01%		1.04E+00
Cd-113m#A	5.4523E+03	5.4523E+03	9.782E+01%		1.80E+04
Cd-109 #A	9.7391E+00	9.7391E+00	1.583E+02%		5.15E+01
Cf-251 #A	-2.1585E+00	-2.1585E+00	1.044E+02%		6.06E+00
Cf-249 #A	-4.7616E-01	-4.7616E-01	1.057E+02%		3.38E+00
Sn-126 #A	-4.3196E-02	-4.3196E-02	1.161E+04%		1.71E+01
PB-210 A	1.7392E+01	1.7392E+01	7.333E+01%		3.57E+01
PB-212	2.1058E+01	2.1058E+01	5.618E+00%		1.75E+00
PB-214	1.6020E+01	1.6020E+01	9.013E+00%		2.42E+00
BI-207 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.66E+00
BI-212 #A	-2.0144E+00	-2.0144E+00	2.641E+02%		2.82E+01
BI-214	1.6098E+01	1.6098E+01	9.402E+00%		2.14E+00
BI-210M#A	-8.3897E-01	-8.3897E-01	1.003E+02%		2.83E+00
AC-228 #	1.6487E+01	1.6487E+01	1.529E+01%		7.00E+00
TH-227 #A	5.1316E+00	5.1316E+00	7.809E+01%		1.81E+01
TH-229 #A	1.4037E+01	1.4037E+01	4.958E+01%		1.82E+01
TH-234 A	2.4517E+01	2.4517E+01	3.766E+01%		2.93E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.43E+01
PA-233 #A	1.1745E+00	1.1745E+00	1.390E+02%		5.51E+00
PA-234 #A	7.3560E-01	7.3560E-01	8.299E+01%		8.09E+00
PA-234M#A	5.3818E+01	5.3818E+01	1.049E+02%		1.96E+02
U-235 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.36E+01
AM-241 #A	8.0566E-01	8.0566E-01	1.614E+02%		3.73E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.57E+01
Ir-192 #A	8.7511E-02	8.7511E-02	7.052E+01%		1.61E+00
Cs-136 #A	6.0227E-01	6.0228E-01	7.749E+01%		1.57E+00
Np-239 #A	2.0280E-01	2.0283E-01	6.984E+02%		4.84E+00
Nd-147 #A	-5.6242E+00	-5.6244E+00	9.342E+01%		1.30E+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)     3.924E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 3.9241269E+02  Bq/Sample
```

257318_Gamma_160-17797-A-6-B. 5_Gamma_20161270.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20161698

Sample Description: 257318_Gamma_160-17797-A-7-B
Detector: Detector # 7
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-7-B

Decay to Time: 7/12/2016 10:33 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:33:57 Real Time: 1831 sec
Analysis Time: 7/12/2016 11:05 Dead Time: 1.68 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-10_0612.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	3.101E+00	126.7	3.927E+00	3.930E+00	1.331E+01
NA-22	0.000E+00	1.#INF	1.644E-01	1.644E-01	1.472E+00
K-40	2.603E+02	5.3	1.372E+01	1.912E+01	7.230E+00
Sc-46	-6.836E-01	91.2	6.233E-01	6.242E-01	2.095E+00
CR-51	-2.987E-01	1777.0	5.307E+00	5.307E+00	1.801E+01
MN-54	-3.703E-01	130.4	4.829E-01	4.833E-01	1.508E+00
FE-59	1.190E+00	62.4	7.427E-01	7.451E-01	1.861E+00
Co-56	2.258E-01	105.2	2.375E-01	2.378E-01	1.361E+00
CO-57	-1.557E-01	89.4	1.391E-01	1.393E-01	8.020E-01
CO-58	-5.830E-01	86.7	5.053E-01	5.062E-01	1.699E+00
CO-60	5.458E-01	83.0	4.532E-01	4.540E-01	1.286E+00
ZN-65	1.531E-01	1081.6	1.656E+00	1.656E+00	5.756E+00
NB-94	6.547E-01	34.6	2.266E-01	2.292E-01	1.177E+00
ZR-95	-2.036E-01	97.3	1.981E-01	1.984E-01	2.534E+00
NB-95	1.541E+00	27.9	4.296E-01	4.369E-01	1.252E+00
RU-103	-1.274E-01	371.4	4.731E-01	4.731E-01	1.157E+00
RH-106	1.214E+00	107.1	1.299E+00	1.301E+00	3.262E+01
AG-108M	7.025E-01	46.6	3.276E-01	3.295E-01	7.817E-01
AG-110M	6.291E-02	482.4	3.035E-01	3.035E-01	2.420E+00
SN-113	2.638E-01	213.7	5.639E-01	5.640E-01	1.928E+00
SB-124	4.772E-01	159.2	7.595E-01	7.599E-01	3.108E+00
SB-125	3.269E+00	30.7	1.003E+00	1.017E+00	2.886E+00
I-131	7.820E-01	100.0	7.823E-01	7.833E-01	9.105E-01
Gd-153	-8.146E-01	140.8	1.147E+00	1.148E+00	3.831E+00
Ga-68	-4.103E+00	646.8	2.654E+01	2.654E+01	5.964E+01
Tc-99m	1.443E-01	216.0	3.118E-01	3.119E-01	1.051E+00
BA-133	1.456E-01	649.3	9.452E-01	9.452E-01	3.200E+00
CS-134	5.420E-01	86.8	4.702E-01	4.710E-01	3.166E+00
CS-137	3.803E+00	16.6	6.318E-01	6.621E-01	1.135E+00
CE-139	9.497E-02	350.3	3.327E-01	3.328E-01	1.128E+00
Ba-140	1.984E+00	73.4	1.457E+00	1.461E+00	3.620E+00
La-140	-6.926E-02	150.9	1.045E-01	1.046E-01	1.943E+00
CE-141	-5.773E-01	159.1	9.183E-01	9.188E-01	3.063E+00

CE-144	-2.319E+00	116.3	2.696E+00	2.699E+00	9.003E+00
PM-144	9.452E-01	43.4	4.106E-01	4.135E-01	9.057E-01
EU-152	8.187E-01	73.0	5.978E-01	5.993E-01	6.367E+00
EU-154	4.570E-01	398.6	1.822E+00	1.822E+00	1.271E+01
EU-155	-3.343E-02	4180.0	1.397E+00	1.397E+00	5.520E+00
HF-181	-1.876E-01	87.3	1.638E-01	1.641E-01	2.188E+00
Ta-182	1.642E+00	97.2	1.596E+00	1.598E+00	7.199E+00
Hg-203	-3.316E-01	111.1	3.683E-01	3.688E-01	1.240E+00
TL-208	5.955E+00	9.7	5.801E-01	6.572E-01	7.650E-01
pm-146	5.664E-01	94.0	5.322E-01	5.330E-01	3.579E+00
y-88	1.565E-01	332.8	5.207E-01	5.208E-01	1.228E+00
Cd-113m	-8.391E+02	435.9	3.658E+03	3.658E+03	1.270E+04
Cd-109	0.000E+00	1.#INF	1.175E+01	1.175E+01	3.945E+01
Cf-251	1.105E+00	137.6	1.521E+00	1.524E+00	3.914E+00
Cf-249	6.405E-01	101.0	6.466E-01	6.475E-01	1.874E+00
Sn-126	3.568E+00	101.3	3.612E+00	3.617E+00	1.205E+01
PB-210	1.250E+01	74.6	9.321E+00	9.349E+00	2.612E+01
PB-212	1.886E+01	4.9	9.240E-01	1.530E+00	1.491E+00
PB-214	1.496E+01	7.5	1.125E+00	1.367E+00	2.175E+00
BI-207	-5.273E-01	74.8	3.942E-01	3.951E-01	1.314E+00
BI-212	4.557E+00	140.9	6.422E+00	6.427E+00	2.198E+01
BI-214	1.695E+01	7.9	1.342E+00	1.605E+00	1.546E+00
BI-210M	-4.422E-01	131.1	5.796E-01	5.802E-01	1.832E+00
AC-228	1.818E+01	8.5	1.537E+00	1.796E+00	1.258E+00
TH-227	-5.048E+00	128.4	6.480E+00	6.486E+00	2.170E+01
TH-229	3.823E+00	160.7	6.143E+00	6.151E+00	1.587E+01
TH-234	2.226E+00	486.3	1.083E+01	1.083E+01	2.956E+01
PA-231	1.116E+01	115.8	1.293E+01	1.294E+01	5.848E+01
PA-233	7.031E-01	164.0	1.153E+00	1.153E+00	4.921E+00
PA-234	1.533E+00	105.3	1.614E+00	1.616E+00	5.273E+00
PA-234M	-6.118E+01	104.7	6.407E+01	6.415E+01	2.712E+02
U-235	-6.579E-01	92.7	6.101E-01	6.110E-01	1.364E+01
AM-241	3.066E-01	382.9	1.174E+00	1.174E+00	3.173E+00
Np-237	0.000E+00	1.#INF	3.707E+00	3.707E+00	1.234E+01
Ir-192	0.000E+00	1.#INF	1.233E-01	1.234E-01	2.060E+00
Cs-136	3.973E-01	130.6	5.191E-01	5.196E-01	1.775E+00
Np-239	1.027E+00	144.3	1.482E+00	1.483E+00	4.951E+00
Nd-147	2.307E-01	252.4	5.825E-01	5.826E-01	8.230E+00
Total	4.045E+02				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-7-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20161698.An1

Acquisition information
Start time: 7/12/2016 10:33:57 AM
Live time: 1800
Real time: 1831
Dead time: 1.68 %
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	7/12/2016 10:33:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-10_0612.PBC 7/10/2016 6:12:03 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2221

***** 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
46.25	24.	74.58	0.78	2.483E-02	46.54	4.250	PBC<MDA	PB210
59.54	7.	382.90	0.85	3.701E-02	59.54	35.900	PBC<MDA	AM241
63.29	6.	486.30	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.28	25.	101.25	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
74.73	204.	11.55	0.87	4.762E-02				
77.14	384.	7.06	0.87	4.889E-02				
86.34	0.	150.54	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	PBC<MDA	EU155
					86.94	9.040	PBC<MDA	Sn126
86.74	13.	184.36	0.88	5.294E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.301E-01	EU155
					86.94	9.040	1.457E+00	Sn126
87.37	56.	40.22	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
89.89	85.	25.48	0.80	5.383E-02				
91.10	17.	252.44	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
93.15	115.	17.61	0.89	5.470E-02	93.35	5.561	2.103E+01	AC228
106.13	24.	144.34	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
122.16	27.	54.84	1.02	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.165E-01	CO57
131.29	23.	121.83	0.93	5.493E-02	131.29	18.000	PBC<MDA	PA234
136.47	8.	380.31	0.93	5.410E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	7.533E-01	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
140.51	12.	216.02	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	22.	104.37	0.96	4.843E-02	162.66	6.220	PBC<MDA	Ba140
163.38	16.	149.69	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
165.85	7.	350.29	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
176.59	16.	137.62	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
186.02	100.	23.23	0.91	4.437E-02				
193.86	13.	160.71	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	4.	567.49	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
209.32	56.	38.45	0.49	4.021E-02				
238.69	530.	5.95	1.01	3.601E-02	238.63	43.300	1.890E+01	PB212
242.10	98.	15.40	1.04	3.560E-02	242.00	7.430	2.066E+01	PB214
256.24	10.	168.95	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
277.76	39.	34.29	1.14	3.172E-02	277.28	6.310	1.087E+01	TL208
284.30	6.	304.84	1.09	3.106E-02	284.30	6.140	PBC<MDA	I131
295.39	166.	11.68	1.18	3.006E-02	295.09	19.300	1.547E+01	PB214
300.07	16.	160.06	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.206E+01	PA231
					300.18	6.200	4.786E+00	PA233
300.18	16.	163.96	1.10	2.965E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.206E+01	PA231
					300.18	6.200	4.786E+00	PA233
300.48	15.	162.27	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
302.65	16.	167.38	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.635E+00	BA133
328.76	12.	151.62	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	100.95	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.46	105.	15.00	0.74	2.676E-02	338.32	12.010	1.812E+01	AC228
345.83	16.	142.31	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.03	257.	8.91	0.95	2.587E-02	351.93	37.600	1.469E+01	PB214
356.00	4.	649.26	1.16	2.562E-02	356.00	62.050	PBC<MDA	BA133
364.48	13.	100.03	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
383.84	14.	107.92	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	203.50	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	7.	213.72	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	14.	96.54	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
433.94	25.	46.63	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
463.37	42.	30.68	1.27	2.040E-02	463.37	10.470	1.081E+01	SB125
477.60	12.	126.65	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
511.86	75.	32.52	2.56	1.870E-02	511.86	20.000	1.114E+01	RH106
537.26	11.	103.34	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
569.32	5.	162.02	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.121E+00	PA234
					569.70	97.740	1.780E-01	BI207
569.47	5.	171.85	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.055E+00	PA234
					569.70	97.740	1.725E-01	BI207

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
583.44	151.	9.74	1.34	1.669E-02	583.02	84.500	5.955E+00	TL208
600.50	12.	218.39	1.40	1.626E-02	600.50	17.860	PBC<MDA	SB125
602.73	6.	413.25	1.40	1.621E-02	602.73	98.260	PBC<MDA	SB124
609.50	216.	7.92	1.78	1.605E-02	609.31	46.090	1.624E+01	BI214
					610.30	5.750	1.304E+02	RU103
636.97	10.	111.23	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
657.76	3.	482.35	1.45	1.500E-02	657.76	94.640	PBC<MDA	AG110M
661.84	87.	16.61	1.14	1.492E-02	661.66	85.210	3.803E+00	CS137
696.54	24.	43.44	1.49	1.426E-02	696.54	99.000	9.452E-01	PM144
702.63	6.	195.52	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
722.79	8.	159.16	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.325E-01	AG108M
					723.36	20.220	1.494E+00	EU154
724.20	8.	154.63	1.51	1.378E-02	724.20	44.150	PBC<MDA	ZR95
727.17	8.	140.93	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
735.72	7.	93.97	1.52	1.358E-02	735.72	22.500	PBC<MDA	pm146
765.79	36.	27.87	1.55	1.311E-02	765.79	99.790	1.541E+00	NB95
					766.41	0.294	5.235E+02	PA234M
778.92	7.	130.32	1.56	1.291E-02	778.92	12.940	PBC<MDA	EU152
785.42	5.	231.42	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
801.95	11.	86.76	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
818.50	9.	130.64	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
860.07	25.	24.04	0.89	1.181E-02	860.56	12.420	9.489E+00	TL208
871.10	22.	34.62	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
880.53	11.	90.57	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
898.04	3.	332.78	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.54	113.	9.48	1.50	1.122E-02	911.07	29.000	1.932E+01	AC228
964.11	10.	126.94	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
968.97	55.	18.12	1.72	1.062E-02	968.97	17.460	1.634E+01	AC228
1004.77	3.	398.61	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1050.36	11.	107.05	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1099.25	9.	89.04	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1120.52	48.	17.26	1.85	9.311E-03	1120.29	15.100	1.911E+01	BI214
					1120.55	99.987	2.886E+00	Sc46
					1121.30	34.900	8.274E+00	Ta182
1121.30	13.	97.16	1.85	9.303E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.662E-01	Sc46
					1121.30	34.900	2.196E+00	Ta182
1173.24	10.	109.79	1.89	8.929E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	4.	336.06	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	105.19	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	10.	87.40	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	7.	124.60	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1408.83	2.	480.00	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.04	365.	5.27	1.98	7.308E-03	1460.83	10.670	2.603E+02	K40
1765.43	35.	17.15	2.29	6.141E-03	1764.49	15.400	2.077E+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
298.47	74.73	177.	204.	4.293E+03	11.55	0.867	- D
308.12	77.14	176.	384.	7.862E+03	7.06	0.869	- D
358.33	89.89	148.	62.	1.153E+03	30.44	0.883	- sD
743.69	186.02	110.	100.	2.245E+03	23.23	0.909	- s
836.63	209.32	92.	51.	1.273E+03	29.95	1.011	- 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	184.53	46.25	101.	24.	0.013	74.58	0.777
TH-227	200.12	50.14	341.	-21.	-0.011	128.36	0.840s
AM-241	237.70	59.54	247.	7.	0.004	382.90	0.850s
TH-234	252.71	63.29	284.	6.	0.003	486.30	0.854s
Sn-126	256.68	64.28	318.	25.	0.014	101.25	0.856
Np-237	345.53	86.49	1049.	0.	0.000	150.54	0.880A
EU-155	345.74	86.54	1003.	-29.	-0.016	154.64	0.880D
Sn-126	347.33	86.94	938.	13.	0.007	184.36	0.880D
Sn-126	349.85	87.57	882.	56.	0.031	40.22	0.881D
Cd-109	351.73	88.04	912.	0.	0.000	1000.00	0.881A
Nd-147	363.97	91.10	941.	17.	0.010	252.44	0.885s
TH-234	369.93	92.59	984.	-26.	-0.014	116.23	0.886s
AC-228	372.97	93.35	148.	115.	0.064	17.61	0.887D
Gd-153	389.57	97.50	579.	-24.	-0.014	140.82	0.892s
Np-239	397.57	99.50	603.	-16.	-0.009	215.09	0.894
Gd-153	412.38	103.20	619.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	619.	0.	0.000	1000.00	0.898s
Np-239	424.10	106.13	572.	24.	0.013	144.34	0.901s
EU-152	488.22	122.16	70.	27.	0.015	54.84	1.024
CO-57	487.83	122.06	204.	-23.	-0.013	89.36	0.918
EU-154	491.98	123.10	240.	-25.	-0.014	122.25	0.919s
PA-234	524.77	131.29	382.	23.	0.013	121.83	0.928
HF-181	531.68	133.02	440.	-25.	-0.014	119.13	0.930s
CE-144	533.74	133.54	419.	-25.	-0.014	116.29	0.930s
HF-181	544.79	136.30	444.	-12.	-0.007	242.89	0.933s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	545.48	136.47	440.	8.	0.004	380.31	0.933s
Tc-99m	561.63	140.51	330.	12.	0.007	216.02	0.938s
U-235	574.73	143.79	892.	-28.	-0.015	109.51	0.941s
CE-141	581.35	145.44	857.	-26.	-0.015	159.08	0.943s
Ba-140	650.24	162.66	257.	22.	0.012	104.37	0.961s
U-235	653.11	163.38	279.	16.	0.009	149.69	0.962s
CE-139	663.01	165.85	269.	7.	0.004	350.29	0.965s
Cf-251	706.00	176.60	128.	16.	0.009	137.62	0.976s
TH-229	773.64	193.51	121.	13.	0.007	160.71	0.994s
U-235	820.94	205.33	294.	4.	0.002	567.49	1.007s
Cf-251	907.62	227.00	121.	-18.	-0.010	116.73	1.029s
PB-212	954.15	238.63	71.	529.	0.294	4.90	1.041D
PB-214	967.61	242.00	66.	98.	0.055	15.40	1.045D
EU-152	978.39	244.69	899.	-20.	-0.011	210.33	1.048s
TH-227	1024.59	256.24	81.	10.	0.006	168.95	1.060s
Cd-113m	1054.43	263.70	84.	-3.	-0.002	435.89	1.067s
BI-210M	1062.96	265.83	122.	-13.	-0.007	131.08	1.070s
TL-208	1110.69	277.76	37.	39.	0.022	34.29	1.142s
Hg-203	1116.44	279.20	137.	-15.	-0.009	111.06	1.083s
I-131	1136.83	284.30	81.	6.	0.003	304.84	1.089s
PB-214	1181.21	295.39	55.	162.	0.090	12.11	1.176
PB-212	1199.76	300.03	298.	15.	0.008	162.27	1.105
PA-231	1199.92	300.07	313.	16.	0.009	160.06	1.105
PA-233	1200.36	300.18	329.	16.	0.009	163.96	1.105
PA-231	1210.24	302.65	345.	16.	0.009	167.38	1.107s
Ba-140	1219.04	304.85	363.	0.	0.000	1000.00	1.110s
BI-210M	1219.23	304.90	363.	0.	0.000	1000.00	1.110s
Ir-192	1233.41	308.44	363.	0.	0.000	1000.00	1.113s
PA-233	1247.69	312.01	363.	0.	0.000	1000.00	1.117s
Ir-192	1265.61	316.49	363.	0.	0.000	1000.00	1.122
La-140	1314.69	328.76	169.	12.	0.007	151.62	1.134s
Cf-249	1333.41	333.44	135.	17.	0.009	100.95	1.139s
AC-228	1353.47	338.46	41.	105.	0.058	15.00	0.736s
Cs-136	1361.93	340.57	281.	-18.	-0.010	132.02	1.146s
EU-152	1376.80	344.29	276.	-20.	-0.011	122.03	1.150s
HF-181	1382.97	345.83	254.	16.	0.009	142.31	1.151s
PB-214	1407.76	352.03	58.	257.	0.143	8.91	0.952s
BA-133	1423.66	356.00	364.	4.	0.002	649.26	1.162s
I-131	1457.59	364.48	44.	13.	0.007	100.03	1.170s
BA-133	1535.03	383.84	103.	14.	0.008	107.92	1.189s
Cf-249	1551.47	387.95	116.	8.	0.004	203.50	1.193s
SN-113	1566.43	391.69	114.	7.	0.004	213.72	1.197s
SB-125	1711.18	427.88	44.	14.	0.008	96.54	1.233s
AG-108M	1735.43	433.94	28.	25.	0.014	46.63	1.239s
pm-146	1815.20	453.88	60.	0.	0.000	1000.00	1.258s
SB-125	1853.15	463.37	60.	42.	0.023	30.68	1.268s
Ir-192	1871.93	468.06	106.	-6.	-0.003	268.76	1.272s
BE-7	1910.07	477.60	103.	12.	0.006	126.65	1.282

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	1927.68	482.00	165.	-18.	-0.010	101.16	1.286s
La-140	1947.77	487.02	141.	-12.	-0.006	148.20	1.291s
RU-103	1987.91	497.05	52.	-4.	-0.002	371.37	1.301s
RH-106	2047.15	511.86	80.	75.	0.042	32.52	2.565s
Nd-147	2123.70	531.00	48.	-3.	-0.001	532.02	1.333s
Ba-140	2148.74	537.26	31.	11.	0.006	103.34	1.339s
CS-134	2252.65	563.24	65.	-3.	-0.002	348.51	1.364s
CS-134	2276.99	569.32	35.	5.	0.003	162.02	1.369s
PA-234	2277.59	569.47	37.	5.	0.003	171.85	1.370s
BI-207	2278.51	569.70	62.	-16.	-0.009	74.76	1.370s
TL-208	2333.47	583.44	13.	151.	0.084	9.74	1.340
SB-125	2401.71	600.50	331.	12.	0.007	218.39	1.399s
SB-124	2410.64	602.73	344.	6.	0.004	413.25	1.401s
CS-134	2418.55	604.71	350.	0.	0.000	1000.00	1.403s
BI-214	2437.70	609.50	15.	216.	0.120	7.92	1.780s
RU-103	2440.91	610.30	350.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	350.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	350.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	366.	-13.	-0.007	209.31	1.419s
SB-125	2543.28	635.89	44.	-17.	-0.009	102.73	1.432s
I-131	2547.62	636.97	52.	10.	0.005	111.23	1.433s
AG-110M	2630.77	657.76	140.	3.	0.002	482.35	1.452s
CS-137	2647.09	661.84	25.	87.	0.048	16.61	1.143
PM-144	2785.90	696.54	19.	24.	0.013	43.44	1.487s
NB-94	2810.25	702.63	33.	6.	0.004	195.52	1.493s
SB-124	2890.87	722.79	68.	8.	0.004	159.16	1.511s
AG-108M	2891.48	722.94	75.	0.	0.000	1000.00	1.511s
EU-154	2893.15	723.36	75.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	64.	8.	0.004	154.63	1.512s
BI-212	2908.41	727.17	68.	8.	0.005	140.93	1.515
pm-146	2942.61	735.72	9.	7.	0.004	93.97	1.523s
ZR-95	3026.65	756.73	42.	-12.	-0.007	118.15	1.541s
AG-110M	3055.51	763.94	69.	-16.	-0.009	66.61	1.548s
NB-95	3062.89	765.79	33.	36.	0.020	27.87	1.549s
PA-234M	3065.38	766.41	64.	-8.	-0.005	138.68	1.550s
EU-152	3115.41	778.92	19.	7.	0.004	130.32	1.561
BI-212	3141.41	785.42	33.	5.	0.003	231.42	1.567s
CS-134	3183.20	795.87	75.	-5.	-0.003	265.92	1.576s
CS-134	3207.54	801.95	40.	11.	0.006	86.76	1.581
CO-58	3242.84	810.78	57.	-13.	-0.007	86.69	1.589s
La-140	3262.82	815.77	70.	0.	0.000	1000.00	1.593s
Cs-136	3273.74	818.50	62.	9.	0.005	130.64	1.596s
MN-54	3339.13	834.85	42.	-8.	-0.004	130.41	1.610s
Co-56	3386.82	846.77	33.	-7.	-0.004	185.94	1.620s
TL-208	3440.01	860.07	3.	25.	0.014	24.04	0.889s
NB-94	3484.13	871.10	18.	22.	0.012	34.62	1.641s
PA-234	3521.86	880.53	41.	11.	0.006	90.57	1.649s
PA-234	3532.70	883.24	52.	0.	0.000	1000.00	1.652s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	3556.86	889.28	76.	-14.	-0.008	91.17	1.657s
y-88	3591.90	898.04	20.	3.	0.002	332.78	1.664s
AC-228	3645.91	911.54	1.	113.	0.063	9.48	1.500
AG-110M	3749.71	937.49	40.	-2.	-0.001	518.92	1.697s
EU-152	3856.18	964.11	81.	10.	0.006	126.94	1.719
AC-228	3875.62	968.97	21.	55.	0.030	18.12	1.724D
PA-234M	4003.73	1001.00	72.	-10.	-0.005	104.72	1.750s
EU-154	4018.84	1004.77	70.	3.	0.002	398.61	1.753s
Cs-136	4192.02	1048.07	58.	-19.	-0.010	62.45	1.788s
RH-106	4201.18	1050.36	60.	11.	0.006	107.05	1.790s
BI-207	4254.38	1063.66	38.	-8.	-0.004	142.27	1.801s
Ga-68	4309.34	1077.40	32.	-2.	-0.001	646.79	1.812s
FE-59	4396.74	1099.25	11.	9.	0.005	89.04	1.829s
EU-152	4448.04	1112.07	125.	-16.	-0.009	103.89	1.839s
BI-214	4480.88	1120.29	11.	48.	0.027	17.26	1.845D
Sc-46	4481.94	1120.55	114.	-17.	-0.009	92.13	1.846
Ta-182	4484.94	1121.30	71.	13.	0.007	97.16	1.846s
CO-60	4692.68	1173.24	22.	10.	0.006	109.79	1.886s
Ta-182	4885.37	1221.41	32.	4.	0.002	336.06	1.923s
Co-56	4952.84	1238.28	22.	10.	0.006	105.19	1.936s
NA-22	5097.84	1274.53	17.	0.	0.000	1000.00	1.963s
EU-154	5097.89	1274.54	17.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	11.	10.	0.005	87.40	1.975s
CO-60	5329.71	1332.50	11.	7.	0.004	124.60	2.005s
AG-110M	5536.89	1384.30	12.	-2.	-0.001	704.67	2.042s
EU-152	5631.70	1408.00	11.	2.	0.001	480.00	2.059s
K-40	5843.86	1461.04	3.	365.	0.203	5.27	1.984
La-140	6384.49	1596.21	18.	-4.	-0.002	261.01	2.185s
SB-124	6763.55	1690.98	0.	0.	0.000	1000.00	2.245s
BI-214	7057.56	1764.49	1.	35.	0.020	17.15	2.290
Co-56	7084.99	1771.35	36.	0.	0.000	1000.00	2.294s
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	3.1006E+00				5.31E+01	
			477.60	3.101E+00	?(	1.331E+01 1.27E+02 1.05E+01	G
K-40	N	2.6035E+02				4.66E+11	
			1460.83	2.603E+02	(P	7.230E+00 5.27E+00 1.07E+01	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F	-6.8360E-01					8.38E+01	
			889.28	-6.836E-01	&(	2.095E+00	9.12E+01	1.00E+02 G
			1120.55	-1.013E+00	+	3.129E+00	9.21E+01	1.00E+02 G
CR-51	F	-2.9867E-01					2.77E+01	
			320.08	-2.987E-01	%(	1.801E+01	1.78E+03	9.94E+00 G
MN-54	C	-3.7031E-01					3.12E+02	
			834.85	-3.703E-01	?(P	1.508E+00	1.30E+02	1.00E+02 G
FE-59	F	1.1905E+00					4.45E+01	
			1099.25	9.334E-01	?(	1.861E+00	8.90E+01	5.65E+01 G
			1291.60	1.527E+00	?(	2.892E+00	8.74E+01	4.32E+01 G
Co-56	C	2.2580E-01					7.73E+01	
			846.77	-3.093E-01	?(	1.361E+00	1.86E+02	9.99E+01 G
			1238.28	1.035E+00	?(P	2.407E+00	1.05E+02	6.61E+01 G
			1037.84	2.134E-01	% P	1.033E+01	2.04E+03	1.41E+01 G
			1771.35	0.000E+00	-	1.799E+01	1.00E+03	1.55E+01 A
CO-57	C	-1.5566E-01					2.72E+02	
			122.06	-2.691E-01	(	8.020E-01	8.94E+01	8.56E+01 G
			136.47	7.533E-01	?(	9.658E+00	3.80E+02	1.07E+01 G
CO-58	C	-5.8295E-01					7.09E+01	
			810.78	-5.830E-01	?(	1.699E+00	8.67E+01	9.95E+01 G
CO-60	F	5.4579E-01					1.93E+03	
			1332.50	4.659E-01	?(	1.286E+00	1.25E+02	1.00E+02 G
			1173.24	6.257E-01	?(P	1.529E+00	1.10E+02	9.99E+01 G
ZN-65	F	1.5309E-01					2.44E+02	
			1115.55	1.531E-01	%(	5.756E+00	1.08E+03	5.06E+01 G
NB-94	I	6.5470E-01					7.41E+06	
			702.63	2.540E-01	?(	1.177E+00	1.96E+02	9.79E+01 G
			871.10	1.047E+00	&(	1.070E+00	3.46E+01	9.99E+01 G
ZR-95	I	-2.0361E-01					6.40E+01	
			756.73	-9.241E-01	?(	2.534E+00	1.18E+02	5.45E+01 G
			724.20	6.851E-01	?(	3.640E+00	1.55E+02	4.42E+01 G
NB-95	I	1.5412E+00					6.40E+01	
			765.79	1.541E+00	?(	1.252E+00	2.79E+01	9.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	-1.2739E-01					3.93E+01	
			497.05	-1.274E-01	?(	1.157E+00	3.71E+02	9.09E+01 G
			610.30	0.000E+00	+	5.419E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.2137E+00					3.74E+02	
			621.92	-4.631E+00	?(	3.262E+01	2.09E+02	9.93E+00 G
			1050.36	3.842E+01	?(	1.396E+02	1.07E+02	1.56E+00 G
			511.86	1.114E+01	?	6.592E+00	3.25E+01	2.00E+01 GA
AG-108M	C	7.0245E-01					1.53E+05	
			433.94	7.025E-01	&(P	7.817E-01	4.66E+01	9.05E+01 G
			722.94	0.000E+00	-	1.909E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.488E+00	1.00E+03	8.98E+01 G
AG-110M	F	6.2914E-02					2.50E+02	
			884.68	-3.277E-02	&(P	2.420E+00	1.24E+03	7.27E+01 G
			657.76	1.364E-01	?(P	2.260E+00	4.82E+02	9.46E+01 G
			937.49	-3.062E-01	+ P	4.762E+00	5.19E+02	3.44E+01 G
			1384.30	-4.665E-01	+ P	5.528E+00	7.05E+02	2.43E+01 G
			763.94	-2.999E+00	+ P	7.852E+00	6.66E+01	2.23E+01 G
SN-113	F	2.6384E-01					1.15E+02	
			391.69	2.638E-01	?(P	1.928E+00	2.14E+02	6.40E+01 G
SB-124	F	4.7720E-01					6.02E+01	
			602.73	2.224E-01	&(P	3.108E+00	4.13E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.341E+00	1.00E+03	4.78E+01 G
			722.79	2.793E+00	?(	1.527E+01	1.59E+02	1.08E+01 G
SB-125	I	3.2688E+00					1.01E+03	
			427.88	1.202E+00	(	2.886E+00	9.65E+01	2.96E+01 G
			600.50	2.273E+00	?(P	1.673E+01	2.18E+02	1.79E+01 G
			635.89	-5.319E+00	+ P	1.072E+01	1.03E+02	1.13E+01 G
			463.37	1.081E+01	(P	1.013E+01	3.07E+01	1.05E+01 G
I-131	I	7.8201E-01					8.02E+00	
			364.48	3.654E-01	?(	9.105E-01	1.00E+02	8.17E+01 G
			284.30	1.627E+00	&(P	1.304E+01	3.05E+02	6.14E+00 G
			636.97	4.806E+00	?(	1.822E+01	1.11E+02	7.17E+00 G
Gd-153	F	-8.1458E-01					2.42E+02	
			97.50	-8.146E-01	?(	3.831E+00	1.41E+02	3.00E+01 G
			103.20	0.000E+00	+	5.380E+00	1.00E+03	2.18E+01 G
Ga-68	C	-4.1029E+00					4.71E-02	
			1077.40	-4.103E+00	?(	5.964E+01	6.47E+02	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	1.4431E-01					2.51E-01	
			140.51	1.443E-01	(	1.051E+00	2.16E+02	8.93E+01 G
BA-133	F	1.4558E-01					3.85E+03	
			356.00	1.456E-01	?(	3.200E+00	6.49E+02	6.20E+01 G
			302.85	2.181E-01	&	9.396E+00	1.27E+03	1.83E+01 G
			383.84	3.549E+00	?	1.292E+01	1.08E+02	8.94E+00 GA
			80.99	9.091E-02	% P	2.524E+00	1.03E+03	3.41E+01 GA
CS-134	I	5.4196E-01					7.54E+02	
			604.71	0.000E+00	?(	3.166E+00	1.00E+03	9.76E+01 G
			795.87	-2.393E-01	+	2.204E+00	2.66E+02	8.55E+01 G
			569.32	1.131E+00	?(	6.391E+00	1.62E+02	1.54E+01 G
			801.95	5.588E+00	?(	1.636E+01	8.68E+01	8.69E+00 G
			563.24	-1.312E+00	& P	1.562E+01	3.49E+02	8.35E+00 G
CS-137	I	3.8031E+00					1.10E+04	
			661.66	3.803E+00	(P	1.135E+00	1.66E+01	8.52E+01 G
CE-139	F	9.4968E-02					1.38E+02	
			165.85	9.497E-02	?(	1.128E+00	3.50E+02	7.99E+01 G
Ba-140	I	1.9839E+00					1.28E+01	
			537.26	1.447E+00	?(P	3.620E+00	1.03E+02	2.44E+01 G
			162.66	4.089E+00	?(	1.427E+01	1.04E+02	6.22E+00 G
			304.85	0.000E+00	-	4.049E+01	1.00E+03	4.29E+00 G
La-140	I	-6.9256E-02					1.28E+01	
			1596.21	-3.458E-01	?(	1.943E+00	2.61E+02	9.54E+01 G
			487.02	-7.229E-01	+	3.629E+00	1.48E+02	4.55E+01 G
			328.76	1.230E+00	&(	6.307E+00	1.52E+02	2.03E+01 G
			815.77	0.000E+00	+	8.033E+00	1.00E+03	2.33E+01 G
CE-141	I	-5.7726E-01					3.25E+01	
			145.44	-5.773E-01	&(	3.063E+00	1.59E+02	4.82E+01 G
CE-144	I	-2.3187E+00					2.85E+02	
			133.54	-2.319E+00	&(	9.003E+00	1.16E+02	1.11E+01 G
PM-144	C	9.4515E-01					3.63E+02	
			696.54	9.452E-01	?(P	9.057E-01	4.34E+01	9.90E+01 G
			618.06	0.000E+00	-	3.179E+00	1.00E+03	9.91E+01 G
EU-152	F	8.1866E-01					4.94E+03	
			344.29	-1.557E+00	&(	6.367E+00	1.22E+02	2.65E+01 G
			1112.07	-6.803E+00	+	2.377E+01	1.04E+02	1.36E+01 G
			121.78	9.474E-01	+	1.442E+00	5.48E+01	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	2.439E+00	(	7.597E+00	1.30E+02	1.29E+01 G
			964.11	3.693E+00	&(	1.595E+01	1.27E+02	1.46E+01 G
			244.69	-4.215E+00	+	2.961E+01	2.10E+02	7.58E+00 G
			1408.00	5.831E-01	?	6.437E+00	4.80E+02	2.10E+01 GA
EU-154	I	4.5703E-01					3.14E+03	
			873.23	-1.942E-01	%(	1.271E+01	1.83E+03	1.23E+01 G
			123.10	-5.988E-01	& P	1.824E+00	1.22E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.180E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.581E+00	1.00E+03	2.02E+01 G
			1004.77	9.007E-01	?(	1.252E+01	3.99E+02	1.80E+01 G
			996.33	-5.063E-01	%	1.980E+01	1.11E+03	1.06E+01 G
EU-155	I	-3.3430E-02					1.81E+03	
			105.31	-3.343E-02	%(P	5.520E+00	4.18E+03	2.12E+01 G
			86.54	-9.999E-01	&	5.151E+00	1.55E+02	3.07E+01 G
HF-181	F	-1.8765E-01					4.24E+01	
			482.00	-6.454E-01	?(	2.188E+00	1.01E+02	8.05E+01 G
			133.02	-5.926E-01	+	2.357E+00	1.19E+02	4.33E+01 G
			345.83	2.258E+00	?(P	1.080E+01	1.42E+02	1.51E+01 G
			136.30	-2.168E+00	+	1.771E+01	2.43E+02	5.85E+00 G
Ta-182	F	1.6424E+00					1.14E+02	
			1121.30	2.196E+00	?(	7.199E+00	9.72E+01	3.49E+01 G
			1221.41	9.262E-01	&(P	6.961E+00	3.36E+02	2.70E+01 G
			1189.05	5.219E-02	% P	1.044E+01	8.76E+03	1.62E+01 G
Hg-203	F	-3.3158E-01					4.66E+01	
			279.20	-3.316E-01	?(	1.240E+00	1.11E+02	8.15E+01 G
TL-208	N	5.9553E+00					6.98E+02	
			583.02	5.955E+00	(P	7.650E-01	9.74E+00	8.45E+01 G
			277.28	1.087E+01	+	8.602E+00	3.43E+01	6.31E+00 G
			860.56	9.489E+00	+ P	4.057E+00	2.40E+01	1.24E+01 G
pm-146	C	5.6640E-01					2.02E+03	
			747.16	4.065E-02	%(	3.579E+00	3.64E+03	3.40E+01 G
			735.72	1.361E+00	?(	3.081E+00	9.40E+01	2.25E+01 G
			453.88	0.000E+00	&	1.597E+00	1.00E+03	6.50E+01 G
y-88	F	1.5649E-01					1.07E+02	
			898.04	1.565E-01	?(	1.228E+00	3.33E+02	9.37E+01 G
			1836.06	0.000E+00	-	6.973E-01	1.00E+03	9.92E+01 G
Cd-113m		-8.3913E+02					5.33E+03	
			263.70	-8.391E+02	?(	1.270E+04	4.36E+02	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.1050E+00					3.28E+05	
			176.60	1.105E+00	?(	3.914E+00	1.38E+02	1.70E+01 G
			227.00	-4.225E+00	+	1.267E+01	1.17E+02	6.30E+00 GA
Cf-249	T	6.4053E-01					1.28E+05	
			387.95	2.695E-01	&(	1.874E+00	2.03E+02	6.60E+01 G
			333.44	2.219E+00	&(	7.522E+00	1.01E+02	1.55E+01 G
Sn-126		3.5675E+00					3.65E+07	
			87.57	1.559E+00	}	3.934E+00	4.02E+01	3.75E+01 GA
			64.28	3.568E+00	(	1.205E+01	1.01E+02	9.70E+00 G
			86.94	1.457E+00	}	1.688E+01	1.84E+02	9.04E+00 GA
PB-210	N	1.2497E+01					8.14E+03	
			46.54	1.250E+01	(P	2.612E+01	7.46E+01	4.25E+00 G
PB-212	N	1.8858E+01					6.98E+02	
			238.63	1.886E+01	(P	1.491E+00	4.90E+00	4.33E+01 G
			300.03	8.703E+00	- P	4.749E+01	1.62E+02	3.28E+00 GA
PB-214	N	1.4956E+01					5.84E+05	
			351.93	1.469E+01	@(P	2.175E+00	8.91E+00	3.76E+01 G
			295.09	1.547E+01	(P	3.574E+00	1.21E+01	1.93E+01 G
			242.00	2.066E+01	+	8.499E+00	1.54E+01	7.43E+00 GA
BI-207	C	-5.2727E-01					1.18E+04	
			569.70	-5.273E-01	?(	1.314E+00	7.48E+01	9.77E+01 G
			1063.66	-5.974E-01	+ P	2.397E+00	1.42E+02	7.45E+01 G
BI-212	N	4.5571E+00					6.98E+02	
			727.17	4.557E+00	(	2.198E+01	1.41E+02	7.55E+00 G
			785.42	1.806E+01		9.939E+01	2.31E+02	1.28E+00 GA
BI-214	N	1.6949E+01					5.84E+05	
			609.31	1.624E+01	(P	1.546E+00	7.92E+00	4.61E+01 G
			1120.29	1.911E+01	(	7.078E+00	1.73E+01	1.51E+01 G
			1764.49	2.077E+01	+ P	4.329E+00	1.71E+01	1.54E+01 G
BI-210M	T	-4.4217E-01					1.10E+09	
			265.83	-4.422E-01	?(P	1.832E+00	1.31E+02	5.00E+01 G
			304.90	0.000E+00	+	6.204E+00	1.00E+03	2.80E+01 G
AC-228	N	1.8185E+01					2.10E+03	
			911.07	1.932E+01	(P	1.258E+00	9.48E+00	2.90E+01 G
			968.97	1.634E+01	(P	7.284E+00	1.81E+01	1.75E+01 G
			338.32	1.812E+01	(P	5.632E+00	1.50E+01	1.20E+01 G
			93.35	2.103E+01		1.085E+01	1.76E+01	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-5.0484E+00					7.95E+03	
			50.14	-5.048E+00	&(	2.170E+01	1.28E+02	8.00E+00 G
			256.24	2.371E+00	+ P	1.044E+01	1.69E+02	7.00E+00 G
TH-229	N	3.8227E+00					2.68E+06	
			193.51	3.823E+00	?(	1.587E+01	1.61E+02	4.40E+00 G
			210.85	-1.535E-02	%	4.008E+01	7.67E+04	2.99E+00 G
TH-234	N	2.2265E+00					1.63E+12	
			63.29	2.226E+00	*(P	2.956E+01	4.86E+02	3.81E+00 G
			92.59	-4.714E+00	+ P	2.717E+01	1.16E+02	5.58E+00 G
PA-231	N	1.1163E+01					1.20E+07	
			302.65	1.040E+01	?(	5.848E+01	1.67E+02	2.88E+00 G
			300.07	1.206E+01	?(	6.487E+01	1.60E+02	2.46E+00 G
PA-233	C	7.0310E-01					7.82E+08	
			312.01	0.000E+00	&(	4.921E+00	1.00E+03	3.60E+01 G
			300.18	4.786E+00	?(	2.637E+01	1.64E+02	6.20E+00 G
PA-234	N	1.5325E+00					1.63E+12	
			131.29	1.295E+00	?(	5.273E+00	1.22E+02	1.80E+01 G
			946.02	-3.822E-01	%	9.941E+00	1.10E+03	1.34E+01 G
			569.47	2.055E+00	?(	1.233E+01	1.72E+02	8.20E+00 G
			883.24	0.000E+00	-	1.821E+01	1.00E+03	9.60E+00 G
			880.53	8.537E+00	?	2.615E+01	9.06E+01	6.00E+00 GA
PA-234M	N	-6.1184E+01					1.63E+12	
			1001.00	-6.118E+01	?(P	2.712E+02	1.05E+02	8.37E-01 G
			766.41	-1.219E+02	+	5.788E+02	1.39E+02	2.94E-01 G
U-235	N	-6.5789E-01					2.57E+11	
			143.79	-2.644E+00	*(P	1.364E+01	1.10E+02	1.10E+01 G
			205.33	1.164E+00	+ P	2.241E+01	5.67E+02	5.01E+00 G
			163.38	3.628E+00	?(P	1.825E+01	1.50E+02	5.08E+00 G
AM-241	T	3.0661E-01					1.58E+05	
			59.54	3.066E-01	?(	3.173E+00	3.83E+02	3.59E+01 G
Cs-136	F	3.9733E-01					1.30E+01	
			818.50	3.973E-01	?(	1.775E+00	1.31E+02	1.00E+02 G
			1048.07	-1.309E+00	+	2.693E+00	6.25E+01	8.00E+01 G
			340.57	-8.125E-01	+	3.599E+00	1.32E+02	4.69E+01 G
Np-239	T	1.0267E+00					2.36E+00	
			103.70	0.000E+00	-	4.884E+00	1.00E+03	2.40E+01 X
			106.13	1.027E+00	(	4.951E+00	1.44E+02	2.27E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                            99.50-1.079E+00 &   7.778E+00 2.15E+02 1.50E+01 X

Nd-147       2.3074E-01                                        1.11E+01
                           531.00-6.292E-01 &(  8.230E+00 5.32E+02 1.30E+01 G
                            91.10 6.258E-01 ?(  5.280E+00 2.52E+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	341.	-21.	-0.011	128.36	-5.048E+00	
AM-241	59.54	247.	7.	0.004	382.90	3.066E-01	
TH-234	63.29	284.	6.	0.003	486.30	2.226E+00	P
EU-155	86.54	1003.	-29.	-0.016	154.64	-9.999E-01	
Nd-147	91.10	941.	17.	0.010	252.44	6.258E-01	
TH-234	92.59	984.	-26.	-0.014	116.23	-4.714E+00	P
Gd-153	97.50	579.	-24.	-0.014	140.82	-8.146E-01	
Np-239	99.50	603.	-16.	-0.009	215.09	-1.079E+00	
Np-239	106.13	572.	24.	0.013	144.34	1.027E+00	
CO-57	122.06	204.	-23.	-0.013	89.36	-2.691E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	123.10	240.	-25.	-0.014	122.25	-5.988E-01	P
PA-234	131.29	382.	23.	0.013	121.83	1.295E+00	
HF-181	133.02	440.	-25.	-0.014	119.13	-5.926E-01	
CE-144	133.54	419.	-25.	-0.014	116.29	-2.319E+00	
HF-181	136.30	444.	-12.	-0.007	242.89	-2.168E+00	
CO-57	136.47	440.	8.	0.004	380.31	7.533E-01	
Tc-99m	140.51	330.	12.	0.007	216.02	1.443E-01	
U-235	143.79	892.	-28.	-0.015	109.51	-2.644E+00	P
CE-141	145.44	857.	-26.	-0.015	159.08	-5.773E-01	
Ba-140	162.66	257.	22.	0.012	104.37	4.089E+00	
U-235	163.38	279.	16.	0.009	149.69	3.628E+00	P
CE-139	165.85	269.	7.	0.004	350.29	9.497E-02	
U-235	205.33	294.	4.	0.002	567.49	1.164E+00	P
TH-227	256.24	81.	10.	0.006	168.95	2.371E+00	P
Cd-113m	263.70	84.	-3.	-0.002	435.89	-8.391E+02	
BI-210M	265.83	122.	-13.	-0.007	131.08	-4.422E-01	P
Hg-203	279.20	137.	-15.	-0.009	111.06	-3.316E-01	
I-131	284.30	81.	6.	0.003	304.84	1.627E+00	P
PA-231	300.07	313.	16.	0.009	160.06	1.206E+01	
PA-233	300.18	329.	16.	0.009	163.96	4.786E+00	
PA-231	302.65	345.	16.	0.009	167.38	1.040E+01	
La-140	328.76	169.	12.	0.007	151.62	1.230E+00	
Cf-249	333.44	135.	17.	0.009	100.95	2.219E+00	
Cs-136	340.57	281.	-18.	-0.010	132.02	-8.125E-01	
HF-181	345.83	254.	16.	0.009	142.31	2.258E+00	P
BA-133	356.00	364.	4.	0.002	649.26	1.456E-01	
I-131	364.48	44.	13.	0.007	100.03	3.654E-01	
BA-133	383.84	103.	14.	0.008	107.92	3.549E+00	
Cf-249	387.95	116.	8.	0.004	203.50	2.695E-01	
SN-113	391.69	114.	7.	0.004	213.72	2.638E-01	P
AG-108M	433.94	28.	25.	0.014	46.63	7.025E-01	P
Ir-192	468.06	106.	-6.	-0.003	268.76	-2.920E-01	
BE-7	477.60	103.	12.	0.006	126.65	3.101E+00	
HF-181	482.00	165.	-18.	-0.010	101.16	-6.454E-01	
La-140	487.02	141.	-12.	-0.006	148.20	-7.229E-01	
RU-103	497.05	52.	-4.	-0.002	371.37	-1.274E-01	
RH-106	511.86	80.	75.	0.042	32.52	1.114E+01	
Nd-147	531.00	48.	-3.	-0.001	532.02	-6.292E-01	
Ba-140	537.26	31.	11.	0.006	103.34	1.447E+00	P
CS-134	563.24	65.	-3.	-0.002	348.51	-1.312E+00	P
CS-134	569.32	35.	5.	0.003	162.02	1.131E+00	
PA-234	569.47	37.	5.	0.003	171.85	2.055E+00	
BI-207	569.70	62.	-16.	-0.009	74.76	-5.273E-01	
SB-124	602.73	344.	6.	0.004	413.25	2.224E-01	P
RH-106	621.92	366.	-13.	-0.007	209.31	-4.631E+00	
I-131	636.97	52.	10.	0.005	111.23	4.806E+00	
AG-110M	657.76	140.	3.	0.002	482.35	1.364E-01	P
NB-94	702.63	33.	6.	0.004	195.52	2.540E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
SB-124	722.79	68.	8.	0.004	159.16	2.793E+00		
ZR-95	724.20	64.	8.	0.004	154.63	6.851E-01		
BI-212	727.17	68.	8.	0.005	140.93	4.557E+00		
pm-146	735.72	9.	7.	0.004	93.97	1.361E+00		
ZR-95	756.73	42.	-12.	-0.007	118.15	-9.241E-01		
AG-110M	763.94	69.	-16.	-0.009	66.61	-2.999E+00		P
PA-234M	766.41	64.	-8.	-0.005	138.68	-1.219E+02		
BI-212	785.42	33.	5.	0.003	231.42	1.806E+01		
CS-134	795.87	75.	-5.	-0.003	265.92	-2.393E-01		
CS-134	801.95	40.	11.	0.006	86.76	5.588E+00		
CO-58	810.78	57.	-13.	-0.007	86.69	-5.830E-01		
Cs-136	818.50	62.	9.	0.005	130.64	3.973E-01		
MN-54	834.85	42.	-8.	-0.004	130.41	-3.703E-01		P
Co-56	846.77	33.	-7.	-0.004	185.94	-3.093E-01		
NB-94	871.10	18.	22.	0.012	34.62	1.047E+00		
PA-234	880.53	41.	11.	0.006	90.57	8.537E+00		
Sc-46	889.28	76.	-14.	-0.008	91.17	-6.836E-01		
y-88	898.04	20.	3.	0.002	332.78	1.565E-01		
AG-110M	937.49	40.	-2.	-0.001	518.92	-3.062E-01		P
PA-234M	1001.00	72.	-10.	-0.005	104.72	-6.118E+01		P
EU-154	1004.77	70.	3.	0.002	398.61	9.007E-01		
Cs-136	1048.07	58.	-19.	-0.010	62.45	-1.309E+00		
RH-106	1050.36	60.	11.	0.006	107.05	3.842E+01		
BI-207	1063.66	38.	-8.	-0.004	142.27	-5.974E-01		P
Ga-68	1077.40	32.	-2.	-0.001	646.79	-4.103E+00		
FE-59	1099.25	11.	9.	0.005	89.04	9.334E-01		
Sc-46	1120.55	114.	-17.	-0.009	92.13	-1.013E+00		
Ta-182	1121.30	71.	13.	0.007	97.16	2.196E+00		
CO-60	1173.24	22.	10.	0.006	109.79	6.257E-01		P
Ta-182	1221.41	32.	4.	0.002	336.06	9.262E-01		P
Co-56	1238.28	22.	10.	0.006	105.19	1.035E+00		P
FE-59	1291.60	11.	10.	0.005	87.40	1.527E+00		
CO-60	1332.50	11.	7.	0.004	124.60	4.659E-01		
AG-110M	1384.30	12.	-2.	-0.001	704.67	-4.665E-01		P
La-140	1596.21	18.	-4.	-0.002	261.01	-3.458E-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	3.1005E+00	3.1006E+00	1.267E+02%		1.33E+01
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%		1.47E+00
K-40		2.6035E+02	2.6035E+02	5.269E+00%		7.23E+00
Sc-46	#A	-6.8360E-01	-6.8360E-01	9.117E+01%		2.10E+00
CR-51	#A	-2.9866E-01	-2.9867E-01	1.777E+03%		1.80E+01

MN-54	#A	-3.7031E-01	-3.7031E-01	1.304E+02%	1.51E+00
FE-59	#A	1.1905E+00	1.1905E+00	6.238E+01%	1.86E+00
Co-56	#A	2.2580E-01	2.2580E-01	1.052E+02%	1.36E+00
CO-57	#A	-1.5566E-01	-1.5566E-01	8.936E+01%	8.02E-01
CO-58	#A	-5.8295E-01	-5.8295E-01	8.669E+01%	1.70E+00
CO-60	#A	5.4579E-01	5.4579E-01	8.303E+01%	1.29E+00
ZN-65	#A	1.5309E-01	1.5309E-01	1.082E+03%	5.76E+00
NB-94	#A	6.5470E-01	6.5470E-01	3.462E+01%	1.18E+00
ZR-95	#A	-2.0361E-01	-2.0361E-01	9.730E+01%	2.53E+00
NB-95	#	1.5412E+00	1.5412E+00	2.787E+01%	1.25E+00
RU-103	#A	-1.2739E-01	-1.2739E-01	3.714E+02%	1.16E+00
RH-106	#A	1.2137E+00	1.2137E+00	1.071E+02%	3.26E+01
AG-108M	#A	7.0245E-01	7.0245E-01	4.663E+01%	7.82E-01
AG-110M	#A	6.2914E-02	6.2914E-02	4.824E+02%	2.42E+00
SN-113	#A	2.6383E-01	2.6384E-01	2.137E+02%	1.93E+00
SB-124	#A	4.7720E-01	4.7720E-01	1.592E+02%	3.11E+00
SB-125	#C	3.2688E+00	3.2688E+00	3.068E+01%	2.89E+00
I-131	#A	7.8197E-01	7.8201E-01	1.000E+02%	9.10E-01
Gd-153	#A	-8.1458E-01	-8.1458E-01	1.408E+02%	3.83E+00
Ga-68	#A	-4.0632E+00	-4.1029E+00	6.468E+02%	5.96E+01
Tc-99m	#A	1.4405E-01	1.4431E-01	2.160E+02%	1.05E+00
BA-133	#A	1.4558E-01	1.4558E-01	6.493E+02%	3.20E+00
CS-134	#A	5.4196E-01	5.4196E-01	8.676E+01%	3.17E+00
CS-137		3.8031E+00	3.8031E+00	1.661E+01%	1.14E+00
CE-139	#A	9.4968E-02	9.4968E-02	3.503E+02%	1.13E+00
Ba-140	#A	1.9838E+00	1.9839E+00	7.344E+01%	3.62E+00
La-140	#A	-6.9254E-02	-6.9256E-02	1.509E+02%	1.94E+00
CE-141	#A	-5.7726E-01	-5.7726E-01	1.591E+02%	3.06E+00
CE-144	#A	-2.3187E+00	-2.3187E+00	1.163E+02%	9.00E+00
PM-144	#	9.4515E-01	9.4515E-01	4.344E+01%	9.06E-01
EU-152	A	8.1866E-01	8.1866E-01	7.302E+01%	6.37E+00
EU-154	#A	4.5703E-01	4.5703E-01	3.986E+02%	1.27E+01
EU-155	#A	-3.3430E-02	-3.3430E-02	4.180E+03%	5.52E+00
HF-181	#A	-1.8765E-01	-1.8765E-01	8.730E+01%	2.19E+00
Ta-182	#A	1.6424E+00	1.6424E+00	9.716E+01%	7.20E+00
Hg-203	#A	-3.3158E-01	-3.3158E-01	1.111E+02%	1.24E+00
TL-208		5.9553E+00	5.9553E+00	9.741E+00%	7.65E-01
pm-146	#A	5.6640E-01	5.6640E-01	9.397E+01%	3.58E+00
y-88	#A	1.5648E-01	1.5649E-01	3.328E+02%	1.23E+00
Cd-113m	#A	-8.3913E+02	-8.3913E+02	4.359E+02%	1.27E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.94E+01
Cf-251	#A	1.1050E+00	1.1050E+00	1.376E+02%	3.91E+00
Cf-249	#A	6.4053E-01	6.4053E-01	1.010E+02%	1.87E+00
Sn-126	A	3.5675E+00	3.5675E+00	1.013E+02%	1.21E+01
PB-210	A	1.2497E+01	1.2497E+01	7.458E+01%	2.61E+01
PB-212		1.8858E+01	1.8858E+01	4.900E+00%	1.49E+00
PB-214		1.4956E+01	1.4956E+01	7.519E+00%	2.18E+00
BI-207	#A	-5.2727E-01	-5.2727E-01	7.476E+01%	1.31E+00
BI-212	#A	4.5571E+00	4.5571E+00	1.409E+02%	2.20E+01

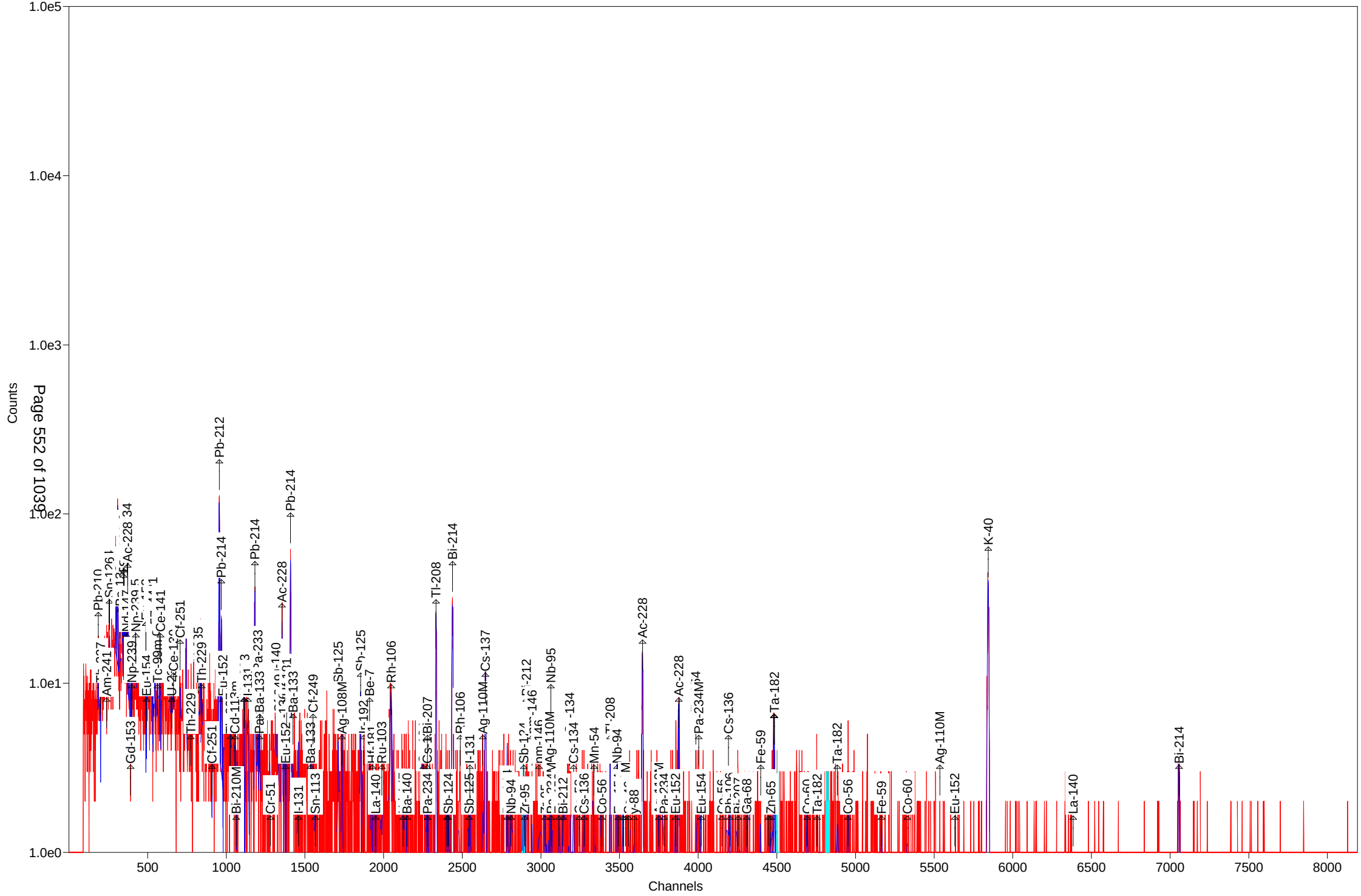
BI-214	1.6949E+01	1.6949E+01	7.919E+00%	1.55E+00
BI-210M#A	-4.4217E-01	-4.4217E-01	1.311E+02%	1.83E+00
AC-228	1.8185E+01	1.8185E+01	8.454E+00%	1.26E+00
TH-227 #A	-5.0484E+00	-5.0484E+00	1.284E+02%	2.17E+01
TH-229 #A	3.8227E+00	3.8227E+00	1.607E+02%	1.59E+01
TH-234 #A	2.2265E+00	2.2265E+00	4.863E+02%	2.96E+01
PA-231 #A	1.1163E+01	1.1163E+01	1.158E+02%	5.85E+01
PA-233 #A	7.0310E-01	7.0310E-01	1.640E+02%	4.92E+00
PA-234 #A	1.5325E+00	1.5325E+00	1.053E+02%	5.27E+00
PA-234M#A	-6.1184E+01	-6.1184E+01	1.047E+02%	2.71E+02
U-235 #A	-6.5789E-01	-6.5789E-01	9.273E+01%	1.36E+01
AM-241 #A	3.0661E-01	3.0661E-01	3.829E+02%	3.17E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.23E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.06E+00
Cs-136 #A	3.9732E-01	3.9733E-01	1.306E+02%	1.77E+00
Np-239 #A	1.0265E+00	1.0267E+00	1.443E+02%	4.95E+00
Nd-147 #A	2.3073E-01	2.3074E-01	2.524E+02%	8.23E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 3.516E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.5155014E+02 Bq/Sample

257318_Gamma_160-17797-A-7-B. 7_Gamma_20161698.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161003

Sample Description: 257318_Gamma_160-17797-A-8-B
Detector: Detector # 8
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-8-B

Decay to Time: 7/12/2016 10:38 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:39:12 Real Time: 1853 sec
Analysis Time: 7/12/2016 11:10 Dead Time: 2.88 %
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_2016-07-10_1451.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	-6.190E+00	103.9	6.432E+00	6.440E+00	2.156E+01
NA-22	3.471E-01	116.9	4.058E-01	4.062E-01	1.436E+00
K-40	2.591E+02	5.8	1.490E+01	1.995E+01	8.115E+00
Sc-46	6.339E-01	101.0	6.400E-01	6.409E-01	2.169E+00
CR-51	-5.126E+00	77.8	3.990E+00	3.999E+00	1.550E+01
MN-54	-2.977E-01	246.9	7.349E-01	7.351E-01	1.741E+00
FE-59	-2.433E+00	41.3	1.004E+00	1.011E+00	4.470E+00
Co-56	8.277E-01	92.3	7.643E-01	7.655E-01	1.147E+00
CO-57	2.679E-01	235.5	6.307E-01	6.309E-01	1.140E+00
CO-58	2.099E-01	263.7	5.534E-01	5.535E-01	1.937E+00
CO-60	3.094E-01	66.3	2.052E-01	2.058E-01	8.901E-01
ZN-65	-1.906E+00	104.6	1.993E+00	1.995E+00	6.723E+00
NB-94	-4.605E-01	142.7	6.571E-01	6.575E-01	1.539E+00
ZR-95	-6.291E-01	185.9	1.170E+00	1.170E+00	2.769E+00
NB-95	-3.139E-02	1984.1	6.229E-01	6.229E-01	2.189E+00
RU-103	1.145E+00	35.0	4.013E-01	4.056E-01	8.834E-01
RH-106	3.344E+00	148.7	4.972E+00	4.975E+00	3.738E+01
AG-108M	4.573E-01	98.6	4.511E-01	4.517E-01	1.085E+00
AG-110M	-1.099E+00	81.8	8.990E-01	9.007E-01	3.014E+00
SN-113	5.850E-01	116.4	6.808E-01	6.815E-01	2.303E+00
SB-124	-6.749E-01	175.1	1.182E+00	1.182E+00	3.970E+00
SB-125	2.065E+00	64.8	1.339E+00	1.343E+00	2.973E+00
I-131	1.161E+00	72.0	8.358E-01	8.379E-01	1.211E+00
Gd-153	0.000E+00	1.#INF	4.344E-01	4.344E-01	7.221E+00
Ga-68	1.487E+01	168.9	2.512E+01	2.513E+01	5.838E+01
Tc-99m	0.000E+00	1.#INF	2.574E-01	2.574E-01	1.930E+00
BA-133	-7.745E-01	151.3	1.172E+00	1.172E+00	3.933E+00
CS-134	-2.829E-01	99.1	2.804E-01	2.808E-01	3.923E+00
CS-137	4.671E+00	13.9	6.487E-01	6.927E-01	1.132E+00
CE-139	3.832E-01	100.7	3.861E-01	3.878E-01	1.292E+00
Ba-140	3.314E+00	41.6	1.378E+00	1.389E+00	3.108E+00
La-140	8.164E-01	83.2	6.794E-01	6.807E-01	1.434E+00
CE-141	-7.884E-01	147.6	1.163E+00	1.164E+00	3.881E+00

CE-144	2.835E+00	147.7	4.188E+00	4.190E+00	1.400E+01
PM-144	-7.884E-01	92.4	7.287E-01	7.298E-01	1.673E+00
EU-152	1.250E+00	91.6	1.145E+00	1.146E+00	8.593E+00
EU-154	2.396E+00	86.8	2.081E+00	2.084E+00	1.757E+01
EU-155	5.213E-01	193.0	1.006E+00	1.006E+00	1.018E+01
HF-181	-2.019E-02	78.5	1.584E-02	1.588E-02	2.979E+00
Ta-182	2.260E+00	106.4	2.405E+00	2.407E+00	8.156E+00
Hg-203	-9.366E-02	464.8	4.353E-01	4.353E-01	1.500E+00
TL-208	4.895E+00	12.8	6.263E-01	6.758E-01	1.018E+00
pm-146	8.474E-01	185.6	1.573E+00	1.574E+00	3.772E+00
y-88	2.953E-01	224.8	6.637E-01	6.638E-01	1.598E+00
Cd-113m	-7.164E+03	82.9	5.937E+03	5.955E+03	1.981E+04
Cd-109	0.000E+00	1.#INF	1.801E+01	1.801E+01	6.035E+01
Cf-251	9.445E-02	2239.4	2.115E+00	2.115E+00	5.519E+00
Cf-249	9.128E-01	100.9	9.211E-01	9.223E-01	2.110E+00
Sn-126	2.279E+00	251.3	5.726E+00	5.728E+00	1.924E+01
PB-210	3.777E+01	24.9	9.410E+00	9.667E+00	2.326E+01
PB-212	2.039E+01	5.4	1.091E+00	1.711E+00	1.716E+00
PB-214	1.580E+01	6.7	1.064E+00	1.344E+00	1.838E+00
BI-207	-2.646E-01	147.1	3.892E-01	3.894E-01	1.412E+00
BI-212	3.301E+01	22.3	7.368E+00	7.564E+00	1.321E+01
BI-214	1.771E+01	7.8	1.384E+00	1.663E+00	1.463E+00
BI-210M	-1.163E-03	63879.6	7.431E-01	7.431E-01	2.568E+00
AC-228	1.519E+01	15.7	2.378E+00	2.501E+00	6.460E+00
TH-227	8.838E-01	49.1	4.343E-01	4.370E-01	2.586E+01
TH-229	3.914E-01	2239.4	8.764E+00	8.764E+00	2.287E+01
TH-234	2.736E+01	34.1	9.323E+00	9.432E+00	2.956E+01
PA-231	-4.609E+00	551.9	2.544E+01	2.544E+01	8.586E+01
PA-233	-2.986E-02	3612.0	1.078E+00	1.078E+00	6.998E+00
PA-234	3.179E+00	79.1	2.516E+00	2.521E+00	8.219E+00
PA-234M	-2.217E+01	335.8	7.446E+01	7.447E+01	2.691E+02
U-235	-7.933E-01	378.8	3.005E+00	3.005E+00	1.549E+01
AM-241	8.113E-01	190.9	1.549E+00	1.549E+00	5.198E+00
Np-237	0.000E+00	1.#INF	5.140E+00	5.140E+00	1.723E+01
Ir-192	5.802E-01	66.9	3.881E-01	3.896E-01	1.266E+00
Cs-136	3.342E-01	171.9	5.747E-01	5.750E-01	1.402E+00
Np-239	-1.851E+00	167.9	3.108E+00	3.110E+00	1.034E+01
Nd-147	1.867E+00	155.2	2.898E+00	2.900E+00	7.195E+00
Total	4.884E+02				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-8-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161003.An1

Acquisition information
Start time: 7/12/2016 10:39:12 AM
Live time: 1800
Real time: 1853
Dead time: 2.88 %
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	7/12/2016 10:38:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-07-10_1451.PBC 7/10/2016 2:51:27 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1459

***** 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
46.50	58.	24.91	1.41	2.005E-02	46.54	4.250	3.777E+01	PB210
59.54	15.	190.88	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.31	58.	34.08	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
64.31	13.	251.31	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
74.80	168.	13.56	1.03	3.617E-02				
77.14	270.	8.71	1.04	3.700E-02				
87.20	111.	19.60	0.83	3.975E-02	86.49	13.100	1.191E+01	Np237
					86.54	30.700	5.079E+00	EU155
					86.94	9.040	1.721E+01	Sn126
					87.57	37.500	4.135E+00	Sn126
					88.04	3.790	4.082E+01	Cd109
92.60	14.	162.94	1.05	4.072E-02	92.59	5.584	PBC<MDA	TH234
93.36	18.	262.68	1.05	4.083E-02	93.35	5.561	PBC<MDA	AC228
99.50	13.	114.94	1.05	4.151E-02	99.50	15.000	PBC<MDA	Np239
103.70	6.	741.48	1.06	4.178E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	3.589E-01	Np239
121.78	23.	91.55	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.544E-01	CO57
122.06	4.	553.37	1.07	4.146E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	6.042E-02	CO57
131.22	23.	141.91	1.08	4.061E-02	131.29	18.000	PBC<MDA	PA234
133.02	23.	144.79	1.08	4.041E-02	133.02	43.300	PBC<MDA	HF181

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					133.54	11.090	2.834E+00	CE144
133.54	23.	147.74	1.08	4.035E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.835E+00	CE144
136.30	23.	150.38	1.08	4.001E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.976E+00	CO57
136.47	15.	235.47	1.08	3.999E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.930E+00	CO57
163.38	-3.	714.69	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
165.85	20.	100.75	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
185.54	95.	21.04	0.95	3.332E-02				
227.00	15.	135.59	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.67	410.	6.43	1.02	2.744E-02	238.63	43.300	1.916E+01	PB212
242.06	87.	15.87	1.16	2.714E-02	242.00	7.430	2.408E+01	PB214
256.24	33.	49.14	1.17	2.596E-02	256.24	7.000	PBC<MDA	TH227
279.17	6.	265.24	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
					279.20	81.460	PBC<MDA	Hg203
284.30	12.	141.42	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.33	131.	11.42	1.29	2.322E-02	295.09	19.300	1.621E+01	PB214
300.21	34.	26.08	1.20	2.294E-02	300.03	3.280	2.529E+01	PB212
					300.07	2.460	3.372E+01	PA231
					300.18	6.200	1.338E+01	PA233
316.49	14.	92.39	1.22	2.199E-02	316.49	87.040	PBC<MDA	Ir192
328.76	14.	164.74	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	14.	168.51	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.29	88.	20.58	0.91	2.085E-02	338.32	12.010	1.952E+01	AC228
340.57	14.	171.94	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	14.	175.60	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.95	225.	7.73	1.29	2.021E-02	351.93	37.600	1.644E+01	PB214
364.48	10.	139.28	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	12.	106.29	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	12.	111.09	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
391.69	13.	116.38	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
427.88	12.	91.54	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
433.94	13.	98.65	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
463.37	13.	91.82	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
468.06	13.	96.77	1.33	1.606E-02	468.06	51.750	PBC<MDA	Ir192
487.02	15.	116.67	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
497.05	29.	35.04	1.35	1.530E-02	497.05	90.900	1.145E+00	RU103
511.86	83.	26.00	2.61	1.494E-02	511.86	20.000	1.544E+01	RH106
531.00	6.	155.20	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
537.26	21.	41.59	1.37	1.436E-02	537.26	24.390	3.314E+00	Ba140
563.24	9.	99.95	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.47	13.	79.13	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.354E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.39	100.	12.79	1.40	1.342E-02	583.02	84.500	4.895E+00	TL208
609.37	190.	7.82	0.86	1.294E-02	609.31	46.090	1.771E+01	BI214
					610.30	5.750	1.422E+02	RU103

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
636.97	12.	85.09	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
661.68	87.	13.89	1.16	1.209E-02	661.66	85.210	4.671E+00	CS137
723.36	6.	190.61	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.540E-01	AG108M
					723.36	20.220	1.591E+00	EU154
727.04	50.	22.32	0.91	1.118E-02	727.17	7.550	3.301E+01	BI212
747.16	6.	185.64	1.51	1.093E-02	747.16	34.000	PBC<MDA	pm146
810.78	4.	263.68	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
818.50	2.	524.40	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
846.77	9.	92.34	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.20	4.	284.30	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
873.23	2.	547.55	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
880.53	2.	563.92	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234
889.28	11.	100.97	1.60	9.438E-03	889.28	99.984	PBC<MDA	Sc46
898.04	5.	224.77	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.57	65.	23.59	1.62	9.247E-03	911.07	29.000	1.340E+01	AC228
937.49	3.	370.93	1.63	9.026E-03	937.49	34.360	PBC<MDA	AG110M
969.52	83.	12.69	1.06	8.776E-03	968.97	17.460	3.015E+01	AC228
996.33	10.	86.82	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1001.00	-3.	335.80	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	120.54	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	8.	95.89	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	6.	148.70	1.70	8.193E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	-3.	258.92	1.71	8.106E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	6.	168.87	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1120.42	49.	14.51	1.31	7.754E-03	1120.29	15.100	2.302E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.14	11.	106.41	1.74	7.748E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.884E-01	Sc46
					1121.30	34.900	2.260E+00	Ta182
1172.83	3.	220.66	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	2.	507.29	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	6.	248.66	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	4.	116.91	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	9.858E-01	EU154
1331.92	5.	66.32	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	1.	796.87	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	4.	152.39	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1461.04	307.	5.75	1.89	6.164E-03	1460.83	10.670	2.591E+02	K40
1596.21	4.	146.89	1.99	5.706E-03	1596.21	95.400	PBC<MDA	La140
1765.10	7.	72.11	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.01	74.81	176.	168.	4.644E+03	13.56	1.034	- sD
308.36	77.15	141.	270.	7.302E+03	8.71	1.036	- D
742.00	185.54	90.	95.	2.861E+03	21.04	0.947	- 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	46.50	50.	58.	0.032	24.91	1.408s
TH-227	200.37	50.14	307.	-23.	-0.013	107.93	1.015s
AM-241	237.95	59.54	408.	15.	0.008	190.88	1.022s
TH-234	252.96	63.29	166.	58.	0.032	34.08	1.025D
Sn-126	256.93	64.28	488.	13.	0.007	251.31	1.026s
Np-237	345.77	86.49	1151.	0.	0.000	1000.00	1.043A
EU-155	345.98	86.54	1178.	25.	0.014	193.00	1.043s
Sn-126	347.57	86.94	1185.	15.	0.008	142.74	1.044D
Sn-126	350.09	87.57	1116.	61.	0.034	33.57	1.044D
Nd-147	364.21	91.10	1234.	-28.	-0.016	175.79	1.047s
TH-234	370.17	92.59	251.	14.	0.008	162.94	1.048D
AC-228	373.21	93.35	1138.	18.	0.010	262.68	1.049s
Gd-153	389.81	97.50	1156.	0.	0.000	1000.00	1.052s
Np-239	397.81	99.50	107.	13.	0.007	114.94	1.053D
Gd-153	412.62	103.20	1156.	0.	0.000	1000.00	1.056s
Np-239	414.62	103.70	1150.	6.	0.004	741.48	1.057s
EU-155	421.07	105.31	1176.	-6.	-0.004	766.89	1.058s
Np-239	424.34	106.13	1397.	-32.	-0.018	167.93	1.058s
EU-152	486.92	121.78	204.	23.	0.013	91.55	1.071s
CO-57	488.06	122.06	226.	4.	0.002	553.37	1.071s
EU-154	492.22	123.10	193.	-5.	-0.003	395.47	1.072
PA-234	525.00	131.29	512.	23.	0.013	141.91	1.078s
HF-181	531.92	133.02	535.	23.	0.013	144.79	1.079s
CE-144	533.98	133.54	557.	23.	0.013	147.74	1.080s
HF-181	545.02	136.30	580.	23.	0.013	150.38	1.082s
CO-57	545.72	136.47	603.	15.	0.008	235.47	1.082s
Tc-99m	561.86	140.51	618.	0.	0.000	1000.00	1.085s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	574.97	143.79	624.	-6.	-0.003	378.83	1.087
CE-141	581.59	145.44	751.	-26.	-0.015	147.57	1.089s
U-235	653.35	163.38	264.	-3.	-0.002	714.69	1.102s
CE-139	663.24	165.85	193.	20.	0.011	100.75	1.104s
U-235	821.17	205.33	135.	-8.	-0.004	254.09	1.134s
TH-229	843.24	210.85	172.	-16.	-0.009	162.42	1.138
Cf-251	907.84	227.00	104.	15.	0.008	135.59	1.151s
PB-212	954.37	238.63	53.	436.	0.242	5.35	1.159D
PB-214	967.84	242.00	53.	87.	0.049	15.87	1.162D
EU-152	978.62	244.69	753.	-21.	-0.012	185.88	1.164
TH-227	1024.81	256.24	60.	33.	0.018	49.14	1.172s
Cd-113m	1054.65	263.70	123.	-20.	-0.011	82.88	1.178
TL-208	1108.99	277.28	117.	6.	0.003	265.24	1.188s
Hg-203	1116.66	279.20	118.	-3.	-0.002	464.76	1.189s
I-131	1137.05	284.30	72.	12.	0.007	141.42	1.193s
PB-214	1180.22	295.09	25.	118.	0.065	11.03	1.201D
PB-212	1199.98	300.03	23.	34.	0.019	26.08	1.205D
PA-233	1200.58	300.18	465.	-16.	-0.009	189.54	1.205s
PA-231	1210.46	302.65	448.	-5.	-0.003	551.89	1.207s
BA-133	1211.27	302.85	443.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	443.	0.	0.000	1000.00	1.208
BI-210M	1219.45	304.90	443.	0.	0.000	1000.00	1.208
Ir-192	1233.62	308.44	443.	0.	0.000	1000.00	1.211s
Ir-192	1265.82	316.49	77.	14.	0.008	92.39	1.217s
CR-51	1280.20	320.08	153.	-20.	-0.011	77.83	1.219s
La-140	1314.91	328.76	264.	14.	0.008	164.74	1.226s
Cf-249	1333.63	333.44	278.	14.	0.008	168.51	1.229s
AC-228	1353.03	338.29	48.	88.	0.049	20.58	0.910s
Cs-136	1362.15	340.57	292.	14.	0.008	171.94	1.234
EU-152	1377.01	344.29	307.	14.	0.008	175.60	1.237
HF-181	1383.19	345.83	375.	-17.	-0.009	166.05	1.238s
PB-214	1407.66	351.95	23.	225.	0.125	7.73	1.293
BA-133	1423.87	356.00	335.	-17.	-0.010	151.29	1.245s
I-131	1457.81	364.48	48.	10.	0.006	139.28	1.252s
BA-133	1535.24	383.84	78.	12.	0.007	106.29	1.266s
Cf-249	1551.68	387.95	90.	12.	0.007	111.09	1.269s
SN-113	1566.64	391.69	100.	13.	0.007	116.38	1.271s
SB-125	1711.39	427.88	28.	12.	0.007	91.54	1.297s
AG-108M	1735.64	433.94	35.	13.	0.007	98.65	1.301s
pm-146	1815.41	453.88	53.	-4.	-0.002	329.71	1.315s
SB-125	1853.36	463.37	64.	13.	0.007	91.82	1.322s
Ir-192	1872.14	468.06	73.	13.	0.007	96.77	1.325s
BE-7	1910.28	477.60	176.	-19.	-0.010	103.92	1.332s
HF-181	1927.89	482.00	195.	-19.	-0.010	108.74	1.335s
La-140	1947.98	487.02	154.	15.	0.009	116.67	1.339s
RU-103	1988.12	497.05	17.	29.	0.016	35.04	1.346
RH-106	2047.36	511.86	56.	83.	0.046	26.00	2.606s
Nd-147	2123.91	531.00	22.	6.	0.004	155.20	1.369s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	2148.95	537.26	13.	21.	0.012	41.59	1.373s
CS-134	2252.86	563.24	18.	9.	0.005	99.95	1.391s
CS-134	2277.20	569.32	48.	-14.	-0.008	76.39	1.395s
PA-234	2277.80	569.47	45.	13.	0.007	79.13	1.395
BI-207	2278.73	569.70	45.	-6.	-0.004	147.08	1.396s
TL-208	2333.50	583.39	15.	100.	0.056	12.79	1.397
SB-125	2401.92	600.50	380.	-16.	-0.009	178.91	1.416s
SB-124	2410.85	602.73	365.	-16.	-0.009	175.10	1.418s
CS-134	2418.76	604.71	349.	-16.	-0.009	171.23	1.419s
BI-214	2437.40	609.37	8.	190.	0.106	7.82	0.858s
RU-103	2441.12	610.30	334.	-16.	-0.009	167.02	1.423s
AG-108M	2457.05	614.28	318.	-6.	-0.003	427.77	1.426
PM-144	2472.18	618.06	312.	0.	0.000	1000.00	1.428s
RH-106	2487.60	621.92	312.	0.	0.000	1000.00	1.431s
SB-125	2543.49	635.89	43.	-11.	-0.006	87.35	1.440s
I-131	2547.83	636.97	48.	12.	0.007	85.09	1.441s
AG-110M	2630.98	657.76	137.	-12.	-0.007	136.44	1.455s
CS-137	2646.64	661.68	15.	87.	0.048	13.89	1.160
PM-144	2786.11	696.54	47.	-16.	-0.009	92.43	1.480s
NB-94	2810.46	702.63	37.	-9.	-0.005	142.68	1.484s
SB-124	2891.09	722.79	90.	-8.	-0.004	178.37	1.497s
AG-108M	2891.70	722.94	82.	0.	0.000	1000.00	1.498s
EU-154	2893.37	723.36	74.	6.	0.004	190.61	1.498s
ZR-95	2896.74	724.20	80.	0.	0.000	1000.00	1.498s
BI-212	2908.12	727.04	14.	50.	0.028	22.32	0.914s
pm-146	2942.83	735.72	37.	-7.	-0.004	180.56	1.506s
pm-146	2988.59	747.16	23.	6.	0.003	185.64	1.513s
ZR-95	3026.87	756.73	33.	-7.	-0.004	185.94	1.519s
AG-110M	3055.73	763.94	56.	-16.	-0.009	70.86	1.524s
PA-234M	3065.60	766.41	93.	-16.	-0.009	71.79	1.526s
EU-152	3115.64	778.92	28.	-9.	-0.005	129.10	1.534s
BI-212	3141.64	785.42	47.	-11.	-0.006	139.26	1.538s
CS-134	3207.77	801.95	34.	-8.	-0.004	160.76	1.548s
CO-58	3243.06	810.78	49.	4.	0.002	263.68	1.554
Cs-136	3273.97	818.50	24.	2.	0.001	524.40	1.559s
MN-54	3339.36	834.85	37.	-5.	-0.003	246.86	1.569s
Co-56	3387.05	846.77	14.	9.	0.005	92.34	1.577
TL-208	3442.23	860.56	23.	4.	0.002	284.30	1.585s
NB-94	3484.36	871.10	38.	-12.	-0.006	74.40	1.592
EU-154	3492.89	873.23	55.	2.	0.001	547.55	1.593s
PA-234	3522.10	880.53	43.	2.	0.001	563.92	1.598s
AG-110M	3538.71	884.68	55.	-14.	-0.008	81.81	1.600s
Sc-46	3557.10	889.28	54.	11.	0.006	100.97	1.603s
y-88	3592.14	898.04	23.	5.	0.003	224.77	1.608s
AC-228	3644.26	911.07	37.	65.	0.036	23.59	1.616
AG-110M	3749.96	937.49	25.	3.	0.002	370.93	1.633s
PA-234	3784.07	946.02	45.	-17.	-0.009	89.67	1.638s
AC-228	3878.08	969.52	5.	83.	0.046	12.69	1.064s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3985.31	996.33	33.	10.	0.006	86.82	1.668s
PA-234M	4003.99	1001.00	47.	-3.	-0.002	335.80	1.671s
EU-154	4019.10	1004.77	22.	6.	0.003	120.54	1.673s
Co-56	4151.36	1037.84	10.	8.	0.004	95.89	1.693s
Cs-136	4192.29	1048.07	32.	-7.	-0.004	125.50	1.698s
RH-106	4201.45	1050.36	33.	6.	0.003	148.70	1.700s
BI-207	4254.65	1063.66	33.	-3.	-0.002	258.92	1.708s
Ga-68	4309.61	1077.40	20.	6.	0.003	168.87	1.716s
FE-59	4397.02	1099.25	51.	-20.	-0.011	41.25	1.728s
EU-152	4448.32	1112.07	106.	-13.	-0.007	111.54	1.736s
ZN-65	4462.20	1115.55	93.	-14.	-0.008	104.57	1.738s
BI-214	4481.71	1120.42	0.	49.	0.027	14.51	1.312s
Sc-46	4482.22	1120.55	79.	-4.	-0.002	346.05	1.740s
Ta-182	4485.22	1121.30	63.	11.	0.006	106.41	1.741s
CO-60	4692.97	1173.24	9.	3.	0.001	220.66	1.770s
Ta-182	4885.67	1221.41	27.	2.	0.001	507.29	1.797
Co-56	4953.16	1238.28	37.	6.	0.003	248.66	1.806s
NA-22	5098.16	1274.53	11.	4.	0.002	116.91	1.826s
EU-154	5098.22	1274.54	15.	0.	0.000	1000.00	1.826s
CO-60	5330.06	1332.50	3.	5.	0.003	66.32	1.857s
AG-110M	5537.25	1384.30	5.	1.	0.000	796.87	1.884s
EU-152	5632.07	1408.00	5.	4.	0.002	152.39	1.896s
K-40	5844.24	1461.04	2.	307.	0.170	5.75	1.889
La-140	6384.93	1596.21	6.	4.	0.002	146.89	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
BI-214	7058.07	1764.49	10.	7.	0.004	72.11	2.067s
Co-56	7085.51	1771.35	18.	7.	0.004	90.30	2.070s
y-88	7344.36	1836.06	0.	0.	0.000	1000.00	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-6.1898E+00				5.31E+01	
			477.60	-6.190E+00	*(	2.156E+01 1.04E+02 1.05E+01	G
NA-22	C	3.4712E-01				9.50E+02	
			1274.53	3.471E-01	?(	1.436E+00 1.17E+02 9.99E+01	G
K-40	N	2.5911E+02				4.66E+11	
			1460.83	2.591E+02	(P	8.115E+00 5.75E+00 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F	6.3385E-01					8.38E+01	
			889.28	6.339E-01	?(P	2.169E+00	1.01E+02	1.00E+02 G
			1120.55	-2.628E-01	-	3.157E+00	3.46E+02	1.00E+02 G
CR-51	F	-5.1261E+00					2.77E+01	
			320.08	-5.126E+00	?(P	1.550E+01	7.78E+01	9.94E+00 G
MN-54	C	-2.9771E-01					3.12E+02	
			834.85	-2.977E-01	?(	1.741E+00	2.47E+02	1.00E+02 G
FE-59	F	-2.4331E+00					4.45E+01	
			1099.25	-2.433E+00	?(P	4.470E+00	4.13E+01	5.65E+01 G
			1291.60	6.249E-02	%	3.361E+00	2.23E+03	4.32E+01 G
Co-56	C	8.2766E-01					7.73E+01	
			846.77	5.223E-01	?(P	1.147E+00	9.23E+01	9.99E+01 G
			1238.28	6.698E-01	&(	3.686E+00	2.49E+02	6.61E+01 G
			1037.84	3.726E+00	?(P	8.341E+00	9.59E+01	1.41E+01 G
			1771.35	4.960E+00	?	1.531E+01	9.03E+01	1.55E+01 A
CO-57	C	2.6786E-01					2.72E+02	
			122.06	6.042E-02	?(	1.140E+00	5.53E+02	8.56E+01 G
			136.47	1.930E+00	?(	1.524E+01	2.35E+02	1.07E+01 G
CO-58	C	2.0987E-01					7.09E+01	
			810.78	2.099E-01	?(	1.937E+00	2.64E+02	9.95E+01 G
CO-60	F	3.0941E-01					1.93E+03	
			1332.50	4.213E-01	?(P	8.901E-01	6.63E+01	1.00E+02 G
			1173.24	1.975E-01	?(P	1.217E+00	2.21E+02	9.99E+01 G
ZN-65	F	-1.9057E+00					2.44E+02	
			1115.55	-1.906E+00	?(	6.723E+00	1.05E+02	5.06E+01 G
NB-94	I	-4.6051E-01					7.41E+06	
			702.63	-4.605E-01	?(	1.539E+00	1.43E+02	9.79E+01 G
			871.10	-6.665E-01	+ P	1.810E+00	7.44E+01	9.99E+01 G
ZR-95	I	-6.2910E-01					6.40E+01	
			756.73	-6.291E-01	?(	2.769E+00	1.86E+02	5.45E+01 G
			724.20	0.000E+00	&	4.981E+00	1.00E+03	4.42E+01 G
NB-95	I	-3.1393E-02					6.40E+01	
			765.79	-3.139E-02	%(	2.189E+00	1.98E+03	9.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	1.1453E+00					3.93E+01	
			497.05	1.145E+00	(	8.834E-01	3.50E+01	9.09E+01 G
			610.30	-1.169E+01	-	6.564E+01	1.67E+02	5.75E+00 GA
RH-106	I	3.3440E+00					3.74E+02	
			621.92	0.000E+00	?(	3.738E+01	1.00E+03	9.93E+00 G
			1050.36	2.463E+01	?(	1.275E+02	1.49E+02	1.56E+00 G
			511.86	1.544E+01	?	6.990E+00	2.60E+01	2.00E+01 GA
AG-108M	C	4.5731E-01					1.53E+05	
			433.94	4.573E-01	?(P	1.085E+00	9.86E+01	9.05E+01 G
			722.94	0.000E+00	-	2.445E+00	1.00E+03	9.08E+01 G
			614.28	-2.848E-01	&	4.126E+00	4.28E+02	8.98E+01 G
AG-110M	F	-1.0989E+00					2.50E+02	
			884.68	-1.099E+00	?(	3.014E+00	8.18E+01	7.27E+01 G
			657.76	-5.986E-01	+	2.763E+00	1.36E+02	9.46E+01 G
			937.49	5.374E-01	+	4.660E+00	3.71E+02	3.44E+01 G
			1384.30	2.360E-01	+	4.769E+00	7.97E+02	2.43E+01 G
			763.94	-3.696E+00	&	8.702E+00	7.09E+01	2.23E+01 G
SN-113	F	5.8499E-01					1.15E+02	
			391.69	5.850E-01	?(	2.303E+00	1.16E+02	6.40E+01 G
SB-124	F	-6.7487E-01					6.02E+01	
			602.73	-6.749E-01	&(	3.970E+00	1.75E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.579E+00	1.00E+03	4.78E+01 G
			722.79	-3.508E+00	+	2.143E+01	1.78E+02	1.08E+01 G
SB-125	I	2.0653E+00					1.01E+03	
			427.88	1.296E+00	*(	2.973E+00	9.15E+01	2.96E+01 G
			600.50	-3.698E+00	+	2.222E+01	1.79E+02	1.79E+01 G
			635.89	-4.455E+00	+	1.312E+01	8.73E+01	1.13E+01 G
			463.37	4.240E+00	(P	1.311E+01	9.18E+01	1.05E+01 G
I-131	I	1.1610E+00					8.02E+00	
			364.48	3.461E-01	?(	1.211E+00	1.39E+02	8.17E+01 G
			284.30	4.538E+00	&(	1.598E+01	1.41E+02	6.14E+00 G
			636.97	7.556E+00	?(	2.163E+01	8.51E+01	7.17E+00 G
Ga-68	C	1.4874E+01					4.71E-02	
			1077.40	1.487E+01	?(	5.838E+01	1.69E+02	3.30E+00 G
BA-133	F	-7.7446E-01					3.85E+03	
			356.00	-7.745E-01	?(	3.933E+00	1.51E+02	6.20E+01 G
			302.85	0.000E+00	+	1.342E+01	1.00E+03	1.83E+01 G
			383.84	4.014E+00	? P	1.442E+01	1.06E+02	8.94E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			80.99	6.194E-02	%	6.409E+00	3.08E+03	3.41E+01 GA
CS-134	I	-2.8288E-01					7.54E+02	
			604.71	-6.818E-01	?(	3.923E+00	1.71E+02	9.76E+01 G
			795.87	-5.223E-02	&	2.467E+00	1.34E+03	8.55E+01 G
			569.32	-3.606E+00	+	9.205E+00	7.64E+01	1.54E+01 G
			801.95	-4.863E+00	&	1.843E+01	1.61E+02	8.69E+00 G
			563.24	4.381E+00	?(P	1.081E+01	1.00E+02	8.35E+00 G
CS-137	I	4.6712E+00					1.10E+04	
			661.66	4.671E+00	(P	1.132E+00	1.39E+01	8.52E+01 G
CE-139	F	3.8320E-01					1.38E+02	
			165.85	3.832E-01	?(	1.292E+00	1.01E+02	7.99E+01 G
Ba-140	I	3.3139E+00					1.28E+01	
			537.26	3.314E+00	?(P	3.108E+00	4.16E+01	2.44E+01 G
			162.66	2.486E-01	%	1.935E+01	2.28E+03	6.22E+00 G
			304.85	0.000E+00	-	5.763E+01	1.00E+03	4.29E+00 G
La-140	I	8.1636E-01					1.28E+01	
			1596.21	4.157E-01	?(P	1.434E+00	1.47E+02	9.54E+01 G
			487.02	1.212E+00	?(	4.759E+00	1.17E+02	4.55E+01 G
			328.76	1.813E+00	&(	1.006E+01	1.65E+02	2.03E+01 G
			815.77	1.567E-01	%	8.487E+00	1.52E+03	2.33E+01 G
CE-141	I	-7.8835E-01					3.25E+01	
			145.44	-7.884E-01	?(	3.881E+00	1.48E+02	4.82E+01 G
CE-144	I	2.8346E+00					2.85E+02	
			133.54	2.835E+00	(	1.400E+01	1.48E+02	1.11E+01 G
PM-144	C	-7.8836E-01					3.63E+02	
			696.54	-7.884E-01	?(	1.673E+00	9.24E+01	9.90E+01 G
			618.06	0.000E+00	+	3.726E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2501E+00					4.94E+03	
			344.29	1.454E+00	&(	8.593E+00	1.76E+02	2.65E+01 G
			1112.07	-7.041E+00	+	2.651E+01	1.12E+02	1.36E+01 G
			121.78	1.061E+00	?(	3.243E+00	9.16E+01	2.86E+01 G
			778.92	-3.662E+00	+	1.114E+01	1.29E+02	1.29E+01 G
			964.11	-3.597E-01	%	2.409E+01	1.94E+03	1.46E+01 G
			244.69	-5.726E+00	+	3.557E+01	1.86E+02	7.58E+00 G
			1408.00	1.523E+00	?	5.597E+00	1.52E+02	2.10E+01 GA
EU-154	I	2.3964E+00					3.14E+03	
			873.23	9.109E-01	?(P	1.757E+01	5.48E+02	1.23E+01 G
			123.10	-1.646E-01	+	2.220E+00	3.95E+02	4.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1274.54	0.000E+00	-	4.723E+00	1.00E+03	3.52E+01 G
			723.36	1.591E+00	?(	1.044E+01	1.91E+02	2.02E+01 G
			1004.77	2.108E+00	&(	8.846E+00	1.21E+02	1.80E+01 G
			996.33	6.142E+00	&(	1.803E+01	8.68E+01	1.06E+01 G
EU-155	I	5.2128E-01					1.81E+03	
			105.31	-3.966E-01	(	1.018E+01	7.67E+02	2.12E+01 G
			86.54	1.155E+00	?(	7.431E+00	1.93E+02	3.07E+01 G
HF-181	F	-2.0192E-02					4.24E+01	
			482.00	-8.169E-01	?(	2.979E+00	1.09E+02	8.05E+01 G
			133.02	7.247E-01	&(	3.507E+00	1.45E+02	4.33E+01 G
			345.83	-2.999E+00	+	1.672E+01	1.66E+02	1.51E+01 G
			136.30	5.430E+00	?(	2.729E+01	1.50E+02	5.85E+00 G
Ta-182	F	2.2600E+00					1.14E+02	
			1121.30	2.260E+00	?(	8.156E+00	1.06E+02	3.49E+01 G
			1221.41	6.669E-01	-	7.653E+00	5.07E+02	2.70E+01 G
			1189.05	4.655E-01	%	1.211E+01	1.10E+03	1.62E+01 G
Hg-203	F	-9.3657E-02					4.66E+01	
			279.20	-9.366E-02	?(	1.500E+00	4.65E+02	8.15E+01 G
TL-208	N	4.8950E+00					6.98E+02	
			583.02	4.895E+00	(P	1.018E+00	1.28E+01	8.45E+01 G
			277.28	2.109E+00	& P	1.917E+01	2.65E+02	6.31E+00 G
			860.56	1.690E+00	-	1.163E+01	2.84E+02	1.24E+01 G
pm-146	C	8.4745E-01					2.02E+03	
			747.16	8.474E-01	?(	3.772E+00	1.86E+02	3.40E+01 G
			735.72	-1.636E+00	+	6.957E+00	1.81E+02	2.25E+01 G
			453.88	-1.988E-01	- P	1.898E+00	3.30E+02	6.50E+01 G
y-88	F	2.9527E-01					1.07E+02	
			898.04	2.953E-01	?(P	1.598E+00	2.25E+02	9.37E+01 G
			1836.06	0.000E+00	-	8.180E-01	1.00E+03	9.92E+01 G
Cd-113m		-7.1638E+03					5.33E+03	
			263.70	-7.164E+03	&(	1.981E+04	8.29E+01	6.00E-03 K
Cf-251	T	9.4454E-02					3.28E+05	
			176.60	9.445E-02	&(	5.519E+00	2.24E+03	1.70E+01 G
			227.00	4.637E+00	?	1.553E+01	1.36E+02	6.30E+00 GA
Cf-249	T	9.1275E-01					1.28E+05	
			387.95	5.617E-01	&(	2.110E+00	1.11E+02	6.60E+01 G
			333.44	2.407E+00	&(	1.366E+01	1.69E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		2.2786E+00					3.65E+07	
			87.57	2.279E+00	}	5.893E+00	3.36E+01	3.75E+01 GA
			64.28	2.279E+00	?(	1.924E+01	2.51E+02	9.70E+00 G
			86.94	2.279E+00	}	2.525E+01	1.43E+02	9.04E+00 GA
PB-210	N	3.7774E+01					8.14E+03	
			46.54	3.777E+01	(P	2.326E+01	2.49E+01	4.25E+00 G
PB-212	N	2.0386E+01					6.98E+02	
			238.63	2.039E+01	(P	1.716E+00	5.35E+00	4.33E+01 G
			300.03	2.529E+01	+	1.842E+01	2.61E+01	3.28E+00 GA
PB-214	N	1.5803E+01					5.84E+05	
			351.93	1.644E+01	(P	1.838E+00	7.73E+00	3.76E+01 G
			295.09	1.457E+01	(	3.245E+00	1.10E+01	1.93E+01 G
			242.00	2.408E+01	+	1.005E+01	1.59E+01	7.43E+00 GA
BI-207	C	-2.6461E-01					1.18E+04	
			569.70	-2.646E-01	&(P	1.412E+00	1.47E+02	9.77E+01 G
			1063.66	-2.833E-01	+ P	2.715E+00	2.59E+02	7.45E+01 G
BI-212	N	3.3007E+01					6.98E+02	
			727.17	3.301E+01	(P	1.321E+01	2.23E+01	7.55E+00 G
			785.42	-4.418E+01	-	1.431E+02	1.39E+02	1.28E+00 GA
BI-214	N	1.7713E+01					5.84E+05	
			609.31	1.771E+01	(P	1.463E+00	7.82E+00	4.61E+01 G
			1120.29	2.302E+01	+ P	3.497E+00	1.45E+01	1.51E+01 G
			1764.49	4.961E+00	-	1.196E+01	7.21E+01	1.54E+01 G
BI-210M	T	-1.1633E-03					1.10E+09	
			265.83	-1.163E-03	%(	2.568E+00	6.39E+04	5.00E+01 G
			304.90	0.000E+00	+	8.831E+00	1.00E+03	2.80E+01 G
AC-228	N	1.5190E+01					2.10E+03	
			911.07	1.340E+01	?(	6.460E+00	2.36E+01	2.90E+01 G
			968.97	3.015E+01	+	4.697E+00	1.27E+01	1.75E+01 G
			338.32	1.952E+01	(	7.763E+00	2.06E+01	1.20E+01 G
			93.35	4.461E+00	-	3.913E+01	2.63E+02	5.56E+00 XA
TH-227	N	8.8382E-01					7.95E+03	
			50.14	-7.170E+00	&(	2.586E+01	1.08E+02	8.00E+00 G
			256.24	1.009E+01	?(	1.186E+01	4.91E+01	7.00E+00 G
TH-229	N	3.9136E-01					2.68E+06	
			193.51	3.914E-01	&(	2.287E+01	2.24E+03	4.40E+00 G
			210.85	-9.843E+00	&	3.927E+01	1.62E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	2.7355E+01					1.63E+12	
			63.29	2.736E+01	(P	2.956E+01	3.41E+01	3.81E+00 G
			92.59	3.421E+00	- P	1.872E+01	1.63E+02	5.58E+00 G
PA-231	N	-4.6092E+00					1.20E+07	
			302.65	-4.609E+00	&(	8.586E+01	5.52E+02	2.88E+00 G
			300.07	2.779E+00	%	9.982E+01	1.06E+03	2.46E+00 G
PA-233	C	-2.9856E-02					7.82E+08	
			312.01	-2.986E-02	%(P	6.998E+00	3.61E+03	3.60E+01 G
			300.18	-6.341E+00	+	4.032E+01	1.90E+02	6.20E+00 G
PA-234	N	3.1791E+00					1.63E+12	
			131.29	1.733E+00	?(	8.219E+00	1.42E+02	1.80E+01 G
			946.02	-7.907E+00	+	1.572E+01	8.97E+01	1.34E+01 G
			569.47	6.354E+00	(	1.685E+01	7.91E+01	8.20E+00 G
			883.24	4.064E-01	%	2.057E+01	1.42E+03	9.60E+00 G
			880.53	1.621E+00	?	3.248E+01	5.64E+02	6.00E+00 GA
PA-234M	N	-2.2175E+01					1.63E+12	
			1001.00	-2.217E+01	?(P	2.691E+02	3.36E+02	8.37E-01 G
			766.41	-2.759E+02	+ P	8.402E+02	7.18E+01	2.94E-01 G
U-235	N	-7.9328E-01					2.57E+11	
			143.79	-7.933E-01	(P	1.549E+01	3.79E+02	1.10E+01 G
			205.33	-2.870E+00	+ P	2.045E+01	2.54E+02	5.01E+00 G
			163.38	-9.965E-01	& P	2.397E+01	7.15E+02	5.08E+00 G
AM-241	T	8.1131E-01					1.58E+05	
			59.54	8.113E-01	(P	5.198E+00	1.91E+02	3.59E+01 G
Ir-192	F	5.8016E-01					7.40E+01	
			316.49	4.073E-01	?(	1.266E+00	9.24E+01	8.70E+01 G
			468.06	8.709E-01	?(	2.842E+00	9.68E+01	5.18E+01 G
			308.44	0.000E+00	&	7.859E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.3421E-01					1.30E+01	
			818.50	1.098E-01	&(	1.402E+00	5.24E+02	1.00E+02 G
			1048.07	-5.640E-01	+	2.448E+00	1.25E+02	8.00E+01 G
			340.57	8.127E-01	&(	4.704E+00	1.72E+02	4.69E+01 G
Np-239	T	-1.8507E+00					2.36E+00	
			103.70	3.589E-01	&	8.905E+00	7.41E+02	2.40E+01 X
			106.13	-1.851E+00	&(	1.034E+01	1.68E+02	2.27E+01 G
			99.50	1.170E+00		4.541E+00	1.15E+02	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147       1.8674E+00                                        1.11E+01
                           531.00 1.867E+00 ?(  7.195E+00 1.55E+02 1.30E+01 G
                            91.10-1.379E+00 +   8.071E+00 1.76E+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	307.	-23.	-0.013	107.93	-7.170E+00	
AM-241	59.54	408.	15.	0.008	190.88	8.113E-01	P
EU-155	86.54	1178.	25.	0.014	193.00	1.155E+00	
Nd-147	91.10	1234.	-28.	-0.016	175.79	-1.379E+00	
EU-155	105.31	1176.	-6.	-0.004	766.89	-3.966E-01	
EU-152	121.78	204.	23.	0.013	91.55	1.061E+00	
CO-57	122.06	226.	4.	0.002	553.37	6.042E-02	
EU-154	123.10	193.	-5.	-0.003	395.47	-1.646E-01	
HF-181	133.02	535.	23.	0.013	144.79	7.247E-01	
CE-144	133.54	557.	23.	0.013	147.74	2.835E+00	
HF-181	136.30	580.	23.	0.013	150.38	5.430E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	136.47	603.	15.	0.008	235.47	1.930E+00	
U-235	143.79	624.	-6.	-0.003	378.83	-7.933E-01	P
CE-141	145.44	751.	-26.	-0.015	147.57	-7.884E-01	
U-235	163.38	264.	-3.	-0.002	714.69	-9.965E-01	P
CE-139	165.85	193.	20.	0.011	100.75	3.832E-01	
U-235	205.33	135.	-8.	-0.004	254.09	-2.870E+00	P
TH-229	210.85	172.	-16.	-0.009	162.42	-9.843E+00	
Cf-251	227.00	104.	15.	0.008	135.59	4.637E+00	
EU-152	244.69	753.	-21.	-0.012	185.88	-5.726E+00	
TH-227	256.24	60.	33.	0.018	49.14	1.009E+01	
Cd-113m	263.70	123.	-20.	-0.011	82.88	-7.164E+03	
Hg-203	279.20	118.	-3.	-0.002	464.76	-9.366E-02	
I-131	284.30	72.	12.	0.007	141.42	4.538E+00	
PA-233	300.18	465.	-16.	-0.009	189.54	-6.341E+00	
PA-231	302.65	448.	-5.	-0.003	551.89	-4.609E+00	
Ir-192	316.49	77.	14.	0.008	92.39	4.073E-01	
CR-51	320.08	153.	-20.	-0.011	77.83	-5.126E+00	P
La-140	328.76	264.	14.	0.008	164.74	1.813E+00	
Cf-249	333.44	278.	14.	0.008	168.51	2.407E+00	
Cs-136	340.57	292.	14.	0.008	171.94	8.127E-01	
EU-152	344.29	307.	14.	0.008	175.60	1.454E+00	
HF-181	345.83	375.	-17.	-0.009	166.05	-2.999E+00	
BA-133	356.00	335.	-17.	-0.010	151.29	-7.745E-01	
I-131	364.48	48.	10.	0.006	139.28	3.461E-01	
BA-133	383.84	78.	12.	0.007	106.29	4.014E+00	P
Cf-249	387.95	90.	12.	0.007	111.09	5.617E-01	
SN-113	391.69	100.	13.	0.007	116.38	5.850E-01	
SB-125	427.88	28.	12.	0.007	91.54	1.296E+00	
AG-108M	433.94	35.	13.	0.007	98.65	4.573E-01	P
pm-146	453.88	53.	-4.	-0.002	329.71	-1.988E-01	P
SB-125	463.37	64.	13.	0.007	91.82	4.240E+00	P
Ir-192	468.06	73.	13.	0.007	96.77	8.709E-01	
BE-7	477.60	176.	-19.	-0.010	103.92	-6.190E+00	
HF-181	482.00	195.	-19.	-0.010	108.74	-8.169E-01	
La-140	487.02	154.	15.	0.009	116.67	1.212E+00	
RH-106	511.86	56.	83.	0.046	26.00	1.544E+01	
Nd-147	531.00	22.	6.	0.004	155.20	1.867E+00	
CS-134	563.24	18.	9.	0.005	99.95	4.381E+00	P
CS-134	569.32	48.	-14.	-0.008	76.39	-3.606E+00	
BI-207	569.70	45.	-6.	-0.004	147.08	-2.646E-01	P
SB-125	600.50	380.	-16.	-0.009	178.91	-3.698E+00	
SB-124	602.73	365.	-16.	-0.009	175.10	-6.749E-01	
CS-134	604.71	349.	-16.	-0.009	171.23	-6.818E-01	
AG-108M	614.28	318.	-6.	-0.003	427.77	-2.848E-01	
SB-125	635.89	43.	-11.	-0.006	87.35	-4.455E+00	
I-131	636.97	48.	12.	0.007	85.09	7.556E+00	
AG-110M	657.76	137.	-12.	-0.007	136.44	-5.986E-01	
PM-144	696.54	47.	-16.	-0.009	92.43	-7.884E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	702.63	37.	-9.	-0.005	142.68	-4.605E-01		
SB-124	722.79	90.	-8.	-0.004	178.37	-3.508E+00		
EU-154	723.36	74.	6.	0.004	190.61	1.591E+00		
pm-146	735.72	37.	-7.	-0.004	180.56	-1.636E+00		
pm-146	747.16	23.	6.	0.003	185.64	8.474E-01		
ZR-95	756.73	33.	-7.	-0.004	185.94	-6.291E-01		
AG-110M	763.94	56.	-16.	-0.009	70.86	-3.696E+00		
PA-234M	766.41	93.	-16.	-0.009	71.79	-2.759E+02		P
EU-152	778.92	28.	-9.	-0.005	129.10	-3.662E+00		
CS-134	801.95	34.	-8.	-0.004	160.76	-4.863E+00		
CO-58	810.78	49.	4.	0.002	263.68	2.099E-01		
Cs-136	818.50	24.	2.	0.001	524.40	1.098E-01		
MN-54	834.85	37.	-5.	-0.003	246.86	-2.977E-01		
Co-56	846.77	14.	9.	0.005	92.34	5.223E-01		P
NB-94	871.10	38.	-12.	-0.006	74.40	-6.665E-01		P
EU-154	873.23	55.	2.	0.001	547.55	9.109E-01		P
AG-110M	884.68	55.	-14.	-0.008	81.81	-1.099E+00		
Sc-46	889.28	54.	11.	0.006	100.97	6.339E-01		P
y-88	898.04	23.	5.	0.003	224.77	2.953E-01		P
AG-110M	937.49	25.	3.	0.002	370.93	5.374E-01		
EU-154	996.33	33.	10.	0.006	86.82	6.142E+00		
PA-234M	1001.00	47.	-3.	-0.002	335.80	-2.217E+01		P
EU-154	1004.77	22.	6.	0.003	120.54	2.108E+00		
Co-56	1037.84	10.	8.	0.004	95.89	3.726E+00		P
Cs-136	1048.07	32.	-7.	-0.004	125.50	-5.640E-01		
RH-106	1050.36	33.	6.	0.003	148.70	2.463E+01		
BI-207	1063.66	33.	-3.	-0.002	258.92	-2.833E-01		P
Ga-68	1077.40	20.	6.	0.003	168.87	1.487E+01		
FE-59	1099.25	51.	-20.	-0.011	41.25	-2.433E+00		P
EU-152	1112.07	106.	-13.	-0.007	111.54	-7.041E+00		
ZN-65	1115.55	93.	-14.	-0.008	104.57	-1.906E+00		
Sc-46	1120.55	79.	-4.	-0.002	346.05	-2.628E-01		
Ta-182	1121.30	63.	11.	0.006	106.41	2.260E+00		
Ta-182	1221.41	27.	2.	0.001	507.29	6.669E-01		
Co-56	1238.28	37.	6.	0.003	248.66	6.698E-01		
NA-22	1274.53	11.	4.	0.002	116.91	3.471E-01		
AG-110M	1384.30	5.	1.	0.000	796.87	2.360E-01		
EU-152	1408.00	5.	4.	0.002	152.39	1.523E+00		
La-140	1596.21	6.	4.	0.002	146.89	4.157E-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 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-6.1897E+00	-6.1898E+00	1.039E+02%	2.16E+01
NA-22	#A	3.4712E-01	3.4712E-01	1.169E+02%	1.44E+00
K-40		2.5911E+02	2.5911E+02	5.752E+00%	8.12E+00
Sc-46	#A	6.3385E-01	6.3385E-01	1.010E+02%	2.17E+00
CR-51	#A	-5.1260E+00	-5.1261E+00	7.783E+01%	1.55E+01
MN-54	#A	-2.9771E-01	-2.9771E-01	2.469E+02%	1.74E+00
FE-59	#A	-2.4330E+00	-2.4331E+00	4.125E+01%	4.47E+00
Co-56	#A	8.2766E-01	8.2766E-01	9.234E+01%	1.15E+00
CO-57	#A	2.6786E-01	2.6786E-01	2.355E+02%	1.14E+00
CO-58	#A	2.0987E-01	2.0987E-01	2.637E+02%	1.94E+00
CO-60	#A	3.0941E-01	3.0941E-01	6.632E+01%	8.90E-01
ZN-65	#A	-1.9057E+00	-1.9057E+00	1.046E+02%	6.72E+00
NB-94	#A	-4.6051E-01	-4.6051E-01	1.427E+02%	1.54E+00
ZR-95	#A	-6.2910E-01	-6.2910E-01	1.859E+02%	2.77E+00
NB-95	#A	-3.1393E-02	-3.1393E-02	1.984E+03%	2.19E+00
RU-103	#	1.1453E+00	1.1453E+00	3.504E+01%	8.83E-01
RH-106	#A	3.3440E+00	3.3440E+00	1.487E+02%	3.74E+01
AG-108M	#A	4.5731E-01	4.5731E-01	9.865E+01%	1.08E+00
AG-110M	#A	-1.0989E+00	-1.0989E+00	8.181E+01%	3.01E+00
SN-113	#A	5.8498E-01	5.8499E-01	1.164E+02%	2.30E+00
SB-124	#A	-6.7487E-01	-6.7487E-01	1.751E+02%	3.97E+00
SB-125	#A	2.0653E+00	2.0653E+00	6.483E+01%	2.97E+00
I-131	#A	1.1609E+00	1.1610E+00	7.199E+01%	1.21E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.22E+00
Ga-68	#A	1.4693E+01	1.4874E+01	1.689E+02%	5.84E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.93E+00
BA-133	#A	-7.7446E-01	-7.7446E-01	1.513E+02%	3.93E+00
CS-134	#A	-2.8288E-01	-2.8288E-01	9.914E+01%	3.92E+00
CS-137		4.6712E+00	4.6712E+00	1.389E+01%	1.13E+00
CE-139	#A	3.8319E-01	3.8320E-01	1.007E+02%	1.29E+00
Ba-140	#	3.3137E+00	3.3139E+00	4.159E+01%	3.11E+00
La-140	#A	8.1632E-01	8.1636E-01	8.322E+01%	1.43E+00
CE-141	#A	-7.8834E-01	-7.8835E-01	1.476E+02%	3.88E+00
CE-144	#A	2.8346E+00	2.8346E+00	1.477E+02%	1.40E+01
PM-144	#A	-7.8835E-01	-7.8836E-01	9.243E+01%	1.67E+00
EU-152	#A	1.2501E+00	1.2501E+00	9.155E+01%	8.59E+00
EU-154	#A	2.3964E+00	2.3964E+00	8.682E+01%	1.76E+01
EU-155	#A	5.2128E-01	5.2128E-01	1.930E+02%	1.02E+01
HF-181	#A	-2.0192E-02	-2.0192E-02	7.846E+01%	2.98E+00
Ta-182	#A	2.2600E+00	2.2600E+00	1.064E+02%	8.16E+00
Hg-203	#A	-9.3656E-02	-9.3657E-02	4.648E+02%	1.50E+00
TL-208		4.8950E+00	4.8950E+00	1.279E+01%	1.02E+00
pm-146	#A	8.4745E-01	8.4745E-01	1.856E+02%	3.77E+00

y-88 #A	2.9527E-01	2.9527E-01	2.248E+02%		1.60E+00
Cd-113m#A	-7.1638E+03	-7.1638E+03	8.288E+01%		1.98E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.03E+01
Cf-251 #A	9.4454E-02	9.4454E-02	2.239E+03%		5.52E+00
Cf-249 #A	9.1275E-01	9.1275E-01	1.009E+02%		2.11E+00
Sn-126 #A	2.2786E+00	2.2786E+00	2.513E+02%		1.92E+01
PB-210	3.7774E+01	3.7774E+01	2.491E+01%		2.33E+01
PB-212	2.0386E+01	2.0386E+01	5.351E+00%		1.72E+00
PB-214	1.5803E+01	1.5803E+01	6.735E+00%		1.84E+00
BI-207 #A	-2.6461E-01	-2.6461E-01	1.471E+02%		1.41E+00
BI-212	3.3007E+01	3.3007E+01	2.232E+01%		1.32E+01
BI-214	1.7713E+01	1.7713E+01	7.816E+00%		1.46E+00
BI-210M#A	-1.1633E-03	-1.1633E-03	6.388E+04%		2.57E+00
AC-228	1.5190E+01	1.5190E+01	1.565E+01%		6.46E+00
TH-227 #A	8.8382E-01	8.8382E-01	4.914E+01%		2.59E+01
TH-229 #A	3.9136E-01	3.9136E-01	2.239E+03%		2.29E+01
TH-234 #A	2.7355E+01	2.7355E+01	3.408E+01%		2.96E+01
PA-231 #A	-4.6092E+00	-4.6092E+00	5.519E+02%		8.59E+01
PA-233 #A	-2.9856E-02	-2.9856E-02	3.612E+03%		7.00E+00
PA-234 A	3.1791E+00	3.1791E+00	7.913E+01%		8.22E+00
PA-234M#A	-2.2175E+01	-2.2175E+01	3.358E+02%		2.69E+02
U-235 #A	-7.9328E-01	-7.9328E-01	3.788E+02%		1.55E+01
AM-241 #A	8.1131E-01	8.1131E-01	1.909E+02%		5.20E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.72E+01
Ir-192 #A	5.8015E-01	5.8016E-01	6.689E+01%		1.27E+00
Cs-136 #A	3.3419E-01	3.3421E-01	1.719E+02%		1.40E+00
Np-239 A	-1.8502E+00	-1.8507E+00	1.679E+02%		1.03E+01
Nd-147 #A	1.8674E+00	1.8674E+00	1.552E+02%		7.19E+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) 4.362E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 4.3621616E+02 Bq/Sample

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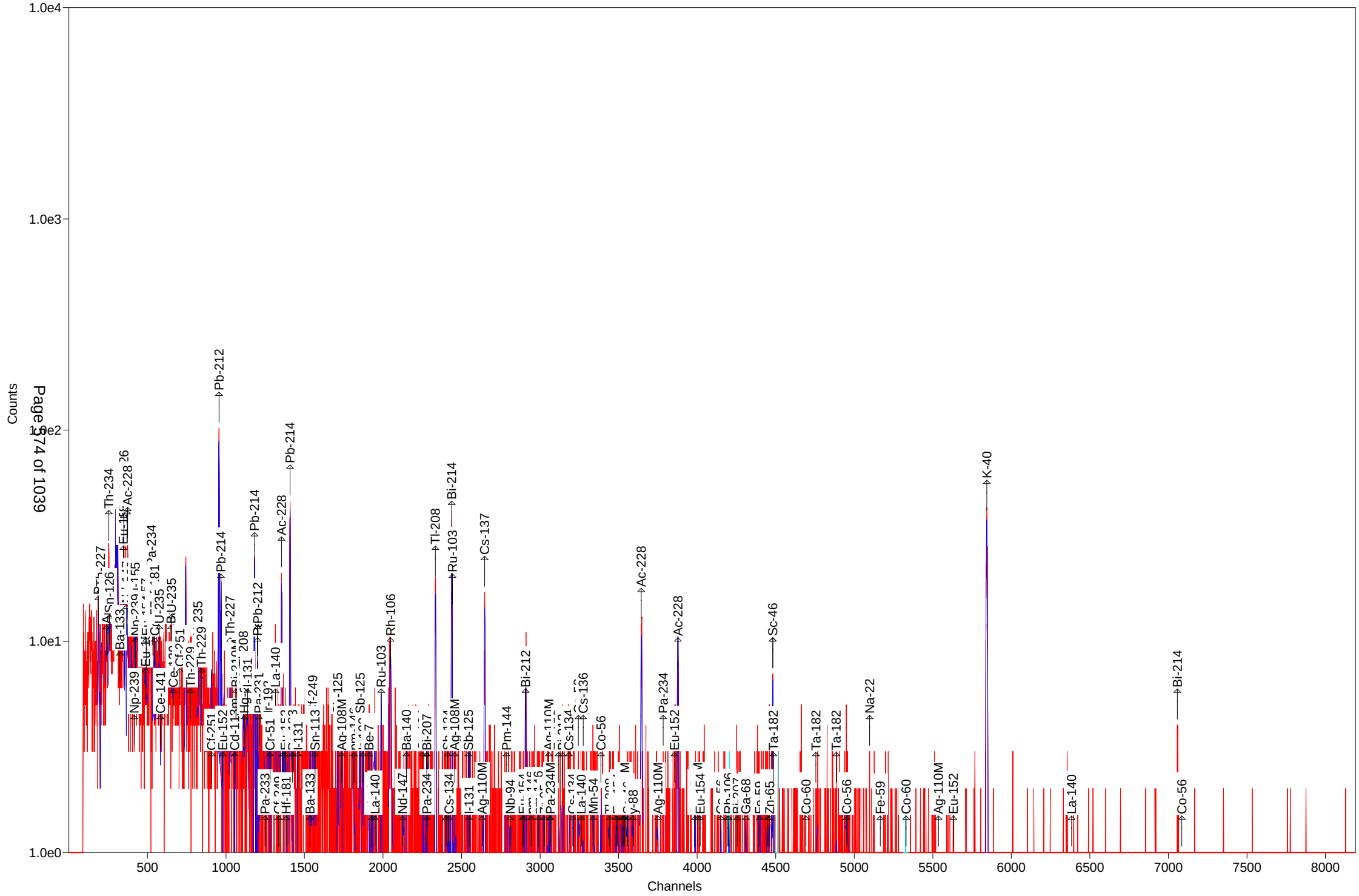
257318_Gamma_160-17797-A-8-B. 8_Gamma_20161003.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161455

Sample Description: 257318_Gamma_160-17797-A-9-B
Detector: Detector #12
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-9-B

Decay to Time: 7/12/2016 11:32 Live Time: 1800 sec
Acquisition Time: 7/12/2016 11:32:55 Real Time: 1808 sec
Analysis Time: 7/12/2016 12:04 Dead Time: 0.44 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCanCal_90099_100212
Efficiency Cal Date: 10/4/2012 09:05
Energy Cal Date: 2/28/2012 13:26
Library: Client_Long_Rev11.lib
Bkgd Correction File: 12_2016-07-10_1414.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	3.006E+00	132.3	3.975E+00	3.978E+00	1.348E+01
NA-22	5.434E-01	86.0	4.674E-01	4.682E-01	1.044E+00
K-40	2.437E+02	5.1	1.231E+01	1.752E+01	7.749E+00
Sc-46	-4.191E-01	106.6	4.466E-01	4.471E-01	1.521E+00
CR-51	-1.753E-01	1685.6	2.955E+00	2.955E+00	2.109E+01
MN-54	3.365E-01	144.7	4.869E-01	4.872E-01	1.151E+00
FE-59	-1.238E-01	761.5	9.423E-01	9.424E-01	2.863E+00
Co-56	7.996E-01	85.9	6.866E-01	6.879E-01	1.091E+00
CO-57	-3.585E-01	87.2	3.127E-01	3.133E-01	1.042E+00
CO-58	-7.172E-01	83.7	6.003E-01	6.015E-01	2.007E+00
CO-60	4.206E-01	37.2	1.565E-01	1.579E-01	1.500E+00
ZN-65	0.000E+00	1.#INF	4.399E-01	4.399E-01	5.161E+00
NB-94	-1.651E-02	75.7	1.250E-02	1.253E-02	1.108E+00
ZR-95	1.412E+00	46.4	6.553E-01	6.593E-01	1.459E+00
NB-95	-2.369E-01	243.9	5.778E-01	5.779E-01	1.984E+00
RU-103	3.158E-02	1278.7	4.039E-01	4.039E-01	1.005E+00
RH-106	6.008E+00	80.0	4.804E+00	4.814E+00	3.227E+01
AG-108M	2.378E-01	89.2	2.121E-01	2.125E-01	1.046E+00
AG-110M	0.000E+00	1.#INF	8.549E-02	8.549E-02	1.989E+00
SN-113	-2.525E-02	2527.8	6.383E-01	6.383E-01	2.203E+00
SB-124	-1.888E-01	54.0	1.020E-01	1.025E-01	3.546E+00
SB-125	3.482E+00	29.1	1.012E+00	1.028E+00	3.165E+00
I-131	6.024E-01	100.2	6.038E-01	6.046E-01	1.128E+00
Gd-153	-1.043E+00	101.7	1.061E+00	1.063E+00	2.837E+00
Ga-68	-3.570E+01	91.4	3.261E+01	3.267E+01	6.971E+01
Tc-99m	-1.118E-07	544856051.6	6.092E-01	6.092E-01	2.047E+00
BA-133	-7.025E-01	152.8	1.073E+00	1.074E+00	3.596E+00
CS-134	2.792E-01	70.5	1.967E-01	1.973E-01	3.503E+00
CS-137	3.426E+00	13.9	4.765E-01	5.087E-01	7.667E-01
CE-139	3.701E-01	108.3	4.010E-01	4.026E-01	1.341E+00
Ba-140	-2.406E+00	69.9	1.681E+00	1.686E+00	5.320E+00
La-140	6.649E-02	88.6	5.891E-02	5.902E-02	1.638E+00
CE-141	-3.412E-01	194.7	6.643E-01	6.645E-01	2.239E+00

CE-144	-2.973E+00	89.9	2.672E+00	2.676E+00	1.510E+01
PM-144	3.819E-01	94.3	3.603E-01	3.608E-01	8.475E-01
EU-152	1.190E+00	109.5	1.303E+00	1.305E+00	5.803E+00
EU-154	2.483E+00	44.1	1.094E+00	1.101E+00	4.931E+00
EU-155	9.007E-01	152.4	1.373E+00	1.373E+00	4.615E+00
HF-181	0.000E+00	1.#INF	1.103E-01	1.103E-01	1.861E+00
Ta-182	3.049E+00	34.9	1.065E+00	1.076E+00	6.713E+00
Hg-203	3.376E-01	107.1	3.616E-01	3.621E-01	1.218E+00
TL-208	6.239E+00	9.4	5.852E-01	6.688E-01	8.247E-01
pm-146	3.741E-01	93.6	3.500E-01	3.505E-01	2.881E+00
y-88	3.634E-01	133.8	4.862E-01	4.866E-01	1.125E+00
Cd-113m	3.999E+03	106.9	4.273E+03	4.281E+03	1.443E+04
Cd-109	3.750E+00	377.1	1.414E+01	1.414E+01	4.737E+01
Cf-251	1.082E+00	167.6	1.814E+00	1.817E+00	4.682E+00
Cf-249	4.282E-01	103.6	4.436E-01	4.442E-01	2.139E+00
Sn-126	1.569E+00	350.1	5.494E+00	5.495E+00	1.848E+01
PB-210	2.477E+01	45.1	1.118E+01	1.127E+01	2.983E+01
PB-212	1.742E+01	5.7	9.928E-01	1.502E+00	1.878E+00
PB-214	1.612E+01	7.3	1.183E+00	1.449E+00	2.170E+00
BI-207	3.809E-01	96.7	3.683E-01	3.688E-01	1.242E+00
BI-212	2.800E+00	223.0	6.245E+00	6.246E+00	2.155E+01
BI-214	1.404E+01	8.4	1.180E+00	1.387E+00	2.203E+00
BI-210M	-2.073E-02	4468.9	9.262E-01	9.262E-01	1.860E+00
AC-228	1.571E+01	9.4	1.475E+00	1.678E+00	2.625E+00
TH-227	8.536E-01	441.6	3.769E+00	3.770E+00	2.499E+01
TH-229	-1.710E-01	99.2	1.696E-01	1.701E-01	1.897E+01
TH-234	1.676E+00	742.8	1.245E+01	1.245E+01	4.201E+01
PA-231	6.616E+00	164.0	1.085E+01	1.086E+01	6.999E+01
PA-233	4.203E-01	331.9	1.395E+00	1.395E+00	5.718E+00
PA-234	-1.864E+00	87.7	1.635E+00	1.638E+00	9.717E+00
PA-234M	-2.309E+01	209.0	4.825E+01	4.827E+01	1.700E+02
U-235	-3.715E+00	75.3	2.797E+00	2.804E+00	8.884E+00
AM-241	1.271E+00	123.8	1.574E+00	1.576E+00	5.255E+00
Np-237	0.000E+00	1.#INF	4.483E+00	4.483E+00	1.493E+01
Ir-192	0.000E+00	1.#INF	2.518E-01	2.519E-01	2.388E+00
Cs-136	-8.834E-01	91.5	8.085E-01	8.101E-01	2.701E+00
Np-239	1.233E+00	98.6	1.215E+00	1.218E+00	4.060E+00
Nd-147	-4.305E+00	94.4	4.062E+00	4.069E+00	9.615E+00
Total	4.389E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-9-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161455.An1

Acquisition information
Start time: 7/12/2016 11:32:55 AM
Live time: 1800
Real time: 1808
Dead time: 0.44 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/12/2016 11:32:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2016-07-10_1414.PBC 7/10/2016 2:14:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1320

***** 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
46.17	42.	45.12	1.19	2.229E-02	46.54	4.250	PBC<MDA	PB210
59.54	26.	123.83	0.90	3.122E-02	59.54	35.900	PBC<MDA	AM241
63.29	4.	742.76	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
64.28	9.	350.14	0.91	3.392E-02	64.28	9.700	PBC<MDA	Sn126
74.68	208.	11.08	0.92	3.872E-02				
77.14	305.	8.37	0.92	3.964E-02				
86.52	11.	189.74	0.93	4.243E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.835E-01	EU155
					86.94	9.040	1.638E+00	Sn126
86.89	11.	199.90	0.93	4.253E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.631E-01	EU155
					86.94	9.040	1.569E+00	Sn126
87.52	45.	46.77	0.93	4.267E-02	87.57	37.500	PBC<MDA	Sn126
88.02	11.	377.07	0.93	4.278E-02	88.04	3.790	PBC<MDA	Cd109
92.99	180.	14.91	1.65	4.382E-02	92.59	5.584	3.369E+01	TH234
					93.35	5.561	4.104E+01	AC228
99.50	5.	570.91	0.94	4.467E-02	99.50	15.000	PBC<MDA	Np239
104.70	33.	42.00	0.38	4.512E-02	105.31	21.200	PBC<MDA	EU155
106.13	23.	98.55	0.95	4.521E-02	106.13	22.700	PBC<MDA	Np239
121.78	20.	109.54	0.96	4.528E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.868E-01	CO57
165.85	22.	108.35	1.00	4.089E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	13.	167.65	1.01	3.926E-02	176.60	17.000	PBC<MDA	Cf251
211.59	9.	244.95	1.05	3.496E-02	210.85	2.990	PBC<MDA	TH229
227.00	19.	99.93	1.06	3.329E-02	227.00	6.300	PBC<MDA	Cf251
238.49	456.	6.19	1.10	3.221E-02	238.63	43.300	1.817E+01	PB212
241.94	64.	24.47	1.07	3.189E-02	242.00	7.430	1.502E+01	PB214
256.24	4.	441.59	1.09	3.069E-02	256.24	7.000	PBC<MDA	TH227
263.70	13.	106.86	1.09	3.010E-02	263.70	0.006	PBC<MDA	Cd113m
277.36	29.	58.96	1.03	2.910E-02	277.28	6.310	PBC<MDA	TL208
279.20	14.	107.09	1.11	2.896E-02	279.20	81.460	PBC<MDA	Hg203
284.30	15.	100.23	1.11	2.861E-02	284.30	6.140	PBC<MDA	I131
295.17	167.	12.13	1.06	2.788E-02	295.09	19.300	1.720E+01	PB214
299.79	54.	25.59	1.08	2.757E-02	300.03	3.280	3.328E+01	PB212
					300.07	2.460	4.438E+01	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	18.	164.01	1.13	2.757E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.436E+01	PA231
					300.18	6.200	5.699E+00	PA233
300.18	9.	331.89	1.13	2.756E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	7.209E+00	PA231
					300.18	6.200	2.861E+00	PA233
328.76	17.	88.61	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
333.44	16.	103.59	1.16	2.564E-02	333.44	15.510	PBC<MDA	Cf249
338.26	100.	13.71	0.98	2.539E-02	338.32	12.010	1.822E+01	AC228
344.29	16.	129.09	1.17	2.508E-02	344.29	26.500	PBC<MDA	EU152
351.76	260.	8.26	1.32	2.471E-02	351.93	37.600	1.556E+01	PB214
364.48	2.	786.34	1.19	2.410E-02	364.48	81.700	PBC<MDA	I131
427.88	5.	285.89	1.24	2.153E-02	427.88	29.600	PBC<MDA	SB125
453.88	12.	93.56	1.27	2.065E-02	453.88	65.000	PBC<MDA	pm146
463.37	46.	29.07	1.28	2.035E-02	463.37	10.470	1.209E+01	SB125
477.60	11.	132.25	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
510.54	176.	8.50	1.05	1.898E-02	511.86	20.000	2.588E+01	RH106
563.24	11.	109.75	1.36	1.768E-02	563.24	8.350	PBC<MDA	CS134
569.34	12.	96.68	1.37	1.753E-02	569.32	15.380	2.420E+00	CS134
					569.47	8.200	4.539E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.16	161.	9.38	1.52	1.724E-02	583.02	84.500	6.122E+00	TL208
609.35	209.	8.76	1.20	1.669E-02	609.31	46.090	1.507E+01	BI214
					610.30	5.750	1.209E+02	RU103
636.97	7.	154.43	1.43	1.616E-02	636.97	7.170	PBC<MDA	I131
661.66	83.	13.91	1.64	1.571E-02	661.66	85.210	3.426E+00	CS137
696.54	10.	94.33	1.48	1.513E-02	696.54	99.000	PBC<MDA	PM144
722.79	13.	79.99	1.50	1.472E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.320E-01	AG108M
					723.36	20.220	2.391E+00	EU154
722.94	13.	89.22	1.50	1.471E-02	722.79	10.810	4.470E+00	SB124
					722.94	90.840	5.320E-01	AG108M
					723.36	20.220	2.391E+00	EU154
722.95	10.	119.13	1.50	1.471E-02	722.79	10.810	PBC<MDA	SB124

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					722.94	90.840	4.324E-01	AG108M
					723.36	20.220	1.943E+00	EU154
727.17	6.	223.03	1.51	1.465E-02	727.17	7.550	PBC<MDA	BI212
747.16	1.	706.43	1.52	1.436E-02	747.16	34.000	PBC<MDA	pm146
756.73	20.	46.42	1.53	1.422E-02	756.73	54.460	PBC<MDA	ZR95
785.42	11.	91.26	1.56	1.383E-02	785.42	1.280	PBC<MDA	BI212
801.95	15.	86.95	1.57	1.362E-02	801.95	8.690	PBC<MDA	CS134
834.85	8.	144.70	1.60	1.321E-02	834.85	99.980	PBC<MDA	MN54
860.61	20.	50.83	1.62	1.291E-02	860.56	12.420	PBC<MDA	TL208
871.10	6.	75.70	1.63	1.279E-02	871.10	99.890	PBC<MDA	NB94
873.38	7.	61.98	1.63	1.277E-02	873.23	12.270	PBC<MDA	EU154
898.04	8.	133.82	1.65	1.250E-02	898.04	93.700	PBC<MDA	y88
911.17	95.	12.83	1.42	1.237E-02	911.07	29.000	1.467E+01	AC228
968.85	86.	11.77	1.74	1.180E-02	968.97	17.460	2.306E+01	AC228
996.33	9.	69.07	1.73	1.155E-02	996.33	10.600	PBC<MDA	EU154
1004.77	9.	90.88	1.74	1.148E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	11.	85.87	1.76	1.119E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	14.	79.95	1.77	1.109E-02	1050.36	1.560	PBC<MDA	RH106
1112.07	4.	339.27	1.82	1.061E-02	1112.07	13.644	PBC<MDA	EU152
1120.77	49.	17.87	2.11	1.055E-02	1120.29	15.100	1.706E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	7.387E+00	Ta182
1121.22	9.	144.83	1.83	1.055E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.736E-01	Sc46
					1121.30	34.900	1.357E+00	Ta182
1173.24	18.	37.20	1.87	1.018E-02	1173.24	99.900	1.002E+00	CO60
1189.05	20.	34.94	1.88	1.008E-02	1189.05	16.200	6.692E+00	Ta182
1238.28	15.	87.32	1.92	9.765E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	9.	86.01	1.95	9.547E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.543E+00	EU154
1408.00	5.	198.49	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1460.68	401.	5.05	1.71	8.576E-03	1460.83	10.670	2.437E+02	K40
1690.98	10.	31.62	2.25	7.633E-03	1690.98	47.790	1.523E+00	SB124
1764.46	39.	17.57	2.30	7.376E-03	1764.49	15.400	1.889E+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
298.28	74.68	161.	208.	5.367E+03	11.08	0.916	- D
308.11	77.14	173.	305.	7.698E+03	8.37	0.919	- D
2040.76	510.54	6.	176.	9.299E+03	8.50	1.053	- 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	184.32	46.17	107.	42.	0.023	45.12	1.193s
AM-241	237.74	59.54	491.	26.	0.014	123.83	0.902s
TH-234	252.73	63.29	402.	4.	0.002	742.76	0.905s
Sn-126	256.70	64.28	525.	9.	0.005	350.14	0.906
BA-133	323.48	80.99	1143.	-5.	-0.003	891.34	0.922s
Np-237	345.47	86.49	990.	0.	0.000	147.50	0.928A
EU-155	345.68	86.54	960.	11.	0.006	189.74	0.928D
Sn-126	347.27	86.94	897.	11.	0.006	199.90	0.928D
Sn-126	349.78	87.57	820.	45.	0.025	46.77	0.929D
Cd-109	351.66	88.04	846.	11.	0.006	377.07	0.929A
Nd-147	363.89	91.10	857.	0.	0.000	1000.00	0.932s
TH-234	369.85	92.59	889.	-32.	-0.018	130.01	0.934s
AC-228	371.45	92.99	135.	180.	0.100	14.91	1.652s
Gd-153	389.47	97.50	197.	-25.	-0.014	101.68	0.938s
Np-239	397.47	99.50	467.	5.	0.003	570.91	0.940
Np-239	414.25	103.70	292.	-18.	-0.010	138.03	0.944s
EU-155	420.70	105.31	272.	16.	0.009	152.39	0.946s
Np-239	423.96	106.13	241.	23.	0.013	98.55	0.946s
EU-152	486.50	121.78	230.	20.	0.011	109.54	0.961s
CO-57	487.64	122.06	225.	-25.	-0.014	87.24	0.962s
EU-154	491.79	123.10	243.	-15.	-0.009	146.13	0.963s
PA-234	524.55	131.29	876.	-27.	-0.015	87.73	0.970s
HF-181	531.46	133.02	900.	-27.	-0.015	158.26	0.972s
CE-144	533.51	133.54	794.	-26.	-0.015	89.86	0.973s
HF-181	544.55	136.30	819.	-26.	-0.014	159.46	0.975s
CO-57	545.24	136.47	845.	-19.	-0.011	212.75	0.975s
U-235	574.47	143.79	248.	-32.	-0.018	75.30	0.982
CE-141	581.09	145.44	303.	-13.	-0.007	194.69	0.984s
Ba-140	649.91	162.66	317.	-25.	-0.014	104.40	1.000s
U-235	652.79	163.38	342.	-16.	-0.009	151.68	1.001s
CE-139	662.68	165.85	267.	22.	0.012	108.35	1.003
Cf-251	705.64	176.60	132.	13.	0.007	167.65	1.013s
TH-229	773.22	193.51	129.	-11.	-0.006	99.16	1.029
U-235	820.49	205.33	140.	-11.	-0.006	101.64	1.040s
TH-229	842.54	210.85	147.	9.	0.005	244.95	1.046s
Cf-251	907.10	227.00	95.	19.	0.010	99.93	1.061s
PB-212	953.60	238.63	91.	437.	0.243	5.70	1.071D
PB-214	967.05	242.00	91.	64.	0.036	24.47	1.074D
EU-152	977.83	244.69	847.	-24.	-0.013	104.83	1.077s
TH-227	1023.99	256.24	88.	4.	0.002	441.59	1.088s
Cd-113m	1053.81	263.70	90.	13.	0.007	106.86	1.095s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.43	277.36	61.	29.	0.016	58.96	1.032
Hg-203	1115.78	279.20	111.	14.	0.008	107.09	1.109s
I-131	1136.16	284.30	63.	15.	0.008	100.23	1.114
PB-214	1179.61	295.17	58.	167.	0.093	12.13	1.060s
PB-212	1198.09	299.79	38.	54.	0.030	25.59	1.076s
PA-231	1199.21	300.07	405.	18.	0.010	164.01	1.128s
PA-233	1199.65	300.18	422.	9.	0.005	331.89	1.128s
PA-231	1209.52	302.65	431.	0.	0.000	1000.00	1.131s
BA-133	1210.33	302.85	431.	0.	0.000	1000.00	1.131s
Ba-140	1218.32	304.85	431.	0.	0.000	1000.00	1.133s
BI-210M	1218.50	304.90	431.	0.	0.000	1000.00	1.133s
Ir-192	1232.67	308.44	431.	0.	0.000	1000.00	1.136s
PA-233	1246.95	312.01	431.	0.	0.000	1000.00	1.139s
Ir-192	1264.85	316.49	431.	0.	0.000	1000.00	1.143
La-140	1313.91	328.76	99.	17.	0.009	88.61	1.155s
Cf-249	1332.62	333.44	131.	16.	0.009	103.59	1.159s
AC-228	1351.88	338.26	24.	100.	0.056	13.71	0.976
Cs-136	1361.13	340.57	338.	-21.	-0.011	127.88	1.165s
EU-152	1375.98	344.29	205.	16.	0.009	129.09	1.169
HF-181	1382.15	345.83	304.	-20.	-0.011	125.70	1.170s
PB-214	1405.85	351.76	52.	260.	0.145	8.26	1.325
BA-133	1422.81	356.00	422.	-19.	-0.011	152.75	1.180s
I-131	1456.73	364.48	64.	2.	0.001	786.34	1.187s
BA-133	1534.13	383.84	133.	-11.	-0.006	151.30	1.205s
Cf-249	1550.56	387.95	144.	0.	0.000	1000.00	1.209s
SB-125	1710.19	427.88	52.	5.	0.003	285.89	1.245s
AG-108M	1734.43	433.94	52.	-2.	-0.001	709.46	1.250s
pm-146	1814.18	453.88	28.	12.	0.006	93.56	1.268s
SB-125	1852.11	463.37	68.	46.	0.026	29.07	1.277s
Ir-192	1870.88	468.06	118.	-8.	-0.005	191.47	1.281s
BE-7	1909.00	477.60	107.	11.	0.006	132.25	1.289
HF-181	1926.61	482.00	118.	0.	0.000	1000.00	1.293s
La-140	1946.69	487.02	156.	-17.	-0.009	107.46	1.298s
RH-106	2046.04	511.86	320.	-38.	-0.021	68.76	2.570s
Nd-147	2122.56	531.00	69.	-19.	-0.010	94.35	1.337s
Ba-140	2147.60	537.26	74.	-19.	-0.011	69.87	1.342s
CS-134	2251.48	563.24	30.	11.	0.006	109.75	1.365s
CS-134	2275.81	569.32	68.	-14.	-0.008	85.98	1.370s
BI-207	2277.34	569.70	58.	12.	0.007	96.68	1.371s
TL-208	2331.18	583.16	16.	161.	0.089	9.38	1.521s
SB-125	2400.51	600.50	413.	-16.	-0.009	180.05	1.398s
SB-124	2409.43	602.73	487.	-21.	-0.012	72.69	1.399s
CS-134	2417.34	604.71	466.	-19.	-0.011	158.34	1.401s
BI-214	2435.75	609.31	36.	194.	0.108	8.40	1.405D
RU-103	2439.69	610.30	447.	-20.	-0.011	154.52	1.406s
AG-108M	2455.62	614.28	422.	-20.	-0.011	149.96	1.410s
PM-144	2470.74	618.06	403.	-12.	-0.006	247.43	1.413
SB-125	2542.05	635.89	57.	-5.	-0.003	232.77	1.428s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2546.39	636.97	50.	7.	0.004	154.43	1.429
AG-110M	2629.52	657.76	157.	-17.	-0.009	108.93	1.447s
CS-137	2645.10	661.66	11.	83.	0.046	13.91	1.642s
PM-144	2784.64	696.54	19.	10.	0.006	94.33	1.481s
NB-94	2808.99	702.63	33.	-8.	-0.004	162.22	1.486s
SB-124	2889.61	722.79	46.	13.	0.007	79.99	1.503s
AG-108M	2890.22	722.94	59.	13.	0.007	89.22	1.503
EU-154	2891.89	723.36	72.	10.	0.006	119.13	1.503
BI-212	2907.15	727.17	74.	6.	0.003	223.03	1.507s
pm-146	2941.34	735.72	37.	-6.	-0.004	208.48	1.514s
pm-146	2987.11	747.16	24.	1.	0.001	706.43	1.524s
ZR-95	3025.38	756.73	14.	20.	0.011	46.42	1.532s
AG-110M	3054.24	763.94	79.	-20.	-0.011	66.83	1.538s
NB-95	3061.63	765.79	104.	-6.	-0.003	243.92	1.539s
EU-152	3114.15	778.92	47.	-12.	-0.006	127.62	1.550s
BI-212	3140.15	785.42	19.	11.	0.006	91.26	1.556
CS-134	3181.95	795.87	77.	-13.	-0.007	99.41	1.565s
CS-134	3206.28	801.95	82.	15.	0.009	86.95	1.570s
CO-58	3241.58	810.78	97.	-17.	-0.010	83.71	1.577s
La-140	3261.56	815.77	114.	-17.	-0.010	90.10	1.581s
Cs-136	3272.49	818.50	180.	-21.	-0.012	91.52	1.583s
MN-54	3337.89	834.85	28.	8.	0.004	144.70	1.597s
TL-208	3440.76	860.56	20.	20.	0.011	50.83	1.619
NB-94	3482.90	871.10	7.	6.	0.003	75.70	1.627s
EU-154	3491.44	873.23	6.	7.	0.004	61.98	1.629
PA-234	3531.48	883.24	42.	0.	0.000	1000.00	1.637s
AG-110M	3537.26	884.68	42.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	46.	-10.	-0.005	106.57	1.642
y-88	3590.70	898.04	20.	8.	0.004	133.82	1.649s
AC-228	3643.23	911.17	9.	95.	0.053	12.83	1.418
AG-110M	3748.54	937.49	35.	-4.	-0.002	328.98	1.682s
PA-234	3782.66	946.02	35.	-2.	-0.001	654.15	1.688s
EU-152	3855.05	964.11	146.	-17.	-0.009	104.72	1.703s
AC-228	3874.02	968.85	4.	86.	0.047	11.77	1.742
EU-154	3983.96	996.33	13.	9.	0.005	69.07	1.729
PA-234M	4002.64	1001.00	33.	-4.	-0.002	208.95	1.733s
EU-154	4017.76	1004.77	26.	9.	0.005	90.88	1.736
Co-56	4150.07	1037.84	15.	11.	0.006	85.87	1.762s
Cs-136	4191.00	1048.07	60.	-21.	-0.012	55.73	1.771s
RH-106	4200.17	1050.36	54.	14.	0.008	79.95	1.772s
BI-207	4253.39	1063.66	35.	-9.	-0.005	148.31	1.783s
Ga-68	4308.37	1077.40	59.	-20.	-0.011	91.35	1.794s
FE-59	4395.81	1099.25	37.	-1.	-0.001	761.47	1.811
EU-152	4447.13	1112.07	98.	4.	0.002	339.27	1.821s
ZN-65	4461.03	1115.55	102.	0.	0.000	1000.00	1.824s
BI-214	4481.95	1120.77	8.	49.	0.027	17.87	2.110
Sc-46	4481.05	1120.55	102.	0.	0.000	1000.00	1.828
Ta-182	4484.05	1121.30	80.	9.	0.005	144.83	1.828

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4691.91	1173.24	6.	18.	0.010	37.20	1.869s
Ta-182	4755.20	1189.05	5.	20.	0.011	34.94	1.881
Ta-182	4884.72	1221.41	37.	-10.	-0.006	137.96	1.906
Co-56	4952.24	1238.28	33.	15.	0.009	87.32	1.919s
NA-22	5097.34	1274.53	11.	9.	0.005	86.01	1.946s
EU-154	5097.39	1274.54	20.	0.	0.000	1000.00	1.946
FE-59	5165.65	1291.60	18.	-6.	-0.003	241.96	1.959s
CO-60	5329.39	1332.50	23.	-3.	-0.001	423.16	1.990s
AG-110M	5536.74	1384.30	28.	-15.	-0.009	85.32	2.029s
EU-152	5631.64	1408.00	17.	5.	0.003	198.49	2.046s
K-40	5842.54	1460.68	5.	401.	0.223	5.05	1.710
La-140	6385.21	1596.21	18.	-4.	-0.002	261.01	2.182s
SB-124	6764.73	1690.98	0.	10.	0.006	31.62	2.247s
BI-214	7059.14	1764.49	3.	39.	0.021	17.57	2.297s
Co-56	7086.61	1771.35	42.	0.	0.000	1000.00	2.302s
y-88	7345.80	1836.06	0.	0.	0.000	1000.00	2.345s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.0057E+00				5.31E+01	
			477.60	3.006E+00	(	1.348E+01 1.32E+02 1.05E+01	G
NA-22	C	5.4344E-01				9.50E+02	
			1274.53	5.434E-01	?(	1.044E+00 8.60E+01 9.99E+01	G
K-40	N	2.4368E+02				4.66E+11	
			1460.83	2.437E+02	(P	7.749E+00 5.05E+00 1.07E+01	G
Sc-46	F	-4.1910E-01				8.38E+01	
			889.28	-4.191E-01	?(	1.521E+00 1.07E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.621E+00 1.00E+03 1.00E+02	G
CR-51	F	-1.7529E-01				2.77E+01	
			320.08	-1.753E-01	%(P	2.109E+01 1.69E+03 9.94E+00	G
MN-54	C	3.3649E-01				3.12E+02	
			834.85	3.365E-01	?(	1.151E+00 1.45E+02 1.00E+02	G
FE-59	F	-1.2375E-01				4.45E+01	
			1099.25	-1.238E-01	?(P	2.863E+00 7.61E+02 5.65E+01	G
			1291.60	-7.632E-01	+ P	3.030E+00 2.42E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 7.9958E-01					7.73E+01	
		846.77	3.279E-02	%(P	1.091E+00	1.35E+03	9.99E+01 G
		1238.28	1.333E+00	?(P	2.534E+00	8.73E+01	6.61E+01 G
		1037.84	3.729E+00	?(	7.290E+00	8.59E+01	1.41E+01 G
		1771.35	0.000E+00	-	1.606E+01	1.00E+03	1.55E+01 A
CO-57	C -3.5847E-01					2.72E+02	
		122.06	-3.585E-01	(	1.042E+00	8.72E+01	8.56E+01 G
		136.47	-2.287E+00	&	1.626E+01	2.13E+02	1.07E+01 G
CO-58	C -7.1719E-01					7.09E+01	
		810.78	-7.172E-01	?(	2.007E+00	8.37E+01	9.95E+01 G
CO-60	F 4.2060E-01					1.93E+03	
		1332.50	-1.607E-01	?(	1.500E+00	4.23E+02	1.00E+02 G
		1173.24	1.002E+00	?(P	7.526E-01	3.72E+01	9.99E+01 G
NB-94	I -1.6512E-02					7.41E+06	
		702.63	-2.895E-01	?(	1.108E+00	1.62E+02	9.79E+01 G
		871.10	2.510E-01	?(	6.409E-01	7.57E+01	9.99E+01 G
ZR-95	I 1.4117E+00					6.40E+01	
		756.73	1.412E+00	&(P	1.459E+00	4.64E+01	5.45E+01 G
		724.20	-1.678E-02	& P	3.850E+00	5.87E+03	4.42E+01 G
NB-95	I -2.3688E-01					6.40E+01	
		765.79	-2.369E-01	?(	1.984E+00	2.44E+02	9.98E+01 G
RU-103	I 3.1585E-02					3.93E+01	
		497.05	3.158E-02	%(	1.005E+00	1.28E+03	9.09E+01 G
		610.30	-1.133E+01	+	5.864E+01	1.55E+02	5.75E+00 GA
RH-106	I 6.0082E+00					3.74E+02	
		621.92	5.191E-06	%(	3.227E+01	1.83E+08	9.93E+00 G
		1050.36	4.425E+01	?(	1.185E+02	8.00E+01	1.56E+00 G
		511.86	-5.556E+00	+	1.263E+01	6.88E+01	2.00E+01 GA
AG-108M	C 2.3776E-01					1.53E+05	
		433.94	-5.760E-02	?(	1.046E+00	7.09E+02	9.05E+01 G
		722.94	5.320E-01	(	1.598E+00	8.92E+01	9.08E+01 G
		614.28	-7.303E-01	+	3.669E+00	1.50E+02	8.98E+01 G
SN-113	F -2.5250E-02					1.15E+02	
		391.69	-2.525E-02	%(	2.203E+00	2.53E+03	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	-1.8876E-01					6.02E+01	
			602.73	-7.012E-01	?(P	3.546E+00	7.27E+01	9.83E+01 G
			1690.98	1.523E+00	+	1.122E+00	3.16E+01	4.78E+01 G
			722.79	4.470E+00	&(	1.198E+01	8.00E+01	1.08E+01 G
SB-125	I	3.4821E+00					1.01E+03	
			427.88	4.358E-01	?(	3.165E+00	2.86E+02	2.96E+01 G
			600.50	-2.971E+00	+	1.796E+01	1.80E+02	1.79E+01 G
			635.89	-1.417E+00	+	1.147E+01	2.33E+02	1.13E+01 G
			463.37	1.209E+01	(P	1.070E+01	2.91E+01	1.05E+01 G
I-131	I	6.0245E-01					8.02E+00	
			364.48	5.643E-02	?(	1.128E+00	7.86E+02	8.17E+01 G
			284.30	4.838E+00	&(P	1.256E+01	1.00E+02	6.14E+00 G
			636.97	3.197E+00	&(	1.705E+01	1.54E+02	7.17E+00 G
Gd-153	F	-1.0433E+00					2.42E+02	
			97.50	-1.043E+00	?(	2.837E+00	1.02E+02	3.00E+01 G
			103.20	5.399E-08	&	5.885E+00	3.22E+09	2.18E+01 G
Ga-68	C	-3.5700E+01					4.71E-02	
			1077.40	-3.570E+01	?(	6.971E+01	9.14E+01	3.30E+00 G
Tc-99m	I	-1.1181E-07					2.51E-01	
			140.51	-1.118E-07	%(	2.047E+00	5.45E+08	8.93E+01 G
BA-133	F	-7.0254E-01					3.85E+03	
			356.00	-7.025E-01	?(	3.596E+00	1.53E+02	6.20E+01 G
			302.85	0.000E+00	+	1.100E+01	1.00E+03	1.83E+01 G
			383.84	-2.940E+00	+	1.509E+01	1.51E+02	8.94E+00 GA
			80.99	-2.141E-01	+	6.390E+00	8.91E+02	3.41E+01 GA
CS-134	I	2.7924E-01					7.54E+02	
			604.71	-6.605E-01	&(	3.503E+00	1.58E+02	9.76E+01 G
			795.87	-6.166E-01	+	2.068E+00	9.94E+01	8.55E+01 G
			569.32	-2.943E+00	+	8.491E+00	8.60E+01	1.54E+01 G
			801.95	7.247E+00	?(	2.112E+01	8.69E+01	8.69E+00 G
			563.24	4.014E+00	?(	1.068E+01	1.10E+02	8.35E+00 G
CS-137	I	3.4256E+00					1.10E+04	
			661.66	3.426E+00	(P	7.667E-01	1.39E+01	8.52E+01 G
CE-139	F	3.7014E-01					1.38E+02	
			165.85	3.701E-01	?(	1.341E+00	1.08E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-2.4062E+00					1.28E+01	
			537.26	-2.406E+00	?(P	5.320E+00	6.99E+01	2.44E+01 G
			162.66	-5.389E+00	+	1.878E+01	1.04E+02	6.22E+00 G
			304.85	0.000E+00	+	4.722E+01	1.00E+03	4.29E+00 G
La-140	I	6.6486E-02					1.28E+01	
			1596.21	-2.914E-01	?(	1.638E+00	2.61E+02	9.54E+01 G
			487.02	-1.049E+00	+	3.788E+00	1.07E+02	4.55E+01 G
			328.76	1.749E+00	?(	5.191E+00	8.86E+01	2.03E+01 G
			815.77	-3.086E+00	+	9.314E+00	9.01E+01	2.33E+01 G
CE-141	I	-3.4122E-01					3.25E+01	
			145.44	-3.412E-01	?(	2.239E+00	1.95E+02	4.82E+01 G
CE-144	I	-2.9733E+00					2.85E+02	
			133.54	-2.973E+00	?(P	1.510E+01	8.99E+01	1.11E+01 G
PM-144	C	3.8190E-01					3.63E+02	
			696.54	3.819E-01	?(	8.475E-01	9.43E+01	9.90E+01 G
			618.06	-3.919E-01	&	3.265E+00	2.47E+02	9.91E+01 G
EU-152	F	1.1898E+00					4.94E+03	
			344.29	1.337E+00	&(P	5.803E+00	1.29E+02	2.65E+01 G
			1112.07	1.598E+00	?(	1.872E+01	3.39E+02	1.36E+01 G
			121.78	8.587E-01	(	3.151E+00	1.10E+02	2.86E+01 G
			778.92	-3.599E+00	+	1.066E+01	1.28E+02	1.29E+01 G
			964.11	-5.380E+00	+	1.892E+01	1.05E+02	1.46E+01 G
			244.69	-5.505E+00	+ P	3.202E+01	1.05E+02	7.58E+00 G
			1408.00	1.498E+00	?	6.568E+00	1.98E+02	2.10E+01 GA
EU-154	I	2.4829E+00					3.14E+03	
			873.23	2.459E+00	(	4.931E+00	6.20E+01	1.23E+01 G
			123.10	-4.618E-01	-	2.271E+00	1.46E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.894E+00	1.00E+03	3.52E+01 G
			723.36	1.943E+00	(	7.872E+00	1.19E+02	2.02E+01 G
			1004.77	2.295E+00	(	7.095E+00	9.09E+01	1.80E+01 G
			996.33	3.859E+00	(	8.853E+00	6.91E+01	1.06E+01 G
EU-155	I	9.0065E-01					1.81E+03	
			105.31	9.007E-01	?(P	4.615E+00	1.52E+02	2.12E+01 G
			86.54	4.835E-01	}	6.272E+00	1.90E+02	3.07E+01 G
Ta-182	F	3.0487E+00					1.14E+02	
			1121.30	1.357E+00	(	6.713E+00	1.45E+02	3.49E+01 G
			1221.41	-2.154E+00	+	6.501E+00	1.38E+02	2.70E+01 G
			1189.05	6.692E+00	(	4.584E+00	3.49E+01	1.62E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Hg-203   F   3.3764E-01                                     4.66E+01
                          279.20 3.376E-01 &(P 1.218E+00 1.07E+02 8.15E+01 G

TL-208   N   6.2386E+00                                     6.98E+02
                          583.02 6.122E+00 *(P 8.247E-01 9.38E+00 8.45E+01 G
                          277.28 8.760E+00 + P 1.184E+01 5.90E+01 6.31E+00 G
                          860.56 7.034E+00 ?(P 8.103E+00 5.08E+01 1.24E+01 G

pm-146   C   3.7408E-01                                     2.02E+03
                          747.16 1.667E-01 ?(P 2.881E+00 7.06E+02 3.40E+01 G
                          735.72-1.077E+00 +   5.301E+00 2.08E+02 2.25E+01 G
                          453.88 4.826E-01 &(  1.133E+00 9.36E+01 6.50E+01 G

y-88     F   3.6336E-01                                     1.07E+02
                          898.04 3.634E-01 ?(P 1.125E+00 1.34E+02 9.37E+01 G
                         1836.06 0.000E+00 -   5.777E-01 1.00E+03 9.92E+01 G

Cd-113m      3.9985E+03                                     5.33E+03
                          263.70 3.999E+03 ?(  1.443E+04 1.07E+02 6.00E-03   K

Cd-109   F   3.7502E+00                                     4.53E+02
                                                          Derived Ave Activity
                           88.04 3.750E+00 }(  4.737E+01 3.77E+02 3.79E+00 G

Cf-251   T   1.0821E+00                                     3.28E+05
                          176.60 1.082E+00 &(  4.682E+00 1.68E+02 1.70E+01 G
                          227.00 4.977E+00     1.277E+01 9.99E+01 6.30E+00 GA

Cf-249   T   4.2823E-01                                     1.28E+05
                          387.95 0.000E+00  (  2.139E+00 1.00E+03 6.60E+01 G
                          333.44 2.250E+00 &(  7.835E+00 1.04E+02 1.55E+01 G

Sn-126       1.5692E+00                                     3.65E+07
                           87.57 1.569E+00 } P 4.727E+00 4.68E+01 3.75E+01 GA
                           64.28 1.569E+00  (  1.848E+01 3.50E+02 9.70E+00 G
                           86.94 1.569E+00 }   2.057E+01 2.00E+02 9.04E+00 GA

PB-210   N   2.4766E+01                                     8.14E+03
                           46.54 2.477E+01  (P 2.983E+01 4.51E+01 4.25E+00 G

PB-212   N   1.7423E+01                                     6.98E+02
                          238.63 1.742E+01  (P 1.878E+00 5.70E+00 4.33E+01 G
                          300.03 3.328E+01 + P 1.927E+01 2.56E+01 3.28E+00 GA

PB-214   N   1.6117E+01                                     5.84E+05
                          351.93 1.556E+01  (P 2.170E+00 8.26E+00 3.76E+01 G
                          295.09 1.720E+01 @(P 3.954E+00 1.21E+01 1.93E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          242.00 1.502E+01     1.105E+01 2.45E+01 7.43E+00 GA

BI-207   C   3.8094E-01                                     1.18E+04
                          569.70 3.809E-01 ?(P 1.242E+00 9.67E+01 9.77E+01 G
                         1063.66-6.109E-01 +   2.055E+00 1.48E+02 7.45E+01 G

BI-212   N   2.8000E+00                                     6.98E+02
                          727.17 2.800E+00  (P 2.155E+01 2.23E+02 7.55E+00 G
                          785.42 3.353E+01 ? P 7.191E+01 9.13E+01 1.28E+00 GA

BI-214   N   1.4037E+01                                     5.84E+05
                          609.31 1.404E+01  (P 2.203E+00 8.40E+00 4.61E+01 G
                         1120.29 1.706E+01 + P 5.556E+00 1.79E+01 1.51E+01 G
                         1764.49 1.889E+01 + P 5.507E+00 1.76E+01 1.54E+01 G

BI-210M  T  -2.0726E-02                                     1.10E+09
                          265.83-2.073E-02 &(P 1.860E+00 4.47E+03 5.00E+01 G
                          304.90 0.000E+00 +   7.236E+00 1.00E+03 2.80E+01 G

AC-228   N   1.5707E+01                                     2.10E+03
                          911.07 1.467E+01  (  2.625E+00 1.28E+01 2.90E+01 G
                          968.97 2.306E+01 +   3.082E+00 1.18E+01 1.75E+01 G
                          338.32 1.822E+01  (  4.654E+00 1.37E+01 1.20E+01 G
                           93.35 4.104E+01 +   1.296E+01 1.49E+01 5.56E+00 XA

TH-227   N   8.5361E-01                                     7.95E+03
                           50.14 6.955E-01 %(  2.499E+01 1.06E+03 8.00E+00 G
                          256.24 1.034E+00 &(  1.200E+01 4.42E+02 7.00E+00 G

TH-229   N  -1.7100E-01                                     2.68E+06
                          193.51-3.658E+00 ?(P 1.897E+01 9.92E+01 4.40E+00 G
                          210.85 4.961E+00 &(  3.144E+01 2.45E+02 2.99E+00 G

TH-234   N   1.6757E+00                                     1.63E+12
                           63.29 1.676E+00 *(P 4.201E+01 7.43E+02 3.81E+00 G
                           92.59-7.304E+00 + P 3.226E+01 1.30E+02 5.58E+00 G

PA-231   N   6.6157E+00                                     1.20E+07
                          302.65 0.000E+00 ?(  6.999E+01 1.00E+03 2.88E+00 G
                          300.07 1.436E+01 *(  7.900E+01 1.64E+02 2.46E+00 G

PA-233   C   4.2034E-01                                     7.82E+08
                          312.01 0.000E+00 ?(  5.718E+00 1.00E+03 3.60E+01 G
                          300.18 2.861E+00 *(  3.201E+01 3.32E+02 6.20E+00 G

PA-234   N  -1.8640E+00                                     1.63E+12
                          131.29-1.864E+00 &(P 9.717E+00 8.77E+01 1.80E+01 G
                          946.02-6.900E-01 +   1.045E+01 6.54E+02 1.34E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47-4.032E-01 %   1.428E+01 1.00E+03 8.20E+00 G
                          883.24 0.000E+00 +   1.504E+01 1.00E+03 9.60E+00 G
                          880.53 4.864E-01 %   2.384E+01 1.37E+03 6.00E+00 GA

PA-234M  N  -2.3093E+01                                      1.63E+12
                         1001.00-2.309E+01 ?(  1.700E+02 2.09E+02 8.37E-01 G
                          766.41 4.471E+00 %   7.057E+02 4.55E+03 2.94E-01 G

U-235    N  -3.7146E+00                                      2.57E+11
                          143.79-3.715E+00  (P 8.884E+00 7.53E+01 1.10E+01 G
                          205.33-3.273E+00 + P 1.800E+01 1.02E+02 5.01E+00 G
                          163.38-4.258E+00 + P 2.394E+01 1.52E+02 5.08E+00 G

AM-241   T   1.2712E+00                                      1.58E+05
                           59.54 1.271E+00 ?(  5.255E+00 1.24E+02 3.59E+01 G

Cs-136   F  -8.8340E-01                                      1.30E+01
                          818.50-8.834E-01 ?(  2.701E+00 9.15E+01 1.00E+02 G
                         1048.07-1.333E+00 +   2.426E+00 5.57E+01 8.00E+01 G
                          340.57-9.681E-01 +   4.145E+00 1.28E+02 4.69E+01 G

Np-239   T   1.2332E+00                                      2.36E+00
                          103.70-9.129E-01 -   4.230E+00 1.38E+02 2.40E+01 X
                          106.13 1.233E+00 &(  4.060E+00 9.86E+01 2.27E+01 G
                           99.50 4.451E-01     8.573E+00 5.71E+02 1.50E+01 X

Nd-147      -4.3046E+00                                      1.11E+01
                          531.00-4.305E+00 ?(  9.615E+00 9.44E+01 1.30E+01 G
                           91.10 0.000E+00 +   6.292E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
```

to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	491.	26.	0.014	123.83	1.271E+00	
TH-234	63.29	402.	4.	0.002	742.76	1.676E+00	P
BA-133	80.99	1143.	-5.	-0.003	891.34	-2.141E-01	
TH-234	92.59	889.	-32.	-0.018	130.01	-7.304E+00	P
Gd-153	97.50	197.	-25.	-0.014	101.68	-1.043E+00	
EU-152	121.78	230.	20.	0.011	109.54	8.587E-01	
CO-57	122.06	225.	-25.	-0.014	87.24	-3.585E-01	
EU-154	123.10	243.	-15.	-0.009	146.13	-4.618E-01	
PA-234	131.29	876.	-27.	-0.015	87.73	-1.864E+00	P
HF-181	133.02	900.	-27.	-0.015	158.26	-7.783E-01	
CE-144	133.54	794.	-26.	-0.015	89.86	-2.973E+00	P
HF-181	136.30	819.	-26.	-0.014	159.46	-5.494E+00	
CO-57	136.47	845.	-19.	-0.011	212.75	-2.287E+00	
U-235	143.79	248.	-32.	-0.018	75.30	-3.715E+00	P
CE-141	145.44	303.	-13.	-0.007	194.69	-3.412E-01	
Ba-140	162.66	317.	-25.	-0.014	104.40	-5.389E+00	
U-235	163.38	342.	-16.	-0.009	151.68	-4.258E+00	P
CE-139	165.85	267.	22.	0.012	108.35	3.701E-01	
Cf-251	176.60	132.	13.	0.007	167.65	1.082E+00	
U-235	205.33	140.	-11.	-0.006	101.64	-3.273E+00	P
Cf-251	227.00	95.	19.	0.010	99.93	4.977E+00	
EU-152	244.69	847.	-24.	-0.013	104.83	-5.505E+00	P
TH-227	256.24	88.	4.	0.002	441.59	1.034E+00	
Cd-113m	263.70	90.	13.	0.007	106.86	3.999E+03	
Hg-203	279.20	111.	14.	0.008	107.09	3.376E-01	P
I-131	284.30	63.	15.	0.008	100.23	4.838E+00	P
PA-231	300.07	405.	18.	0.010	164.01	1.436E+01	
PA-233	300.18	422.	9.	0.005	331.89	2.861E+00	
La-140	328.76	99.	17.	0.009	88.61	1.749E+00	
Cf-249	333.44	131.	16.	0.009	103.59	2.250E+00	
Cs-136	340.57	338.	-21.	-0.011	127.88	-9.681E-01	
EU-152	344.29	205.	16.	0.009	129.09	1.337E+00	P
HF-181	345.83	304.	-20.	-0.011	125.70	-2.938E+00	
BA-133	356.00	422.	-19.	-0.011	152.75	-7.025E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
I-131	364.48	64.	2.	0.001	786.34	5.643E-02		
BA-133	383.84	133.	-11.	-0.006	151.30	-2.940E+00		
pm-146	453.88	28.	12.	0.006	93.56	4.826E-01		
Ir-192	468.06	118.	-8.	-0.005	191.47	-4.340E-01		
BE-7	477.60	107.	11.	0.006	132.25	3.006E+00		
La-140	487.02	156.	-17.	-0.009	107.46	-1.049E+00		
RH-106	511.86	320.	-38.	-0.021	68.76	-5.556E+00		
Nd-147	531.00	69.	-19.	-0.010	94.35	-4.305E+00		
Ba-140	537.26	74.	-19.	-0.011	69.87	-2.406E+00		P
CS-134	563.24	30.	11.	0.006	109.75	4.014E+00		
CS-134	569.32	68.	-14.	-0.008	85.98	-2.943E+00		
SB-124	602.73	487.	-21.	-0.012	72.69	-7.012E-01		P
CS-134	604.71	466.	-19.	-0.011	158.34	-6.605E-01		
RU-103	610.30	447.	-20.	-0.011	154.52	-1.133E+01		
PM-144	618.06	403.	-12.	-0.006	247.43	-3.919E-01		
I-131	636.97	50.	7.	0.004	154.43	3.197E+00		
AG-110M	657.76	157.	-17.	-0.009	108.93	-6.207E-01		
PM-144	696.54	19.	10.	0.006	94.33	3.819E-01		
NB-94	702.63	33.	-8.	-0.004	162.22	-2.895E-01		
SB-124	722.79	46.	13.	0.007	79.99	4.470E+00		
EU-154	723.36	72.	10.	0.006	119.13	1.943E+00		
BI-212	727.17	74.	6.	0.003	223.03	2.800E+00		P
pm-146	735.72	37.	-6.	-0.004	208.48	-1.077E+00		
pm-146	747.16	24.	1.	0.001	706.43	1.667E-01		P
ZR-95	756.73	14.	20.	0.011	46.42	1.412E+00		P
AG-110M	763.94	79.	-20.	-0.011	66.83	-3.532E+00		
NB-95	765.79	104.	-6.	-0.003	243.92	-2.369E-01		
EU-152	778.92	47.	-12.	-0.006	127.62	-3.599E+00		
BI-212	785.42	19.	11.	0.006	91.26	3.353E+01		P
CS-134	795.87	77.	-13.	-0.007	99.41	-6.166E-01		
CS-134	801.95	82.	15.	0.009	86.95	7.247E+00		
CO-58	810.78	97.	-17.	-0.010	83.71	-7.172E-01		
La-140	815.77	114.	-17.	-0.010	90.10	-3.086E+00		
Cs-136	818.50	180.	-21.	-0.012	91.52	-8.834E-01		
MN-54	834.85	28.	8.	0.004	144.70	3.365E-01		
NB-94	871.10	7.	6.	0.003	75.70	2.510E-01		
EU-154	873.23	6.	7.	0.004	61.98	2.459E+00		
Sc-46	889.28	46.	-10.	-0.005	106.57	-4.191E-01		
y-88	898.04	20.	8.	0.004	133.82	3.634E-01		P
AG-110M	937.49	35.	-4.	-0.002	328.98	-5.345E-01		
PA-234	946.02	35.	-2.	-0.001	654.15	-6.900E-01		
EU-152	964.11	146.	-17.	-0.009	104.72	-5.380E+00		
EU-154	996.33	13.	9.	0.005	69.07	3.859E+00		
PA-234M	1001.00	33.	-4.	-0.002	208.95	-2.309E+01		
EU-154	1004.77	26.	9.	0.005	90.88	2.295E+00		
Co-56	1037.84	15.	11.	0.006	85.87	3.729E+00		
Cs-136	1048.07	60.	-21.	-0.012	55.73	-1.333E+00		
RH-106	1050.36	54.	14.	0.008	79.95	4.425E+01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ga-68	1077.40	59.	-20.	-0.011	91.35	-3.570E+01		
FE-59	1099.25	37.	-1.	-0.001	761.47	-1.238E-01		P
EU-152	1112.07	98.	4.	0.002	339.27	1.598E+00		
Ta-182	1121.30	80.	9.	0.005	144.83	1.357E+00		
CO-60	1173.24	6.	18.	0.010	37.20	1.002E+00		P
Ta-182	1189.05	5.	20.	0.011	34.94	6.692E+00		
Ta-182	1221.41	37.	-10.	-0.006	137.96	-2.154E+00		
Co-56	1238.28	33.	15.	0.009	87.32	1.333E+00		P
NA-22	1274.53	11.	9.	0.005	86.01	5.434E-01		
FE-59	1291.60	18.	-6.	-0.003	241.96	-7.632E-01		P
CO-60	1332.50	23.	-3.	-0.001	423.16	-1.607E-01		
AG-110M	1384.30	28.	-15.	-0.009	85.32	-3.919E+00		
EU-152	1408.00	17.	5.	0.003	198.49	1.498E+00		
La-140	1596.21	18.	-4.	-0.002	261.01	-2.914E-01		
SB-124	1690.98	0.	10.	0.006	31.62	1.523E+00		

P - Peakbackground subtraction

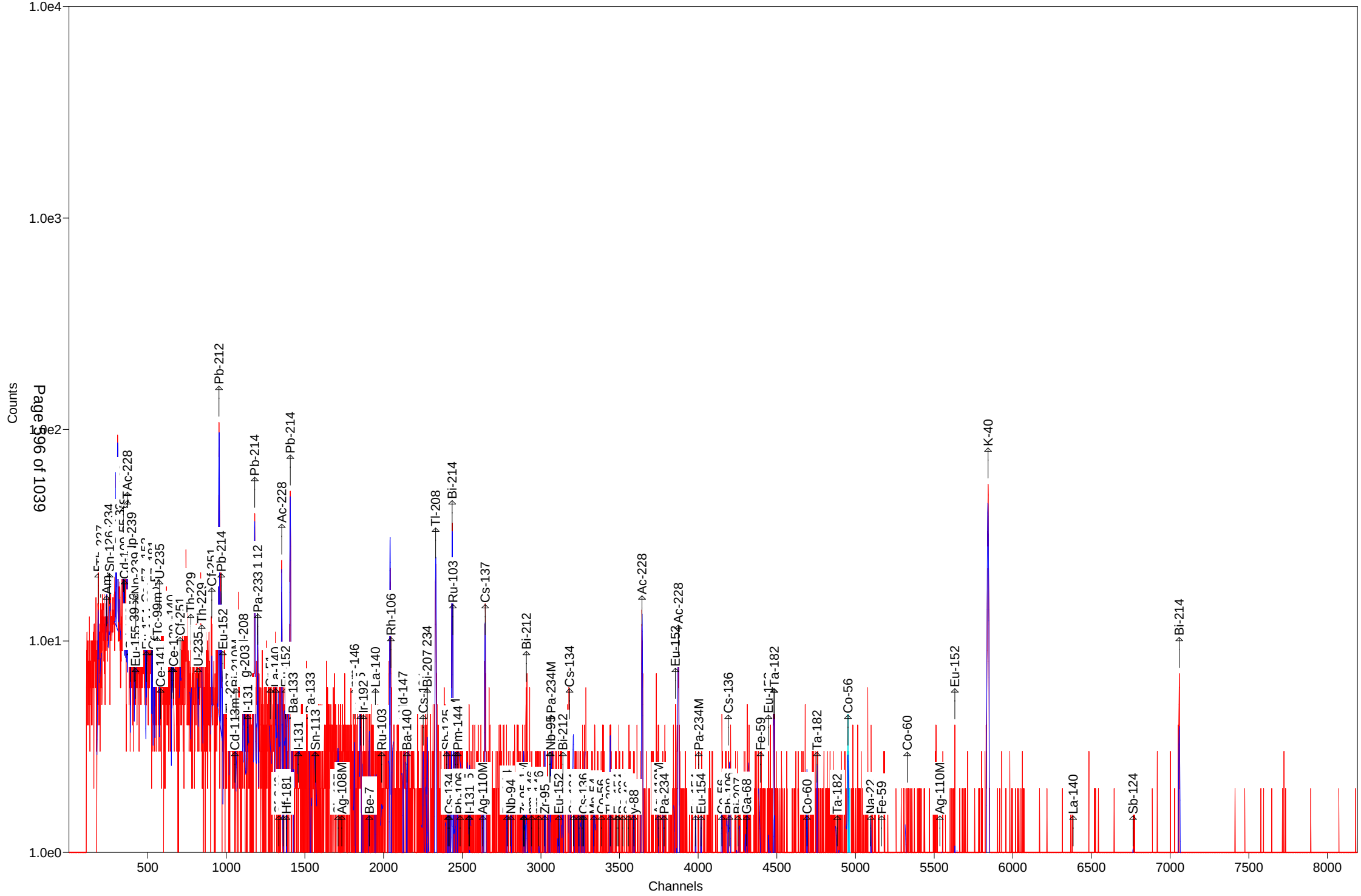
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.0057E+00	3.0057E+00	1.323E+02%	1.35E+01
NA-22	#A	5.4344E-01	5.4344E-01	8.601E+01%	1.04E+00
K-40		2.4368E+02	2.4368E+02	5.053E+00%	7.75E+00
Sc-46	#A	-4.1909E-01	-4.1910E-01	1.066E+02%	1.52E+00
CR-51	#A	-1.7529E-01	-1.7529E-01	1.686E+03%	2.11E+01
MN-54	#A	3.3649E-01	3.3649E-01	1.447E+02%	1.15E+00
FE-59	#A	-1.2375E-01	-1.2375E-01	7.615E+02%	2.86E+00
Co-56	#A	7.9958E-01	7.9958E-01	8.587E+01%	1.09E+00
CO-57	#A	-3.5847E-01	-3.5847E-01	8.724E+01%	1.04E+00
CO-58	#A	-7.1718E-01	-7.1719E-01	8.371E+01%	2.01E+00
CO-60	#A	4.2060E-01	4.2060E-01	3.720E+01%	1.50E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.16E+00
NB-94	#A	-1.6512E-02	-1.6512E-02	7.570E+01%	1.11E+00
ZR-95	#A	1.4117E+00	1.4117E+00	4.642E+01%	1.46E+00
NB-95	#A	-2.3688E-01	-2.3688E-01	2.439E+02%	1.98E+00
RU-103	#A	3.1584E-02	3.1585E-02	1.279E+03%	1.00E+00
RH-106	#A	6.0082E+00	6.0082E+00	7.995E+01%	3.23E+01
AG-108M	A	2.3776E-01	2.3776E-01	8.922E+01%	1.05E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.99E+00
SN-113	#A	-2.5250E-02	-2.5250E-02	2.528E+03%	2.20E+00
SB-124	#A	-1.8876E-01	-1.8876E-01	5.404E+01%	3.55E+00
SB-125	#C	3.4821E+00	3.4821E+00	2.907E+01%	3.17E+00
I-131	#A	6.0241E-01	6.0245E-01	1.002E+02%	1.13E+00
Gd-153	#A	-1.0433E+00	-1.0433E+00	1.017E+02%	2.84E+00
Ga-68	#A	-3.5367E+01	-3.5700E+01	9.135E+01%	6.97E+01

Tc-99m	#A	-1.1162E-07	-1.1181E-07	5.449E+08%	2.05E+00
BA-133	#A	-7.0254E-01	-7.0254E-01	1.528E+02%	3.60E+00
CS-134	#A	2.7924E-01	2.7924E-01	7.046E+01%	3.50E+00
CS-137	#	3.4256E+00	3.4256E+00	1.391E+01%	7.67E-01
CE-139	#A	3.7014E-01	3.7014E-01	1.083E+02%	1.34E+00
Ba-140	#A	-2.4062E+00	-2.4062E+00	6.987E+01%	5.32E+00
La-140	#A	6.6483E-02	6.6486E-02	8.861E+01%	1.64E+00
CE-141	#A	-3.4122E-01	-3.4122E-01	1.947E+02%	2.24E+00
CE-144	#A	-2.9733E+00	-2.9733E+00	8.986E+01%	1.51E+01
PM-144	#A	3.8189E-01	3.8190E-01	9.433E+01%	8.47E-01
EU-152	#A	1.1898E+00	1.1898E+00	1.095E+02%	5.80E+00
EU-154	#A	2.4829E+00	2.4829E+00	4.406E+01%	4.93E+00
EU-155	#A	9.0065E-01	9.0065E-01	1.524E+02%	4.62E+00
HF-181	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.86E+00
Ta-182	#A	3.0487E+00	3.0487E+00	3.494E+01%	6.71E+00
Hg-203	#A	3.3764E-01	3.3764E-01	1.071E+02%	1.22E+00
TL-208		6.2386E+00	6.2386E+00	9.381E+00%	8.25E-01
pm-146	#A	3.7408E-01	3.7408E-01	9.356E+01%	2.88E+00
y-88	#A	3.6336E-01	3.6336E-01	1.338E+02%	1.13E+00
Cd-113m	#A	3.9985E+03	3.9985E+03	1.069E+02%	1.44E+04
Cd-109	#A	3.7502E+00	3.7502E+00	3.771E+02%	4.74E+01
Cf-251	#A	1.0821E+00	1.0821E+00	1.676E+02%	4.68E+00
Cf-249	#A	4.2823E-01	4.2823E-01	1.036E+02%	2.14E+00
Sn-126	A	1.5692E+00	1.5692E+00	3.501E+02%	1.85E+01
PB-210	A	2.4766E+01	2.4766E+01	4.512E+01%	2.98E+01
PB-212		1.7423E+01	1.7423E+01	5.698E+00%	1.88E+00
PB-214		1.6117E+01	1.6117E+01	7.339E+00%	2.17E+00
BI-207	#A	3.8094E-01	3.8094E-01	9.668E+01%	1.24E+00
BI-212	#A	2.8000E+00	2.8000E+00	2.230E+02%	2.16E+01
BI-214		1.4037E+01	1.4037E+01	8.403E+00%	2.20E+00
BI-210M	#A	-2.0726E-02	-2.0726E-02	4.469E+03%	1.86E+00
AC-228		1.5707E+01	1.5707E+01	9.389E+00%	2.63E+00
TH-227	#A	8.5361E-01	8.5361E-01	4.416E+02%	2.50E+01
TH-229	#A	-1.7100E-01	-1.7100E-01	9.916E+01%	1.90E+01
TH-234	#A	1.6757E+00	1.6757E+00	7.428E+02%	4.20E+01
PA-231	#A	6.6157E+00	6.6157E+00	1.640E+02%	7.00E+01
PA-233	#A	4.2034E-01	4.2034E-01	3.319E+02%	5.72E+00
PA-234	#A	-1.8640E+00	-1.8640E+00	8.773E+01%	9.72E+00
PA-234M	#A	-2.3093E+01	-2.3093E+01	2.090E+02%	1.70E+02
U-235	#A	-3.7146E+00	-3.7146E+00	7.530E+01%	8.88E+00
AM-241	#A	1.2712E+00	1.2712E+00	1.238E+02%	5.25E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.49E+01
Ir-192	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.39E+00
Cs-136	#A	-8.8337E-01	-8.8340E-01	9.152E+01%	2.70E+00
Np-239	A	1.2330E+00	1.2332E+00	9.855E+01%	4.06E+00
Nd-147	#A	-4.3045E+00	-4.3046E+00	9.435E+01%	9.62E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.4 keV)     3.414E+02  Bq/Sample
Total Decayed Activity (   37.6 to  1999.4 keV) 3.4139349E+02  Bq/Sample
```

257318_Gamma_160-17797-A-9-B. 12_Gamma_20161455.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20161797

Sample Description: 257318_Gamma_160-17797-A-10-B
Detector: Detector #14
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-10-B

Decay to Time: 7/12/2016 10:40 Live Time: 1800 sec
Acquisition Time: 7/12/2016 10:40:31 Real Time: 1806 sec
Analysis Time: 7/12/2016 11:10 Dead Time: 0.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev11.lib
Bkgd Correction File: 14_2016-07-10_0624.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	2.222E+00	179.1	3.980E+00	3.981E+00	1.367E+01
NA-22	-1.300E+00	56.4	7.339E-01	7.367E-01	2.393E+00
K-40	2.585E+02	5.8	1.498E+01	1.998E+01	1.399E+01
Sc-46	-1.013E+00	29.7	3.009E-01	3.053E-01	3.250E+00
CR-51	3.236E+00	73.7	2.386E+00	2.392E+00	7.944E+00
MN-54	4.173E-01	142.7	5.953E-01	5.957E-01	1.416E+00
FE-59	-1.470E+00	103.8	1.526E+00	1.528E+00	3.424E+00
Co-56	8.450E-01	66.1	5.584E-01	5.601E-01	1.041E+00
CO-57	-3.173E-01	99.8	3.167E-01	3.171E-01	1.063E+00
CO-58	-7.252E-01	89.2	6.466E-01	6.477E-01	2.172E+00
CO-60	4.085E-01	113.2	4.623E-01	4.628E-01	1.620E+00
ZN-65	-2.286E+00	92.8	2.121E+00	2.124E+00	7.104E+00
NB-94	-3.024E-01	214.9	6.498E-01	6.500E-01	1.582E+00
ZR-95	9.424E-01	92.6	8.730E-01	8.744E-01	2.121E+00
NB-95	4.754E-01	101.3	4.816E-01	4.822E-01	1.637E+00
RU-103	-3.232E-01	145.8	4.712E-01	4.715E-01	1.445E+00
RH-106	9.876E+00	79.2	7.820E+00	7.837E+00	3.446E+01
AG-108M	-4.893E-01	69.1	3.382E-01	3.391E-01	1.252E+00
AG-110M	5.170E-01	32.3	1.669E-01	1.690E-01	3.569E+00
SN-113	-6.240E-01	101.3	6.323E-01	6.331E-01	2.560E+00
SB-124	-3.267E-01	175.2	5.723E-01	5.725E-01	3.527E+00
SB-125	2.158E+00	54.0	1.165E+00	1.170E+00	2.679E+00
I-131	1.387E-01	337.0	4.673E-01	4.674E-01	1.239E+00
Gd-153	8.957E-01	117.5	1.053E+00	1.054E+00	3.524E+00
Ga-68	3.781E+01	37.7	1.427E+01	1.443E+01	2.920E+01
Tc-99m	-2.242E-01	185.5	4.158E-01	4.160E-01	1.398E+00
BA-133	-7.207E-01	164.8	1.188E+00	1.188E+00	3.985E+00
CS-134	2.860E-01	109.8	3.139E-01	3.142E-01	3.517E+00
CS-137	2.656E+00	16.7	4.434E-01	4.644E-01	7.681E-01
CE-139	0.000E+00	1.#INF	1.665E-01	1.665E-01	1.356E+00
Ba-140	1.588E+00	82.9	1.316E+00	1.318E+00	2.896E+00
La-140	7.415E-01	53.9	4.000E-01	4.019E-01	1.258E+00
CE-141	1.396E-01	517.9	7.228E-01	7.228E-01	2.448E+00

CE-144	-1.155E+00	217.9	2.516E+00	2.517E+00	1.145E+01
PM-144	3.414E-01	151.0	5.156E-01	5.159E-01	1.264E+00
EU-152	1.209E+00	95.7	1.158E+00	1.160E+00	3.907E+00
EU-154	1.565E+00	46.5	7.273E-01	7.317E-01	1.420E+01
EU-155	-7.354E-02	1604.4	1.180E+00	1.180E+00	5.426E+00
HF-181	-7.314E-03	150.5	1.100E-02	1.101E-02	1.926E+00
Ta-182	1.798E+00	143.5	2.580E+00	2.582E+00	8.790E+00
Hg-203	-3.177E-01	133.4	4.238E-01	4.242E-01	1.435E+00
TL-208	6.504E+00	9.9	6.451E-01	7.280E-01	1.023E+00
pm-146	1.057E+00	104.3	1.102E+00	1.103E+00	3.353E+00
y-88	-5.411E-02	612.5	3.314E-01	3.314E-01	1.474E+00
Cd-113m	-6.507E+03	98.1	6.381E+03	6.395E+03	2.137E+04
Cd-109	5.067E+00	263.7	1.336E+01	1.336E+01	4.475E+01
Cf-251	8.262E-01	225.3	1.861E+00	1.863E+00	5.062E+00
Cf-249	3.315E-01	200.0	6.630E-01	6.633E-01	2.264E+00
Sn-126	3.855E+00	118.6	4.572E+00	4.577E+00	1.529E+01
PB-210	1.143E+01	97.7	1.116E+01	1.118E+01	3.237E+01
PB-212	1.676E+01	6.3	1.059E+00	1.516E+00	2.159E+00
PB-214	1.619E+01	7.7	1.247E+00	1.505E+00	2.267E+00
BI-207	0.000E+00	1.#INF	2.103E-01	2.103E-01	1.829E+00
BI-212	3.899E+01	16.8	6.565E+00	6.870E+00	1.032E+01
BI-214	1.514E+01	9.4	1.425E+00	1.628E+00	2.345E+00
BI-210M	-8.582E-01	99.1	8.507E-01	8.522E-01	2.846E+00
AC-228	2.144E+01	8.2	1.768E+00	2.079E+00	3.286E+00
TH-227	3.710E+00	96.6	3.582E+00	3.587E+00	1.619E+01
TH-229	-4.303E+00	186.1	8.008E+00	8.015E+00	2.198E+01
TH-234	2.527E+01	33.8	8.534E+00	8.636E+00	2.693E+01
PA-231	0.000E+00	1.#INF	2.960E+00	2.960E+00	6.159E+01
PA-233	-1.159E+00	100.5	1.166E+00	1.167E+00	3.772E+00
PA-234	-1.769E+00	86.9	1.536E+00	1.539E+00	7.687E+00
PA-234M	4.235E+01	128.7	5.453E+01	5.457E+01	1.794E+02
U-235	5.397E+00	43.8	2.366E+00	2.382E+00	1.016E+01
AM-241	9.593E-01	127.7	1.225E+00	1.226E+00	3.472E+00
Np-237	0.000E+00	1.#INF	3.642E+00	3.642E+00	1.214E+01
Ir-192	5.224E-01	62.9	3.284E-01	3.298E-01	9.606E-01
Cs-136	6.322E-01	109.1	6.897E-01	6.907E-01	2.332E+00
Np-239	1.160E+00	111.1	1.289E+00	1.291E+00	4.314E+00
Nd-147	1.554E+00	96.7	1.503E+00	1.506E+00	6.970E+00
Total	5.479E+02				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-10-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20161797.An1

Acquisition information
Start time: 7/12/2016 10:40:31 AM
Live time: 1800
Real time: 1806
Dead time: 0.36 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/12/2016 10:40:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2016-07-10_0624.PBC 7/10/2016 6:24:26 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1957

***** 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
46.67	19.	97.66	0.85	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	13.	152.98	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
59.54	19.	127.68	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.22	82.	27.86	1.03	3.277E-02	63.29	3.810	3.643E+01	TH234
64.40	22.	118.61	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.82	209.	11.63	0.78	3.814E-02				
77.11	315.	8.23	0.78	3.897E-02				
86.91	20.	103.91	0.79	4.173E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	2.919E+00	Sn126
87.54	46.	44.30	0.79	4.186E-02	87.57	37.500	PBC<MDA	Sn126
88.01	15.	263.71	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
91.10	25.	158.01	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.68	27.	72.93	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.44	25.	151.85	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.50	21.	117.53	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
99.50	20.	112.53	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
106.13	21.	111.13	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
121.78	16.	136.36	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	PBC<MDA	CO57
123.10	20.	106.14	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
136.30	15.	202.44	0.84	4.245E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	PBC<MDA	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
143.79	20.	124.00	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
145.98	5.	517.85	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
162.66	19.	112.34	0.87	3.853E-02	162.66	6.220	PBC<MDA	Ba140
163.38	14.	152.13	0.87	3.841E-02	163.38	5.080	PBC<MDA	U235
176.60	9.	225.28	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
205.33	39.	43.85	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
227.00	4.	496.10	0.93	3.046E-02	227.00	6.300	PBC<MDA	Cf251
238.16	428.	6.41	1.11	2.936E-02	238.63	43.300	1.834E+01	PB212
241.58	19.	194.47	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	17.	213.06	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
256.24	13.	117.84	0.96	2.775E-02	256.24	7.000	PBC<MDA	TH227
277.89	14.	89.35	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
294.74	142.	12.33	1.26	2.489E-02	295.09	19.300	1.600E+01	PB214
299.84	49.	26.27	0.44	2.455E-02	300.03	3.280	3.381E+01	PB212
308.44	14.	121.07	1.01	2.403E-02	308.44	31.750	PBC<MDA	Ir192
316.49	12.	90.51	1.02	2.355E-02	316.49	87.040	PBC<MDA	Ir192
320.08	14.	73.73	1.03	2.334E-02	320.08	9.940	PBC<MDA	CR51
328.76	12.	109.79	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
337.84	113.	14.23	0.98	2.238E-02	338.32	12.010	2.326E+01	AC228
344.29	9.	136.08	1.05	2.205E-02	344.29	26.500	PBC<MDA	EU152
351.58	247.	8.14	1.22	2.169E-02	351.93	37.600	1.630E+01	PB214
364.48	4.	336.99	1.07	2.109E-02	364.48	81.700	PBC<MDA	I131
383.84	13.	115.60	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	200.02	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
427.88	10.	101.13	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
463.37	12.	103.01	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	9.	112.76	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
477.60	7.	179.15	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
487.02	21.	53.94	1.18	1.677E-02	487.02	45.500	PBC<MDA	La140
511.86	81.	32.77	2.46	1.612E-02	511.86	20.000	1.387E+01	RH106
531.00	9.	111.67	1.23	1.566E-02	531.00	13.000	PBC<MDA	Nd147
537.26	6.	121.82	1.23	1.551E-02	537.26	24.390	PBC<MDA	Ba140
583.00	144.	9.92	1.62	1.453E-02	583.02	84.500	6.504E+00	TL208
609.08	176.	9.42	1.47	1.403E-02	609.31	46.090	1.514E+01	BI214
					610.30	5.750	1.215E+02	RU103
621.92	13.	196.23	1.31	1.380E-02	621.92	9.930	PBC<MDA	RH106
635.89	10.	73.51	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
657.76	2.	915.30	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
661.52	54.	16.69	1.10	1.313E-02	661.66	85.210	2.656E+00	CS137
696.54	8.	151.02	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
727.02	64.	16.84	1.18	1.217E-02	727.17	7.550	3.899E+01	BI212
735.72	9.	104.29	1.41	1.206E-02	735.72	22.500	PBC<MDA	pm146
747.16	4.	228.15	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
756.73	11.	92.63	1.43	1.179E-02	756.73	54.460	PBC<MDA	ZR95
763.94	24.	32.27	1.43	1.170E-02	763.94	22.280	5.117E+00	AG110M
765.79	10.	101.31	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.615E+02	PA234M
766.41	3.	359.60	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	4.913E+01	PA234M
785.07	18.	53.67	1.45	1.144E-02	785.42	1.280	PBC<MDA	BI212
795.87	11.	109.75	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
818.50	13.	109.09	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136
834.85	8.	142.65	1.49	1.088E-02	834.85	99.980	PBC<MDA	MN54
846.77	9.	93.87	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
860.07	20.	26.70	1.11	1.062E-02	860.56	12.420	8.575E+00	TL208
910.94	118.	11.21	1.87	1.014E-02	911.07	29.000	2.231E+01	AC228
946.02	5.	177.22	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
968.66	57.	16.79	1.67	9.642E-03	968.97	17.460	1.874E+01	AC228
996.33	13.	46.48	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	128.74	1.63	9.389E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	140.45	1.63	9.360E-03	1004.77	18.010	PBC<MDA	EU154
1050.36	10.	79.18	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	17.	37.74	1.69	8.841E-03	1077.40	3.300	3.781E+01	Ga68
1120.15	15.	112.10	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	16.	98.62	1.72	8.561E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.027E+00	Sc46
					1121.30	34.900	2.944E+00	Ta182
1121.12	10.	143.47	1.72	8.556E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.798E+00	Ta182
1173.24	6.	147.67	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	13.	93.03	1.80	7.886E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	6.	171.59	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	7.	89.07	1.92	7.092E-03	1408.00	21.005	PBC<MDA	EU152
1460.71	342.	5.79	1.48	6.879E-03	1460.83	10.670	2.585E+02	K40
1596.21	2.	248.05	2.04	6.391E-03	1596.21	95.400	PBC<MDA	La140
1764.28	42.	16.34	3.23	5.878E-03	1764.49	15.400	2.601E+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
298.66	74.86	192.	209.	5.487E+03	11.63	0.777	- D
307.83	77.15	180.	315.	8.094E+03	8.23	0.780	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.10	46.67	120.	19.	0.011	97.66	0.846
TH-227	199.98	50.14	135.	13.	0.007	152.98	0.751s
AM-241	237.55	59.54	201.	19.	0.011	127.68	0.761s
TH-234	252.55	63.29	154.	57.	0.032	33.78	0.765D
Sn-126	256.52	64.28	343.	22.	0.012	118.61	0.766s
Np-237	345.33	86.49	624.	0.	0.000	121.51	0.789A
EU-155	345.54	86.54	437.	-3.	-0.002	880.67	0.790s
Sn-126	347.13	86.94	382.	20.	0.011	103.91	0.790D
Sn-126	349.65	87.57	451.	46.	0.026	44.30	0.791D
Cd-109	351.53	88.04	724.	15.	0.008	263.71	0.791A
Nd-147	363.77	91.10	749.	25.	0.014	158.01	0.794s
TH-234	369.72	92.59	179.	27.	0.015	72.93	0.796D
AC-228	372.76	93.35	712.	25.	0.014	151.85	0.797s
Gd-153	389.36	97.50	294.	21.	0.012	117.53	0.801s
Np-239	397.36	99.50	246.	20.	0.011	112.53	0.803s
Np-239	414.15	103.70	359.	0.	0.000	1000.00	0.807s
Np-239	423.87	106.13	259.	21.	0.012	111.13	0.810s
EU-152	486.43	121.78	219.	16.	0.009	136.36	0.826s
CO-57	487.58	122.06	219.	-21.	-0.012	99.79	0.826s
EU-154	491.73	123.10	205.	20.	0.011	106.14	0.828
PA-234	524.50	131.29	502.	-25.	-0.014	86.85	0.836s
HF-181	531.42	133.02	526.	-25.	-0.014	87.01	0.838s
CE-144	533.47	133.54	416.	-10.	-0.005	217.86	0.838
HF-181	544.52	136.30	453.	15.	0.008	202.44	0.841s
Tc-99m	561.35	140.51	363.	-15.	-0.008	185.47	0.845s
U-235	574.45	143.79	298.	20.	0.011	124.00	0.849s
CE-141	581.07	145.44	332.	5.	0.003	517.85	0.850
Ba-140	649.93	162.66	209.	19.	0.010	112.34	0.868s
U-235	652.81	163.38	230.	14.	0.008	152.13	0.869s
CE-139	662.70	165.85	244.	0.	0.000	1000.00	0.871
Cf-251	705.68	176.60	137.	9.	0.005	225.28	0.882s
TH-229	773.30	193.51	151.	-12.	-0.007	186.08	0.899s
U-235	820.58	205.33	81.	39.	0.022	43.85	0.912s
TH-229	842.65	210.85	193.	-24.	-0.013	103.92	0.917s
Cf-251	907.23	227.00	103.	4.	0.002	496.10	0.933s
PB-212	953.75	238.63	100.	383.	0.213	6.32	0.944D
PB-214	967.21	242.00	648.	19.	0.010	194.47	0.948s
EU-152	977.99	244.69	681.	17.	0.010	213.06	0.951s
TH-227	1024.17	256.24	70.	13.	0.007	117.84	0.962s
Cd-113m	1054.01	263.70	165.	-19.	-0.011	98.06	0.970s
BI-210M	1062.53	265.83	203.	-21.	-0.012	99.12	0.972s
TL-208	1108.33	277.28	71.	14.	0.008	89.35	0.983s
Hg-203	1115.99	279.20	124.	-12.	-0.007	133.42	0.985s
I-131	1136.39	284.30	92.	-8.	-0.005	151.88	0.990s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1178.16	294.74	52.	138.	0.077	12.84	1.255s
PB-212	1198.53	299.84	35.	49.	0.027	26.27	0.441s
PA-231	1199.46	300.07	271.	-11.	-0.006	220.26	1.006s
PA-233	1199.90	300.18	260.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	260.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	260.	0.	0.000	1000.00	1.009s
Ir-192	1232.94	308.44	139.	14.	0.008	121.07	1.014s
PA-233	1247.22	312.01	142.	-18.	-0.010	100.55	1.018
Ir-192	1265.13	316.49	49.	12.	0.006	90.51	1.022s
CR-51	1279.51	320.08	43.	14.	0.008	73.73	1.026s
La-140	1314.21	328.76	48.	12.	0.007	109.79	1.034s
Cf-249	1332.92	333.44	70.	-5.	-0.003	337.80	1.039
AC-228	1350.52	337.84	34.	112.	0.062	14.28	0.982s
EU-152	1376.30	344.29	68.	9.	0.005	136.08	1.049s
HF-181	1382.47	345.83	83.	-5.	-0.003	253.47	1.050s
PB-214	1405.48	351.58	43.	239.	0.133	8.52	1.219s
BA-133	1423.15	356.00	397.	-17.	-0.010	164.82	1.060s
I-131	1457.08	364.48	59.	4.	0.002	336.99	1.069s
BA-133	1534.50	383.84	108.	13.	0.007	115.60	1.087s
Cf-249	1550.94	387.95	121.	8.	0.004	200.02	1.091s
SN-113	1565.90	391.69	145.	-14.	-0.008	101.32	1.095s
SB-125	1710.63	427.88	26.	10.	0.006	101.13	1.129
AG-108M	1734.87	433.94	56.	-15.	-0.008	69.12	1.135s
SB-125	1852.59	463.37	74.	12.	0.007	103.01	1.163
Ir-192	1871.36	468.06	48.	9.	0.005	112.76	1.167s
BE-7	1909.50	477.60	79.	7.	0.004	179.15	1.176s
HF-181	1927.10	482.00	91.	-6.	-0.003	222.64	1.180
La-140	1947.19	487.02	28.	21.	0.012	53.94	1.185s
RU-103	1987.33	497.05	61.	-9.	-0.005	145.80	1.194s
RH-106	2046.57	511.86	96.	81.	0.045	32.77	2.458s
Nd-147	2123.11	531.00	24.	9.	0.005	111.67	1.225
Ba-140	2148.15	537.26	13.	6.	0.003	121.82	1.231s
CS-134	2252.06	563.24	44.	-8.	-0.005	92.02	1.255s
CS-134	2276.40	569.32	65.	-17.	-0.009	71.44	1.260s
PA-234	2276.99	569.47	82.	-11.	-0.006	119.92	1.261s
BI-207	2277.92	569.70	93.	0.	0.000	1000.00	1.261s
TL-208	2331.13	583.00	18.	144.	0.080	9.92	1.616s
SB-125	2401.12	600.50	350.	-13.	-0.007	198.75	1.289s
SB-124	2410.04	602.73	337.	-8.	-0.005	175.18	1.291s
CS-134	2417.96	604.71	329.	0.	0.000	1000.00	1.292s
BI-214	2435.42	609.08	28.	176.	0.098	9.42	1.467
RU-103	2440.31	610.30	329.	0.	0.000	1000.00	1.297s
AG-108M	2456.25	614.28	329.	0.	0.000	1000.00	1.301
PM-144	2471.37	618.06	329.	0.	0.000	1000.00	1.304s
RH-106	2486.79	621.92	312.	13.	0.007	196.23	1.308s
SB-125	2542.69	635.89	23.	10.	0.006	73.51	1.320s
AG-110M	2630.18	657.76	94.	2.	0.001	915.30	1.339s
CS-137	2645.22	661.52	8.	54.	0.030	16.69	1.105

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2785.32	696.54	30.	8.	0.004	151.02	1.374s
NB-94	2809.67	702.63	48.	-7.	-0.004	214.91	1.379s
SB-124	2890.31	722.79	97.	-2.	-0.001	837.86	1.396s
EU-154	2892.59	723.36	95.	0.	0.000	1000.00	1.397s
BI-212	2907.22	727.02	10.	64.	0.036	16.84	1.179
pm-146	2942.05	735.72	17.	9.	0.005	104.29	1.408s
pm-146	2987.81	747.16	22.	4.	0.002	228.15	1.417s
ZR-95	3026.09	756.73	22.	11.	0.006	92.63	1.426s
AG-110M	3054.96	763.94	18.	24.	0.013	32.27	1.432s
NB-95	3062.34	765.79	46.	10.	0.006	101.31	1.433s
PA-234M	3064.83	766.41	58.	3.	0.002	359.60	1.434s
EU-152	3114.87	778.92	22.	-4.	-0.002	264.34	1.444s
BI-212	3140.88	785.42	17.	18.	0.010	53.67	1.450s
CS-134	3182.67	795.87	30.	11.	0.006	109.75	1.459s
CS-134	3207.01	801.95	28.	-2.	-0.001	565.69	1.464s
CO-58	3242.31	810.77	76.	-14.	-0.008	89.17	1.471s
La-140	3262.30	815.77	90.	-15.	-0.008	96.34	1.475s
Cs-136	3273.22	818.50	88.	13.	0.007	109.09	1.478s
MN-54	3338.63	834.85	29.	8.	0.005	142.65	1.492s
Co-56	3386.32	846.77	14.	9.	0.005	93.87	1.501s
TL-208	3439.55	860.07	3.	20.	0.011	26.70	1.113s
NB-94	3483.65	871.10	34.	-6.	-0.003	87.83	1.522s
EU-154	3492.19	873.23	42.	-1.	-0.001	921.95	1.523s
PA-234	3521.39	880.53	71.	-14.	-0.008	88.89	1.529
PA-234	3532.24	883.24	85.	-9.	-0.005	147.29	1.531s
AG-110M	3538.01	884.68	96.	-4.	-0.002	337.00	1.533s
Sc-46	3556.40	889.28	154.	-19.	-0.010	29.70	1.536s
y-88	3591.45	898.04	24.	-1.	-0.001	612.49	1.543s
AC-228	3643.08	910.94	10.	118.	0.066	11.21	1.865s
AG-110M	3749.30	937.49	65.	-20.	-0.011	86.51	1.576s
PA-234	3783.42	946.02	19.	5.	0.003	177.22	1.582s
AC-228	3873.99	968.66	9.	57.	0.032	16.79	1.675
EU-154	3984.71	996.33	11.	13.	0.007	46.48	1.622
PA-234M	4003.39	1001.00	24.	6.	0.003	128.74	1.626s
EU-154	4018.51	1004.77	29.	6.	0.003	140.45	1.629s
Co-56	4150.81	1037.84	20.	-1.	-0.001	988.26	1.655s
Cs-136	4191.74	1048.07	25.	-7.	-0.004	107.85	1.663s
RH-106	4200.91	1050.36	26.	10.	0.006	79.18	1.665s
BI-207	4254.12	1063.66	40.	-4.	-0.002	351.19	1.675s
Ga-68	4309.10	1077.40	5.	17.	0.009	37.74	1.685s
FE-59	4396.54	1099.25	35.	-13.	-0.007	103.82	1.702s
EU-152	4447.85	1112.07	147.	-18.	-0.010	98.78	1.712s
ZN-65	4461.74	1115.55	129.	-18.	-0.010	92.80	1.714s
BI-214	4480.72	1120.29	135.	15.	0.008	112.10	1.718s
Sc-46	4481.77	1120.55	114.	16.	0.009	98.62	1.718s
Ta-182	4484.77	1121.30	91.	10.	0.005	143.47	1.719s
CO-60	4692.60	1173.24	15.	6.	0.003	147.67	1.757s
Ta-182	4755.88	1189.05	25.	0.	0.000	1000.00	1.769

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4885.38	1221.41	43.	-18.	-0.010	87.50	1.792
Co-56	4952.89	1238.28	27.	13.	0.007	93.03	1.805s
NA-22	5097.96	1274.53	43.	-18.	-0.010	56.44	1.831s
EU-154	5098.01	1274.54	61.	-2.	-0.001	669.55	1.831s
FE-59	5166.25	1291.60	21.	-6.	-0.004	170.46	1.843s
CO-60	5329.96	1332.50	16.	6.	0.003	171.59	1.871s
AG-110M	5537.26	1384.30	21.	-8.	-0.005	130.66	1.907s
EU-152	5632.13	1408.00	5.	7.	0.004	89.07	1.923s
K-40	5843.10	1460.71	11.	342.	0.190	5.79	1.481s
La-140	6385.44	1596.21	6.	2.	0.001	248.05	2.044s
SB-124	6764.81	1690.98	6.	-1.	0.000	846.32	2.102s
BI-214	7058.22	1764.28	3.	42.	0.024	16.34	3.227s
Co-56	7086.53	1771.35	45.	0.	0.000	1000.00	2.149s
y-88	7345.59	1836.06	6.	-1.	-0.001	600.00	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.2215E+00					5.31E+01	
			477.60	2.222E+00	?(	1.367E+01	1.79E+02	1.05E+01 G
NA-22	C	-1.3002E+00					9.50E+02	
			1274.53	-1.300E+00	?(	2.393E+00	5.64E+01	9.99E+01 G
K-40	N	2.5852E+02					4.66E+11	
			1460.83	2.585E+02	(P	1.399E+01	5.79E+00	1.07E+01 G
Sc-46	F	-1.0131E+00					8.38E+01	
			889.28	-1.013E+00	?(P	3.250E+00	2.97E+01	1.00E+02 G
			1120.55	1.027E+00	+	3.403E+00	9.86E+01	1.00E+02 G
CR-51	F	3.2363E+00					2.77E+01	
			320.08	3.236E+00	?(P	7.944E+00	7.37E+01	9.94E+00 G
MN-54	C	4.1732E-01					3.12E+02	
			834.85	4.173E-01	?(P	1.416E+00	1.43E+02	1.00E+02 G
FE-59	F	-1.4699E+00					4.45E+01	
			1099.25	-1.470E+00	?(	3.424E+00	1.04E+02	5.65E+01 G
			1291.60	-1.069E+00	+	4.092E+00	1.70E+02	4.32E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	8.4498E-01					7.73E+01	
			846.77	4.672E-01	?(	1.041E+00	9.39E+01	9.99E+01 G
			1238.28	1.416E+00	?(P	2.891E+00	9.30E+01	6.61E+01 G
			1037.84	-4.313E-01	-	1.016E+01	9.88E+02	1.41E+01 G
			1771.35	0.000E+00	-	2.081E+01	1.00E+03	1.55E+01 A
CO-57	C	-3.1734E-01					2.72E+02	
			122.06	-3.173E-01	&(P	1.063E+00	9.98E+01	8.56E+01 G
			136.47	-1.434E-01	% P	1.227E+01	2.60E+03	1.07E+01 G
CO-58	C	-7.2518E-01					7.09E+01	
			810.78	-7.252E-01	?(	2.172E+00	8.92E+01	9.95E+01 G
CO-60	F	4.0846E-01					1.93E+03	
			1332.50	4.122E-01	?(P	1.620E+00	1.72E+02	1.00E+02 G
			1173.24	4.048E-01	?(	1.400E+00	1.48E+02	9.99E+01 G
ZN-65	F	-2.2856E+00					2.44E+02	
			1115.55	-2.286E+00	?(	7.104E+00	9.28E+01	5.06E+01 G
NB-94	I	-3.0235E-01					7.41E+06	
			702.63	-3.024E-01	?(	1.582E+00	2.15E+02	9.79E+01 G
			871.10	-3.321E-01	+ P	1.586E+00	8.78E+01	9.99E+01 G
ZR-95	I	9.4241E-01					6.40E+01	
			756.73	9.424E-01	?(P	2.121E+00	9.26E+01	5.45E+01 G
			724.20	-8.326E-02	% P	4.980E+00	2.06E+03	4.42E+01 G
NB-95	I	4.7537E-01					6.40E+01	
			765.79	4.754E-01	?(	1.637E+00	1.01E+02	9.98E+01 G
RU-103	I	-3.2319E-01					3.93E+01	
			497.05	-3.232E-01	?(P	1.445E+00	1.46E+02	9.09E+01 G
			610.30	0.000E+00	+	6.015E+01	1.00E+03	5.75E+00 GA
RH-106	I	9.8759E+00					3.74E+02	
			621.92	5.213E+00	?(	3.446E+01	1.96E+02	9.93E+00 G
			1050.36	3.956E+01	?(	1.053E+02	7.92E+01	1.56E+00 G
			511.86	1.387E+01	? P	8.352E+00	3.28E+01	2.00E+01 GA
AG-108M	C	-4.8930E-01					1.53E+05	
			433.94	-4.893E-01	?(P	1.252E+00	6.91E+01	9.05E+01 G
			722.94	3.334E-02	&	2.399E+00	2.06E+03	9.08E+01 G
			614.28	0.000E+00	+	3.870E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	5.1702E-01					2.50E+02	
			884.68	-3.067E-01	?(	3.569E+00	3.37E+02	7.27E+01 G
			657.76	6.673E-02	?(	2.125E+00	9.15E+02	9.46E+01 G
			937.49	-3.346E+00	+	6.591E+00	8.65E+01	3.44E+01 G
			1384.30	-2.650E+00	+	7.706E+00	1.31E+02	2.43E+01 G
			763.94	5.117E+00	?(	4.793E+00	3.23E+01	2.23E+01 G
SN-113	F	-6.2401E-01					1.15E+02	
			391.69	-6.240E-01	?(P	2.560E+00	1.01E+02	6.40E+01 G
SB-124	F	-3.2668E-01					6.02E+01	
			602.73	-3.267E-01	?(P	3.527E+00	1.75E+02	9.83E+01 G
			1690.98	-1.272E-01	+	2.634E+00	8.46E+02	4.78E+01 G
			722.79	-7.003E-01	&	2.039E+01	8.38E+02	1.08E+01 G
SB-125	I	2.1575E+00					1.01E+03	
			427.88	1.003E+00	&(P	2.679E+00	1.01E+02	2.96E+01 G
			600.50	-2.945E+00	+	1.970E+01	1.99E+02	1.79E+01 G
			635.89	3.719E+00	?(	9.137E+00	7.35E+01	1.13E+01 G
			463.37	3.735E+00	?(P	1.300E+01	1.03E+02	1.05E+01 G
I-131	I	1.3867E-01					8.02E+00	
			364.48	1.387E-01	?(P	1.239E+00	3.37E+02	8.17E+01 G
			284.30	-2.926E+00	+ P	1.678E+01	1.52E+02	6.14E+00 G
			636.97	4.212E-01	%	1.847E+01	1.22E+03	7.17E+00 G
Gd-153	F	8.9569E-01					2.42E+02	
			97.50	8.957E-01	&(	3.524E+00	1.18E+02	3.00E+01 G
			103.20	1.160E-01	&	5.266E+00	1.34E+03	2.18E+01 G
Ga-68	C	3.7808E+01					4.71E-02	
			1077.40	3.781E+01	?(	2.920E+01	3.77E+01	3.30E+00 G
Tc-99m	I	-2.2420E-01					2.51E-01	
			140.51	-2.242E-01	?(	1.398E+00	1.85E+02	8.93E+01 G
BA-133	F	-7.2067E-01					3.85E+03	
			356.00	-7.207E-01	?(	3.985E+00	1.65E+02	6.20E+01 G
			302.85	0.000E+00	+	9.682E+00	1.00E+03	1.83E+01 G
			383.84	4.019E+00	&	1.570E+01	1.16E+02	8.94E+00 GA
			80.99	9.318E-02	% P	3.025E+00	1.13E+03	3.41E+01 GA
CS-134	I	2.8597E-01					7.54E+02	
			604.71	0.000E+00	&(	3.517E+00	1.00E+03	9.76E+01 G
			795.87	6.124E-01	?(	1.629E+00	1.10E+02	8.55E+01 G
			569.32	-4.138E+00	+	9.822E+00	7.14E+01	1.54E+01 G
			801.95	-1.137E+00	+	1.556E+01	5.66E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-3.611E+00	+ P	1.499E+01	9.20E+01	8.35E+00 G
CS-137	I	2.6562E+00					1.10E+04	
			661.66	2.656E+00	(	7.681E-01	1.67E+01	8.52E+01 G
Ba-140	I	1.5880E+00					1.28E+01	
			537.26	8.933E-01	(P	2.896E+00	1.22E+02	2.44E+01 G
			162.66	4.312E+00	?(	1.625E+01	1.12E+02	6.22E+00 G
			304.85	-2.777E-01	& P	4.162E+01	3.42E+03	4.29E+00 G
La-140	I	7.4148E-01					1.28E+01	
			1596.21	2.126E-01	?(	1.258E+00	2.48E+02	9.54E+01 G
			487.02	1.529E+00	?(	1.992E+00	5.39E+01	4.55E+01 G
			328.76	1.463E+00	&(P	4.187E+00	1.10E+02	2.03E+01 G
			815.77	-3.123E+00	+	1.012E+01	9.63E+01	2.33E+01 G
CE-141	I	1.3957E-01					3.25E+01	
			145.44	1.396E-01	&(	2.448E+00	5.18E+02	4.82E+01 G
CE-144	I	-1.1551E+00					2.85E+02	
			133.54	-1.155E+00	?(P	1.145E+01	2.18E+02	1.11E+01 G
PM-144	C	3.4144E-01					3.63E+02	
			696.54	3.414E-01	?(	1.264E+00	1.51E+02	9.90E+01 G
			618.06	0.000E+00	-	3.526E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2094E+00					4.94E+03	
			344.29	8.399E-01	?(	3.907E+00	1.36E+02	2.65E+01 G
			1112.07	-8.442E+00	+	2.796E+01	9.88E+01	1.36E+01 G
			121.78	6.940E-01	?(P	3.183E+00	1.36E+02	2.86E+01 G
			778.92	-1.367E+00	+	9.099E+00	2.64E+02	1.29E+01 G
			964.11	-2.619E-01	%	2.006E+01	2.20E+03	1.46E+01 G
			244.69	4.445E+00	&(P	3.169E+01	2.13E+02	7.58E+00 G
			1408.00	2.457E+00	? P	5.062E+00	8.91E+01	2.10E+01 GA
EU-154	I	1.5648E+00					3.14E+03	
			873.23	-4.314E-01	?(	1.420E+01	9.22E+02	1.23E+01 G
			123.10	6.078E-01	(	2.161E+00	1.06E+02	4.08E+01 G
			1274.54	-3.396E-01	+	7.998E+00	6.70E+02	3.52E+01 G
			723.36	0.000E+00	-	1.082E+01	1.00E+03	2.02E+01 G
			1004.77	1.867E+00	?(	9.138E+00	1.40E+02	1.80E+01 G
			996.33	7.045E+00	?(	1.010E+01	4.65E+01	1.06E+01 G
EU-155	I	-7.3536E-02					1.81E+03	
			105.31	-7.354E-02	&(P	5.426E+00	1.60E+03	2.12E+01 G
			86.54	-1.462E-01	&	4.353E+00	8.81E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	-7.3136E-03					4.24E+01	
			482.00	-2.516E-01	?(	1.926E+00	2.23E+02	8.05E+01 G
			133.02	-7.387E-01	+ P	3.284E+00	8.70E+01	4.33E+01 G
			345.83	-8.669E-01	&	7.585E+00	2.53E+02	1.51E+01 G
			136.30	3.355E+00	?(P	2.279E+01	2.02E+02	5.85E+00 G
Ta-182	F	1.7985E+00					1.14E+02	
			1121.30	1.798E+00	?(	8.790E+00	1.43E+02	3.49E+01 G
			1221.41	-4.550E+00	+	8.552E+00	8.75E+01	2.70E+01 G
			1189.05	0.000E+00	-	1.094E+01	1.00E+03	1.62E+01 G
Hg-203	F	-3.1767E-01					4.66E+01	
			279.20	-3.177E-01	&(	1.435E+00	1.33E+02	8.15E+01 G
TL-208	N	6.5036E+00					6.98E+02	
			583.02	6.504E+00	(P	1.023E+00	9.92E+00	8.45E+01 G
			277.28	4.719E+00	& P	1.415E+01	8.94E+01	6.31E+00 G
			860.56	8.575E+00	+ P	4.332E+00	2.67E+01	1.24E+01 G
pm-146	C	1.0566E+00					2.02E+03	
			747.16	5.857E-01	?(P	3.353E+00	2.28E+02	3.40E+01 G
			735.72	1.768E+00	?(P	4.532E+00	1.04E+02	2.25E+01 G
			453.88	4.818E-02	&	1.811E+00	1.47E+03	6.50E+01 G
y-88	F	-5.4107E-02					1.07E+02	
			898.04	-5.411E-02	?(P	1.474E+00	6.12E+02	9.37E+01 G
			1836.06	-9.849E-02	+	1.391E+00	6.00E+02	9.92E+01 G
Cd-113m		-6.5074E+03					5.33E+03	
			263.70	-6.507E+03	&(	2.137E+04	9.81E+01	6.00E-03 K
Cd-109	F	5.0667E+00					4.53E+02	
								Derived Ave Activity
			88.04	5.067E+00	}(	4.475E+01	2.64E+02	3.79E+00 G
Cf-251	T	8.2621E-01					3.28E+05	
			176.60	8.262E-01	(	5.062E+00	2.25E+02	1.70E+01 G
			227.00	1.061E+00	?	1.450E+01	4.96E+02	6.30E+00 GA
Cf-249	T	3.3148E-01					1.28E+05	
			387.95	3.315E-01	?(	2.264E+00	2.00E+02	6.60E+01 G
			333.44	-7.394E-01	&	6.592E+00	3.38E+02	1.55E+01 G
Sn-126		3.8551E+00					3.65E+07	
			87.57	1.640E+00	}	3.600E+00	4.43E+01	3.75E+01 GA
			64.28	3.855E+00	?(	1.529E+01	1.19E+02	9.70E+00 G
			86.94	2.919E+00	}	1.381E+01	1.04E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.1432E+01					8.14E+03	
			46.54	1.143E+01	(P	3.237E+01	9.77E+01	4.25E+00 G
PB-212	N	1.6762E+01					6.98E+02	
			238.63	1.676E+01	(P	2.159E+00	6.32E+00	4.33E+01 G
			300.03	3.381E+01	+	2.089E+01	2.63E+01	3.28E+00 GA
PB-214	N	1.6195E+01					5.84E+05	
			351.93	1.630E+01	@(P	2.267E+00	8.52E+00	3.76E+01 G
			295.09	1.600E+01	(P	4.196E+00	1.28E+01	1.93E+01 G
			242.00	4.808E+00	&	3.129E+01	1.94E+02	7.43E+00 GA
BI-212	N	3.8994E+01					6.98E+02	
			727.17	3.899E+01	(P	1.032E+01	1.68E+01	7.55E+00 G
			785.42	6.705E+01	+	8.392E+01	5.37E+01	1.28E+00 GA
BI-214	N	1.5135E+01					5.84E+05	
			609.31	1.514E+01	(P	2.345E+00	9.42E+00	4.61E+01 G
			1120.29	6.466E+00	- P	2.440E+01	1.12E+02	1.51E+01 G
			1764.49	2.601E+01	+ P	6.297E+00	1.63E+01	1.54E+01 G
BI-210M	T	-8.5825E-01					1.10E+09	
			265.83	-8.582E-01	?(	2.846E+00	9.91E+01	5.00E+01 G
			304.90	-8.511E-02	& P	6.384E+00	1.72E+03	2.80E+01 G
AC-228	N	2.1439E+01					2.10E+03	
			911.07	2.231E+01	(P	3.286E+00	1.12E+01	2.90E+01 G
			968.97	1.874E+01	(P	5.564E+00	1.68E+01	1.75E+01 G
			338.32	2.326E+01	(P	6.152E+00	1.43E+01	1.20E+01 G
			93.35	5.838E+00	-	2.959E+01	1.52E+02	5.56E+00 XA
TH-227	N	3.7095E+00					7.95E+03	
			50.14	3.701E+00	*(	1.619E+01	1.53E+02	8.00E+00 G
			256.24	3.719E+00	(	1.193E+01	1.18E+02	7.00E+00 G
TH-229	N	-4.3033E+00					2.68E+06	
			193.51	-4.303E+00	*(P	2.198E+01	1.86E+02	4.40E+00 G
			210.85	-1.399E+01	+	3.890E+01	1.04E+02	2.99E+00 G
TH-234	N	2.5267E+01					1.63E+12	
			63.29	2.527E+01	(P	2.693E+01	3.38E+01	3.81E+00 G
			92.59	6.293E+00	- P	1.514E+01	7.29E+01	5.58E+00 G
PA-233	C	-1.1593E+00					7.82E+08	
			312.01	-1.159E+00	&(P	3.772E+00	1.01E+02	3.60E+01 G
			300.18	0.000E+00	&	2.843E+01	1.00E+03	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -1.7689E+00                                     1.63E+12
                         131.29-1.769E+00  (P 7.687E+00 8.69E+01 1.80E+01 G
                         946.02 2.249E+00 +   9.632E+00 1.77E+02 1.34E+01 G
                         569.47-5.046E+00 +   2.054E+01 1.20E+02 8.20E+00 G
                         883.24-5.064E+00 +   2.545E+01 1.47E+02 9.60E+00 G
                         880.53-1.250E+01 +   3.733E+01 8.89E+01 6.00E+00 GA

PA-234M  N   4.2354E+01                                     1.63E+12
                        1001.00 3.997E+01  (  1.794E+02 1.29E+02 8.37E-01 G
                         766.41 4.913E+01 ?(  6.186E+02 3.60E+02 2.94E-01 G

U-235    N   5.3972E+00                                     2.57E+11
                         143.79 2.445E+00 *(  1.016E+01 1.24E+02 1.10E+01 G
                         205.33 1.320E+01 &(P 1.503E+01 4.38E+01 5.01E+00 G
                         163.38 4.076E+00  (P 2.088E+01 1.52E+02 5.08E+00 G

AM-241   T   9.5926E-01                                     1.58E+05
                          59.54 9.593E-01  (  3.472E+00 1.28E+02 3.59E+01 G

Ir-192   F   5.2238E-01                                     7.40E+01
                         316.49 3.145E-01 ?(  9.606E-01 9.05E+01 8.70E+01 G
                         468.06 5.626E-01 ?(  2.166E+00 1.13E+02 5.18E+01 G
                         308.44 1.027E+00 &(  4.194E+00 1.21E+02 3.18E+01 G

Cs-136   F   6.3224E-01                                     1.30E+01
                         818.50 6.322E-01 ?(  2.332E+00 1.09E+02 1.00E+02 G
                        1048.07-5.376E-01 +   1.997E+00 1.08E+02 8.00E+01 G
                         340.57-1.776E-02 %   4.017E+00 6.62E+03 4.69E+01 G

Np-239   T   1.1597E+00                                     2.36E+00
                         103.70 0.000E+00 &   4.794E+00 1.00E+03 2.40E+01 X
                         106.13 1.160E+00 ?(  4.314E+00 1.11E+02 2.27E+01 G
                          99.50 1.708E+00 *   6.437E+00 1.13E+02 1.50E+01 X

Nd-147       1.5538E+00                                     1.11E+01
                         531.00 2.456E+00 &(  6.970E+00 1.12E+02 1.30E+01 G
                          91.10 1.139E+00 ?(  6.009E+00 1.58E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
```

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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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	135.	13.	0.007	152.98	3.701E+00	
AM-241	59.54	201.	19.	0.011	127.68	9.593E-01	
EU-155	86.54	437.	-3.	-0.002	880.67	-1.462E-01	
Nd-147	91.10	749.	25.	0.014	158.01	1.139E+00	
Gd-153	97.50	294.	21.	0.012	117.53	8.957E-01	
Np-239	99.50	246.	20.	0.011	112.53	1.708E+00	
Np-239	106.13	259.	21.	0.012	111.13	1.160E+00	
EU-152	121.78	219.	16.	0.009	136.36	6.940E-01	P
CO-57	122.06	219.	-21.	-0.012	99.79	-3.173E-01	P
EU-154	123.10	205.	20.	0.011	106.14	6.078E-01	
PA-234	131.29	502.	-25.	-0.014	86.85	-1.769E+00	P
HF-181	133.02	526.	-25.	-0.014	87.01	-7.387E-01	P
CE-144	133.54	416.	-10.	-0.005	217.86	-1.155E+00	P
HF-181	136.30	453.	15.	0.008	202.44	3.355E+00	P
Tc-99m	140.51	363.	-15.	-0.008	185.47	-2.242E-01	
U-235	143.79	298.	20.	0.011	124.00	2.445E+00	
Ba-140	162.66	209.	19.	0.010	112.34	4.312E+00	
U-235	163.38	230.	14.	0.008	152.13	4.076E+00	P
Cf-251	176.60	137.	9.	0.005	225.28	8.262E-01	
TH-229	193.51	151.	-12.	-0.007	186.08	-4.303E+00	P
U-235	205.33	81.	39.	0.022	43.85	1.320E+01	P
TH-229	210.85	193.	-24.	-0.013	103.92	-1.399E+01	
Cf-251	227.00	103.	4.	0.002	496.10	1.061E+00	
EU-152	244.69	681.	17.	0.010	213.06	4.445E+00	P
TH-227	256.24	70.	13.	0.007	117.84	3.719E+00	
Cd-113m	263.70	165.	-19.	-0.011	98.06	-6.507E+03	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	203.	-21.	-0.012	99.12	-8.582E-01	
Hg-203	279.20	124.	-12.	-0.007	133.42	-3.177E-01	
I-131	284.30	92.	-8.	-0.005	151.88	-2.926E+00	P
PA-231	300.07	271.	-11.	-0.006	220.26	-9.814E+00	
Ir-192	308.44	139.	14.	0.008	121.07	1.027E+00	
PA-233	312.01	142.	-18.	-0.010	100.55	-1.159E+00	P
Ir-192	316.49	49.	12.	0.006	90.51	3.145E-01	
CR-51	320.08	43.	14.	0.008	73.73	3.236E+00	P
La-140	328.76	48.	12.	0.007	109.79	1.463E+00	P
Cf-249	333.44	70.	-5.	-0.003	337.80	-7.394E-01	
EU-152	344.29	68.	9.	0.005	136.08	8.399E-01	
HF-181	345.83	83.	-5.	-0.003	253.47	-8.669E-01	
BA-133	356.00	397.	-17.	-0.010	164.82	-7.207E-01	
I-131	364.48	59.	4.	0.002	336.99	1.387E-01	P
BA-133	383.84	108.	13.	0.007	115.60	4.019E+00	
Cf-249	387.95	121.	8.	0.004	200.02	3.315E-01	
SN-113	391.69	145.	-14.	-0.008	101.32	-6.240E-01	P
SB-125	427.88	26.	10.	0.006	101.13	1.003E+00	P
AG-108M	433.94	56.	-15.	-0.008	69.12	-4.893E-01	P
SB-125	463.37	74.	12.	0.007	103.01	3.735E+00	P
Ir-192	468.06	48.	9.	0.005	112.76	5.626E-01	
BE-7	477.60	79.	7.	0.004	179.15	2.222E+00	
HF-181	482.00	91.	-6.	-0.003	222.64	-2.516E-01	
La-140	487.02	28.	21.	0.012	53.94	1.529E+00	
RU-103	497.05	61.	-9.	-0.005	145.80	-3.232E-01	P
RH-106	511.86	96.	81.	0.045	32.77	1.387E+01	P
Nd-147	531.00	24.	9.	0.005	111.67	2.456E+00	
Ba-140	537.26	13.	6.	0.003	121.82	8.933E-01	P
CS-134	563.24	44.	-8.	-0.005	92.02	-3.611E+00	P
CS-134	569.32	65.	-17.	-0.009	71.44	-4.138E+00	
PA-234	569.47	82.	-11.	-0.006	119.92	-5.046E+00	
SB-125	600.50	350.	-13.	-0.007	198.75	-2.945E+00	
SB-124	602.73	337.	-8.	-0.005	175.18	-3.267E-01	P
RH-106	621.92	312.	13.	0.007	196.23	5.213E+00	
SB-125	635.89	23.	10.	0.006	73.51	3.719E+00	
AG-110M	657.76	94.	2.	0.001	915.30	6.673E-02	
PM-144	696.54	30.	8.	0.004	151.02	3.414E-01	
NB-94	702.63	48.	-7.	-0.004	214.91	-3.024E-01	
SB-124	722.79	97.	-2.	-0.001	837.86	-7.003E-01	
pm-146	735.72	17.	9.	0.005	104.29	1.768E+00	P
pm-146	747.16	22.	4.	0.002	228.15	5.857E-01	P
ZR-95	756.73	22.	11.	0.006	92.63	9.424E-01	P
AG-110M	763.94	18.	24.	0.013	32.27	5.117E+00	
NB-95	765.79	46.	10.	0.006	101.31	4.754E-01	
PA-234M	766.41	58.	3.	0.002	359.60	4.913E+01	
EU-152	778.92	22.	-4.	-0.002	264.34	-1.367E+00	
CS-134	795.87	30.	11.	0.006	109.75	6.124E-01	
CS-134	801.95	28.	-2.	-0.001	565.69	-1.137E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.77	76.	-14.	-0.008	89.17	-7.252E-01		
La-140	815.77	90.	-15.	-0.008	96.34	-3.123E+00		
Cs-136	818.50	88.	13.	0.007	109.09	6.322E-01		
MN-54	834.85	29.	8.	0.005	142.65	4.173E-01		P
Co-56	846.77	14.	9.	0.005	93.87	4.672E-01		
NB-94	871.10	34.	-6.	-0.003	87.83	-3.321E-01		P
EU-154	873.23	42.	-1.	-0.001	921.95	-4.314E-01		
PA-234	880.53	71.	-14.	-0.008	88.89	-1.250E+01		
PA-234	883.24	85.	-9.	-0.005	147.29	-5.064E+00		
AG-110M	884.68	96.	-4.	-0.002	337.00	-3.067E-01		
Sc-46	889.28	154.	-19.	-0.010	29.70	-1.013E+00		P
y-88	898.04	24.	-1.	-0.001	612.49	-5.411E-02		P
AG-110M	937.49	65.	-20.	-0.011	86.51	-3.346E+00		
PA-234	946.02	19.	5.	0.003	177.22	2.249E+00		
EU-154	996.33	11.	13.	0.007	46.48	7.045E+00		
PA-234M	1001.00	24.	6.	0.003	128.74	3.997E+01		
EU-154	1004.77	29.	6.	0.003	140.45	1.867E+00		
Co-56	1037.84	20.	-1.	-0.001	988.26	-4.313E-01		
Cs-136	1048.07	25.	-7.	-0.004	107.85	-5.376E-01		
RH-106	1050.36	26.	10.	0.006	79.18	3.956E+01		
BI-207	1063.66	40.	-4.	-0.002	351.19	-3.339E-01		
FE-59	1099.25	35.	-13.	-0.007	103.82	-1.470E+00		
EU-152	1112.07	147.	-18.	-0.010	98.78	-8.442E+00		
ZN-65	1115.55	129.	-18.	-0.010	92.80	-2.286E+00		
Sc-46	1120.55	114.	16.	0.009	98.62	1.027E+00		
Ta-182	1121.30	91.	10.	0.005	143.47	1.798E+00		
CO-60	1173.24	15.	6.	0.003	147.67	4.048E-01		
Ta-182	1221.41	43.	-18.	-0.010	87.50	-4.550E+00		
Co-56	1238.28	27.	13.	0.007	93.03	1.416E+00		P
NA-22	1274.53	43.	-18.	-0.010	56.44	-1.300E+00		
EU-154	1274.54	61.	-2.	-0.001	669.55	-3.396E-01		
FE-59	1291.60	21.	-6.	-0.004	170.46	-1.069E+00		
CO-60	1332.50	16.	6.	0.003	171.59	4.122E-01		P
AG-110M	1384.30	21.	-8.	-0.005	130.66	-2.650E+00		
EU-152	1408.00	5.	7.	0.004	89.07	2.457E+00		P
La-140	1596.21	6.	2.	0.001	248.05	2.126E-01		
SB-124	1690.98	6.	-1.	0.000	846.32	-1.272E-01		
y-88	1836.06	6.	-1.	-0.001	600.00	-9.849E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.2215E+00	2.2215E+00	1.791E+02%	1.37E+01
NA-22	#A	-1.3002E+00	-1.3002E+00	5.644E+01%	2.39E+00
K-40		2.5852E+02	2.5852E+02	5.795E+00%	1.40E+01
Sc-46	#A	-1.0131E+00	-1.0131E+00	2.970E+01%	3.25E+00
CR-51	#A	3.2362E+00	3.2363E+00	7.373E+01%	7.94E+00
MN-54	#A	4.1732E-01	4.1732E-01	1.427E+02%	1.42E+00
FE-59	#A	-1.4698E+00	-1.4699E+00	1.038E+02%	3.42E+00
Co-56	#A	8.4498E-01	8.4498E-01	6.608E+01%	1.04E+00
CO-57	#A	-3.1734E-01	-3.1734E-01	9.979E+01%	1.06E+00
CO-58	#A	-7.2517E-01	-7.2518E-01	8.917E+01%	2.17E+00
CO-60	#A	4.0846E-01	4.0846E-01	1.132E+02%	1.62E+00
ZN-65	#A	-2.2856E+00	-2.2856E+00	9.280E+01%	7.10E+00
NB-94	#A	-3.0235E-01	-3.0235E-01	2.149E+02%	1.58E+00
ZR-95	#A	9.4241E-01	9.4241E-01	9.263E+01%	2.12E+00
NB-95	#A	4.7536E-01	4.7537E-01	1.013E+02%	1.64E+00
RU-103	#A	-3.2319E-01	-3.2319E-01	1.458E+02%	1.45E+00
RH-106	#A	9.8759E+00	9.8759E+00	7.918E+01%	3.45E+01
AG-108M	#A	-4.8930E-01	-4.8930E-01	6.912E+01%	1.25E+00
AG-110M	#A	5.1702E-01	5.1702E-01	3.227E+01%	3.57E+00
SN-113	#A	-6.2401E-01	-6.2401E-01	1.013E+02%	2.56E+00
SB-124	#A	-3.2668E-01	-3.2668E-01	1.752E+02%	3.53E+00
SB-125	#A	2.1575E+00	2.1575E+00	5.400E+01%	2.68E+00
I-131	#A	1.3867E-01	1.3867E-01	3.370E+02%	1.24E+00
Gd-153	#A	8.9569E-01	8.9569E-01	1.175E+02%	3.52E+00
Ga-68	#	3.7609E+01	3.7808E+01	3.774E+01%	2.92E+01
Tc-99m	#A	-2.2398E-01	-2.2420E-01	1.855E+02%	1.40E+00
BA-133	#A	-7.2067E-01	-7.2067E-01	1.648E+02%	3.99E+00
CS-134	#A	2.8597E-01	2.8597E-01	1.098E+02%	3.52E+00
CS-137		2.6562E+00	2.6562E+00	1.669E+01%	7.68E-01
CE-139	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.36E+00
Ba-140	#A	1.5879E+00	1.5880E+00	8.286E+01%	2.90E+00
La-140	#A	7.4147E-01	7.4148E-01	5.394E+01%	1.26E+00
CE-141	#A	1.3957E-01	1.3957E-01	5.179E+02%	2.45E+00
CE-144	#A	-1.1551E+00	-1.1551E+00	2.179E+02%	1.15E+01
PM-144	#A	3.4144E-01	3.4144E-01	1.510E+02%	1.26E+00
EU-152	#A	1.2094E+00	1.2094E+00	9.575E+01%	3.91E+00
EU-154	#A	1.5648E+00	1.5648E+00	4.648E+01%	1.42E+01
EU-155	#A	-7.3536E-02	-7.3536E-02	1.604E+03%	5.43E+00
HF-181	#A	-7.3136E-03	-7.3136E-03	1.505E+02%	1.93E+00
Ta-182	#A	1.7985E+00	1.7985E+00	1.435E+02%	8.79E+00
Hg-203	#A	-3.1767E-01	-3.1767E-01	1.334E+02%	1.43E+00
TL-208		6.5036E+00	6.5036E+00	9.920E+00%	1.02E+00
pm-146	#A	1.0566E+00	1.0566E+00	1.043E+02%	3.35E+00

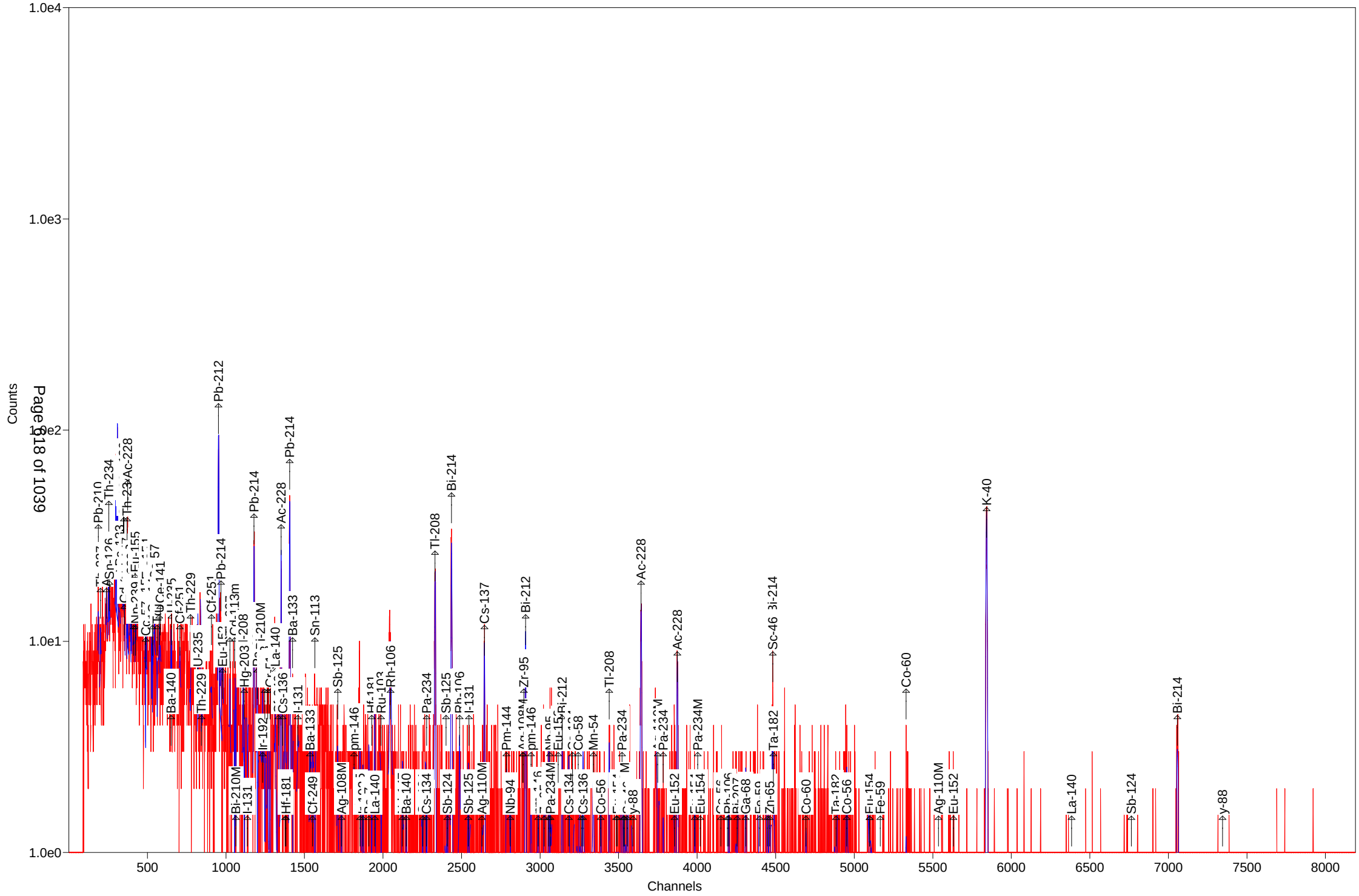
y-88 #A	-5.4107E-02	-5.4107E-02	6.125E+02%		1.47E+00
Cd-113m#A	-6.5074E+03	-6.5074E+03	9.806E+01%		2.14E+04
Cd-109 #A	5.0667E+00	5.0667E+00	2.637E+02%		4.48E+01
Cf-251 #A	8.2621E-01	8.2621E-01	2.253E+02%		5.06E+00
Cf-249 #A	3.3148E-01	3.3148E-01	2.000E+02%		2.26E+00
Sn-126 #A	3.8551E+00	3.8551E+00	1.186E+02%		1.53E+01
PB-210 A	1.1432E+01	1.1432E+01	9.766E+01%		3.24E+01
PB-212	1.6762E+01	1.6762E+01	6.321E+00%		2.16E+00
PB-214	1.6195E+01	1.6195E+01	7.702E+00%		2.27E+00
BI-207 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.83E+00
BI-212	3.8994E+01	3.8994E+01	1.684E+01%		1.03E+01
BI-214	1.5135E+01	1.5135E+01	9.416E+00%		2.35E+00
BI-210M#A	-8.5825E-01	-8.5825E-01	9.912E+01%		2.85E+00
AC-228	2.1439E+01	2.1439E+01	8.245E+00%		3.29E+00
TH-227 #A	3.7095E+00	3.7095E+00	9.655E+01%		1.62E+01
TH-229 #A	-4.3033E+00	-4.3033E+00	1.861E+02%		2.20E+01
TH-234 #A	2.5267E+01	2.5267E+01	3.378E+01%		2.69E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.16E+01
PA-233 #A	-1.1593E+00	-1.1593E+00	1.005E+02%		3.77E+00
PA-234 #A	-1.7689E+00	-1.7689E+00	8.685E+01%		7.69E+00
PA-234M#A	4.2354E+01	4.2354E+01	1.287E+02%		1.79E+02
U-235 #A	5.3972E+00	5.3972E+00	4.385E+01%		1.02E+01
AM-241 #A	9.5926E-01	9.5926E-01	1.277E+02%		3.47E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.21E+01
Ir-192 #A	5.2238E-01	5.2238E-01	6.286E+01%		9.61E-01
Cs-136 #A	6.3223E-01	6.3224E-01	1.091E+02%		2.33E+00
Np-239 #A	1.1596E+00	1.1597E+00	1.111E+02%		4.31E+00
Nd-147 #A	1.5538E+00	1.5538E+00	9.674E+01%		6.97E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 4.015E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 4.0146793E+02 Bq/Sample

257318_Gamma_160-17797-A-10-B. 14_Gamma_20161797.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20161655

Sample Description: 257318_Gamma_160-17797-A-11-B
Detector: Detector #16
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-11-B

Decay to Time: 7/12/2016 12:20 Live Time: 1800 sec
Acquisition Time: 7/12/2016 12:20:46 Real Time: 1811 sec
Analysis Time: 7/12/2016 12:51 Dead Time: 0.63 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Soil_TunaCan.Clb
Efficiency Cal Desc: 16_TunaCan_90099_071012
Efficiency Cal Date: 7/13/2012 09:47
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 16_2016-07-10_0627.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	4.213E+00	102.3	4.310E+00	4.316E+00	1.449E+01
NA-22	2.560E-01	162.6	4.164E-01	4.166E-01	1.471E+00
K-40	2.696E+02	4.9	1.322E+01	1.911E+01	1.152E+01
Sc-46	-6.561E-01	92.3	6.053E-01	6.062E-01	2.034E+00
CR-51	1.072E+00	715.7	7.676E+00	7.676E+00	2.582E+01
MN-54	-5.706E-03	9972.5	5.690E-01	5.690E-01	1.216E+00
FE-59	-1.530E+00	74.7	1.143E+00	1.145E+00	3.282E+00
Co-56	6.560E-01	88.1	5.780E-01	5.790E-01	1.227E+00
CO-57	2.731E-01	132.3	3.613E-01	3.616E-01	1.211E+00
CO-58	0.000E+00	1.#INF	2.866E-01	2.866E-01	1.876E+00
CO-60	1.047E-01	265.7	2.782E-01	2.783E-01	1.681E+00
ZN-65	1.396E+00	88.3	1.232E+00	1.234E+00	4.143E+00
NB-94	-3.121E-01	258.7	8.074E-01	8.076E-01	1.886E+00
ZR-95	3.667E-01	264.2	9.688E-01	9.690E-01	2.305E+00
NB-95	-4.192E-01	153.0	6.412E-01	6.416E-01	2.178E+00
RU-103	-5.802E-01	94.4	5.478E-01	5.486E-01	1.298E+00
RH-106	5.363E+00	175.5	9.412E+00	9.416E+00	3.163E+01
AG-108M	-7.821E-02	599.3	4.688E-01	4.688E-01	1.144E+00
AG-110M	9.725E-01	47.1	4.584E-01	4.611E-01	2.281E+00
SN-113	-8.692E-01	104.8	9.109E-01	9.120E-01	3.045E+00
SB-124	-5.355E-01	189.5	1.015E+00	1.015E+00	3.406E+00
SB-125	8.256E-02	69.9	5.769E-02	5.785E-02	4.369E+00
I-131	5.643E-01	125.8	7.102E-01	7.108E-01	1.111E+00
Gd-153	1.124E+00	92.2	1.036E+00	1.038E+00	4.144E+00
Ga-68	-1.723E+01	152.4	2.625E+01	2.627E+01	5.757E+01
Tc-99m	-4.559E-01	145.3	6.624E-01	6.629E-01	2.205E+00
BA-133	-7.153E-01	155.1	1.110E+00	1.110E+00	3.717E+00
CS-134	6.478E-01	73.1	4.736E-01	4.748E-01	3.376E+00
CS-137	3.543E+00	16.7	5.905E-01	6.186E-01	1.094E+00
CE-139	-3.633E-03	15840.6	5.755E-01	5.755E-01	1.418E+00
Ba-140	-2.543E-01	641.3	1.631E+00	1.631E+00	4.045E+00
La-140	4.163E-01	118.0	4.913E-01	4.918E-01	1.061E+00
CE-141	-8.207E-01	150.0	1.231E+00	1.232E+00	4.099E+00

CE-144	-1.553E+00	293.2	4.554E+00	4.555E+00	1.524E+01
PM-144	3.224E-01	152.3	4.909E-01	4.912E-01	1.679E+00
EU-152	1.722E+00	79.4	1.367E+00	1.370E+00	8.575E+00
EU-154	-2.353E+00	161.0	3.789E+00	3.791E+00	1.309E+01
EU-155	4.003E-01	471.4	1.887E+00	1.887E+00	6.345E+00
HF-181	4.363E-01	136.9	5.973E-01	5.977E-01	2.021E+00
Ta-182	0.000E+00	1.#INF	1.630E+00	1.630E+00	7.392E+00
Hg-203	4.099E-01	90.5	3.711E-01	3.718E-01	1.243E+00
TL-208	5.653E+00	11.7	6.592E-01	7.215E-01	1.099E+00
pm-146	1.284E+00	88.3	1.134E+00	1.136E+00	2.658E+00
y-88	4.584E-01	40.8	1.872E-01	1.887E-01	1.259E+00
Cd-113m	5.836E+03	87.9	5.130E+03	5.144E+03	1.715E+04
Cd-109	0.000E+00	1.#INF	1.945E+01	1.945E+01	6.467E+01
Cf-251	-1.260E+00	172.0	2.167E+00	2.170E+00	5.561E+00
Cf-249	-3.415E-01	241.8	8.257E-01	8.259E-01	2.796E+00
Sn-126	-2.101E+00	272.8	5.732E+00	5.733E+00	1.922E+01
PB-210	2.865E+01	33.8	9.688E+00	9.833E+00	3.028E+01
PB-212	1.867E+01	5.5	1.030E+00	1.587E+00	1.938E+00
PB-214	1.619E+01	8.0	1.293E+00	1.543E+00	2.186E+00
BI-207	4.023E-01	109.5	4.405E-01	4.410E-01	1.066E+00
BI-212	3.415E+01	20.5	7.005E+00	7.225E+00	1.140E+01
BI-214	1.627E+01	9.9	1.614E+00	1.822E+00	2.530E+00
BI-210M	6.375E-01	95.3	6.077E-01	6.088E-01	2.036E+00
AC-228	2.021E+01	10.0	2.030E+00	2.277E+00	2.873E+00
TH-227	-6.211E+00	117.7	7.312E+00	7.319E+00	2.443E+01
TH-229	2.138E+00	341.7	7.305E+00	7.307E+00	1.954E+01
TH-234	1.678E+01	50.3	8.442E+00	8.487E+00	2.743E+01
PA-231	0.000E+00	1.#INF	4.263E+00	4.263E+00	7.216E+01
PA-233	-1.238E+00	174.7	2.162E+00	2.163E+00	7.228E+00
PA-234	2.207E-01	102.1	2.254E-01	2.257E-01	9.443E+00
PA-234M	-5.344E+00	66.9	3.576E+00	3.586E+00	2.963E+02
U-235	-3.648E+00	106.9	3.901E+00	3.905E+00	1.705E+01
AM-241	-1.866E+00	45.0	8.402E-01	8.458E-01	5.344E+00
Np-237	0.000E+00	1.#INF	5.647E+00	5.647E+00	1.878E+01
Ir-192	-8.245E-02	101.3	8.352E-02	8.366E-02	2.939E+00
Cs-136	2.375E-01	90.9	2.158E-01	2.162E-01	1.894E+00
Np-239	1.240E+00	138.4	1.717E+00	1.719E+00	5.735E+00
Nd-147	-3.312E+00	108.5	3.592E+00	3.597E+00	8.590E+00
Total	6.294E+03				

Analyst: Mike Aldridge

Sample description
257318_Gamma_160-17797-A-11-B

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20161655.An1

Acquisition information
Start time: 7/12/2016 12:20:46 PM
Live time: 1800
Real time: 1811
Dead time: 0.63 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Soil_TunaCan.Clb
16_TunaCan_90099_071012

Energy Calibration
Created: 2/28/2012 9:35:31 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: -2.285E-08 keV/channel^2

Efficiency Calibration
Created: 7/13/2012 9:47:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.17 %
Log(Eff): -2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.64keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/12/2016 12:20:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2016-07-10_0627.PBC 7/10/2016 6:27:28 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1862

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.61	72.	23.98	0.70	2.387E-02	46.54	4.250	PBC<MDA	PB210
63.47	41.	50.30	0.97	3.561E-02	63.29	3.810	PBC<MDA	TH234
74.86	224.	11.25	0.99	4.141E-02				
77.24	343.	8.28	0.99	4.234E-02				
87.36	133.	16.39	1.00	4.532E-02	86.49	13.100	1.252E+01	Np237
					86.54	30.700	5.339E+00	EU155
					86.94	9.040	1.809E+01	Sn126
					87.57	37.500	4.348E+00	Sn126
					88.04	3.790	4.292E+01	Cd109
90.07	62.	31.01	1.00	4.590E-02				
92.51	27.	86.48	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
97.50	25.	127.52	1.01	4.707E-02	97.50	30.000	PBC<MDA	Gd153
99.50	25.	130.42	1.01	4.728E-02	99.50	15.000	PBC<MDA	Np239
103.20	25.	133.06	1.01	4.755E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.209E+00	Np239
103.70	25.	135.99	1.01	4.758E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	1.210E+00	Np239
105.31	7.	471.42	1.01	4.766E-02	105.31	21.200	PBC<MDA	EU155
106.13	24.	138.42	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
122.04	20.	132.32	1.03	4.729E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.731E-01	CO57
123.10	23.	87.85	1.03	4.721E-02	123.10	40.790	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	3.	830.38	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
210.85	7.	341.70	1.11	3.511E-02	210.85	2.990	PBC<MDA	TH229
227.00	3.	762.40	1.13	3.332E-02	227.00	6.300	PBC<MDA	Cf251
238.73	441.	6.55	1.13	3.215E-02	238.63	43.300	1.761E+01	PB212
242.09	72.	21.70	1.14	3.185E-02	242.00	7.430	1.684E+01	PB214
254.65	17.	100.89	1.15	3.058E-02	256.24	7.000	PBC<MDA	TH227
263.70	19.	87.90	1.16	2.996E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	17.	95.31	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
279.20	17.	90.53	1.17	2.876E-02	279.20	81.460	PBC<MDA	Hg203
284.30	14.	125.85	1.18	2.839E-02	284.30	6.140	PBC<MDA	I131
295.34	153.	13.37	1.25	2.763E-02	295.09	19.300	1.491E+01	PB214
299.92	20.	145.94	1.19	2.732E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.677E+01	PA231
					300.18	6.200	6.655E+00	PA233
320.08	5.	715.72	1.21	2.608E-02	320.08	9.940	PBC<MDA	CR51
338.41	126.	16.44	1.01	2.506E-02	338.32	12.010	2.319E+01	AC228
351.86	278.	7.99	1.19	2.437E-02	351.93	37.600	1.685E+01	PB214
463.37	6.	246.95	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
468.06	12.	115.71	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
477.60	16.	102.31	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	136.92	1.35	1.939E-02	482.00	80.500	PBC<MDA	HF181
511.86	102.	27.23	2.63	1.856E-02	511.86	20.000	1.527E+01	RH106
563.24	11.	100.51	1.43	1.730E-02	563.24	8.350	PBC<MDA	CS134
569.47	4.	210.24	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.710E+00	PA234
					569.70	97.740	1.435E-01	BI207
569.70	5.	184.39	1.43	1.716E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.974E+00	PA234
					569.70	97.740	1.656E-01	BI207
583.52	145.	11.66	1.38	1.687E-02	583.02	84.500	5.653E+00	TL208
609.53	210.	9.92	1.54	1.633E-02	609.31	46.090	1.551E+01	BI214
					610.30	5.750	1.245E+02	RU103
621.92	15.	175.52	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106
635.89	13.	69.88	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
636.97	7.	139.16	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
661.90	84.	16.67	1.59	1.537E-02	661.66	85.210	3.543E+00	CS137
696.54	8.	152.26	1.54	1.479E-02	696.54	99.000	PBC<MDA	PM144
727.55	66.	20.51	1.40	1.432E-02	727.17	7.550	3.415E+01	BI212
747.16	11.	88.30	1.59	1.404E-02	747.16	34.000	PBC<MDA	pm146
756.73	5.	264.20	1.60	1.391E-02	756.73	54.460	PBC<MDA	ZR95
766.41	15.	88.02	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.024E+02	PA234M
795.87	11.	73.11	1.63	1.340E-02	795.87	85.530	PBC<MDA	CS134
801.95	11.	90.56	1.64	1.332E-02	801.95	8.690	PBC<MDA	CS134
846.77	10.	124.50	1.67	1.280E-02	846.77	99.935	PBC<MDA	Co56
860.76	50.	17.41	2.98	1.264E-02	860.56	12.420	1.751E+01	TL208
880.53	12.	83.26	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
883.24	6.	163.83	1.71	1.240E-02	883.24	9.600	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
898.04	8.	141.88	1.72	1.225E-02	898.04	93.700	PBC<MDA	y88
911.48	120.	11.53	2.34	1.211E-02	911.07	29.000	1.898E+01	AC228
964.11	5.	321.87	1.77	1.161E-02	964.11	14.605	PBC<MDA	EU152
969.06	99.	16.05	1.01	1.157E-02	968.97	17.460	2.723E+01	AC228
1048.07	10.	90.86	1.84	1.091E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	10.	118.17	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1112.07	13.	79.37	1.90	1.043E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	13.	88.27	1.90	1.041E-02	1115.55	50.600	PBC<MDA	ZN65
1119.26	12.	103.91	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
1120.55	9.	158.48	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1173.24	5.	265.67	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1238.28	11.	124.73	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	4.	162.63	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.271E-01	EU154
1384.30	15.	47.14	2.12	8.837E-03	1384.30	24.290	3.882E+00	AG110M
1408.00	3.	346.41	2.14	8.723E-03	1408.00	21.005	PBC<MDA	EU152
1461.28	451.	4.71	1.96	8.480E-03	1460.83	10.670	2.696E+02	K40
1596.21	6.	118.01	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1690.98	1.	945.38	2.37	7.585E-03	1690.98	47.790	PBC<MDA	SB124
1765.09	38.	21.27	2.43	7.342E-03	1764.49	15.400	1.857E+01	BI214
1836.06	7.	40.85	2.48	7.121E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.07	74.89	203.	224.	5.404E+03	11.25	0.986	-	D
308.61	77.28	232.	343.	8.110E+03	8.28	0.988	-	D
359.07	89.94	145.	73.	1.586E+03	26.13	0.999	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.54	123.	52.	0.029	33.81	0.959D
TH-227	200.26	50.14	376.	-24.	-0.013	117.71	0.963s
AM-241	237.83	59.54	579.	-40.	-0.022	45.02	0.971s
TH-234	252.82	63.29	190.	41.	0.023	50.30	0.975D
Sn-126	256.79	64.28	649.	-13.	-0.007	272.81	0.976s
BA-133	323.60	80.99	1459.	-36.	-0.020	70.99	0.991s
Np-237	345.59	86.49	1791.	0.	0.000	191.75	0.996A
EU-155	345.80	86.54	1872.	-33.	-0.018	186.08	0.996s
Sn-126	347.39	86.94	1839.	-33.	-0.018	184.40	0.997
Sn-126	349.91	87.57	1641.	-33.	-0.018	174.14	0.997s
Cd-109	351.79	88.04	1806.	0.	0.000	182.54	0.998A
Nd-147	364.02	91.10	1608.	-33.	-0.018	171.84	1.001s
TH-234	369.98	92.59	261.	27.	0.015	86.48	1.002D
Gd-153	389.61	97.50	485.	25.	0.014	127.52	1.007s
Np-239	397.61	99.50	510.	25.	0.014	130.42	1.008s
Gd-153	412.40	103.20	534.	25.	0.014	133.06	1.012s
Np-239	414.40	103.70	559.	25.	0.014	135.99	1.012s
EU-155	420.85	105.31	585.	7.	0.004	471.42	1.014
Np-239	424.11	106.13	547.	24.	0.013	138.42	1.014s
EU-152	486.67	121.78	350.	-27.	-0.015	99.02	1.029s
CO-57	487.81	122.06	337.	20.	0.011	132.32	1.029s
EU-154	491.96	123.10	201.	23.	0.013	87.85	1.030s
PA-234	524.73	131.29	893.	-28.	-0.016	151.22	1.038s
HF-181	531.64	133.02	865.	-28.	-0.016	148.62	1.039s
CE-144	533.70	133.54	872.	-14.	-0.008	293.18	1.040s
HF-181	544.74	136.30	886.	0.	0.000	1000.00	1.042s
CO-57	545.43	136.47	886.	0.	0.000	1000.00	1.042
Tc-99m	561.57	140.51	1072.	-32.	-0.018	145.30	1.046s
U-235	574.67	143.79	1002.	-32.	-0.018	106.94	1.049s
CE-141	581.29	145.44	1109.	-32.	-0.018	150.04	1.050s
Ba-140	650.14	162.66	286.	-24.	-0.013	102.39	1.066
U-235	653.01	163.38	310.	0.	0.000	1000.00	1.067
Cf-251	705.88	176.60	194.	-15.	-0.009	171.99	1.079s
TH-229	773.49	193.51	139.	3.	0.001	830.38	1.094s
U-235	820.76	205.33	185.	-29.	-0.016	119.31	1.105
TH-229	842.82	210.85	185.	7.	0.004	341.70	1.110s
Cf-251	907.40	227.00	117.	3.	0.001	762.40	1.125s
PB-212	953.91	238.63	97.	468.	0.260	5.52	1.136D
PB-214	967.37	242.00	85.	72.	0.040	21.70	1.139D
EU-152	978.14	244.69	863.	-25.	-0.014	166.80	1.141
TH-227	1024.32	256.24	68.	17.	0.009	100.89	1.152s
Cd-113m	1054.15	263.70	128.	19.	0.010	87.90	1.158s
BI-210M	1062.67	265.83	124.	17.	0.009	95.31	1.160s
TL-208	1108.46	277.28	181.	-18.	-0.010	60.51	1.171

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1116.13	279.20	114.	17.	0.010	90.53	1.173
I-131	1136.52	284.30	81.	14.	0.008	125.85	1.177s
PB-214	1180.68	295.34	73.	143.	0.080	14.48	1.248
PB-212	1199.42	300.03	428.	20.	0.011	145.94	1.191s
PA-233	1200.02	300.18	450.	0.	0.000	1000.00	1.192s
PA-231	1209.90	302.65	450.	0.	0.000	1000.00	1.194s
BA-133	1210.70	302.85	450.	0.	0.000	1000.00	1.194s
Ba-140	1218.69	304.85	450.	0.	0.000	1000.00	1.196s
BI-210M	1218.88	304.90	450.	0.	0.000	1000.00	1.196s
Ir-192	1233.05	308.44	703.	-21.	-0.012	177.84	1.199s
PA-233	1247.34	312.01	682.	-21.	-0.012	174.71	1.202s
Ir-192	1265.24	316.49	645.	-22.	-0.012	166.27	1.206s
CR-51	1279.62	320.08	639.	5.	0.003	715.72	1.210s
La-140	1314.31	328.76	499.	-23.	-0.013	92.50	1.217s
Cf-249	1333.02	333.44	477.	-21.	-0.012	150.09	1.222s
AC-228	1352.89	338.41	58.	126.	0.070	16.44	1.007s
Cs-136	1361.54	340.57	456.	-9.	-0.005	332.13	1.228s
HF-181	1382.56	345.83	76.	-3.	-0.002	571.87	1.233s
PB-214	1406.66	351.86	51.	278.	0.154	7.99	1.185s
BA-133	1423.24	356.00	439.	-19.	-0.011	155.12	1.242
BA-133	1534.57	383.84	222.	-21.	-0.012	102.18	1.267s
Cf-249	1551.01	387.95	243.	-9.	-0.005	241.78	1.271s
SN-113	1565.96	391.69	269.	-23.	-0.013	104.80	1.274s
SB-125	1710.67	427.88	100.	-22.	-0.012	95.99	1.307s
AG-108M	1734.91	433.94	61.	-3.	-0.001	599.35	1.312s
pm-146	1814.67	453.88	82.	-20.	-0.011	94.59	1.330s
SB-125	1852.61	463.37	109.	6.	0.003	246.95	1.338s
Ir-192	1871.38	468.06	96.	12.	0.007	115.71	1.342s
BE-7	1909.51	477.60	119.	16.	0.009	102.31	1.351s
HF-181	1927.12	482.00	135.	12.	0.007	136.92	1.355s
La-140	1947.21	487.02	164.	-17.	-0.009	109.15	1.359
RU-103	1987.33	497.05	65.	-18.	-0.010	94.42	1.368s
RH-106	2046.57	511.86	98.	102.	0.057	27.23	2.631s
Nd-147	2123.10	531.00	52.	-14.	-0.008	108.48	1.398s
Ba-140	2148.14	537.26	39.	-2.	-0.001	641.29	1.404s
CS-134	2252.03	563.24	27.	11.	0.006	100.51	1.427s
PA-234	2276.96	569.47	39.	4.	0.002	210.24	1.432s
BI-207	2277.89	569.70	40.	5.	0.003	184.39	1.432s
TL-208	2333.14	583.52	30.	145.	0.081	11.66	1.376
SB-125	2401.07	600.50	446.	-18.	-0.010	171.62	1.460s
SB-124	2409.99	602.73	429.	-16.	-0.009	189.49	1.462s
CS-134	2417.91	604.71	413.	0.	0.000	1000.00	1.463
BI-214	2437.19	609.53	46.	210.	0.117	9.92	1.544
RU-103	2440.26	610.30	413.	0.	0.000	1000.00	1.468
AG-108M	2456.19	614.28	413.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	413.	0.	0.000	1000.00	1.475s
RH-106	2486.73	621.92	358.	15.	0.009	175.52	1.479s
SB-125	2542.62	635.89	33.	13.	0.007	69.88	1.491s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2546.96	636.97	39.	7.	0.004	139.16	1.492s
AG-110M	2630.10	657.76	174.	-19.	-0.011	101.36	1.510s
CS-137	2646.65	661.90	24.	84.	0.046	16.67	1.594
PM-144	2785.22	696.54	80.	8.	0.005	152.26	1.544s
NB-94	2809.57	702.63	98.	-8.	-0.004	258.74	1.549s
SB-124	2890.19	722.79	112.	-6.	-0.004	233.07	1.567s
AG-108M	2890.80	722.94	105.	0.	0.000	1000.00	1.567s
EU-154	2892.47	723.36	113.	-9.	-0.005	170.33	1.567s
ZR-95	2895.84	724.20	104.	0.	0.000	1000.00	1.568s
BI-212	2909.26	727.55	18.	66.	0.037	20.51	1.404s
pm-146	2941.93	735.72	65.	-21.	-0.011	86.41	1.578s
pm-146	2987.69	747.16	19.	11.	0.006	88.30	1.588s
ZR-95	3025.97	756.73	38.	5.	0.003	264.20	1.596s
AG-110M	3054.82	763.94	99.	-22.	-0.012	66.51	1.602s
NB-95	3062.21	765.79	121.	-10.	-0.006	152.97	1.604
PA-234M	3064.70	766.41	77.	15.	0.008	88.02	1.605s
BI-212	3140.74	785.42	61.	-18.	-0.010	96.50	1.621s
CS-134	3182.53	795.87	29.	11.	0.006	73.11	1.630s
CS-134	3206.86	801.95	47.	11.	0.006	90.56	1.635s
CO-58	3242.16	810.78	80.	0.	0.000	1000.00	1.643s
La-140	3262.14	815.77	80.	0.	0.000	1000.00	1.647s
Cs-136	3273.06	818.50	81.	-1.	-0.001	960.47	1.649s
Co-56	3386.15	846.77	30.	10.	0.006	124.50	1.674s
TL-208	3442.11	860.76	4.	50.	0.027	17.41	2.983s
NB-94	3483.47	871.10	38.	-6.	-0.003	150.92	1.695s
EU-154	3492.00	873.23	52.	-6.	-0.004	160.99	1.696s
PA-234	3521.21	880.53	43.	12.	0.007	83.26	1.703s
PA-234	3532.05	883.24	48.	6.	0.003	163.83	1.705s
AG-110M	3537.82	884.68	54.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	83.	-15.	-0.008	92.26	1.710s
y-88	3591.26	898.04	25.	8.	0.004	141.88	1.718s
AC-228	3645.01	911.48	11.	120.	0.067	11.53	2.344s
AG-110M	3749.09	937.49	50.	-9.	-0.005	175.92	1.751s
EU-152	3855.58	964.11	127.	5.	0.003	321.87	1.774s
AC-228	3875.38	969.06	20.	99.	0.055	16.05	1.013s
EU-154	3984.48	996.33	85.	-18.	-0.010	77.48	1.801s
PA-234M	4003.15	1001.00	105.	-13.	-0.007	100.82	1.805s
Co-56	4150.56	1037.84	37.	-3.	-0.002	420.24	1.836s
Cs-136	4191.49	1048.07	32.	10.	0.005	90.86	1.845
RH-106	4200.65	1050.36	58.	-14.	-0.007	84.62	1.847
BI-207	4253.86	1063.66	27.	10.	0.006	118.17	1.858s
Ga-68	4308.84	1077.40	37.	-9.	-0.005	152.36	1.870s
FE-59	4396.27	1099.25	48.	-16.	-0.009	74.68	1.888s
EU-152	4447.58	1112.07	48.	13.	0.007	79.37	1.899s
ZN-65	4461.46	1115.55	62.	13.	0.007	88.27	1.901s
BI-214	4480.43	1120.29	73.	12.	0.007	103.91	1.906s
Sc-46	4481.49	1120.55	86.	9.	0.005	158.48	1.906
Ta-182	4484.49	1121.30	95.	0.	0.000	1000.00	1.906

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.30	1173.24	35.	5.	0.003	265.67	1.950s
Ta-182	4755.57	1189.05	45.	-9.	-0.005	172.32	1.963
Ta-182	4885.06	1221.41	57.	-22.	-0.012	83.46	1.990
Co-56	4952.57	1238.28	35.	11.	0.006	124.73	2.004s
NA-22	5097.62	1274.53	23.	4.	0.002	162.63	2.034s
EU-154	5097.68	1274.54	27.	0.	0.000	1000.00	2.034s
CO-60	5329.61	1332.50	28.	-1.	-0.001	940.25	2.081s
AG-110M	5536.89	1384.30	6.	15.	0.008	47.14	2.124s
EU-152	5631.75	1408.00	18.	3.	0.002	346.41	2.143
K-40	5844.99	1461.28	12.	439.	0.244	4.91	1.961
La-140	6385.02	1596.21	6.	6.	0.003	118.01	2.294s
SB-124	6764.37	1690.98	6.	1.	0.000	945.38	2.369s
BI-214	7058.61	1764.49	13.	38.	0.021	21.27	2.427s
Co-56	7086.08	1771.35	43.	0.	0.000	1000.00	2.433s
y-88	7345.12	1836.06	0.	7.	0.004	40.85	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	4.2127E+00				5.31E+01	
			477.60	4.213E+00	?(	1.449E+01 1.02E+02 1.05E+01	G
NA-22	C	2.5602E-01				9.50E+02	
			1274.53	2.560E-01	?(	1.471E+00 1.63E+02 9.99E+01	G
K-40	N	2.6955E+02				4.66E+11	
			1460.83	2.696E+02	(P	1.152E+01 4.91E+00 1.07E+01	G
Sc-46	F	-6.5605E-01				8.38E+01	
			889.28	-6.561E-01	?(	2.034E+00 9.23E+01 1.00E+02	G
			1120.55	4.559E-01	+ P	2.467E+00 1.58E+02 1.00E+02	G
CR-51	F	1.0725E+00				2.77E+01	
			320.08	1.072E+00	?(	2.582E+01 7.16E+02 9.94E+00	G
MN-54	C	-5.7057E-03				3.12E+02	
			834.85	-5.706E-03	%(P	1.216E+00 9.97E+03 1.00E+02	G
FE-59	F	-1.5301E+00				4.45E+01	
			1099.25	-1.530E+00	&(P	3.282E+00 7.47E+01 5.65E+01	G
			1291.60	-6.488E-02	% P	3.491E+00 2.39E+03 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 6.5599E-01					7.73E+01	
		846.77	4.345E-01	&(	1.227E+00	1.24E+02	9.99E+01 G
		1238.28	9.911E-01	?(P	2.636E+00	1.25E+02	6.61E+01 G
		1037.84	-1.193E+00	+	1.116E+01	4.20E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.625E+01	1.00E+03	1.55E+01 A
CO-57	C 2.7306E-01					2.72E+02	
		122.06	2.731E-01	?(	1.211E+00	1.32E+02	8.56E+01 G
		136.47	0.000E+00	-	1.608E+01	1.00E+03	1.07E+01 G
CO-60	F 1.0474E-01					1.93E+03	
		1332.50	-8.145E-02	&(	1.681E+00	9.40E+02	1.00E+02 G
		1173.24	2.911E-01	?(P	1.676E+00	2.66E+02	9.99E+01 G
ZN-65	F 1.3955E+00					2.44E+02	
		1115.55	1.396E+00	?(	4.143E+00	8.83E+01	5.06E+01 G
NB-94	I -3.1206E-01					7.41E+06	
		702.63	-3.121E-01	?(P	1.886E+00	2.59E+02	9.79E+01 G
		871.10	-2.664E-01	+	1.396E+00	1.51E+02	9.99E+01 G
ZR-95	I 3.6669E-01					6.40E+01	
		756.73	3.667E-01	?(P	2.305E+00	2.64E+02	5.45E+01 G
		724.20	0.000E+00	-	4.398E+00	1.00E+03	4.42E+01 G
NB-95	I -4.1920E-01					6.40E+01	
		765.79	-4.192E-01	(	2.178E+00	1.53E+02	9.98E+01 G
RU-103	I -5.8016E-01					3.93E+01	
		497.05	-5.802E-01	&(	1.298E+00	9.44E+01	9.09E+01 G
		610.30	0.000E+00	+	5.770E+01	1.00E+03	5.75E+00 GA
RH-106	I 5.3625E+00					3.74E+02	
		621.92	5.363E+00	?(	3.163E+01	1.76E+02	9.93E+00 G
		1050.36	-4.415E+01	&	1.254E+02	8.46E+01	1.56E+00 G
		511.86	1.527E+01	?	7.310E+00	2.72E+01	2.00E+01 GA
AG-108M	C -7.8212E-02					1.53E+05	
		433.94	-7.821E-02	?(	1.144E+00	5.99E+02	9.05E+01 G
		722.94	0.000E+00	+	2.144E+00	1.00E+03	9.08E+01 G
		614.28	0.000E+00	+	3.710E+00	1.00E+03	8.98E+01 G
AG-110M	F 9.7249E-01					2.50E+02	
		884.68	0.000E+00	?(	2.281E+00	1.00E+03	7.27E+01 G
		657.76	-7.197E-01	+	2.444E+00	1.01E+02	9.46E+01 G
		937.49	-1.227E+00	+	4.862E+00	1.76E+02	3.44E+01 G
		1384.30	3.882E+00	&(	3.656E+00	4.71E+01	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	-4.022E+00	&	8.844E+00	6.65E+01	2.23E+01 G
SN-113	F	-8.6922E-01					1.15E+02	
			391.69	-8.692E-01	?(	3.045E+00	1.05E+02	6.40E+01 G
SB-124	F	-5.3545E-01					6.02E+01	
			602.73	-5.355E-01	?(	3.406E+00	1.89E+02	9.83E+01 G
			1690.98	1.022E-01	+	2.213E+00	9.45E+02	4.78E+01 G
			722.79	-2.321E+00	+	1.854E+01	2.33E+02	1.08E+01 G
SB-125	I	8.2558E-02					1.01E+03	
			427.88	-1.933E+00	?(	4.369E+00	9.60E+01	2.96E+01 G
			600.50	-3.312E+00	+	1.906E+01	1.72E+02	1.79E+01 G
			635.89	3.940E+00	?(	9.150E+00	6.99E+01	1.13E+01 G
			463.37	1.613E+00	&(P	1.365E+01	2.47E+02	1.05E+01 G
I-131	I	5.6431E-01					8.02E+00	
			364.48	2.863E-02	%(	1.111E+00	1.52E+03	8.17E+01 G
			284.30	4.550E+00	?(P	1.421E+01	1.26E+02	6.14E+00 G
			636.97	3.255E+00	?(	1.566E+01	1.39E+02	7.17E+00 G
Gd-153	F	1.1241E+00					2.42E+02	
			97.50	9.730E-01	&(	4.144E+00	1.28E+02	3.00E+01 G
			103.20	1.332E+00	*(	5.919E+00	1.33E+02	2.18E+01 G
Ga-68	C	-1.7230E+01					4.71E-02	
			1077.40	-1.723E+01	?(	5.757E+01	1.52E+02	3.30E+00 G
Tc-99m	I	-4.5589E-01					2.51E-01	
			140.51	-4.559E-01	(	2.205E+00	1.45E+02	8.93E+01 G
BA-133	F	-7.1534E-01					3.85E+03	
			356.00	-7.153E-01	&(	3.717E+00	1.55E+02	6.20E+01 G
			302.85	0.000E+00	+	1.134E+01	1.00E+03	1.83E+01 G
			383.84	-5.736E+00	+	1.961E+01	1.02E+02	8.94E+00 GA
			80.99	-1.328E+00	+ P	6.759E+00	7.10E+01	3.41E+01 GA
CS-134	I	6.4779E-01					7.54E+02	
			604.71	0.000E+00	&(	3.376E+00	1.00E+03	9.76E+01 G
			795.87	5.494E-01	?(	1.341E+00	7.31E+01	8.55E+01 G
			569.32	-7.014E-02	%	7.025E+00	2.80E+03	1.54E+01 G
			801.95	5.455E+00	?(	1.668E+01	9.06E+01	8.69E+00 G
			563.24	4.226E+00	*(P	1.038E+01	1.01E+02	8.35E+00 G
CS-137	I	3.5426E+00					1.10E+04	
			661.66	3.543E+00	(	1.094E+00	1.67E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-3.6333E-03					1.38E+02	
			165.85	-3.633E-03	%(P	1.418E+00	1.58E+04	7.99E+01 G
Ba-140	I	-2.5432E-01					1.28E+01	
			537.26	-2.543E-01	?(	4.045E+00	6.41E+02	2.44E+01 G
			162.66	-5.147E+00	+	1.760E+01	1.02E+02	6.22E+00 G
			304.85	0.000E+00	&	4.870E+01	1.00E+03	4.29E+00 G
La-140	I	4.1628E-01					1.28E+01	
			1596.21	4.163E-01	?(	1.061E+00	1.18E+02	9.54E+01 G
			487.02	-1.081E+00	+	3.962E+00	1.09E+02	4.55E+01 G
			328.76	-2.410E+00	+ P	1.143E+01	9.25E+01	2.03E+01 G
			815.77	0.000E+00	-	8.052E+00	1.00E+03	2.33E+01 G
CE-141	I	-8.2072E-01					3.25E+01	
			145.44	-8.207E-01	&(	4.099E+00	1.50E+02	4.82E+01 G
CE-144	I	-1.5533E+00					2.85E+02	
			133.54	-1.553E+00	?(	1.524E+01	2.93E+02	1.11E+01 G
PM-144	C	3.2241E-01					3.63E+02	
			696.54	3.224E-01	?(	1.679E+00	1.52E+02	9.90E+01 G
			618.06	0.000E+00	-	3.379E+00	1.00E+03	9.91E+01 G
EU-152	F	1.7218E+00					4.94E+03	
			344.29	6.462E-07	&(	8.575E+00	3.92E+08	2.65E+01 G
			1112.07	5.156E+00	?(	1.371E+01	7.94E+01	1.36E+01 G
			121.78	-1.119E+00	+	3.693E+00	9.90E+01	2.86E+01 G
			778.92	3.153E-01	%	8.629E+00	1.13E+03	1.29E+01 G
			964.11	1.638E+00	?(	1.809E+01	3.22E+02	1.46E+01 G
			244.69	-5.819E+00	+	3.238E+01	1.67E+02	7.58E+00 G
			1408.00	9.096E-01	?	6.816E+00	3.46E+02	2.10E+01 GA
EU-154	I	-2.3535E+00					3.14E+03	
			873.23	-2.353E+00	&(	1.309E+01	1.61E+02	1.23E+01 G
			123.10	6.772E-01	+	1.984E+00	8.78E+01	4.08E+01 G
			1274.54	0.000E+00	+	4.518E+00	1.00E+03	3.52E+01 G
			723.36	-1.719E+00	+	9.978E+00	1.70E+02	2.02E+01 G
			1004.77	9.134E-02	%	1.457E+01	4.60E+03	1.80E+01 G
			996.33	-8.196E+00	+	2.117E+01	7.75E+01	1.06E+01 G
EU-155	I	4.0028E-01					1.81E+03	
			105.31	4.003E-01	?(P	6.345E+00	4.71E+02	2.12E+01 G
			86.54	-1.324E+00	+	8.188E+00	1.86E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	4.3627E-01					4.24E+01	
			482.00	4.363E-01	?(	2.021E+00	1.37E+02	8.05E+01 G
			133.02	-7.836E-01	+	3.882E+00	1.49E+02	4.33E+01 G
			345.83	-4.483E-01	&	6.476E+00	5.72E+02	1.51E+01 G
			136.30	0.000E+00	-	2.935E+01	1.00E+03	5.85E+00 G
Hg-203	F	4.0994E-01					4.66E+01	
			279.20	4.099E-01	?(	1.243E+00	9.05E+01	8.15E+01 G
TL-208	N	5.6532E+00					6.98E+02	
			583.02	5.653E+00	(P	1.099E+00	1.17E+01	8.45E+01 G
			277.28	-5.528E+00	- P	1.993E+01	6.05E+01	6.31E+00 G
			860.56	1.751E+01	+	4.456E+00	1.74E+01	1.24E+01 G
pm-146	C	1.2845E+00					2.02E+03	
			747.16	1.284E+00	?(	2.658E+00	8.83E+01	3.40E+01 G
			735.72	-3.567E+00	&	7.018E+00	8.64E+01	2.25E+01 G
			453.88	-8.499E-01	-	1.898E+00	9.46E+01	6.50E+01 G
y-88	F	4.5838E-01					1.07E+02	
			898.04	3.873E-01	?(	1.259E+00	1.42E+02	9.37E+01 G
			1836.06	5.255E-01	?(P	5.796E-01	4.08E+01	9.92E+01 G
Cd-113m		5.8365E+03					5.33E+03	
			263.70	5.836E+03	&(	1.715E+04	8.79E+01	6.00E-03 K
Cf-251	T	-1.2600E+00					3.28E+05	
			176.60	-1.260E+00	(	5.561E+00	1.72E+02	1.70E+01 G
			227.00	7.057E-01	&	1.408E+01	7.62E+02	6.30E+00 GA
Cf-249	T	-3.4152E-01					1.28E+05	
			387.95	-3.415E-01	?(	2.796E+00	2.42E+02	6.60E+01 G
			333.44	-2.942E+00	+	1.478E+01	1.50E+02	1.55E+01 G
Sn-126		-2.1009E+00					3.65E+07	
			87.57	-1.079E+00	}	6.248E+00	1.74E+02	3.75E+01 GA
			64.28	-2.101E+00	?(	1.922E+01	2.73E+02	9.70E+00 G
			86.94	-4.486E+00	}	2.751E+01	1.84E+02	9.04E+00 GA
PB-210	N	2.8655E+01					8.14E+03	
			46.54	2.865E+01	(P	3.028E+01	3.38E+01	4.25E+00 G
PB-212	N	1.8673E+01					6.98E+02	
			238.63	1.867E+01	(P	1.938E+00	5.52E+00	4.33E+01 G
			300.03	1.258E+01	-	6.145E+01	1.46E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.6192E+01					5.84E+05	
			351.93	1.685E+01	*(P	2.186E+00	7.99E+00	3.76E+01 G
			295.09	1.491E+01	(P	4.422E+00	1.45E+01	1.93E+01 G
			242.00	1.684E+01		1.074E+01	2.17E+01	7.43E+00 GA
BI-207	C	4.0227E-01					1.18E+04	
			569.70	1.656E-01	&(	1.066E+00	1.84E+02	9.77E+01 G
			1063.66	7.127E-01	?(P	1.852E+00	1.18E+02	7.45E+01 G
BI-212	N	3.4147E+01					6.98E+02	
			727.17	3.415E+01	@(	1.140E+01	2.05E+01	7.55E+00 G
			785.42	-5.666E+01	-	1.251E+02	9.65E+01	1.28E+00 GA
BI-214	N	1.6274E+01					5.84E+05	
			609.31	1.551E+01	(P	2.530E+00	9.92E+00	4.61E+01 G
			1120.29	4.294E+00	& P	1.508E+01	1.04E+02	1.51E+01 G
			1764.49	1.857E+01	?(P	9.653E+00	2.13E+01	1.54E+01 G
BI-210M	T	6.3754E-01					1.10E+09	
			265.83	6.375E-01	&(P	2.036E+00	9.53E+01	5.00E+01 G
			304.90	0.000E+00	&	7.462E+00	1.00E+03	2.80E+01 G
AC-228	N	2.0211E+01					2.10E+03	
			911.07	1.898E+01	(	2.873E+00	1.15E+01	2.90E+01 G
			968.97	2.723E+01	+	6.477E+00	1.60E+01	1.75E+01 G
			338.32	2.319E+01	(	7.069E+00	1.64E+01	1.20E+01 G
			93.35	3.561E-01	%	4.068E+01	3.42E+03	5.56E+00 XA
TH-227	N	-6.2114E+00					7.95E+03	
			50.14	-6.211E+00	?(	2.443E+01	1.18E+02	8.00E+00 G
			256.24	4.283E+00	&	1.068E+01	1.01E+02	7.00E+00 G
TH-229	N	2.1379E+00					2.68E+06	
			193.51	9.028E-01	?(	1.954E+01	8.30E+02	4.40E+00 G
			210.85	3.956E+00	?(P	3.494E+01	3.42E+02	2.99E+00 G
TH-234	N	1.6784E+01					1.63E+12	
			63.29	1.678E+01	(P	2.743E+01	5.03E+01	3.81E+00 G
			92.59	5.846E+00	- P	1.672E+01	8.65E+01	5.58E+00 G
PA-233	C	-1.2377E+00					7.82E+08	
			312.01	-1.238E+00	?(	7.228E+00	1.75E+02	3.60E+01 G
			300.18	0.000E+00	&	3.332E+01	1.00E+03	6.20E+00 G
PA-234	N	2.2069E-01					1.63E+12	
			131.29	-1.874E+00	(	9.443E+00	1.51E+02	1.80E+01 G
			946.02	-4.365E-01	% P	9.195E+00	1.07E+03	1.34E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47 1.710E+00 ?(  1.261E+01 2.10E+02 8.20E+00 G
                          883.24 2.875E+00 ?(  1.631E+01 1.64E+02 9.60E+00 G
                          880.53 8.822E+00 ?   2.470E+01 8.33E+01 6.00E+00 GA

PA-234M  N  -5.3440E+00                                      1.63E+12
                         1001.00-7.830E+01 ?(P 2.963E+02 1.01E+02 8.37E-01 G
                          766.41 2.024E+02 ?(  5.978E+02 8.80E+01 2.94E-01 G

U-235    N  -3.6477E+00                                      2.57E+11
                          143.79-3.648E+00 &(P 1.705E+01 1.07E+02 1.10E+01 G
                          205.33-8.956E+00 & P 2.049E+01 1.19E+02 5.01E+00 G
                          163.38 0.000E+00 &   2.247E+01 1.00E+03 5.08E+00 G

AM-241   T  -1.8663E+00                                      1.58E+05
                           59.54-1.866E+00 &(P 5.344E+00 4.50E+01 3.59E+01 G

Ir-192   F  -8.2454E-02                                      7.40E+01
                          316.49-5.288E-01 &(  2.939E+00 1.66E+02 8.70E+01 G
                          468.06 6.683E-01 ?(  2.617E+00 1.16E+02 5.18E+01 G
                          308.44-1.388E+00 &   8.251E+00 1.78E+02 3.18E+01 G

Cs-136   F   2.3750E-01                                      1.30E+01
                          818.50-5.644E-02 ?(  1.894E+00 9.60E+02 1.00E+02 G
                         1048.07 6.049E-01 &(  1.864E+00 9.09E+01 8.00E+01 G
                          340.57-4.340E-01 +   4.855E+00 3.32E+02 4.69E+01 G

Np-239   T   1.2404E+00                                      2.36E+00
                          103.70 1.210E+00 &   5.494E+00 1.36E+02 2.40E+01 X
                          106.13 1.240E+00  (  5.735E+00 1.38E+02 2.27E+01 G
                           99.50 1.941E+00 &   8.456E+00 1.30E+02 1.50E+01 X

Nd-147      -3.3115E+00                                      1.11E+01
                          531.00-3.312E+00 ?(  8.590E+00 1.08E+02 1.30E+01 G
                           91.10-1.412E+00 +   8.068E+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.
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& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** 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	579.	-40.	-0.022	45.02	-1.866E+00	P
Sn-126	64.28	649.	-13.	-0.007	272.81	-2.101E+00	
BA-133	80.99	1459.	-36.	-0.020	70.99	-1.328E+00	P
EU-155	86.54	1872.	-33.	-0.018	186.08	-1.324E+00	
Sn-126	86.94	1839.	-33.	-0.018	184.40	-4.486E+00	
Sn-126	87.57	1641.	-33.	-0.018	174.14	-1.079E+00	
Nd-147	91.10	1608.	-33.	-0.018	171.84	-1.412E+00	
Gd-153	97.50	485.	25.	0.014	127.52	9.730E-01	
Np-239	99.50	510.	25.	0.014	130.42	1.941E+00	
Gd-153	103.20	534.	25.	0.014	133.06	1.332E+00	
Np-239	103.70	559.	25.	0.014	135.99	1.210E+00	
EU-155	105.31	585.	7.	0.004	471.42	4.003E-01	P
Np-239	106.13	547.	24.	0.013	138.42	1.240E+00	
EU-152	121.78	350.	-27.	-0.015	99.02	-1.119E+00	
EU-154	123.10	201.	23.	0.013	87.85	6.772E-01	
PA-234	131.29	893.	-28.	-0.016	151.22	-1.874E+00	
HF-181	133.02	865.	-28.	-0.016	148.62	-7.836E-01	
CE-144	133.54	872.	-14.	-0.008	293.18	-1.553E+00	
Tc-99m	140.51	1072.	-32.	-0.018	145.30	-4.559E-01	
U-235	143.79	1002.	-32.	-0.018	106.94	-3.648E+00	P
CE-141	145.44	1109.	-32.	-0.018	150.04	-8.207E-01	
Ba-140	162.66	286.	-24.	-0.013	102.39	-5.147E+00	
Cf-251	176.60	194.	-15.	-0.009	171.99	-1.260E+00	
TH-229	193.51	139.	3.	0.001	830.38	9.028E-01	
U-235	205.33	185.	-29.	-0.016	119.31	-8.956E+00	P
TH-229	210.85	185.	7.	0.004	341.70	3.956E+00	P
Cf-251	227.00	117.	3.	0.001	762.40	7.057E-01	
EU-152	244.69	863.	-25.	-0.014	166.80	-5.819E+00	
Cd-113m	263.70	128.	19.	0.010	87.90	5.836E+03	
BI-210M	265.83	124.	17.	0.009	95.31	6.375E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Hg-203	279.20	114.	17.	0.010	90.53	4.099E-01		
I-131	284.30	81.	14.	0.008	125.85	4.550E+00		P
Ir-192	308.44	703.	-21.	-0.012	177.84	-1.388E+00		
PA-233	312.01	682.	-21.	-0.012	174.71	-1.238E+00		
Ir-192	316.49	645.	-22.	-0.012	166.27	-5.288E-01		
CR-51	320.08	639.	5.	0.003	715.72	1.072E+00		
La-140	328.76	499.	-23.	-0.013	92.50	-2.410E+00		P
Cf-249	333.44	477.	-21.	-0.012	150.09	-2.942E+00		
Cs-136	340.57	456.	-9.	-0.005	332.13	-4.340E-01		
HF-181	345.83	76.	-3.	-0.002	571.87	-4.483E-01		
BA-133	356.00	439.	-19.	-0.011	155.12	-7.153E-01		
BA-133	383.84	222.	-21.	-0.012	102.18	-5.736E+00		
Cf-249	387.95	243.	-9.	-0.005	241.78	-3.415E-01		
SN-113	391.69	269.	-23.	-0.013	104.80	-8.692E-01		
SB-125	427.88	100.	-22.	-0.012	95.99	-1.933E+00		
AG-108M	433.94	61.	-3.	-0.001	599.35	-7.821E-02		
pm-146	453.88	82.	-20.	-0.011	94.59	-8.499E-01		
SB-125	463.37	109.	6.	0.003	246.95	1.613E+00		P
Ir-192	468.06	96.	12.	0.007	115.71	6.683E-01		
BE-7	477.60	119.	16.	0.009	102.31	4.213E+00		
HF-181	482.00	135.	12.	0.007	136.92	4.363E-01		
La-140	487.02	164.	-17.	-0.009	109.15	-1.081E+00		
RU-103	497.05	65.	-18.	-0.010	94.42	-5.802E-01		
RH-106	511.86	98.	102.	0.057	27.23	1.527E+01		
Nd-147	531.00	52.	-14.	-0.008	108.48	-3.312E+00		
Ba-140	537.26	39.	-2.	-0.001	641.29	-2.543E-01		
CS-134	563.24	27.	11.	0.006	100.51	4.226E+00		P
PA-234	569.47	39.	4.	0.002	210.24	1.710E+00		
BI-207	569.70	40.	5.	0.003	184.39	1.656E-01		
SB-125	600.50	446.	-18.	-0.010	171.62	-3.312E+00		
SB-124	602.73	429.	-16.	-0.009	189.49	-5.355E-01		
RH-106	621.92	358.	15.	0.009	175.52	5.363E+00		
SB-125	635.89	33.	13.	0.007	69.88	3.940E+00		
I-131	636.97	39.	7.	0.004	139.16	3.255E+00		
AG-110M	657.76	174.	-19.	-0.011	101.36	-7.197E-01		
PM-144	696.54	80.	8.	0.005	152.26	3.224E-01		
NB-94	702.63	98.	-8.	-0.004	258.74	-3.121E-01		P
SB-124	722.79	112.	-6.	-0.004	233.07	-2.321E+00		
EU-154	723.36	113.	-9.	-0.005	170.33	-1.719E+00		
pm-146	735.72	65.	-21.	-0.011	86.41	-3.567E+00		
pm-146	747.16	19.	11.	0.006	88.30	1.284E+00		
ZR-95	756.73	38.	5.	0.003	264.20	3.667E-01		P
AG-110M	763.94	99.	-22.	-0.012	66.51	-4.022E+00		
NB-95	765.79	121.	-10.	-0.006	152.97	-4.192E-01		
PA-234M	766.41	77.	15.	0.008	88.02	2.024E+02		
CS-134	795.87	29.	11.	0.006	73.11	5.494E-01		
CS-134	801.95	47.	11.	0.006	90.56	5.455E+00		
Cs-136	818.50	81.	-1.	-0.001	960.47	-5.644E-02		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	846.77	30.	10.	0.006	124.50	4.345E-01		
NB-94	871.10	38.	-6.	-0.003	150.92	-2.664E-01		
EU-154	873.23	52.	-6.	-0.004	160.99	-2.353E+00		
PA-234	880.53	43.	12.	0.007	83.26	8.822E+00		
PA-234	883.24	48.	6.	0.003	163.83	2.875E+00		
Sc-46	889.28	83.	-15.	-0.008	92.26	-6.561E-01		
y-88	898.04	25.	8.	0.004	141.88	3.873E-01		
AG-110M	937.49	50.	-9.	-0.005	175.92	-1.227E+00		
EU-152	964.11	127.	5.	0.003	321.87	1.638E+00		
EU-154	996.33	85.	-18.	-0.010	77.48	-8.196E+00		
PA-234M	1001.00	105.	-13.	-0.007	100.82	-7.830E+01		P
Co-56	1037.84	37.	-3.	-0.002	420.24	-1.193E+00		
Cs-136	1048.07	32.	10.	0.005	90.86	6.049E-01		
RH-106	1050.36	58.	-14.	-0.007	84.62	-4.415E+01		
BI-207	1063.66	27.	10.	0.006	118.17	7.127E-01		P
Ga-68	1077.40	37.	-9.	-0.005	152.36	-1.723E+01		
FE-59	1099.25	48.	-16.	-0.009	74.68	-1.530E+00		P
EU-152	1112.07	48.	13.	0.007	79.37	5.156E+00		
ZN-65	1115.55	62.	13.	0.007	88.27	1.396E+00		
Sc-46	1120.55	86.	9.	0.005	158.48	4.559E-01		P
CO-60	1173.24	35.	5.	0.003	265.67	2.911E-01		P
Ta-182	1189.05	45.	-9.	-0.005	172.32	-3.228E+00		
Ta-182	1221.41	57.	-22.	-0.012	83.46	-4.634E+00		
Co-56	1238.28	35.	11.	0.006	124.73	9.911E-01		P
NA-22	1274.53	23.	4.	0.002	162.63	2.560E-01		
CO-60	1332.50	28.	-1.	-0.001	940.25	-8.145E-02		
AG-110M	1384.30	6.	15.	0.008	47.14	3.882E+00		
EU-152	1408.00	18.	3.	0.002	346.41	9.096E-01		
La-140	1596.21	6.	6.	0.003	118.01	4.163E-01		
SB-124	1690.98	6.	1.	0.000	945.38	1.022E-01		
y-88	1836.06	0.	7.	0.004	40.85	5.255E-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	4.2127E+00	4.2127E+00	1.023E+02%	1.45E+01
NA-22	#A	2.5602E-01	2.5602E-01	1.626E+02%	1.47E+00
K-40		2.6955E+02	2.6955E+02	4.905E+00%	1.15E+01
Sc-46	#A	-6.5605E-01	-6.5605E-01	9.226E+01%	2.03E+00
CR-51	#A	1.0724E+00	1.0725E+00	7.157E+02%	2.58E+01
MN-54	#A	-5.7057E-03	-5.7057E-03	9.973E+03%	1.22E+00
FE-59	#A	-1.5300E+00	-1.5301E+00	7.468E+01%	3.28E+00
Co-56	#A	6.5598E-01	6.5599E-01	8.811E+01%	1.23E+00
CO-57	#A	2.7306E-01	2.7306E-01	1.323E+02%	1.21E+00

CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.88E+00
CO-60	#A	1.0474E-01	1.0474E-01	2.657E+02%	1.68E+00
ZN-65	#A	1.3955E+00	1.3955E+00	8.827E+01%	4.14E+00
NB-94	#A	-3.1206E-01	-3.1206E-01	2.587E+02%	1.89E+00
ZR-95	#A	3.6669E-01	3.6669E-01	2.642E+02%	2.30E+00
NB-95	#A	-4.1919E-01	-4.1920E-01	1.530E+02%	2.18E+00
RU-103	#A	-5.8015E-01	-5.8016E-01	9.442E+01%	1.30E+00
RH-106	#A	5.3625E+00	5.3625E+00	1.755E+02%	3.16E+01
AG-108M	#A	-7.8212E-02	-7.8212E-02	5.993E+02%	1.14E+00
AG-110M	#A	9.7249E-01	9.7249E-01	4.714E+01%	2.28E+00
SN-113	#A	-8.6922E-01	-8.6922E-01	1.048E+02%	3.04E+00
SB-124	#A	-5.3545E-01	-5.3545E-01	1.895E+02%	3.41E+00
SB-125	#A	8.2558E-02	8.2558E-02	6.988E+01%	4.37E+00
I-131	#A	5.6428E-01	5.6431E-01	1.258E+02%	1.11E+00
Gd-153	#A	1.1241E+00	1.1241E+00	9.215E+01%	4.14E+00
Ga-68	#A	-1.7096E+01	-1.7230E+01	1.524E+02%	5.76E+01
Tc-99m	#A	-4.5522E-01	-4.5589E-01	1.453E+02%	2.20E+00
BA-133	#A	-7.1534E-01	-7.1534E-01	1.551E+02%	3.72E+00
CS-134	#A	6.4779E-01	6.4779E-01	7.311E+01%	3.38E+00
CS-137		3.5426E+00	3.5426E+00	1.667E+01%	1.09E+00
CE-139	#A	-3.6333E-03	-3.6333E-03	1.584E+04%	1.42E+00
Ba-140	#A	-2.5432E-01	-2.5432E-01	6.413E+02%	4.05E+00
La-140	#A	4.1626E-01	4.1628E-01	1.180E+02%	1.06E+00
CE-141	#A	-8.2071E-01	-8.2072E-01	1.500E+02%	4.10E+00
CE-144	#A	-1.5533E+00	-1.5533E+00	2.932E+02%	1.52E+01
PM-144	#A	3.2241E-01	3.2241E-01	1.523E+02%	1.68E+00
EU-152	#A	1.7218E+00	1.7218E+00	7.937E+01%	8.57E+00
EU-154	#A	-2.3535E+00	-2.3535E+00	1.610E+02%	1.31E+01
EU-155	#A	4.0028E-01	4.0028E-01	4.714E+02%	6.35E+00
HF-181	#A	4.3627E-01	4.3627E-01	1.369E+02%	2.02E+00
Ta-182	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.39E+00
Hg-203	#A	4.0994E-01	4.0994E-01	9.053E+01%	1.24E+00
TL-208		5.6532E+00	5.6532E+00	1.166E+01%	1.10E+00
pm-146	#A	1.2845E+00	1.2845E+00	8.830E+01%	2.66E+00
y-88	#A	4.5838E-01	4.5838E-01	4.085E+01%	1.26E+00
Cd-113m	#A	5.8365E+03	5.8365E+03	8.790E+01%	1.72E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.47E+01
Cf-251	#A	-1.2600E+00	-1.2600E+00	1.720E+02%	5.56E+00
Cf-249	#A	-3.4152E-01	-3.4152E-01	2.418E+02%	2.80E+00
Sn-126	#A	-2.1009E+00	-2.1009E+00	2.728E+02%	1.92E+01
PB-210	#A	2.8655E+01	2.8655E+01	3.381E+01%	3.03E+01
PB-212		1.8673E+01	1.8673E+01	5.515E+00%	1.94E+00
PB-214		1.6192E+01	1.6192E+01	7.987E+00%	2.19E+00
BI-207	#A	4.0227E-01	4.0227E-01	1.095E+02%	1.07E+00
BI-212	#	3.4147E+01	3.4147E+01	2.051E+01%	1.14E+01
BI-214		1.6274E+01	1.6274E+01	9.918E+00%	2.53E+00
BI-210M	#A	6.3754E-01	6.3754E-01	9.531E+01%	2.04E+00
AC-228		2.0211E+01	2.0211E+01	1.004E+01%	2.87E+00
TH-227	#A	-6.2114E+00	-6.2114E+00	1.177E+02%	2.44E+01

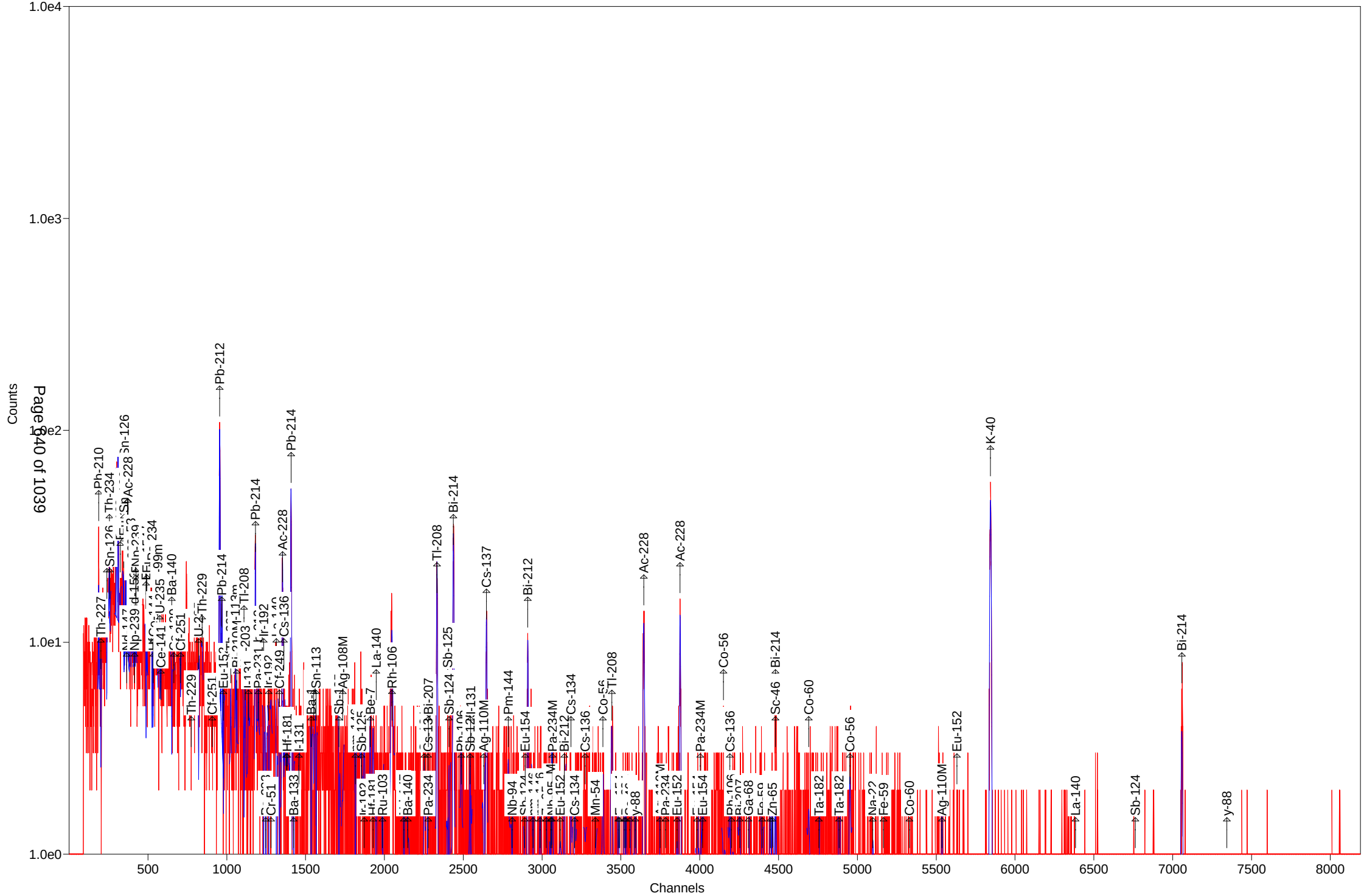
TH-229 #A	2.1379E+00	2.1379E+00	3.417E+02%		1.95E+01
TH-234 A	1.6784E+01	1.6784E+01	5.030E+01%		2.74E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.22E+01
PA-233 #A	-1.2377E+00	-1.2377E+00	1.747E+02%		7.23E+00
PA-234 #A	2.2069E-01	2.2069E-01	1.021E+02%		9.44E+00
PA-234M#A	-5.3440E+00	-5.3440E+00	6.692E+01%		2.96E+02
U-235 #A	-3.6477E+00	-3.6477E+00	1.069E+02%		1.71E+01
AM-241 #A	-1.8663E+00	-1.8663E+00	4.502E+01%		5.34E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.88E+01
Ir-192 #A	-8.2454E-02	-8.2454E-02	1.013E+02%		2.94E+00
Cs-136 #A	2.3749E-01	2.3750E-01	9.086E+01%		1.89E+00
Np-239 #A	1.2402E+00	1.2404E+00	1.384E+02%		5.74E+00
Nd-147 #A	-3.3114E+00	-3.3115E+00	1.085E+02%		8.59E+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) 4.297E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.6 keV) 4.2968326E+02 Bq/Sample

257318_Gamma_160-17797-A-11-B. 16_Gamma_20161655.spc.



Test America St. Louis Spectrum ID: 3_Gamma_20161206

Sample Description: 257318_Gamma_160-17797-A-12-B
Detector: Detector # 3
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-12-B

Decay to Time: 7/12/2016 11:27 Live Time: 1800 sec
Acquisition Time: 7/12/2016 11:27:26 Real Time: 1803 sec
Analysis Time: 7/12/2016 11:57 Dead Time: 0.17 %
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_2016-07-10_0602.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	-4.672E+00	107.1	5.003E+00	5.009E+00	1.680E+01
NA-22	-5.675E-01	87.0	4.940E-01	4.948E-01	1.673E+00
K-40	2.481E+02	5.4	1.343E+01	1.848E+01	1.293E+01
Sc-46	4.918E-01	92.5	4.548E-01	4.555E-01	1.539E+00
CR-51	2.982E+00	134.5	4.010E+00	4.013E+00	1.353E+01
MN-54	-5.500E-01	81.5	4.481E-01	4.490E-01	1.531E+00
FE-59	8.309E-01	87.8	7.294E-01	7.305E-01	2.568E+00
Co-56	2.266E-01	93.4	2.118E-01	2.121E-01	1.305E+00
CO-57	-7.104E-02	479.8	3.408E-01	3.409E-01	1.157E+00
CO-58	4.716E-01	86.1	4.060E-01	4.068E-01	1.370E+00
CO-60	1.613E-01	315.1	5.083E-01	5.084E-01	1.162E+00
ZN-65	-1.536E+00	110.3	1.694E+00	1.696E+00	5.711E+00
NB-94	1.336E-01	232.6	3.107E-01	3.108E-01	1.230E+00
ZR-95	-2.499E-01	392.7	9.812E-01	9.813E-01	2.337E+00
NB-95	-7.904E-01	72.5	5.731E-01	5.746E-01	1.904E+00
RU-103	-5.080E-01	92.0	4.673E-01	4.680E-01	1.322E+00
RH-106	-6.456E+00	139.2	8.987E+00	8.993E+00	2.875E+01
AG-108M	-3.919E-02	198.4	7.777E-02	7.780E-02	1.272E+00
AG-110M	1.140E+00	26.7	3.047E-01	3.103E-01	2.355E+00
SN-113	-2.508E-01	231.5	5.805E-01	5.806E-01	2.563E+00
SB-124	1.462E-01	122.7	1.793E-01	1.795E-01	3.452E+00
SB-125	1.134E+00	85.6	9.707E-01	9.724E-01	3.055E+00
I-131	9.996E-01	57.0	5.702E-01	5.725E-01	1.077E+00
Gd-153	-4.063E-02	2518.6	1.023E+00	1.023E+00	2.788E+00
Ga-68	3.459E+01	46.7	1.617E+01	1.628E+01	3.383E+01
Tc-99m	2.902E-01	121.0	3.510E-01	3.514E-01	1.176E+00
BA-133	-7.037E-01	150.3	1.058E+00	1.059E+00	3.547E+00
CS-134	6.077E-01	93.9	5.706E-01	5.715E-01	3.453E+00
CS-137	4.162E+00	12.6	5.229E-01	5.660E-01	7.236E-01
CE-139	-1.907E-01	211.2	4.026E-01	4.030E-01	1.360E+00
Ba-140	1.918E+00	75.7	1.451E+00	1.455E+00	3.197E+00
La-140	7.673E-01	49.6	3.806E-01	3.828E-01	1.077E+00
CE-141	4.467E-02	1533.6	6.851E-01	6.851E-01	2.328E+00

CE-144	0.000E+00	1.#INF	7.139E-01	7.139E-01	1.100E+01
PM-144	3.619E+00	13.2	4.783E-01	5.140E-01	1.069E+00
EU-152	3.756E-01	105.1	3.948E-01	3.953E-01	7.390E+00
EU-154	2.686E-01	60.4	1.622E-01	1.628E-01	1.357E+01
EU-155	9.807E-01	109.2	1.071E+00	1.072E+00	3.593E+00
HF-181	6.342E-01	139.5	8.849E-01	8.855E-01	2.061E+00
Ta-182	2.825E+00	58.5	1.652E+00	1.658E+00	6.896E+00
Hg-203	-3.612E-01	84.0	3.035E-01	3.042E-01	1.565E+00
TL-208	6.780E+00	10.1	6.815E-01	7.669E-01	1.029E+00
pm-146	-2.195E+00	54.6	1.200E+00	1.205E+00	4.480E+00
y-88	1.983E-01	218.7	4.335E-01	4.336E-01	1.029E+00
Cd-113m	-6.940E+03	94.0	6.526E+03	6.542E+03	2.180E+04
Cd-109	0.000E+00	1.#INF	1.337E+01	1.337E+01	4.495E+01
Cf-251	1.719E+00	103.9	1.786E+00	1.793E+00	4.800E+00
Cf-249	5.967E-01	116.1	6.926E-01	6.932E-01	2.330E+00
Sn-126	1.290E+00	354.5	4.572E+00	4.573E+00	1.544E+01
PB-210	1.770E+01	53.2	9.410E+00	9.468E+00	2.726E+01
PB-212	1.891E+01	5.4	1.031E+00	1.600E+00	1.840E+00
PB-214	1.414E+01	7.5	1.059E+00	1.289E+00	2.664E+00
BI-207	6.374E-01	50.3	3.204E-01	3.221E-01	1.130E+00
BI-212	4.718E+00	111.6	5.267E+00	5.273E+00	1.796E+01
BI-214	1.514E+01	8.1	1.226E+00	1.457E+00	1.879E+00
BI-210M	-7.783E-01	123.6	9.618E-01	9.629E-01	2.661E+00
AC-228	1.912E+01	8.6	1.651E+00	1.918E+00	2.761E+00
TH-227	5.018E+00	130.7	6.558E+00	6.564E+00	2.201E+01
TH-229	1.260E+01	48.2	6.073E+00	6.157E+00	1.795E+01
TH-234	-1.140E+01	68.4	7.804E+00	7.827E+00	3.991E+01
PA-231	0.000E+00	1.#INF	4.266E+00	4.267E+00	6.871E+01
PA-233	8.172E-01	123.2	1.007E+00	1.008E+00	3.399E+00
PA-234	9.394E-01	65.3	6.132E-01	6.151E-01	6.948E+00
PA-234M	7.566E+01	80.5	6.091E+01	6.103E+01	2.203E+02
U-235	3.430E+00	78.7	2.700E+00	2.705E+00	9.785E+00
AM-241	-1.298E+00	113.9	1.478E+00	1.480E+00	3.946E+00
Np-237	2.549E+00	160.3	4.085E+00	4.088E+00	1.362E+01
Ir-192	4.978E-01	74.5	3.708E-01	3.720E-01	1.341E+00
Cs-136	-8.017E-02	94.4	7.566E-02	7.580E-02	1.771E+00
Np-239	1.053E+00	110.1	1.159E+00	1.160E+00	3.881E+00
Nd-147	-5.642E-01	579.6	3.270E+00	3.270E+00	8.073E+00
Total	5.115E+02				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-12-B

Spectrum Filename: C:\User\SPC\Det3\3_Gamma_20161206.An1

Acquisition information
Start time: 7/12/2016 11:27:26 AM
Live time: 1800
Real time: 1803
Dead time: 0.17 %
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	7/12/2016 11:27:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	3_2016-07-10_0602.PBC 7/10/2016 6:02:16 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1685

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.52	30.	53.16	0.79	2.213E-02	46.54	4.250	PBC<MDA	PB210
50.14	18.	130.68	0.82	2.503E-02	50.14	8.000	PBC<MDA	TH227
64.48	8.	354.47	0.84	3.475E-02	64.28	9.700	PBC<MDA	Sn126
74.80	203.	12.21	0.85	3.993E-02				
77.04	316.	8.25	0.85	4.081E-02				
86.12	26.	160.30	0.86	4.369E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.087E+00	EU155
87.17	137.	16.17	0.81	4.385E-02	86.54	30.700	5.673E+00	EU155
					86.94	9.040	1.922E+01	Sn126
					87.57	37.500	4.619E+00	Sn126
					88.04	3.790	4.560E+01	Cd109
92.67	64.	38.57	0.62	4.492E-02	92.59	5.584	1.426E+01	TH234
					93.35	5.561	1.428E+01	AC228
102.96	7.	438.37	0.88	4.605E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	3.548E-01	Np239
105.31	17.	109.20	0.88	4.612E-02	105.31	21.200	PBC<MDA	EU155
106.13	20.	110.06	0.88	4.614E-02	106.13	22.700	PBC<MDA	Np239
128.69	33.	50.69	0.58	4.498E-02				
140.51	20.	120.96	0.92	4.337E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	17.	145.37	0.92	4.285E-02	143.79	10.960	PBC<MDA	U235
162.66	20.	111.31	0.94	3.943E-02	162.66	6.220	PBC<MDA	Ba140
163.38	17.	131.02	0.94	3.929E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	20.	103.88	0.95	3.802E-02	176.60	17.000	PBC<MDA	Cf251
193.51	40.	48.21	0.97	3.577E-02	193.51	4.400	PBC<MDA	TH229
205.33	16.	132.07	0.98	3.437E-02	205.33	5.010	PBC<MDA	U235
209.44	52.	28.25	0.74	3.392E-02				
210.85	19.	131.51	0.99	3.376E-02	210.85	2.990	PBC<MDA	TH229
238.70	439.	6.01	1.02	3.104E-02	238.63	43.300	1.815E+01	PB212
241.04	18.	85.99	1.02	3.084E-02				
242.06	77.	19.46	1.02	3.075E-02	242.00	7.430	1.881E+01	PB214
277.36	36.	34.03	0.70	2.801E-02	277.28	6.310	1.139E+01	TL208
284.30	14.	100.61	1.06	2.753E-02	284.30	6.140	PBC<MDA	I131
295.27	127.	11.18	1.29	2.682E-02	295.09	19.300	1.365E+01	PB214
312.01	14.	123.23	1.09	2.581E-02	312.01	36.000	PBC<MDA	PA233
316.69	14.	115.91	1.09	2.556E-02	316.49	87.040	PBC<MDA	Ir192
320.08	14.	134.46	1.10	2.536E-02	320.08	9.940	PBC<MDA	CR51
328.76	33.	49.60	1.11	2.489E-02	328.76	20.300	PBC<MDA	La140
338.59	120.	14.31	1.15	2.438E-02	338.32	12.010	2.258E+01	AC228
340.86	16.	154.79	1.12	2.428E-02	340.57	46.900	PBC<MDA	Cs136
345.83	17.	141.16	1.12	2.402E-02	345.83	15.070	PBC<MDA	HF181
352.02	231.	9.96	0.95	2.372E-02	351.93	37.600	1.439E+01	PB214
364.48	13.	110.23	1.14	2.315E-02	364.48	81.700	PBC<MDA	I131
383.84	16.	110.82	1.16	2.231E-02	383.84	8.940	PBC<MDA	BA133
387.95	16.	116.06	1.17	2.215E-02	387.95	66.000	PBC<MDA	Cf249
427.88	8.	166.15	1.20	2.065E-02	427.88	29.600	PBC<MDA	SB125
463.37	3.	494.58	1.24	1.951E-02	463.37	10.470	PBC<MDA	SB125
468.15	14.	93.59	1.24	1.936E-02	468.06	51.750	PBC<MDA	Ir192
482.00	7.	240.72	1.26	1.896E-02	482.00	80.500	PBC<MDA	HF181
487.02	15.	111.11	1.26	1.882E-02	487.02	45.500	PBC<MDA	La140
511.86	38.	76.34	2.54	1.815E-02	511.86	20.000	PBC<MDA	RH106
537.26	10.	102.51	1.31	1.752E-02	537.26	24.390	PBC<MDA	Ba140
563.24	10.	120.67	1.34	1.693E-02	563.24	8.350	PBC<MDA	CS134
569.47	8.	111.04	1.34	1.679E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.25	171.	10.05	1.04	1.650E-02	583.02	84.500	6.825E+00	TL208
609.45	204.	8.10	1.19	1.598E-02	609.31	46.090	1.541E+01	BI214
					610.30	5.750	1.237E+02	RU103
618.06	191.	13.22	1.39	1.582E-02	618.06	99.100	6.771E+00	PM144
635.89	8.	85.57	1.41	1.549E-02	635.89	11.310	PBC<MDA	SB125
636.97	10.	83.71	1.41	1.547E-02	636.97	7.170	PBC<MDA	I131
661.93	96.	12.56	1.15	1.504E-02	661.66	85.210	4.162E+00	CS137
696.54	12.	98.52	1.46	1.448E-02	696.54	99.000	PBC<MDA	PM144
702.63	6.	232.56	1.47	1.438E-02	702.63	97.900	PBC<MDA	NB94
722.79	10.	122.66	1.49	1.408E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.493E-01	AG108M
					723.36	20.220	2.019E+00	EU154
722.94	3.	397.88	1.49	1.408E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.443E-01	AG108M
					723.36	20.220	6.484E-01	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
727.64	9.	111.64	1.49	1.402E-02	727.17	7.550	PBC<MDA	BI212
763.94	11.	76.60	1.53	1.351E-02	763.94	22.280	PBC<MDA	AG110M
766.41	12.	80.51	1.53	1.348E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.666E+02	PA234M
778.92	5.	228.91	1.54	1.332E-02	778.92	12.940	PBC<MDA	EU152
785.42	5.	281.58	1.55	1.323E-02	785.42	1.280	PBC<MDA	BI212
795.87	13.	93.90	1.56	1.310E-02	795.87	85.530	PBC<MDA	CS134
801.95	8.	153.83	1.56	1.303E-02	801.95	8.690	PBC<MDA	CS134
810.78	11.	86.09	1.57	1.292E-02	810.78	99.460	PBC<MDA	CO58
860.70	18.	43.93	1.61	1.236E-02	860.56	12.420	6.471E+00	TL208
871.10	1.	781.02	1.62	1.224E-02	871.10	99.890	PBC<MDA	NB94
889.28	11.	92.49	1.64	1.205E-02	889.28	99.984	PBC<MDA	Sc46
898.04	4.	218.66	1.65	1.196E-02	898.04	93.700	PBC<MDA	y88
911.41	129.	9.20	0.94	1.183E-02	911.07	29.000	2.086E+01	AC228
946.02	8.	90.47	1.69	1.150E-02	946.02	13.400	PBC<MDA	PA234
964.11	9.	167.00	1.71	1.133E-02	964.11	14.605	PBC<MDA	EU152
969.22	53.	17.42	2.78	1.129E-02	968.97	17.460	1.488E+01	AC228
996.33	12.	80.03	1.74	1.105E-02	996.33	10.600	PBC<MDA	EU154
1001.00	7.	146.33	1.74	1.101E-02	1001.00	0.837	PBC<MDA	PA234M
1063.66	20.	50.27	1.80	1.051E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	18.	46.75	1.81	1.041E-02	1077.40	3.300	3.459E+01	Ga68
1099.25	4.	275.10	1.83	1.025E-02	1099.25	56.500	PBC<MDA	FE59
1120.43	39.	23.29	1.85	1.010E-02	1120.29	15.100	1.411E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.45	16.	83.09	1.85	1.010E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.480E+00	Ta182
1187.90	3.	398.43	1.91	9.648E-03	1189.05	16.200	PBC<MDA	Ta182
1221.68	15.	82.27	1.93	9.449E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	11.	107.75	1.95	9.349E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	10.	87.78	1.99	9.048E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	315.09	2.03	8.830E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	14.	26.73	2.07	8.571E-03	1384.30	24.290	3.736E+00	AG110M
1461.08	392.	5.41	1.78	8.215E-03	1460.83	10.670	2.481E+02	K40
1596.21	1.	627.20	2.24	7.662E-03	1596.21	95.400	PBC<MDA	La140
1764.66	30.	25.85	2.37	7.075E-03	1764.49	15.400	1.533E+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
298.97	74.80	202.	203.	5.072E+03	12.21	0.848	- D
307.92	77.04	181.	316.	7.736E+03	8.25	0.850	- D
514.67	128.69	86.	33.	7.299E+02	50.69	0.576	- s
837.89	209.44	59.	52.	1.543E+03	28.25	0.744	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.75	46.52	87.	30.	0.017	53.16	0.792
TH-227	200.24	50.14	270.	18.	0.010	130.68	0.822s
AM-241	237.85	59.54	283.	-27.	-0.015	113.91	0.832s
TH-234	252.87	63.29	380.	-27.	-0.015	68.45	0.836
Sn-126	256.84	64.28	381.	8.	0.004	354.47	0.837
BA-133	323.73	80.99	294.	-29.	-0.016	85.49	0.854s
Np-237	345.75	86.49	873.	26.	0.015	160.30	0.860s
Sn-126	350.08	87.57	780.	38.	0.021	56.53	0.861D
Cd-109	351.96	88.04	807.	0.	0.000	1000.00	0.862A
Nd-147	364.21	91.10	927.	-30.	-0.017	142.85	0.865s
TH-234	370.17	92.59	173.	59.	0.033	34.07	0.866D
AC-228	373.21	93.35	816.	25.	0.014	160.06	0.867s
Np-239	397.83	99.50	505.	-23.	-0.013	140.09	0.873
Np-239	414.64	103.70	475.	7.	0.004	438.37	0.878s
EU-155	421.10	105.31	169.	17.	0.010	109.20	0.879
Np-239	424.37	106.13	229.	20.	0.011	110.06	0.880
EU-152	487.00	121.78	261.	-23.	-0.013	100.12	0.896s
CO-57	488.14	122.06	285.	-5.	-0.003	479.80	0.897s
EU-154	492.30	123.10	308.	-26.	-0.014	99.00	0.898s
PA-234	525.11	131.29	441.	-23.	-0.013	133.55	0.906s
HF-181	532.03	133.02	418.	-15.	-0.009	190.55	0.908s
CE-144	534.09	133.54	413.	0.	0.000	1000.00	0.909s
HF-181	545.14	136.30	413.	0.	0.000	1000.00	0.911s
CO-57	545.83	136.47	413.	0.	0.000	1000.00	0.912s
Tc-99m	561.99	140.51	272.	20.	0.011	120.96	0.916s
U-235	575.10	143.79	295.	17.	0.009	145.37	0.919s
Ba-140	650.65	162.66	228.	20.	0.011	111.31	0.939s
U-235	653.53	163.38	250.	17.	0.010	131.02	0.939s
CE-139	663.43	165.85	258.	-11.	-0.006	211.18	0.942s
Cf-251	706.45	176.60	130.	20.	0.011	103.88	0.953s
TH-229	774.13	193.51	107.	40.	0.022	48.21	0.970s
U-235	821.46	205.33	212.	16.	0.009	132.07	0.982s
TH-229	843.54	210.85	287.	19.	0.010	131.51	0.988s
Cf-251	908.18	227.00	128.	-14.	-0.008	150.20	1.004s
PB-212	954.74	238.63	80.	458.	0.254	5.45	1.016D
PB-214	968.20	242.00	75.	77.	0.043	19.46	1.019D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	978.99	244.69	816.	-20.	-0.011	199.02	1.022s
TH-227	1025.21	256.24	125.	-5.	-0.003	450.00	1.034s
Cd-113m	1055.07	263.70	198.	-22.	-0.012	94.04	1.041s
BI-210M	1063.60	265.83	203.	-20.	-0.011	123.58	1.044s
TL-208	1109.73	277.36	39.	36.	0.020	34.03	0.696s
Hg-203	1117.10	279.20	173.	-15.	-0.008	84.03	1.057s
I-131	1137.51	284.30	51.	14.	0.008	100.61	1.062s
PB-214	1181.41	295.27	26.	127.	0.071	11.18	1.289s
PB-212	1200.47	300.03	398.	-16.	-0.009	183.90	1.078s
PA-231	1200.63	300.07	383.	0.	0.000	1000.00	1.078s
PA-233	1201.07	300.18	383.	0.	0.000	1000.00	1.078s
PA-231	1210.95	302.65	383.	0.	0.000	1000.00	1.081s
BA-133	1211.76	302.85	383.	0.	0.000	1000.00	1.081s
Ba-140	1219.75	304.85	383.	0.	0.000	1000.00	1.083s
BI-210M	1219.94	304.90	383.	0.	0.000	1000.00	1.083s
PA-233	1248.42	312.01	135.	14.	0.008	123.23	1.090
Ir-192	1266.34	316.49	120.	14.	0.008	115.91	1.094s
CR-51	1280.73	320.08	158.	14.	0.008	134.46	1.098s
La-140	1315.45	328.76	68.	33.	0.018	49.60	1.107s
Cf-249	1334.18	333.44	92.	-3.	-0.001	674.48	1.111
AC-228	1353.71	338.32	49.	104.	0.058	13.67	1.117D
Cs-136	1362.71	340.57	298.	16.	0.009	154.79	1.119s
EU-152	1377.58	344.29	311.	-18.	-0.010	138.28	1.122s
HF-181	1383.75	345.83	296.	17.	0.010	141.16	1.124s
PB-214	1408.53	352.02	74.	231.	0.128	9.96	0.953
BA-133	1424.46	356.00	377.	-18.	-0.010	150.34	1.134s
I-131	1458.41	364.48	53.	13.	0.007	110.23	1.142
BA-133	1535.87	383.84	142.	16.	0.009	110.82	1.162s
Cf-249	1552.32	387.95	158.	16.	0.009	116.06	1.165
SN-113	1567.28	391.69	178.	-6.	-0.004	231.47	1.169s
SB-125	1712.08	427.88	44.	8.	0.004	166.15	1.205s
AG-108M	1736.34	433.94	72.	-7.	-0.004	198.42	1.211
pm-146	1816.14	453.88	52.	-11.	-0.006	131.84	1.230s
SB-125	1854.10	463.37	98.	3.	0.002	494.58	1.240s
Ir-192	1872.88	468.06	75.	14.	0.008	93.59	1.244s
BE-7	1911.04	477.60	155.	-17.	-0.009	107.08	1.254s
HF-181	1928.65	482.00	134.	7.	0.004	240.72	1.258s
La-140	1948.75	487.02	124.	15.	0.008	111.11	1.263s
RU-103	1988.90	497.05	64.	-15.	-0.009	91.98	1.273s
RH-106	2048.16	511.86	127.	38.	0.021	76.34	2.537s
Nd-147	2124.72	531.00	43.	-2.	-0.001	579.58	1.306s
Ba-140	2149.77	537.26	22.	10.	0.005	102.51	1.312s
CS-134	2253.70	563.24	30.	10.	0.005	120.67	1.337
CS-134	2278.04	569.32	42.	0.	0.000	1000.00	1.342s
PA-234	2278.64	569.47	31.	8.	0.004	111.04	1.343s
TL-208	2333.76	583.25	25.	171.	0.095	10.05	1.036
SB-125	2402.79	600.50	438.	-17.	-0.010	99.70	1.372s
SB-124	2411.71	602.73	421.	-7.	-0.004	240.45	1.374s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2419.63	604.71	414.	0.	0.000	1000.00	1.376s
BI-214	2438.61	609.45	23.	204.	0.113	8.10	1.192
PM-144	2473.05	618.06	223.	191.	0.106	13.22	1.389s
RH-106	2488.47	621.92	282.	-18.	-0.010	139.19	1.392s
SB-125	2544.37	635.89	19.	8.	0.004	85.57	1.406s
I-131	2548.71	636.97	29.	10.	0.005	83.71	1.407s
AG-110M	2631.87	657.76	208.	-19.	-0.011	108.71	1.427s
CS-137	2648.54	661.93	9.	96.	0.053	12.56	1.149s
PM-144	2787.02	696.54	28.	12.	0.007	98.52	1.463s
NB-94	2811.37	702.63	37.	6.	0.003	232.56	1.469s
SB-124	2892.00	722.79	75.	10.	0.006	122.66	1.488s
AG-108M	2892.61	722.94	86.	3.	0.002	397.88	1.488s
EU-154	2894.28	723.36	89.	0.	0.000	1000.00	1.488s
BI-212	2909.54	727.17	46.	9.	0.005	111.64	1.492s
pm-146	2989.50	747.16	56.	-18.	-0.010	54.65	1.510s
ZR-95	3027.78	756.73	37.	-3.	-0.002	392.68	1.519s
AG-110M	3056.63	763.94	30.	11.	0.006	76.60	1.526
NB-95	3064.02	765.79	87.	-19.	-0.011	72.51	1.528s
PA-234M	3066.51	766.41	40.	12.	0.007	80.51	1.528s
EU-152	3116.54	778.92	28.	5.	0.003	228.91	1.540s
BI-212	3142.54	785.42	37.	5.	0.003	281.58	1.546
CS-134	3184.33	795.87	68.	13.	0.007	93.90	1.556s
CS-134	3208.67	801.95	75.	8.	0.005	153.83	1.561s
CO-58	3243.96	810.78	39.	11.	0.006	86.09	1.569s
La-140	3263.94	815.77	52.	-3.	-0.002	375.49	1.574s
Cs-136	3274.86	818.50	67.	-11.	-0.006	108.02	1.576s
MN-54	3340.25	834.85	48.	-13.	-0.007	81.47	1.591s
Co-56	3387.93	846.77	33.	-7.	-0.004	152.72	1.602s
TL-208	3443.11	860.56	10.	18.	0.010	43.93	1.615s
NB-94	3485.23	871.10	30.	1.	0.001	781.02	1.625
EU-154	3493.77	873.23	53.	-12.	-0.007	90.52	1.627s
PA-234	3522.96	880.53	55.	0.	0.000	1000.00	1.633s
PA-234	3533.80	883.24	55.	0.	0.000	1000.00	1.636s
AG-110M	3539.58	884.68	55.	0.	0.000	1000.00	1.637s
Sc-46	3557.96	889.28	43.	11.	0.006	92.49	1.641s
y-88	3593.00	898.04	15.	4.	0.002	218.66	1.649s
AC-228	3646.21	911.34	9.	117.	0.065	10.55	0.926s
AG-110M	3750.78	937.49	30.	-3.	-0.002	405.52	1.685
PA-234	3784.89	946.02	10.	8.	0.005	90.47	1.692s
EU-152	3857.23	964.11	96.	9.	0.005	167.00	1.709s
AC-228	3877.69	969.22	10.	53.	0.029	17.42	2.780s
EU-154	3986.08	996.33	41.	12.	0.007	80.03	1.737s
PA-234M	4004.75	1001.00	53.	7.	0.004	146.33	1.742s
EU-154	4019.86	1004.77	83.	-15.	-0.008	90.69	1.745s
Co-56	4152.08	1037.84	25.	-6.	-0.003	187.70	1.774s
Cs-136	4192.99	1048.07	80.	-22.	-0.012	60.48	1.783
RH-106	4202.15	1050.36	100.	-21.	-0.011	72.03	1.785s
BI-207	4255.33	1063.66	17.	20.	0.011	50.27	1.797s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4310.28	1077.40	11.	18.	0.010	46.75	1.809s
FE-59	4397.65	1099.25	27.	4.	0.002	275.10	1.828s
EU-152	4448.93	1112.07	132.	-17.	-0.009	99.13	1.839s
ZN-65	4462.81	1115.55	115.	-14.	-0.008	110.30	1.842s
BI-214	4481.77	1120.29	21.	39.	0.022	23.29	1.847D
Sc-46	4482.82	1120.55	101.	0.	0.000	1000.00	1.847s
Ta-182	4485.82	1121.30	78.	16.	0.009	83.09	1.847s
CO-60	4693.48	1173.24	32.	-9.	-0.005	99.99	1.892s
Ta-182	4756.71	1189.05	21.	3.	0.001	398.43	1.906
Ta-182	4886.09	1221.41	27.	15.	0.008	82.27	1.934s
Co-56	4953.53	1238.28	27.	11.	0.006	107.75	1.948s
NA-22	5098.46	1274.53	28.	-9.	-0.005	87.04	1.979s
FE-59	5166.69	1291.60	11.	10.	0.005	87.78	1.993s
CO-60	5330.21	1332.50	11.	3.	0.001	315.09	2.028s
AG-110M	5537.27	1384.30	0.	14.	0.008	26.73	2.071s
EU-152	5632.02	1408.00	17.	-2.	-0.001	488.62	2.090s
K-40	5844.17	1461.08	14.	392.	0.218	5.41	1.783
La-140	6384.26	1596.21	6.	1.	0.001	627.20	2.242s
SB-124	6763.00	1690.98	13.	-7.	-0.004	138.11	2.317s
BI-214	7056.73	1764.49	15.	30.	0.017	25.85	2.373s
Co-56	7084.14	1771.35	35.	0.	0.000	1000.00	2.379s
y-88	7342.69	1836.06	6.	-3.	-0.002	229.11	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	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.6721E+00				5.31E+01	
			477.60	-4.672E+00	?(	1.680E+01 1.07E+02 1.05E+01	G
NA-22	C	-5.6753E-01				9.50E+02	
			1274.53	-5.675E-01	&(	1.673E+00 8.70E+01 9.99E+01	G
K-40	N	2.4814E+02				4.66E+11	
			1460.83	2.481E+02	(P	1.293E+01 5.41E+00 1.07E+01	G
Sc-46	F	4.9177E-01				8.38E+01	
			889.28	4.918E-01	&(	1.539E+00 9.25E+01 1.00E+02	G
			1120.55	0.000E+00	-	2.725E+00 1.00E+03 1.00E+02	G
CR-51	F	2.9822E+00				2.77E+01	
			320.08	2.982E+00	?(P	1.353E+01 1.34E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-5.5001E-01					3.12E+02	
			834.85	-5.500E-01	?(P	1.531E+00	8.15E+01	1.00E+02 G
FE-59	F	8.3091E-01					4.45E+01	
			1099.25	4.157E-01	?(	2.568E+00	2.75E+02	5.65E+01 G
			1291.60	1.374E+00	&(	2.615E+00	8.78E+01	4.32E+01 G
Co-56	C	2.2660E-01					7.73E+01	
			846.77	-2.975E-01	?(P	1.305E+00	1.53E+02	9.99E+01 G
			1238.28	1.019E+00	?(	2.408E+00	1.08E+02	6.61E+01 G
			1037.84	-2.202E+00	+	9.545E+00	1.88E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.537E+01	1.00E+03	1.55E+01 A
CO-57	C	-7.1035E-02					2.72E+02	
			122.06	-7.104E-02	*(	1.157E+00	4.80E+02	8.56E+01 G
			136.47	0.000E+00	+	1.152E+01	1.00E+03	1.07E+01 G
CO-58	C	4.7164E-01					7.09E+01	
			810.78	4.716E-01	?(	1.370E+00	8.61E+01	9.95E+01 G
CO-60	F	1.6132E-01					1.93E+03	
			1332.50	1.613E-01	?(P	1.162E+00	3.15E+02	1.00E+02 G
			1173.24	-5.162E-01	+ P	1.660E+00	1.00E+02	9.99E+01 G
ZN-65	F	-1.5358E+00					2.44E+02	
			1115.55	-1.536E+00	?(	5.711E+00	1.10E+02	5.06E+01 G
NB-94	I	1.3360E-01					7.41E+06	
			702.63	2.236E-01	?(	1.230E+00	2.33E+02	9.79E+01 G
			871.10	4.543E-02	?(	1.283E+00	7.81E+02	9.99E+01 G
ZR-95	I	-2.4986E-01					6.40E+01	
			756.73	-2.499E-01	?(	2.337E+00	3.93E+02	5.45E+01 G
			724.20	-2.460E-02	% P	4.182E+00	4.31E+03	4.42E+01 G
NB-95	I	-7.9044E-01					6.40E+01	
			765.79	-7.904E-01	?(	1.904E+00	7.25E+01	9.98E+01 G
RU-103	I	-5.0798E-01					3.93E+01	
			497.05	-5.080E-01	?(P	1.322E+00	9.20E+01	9.09E+01 G
			610.30	-9.236E-06	%	5.903E+01	1.89E+08	5.75E+00 GA
RH-106	I	-6.4563E+00					3.74E+02	
			621.92	-6.456E+00	?(P	2.875E+01	1.39E+02	9.93E+00 G
			1050.36	-6.929E+01	+	1.657E+02	7.20E+01	1.56E+00 G
			511.86	5.885E+00	?	8.441E+00	7.63E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	-3.9194E-02					1.53E+05	
			433.94	-2.234E-01	?(P	1.272E+00	1.98E+02	9.05E+01 G
			722.94	1.443E-01	?(	1.991E+00	3.98E+02	9.08E+01 G
			614.28	5.939E-07	&	3.796E+00	1.89E+08	8.98E+01 G
AG-110M	F	1.1402E+00					2.50E+02	
			884.68	0.000E+00	?(	2.355E+00	1.00E+03	7.27E+01 G
			657.76	-7.466E-01	+	2.720E+00	1.09E+02	9.46E+01 G
			937.49	-4.189E-01	+	3.943E+00	4.06E+02	3.44E+01 G
			1384.30	3.736E+00	?(	1.967E+00	2.67E+01	2.43E+01 G
			763.94	2.030E+00	(	5.210E+00	7.66E+01	2.23E+01 G
SN-113	F	-2.5077E-01					1.15E+02	
			391.69	-2.508E-01	?(P	2.563E+00	2.31E+02	6.40E+01 G
SB-124	F	1.4620E-01					6.02E+01	
			602.73	-2.530E-01	&(P	3.452E+00	2.40E+02	9.83E+01 G
			1690.98	-1.059E+00	+	3.065E+00	1.38E+02	4.78E+01 G
			722.79	3.775E+00	?(	1.575E+01	1.23E+02	1.08E+01 G
SB-125	I	1.1344E+00					1.01E+03	
			427.88	7.270E-01	?(	3.055E+00	1.66E+02	2.96E+01 G
			600.50	-3.342E+00	+ P	1.931E+01	9.97E+01	1.79E+01 G
			635.89	2.532E+00	?(	7.358E+00	8.56E+01	1.13E+01 G
			463.37	7.767E-01	?(P	1.330E+01	4.95E+02	1.05E+01 G
I-131	I	9.9959E-01					8.02E+00	
			364.48	3.908E-01	&(P	1.077E+00	1.10E+02	8.17E+01 G
			284.30	4.544E+00	&(	1.186E+01	1.01E+02	6.14E+00 G
			636.97	4.901E+00	?(	1.385E+01	8.37E+01	7.17E+00 G
Gd-153	F	-4.0634E-02					2.42E+02	
			97.50	-4.063E-02	&(	2.788E+00	2.52E+03	3.00E+01 G
			103.20	-3.189E-03	%	5.815E+00	5.39E+04	2.18E+01 G
Ga-68	C	3.4587E+01					4.71E-02	
			1077.40	3.459E+01	?(	3.383E+01	4.67E+01	3.30E+00 G
Tc-99m	I	2.9015E-01					2.51E-01	
			140.51	2.902E-01	*(	1.176E+00	1.21E+02	8.93E+01 G
BA-133	F	-7.0370E-01					3.85E+03	
			356.00	-7.037E-01	?(	3.547E+00	1.50E+02	6.20E+01 G
			302.85	0.000E+00	+	1.080E+01	1.00E+03	1.83E+01 G
			383.84	4.357E+00	?	1.625E+01	1.11E+02	8.94E+00 GA
			80.99	-1.122E+00	+ P	3.198E+00	8.55E+01	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	6.0769E-01				7.54E+02		
			604.71	0.000E+00	?(	3.453E+00	1.00E+03	9.76E+01 G
			795.87	6.444E-01	?(	2.039E+00	9.39E+01	8.55E+01 G
			569.32	0.000E+00	-	7.077E+00	1.00E+03	1.54E+01 G
			801.95	4.007E+00	&(	2.111E+01	1.54E+02	8.69E+00 G
			563.24	3.799E+00	(	1.115E+01	1.21E+02	8.35E+00 G
CS-137	I	4.1619E+00				1.10E+04		
			661.66	4.162E+00	@(	7.236E-01	1.26E+01	8.52E+01 G
CE-139	F	-1.9066E-01				1.38E+02		
			165.85	-1.907E-01	*(	1.360E+00	2.11E+02	7.99E+01 G
Ba-140	I	1.9181E+00				1.28E+01		
			537.26	1.276E+00	?(P	3.197E+00	1.03E+02	2.44E+01 G
			162.66	4.438E+00	(	1.655E+01	1.11E+02	6.22E+00 G
			304.85	0.000E+00	-	4.636E+01	1.00E+03	4.29E+00 G
La-140	I	7.6730E-01				1.28E+01		
			1596.21	7.291E-02	?(P	1.077E+00	6.27E+02	9.54E+01 G
			487.02	9.451E-01	?(	3.538E+00	1.11E+02	4.55E+01 G
			328.76	3.632E+00	?(P	4.523E+00	4.96E+01	2.03E+01 G
			815.77	-5.093E-01	+	6.722E+00	3.75E+02	2.33E+01 G
CE-141	I	4.4673E-02				3.25E+01		
			145.44	4.467E-02	%(	2.328E+00	1.53E+03	4.82E+01 G
PM-144	C	3.6194E+00				3.63E+02		
			696.54	4.645E-01	?(P	1.069E+00	9.85E+01	9.90E+01 G
			618.06	6.771E+00	?(P	2.563E+00	1.32E+01	9.91E+01 G
EU-152	F	3.7564E-01				4.94E+03		
			344.29	-1.593E+00	&(	7.390E+00	1.38E+02	2.65E+01 G
			1112.07	-6.778E+00	+	2.255E+01	9.91E+01	1.36E+01 G
			121.78	-9.936E-01	+	3.323E+00	1.00E+02	2.86E+01 G
			778.92	1.612E+00	?(	8.823E+00	2.29E+02	1.29E+01 G
			964.11	2.853E+00	?(	1.627E+01	1.67E+02	1.46E+01 G
			244.69	-4.905E+00	+	3.262E+01	1.99E+02	7.58E+00 G
			1408.00	-6.254E-01	+	6.856E+00	4.89E+02	2.10E+01 GA
EU-154	I	2.6856E-01				3.14E+03		
			873.23	-4.446E+00	?(	1.357E+01	9.05E+01	1.23E+01 G
			123.10	-7.645E-01	+	2.525E+00	9.90E+01	4.08E+01 G
			1274.54	-1.439E-01	&	5.461E+00	1.06E+03	3.52E+01 G
			723.36	0.000E+00	+	9.111E+00	1.00E+03	2.02E+01 G
			1004.77	-4.173E+00	+	1.271E+01	9.07E+01	1.80E+01 G
			996.33	5.726E+00	?(	1.538E+01	8.00E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	9.8075E-01					1.81E+03	
			105.31	9.807E-01	&(P	3.593E+00	1.09E+02	2.12E+01 G
			86.54	1.755E-01	%	5.897E+00	1.00E+03	3.07E+01 G
HF-181	F	6.3418E-01					4.24E+01	
			482.00	2.506E-01	?(	2.061E+00	2.41E+02	8.05E+01 G
			133.02	-4.422E-01	+	2.829E+00	1.91E+02	4.33E+01 G
			345.83	2.683E+00	?(	1.272E+01	1.41E+02	1.51E+01 G
			136.30	0.000E+00	-	2.103E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.8252E+00					1.14E+02	
			1121.30	2.480E+00	?(	6.896E+00	8.31E+01	3.49E+01 G
			1221.41	3.272E+00	?(	5.830E+00	8.23E+01	2.70E+01 G
			1189.05	9.479E-01	&	8.614E+00	3.98E+02	1.62E+01 G
Hg-203	F	-3.6120E-01					4.66E+01	
			279.20	-3.612E-01	&(P	1.565E+00	8.40E+01	8.15E+01 G
TL-208	N	6.7799E+00					6.98E+02	
			583.02	6.825E+00	(P	1.029E+00	1.01E+01	8.45E+01 G
			277.28	1.139E+01	+ P	9.969E+00	3.40E+01	6.31E+00 G
			860.56	6.471E+00	?(P	6.350E+00	4.39E+01	1.24E+01 G
pm-146	C	-2.1953E+00					2.02E+03	
			747.16	-2.195E+00	?(P	4.480E+00	5.46E+01	3.40E+01 G
			735.72	5.922E-02	%	5.213E+00	3.64E+03	2.25E+01 G
			453.88	-4.749E-01	&	1.568E+00	1.32E+02	6.50E+01 G
y-88	F	1.9825E-01					1.07E+02	
			898.04	1.983E-01	?(	1.029E+00	2.19E+02	9.37E+01 G
			1836.06	-2.779E-01	+ P	1.185E+00	2.29E+02	9.92E+01 G
Cd-113m		-6.9400E+03					5.33E+03	
			263.70	-6.940E+03	?(	2.180E+04	9.40E+01	6.00E-03 K
Cf-251	T	1.7193E+00					3.28E+05	
			176.60	1.719E+00	?(	4.800E+00	1.04E+02	1.70E+01 G
			227.00	-3.935E+00	+	1.524E+01	1.50E+02	6.30E+00 GA
Cf-249	T	5.9673E-01					1.28E+05	
			387.95	5.967E-01	?(	2.330E+00	1.16E+02	6.60E+01 G
			333.44	-3.876E-01	-	6.880E+00	6.74E+02	1.55E+01 G
Sn-126		1.2899E+00					3.65E+07	
			87.57	1.290E+00	}	4.481E+00	5.65E+01	3.75E+01 GA
			64.28	1.290E+00	?(	1.544E+01	3.54E+02	9.70E+00 G
			86.94	2.141E-06	%	2.003E+01	2.79E+08	9.04E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-210   N   1.7702E+01                                      8.14E+03
                           46.54 1.770E+01  (P 2.726E+01 5.32E+01 4.25E+00 G

PB-212   N   1.8912E+01                                      6.98E+02
                          238.63 1.891E+01  (P 1.840E+00 5.45E+00 4.33E+01 G
                          300.03-9.898E+00 -   6.113E+01 1.84E+02 3.28E+00 GA

PB-214   N   1.4141E+01                                      5.84E+05
                          351.93 1.439E+01  (P 2.664E+00 9.96E+00 3.76E+01 G
                          295.09 1.365E+01  (P 2.829E+00 1.12E+01 1.93E+01 G
                          242.00 1.881E+01 +   1.045E+01 1.95E+01 7.43E+00 GA

BI-207   C   6.3743E-01                                      1.18E+04
                          569.70 2.334E-02 %(P 1.130E+00 1.36E+03 9.77E+01 G
                         1063.66 1.443E+00 ?(P 1.541E+00 5.03E+01 7.45E+01 G

BI-212   N   4.7182E+00                                      6.98E+02
                          727.17 4.718E+00 ?(P 1.796E+01 1.12E+02 7.55E+00 G
                          785.42 1.530E+01     1.023E+02 2.82E+02 1.28E+00 GA

BI-214   N   1.5136E+01                                      5.84E+05
                          609.31 1.541E+01  (P 1.879E+00 8.10E+00 4.61E+01 G
                         1120.29 1.411E+01  (P 8.797E+00 2.33E+01 1.51E+01 G
                         1764.49 1.533E+01 ?(P 1.056E+01 2.59E+01 1.54E+01 G

BI-210M  T  -7.7825E-01                                      1.10E+09
                          265.83-7.783E-01 ?(P 2.661E+00 1.24E+02 5.00E+01 G
                          304.90 0.000E+00 +   7.104E+00 1.00E+03 2.80E+01 G

AC-228   N   1.9121E+01                                      2.10E+03
                          911.07 1.887E+01  (P 2.761E+00 1.06E+01 2.90E+01 G
                          968.97 1.488E+01 - P 4.954E+00 1.74E+01 1.75E+01 G
                          338.32 1.974E+01  (P 6.696E+00 1.37E+01 1.20E+01 G
                           93.35 5.641E+00 &   3.013E+01 1.60E+02 5.56E+00 XA

TH-227   N   5.0181E+00                                      7.95E+03
                           50.14 5.018E+00 ?(  2.201E+01 1.31E+02 8.00E+00 G
                          256.24-1.252E+00 -   1.469E+01 4.50E+02 7.00E+00 G

TH-229   N   1.2598E+01                                      2.68E+06
                          193.51 1.424E+01 *(  1.795E+01 4.82E+01 4.40E+00 G
                          210.85 1.018E+01 ?(  4.493E+01 1.32E+02 2.99E+00 G

TH-234   N  -1.1402E+01                                      1.63E+12
                           63.29-1.140E+01 ?(P 3.991E+01 6.84E+01 3.81E+00 G
                           92.59 1.316E+01 + P 1.416E+01 3.41E+01 5.58E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	8.1720E-01					7.82E+08	
			312.01	8.172E-01	(	3.399E+00	1.23E+02	3.60E+01 G
			300.18	0.000E+00	-	3.174E+01	1.00E+03	6.20E+00 G
PA-234	N	9.3939E-01					1.63E+12	
			131.29	-1.556E+00	?(	6.948E+00	1.34E+02	1.80E+01 G
			946.02	2.999E+00	?(	6.290E+00	9.05E+01	1.34E+01 G
			569.47	3.050E+00	?(P	1.154E+01	1.11E+02	8.20E+00 G
			883.24	0.000E+00	-	1.780E+01	1.00E+03	9.60E+00 G
			880.53	0.000E+00	-	2.842E+01	1.00E+03	6.00E+00 GA
PA-234M	N	7.5658E+01					1.63E+12	
			1001.00	4.373E+01	?(	2.203E+02	1.46E+02	8.37E-01 G
			766.41	1.666E+02	?(	4.502E+02	8.05E+01	2.94E-01 G
U-235	N	3.4302E+00					2.57E+11	
			143.79	2.005E+00	(P	9.785E+00	1.45E+02	1.10E+01 G
			205.33	5.125E+00	(P	2.276E+01	1.32E+02	5.01E+00 G
			163.38	4.833E+00	?(P	2.125E+01	1.31E+02	5.08E+00 G
AM-241	T	-1.2977E+00					1.58E+05	
			59.54	-1.298E+00	(	3.946E+00	1.14E+02	3.59E+01 G
Np-237	F	2.5485E+00					2.14E+06	
			86.49	2.549E+00	&(	1.362E+01	1.60E+02	1.31E+01 G
Ir-192	F	4.9784E-01					7.40E+01	
			316.49	3.428E-01	?(	1.341E+00	1.16E+02	8.70E+01 G
			468.06	7.586E-01	?(	2.390E+00	9.36E+01	5.18E+01 G
			308.44	1.345E-01	%	6.299E+00	1.38E+03	3.18E+01 G
Cs-136	F	-8.0167E-02					1.30E+01	
			818.50	-4.835E-01	?(	1.771E+00	1.08E+02	1.00E+02 G
			1048.07	-1.459E+00	+	2.902E+00	6.05E+01	8.00E+01 G
			340.57	7.798E-01	?(	4.057E+00	1.55E+02	4.69E+01 G
Np-239	T	1.0526E+00					2.36E+00	
			103.70	3.548E-01	&	5.242E+00	4.38E+02	2.40E+01 X
			106.13	1.053E+00	(	3.881E+00	1.10E+02	2.27E+01 G
			99.50	-1.857E+00	+	8.694E+00	1.40E+02	1.50E+01 X
Nd-147		-5.6419E-01					1.11E+01	
			531.00	-5.642E-01	?(	8.073E+00	5.80E+02	1.30E+01 G
			91.10	-1.336E+00	+	6.355E+00	1.43E+02	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	270.	18.	0.010	130.68	5.018E+00	
AM-241	59.54	283.	-27.	-0.015	113.91	-1.298E+00	
BA-133	80.99	294.	-29.	-0.016	85.49	-1.122E+00	P
Nd-147	91.10	927.	-30.	-0.017	142.85	-1.336E+00	
EU-155	105.31	169.	17.	0.010	109.20	9.807E-01	P
EU-152	121.78	261.	-23.	-0.013	100.12	-9.936E-01	
CO-57	122.06	285.	-5.	-0.003	479.80	-7.104E-02	
EU-154	123.10	308.	-26.	-0.014	99.00	-7.645E-01	
PA-234	131.29	441.	-23.	-0.013	133.55	-1.556E+00	
HF-181	133.02	418.	-15.	-0.009	190.55	-4.422E-01	
Tc-99m	140.51	272.	20.	0.011	120.96	2.902E-01	
U-235	143.79	295.	17.	0.009	145.37	2.005E+00	P
Ba-140	162.66	228.	20.	0.011	111.31	4.438E+00	
U-235	163.38	250.	17.	0.010	131.02	4.833E+00	P
CE-139	165.85	258.	-11.	-0.006	211.18	-1.907E-01	
Cf-251	176.60	130.	20.	0.011	103.88	1.719E+00	
TH-229	193.51	107.	40.	0.022	48.21	1.424E+01	
U-235	205.33	212.	16.	0.009	132.07	5.125E+00	P
TH-229	210.85	287.	19.	0.010	131.51	1.018E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	227.00	128.	-14.	-0.008	150.20	-3.935E+00	
EU-152	244.69	816.	-20.	-0.011	199.02	-4.905E+00	
TH-227	256.24	125.	-5.	-0.003	450.00	-1.252E+00	
Cd-113m	263.70	198.	-22.	-0.012	94.04	-6.940E+03	
BI-210M	265.83	203.	-20.	-0.011	123.58	-7.783E-01	P
Hg-203	279.20	173.	-15.	-0.008	84.03	-3.612E-01	P
I-131	284.30	51.	14.	0.008	100.61	4.544E+00	
PA-233	312.01	135.	14.	0.008	123.23	8.172E-01	
CR-51	320.08	158.	14.	0.008	134.46	2.982E+00	P
La-140	328.76	68.	33.	0.018	49.60	3.632E+00	P
Cf-249	333.44	92.	-3.	-0.001	674.48	-3.876E-01	
EU-152	344.29	311.	-18.	-0.010	138.28	-1.593E+00	
HF-181	345.83	296.	17.	0.010	141.16	2.683E+00	
BA-133	356.00	377.	-18.	-0.010	150.34	-7.037E-01	
I-131	364.48	53.	13.	0.007	110.23	3.908E-01	P
BA-133	383.84	142.	16.	0.009	110.82	4.357E+00	
Cf-249	387.95	158.	16.	0.009	116.06	5.967E-01	
SN-113	391.69	178.	-6.	-0.004	231.47	-2.508E-01	P
SB-125	427.88	44.	8.	0.004	166.15	7.270E-01	
AG-108M	433.94	72.	-7.	-0.004	198.42	-2.234E-01	P
pm-146	453.88	52.	-11.	-0.006	131.84	-4.749E-01	
SB-125	463.37	98.	3.	0.002	494.58	7.767E-01	P
BE-7	477.60	155.	-17.	-0.009	107.08	-4.672E+00	
HF-181	482.00	134.	7.	0.004	240.72	2.506E-01	
La-140	487.02	124.	15.	0.008	111.11	9.451E-01	
RU-103	497.05	64.	-15.	-0.009	91.98	-5.080E-01	P
RH-106	511.86	127.	38.	0.021	76.34	5.885E+00	
Nd-147	531.00	43.	-2.	-0.001	579.58	-5.642E-01	
Ba-140	537.26	22.	10.	0.005	102.51	1.276E+00	P
CS-134	563.24	30.	10.	0.005	120.67	3.799E+00	
PA-234	569.47	31.	8.	0.004	111.04	3.050E+00	P
SB-125	600.50	438.	-17.	-0.010	99.70	-3.342E+00	P
SB-124	602.73	421.	-7.	-0.004	240.45	-2.530E-01	P
RH-106	621.92	282.	-18.	-0.010	139.19	-6.456E+00	P
SB-125	635.89	19.	8.	0.004	85.57	2.532E+00	
I-131	636.97	29.	10.	0.005	83.71	4.901E+00	
AG-110M	657.76	208.	-19.	-0.011	108.71	-7.466E-01	
NB-94	702.63	37.	6.	0.003	232.56	2.236E-01	
SB-124	722.79	75.	10.	0.006	122.66	3.775E+00	
AG-108M	722.94	86.	3.	0.002	397.88	1.443E-01	
pm-146	747.16	56.	-18.	-0.010	54.65	-2.195E+00	P
ZR-95	756.73	37.	-3.	-0.002	392.68	-2.499E-01	
AG-110M	763.94	30.	11.	0.006	76.60	2.030E+00	
NB-95	765.79	87.	-19.	-0.011	72.51	-7.904E-01	
PA-234M	766.41	40.	12.	0.007	80.51	1.666E+02	
EU-152	778.92	28.	5.	0.003	228.91	1.612E+00	
CS-134	795.87	68.	13.	0.007	93.90	6.444E-01	
CS-134	801.95	75.	8.	0.005	153.83	4.007E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.78	39.	11.	0.006	86.09	4.716E-01		
La-140	815.77	52.	-3.	-0.002	375.49	-5.093E-01		
MN-54	834.85	48.	-13.	-0.007	81.47	-5.500E-01		P
Co-56	846.77	33.	-7.	-0.004	152.72	-2.975E-01		P
NB-94	871.10	30.	1.	0.001	781.02	4.543E-02		
EU-154	873.23	53.	-12.	-0.007	90.52	-4.446E+00		
Sc-46	889.28	43.	11.	0.006	92.49	4.918E-01		
y-88	898.04	15.	4.	0.002	218.66	1.983E-01		
AG-110M	937.49	30.	-3.	-0.002	405.52	-4.189E-01		
PA-234	946.02	10.	8.	0.005	90.47	2.999E+00		
EU-152	964.11	96.	9.	0.005	167.00	2.853E+00		
EU-154	996.33	41.	12.	0.007	80.03	5.726E+00		
PA-234M	1001.00	53.	7.	0.004	146.33	4.373E+01		
EU-154	1004.77	83.	-15.	-0.008	90.69	-4.173E+00		
Co-56	1037.84	25.	-6.	-0.003	187.70	-2.202E+00		
RH-106	1050.36	100.	-21.	-0.011	72.03	-6.929E+01		
BI-207	1063.66	17.	20.	0.011	50.27	1.443E+00		P
FE-59	1099.25	27.	4.	0.002	275.10	4.157E-01		
EU-152	1112.07	132.	-17.	-0.009	99.13	-6.778E+00		
ZN-65	1115.55	115.	-14.	-0.008	110.30	-1.536E+00		
CO-60	1173.24	32.	-9.	-0.005	99.99	-5.162E-01		P
Co-56	1238.28	27.	11.	0.006	107.75	1.019E+00		
NA-22	1274.53	28.	-9.	-0.005	87.04	-5.675E-01		
FE-59	1291.60	11.	10.	0.005	87.78	1.374E+00		
CO-60	1332.50	11.	3.	0.001	315.09	1.613E-01		P
AG-110M	1384.30	0.	14.	0.008	26.73	3.736E+00		
EU-152	1408.00	17.	-2.	-0.001	488.62	-6.254E-01		
La-140	1596.21	6.	1.	0.001	627.20	7.291E-02		P
SB-124	1690.98	13.	-7.	-0.004	138.11	-1.059E+00		
y-88	1836.06	6.	-3.	-0.002	229.11	-2.779E-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	-4.6720E+00	-4.6721E+00	1.071E+02%	1.68E+01
NA-22	#A	-5.6753E-01	-5.6753E-01	8.704E+01%	1.67E+00
K-40		2.4814E+02	2.4814E+02	5.413E+00%	1.29E+01
Sc-46	#A	4.9177E-01	4.9177E-01	9.249E+01%	1.54E+00
CR-51	#A	2.9822E+00	2.9822E+00	1.345E+02%	1.35E+01
MN-54	#A	-5.5001E-01	-5.5001E-01	8.147E+01%	1.53E+00
FE-59	#A	8.3090E-01	8.3091E-01	8.778E+01%	2.57E+00
Co-56	#A	2.2660E-01	2.2660E-01	9.345E+01%	1.30E+00
CO-57	#A	-7.1035E-02	-7.1035E-02	4.798E+02%	1.16E+00
CO-58	#A	4.7164E-01	4.7164E-01	8.609E+01%	1.37E+00

CO-60	#A	1.6132E-01	1.6132E-01	3.151E+02%	1.16E+00
ZN-65	#A	-1.5358E+00	-1.5358E+00	1.103E+02%	5.71E+00
NB-94	#A	1.3360E-01	1.3360E-01	2.326E+02%	1.23E+00
ZR-95	#A	-2.4986E-01	-2.4986E-01	3.927E+02%	2.34E+00
NB-95	#A	-7.9044E-01	-7.9044E-01	7.251E+01%	1.90E+00
RU-103	#A	-5.0798E-01	-5.0798E-01	9.198E+01%	1.32E+00
RH-106	#A	-6.4563E+00	-6.4563E+00	1.392E+02%	2.88E+01
AG-108M	#A	-3.9194E-02	-3.9194E-02	1.984E+02%	1.27E+00
AG-110M	#A	1.1402E+00	1.1402E+00	2.673E+01%	2.35E+00
SN-113	#A	-2.5077E-01	-2.5077E-01	2.315E+02%	2.56E+00
SB-124	#A	1.4620E-01	1.4620E-01	1.227E+02%	3.45E+00
SB-125	#A	1.1344E+00	1.1344E+00	8.557E+01%	3.06E+00
I-131	#A	9.9956E-01	9.9959E-01	5.704E+01%	1.08E+00
Gd-153	#A	-4.0634E-02	-4.0634E-02	2.519E+03%	2.79E+00
Ga-68	#	3.4434E+01	3.4587E+01	4.675E+01%	3.38E+01
Tc-99m	#A	2.8991E-01	2.9015E-01	1.210E+02%	1.18E+00
BA-133	#A	-7.0370E-01	-7.0370E-01	1.503E+02%	3.55E+00
CS-134	#A	6.0769E-01	6.0769E-01	9.390E+01%	3.45E+00
CS-137	#	4.1619E+00	4.1619E+00	1.256E+01%	7.24E-01
CE-139	#A	-1.9066E-01	-1.9066E-01	2.112E+02%	1.36E+00
Ba-140	#A	1.9181E+00	1.9181E+00	7.566E+01%	3.20E+00
La-140	#A	7.6729E-01	7.6730E-01	4.960E+01%	1.08E+00
CE-141	#A	4.4672E-02	4.4673E-02	1.534E+03%	2.33E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E+01
PM-144	#C	3.6194E+00	3.6194E+00	1.322E+01%	1.07E+00
EU-152	#A	3.7564E-01	3.7564E-01	1.051E+02%	7.39E+00
EU-154	#A	2.6856E-01	2.6856E-01	6.041E+01%	1.36E+01
EU-155	#A	9.8075E-01	9.8075E-01	1.092E+02%	3.59E+00
HF-181	#A	6.3418E-01	6.3418E-01	1.395E+02%	2.06E+00
Ta-182	#A	2.8252E+00	2.8252E+00	5.846E+01%	6.90E+00
Hg-203	#A	-3.6120E-01	-3.6120E-01	8.403E+01%	1.56E+00
TL-208		6.7799E+00	6.7799E+00	1.005E+01%	1.03E+00
pm-146	#A	-2.1953E+00	-2.1953E+00	5.465E+01%	4.48E+00
y-88	#A	1.9825E-01	1.9825E-01	2.187E+02%	1.03E+00
Cd-113m	#A	-6.9400E+03	-6.9400E+03	9.404E+01%	2.18E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.50E+01
Cf-251	#A	1.7193E+00	1.7193E+00	1.039E+02%	4.80E+00
Cf-249	#A	5.9673E-01	5.9673E-01	1.161E+02%	2.33E+00
Sn-126	#A	1.2899E+00	1.2899E+00	3.545E+02%	1.54E+01
PB-210	A	1.7702E+01	1.7702E+01	5.316E+01%	2.73E+01
PB-212		1.8912E+01	1.8912E+01	5.450E+00%	1.84E+00
PB-214		1.4141E+01	1.4141E+01	7.488E+00%	2.66E+00
BI-207	#A	6.3743E-01	6.3743E-01	5.027E+01%	1.13E+00
BI-212	A	4.7182E+00	4.7182E+00	1.116E+02%	1.80E+01
BI-214		1.5136E+01	1.5136E+01	8.102E+00%	1.88E+00
BI-210M	#A	-7.7825E-01	-7.7825E-01	1.236E+02%	2.66E+00
AC-228		1.9121E+01	1.9121E+01	8.634E+00%	2.76E+00
TH-227	#A	5.0181E+00	5.0181E+00	1.307E+02%	2.20E+01
TH-229	#A	1.2598E+01	1.2598E+01	4.821E+01%	1.79E+01

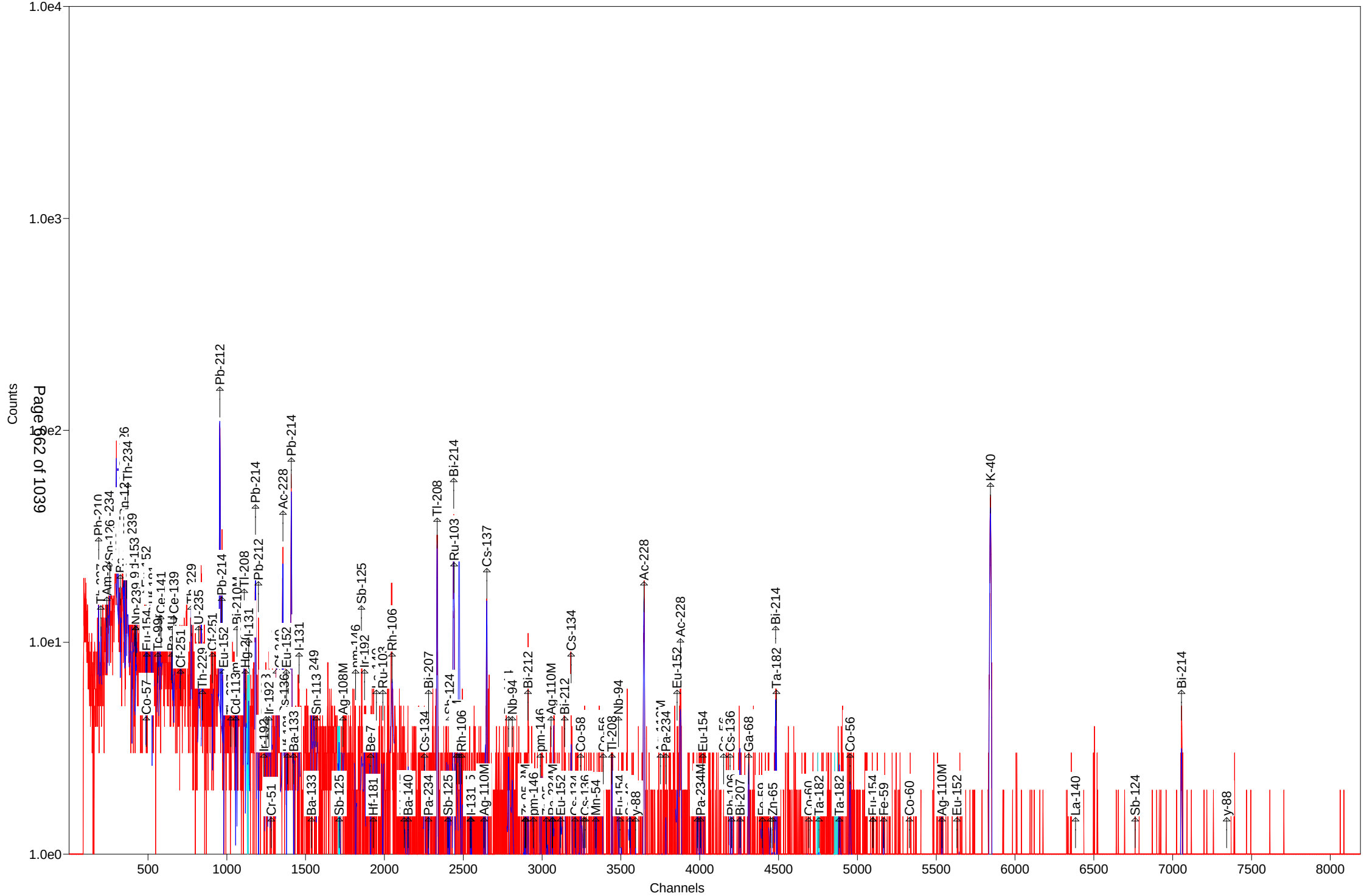
TH-234 #A	-1.1402E+01	-1.1402E+01	6.845E+01%		3.99E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.87E+01
PA-233 #A	8.1720E-01	8.1720E-01	1.232E+02%		3.40E+00
PA-234 #A	9.3939E-01	9.3939E-01	6.528E+01%		6.95E+00
PA-234M#A	7.5658E+01	7.5658E+01	8.051E+01%		2.20E+02
U-235 #A	3.4302E+00	3.4302E+00	7.870E+01%		9.78E+00
AM-241 #A	-1.2977E+00	-1.2977E+00	1.139E+02%		3.95E+00
Np-237 #A	2.5485E+00	2.5485E+00	1.603E+02%		1.36E+01
Ir-192 #A	4.9784E-01	4.9784E-01	7.449E+01%		1.34E+00
Cs-136 #A	-8.0166E-02	-8.0167E-02	9.438E+01%		1.77E+00
Np-239 A	1.0525E+00	1.0526E+00	1.101E+02%		3.88E+00
Nd-147 #A	-5.6418E-01	-5.6419E-01	5.796E+02%		8.07E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.6 keV) 3.441E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.6 keV) 3.4409653E+02 Bq/Sample

257318_Gamma_160-17797-A-12-B. 3_Gamma_20161206.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161271

Sample Description: 257318_Gamma_160-17797-A-13-B
Detector: Detector # 5
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-13-B

Decay to Time: 7/12/2016 11:28 Live Time: 1800 sec
Acquisition Time: 7/12/2016 11:28:43 Real Time: 1807 sec
Analysis Time: 7/12/2016 11:59 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_2016-07-10_0601.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	-6.571E+00	84.2	5.531E+00	5.541E+00	1.851E+01
NA-22	-1.942E-01	291.5	5.662E-01	5.663E-01	2.073E+00
K-40	2.768E+02	6.2	1.704E+01	2.216E+01	1.187E+01
Sc-46	-1.094E+00	103.0	1.127E+00	1.128E+00	3.792E+00
CR-51	3.915E+00	106.1	4.156E+00	4.161E+00	1.404E+01
MN-54	-5.325E-01	117.9	6.278E-01	6.284E-01	2.134E+00
FE-59	4.074E-01	225.0	9.167E-01	9.170E-01	2.729E+00
Co-56	1.069E+00	76.4	8.174E-01	8.193E-01	1.885E+00
CO-57	3.118E-01	100.3	3.128E-01	3.132E-01	1.050E+00
CO-58	4.148E-01	147.3	6.112E-01	6.116E-01	2.117E+00
CO-60	2.455E-01	237.5	5.830E-01	5.831E-01	1.387E+00
ZN-65	1.025E+00	164.1	1.682E+00	1.682E+00	5.831E+00
NB-94	-2.606E-01	263.8	6.875E-01	6.876E-01	1.706E+00
ZR-95	6.523E-01	137.3	8.957E-01	8.963E-01	2.268E+00
NB-95	-5.486E-02	1333.4	7.315E-01	7.315E-01	2.574E+00
RU-103	-3.395E-01	189.3	6.427E-01	6.430E-01	1.630E+00
RH-106	-6.557E+00	188.9	1.238E+01	1.239E+01	4.179E+01
AG-108M	1.740E-01	313.6	5.457E-01	5.458E-01	1.400E+00
AG-110M	4.128E-01	121.6	5.021E-01	5.025E-01	4.616E+00
SN-113	-5.721E-01	180.0	1.030E+00	1.030E+00	3.097E+00
SB-124	7.597E-01	44.7	3.397E-01	3.420E-01	3.680E+00
SB-125	1.042E+00	214.5	2.234E+00	2.235E+00	4.052E+00
I-131	9.848E-01	66.1	6.511E-01	6.531E-01	1.165E+00
Gd-153	-6.557E-01	174.4	1.144E+00	1.144E+00	3.859E+00
Ga-68	2.485E+01	90.5	2.249E+01	2.253E+01	5.213E+01
Tc-99m	3.045E-01	126.1	3.841E-01	3.845E-01	1.292E+00
BA-133	5.189E-01	167.6	8.699E-01	8.703E-01	4.046E+00
CS-134	1.318E+00	31.6	4.169E-01	4.225E-01	3.795E+00
CS-137	5.401E-01	153.3	8.279E-01	8.284E-01	2.827E+00
CE-139	-2.589E-01	160.6	4.158E-01	4.165E-01	1.407E+00
Ba-140	2.635E+00	89.8	2.365E+00	2.369E+00	4.992E+00
La-140	7.660E-01	44.7	3.425E-01	3.449E-01	9.063E-01
CE-141	5.400E-01	131.7	7.111E-01	7.116E-01	2.393E+00

CE-144	0.000E+00	1.#INF	1.917E+00	1.917E+00	1.295E+01
PM-144	-9.981E-02	746.5	7.451E-01	7.451E-01	1.780E+00
EU-152	1.136E+00	97.5	1.107E+00	1.109E+00	8.606E+00
EU-154	1.801E+00	98.1	1.766E+00	1.768E+00	1.923E+01
EU-155	-1.601E+00	83.7	1.340E+00	1.343E+00	8.047E+00
HF-181	6.675E-01	105.2	7.024E-01	7.033E-01	2.258E+00
Ta-182	2.611E+00	72.7	1.898E+00	1.902E+00	9.492E+00
Hg-203	-4.577E-01	131.5	6.018E-01	6.024E-01	1.558E+00
TL-208	6.939E+00	10.9	7.551E-01	8.365E-01	1.040E+00
pm-146	5.733E-01	100.0	5.730E-01	5.738E-01	4.040E+00
y-88	3.899E-01	137.7	5.371E-01	5.374E-01	1.343E+00
Cd-113m	1.301E+03	465.5	6.056E+03	6.057E+03	2.098E+04
Cd-109	-1.033E+01	152.0	1.570E+01	1.571E+01	5.242E+01
Cf-251	1.679E+00	105.1	1.765E+00	1.771E+00	4.780E+00
Cf-249	4.999E-01	100.2	5.011E-01	5.017E-01	2.955E+00
Sn-126	2.078E+00	238.3	4.952E+00	4.953E+00	1.673E+01
PB-210	2.019E+01	60.0	1.212E+01	1.218E+01	3.309E+01
PB-212	1.973E+01	5.8	1.140E+00	1.711E+00	1.653E+00
PB-214	1.482E+01	8.9	1.320E+00	1.528E+00	2.931E+00
BI-207	0.000E+00	1.#INF	1.011E-01	1.011E-01	1.723E+00
BI-212	3.969E+01	18.5	7.346E+00	7.629E+00	1.097E+01
BI-214	1.213E+01	12.3	1.497E+00	1.624E+00	2.610E+00
BI-210M	-5.414E-01	144.5	7.824E-01	7.830E-01	2.659E+00
AC-228	1.992E+01	10.0	1.989E+00	2.234E+00	3.833E+00
TH-227	1.099E+01	58.5	6.429E+00	6.457E+00	1.790E+01
TH-229	-4.730E+00	177.8	8.410E+00	8.418E+00	2.292E+01
TH-234	2.978E+01	43.4	1.294E+01	1.303E+01	3.271E+01
PA-231	1.305E+01	111.4	1.454E+01	1.456E+01	6.685E+01
PA-233	6.684E-01	157.8	1.055E+00	1.055E+00	5.932E+00
PA-234	1.954E-01	311.1	6.078E-01	6.078E-01	7.990E+00
PA-234M	-1.424E+02	82.9	1.181E+02	1.183E+02	3.955E+02
U-235	3.720E+00	88.8	3.304E+00	3.309E+00	1.073E+01
AM-241	1.675E+00	71.0	1.189E+00	1.192E+00	3.186E+00
Np-237	-3.027E+00	166.7	5.047E+00	5.050E+00	1.684E+01
Ir-192	1.765E-01	84.4	1.489E-01	1.493E-01	1.731E+00
Cs-136	-5.029E-02	69.9	3.515E-02	3.527E-02	2.504E+00
Np-239	-1.526E+00	158.0	2.411E+00	2.413E+00	8.057E+00
Nd-147	2.866E+00	104.1	2.984E+00	2.988E+00	7.650E+00
Total	1.829E+03				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-13-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161271.An1

Acquisition information
Start time: 7/12/2016 11:28:43 AM
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	7/12/2016 11:28:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-10_0601.PBC 7/10/2016 6:01:50 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1734

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.64	28.	60.02	0.63	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	32.	58.51	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.47	27.	70.98	0.38	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.25	55.	43.44	0.83	2.711E-02	63.29	3.810	PBC<MDA	TH234
64.28	10.	238.33	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.79	189.	11.30	0.81	3.150E-02				
77.09	278.	7.93	0.81	3.219E-02				
87.26	78.	21.66	0.83	3.447E-02	86.49	13.100	9.607E+00	Np237
					86.54	30.700	4.098E+00	EU155
					86.94	9.040	1.389E+01	Sn126
					87.57	37.500	3.338E+00	Sn126
89.74	71.	21.76	0.83	3.487E-02				
92.80	64.	27.57	0.83	3.529E-02	92.59	5.584	1.800E+01	TH234
					93.35	5.561	1.803E+01	AC228
122.06	17.	100.31	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.118E-01	CO57
128.82	69.	27.33	0.46	3.531E-02				
140.51	16.	126.14	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	16.	130.46	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
145.44	16.	131.67	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
162.66	15.	122.75	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
176.60	15.	105.09	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	15.	120.54	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
238.71	331.	7.12	0.89	2.319E-02	238.63	43.300	1.833E+01	PB212
242.08	74.	18.70	0.98	2.293E-02	242.00	7.430	2.429E+01	PB214
244.69	9.	363.08	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
263.70	3.	465.47	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
295.25	103.	14.07	0.79	1.944E-02	295.09	19.300	1.527E+01	PB214
299.67	27.	38.32	0.78	1.918E-02	300.03	3.280	2.355E+01	PB212
300.07	12.	152.42	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.410E+01	PA231
					300.18	6.200	5.595E+00	PA233
300.18	12.	157.80	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.410E+01	PA231
					300.18	6.200	5.595E+00	PA233
302.65	12.	162.64	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.911E+00	BA133
302.85	12.	167.65	1.04	1.903E-02	302.65	2.880	1.216E+01	PA231
					302.85	18.330	1.911E+00	BA133
304.85	11.	195.91	1.04	1.893E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.106E+00	BI210M
320.08	13.	106.14	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	8.	196.01	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	100.24	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.31	75.	15.06	0.64	1.736E-02	338.32	12.010	1.998E+01	AC228
345.83	4.	486.37	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.12	166.	10.94	0.91	1.679E-02	351.93	37.600	1.458E+01	PB214
364.48	11.	98.53	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
433.94	4.	313.58	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
453.88	11.	99.95	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
468.06	14.	103.49	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
482.00	12.	105.23	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	98.42	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
511.86	80.	25.92	2.48	1.230E-02	511.86	20.000	1.799E+01	RH106
531.00	8.	104.08	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
537.26	7.	138.12	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
563.24	17.	46.69	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
583.46	116.	10.88	1.00	1.102E-02	583.02	84.500	6.913E+00	TL208
600.50	9.	214.53	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	216.08	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
609.49	107.	12.34	1.62	1.063E-02	609.31	46.090	1.213E+01	BI214
					610.30	5.750	9.736E+01	RU103
636.97	9.	88.20	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
661.88	59.	20.61	1.04	9.922E-03	661.66	85.210	3.895E+00	CS137
723.36	4.	321.13	1.42	9.211E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.413E-01	AG108M
					723.36	20.220	1.085E+00	EU154
727.24	49.	18.51	0.65	9.170E-03	727.17	7.550	3.969E+01	BI212
735.72	2.	496.44	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
747.16	3.	337.46	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
756.73	6.	137.31	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
766.41	6.	181.18	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.364E+02	PA234M
778.92	7.	97.50	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
784.98	9.	95.86	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	20.	31.62	1.48	8.503E-03	795.87	85.530	1.553E+00	CS134
801.95	7.	96.35	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
810.78	6.	147.35	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
846.77	7.	164.75	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.85	13.	106.11	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
898.04	5.	137.75	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.26	79.	13.13	0.73	7.591E-03	911.07	29.000	1.989E+01	AC228
937.49	4.	204.63	1.59	7.411E-03	937.49	34.360	PBC<MDA	AG110M
946.02	2.	403.11	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
968.85	75.	11.57	1.72	7.209E-03	968.97	17.460	3.308E+01	AC228
996.33	8.	98.08	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1004.77	5.	208.25	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	6.	128.72	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	69.89	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1077.40	8.	90.50	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	3.	225.00	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	153.83	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	164.14	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1119.91	3.	288.00	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	151.46	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.215E-01	Sc46
					1121.30	34.900	1.495E+00	Ta182
1120.92	7.	167.43	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.643E+00	Ta182
1173.24	4.	260.44	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1189.03	7.	106.27	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1220.01	9.	90.75	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	94.24	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	1.	574.71	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	1.	397.16	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	121.64	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1461.17	271.	6.16	1.78	5.103E-03	1460.83	10.670	2.768E+02	K40
1596.21	5.	44.72	2.02	4.736E-03	1596.21	95.400	PBC<MDA	La140
1690.98	5.	44.72	2.08	4.511E-03	1690.98	47.790	PBC<MDA	SB124
1764.83	8.	84.88	2.11	4.351E-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
298.79	74.79	133.	189.	6.003E+03	11.30	0.813	- D
308.01	77.09	103.	278.	8.641E+03	7.93	0.815	- D
348.64	87.17	122.	69.	2.008E+03	25.61	0.825	- sD
358.57	89.65	88.	71.	2.043E+03	22.05	0.828	- sD
515.09	128.82	77.	69.	1.944E+03	27.33	0.455	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.07	46.64	83.	28.	0.015	60.02	0.628
TH-227	200.11	50.14	111.	32.	0.018	58.51	0.787s
AM-241	237.46	59.47	113.	27.	0.015	70.98	0.385s
TH-234	252.60	63.25	156.	55.	0.031	43.44	0.826s
Sn-126	256.71	64.28	279.	10.	0.006	238.33	0.802
BA-133	323.61	80.99	247.	-25.	-0.014	115.77	0.819s
Np-237	345.63	86.49	823.	-25.	-0.014	166.72	0.825s
EU-155	345.84	86.54	755.	-24.	-0.014	160.85	0.825s
Sn-126	347.43	86.94	731.	-24.	-0.014	158.23	0.825
Sn-126	349.95	87.57	706.	-24.	-0.014	155.47	0.826
Cd-109	351.83	88.04	675.	-24.	-0.014	151.99	0.826s
Nd-147	364.08	91.10	651.	-24.	-0.013	152.98	0.829s
TH-234	370.05	92.59	144.	49.	0.027	37.28	0.831D
AC-228	373.09	93.35	661.	-8.	-0.005	433.99	0.832s
Gd-153	389.70	97.50	238.	-13.	-0.007	174.40	0.836
Np-239	397.71	99.50	246.	-18.	-0.010	127.79	0.838s
Gd-153	412.52	103.20	298.	-21.	-0.012	118.63	0.842s
Np-239	414.52	103.70	318.	-21.	-0.012	122.52	0.842s
EU-155	420.98	105.31	541.	-22.	-0.012	83.71	0.844s
Np-239	424.25	106.13	625.	-23.	-0.013	157.95	0.845s
EU-152	486.88	121.78	203.	-19.	-0.011	106.26	0.861s
CO-57	488.03	122.06	140.	17.	0.010	100.31	0.861s
EU-154	492.18	123.10	149.	-3.	-0.002	657.34	0.862
PA-234	524.99	131.29	358.	-6.	-0.003	473.85	0.871s
HF-181	531.91	133.02	352.	0.	0.000	1000.00	0.872s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-144	533.97	133.54	352.	0.	0.000	1000.00	0.873s
HF-181	545.02	136.30	352.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	352.	0.	0.000	1000.00	0.876s
Tc-99m	561.88	140.51	201.	16.	0.009	126.14	0.880s
U-235	574.99	143.79	217.	16.	0.009	130.46	0.883
CE-141	581.61	145.44	206.	16.	0.009	131.67	0.885s
Ba-140	650.54	162.66	162.	15.	0.008	122.75	0.902
U-235	653.42	163.38	177.	0.	0.000	1000.00	0.903
CE-139	663.32	165.85	170.	-12.	-0.006	160.59	0.905s
Cf-251	706.34	176.60	77.	15.	0.008	105.09	0.916
TH-229	774.03	193.51	103.	-10.	-0.006	177.80	0.933
U-235	821.35	205.33	105.	15.	0.009	120.54	0.945s
TH-229	843.44	210.85	160.	-23.	-0.013	79.84	0.950s
Cf-251	908.08	227.00	113.	-20.	-0.011	99.25	0.966s
PB-212	954.64	238.63	34.	357.	0.198	5.78	0.978D
PB-214	968.10	242.00	60.	74.	0.041	18.70	0.981D
EU-152	978.89	244.69	570.	9.	0.005	363.08	0.984s
TH-227	1025.11	256.24	110.	-13.	-0.007	105.75	0.995s
Cd-113m	1054.97	263.70	96.	3.	0.002	465.47	1.002s
BI-210M	1063.50	265.83	106.	-10.	-0.006	144.51	1.005s
Hg-203	1117.00	279.20	88.	-14.	-0.008	131.47	1.017s
I-131	1137.41	284.30	88.	-17.	-0.010	103.55	1.022s
PB-214	1181.25	295.25	30.	103.	0.057	14.07	0.788s
PB-212	1198.95	299.67	23.	27.	0.015	38.32	0.784
PA-231	1200.53	300.07	160.	12.	0.007	152.42	1.038s
PA-233	1200.97	300.18	172.	12.	0.007	157.80	1.038s
PA-231	1210.86	302.65	184.	12.	0.007	162.64	1.040s
BA-133	1211.66	302.85	196.	12.	0.007	167.65	1.040s
Ba-140	1219.66	304.85	208.	11.	0.006	195.91	1.042
BI-210M	1219.85	304.90	219.	0.	0.000	1000.00	1.042
Ir-192	1234.03	308.44	219.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	217.	-2.	-0.001	964.27	1.049s
Ir-192	1266.25	316.49	102.	-11.	-0.006	133.30	1.053s
CR-51	1280.63	320.08	85.	13.	0.007	106.14	1.057s
La-140	1315.35	328.76	62.	8.	0.004	196.01	1.065s
Cf-249	1334.08	333.44	44.	13.	0.007	100.24	1.070s
AC-228	1353.57	338.31	15.	75.	0.042	15.06	0.641s
Cs-136	1362.62	340.57	222.	-15.	-0.008	142.94	1.077s
EU-152	1377.49	344.29	210.	-16.	-0.009	131.03	1.080s
HF-181	1383.66	345.83	179.	4.	0.002	486.37	1.082s
PB-214	1408.84	352.12	43.	166.	0.092	10.94	0.911
I-131	1458.32	364.48	29.	11.	0.006	98.53	1.099s
BA-133	1535.78	383.84	114.	-9.	-0.005	171.05	1.117
Cf-249	1552.22	387.95	123.	0.	0.000	1000.00	1.121s
SN-113	1567.19	391.69	125.	-10.	-0.006	179.98	1.125s
AG-108M	1736.25	433.94	40.	4.	0.002	313.58	1.164s
pm-146	1816.05	453.88	28.	11.	0.006	99.95	1.182s
SB-125	1854.01	463.37	108.	-16.	-0.009	94.76	1.191

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1872.79	468.06	95.	14.	0.008	103.49	1.195s
BE-7	1910.94	477.59	85.	-16.	-0.009	84.16	1.204s
HF-181	1928.56	482.00	72.	12.	0.007	105.23	1.208s
La-140	1948.65	487.02	20.	9.	0.005	98.42	1.212s
RU-103	1988.80	497.05	44.	-7.	-0.004	189.34	1.221s
RH-106	2048.06	511.86	53.	80.	0.044	25.92	2.485s
Nd-147	2124.62	531.00	16.	8.	0.004	104.08	1.252s
Ba-140	2149.67	537.26	25.	7.	0.004	138.12	1.258s
CS-134	2253.60	563.24	12.	17.	0.009	46.69	1.280s
CS-134	2277.94	569.32	40.	-3.	-0.002	303.68	1.286s
BI-207	2279.47	569.70	45.	0.	0.000	1000.00	1.286s
TL-208	2334.53	583.46	10.	116.	0.064	10.88	1.001
SB-125	2402.69	600.50	187.	9.	0.005	214.53	1.313s
SB-124	2411.61	602.73	207.	10.	0.005	216.08	1.315s
CS-134	2419.53	604.71	217.	0.	0.000	1000.00	1.317s
BI-214	2438.65	609.49	19.	107.	0.059	12.34	1.622s
RU-103	2441.89	610.30	217.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	217.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	217.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	262.	-12.	-0.007	188.87	1.332s
SB-125	2544.26	635.89	39.	-9.	-0.005	107.00	1.344
I-131	2548.61	636.97	29.	9.	0.005	88.20	1.345
AG-110M	2631.76	657.76	140.	-15.	-0.008	114.46	1.362s
CS-137	2647.36	661.66	75.	8.	0.005	153.29	1.366s
PM-144	2786.90	696.54	35.	-2.	-0.001	746.49	1.395s
NB-94	2811.25	702.63	30.	-4.	-0.002	263.85	1.400s
SB-124	2891.88	722.79	100.	-12.	-0.007	120.48	1.417s
AG-108M	2892.48	722.94	88.	-12.	-0.007	113.39	1.417s
EU-154	2894.16	723.36	66.	4.	0.002	321.13	1.418s
ZR-95	2897.53	724.20	70.	0.	0.000	1000.00	1.418s
BI-212	2909.68	727.24	6.	49.	0.027	18.51	0.655s
pm-146	2943.61	735.72	13.	2.	0.001	496.44	1.428s
pm-146	2989.37	747.16	17.	3.	0.001	337.46	1.437s
ZR-95	3027.65	756.73	13.	6.	0.003	137.31	1.445s
AG-110M	3056.50	763.94	48.	-15.	-0.008	69.65	1.451s
PA-234M	3066.38	766.41	63.	6.	0.004	181.18	1.453s
EU-152	3116.41	778.92	9.	7.	0.004	97.50	1.463s
BI-212	3142.41	785.42	14.	9.	0.005	95.86	1.468s
CS-134	3184.19	795.87	5.	20.	0.011	31.62	1.477s
CS-134	3208.53	801.95	9.	7.	0.004	96.35	1.482s
CO-58	3243.82	810.78	39.	6.	0.003	147.35	1.489s
La-140	3263.80	815.77	45.	0.	0.000	1000.00	1.493s
Cs-136	3274.72	818.50	56.	-8.	-0.005	128.61	1.495s
MN-54	3340.10	834.85	38.	-8.	-0.004	117.89	1.508s
Co-56	3387.78	846.77	28.	7.	0.004	164.75	1.518s
TL-208	3442.95	860.56	37.	13.	0.007	106.11	1.529
NB-94	3485.08	871.10	30.	-12.	-0.007	75.41	1.537s
EU-154	3493.61	873.23	43.	-3.	-0.001	372.44	1.539s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3522.80	880.53	72.	-14.	-0.008	88.74	1.544s
PA-234	3533.64	883.24	87.	-14.	-0.008	96.22	1.547s
AG-110M	3539.41	884.68	90.	-3.	-0.002	398.08	1.547s
Sc-46	3557.79	889.28	116.	-15.	-0.008	103.03	1.551s
y-88	3592.83	898.04	10.	5.	0.003	137.75	1.558s
AC-228	3645.69	911.26	7.	79.	0.044	13.13	0.726s
AG-110M	3750.60	937.49	14.	4.	0.002	204.63	1.589s
PA-234	3784.70	946.02	14.	2.	0.001	403.11	1.595s
EU-152	3857.05	964.11	91.	-8.	-0.004	174.59	1.609s
AC-228	3875.99	968.85	0.	75.	0.042	11.57	1.722
EU-154	3985.88	996.33	30.	8.	0.005	98.08	1.633s
PA-234M	4004.55	1001.00	70.	-15.	-0.008	82.93	1.636s
EU-154	4019.65	1004.77	49.	5.	0.003	208.25	1.639s
Co-56	4151.87	1037.84	10.	6.	0.003	128.72	1.664s
Cs-136	4192.77	1048.07	5.	6.	0.003	69.89	1.671s
RH-106	4201.93	1050.36	19.	-2.	-0.001	347.36	1.673s
BI-207	4255.11	1063.66	15.	-5.	-0.003	176.07	1.682s
Ga-68	4310.04	1077.40	10.	8.	0.005	90.50	1.692s
FE-59	4397.41	1099.25	11.	3.	0.002	225.00	1.708s
EU-152	4448.68	1112.07	39.	6.	0.003	153.83	1.717s
ZN-65	4462.56	1115.55	45.	6.	0.003	164.14	1.720s
BI-214	4481.51	1120.29	35.	3.	0.002	288.00	1.723s
Sc-46	4482.57	1120.55	38.	6.	0.003	151.46	1.723s
Ta-182	4485.56	1121.30	57.	7.	0.004	167.43	1.724s
CO-60	4693.21	1173.24	21.	4.	0.002	260.44	1.760s
Ta-182	4756.42	1189.05	10.	7.	0.004	106.27	1.771s
Ta-182	4885.79	1221.41	11.	9.	0.005	90.75	1.793s
Co-56	4953.23	1238.28	17.	10.	0.006	94.24	1.804s
NA-22	5098.13	1274.53	16.	-2.	-0.001	291.55	1.828s
EU-154	5098.19	1274.54	18.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	11.	1.	0.001	574.71	1.840s
CO-60	5329.85	1332.50	6.	1.	0.001	397.16	1.866s
AG-110M	5536.88	1384.30	5.	5.	0.003	121.64	1.899s
EU-152	5631.62	1408.00	16.	-7.	-0.004	135.27	1.914s
K-40	5844.09	1461.17	4.	271.	0.151	6.16	1.779
La-140	6383.73	1596.21	0.	5.	0.003	44.72	2.024s
SB-124	6762.39	1690.98	0.	5.	0.003	44.72	2.076s
BI-214	7056.06	1764.49	22.	8.	0.005	84.88	2.114
Co-56	7083.46	1771.35	10.	0.	0.000	1000.00	2.117s

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	-6.5714E+00				5.31E+01	
			477.60	-6.571E+00	&(	1.851E+01 8.42E+01 1.05E+01	G
NA-22	C	-1.9420E-01				9.50E+02	
			1274.53	-1.942E-01	?(	2.073E+00 2.92E+02 9.99E+01	G
K-40	N	2.7683E+02				4.66E+11	
			1460.83	2.768E+02	(P	1.187E+01 6.16E+00 1.07E+01	G
Sc-46	F	-1.0939E+00				8.38E+01	
			889.28	-1.094E+00	&(	3.792E+00 1.03E+02 1.00E+02	G
			1120.55	5.215E-01	+	2.742E+00 1.51E+02 1.00E+02	G
CR-51	F	3.9155E+00				2.77E+01	
			320.08	3.915E+00	(	1.404E+01 1.06E+02 9.94E+00	G
MN-54	C	-5.3251E-01				3.12E+02	
			834.85	-5.325E-01	?(P	2.134E+00 1.18E+02 1.00E+02	G
FE-59	F	4.0744E-01				4.45E+01	
			1099.25	4.916E-01	?(P	2.729E+00 2.25E+02 5.65E+01	G
			1291.60	2.973E-01	?(P	4.077E+00 5.75E+02 4.32E+01	G
Co-56	C	1.0693E+00				7.73E+01	
			846.77	4.821E-01	?(	1.885E+00 1.65E+02 9.99E+01	G
			1238.28	1.476E+00	?(P	3.107E+00 9.42E+01 6.61E+01	G
			1037.84	3.319E+00	?(P	1.019E+01 1.29E+02 1.41E+01	G
			1771.35	0.000E+00	-	1.467E+01 1.00E+03 1.55E+01	A
CO-57	C	3.1185E-01				2.72E+02	
			122.06	3.118E-01	&(	1.050E+00 1.00E+02 8.56E+01	G
			136.47	0.000E+00	&	1.357E+01 1.00E+03 1.07E+01	G
CO-58	C	4.1481E-01				7.09E+01	
			810.78	4.148E-01	?(P	2.117E+00 1.47E+02 9.95E+01	G
CO-60	F	2.4550E-01				1.93E+03	
			1332.50	1.381E-01	?(P	1.387E+00 3.97E+02 1.00E+02	G
			1173.24	3.530E-01	?(P	2.185E+00 2.60E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	1.0245E+00					2.44E+02	
			1115.55	1.025E+00	?(	5.831E+00	1.64E+02	5.06E+01 G
NB-94	I	-2.6055E-01					7.41E+06	
			702.63	-2.606E-01	?(	1.706E+00	2.64E+02	9.79E+01 G
			871.10	-8.686E-01	+ P	1.978E+00	7.54E+01	9.99E+01 G
ZR-95	I	6.5233E-01					6.40E+01	
			756.73	6.523E-01	&(P	2.268E+00	1.37E+02	5.45E+01 G
			724.20	0.000E+00	-	5.702E+00	1.00E+03	4.42E+01 G
NB-95	I	-5.4859E-02					6.40E+01	
			765.79	-5.486E-02	&(	2.574E+00	1.33E+03	9.98E+01 G
RU-103	I	-3.3946E-01					3.93E+01	
			497.05	-3.395E-01	?(	1.630E+00	1.89E+02	9.09E+01 G
			610.30	0.000E+00	+	6.493E+01	1.00E+03	5.75E+00 GA
RH-106	I	-6.5568E+00					3.74E+02	
			621.92	-6.557E+00	?(	4.179E+01	1.89E+02	9.93E+00 G
			1050.36	-9.556E+00	+	1.212E+02	3.47E+02	1.56E+00 G
			511.86	1.799E+01	?	8.299E+00	2.59E+01	2.00E+01 GA
AG-108M	C	1.7402E-01					1.53E+05	
			433.94	1.740E-01	?(	1.400E+00	3.14E+02	9.05E+01 G
			722.94	-8.009E-01	+	3.074E+00	1.13E+02	9.08E+01 G
			614.28	0.000E+00	-	4.178E+00	1.00E+03	8.98E+01 G
AG-110M	F	4.1277E-01					2.50E+02	
			884.68	-3.347E-01	?(	4.616E+00	3.98E+02	7.27E+01 G
			657.76	-8.817E-01	+	3.399E+00	1.14E+02	9.46E+01 G
			937.49	8.727E-01	?(	4.395E+00	2.05E+02	3.44E+01 G
			1384.30	1.999E+00	?(	5.770E+00	1.22E+02	2.43E+01 G
			763.94	-4.289E+00	+	9.917E+00	6.97E+01	2.23E+01 G
SN-113	F	-5.7206E-01					1.15E+02	
			391.69	-5.721E-01	?(P	3.097E+00	1.80E+02	6.40E+01 G
SB-124	F	7.5969E-01					6.02E+01	
			602.73	5.024E-01	(	3.680E+00	2.16E+02	9.83E+01 G
			1690.98	1.289E+00	?(	1.899E+00	4.47E+01	4.78E+01 G
			722.79	-6.729E+00	+	2.745E+01	1.20E+02	1.08E+01 G
SB-125	I	1.0416E+00					1.01E+03	
			427.88	7.754E-02	%(P	4.052E+00	2.00E+03	2.96E+01 G
			600.50	2.639E+00	?(	1.922E+01	2.15E+02	1.79E+01 G
			635.89	-4.149E+00	+	1.517E+01	1.07E+02	1.13E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		463.37	-6.369E+00	+	2.026E+01	9.48E+01	1.05E+01 G
I-131	I 9.8477E-01						8.02E+00
		364.48	4.505E-01	&(	1.165E+00	9.85E+01	8.17E+01 G
		284.30	-7.858E+00	+	2.094E+01	1.04E+02	6.14E+00 G
		636.97	7.072E+00	&(	2.114E+01	8.82E+01	7.17E+00 G
Gd-153	F -6.5571E-01						2.42E+02
		97.50	-6.557E-01	?(	3.859E+00	1.74E+02	3.00E+01 G
		103.20	-1.476E+00	+	5.863E+00	1.19E+02	2.18E+01 G
Ga-68	C 2.4852E+01						4.71E-02
		1077.40	2.485E+01	?(	5.213E+01	9.05E+01	3.30E+00 G
Tc-99m	I 3.0449E-01						2.51E-01
		140.51	3.045E-01	*(	1.292E+00	1.26E+02	8.93E+01 G
BA-133	F 5.1890E-01						3.85E+03
		356.00	1.076E-01	%(	4.046E+00	1.10E+03	6.20E+01 G
		302.85	1.911E+00	&(	1.083E+01	1.68E+02	1.83E+01 G
		383.84	-3.578E+00	+	2.086E+01	1.71E+02	8.94E+00 GA
		80.99	-1.204E+00	+	3.729E+00	1.16E+02	3.41E+01 GA
CS-134	I 1.3185E+00						7.54E+02
		604.71	0.000E+00	?(	3.795E+00	1.00E+03	9.76E+01 G
		795.87	1.553E+00	?(	9.761E-01	3.16E+01	8.55E+01 G
		569.32	-9.630E-01	+	1.033E+01	3.04E+02	1.54E+01 G
		801.95	5.513E+00	?(	1.282E+01	9.64E+01	8.69E+00 G
		563.24	9.961E+00	*(	1.105E+01	4.67E+01	8.35E+00 G
CS-137	I 5.4009E-01						1.10E+04
		661.66	5.401E-01	?(P	2.827E+00	1.53E+02	8.52E+01 G
CE-139	F -2.5892E-01						1.38E+02
		165.85	-2.589E-01	?(	1.407E+00	1.61E+02	7.99E+01 G
Ba-140	I 2.6349E+00						1.28E+01
		537.26	1.403E+00	?(P	4.992E+00	1.38E+02	2.44E+01 G
		162.66	4.304E+00	(	1.780E+01	1.23E+02	6.22E+00 G
		304.85	7.219E+00	&(	4.788E+01	1.96E+02	4.29E+00 G
La-140	I 7.6596E-01						1.28E+01
		1596.21	6.149E-01	?(	9.063E-01	4.47E+01	9.54E+01 G
		487.02	8.980E-01	?(	2.243E+00	9.84E+01	4.55E+01 G
		328.76	1.180E+00	?(	6.080E+00	1.96E+02	2.03E+01 G
		815.77	0.000E+00	&	9.734E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	5.4004E-01					3.25E+01	
			145.44	5.400E-01	*(	2.393E+00	1.32E+02	4.82E+01 G
PM-144	C	-9.9810E-02					3.63E+02	
			696.54	-9.981E-02	?(P	1.780E+00	7.46E+02	9.90E+01 G
			618.06	0.000E+00	+	3.807E+00	1.00E+03	9.91E+01 G
EU-152	F	1.1356E+00					4.94E+03	
			344.29	-1.952E+00	?(	8.606E+00	1.31E+02	2.65E+01 G
			1112.07	3.784E+00	?(	2.021E+01	1.54E+02	1.36E+01 G
			121.78	-1.053E+00	+	3.748E+00	1.06E+02	2.86E+01 G
			778.92	3.567E+00	?(	8.404E+00	9.75E+01	1.29E+01 G
			964.11	-4.155E+00	+	2.483E+01	1.75E+02	1.46E+01 G
			244.69	3.012E+00	?(	3.676E+01	3.63E+02	7.58E+00 G
			1408.00	-3.517E+00	+	1.073E+01	1.35E+02	2.10E+01 GA
EU-154	I	1.8006E+00					3.14E+03	
			873.23	-1.447E+00	?(P	1.923E+01	3.72E+02	1.23E+01 G
			123.10	-1.078E-01	+ P	2.272E+00	6.57E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.200E+00	1.00E+03	3.52E+01 G
			723.36	1.085E+00	?(	1.213E+01	3.21E+02	2.02E+01 G
			1004.77	2.153E+00	?(	1.562E+01	2.08E+02	1.80E+01 G
			996.33	6.326E+00	?(	2.117E+01	9.81E+01	1.06E+01 G
EU-155	I	-1.6014E+00					1.81E+03	
			105.31	-1.601E+00	?(P	8.047E+00	8.37E+01	2.12E+01 G
			86.54	-1.282E+00	&	6.886E+00	1.61E+02	3.07E+01 G
HF-181	F	6.6754E-01					4.24E+01	
			482.00	6.341E-01	&(	2.258E+00	1.05E+02	8.05E+01 G
			133.02	0.000E+00	-	3.312E+00	1.00E+03	4.33E+01 G
			345.83	8.460E-01	&(	1.407E+01	4.86E+02	1.51E+01 G
			136.30	0.000E+00	&	2.475E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.6108E+00					1.14E+02	
			1121.30	1.643E+00	?(	9.492E+00	1.67E+02	3.49E+01 G
			1221.41	3.055E+00	&(	6.217E+00	9.07E+01	2.70E+01 G
			1189.05	3.955E+00	?(	9.858E+00	1.06E+02	1.62E+01 G
Hg-203	F	-4.5773E-01					4.66E+01	
			279.20	-4.577E-01	?(	1.558E+00	1.31E+02	8.15E+01 G
TL-208	N	6.9391E+00					6.98E+02	
			583.02	6.913E+00	(	1.040E+00	1.09E+01	8.45E+01 G
			277.28	-1.433E-01	&	1.945E+01	3.88E+03	6.31E+00 G
			860.56	7.115E+00	?(	1.752E+01	1.06E+02	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	5.7331E-01					2.02E+03	
			747.16	4.682E-01	?(P	4.040E+00	3.37E+02	3.40E+01 G
			735.72	4.129E-01	?(P	5.389E+00	4.96E+02	2.25E+01 G
			453.88	6.838E-01	?(	1.721E+00	1.00E+02	6.50E+01 G
y-88	F	3.8988E-01					1.07E+02	
			898.04	3.899E-01	&(P	1.343E+00	1.38E+02	9.37E+01 G
			1836.06	-4.150E-02	% P	9.809E-01	2.33E+03	9.92E+01 G
Cd-113m		1.3010E+03					5.33E+03	
			263.70	1.301E+03	(	2.098E+04	4.65E+02	6.00E-03 K
Cd-109	F	-1.0330E+01					4.53E+02	
			88.04	-1.033E+01	?(	5.242E+01	1.52E+02	3.79E+00 G
Cf-251	T	1.6793E+00					3.28E+05	
			176.60	1.679E+00	&(	4.780E+00	1.05E+02	1.70E+01 G
			227.00	-7.151E+00	+	1.909E+01	9.92E+01	6.30E+00 GA
Cf-249	T	4.9988E-01					1.28E+05	
			387.95	0.000E+00	?(	2.955E+00	1.00E+03	6.60E+01 G
			333.44	2.627E+00	&(	6.853E+00	1.00E+02	1.55E+01 G
Sn-126		2.0776E+00					3.65E+07	
			87.57	-1.046E+00	+	5.428E+00	1.55E+02	3.75E+01 GA
			64.28	2.078E+00	(	1.673E+01	2.38E+02	9.70E+00 G
			86.94	-4.348E+00	+	2.296E+01	1.58E+02	9.04E+00 GA
PB-210	N	2.0195E+01					8.14E+03	
			46.54	2.019E+01	(P	3.309E+01	6.00E+01	4.25E+00 G
PB-212	N	1.9725E+01					6.98E+02	
			238.63	1.973E+01	(	1.653E+00	5.78E+00	4.33E+01 G
			300.03	2.355E+01	+	2.227E+01	3.83E+01	3.28E+00 GA
PB-214	N	1.4816E+01					5.84E+05	
			351.93	1.458E+01	(P	2.931E+00	1.09E+01	3.76E+01 G
			295.09	1.527E+01	(P	4.168E+00	1.41E+01	1.93E+01 G
			242.00	2.429E+01	+ P	1.261E+01	1.87E+01	7.43E+00 GA
BI-212	N	3.9689E+01					6.98E+02	
			727.17	3.969E+01	(P	1.097E+01	1.85E+01	7.55E+00 G
			785.42	4.464E+01	?	1.017E+02	9.59E+01	1.28E+00 GA
BI-214	N	1.2130E+01					5.84E+05	
			609.31	1.213E+01	(P	2.610E+00	1.23E+01	4.61E+01 G
			1120.29	1.723E+00	- P	1.749E+01	2.88E+02	1.51E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1764.49	7.034E+00	- P	2.019E+01	8.49E+01	1.54E+01 G
BI-210M	T	-5.4137E-01						1.10E+09
			265.83	-5.414E-01	(	2.659E+00	1.45E+02	5.00E+01 G
			304.90	0.000E+00	&	7.513E+00	1.00E+03	2.80E+01 G
AC-228	N	1.9919E+01						2.10E+03
			911.07	1.989E+01	(P	3.833E+00	1.31E+01	2.90E+01 G
			968.97	3.308E+01	+ P	3.253E+00	1.16E+01	1.75E+01 G
			338.32	1.998E+01	@(	5.531E+00	1.51E+01	1.20E+01 G
			93.35	-2.375E+00	-	3.462E+01	4.34E+02	5.56E+00 XA
TH-227	N	1.0988E+01						7.95E+03
			50.14	1.099E+01	*(P	1.790E+01	5.85E+01	8.00E+00 G
			256.24	-4.792E+00	- P	1.874E+01	1.06E+02	7.00E+00 G
TH-229	N	-4.7300E+00						2.68E+06
			193.51	-4.730E+00	?(	2.292E+01	1.78E+02	4.40E+00 G
			210.85	-1.687E+01	+ P	4.464E+01	7.98E+01	2.99E+00 G
TH-234	N	2.9781E+01						1.63E+12
			63.29	2.978E+01	*(P	3.271E+01	4.34E+01	3.81E+00 G
			92.59	1.396E+01	- P	1.652E+01	3.73E+01	5.58E+00 G
PA-231	N	1.3049E+01						1.20E+07
			302.65	1.215E+01	(	6.685E+01	1.63E+02	2.88E+00 G
			300.07	1.410E+01	?(	7.270E+01	1.52E+02	2.46E+00 G
PA-233	C	6.6837E-01						7.82E+08
			312.01	-1.801E-01	?(	5.932E+00	9.64E+02	3.60E+01 G
			300.18	5.595E+00	?(	2.987E+01	1.58E+02	6.20E+00 G
PA-234	N	1.9538E-01						1.63E+12
			131.29	-4.984E-01	?(	7.990E+00	4.74E+02	1.80E+01 G
			946.02	1.127E+00	?(	1.136E+01	4.03E+02	1.34E+01 G
			569.47	-4.015E-01	%	2.039E+01	1.42E+03	8.20E+00 G
			883.24	-1.056E+01	+	3.421E+01	9.62E+01	9.60E+00 G
			880.53	-1.684E+01	+	5.019E+01	8.87E+01	6.00E+00 GA
PA-234M	N	-1.4239E+02						1.63E+12
			1001.00	-1.424E+02	?(	3.955E+02	8.29E+01	8.37E-01 G
			766.41	1.364E+02	+	8.527E+02	1.81E+02	2.94E-01 G
U-235	N	3.7202E+00						2.57E+11
			143.79	2.445E+00	?(	1.073E+01	1.30E+02	1.10E+01 G
			205.33	6.511E+00	&(P	2.126E+01	1.21E+02	5.01E+00 G
			163.38	0.000E+00	-	2.281E+01	1.00E+03	5.08E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   1.6748E+00                                      1.58E+05
                           59.54 1.675E+00  (P 3.186E+00 7.10E+01 3.59E+01 G

Np-237   F  -3.0270E+00                                      2.14E+06
                           86.49-3.027E+00 &(  1.684E+01 1.67E+02 1.31E+01 G

Ir-192   F   1.7649E-01                                      7.40E+01
                          316.49-3.826E-01 ?(  1.731E+00 1.33E+02 8.70E+01 G
                          468.06 1.117E+00 &(  3.897E+00 1.03E+02 5.18E+01 G
                          308.44 0.000E+00 &   6.689E+00 1.00E+03 3.18E+01 G

Cs-136   F  -5.0291E-02                                      1.30E+01
                          818.50-5.686E-01 ?(  2.504E+00 1.29E+02 1.00E+02 G
                         1048.07 5.976E-01 ?(  1.386E+00 6.99E+01 8.00E+01 G
                          340.57-1.028E+00 +   4.946E+00 1.43E+02 4.69E+01 G

Np-239   T  -1.5264E+00                                      2.36E+00
                          103.70-1.341E+00 +   5.501E+00 1.23E+02 2.40E+01 X
                          106.13-1.526E+00 &(  8.057E+00 1.58E+02 2.27E+01 G
                           99.50-1.822E+00 +   7.817E+00 1.28E+02 1.50E+01 X

Nd-147       2.8665E+00                                      1.11E+01
                          531.00 2.866E+00 ?(  7.650E+00 1.04E+02 1.30E+01 G
                           91.10-1.332E+00 -   6.805E+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
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N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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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	111.	32.	0.018	58.51	1.099E+01	P
BA-133	80.99	247.	-25.	-0.014	115.77	-1.204E+00	
Np-237	86.49	823.	-25.	-0.014	166.72	-3.027E+00	
EU-155	86.54	755.	-24.	-0.014	160.85	-1.282E+00	
Cd-109	88.04	675.	-24.	-0.014	151.99	-1.033E+01	
Nd-147	91.10	651.	-24.	-0.013	152.98	-1.332E+00	
Gd-153	97.50	238.	-13.	-0.007	174.40	-6.557E-01	
Np-239	99.50	246.	-18.	-0.010	127.79	-1.822E+00	
Gd-153	103.20	298.	-21.	-0.012	118.63	-1.476E+00	
Np-239	103.70	318.	-21.	-0.012	122.52	-1.341E+00	
EU-155	105.31	541.	-22.	-0.012	83.71	-1.601E+00	P
Np-239	106.13	625.	-23.	-0.013	157.95	-1.526E+00	
EU-152	121.78	203.	-19.	-0.011	106.26	-1.053E+00	
CO-57	122.06	140.	17.	0.010	100.31	3.118E-01	
EU-154	123.10	149.	-3.	-0.002	657.34	-1.078E-01	P
PA-234	131.29	358.	-6.	-0.003	473.85	-4.984E-01	
Tc-99m	140.51	201.	16.	0.009	126.14	3.045E-01	
U-235	143.79	217.	16.	0.009	130.46	2.445E+00	
CE-141	145.44	206.	16.	0.009	131.67	5.400E-01	
Ba-140	162.66	162.	15.	0.008	122.75	4.304E+00	
CE-139	165.85	170.	-12.	-0.006	160.59	-2.589E-01	
Cf-251	176.60	77.	15.	0.008	105.09	1.679E+00	
TH-229	193.51	103.	-10.	-0.006	177.80	-4.730E+00	
U-235	205.33	105.	15.	0.009	120.54	6.511E+00	P
TH-229	210.85	160.	-23.	-0.013	79.84	-1.687E+01	P
Cf-251	227.00	113.	-20.	-0.011	99.25	-7.151E+00	
EU-152	244.69	570.	9.	0.005	363.08	3.012E+00	
TH-227	256.24	110.	-13.	-0.007	105.75	-4.792E+00	P
Cd-113m	263.70	96.	3.	0.002	465.47	1.301E+03	
BI-210M	265.83	106.	-10.	-0.006	144.51	-5.414E-01	
Hg-203	279.20	88.	-14.	-0.008	131.47	-4.577E-01	
I-131	284.30	88.	-17.	-0.010	103.55	-7.858E+00	
PA-231	300.07	160.	12.	0.007	152.42	1.410E+01	
PA-233	300.18	172.	12.	0.007	157.80	5.595E+00	
PA-231	302.65	184.	12.	0.007	162.64	1.215E+01	
BA-133	302.85	196.	12.	0.007	167.65	1.911E+00	
Ba-140	304.85	208.	11.	0.006	195.91	7.219E+00	
PA-233	312.01	217.	-2.	-0.001	964.27	-1.801E-01	
Ir-192	316.49	102.	-11.	-0.006	133.30	-3.826E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	320.08	85.	13.	0.007	106.14	3.915E+00	
La-140	328.76	62.	8.	0.004	196.01	1.180E+00	
Cf-249	333.44	44.	13.	0.007	100.24	2.627E+00	
Cs-136	340.57	222.	-15.	-0.008	142.94	-1.028E+00	
EU-152	344.29	210.	-16.	-0.009	131.03	-1.952E+00	
HF-181	345.83	179.	4.	0.002	486.37	8.460E-01	
I-131	364.48	29.	11.	0.006	98.53	4.505E-01	
BA-133	383.84	114.	-9.	-0.005	171.05	-3.578E+00	
SN-113	391.69	125.	-10.	-0.006	179.98	-5.721E-01	P
AG-108M	433.94	40.	4.	0.002	313.58	1.740E-01	
pm-146	453.88	28.	11.	0.006	99.95	6.838E-01	
SB-125	463.37	108.	-16.	-0.009	94.76	-6.369E+00	
Ir-192	468.06	95.	14.	0.008	103.49	1.117E+00	
BE-7	477.59	85.	-16.	-0.009	84.16	-6.571E+00	
HF-181	482.00	72.	12.	0.007	105.23	6.341E-01	
La-140	487.02	20.	9.	0.005	98.42	8.980E-01	
RU-103	497.05	44.	-7.	-0.004	189.34	-3.395E-01	
RH-106	511.86	53.	80.	0.044	25.92	1.799E+01	
Nd-147	531.00	16.	8.	0.004	104.08	2.866E+00	
Ba-140	537.26	25.	7.	0.004	138.12	1.403E+00	P
CS-134	563.24	12.	17.	0.009	46.69	9.961E+00	
CS-134	569.32	40.	-3.	-0.002	303.68	-9.630E-01	
SB-125	600.50	187.	9.	0.005	214.53	2.639E+00	
SB-124	602.73	207.	10.	0.005	216.08	5.024E-01	
RH-106	621.92	262.	-12.	-0.007	188.87	-6.557E+00	
SB-125	635.89	39.	-9.	-0.005	107.00	-4.149E+00	
I-131	636.97	29.	9.	0.005	88.20	7.072E+00	
AG-110M	657.76	140.	-15.	-0.008	114.46	-8.817E-01	
PM-144	696.54	35.	-2.	-0.001	746.49	-9.981E-02	P
NB-94	702.63	30.	-4.	-0.002	263.85	-2.606E-01	
SB-124	722.79	100.	-12.	-0.007	120.48	-6.729E+00	
AG-108M	722.94	88.	-12.	-0.007	113.39	-8.009E-01	
EU-154	723.36	66.	4.	0.002	321.13	1.085E+00	
pm-146	735.72	13.	2.	0.001	496.44	4.129E-01	P
pm-146	747.16	17.	3.	0.001	337.46	4.682E-01	P
ZR-95	756.73	13.	6.	0.003	137.31	6.523E-01	P
AG-110M	763.94	48.	-15.	-0.008	69.65	-4.289E+00	
PA-234M	766.41	63.	6.	0.004	181.18	1.364E+02	
EU-152	778.92	9.	7.	0.004	97.50	3.567E+00	
CS-134	795.87	5.	20.	0.011	31.62	1.553E+00	
CS-134	801.95	9.	7.	0.004	96.35	5.513E+00	
CO-58	810.78	39.	6.	0.003	147.35	4.148E-01	P
Cs-136	818.50	56.	-8.	-0.005	128.61	-5.686E-01	
MN-54	834.85	38.	-8.	-0.004	117.89	-5.325E-01	P
Co-56	846.77	28.	7.	0.004	164.75	4.821E-01	
NB-94	871.10	30.	-12.	-0.007	75.41	-8.686E-01	P
EU-154	873.23	43.	-3.	-0.001	372.44	-1.447E+00	P
PA-234	880.53	72.	-14.	-0.008	88.74	-1.684E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	883.24	87.	-14.	-0.008	96.22	-1.056E+01		
AG-110M	884.68	90.	-3.	-0.002	398.08	-3.347E-01		
Sc-46	889.28	116.	-15.	-0.008	103.03	-1.094E+00		
y-88	898.04	10.	5.	0.003	137.75	3.899E-01		P
AG-110M	937.49	14.	4.	0.002	204.63	8.727E-01		
PA-234	946.02	14.	2.	0.001	403.11	1.127E+00		
EU-152	964.11	91.	-8.	-0.004	174.59	-4.155E+00		
EU-154	996.33	30.	8.	0.005	98.08	6.326E+00		
PA-234M	1001.00	70.	-15.	-0.008	82.93	-1.424E+02		
EU-154	1004.77	49.	5.	0.003	208.25	2.153E+00		
Co-56	1037.84	10.	6.	0.003	128.72	3.319E+00		P
Cs-136	1048.07	5.	6.	0.003	69.89	5.976E-01		
RH-106	1050.36	19.	-2.	-0.001	347.36	-9.556E+00		
BI-207	1063.66	15.	-5.	-0.003	176.07	-5.594E-01		
Ga-68	1077.40	10.	8.	0.005	90.50	2.485E+01		
FE-59	1099.25	11.	3.	0.002	225.00	4.916E-01		P
EU-152	1112.07	39.	6.	0.003	153.83	3.784E+00		
ZN-65	1115.55	45.	6.	0.003	164.14	1.025E+00		
Sc-46	1120.55	38.	6.	0.003	151.46	5.215E-01		
CO-60	1173.24	21.	4.	0.002	260.44	3.530E-01		P
Co-56	1238.28	17.	10.	0.006	94.24	1.476E+00		P
NA-22	1274.53	16.	-2.	-0.001	291.55	-1.942E-01		
FE-59	1291.60	11.	1.	0.001	574.71	2.973E-01		P
CO-60	1332.50	6.	1.	0.001	397.16	1.381E-01		P
AG-110M	1384.30	5.	5.	0.003	121.64	1.999E+00		
EU-152	1408.00	16.	-7.	-0.004	135.27	-3.517E+00		
La-140	1596.21	0.	5.	0.003	44.72	6.149E-01		
SB-124	1690.98	0.	5.	0.003	44.72	1.289E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-6.5714E+00	-6.5714E+00	8.416E+01%	1.85E+01
NA-22	#A	-1.9420E-01	-1.9420E-01	2.915E+02%	2.07E+00
K-40		2.7683E+02	2.7683E+02	6.156E+00%	1.19E+01
Sc-46	#A	-1.0939E+00	-1.0939E+00	1.030E+02%	3.79E+00
CR-51	#A	3.9154E+00	3.9155E+00	1.061E+02%	1.40E+01
MN-54	#A	-5.3251E-01	-5.3251E-01	1.179E+02%	2.13E+00
FE-59	#A	4.0744E-01	4.0744E-01	2.250E+02%	2.73E+00
Co-56	#A	1.0693E+00	1.0693E+00	7.645E+01%	1.88E+00
CO-57	#A	3.1185E-01	3.1185E-01	1.003E+02%	1.05E+00
CO-58	#A	4.1481E-01	4.1481E-01	1.473E+02%	2.12E+00
CO-60	#A	2.4550E-01	2.4550E-01	2.375E+02%	1.39E+00
ZN-65	#A	1.0245E+00	1.0245E+00	1.641E+02%	5.83E+00

NB-94	#A	-2.6055E-01	-2.6055E-01	2.638E+02%	1.71E+00
ZR-95	#A	6.5232E-01	6.5233E-01	1.373E+02%	2.27E+00
NB-95	#A	-5.4859E-02	-5.4859E-02	1.333E+03%	2.57E+00
RU-103	#A	-3.3945E-01	-3.3946E-01	1.893E+02%	1.63E+00
RH-106	#A	-6.5568E+00	-6.5568E+00	1.889E+02%	4.18E+01
AG-108M	#A	1.7402E-01	1.7402E-01	3.136E+02%	1.40E+00
AG-110M	#A	4.1277E-01	4.1277E-01	1.216E+02%	4.62E+00
SN-113	#A	-5.7206E-01	-5.7206E-01	1.800E+02%	3.10E+00
SB-124	#A	7.5968E-01	7.5969E-01	4.472E+01%	3.68E+00
SB-125	#A	1.0416E+00	1.0416E+00	2.145E+02%	4.05E+00
I-131	#A	9.8472E-01	9.8477E-01	6.612E+01%	1.16E+00
Gd-153	#A	-6.5571E-01	-6.5571E-01	1.744E+02%	3.86E+00
Ga-68	#A	2.4670E+01	2.4852E+01	9.050E+01%	5.21E+01
Tc-99m	#A	3.0407E-01	3.0449E-01	1.261E+02%	1.29E+00
BA-133	#A	5.1890E-01	5.1890E-01	1.676E+02%	4.05E+00
CS-134	#A	1.3185E+00	1.3185E+00	3.162E+01%	3.80E+00
CS-137	#A	5.4009E-01	5.4009E-01	1.533E+02%	2.83E+00
CE-139	#A	-2.5892E-01	-2.5892E-01	1.606E+02%	1.41E+00
Ba-140	#A	2.6348E+00	2.6349E+00	8.977E+01%	4.99E+00
La-140	#A	7.6594E-01	7.6596E-01	4.472E+01%	9.06E-01
CE-141	#A	5.4004E-01	5.4004E-01	1.317E+02%	2.39E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.29E+01
PM-144	#A	-9.9809E-02	-9.9810E-02	7.465E+02%	1.78E+00
EU-152	#A	1.1356E+00	1.1356E+00	9.750E+01%	8.61E+00
EU-154	#A	1.8006E+00	1.8006E+00	9.808E+01%	1.92E+01
EU-155	#A	-1.6014E+00	-1.6014E+00	8.371E+01%	8.05E+00
HF-181	#A	6.6753E-01	6.6754E-01	1.052E+02%	2.26E+00
Ta-182	#A	2.6108E+00	2.6108E+00	7.270E+01%	9.49E+00
Hg-203	#A	-4.5773E-01	-4.5773E-01	1.315E+02%	1.56E+00
TL-208		6.9391E+00	6.9391E+00	1.088E+01%	1.04E+00
pm-146	#A	5.7331E-01	5.7331E-01	9.995E+01%	4.04E+00
y-88	#A	3.8988E-01	3.8988E-01	1.377E+02%	1.34E+00
Cd-113m	#A	1.3010E+03	1.3010E+03	4.655E+02%	2.10E+04
Cd-109	#A	-1.0330E+01	-1.0330E+01	1.520E+02%	5.24E+01
Cf-251	#A	1.6793E+00	1.6793E+00	1.051E+02%	4.78E+00
Cf-249	#A	4.9988E-01	4.9988E-01	1.002E+02%	2.96E+00
Sn-126	A	2.0776E+00	2.0776E+00	2.383E+02%	1.67E+01
PB-210	A	2.0195E+01	2.0195E+01	6.002E+01%	3.31E+01
PB-212		1.9725E+01	1.9725E+01	5.779E+00%	1.65E+00
PB-214		1.4816E+01	1.4816E+01	8.911E+00%	2.93E+00
BI-207	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.72E+00
BI-212		3.9689E+01	3.9689E+01	1.851E+01%	1.10E+01
BI-214		1.2130E+01	1.2130E+01	1.234E+01%	2.61E+00
BI-210M	#A	-5.4137E-01	-5.4137E-01	1.445E+02%	2.66E+00
AC-228		1.9919E+01	1.9919E+01	9.987E+00%	3.83E+00
TH-227	#A	1.0988E+01	1.0988E+01	5.851E+01%	1.79E+01
TH-229	#A	-4.7300E+00	-4.7300E+00	1.778E+02%	2.29E+01
TH-234	A	2.9781E+01	2.9781E+01	4.344E+01%	3.27E+01
PA-231	#A	1.3049E+01	1.3049E+01	1.114E+02%	6.68E+01

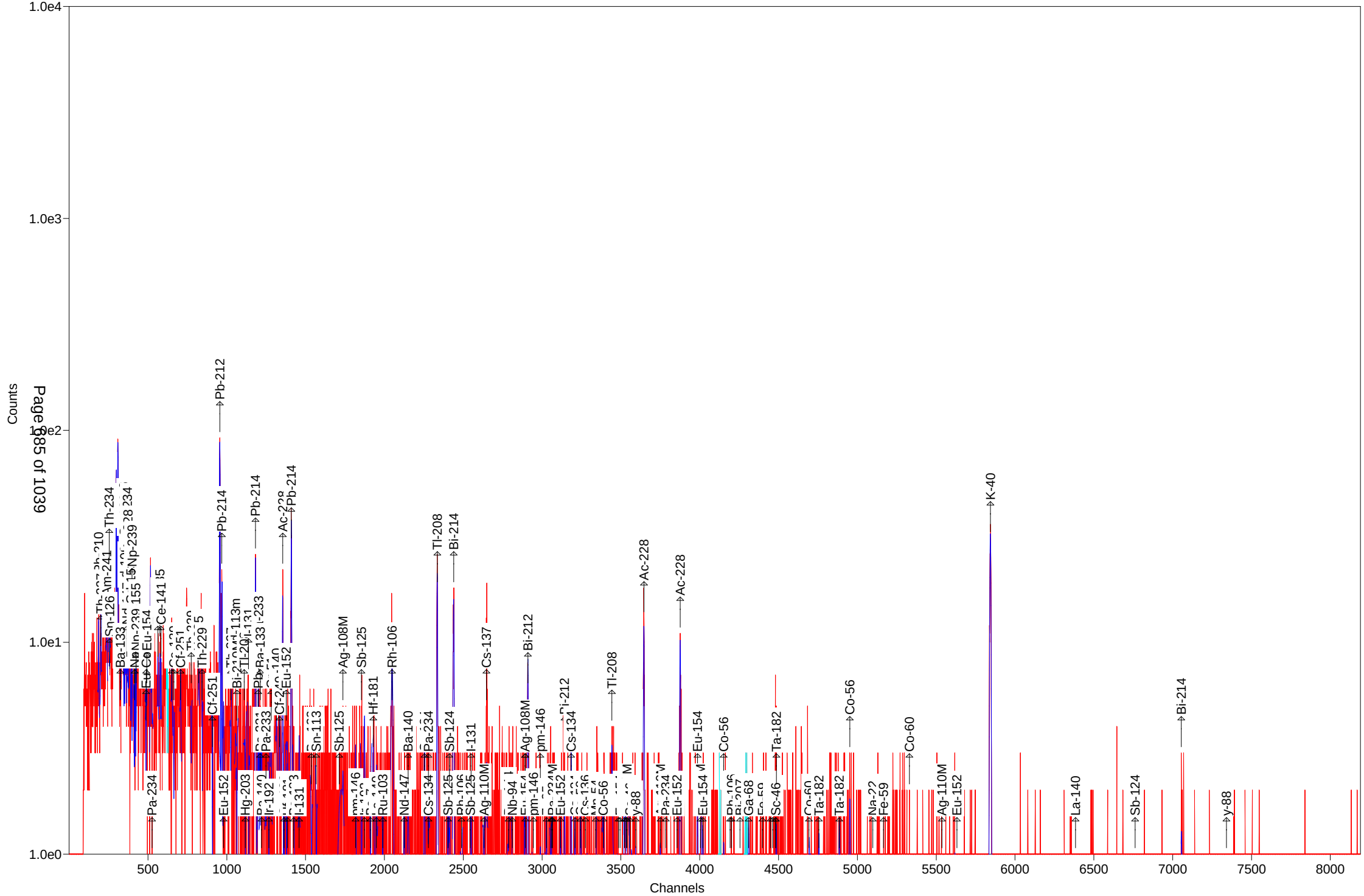
PA-233 #A	6.6837E-01	6.6837E-01	1.578E+02%		5.93E+00
PA-234 #A	1.9538E-01	1.9538E-01	3.111E+02%		7.99E+00
PA-234M#A	-1.4239E+02	-1.4239E+02	8.293E+01%		3.95E+02
U-235 #A	3.7202E+00	3.7202E+00	8.881E+01%		1.07E+01
AM-241 A	1.6748E+00	1.6748E+00	7.098E+01%		3.19E+00
Np-237 #A	-3.0270E+00	-3.0270E+00	1.667E+02%		1.68E+01
Ir-192 #A	1.7648E-01	1.7649E-01	8.438E+01%		1.73E+00
Cs-136 #A	-5.0290E-02	-5.0291E-02	6.989E+01%		2.50E+00
Np-239 #A	-1.5262E+00	-1.5264E+00	1.580E+02%		8.06E+00
Nd-147 #A	2.8664E+00	2.8665E+00	1.041E+02%		7.65E+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) 4.417E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 4.4170425E+02 Bq/Sample

257318_Gamma_160-17797-A-13-B. 5_Gamma_20161271.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20161699

Sample Description: 257318_Gamma_160-17797-A-14-B
Detector: Detector # 7
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-14-B

Decay to Time: 7/12/2016 11:29 Live Time: 1800 sec
Acquisition Time: 7/12/2016 11:29:51 Real Time: 1831 sec
Analysis Time: 7/12/2016 12:00 Dead Time: 1.68 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-10_0612.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	2.658E-01	1578.0	4.194E+00	4.194E+00	1.451E+01
NA-22	2.685E-01	154.1	4.138E-01	4.141E-01	1.472E+00
K-40	2.682E+02	5.2	1.392E+01	1.955E+01	7.230E+00
Sc-46	3.957E-01	174.0	6.884E-01	6.887E-01	2.353E+00
CR-51	-3.653E+00	167.3	6.111E+00	6.114E+00	2.048E+01
MN-54	9.424E-01	38.5	3.632E-01	3.664E-01	7.790E-01
FE-59	-1.522E+00	104.5	1.592E+00	1.594E+00	3.441E+00
Co-56	1.135E+00	39.1	4.433E-01	4.472E-01	9.347E-01
CO-57	-1.050E-02	2743.0	2.881E-01	2.881E-01	9.799E-01
CO-58	4.954E-01	85.1	4.216E-01	4.223E-01	1.421E+00
CO-60	0.000E+00	1.#INF	9.884E-02	9.884E-02	1.532E+00
ZN-65	-1.375E+00	127.0	1.747E+00	1.748E+00	5.920E+00
NB-94	-5.080E-01	133.4	6.778E-01	6.783E-01	1.564E+00
ZR-95	2.285E-01	190.7	4.358E-01	4.360E-01	1.942E+00
NB-95	-9.132E-01	69.3	6.326E-01	6.344E-01	2.096E+00
RU-103	3.527E-01	98.7	3.480E-01	3.485E-01	8.431E-01
RH-106	5.062E+00	86.4	4.372E+00	4.380E+00	3.082E+01
AG-108M	-5.826E-01	76.0	4.426E-01	4.436E-01	1.322E+00
AG-110M	2.814E-01	145.9	4.106E-01	4.109E-01	3.169E+00
SN-113	4.999E-01	114.3	5.715E-01	5.721E-01	1.928E+00
SB-124	4.103E-02	367.6	1.508E-01	1.508E-01	3.049E+00
SB-125	1.396E+00	92.7	1.294E+00	1.296E+00	2.886E+00
I-131	8.603E-01	74.1	6.376E-01	6.392E-01	9.834E-01
Gd-153	-8.717E-01	144.4	1.259E+00	1.260E+00	4.199E+00
Ga-68	-1.161E+01	211.4	2.454E+01	2.455E+01	5.487E+01
Tc-99m	-3.087E-01	120.4	3.717E-01	3.721E-01	1.241E+00
BA-133	-1.721E-01	121.2	2.087E-01	2.089E-01	3.503E+00
CS-134	3.208E-01	57.2	1.835E-01	1.843E-01	3.301E+00
CS-137	4.582E+00	12.1	5.548E-01	6.039E-01	9.099E-01
CE-139	2.867E-01	106.7	3.060E-01	3.072E-01	1.025E+00
Ba-140	9.430E-01	251.1	2.368E+00	2.368E+00	3.844E+00
La-140	4.680E-01	93.7	4.386E-01	4.393E-01	1.221E+00
CE-141	-6.414E-01	165.7	1.063E+00	1.063E+00	3.540E+00

CE-144	-1.241E+00	246.2	3.055E+00	3.056E+00	1.026E+01
PM-144	-1.245E-02	4027.1	5.014E-01	5.014E-01	1.483E+00
EU-152	8.944E-01	85.6	7.653E-01	7.668E-01	6.178E+00
EU-154	2.482E+00	72.8	1.808E+00	1.812E+00	9.348E+00
EU-155	-3.343E-02	3156.0	1.055E+00	1.055E+00	5.660E+00
HF-181	-2.866E-01	81.0	2.322E-01	2.327E-01	1.844E+00
Ta-182	1.894E+00	82.6	1.564E+00	1.567E+00	7.253E+00
Hg-203	-4.309E-01	101.3	4.364E-01	4.371E-01	1.461E+00
TL-208	7.413E+00	8.8	6.519E-01	7.569E-01	8.144E-01
pm-146	1.408E+00	78.5	1.104E+00	1.107E+00	2.786E+00
y-88	-1.001E+00	88.0	8.806E-01	8.821E-01	1.944E+00
Cd-113m	-3.357E+03	143.9	4.829E+03	4.833E+03	1.634E+04
Cd-109	8.047E+00	145.0	1.167E+01	1.167E+01	3.887E+01
Cf-251	-9.874E-01	168.0	1.659E+00	1.661E+00	4.270E+00
Cf-249	6.016E-01	105.5	6.344E-01	6.351E-01	2.081E+00
Sn-126	-4.018E+00	99.8	4.009E+00	4.015E+00	1.336E+01
PB-210	1.601E+01	76.6	1.226E+01	1.230E+01	3.242E+01
PB-212	1.891E+01	4.9	9.298E-01	1.537E+00	1.525E+00
PB-214	1.587E+01	7.2	1.142E+00	1.408E+00	1.773E+00
BI-207	2.782E-01	107.1	2.979E-01	2.983E-01	1.019E+00
BI-212	-4.468E-01	1402.0	6.264E+00	6.264E+00	2.203E+01
BI-214	1.222E+01	9.5	1.157E+00	1.320E+00	1.738E+00
BI-210M	-1.268E-01	396.9	5.030E-01	5.031E-01	2.032E+00
AC-228	1.971E+01	7.8	1.544E+00	1.842E+00	3.855E+00
TH-227	2.631E+00	102.2	2.687E+00	2.691E+00	2.304E+01
TH-229	3.666E+00	128.7	4.720E+00	4.729E+00	1.654E+01
TH-234	9.611E+00	38.8	3.731E+00	3.765E+00	2.260E+01
PA-231	1.049E+01	127.1	1.333E+01	1.334E+01	6.017E+01
PA-233	-1.754E-01	125.5	2.201E-01	2.203E-01	5.741E+00
PA-234	-3.475E-01	106.3	3.694E-01	3.698E-01	5.977E+00
PA-234M	-1.140E+02	56.5	6.441E+01	6.467E+01	3.160E+02
U-235	-2.953E+00	74.4	2.196E+00	2.202E+00	1.587E+01
AM-241	2.369E+00	31.9	7.558E-01	7.657E-01	2.016E+00
Np-237	2.134E+00	166.5	3.552E+00	3.554E+00	1.184E+01
Ir-192	-1.320E-01	141.6	1.870E-01	1.871E-01	2.361E+00
Cs-136	-6.602E-01	91.2	6.018E-01	6.030E-01	2.022E+00
Np-239	1.026E+00	145.1	1.489E+00	1.490E+00	4.973E+00
Nd-147	1.136E+00	120.2	1.365E+00	1.367E+00	6.695E+00
Total	4.258E+02				

Analyst: Amanda Dick

Sample description
257318_Gamma_160-17797-A-14-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20161699.An1

Acquisition information

Start time:	7/12/2016 11:29:51 AM
Live time:	1800
Real time:	1831
Dead time:	1.68 %
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	7/12/2016 11:29:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-10_0612.PBC 7/10/2016 6:12:03 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2089

***** 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
46.72	30.	76.61	0.77	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	8.	349.11	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
59.37	57.	31.90	1.73	3.701E-02	59.54	35.900	2.369E+00	AM241
63.73	53.	41.74	0.47	4.038E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	7.439E+00	Sn126
74.73	237.	10.42	0.87	4.761E-02				
77.13	369.	7.39	0.87	4.887E-02				
86.15	27.	166.47	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	PBC<MDA	EU155
87.18	135.	21.53	0.62	5.302E-02	86.54	30.700	4.638E+00	EU155
					86.94	9.040	1.571E+01	Sn126
					87.57	37.500	3.773E+00	Sn126
					88.04	3.790	3.723E+01	Cd109
91.10	26.	166.95	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.61	45.	50.80	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
93.37	30.	139.83	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
106.13	24.	145.12	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
123.10	19.	120.30	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
165.85	20.	106.73	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
193.51	17.	128.74	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	19.	113.54	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
210.85	4.	671.84	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.70	531.	4.92	1.04	3.601E-02	238.63	43.300	1.892E+01	PB212
241.80	131.	13.76	1.04	3.563E-02	242.00	7.430	2.759E+01	PB214
256.24	15.	102.15	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
277.43	58.	24.87	1.60	3.172E-02	277.28	6.310	1.619E+01	TL208
284.30	16.	102.65	1.09	3.106E-02	284.30	6.140	PBC<MDA	I131
295.52	172.	11.81	1.19	3.005E-02	295.09	19.300	1.598E+01	PB214
300.07	15.	176.22	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.133E+01	PA231
					300.18	6.200	4.495E+00	PA233
300.18	15.	180.00	1.10	2.965E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.133E+01	PA231
					300.18	6.200	4.495E+00	PA233
300.27	73.	18.47	1.03	2.966E-02	300.03	3.280	4.172E+01	PB212
					300.07	2.460	5.564E+01	PA231
					300.18	6.200	2.208E+01	PA233
302.65	15.	183.28	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.536E+00	BA133
302.85	15.	186.86	1.11	2.943E-02	302.65	2.880	9.770E+00	PA231
					302.85	18.330	1.536E+00	BA133
304.85	9.	305.66	1.11	2.926E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	6.278E-01	BI210M
328.76	19.	93.73	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	15.	105.45	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.49	110.	14.17	1.38	2.677E-02	338.32	12.010	1.899E+01	AC228
345.83	13.	146.91	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.17	281.	7.42	1.25	2.586E-02	351.93	37.600	1.581E+01	PB214
364.48	8.	179.99	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
387.30	8.	215.78	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	14.	114.33	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	263.57	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
453.88	8.	179.99	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
463.37	14.	92.71	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	225.80	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
487.02	7.	198.27	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
497.05	11.	98.66	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	92.	26.01	2.56	1.870E-02	511.86	20.000	1.361E+01	RH106
531.00	7.	173.02	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
537.26	3.	398.44	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
569.32	12.	71.57	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.638E+00	PA234
					569.70	97.740	3.893E-01	BI207
569.47	5.	174.42	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.123E+00	PA234
					569.70	97.740	1.782E-01	BI207
569.70	8.	107.11	1.37	1.703E-02	569.32	15.380	1.767E+00	CS134
					569.47	8.200	3.314E+00	PA234
					569.70	97.740	2.782E-01	BI207
583.37	188.	8.77	1.44	1.668E-02	583.02	84.500	7.413E+00	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.41	163.	9.47	1.49	1.605E-02	609.31	46.090	1.222E+01	BI214
635.89	6.	145.94	1.43	1.546E-02	635.89	11.310	PBC<MDA	SB125
636.97	10.	80.69	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
661.77	105.	12.11	1.00	1.492E-02	661.66	85.210	4.582E+00	CS137
722.79	2.	367.59	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	9.506E-02	AG108M
					723.36	20.220	4.273E-01	EU154
722.94	11.	82.32	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	12.	89.42	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
724.20	6.	190.74	1.51	1.378E-02	724.20	44.150	PBC<MDA	ZR95
735.72	11.	106.41	1.52	1.358E-02	735.72	22.500	PBC<MDA	pm146
747.16	8.	115.31	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
766.41	14.	87.97	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.057E+02	PA234M
778.92	7.	164.75	1.56	1.291E-02	778.92	12.940	PBC<MDA	EU152
785.42	12.	92.58	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	9.	115.56	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
810.78	11.	85.09	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
815.77	2.	441.40	1.59	1.239E-02	815.77	23.280	PBC<MDA	La140
834.85	21.	38.54	1.61	1.213E-02	834.85	99.980	9.424E-01	MN54
846.77	9.	94.28	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
860.67	13.	91.98	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
871.10	2.	501.11	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
873.23	10.	72.81	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
889.28	8.	173.96	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
911.53	108.	13.19	1.05	1.122E-02	911.07	29.000	1.841E+01	AC228
964.11	10.	141.96	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
969.55	75.	13.31	0.79	1.062E-02	968.97	17.460	2.238E+01	AC228
1004.77	6.	262.02	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	17.	39.07	1.78	9.978E-03	1037.84	14.130	6.518E+00	Co56
1048.07	7.	106.21	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	10.	86.38	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1119.92	64.	12.50	1.16	9.311E-03	1120.29	15.100	2.529E+01	BI214
1121.48	11.	112.39	1.85	9.303E-03	1121.30	34.900	PBC<MDA	Ta182
1221.41	8.	121.07	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	11.	123.07	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	4.	154.11	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.626E-01	EU154
1291.60	4.	262.10	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	4.	145.92	2.04	7.678E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	6.	96.69	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.17	376.	5.19	1.30	7.307E-03	1460.83	10.670	2.682E+02	K40
1596.21	2.	304.14	2.19	6.737E-03	1596.21	95.400	PBC<MDA	La140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.13	7.	73.30	2.29	6.141E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	84.65	2.29	6.119E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	10.	31.62	2.33	5.919E-03	1836.06	99.200	9.462E-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
298.50	74.70	186.	237.	4.974E+03	10.42	0.867	- D
308.08	77.10	187.	369.	7.551E+03	7.39	0.869	- 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	186.43	46.72	160.	30.	0.017	76.61	0.770
TH-227	200.12	50.14	386.	8.	0.004	349.11	0.840s
AM-241	237.04	59.37	95.	57.	0.031	31.90	1.727s
TH-234	252.71	63.29	162.	32.	0.018	58.72	0.855D
Sn-126	256.68	64.28	394.	-29.	-0.016	99.79	0.856s
BA-133	323.52	80.99	331.	-31.	-0.017	61.32	0.874
Np-237	345.53	86.49	964.	27.	0.015	166.47	0.880s
EU-155	345.74	86.54	1029.	-30.	-0.016	154.05	0.880s
Sn-126	347.33	86.94	999.	-30.	-0.016	151.79	0.880
Sn-126	349.85	87.57	855.	30.	0.016	77.55	0.881D
Cd-109	351.73	88.04	884.	29.	0.016	144.96	0.881A
Nd-147	363.97	91.10	914.	26.	0.014	166.95	0.885s
TH-234	369.93	92.59	232.	45.	0.025	50.80	0.886D
AC-228	372.97	93.35	868.	30.	0.017	139.83	0.887s
Gd-153	389.57	97.50	698.	-26.	-0.015	144.37	0.892s
Np-239	397.57	99.50	724.	-26.	-0.015	146.65	0.894s
Gd-153	412.38	103.20	640.	-12.	-0.006	307.53	0.898s
Np-239	414.38	103.70	652.	0.	0.000	1000.00	0.898s
Np-239	424.10	106.13	577.	24.	0.013	145.12	0.901
EU-152	486.69	121.78	285.	-24.	-0.013	101.17	0.918s
EU-154	491.98	123.10	250.	19.	0.011	120.30	0.919s
PA-234	524.77	131.29	495.	-26.	-0.015	121.61	0.928s
HF-181	531.68	133.02	521.	-26.	-0.015	124.46	0.930s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-144	533.74	133.54	547.	-14.	-0.008	246.25	0.930
HF-181	544.79	136.30	561.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	606.	-29.	-0.016	120.62	0.933s
Tc-99m	561.63	140.51	465.	-26.	-0.014	120.39	0.938s
U-235	574.73	143.79	1214.	-31.	-0.017	74.38	0.941s
CE-141	581.35	145.44	1152.	-29.	-0.016	165.72	0.943s
Ba-140	650.24	162.66	336.	-23.	-0.013	116.22	0.961s
CE-139	663.01	165.85	221.	20.	0.011	106.73	0.965s
Cf-251	706.00	176.60	154.	-14.	-0.008	167.97	0.976s
TH-229	773.64	193.51	132.	17.	0.009	128.74	0.994s
U-235	820.94	205.33	130.	19.	0.011	113.54	1.007
TH-229	843.01	210.85	172.	4.	0.002	671.84	1.012s
Cf-251	907.62	227.00	143.	-22.	-0.012	102.31	1.029s
PB-212	954.15	238.63	74.	531.	0.295	4.92	1.041D
PB-214	967.61	242.00	110.	117.	0.065	15.74	1.045D
EU-152	978.39	244.69	964.	-20.	-0.011	219.68	1.048s
TH-227	1024.59	256.24	59.	15.	0.008	102.15	1.060s
Cd-113m	1054.43	263.70	143.	-12.	-0.007	143.86	1.067
BI-210M	1062.96	265.83	152.	-4.	-0.002	396.85	1.070s
TL-208	1109.35	277.43	40.	58.	0.032	24.87	1.597s
Hg-203	1116.44	279.20	194.	-20.	-0.011	101.27	1.083s
I-131	1136.83	284.30	70.	16.	0.009	102.65	1.089
PB-214	1181.71	295.52	56.	167.	0.093	12.23	1.191s
PB-212	1200.74	300.27	30.	73.	0.041	18.47	1.033s
PA-231	1199.92	300.07	336.	15.	0.008	176.22	1.105s
PA-233	1200.36	300.18	351.	15.	0.008	180.00	1.105s
PA-231	1210.24	302.65	366.	15.	0.008	183.28	1.107
BA-133	1211.05	302.85	381.	15.	0.008	186.86	1.108
Ba-140	1219.04	304.85	396.	9.	0.005	305.66	1.110
BI-210M	1219.23	304.90	405.	0.	0.000	1000.00	1.110
Ir-192	1233.41	308.44	516.	-18.	-0.010	178.60	1.113s
PA-233	1247.69	312.01	498.	-18.	-0.010	174.90	1.117s
Ir-192	1265.61	316.49	480.	-18.	-0.010	171.03	1.122s
CR-51	1279.99	320.08	462.	-18.	-0.010	167.28	1.125
La-140	1314.69	328.76	84.	19.	0.011	93.73	1.134
Cf-249	1333.41	333.44	115.	15.	0.008	105.45	1.139
AC-228	1353.59	338.49	31.	110.	0.061	14.17	1.385s
Cs-136	1361.93	340.57	276.	-17.	-0.009	141.11	1.146s
EU-152	1376.80	344.29	259.	-17.	-0.009	136.41	1.150s
HF-181	1382.97	345.83	176.	13.	0.007	146.91	1.151s
PB-214	1408.32	352.17	37.	277.	0.154	7.58	1.252s
BA-133	1423.66	356.00	438.	-19.	-0.011	154.53	1.162s
I-131	1457.59	364.48	52.	8.	0.004	179.99	1.170
BA-133	1535.03	383.84	148.	-5.	-0.003	346.99	1.189
Cf-249	1551.47	387.95	145.	8.	0.004	215.78	1.193s
SN-113	1566.43	391.69	114.	14.	0.008	114.33	1.197s
SB-125	1711.18	427.88	44.	5.	0.003	263.57	1.233s
AG-108M	1735.43	433.94	88.	-20.	-0.011	75.96	1.239s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	1815.20	453.88	52.	8.	0.004	179.99	1.258s
SB-125	1853.15	463.37	79.	14.	0.008	92.71	1.268s
Ir-192	1871.93	468.06	101.	6.	0.004	225.80	1.272s
HF-181	1927.68	482.00	115.	-19.	-0.011	81.05	1.286s
La-140	1947.77	487.02	106.	7.	0.004	198.27	1.291s
RU-103	1987.91	497.05	26.	11.	0.006	98.66	1.301
RH-106	2047.15	511.86	73.	92.	0.051	26.01	2.565s
Nd-147	2123.70	531.00	30.	7.	0.004	173.02	1.333s
Ba-140	2148.74	537.26	35.	3.	0.002	398.44	1.339s
CS-134	2276.99	569.32	29.	12.	0.006	71.57	1.369s
PA-234	2277.59	569.47	41.	5.	0.003	174.42	1.370s
BI-207	2278.51	569.70	36.	8.	0.005	107.11	1.370s
TL-208	2333.19	583.37	15.	188.	0.105	8.79	1.441s
SB-125	2401.71	600.50	334.	-5.	-0.003	365.43	1.399s
CS-134	2418.55	604.71	382.	-17.	-0.009	165.30	1.403s
BI-214	2437.37	609.41	19.	163.	0.090	9.47	1.495
RU-103	2440.91	610.30	365.	-17.	-0.009	161.09	1.408s
AG-108M	2456.84	614.28	348.	-17.	-0.009	156.98	1.412s
PM-144	2471.96	618.06	331.	-5.	-0.003	555.32	1.415s
RH-106	2487.38	621.92	326.	0.	0.000	1000.00	1.419
SB-125	2543.28	635.89	31.	6.	0.003	145.94	1.432s
I-131	2547.62	636.97	27.	10.	0.006	80.69	1.433s
AG-110M	2630.77	657.76	169.	-16.	-0.009	51.52	1.452
CS-137	2646.81	661.77	15.	105.	0.058	12.11	0.997s
NB-94	2810.25	702.63	61.	-13.	-0.007	133.43	1.493s
SB-124	2890.87	722.79	30.	2.	0.001	367.59	1.511s
AG-108M	2891.48	722.94	32.	11.	0.006	82.32	1.511s
EU-154	2893.15	723.36	49.	12.	0.007	89.42	1.511s
ZR-95	2896.52	724.20	61.	6.	0.003	190.74	1.512
pm-146	2942.61	735.72	28.	11.	0.006	106.41	1.523s
pm-146	2988.37	747.16	19.	8.	0.005	115.31	1.533s
AG-110M	3055.51	763.94	58.	-8.	-0.004	167.91	1.548s
NB-95	3062.89	765.79	100.	-22.	-0.012	69.27	1.549s
PA-234M	3065.38	766.41	72.	14.	0.008	87.97	1.550s
EU-152	3115.41	778.92	28.	7.	0.004	164.75	1.561s
BI-212	3141.41	785.42	23.	12.	0.006	92.58	1.567s
CS-134	3183.20	795.87	34.	11.	0.006	81.10	1.576s
CS-134	3207.54	801.95	46.	9.	0.005	115.56	1.581s
CO-58	3242.84	810.78	39.	11.	0.006	85.09	1.589s
La-140	3262.82	815.77	50.	2.	0.001	441.40	1.593s
Cs-136	3273.74	818.50	82.	-15.	-0.008	91.15	1.596s
MN-54	3339.13	834.85	9.	21.	0.011	38.54	1.610s
Co-56	3386.82	846.77	14.	9.	0.005	94.28	1.620s
TL-208	3442.00	860.56	25.	13.	0.007	91.98	1.632s
NB-94	3484.13	871.10	28.	2.	0.001	501.11	1.641s
EU-154	3492.66	873.23	21.	10.	0.005	72.81	1.643s
PA-234	3521.86	880.53	72.	-16.	-0.009	78.05	1.649s
PA-234	3532.70	883.24	88.	-5.	-0.003	281.45	1.652s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	3556.86	889.28	97.	8.	0.005	173.96	1.657s
y-88	3591.90	898.04	55.	-19.	-0.011	87.99	1.664s
AC-228	3645.88	911.53	18.	108.	0.060	13.19	1.052s
AG-110M	3749.71	937.49	45.	-18.	-0.010	80.08	1.697s
EU-152	3856.18	964.11	103.	10.	0.006	141.96	1.719s
AC-228	3877.92	969.55	5.	75.	0.041	13.31	0.788s
EU-154	3985.06	996.33	81.	-17.	-0.010	78.11	1.746
PA-234M	4003.73	1001.00	99.	-18.	-0.010	56.49	1.750s
EU-154	4018.84	1004.77	109.	6.	0.003	262.02	1.753
Co-56	4151.10	1037.84	5.	17.	0.009	39.07	1.780s
Cs-136	4192.02	1048.07	27.	7.	0.004	106.21	1.788s
RH-106	4201.18	1050.36	35.	10.	0.006	86.38	1.790s
BI-207	4254.38	1063.66	32.	-2.	-0.001	264.06	1.801s
Ga-68	4309.34	1077.40	27.	-6.	-0.003	211.36	1.812s
FE-59	4396.74	1099.25	43.	-15.	-0.008	104.55	1.829s
EU-152	4448.04	1112.07	119.	-14.	-0.008	111.11	1.839s
ZN-65	4461.92	1115.55	105.	-12.	-0.007	127.04	1.842s
BI-214	4479.41	1119.92	0.	64.	0.036	12.50	1.156s
Sc-46	4481.94	1120.55	93.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	72.	11.	0.006	112.39	1.846
CO-60	4692.68	1173.24	33.	-9.	-0.005	77.48	1.886s
Ta-182	4755.93	1189.05	27.	-1.	0.000	776.56	1.899
Ta-182	4885.37	1221.41	16.	8.	0.004	121.07	1.923
Co-56	4952.84	1238.28	32.	11.	0.006	123.07	1.936s
NA-22	5097.84	1274.53	17.	4.	0.002	154.11	1.963s
EU-154	5097.89	1274.54	21.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	23.	4.	0.002	262.10	1.975s
CO-60	5329.71	1332.50	17.	0.	0.000	1000.00	2.005s
AG-110M	5536.89	1384.30	6.	4.	0.002	145.92	2.042s
EU-152	5631.70	1408.00	6.	6.	0.004	96.69	2.059s
K-40	5844.37	1461.17	3.	376.	0.209	5.19	1.301s
La-140	6384.49	1596.21	6.	2.	0.001	304.14	2.185s
SB-124	6763.55	1690.98	6.	-2.	-0.001	304.14	2.245s
BI-214	7057.56	1764.49	11.	7.	0.004	73.30	2.290
Co-56	7084.99	1771.35	19.	8.	0.004	84.65	2.294s
y-88	7343.81	1836.06	0.	10.	0.006	31.62	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	2.6576E-01					5.31E+01	
			477.60	2.658E-01	%(	1.451E+01	1.58E+03 1.05E+01 G	
NA-22	C	2.6853E-01					9.50E+02	
			1274.53	2.685E-01	?(	1.472E+00	1.54E+02 9.99E+01 G	
K-40	N	2.6818E+02					4.66E+11	
			1460.83	2.682E+02	(P	7.230E+00	5.19E+00 1.07E+01 G	
Sc-46	F	3.9572E-01					8.38E+01	
			889.28	3.957E-01	?(	2.353E+00	1.74E+02 1.00E+02 G	
			1120.55	0.000E+00	-	2.844E+00	1.00E+03 1.00E+02 G	
CR-51	F	-3.6533E+00					2.77E+01	
			320.08	-3.653E+00	?(	2.048E+01	1.67E+02 9.94E+00 G	
MN-54	C	9.4237E-01					3.12E+02	
			834.85	9.424E-01	?(P	7.790E-01	3.85E+01 1.00E+02 G	
FE-59	F	-1.5225E+00					4.45E+01	
			1099.25	-1.522E+00	&(	3.441E+00	1.05E+02 5.65E+01 G	
			1291.60	6.812E-01	+	3.914E+00	2.62E+02 4.32E+01 G	
Co-56	C	1.1347E+00					7.73E+01	
			846.77	4.176E-01	?(	9.347E-01	9.43E+01 9.99E+01 G	
			1238.28	1.068E+00	?(P	2.884E+00	1.23E+02 6.61E+01 G	
			1037.84	6.518E+00	?(P	5.358E+00	3.91E+01 1.41E+01 G	
			1771.35	4.676E+00	?	1.344E+01	8.47E+01 1.55E+01	A
CO-57	C	-1.0502E-02					2.72E+02	
			122.06	-1.050E-02	%(	9.799E-01	2.74E+03 8.56E+01 G	
			136.47	-2.809E+00	+	1.129E+01	1.21E+02 1.07E+01 G	
CO-58	C	4.9544E-01					7.09E+01	
			810.78	4.954E-01	?(	1.421E+00	8.51E+01 9.95E+01 G	
ZN-65	F	-1.3749E+00					2.44E+02	
			1115.55	-1.375E+00	?(	5.920E+00	1.27E+02 5.06E+01 G	
NB-94	I	-5.0799E-01					7.41E+06	
			702.63	-5.080E-01	(	1.564E+00	1.33E+02 9.79E+01 G	
			871.10	7.142E-02	+	1.292E+00	5.01E+02 9.99E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	2.2848E-01					6.40E+01	
			756.73	-2.567E-02	%(	1.942E+00	3.08E+03	5.45E+01 G
			724.20	5.420E-01	?(	3.574E+00	1.91E+02	4.42E+01 G
NB-95	I	-9.1321E-01					6.40E+01	
			765.79	-9.132E-01	&(	2.096E+00	6.93E+01	9.98E+01 G
RU-103	I	3.5273E-01					3.93E+01	
			497.05	3.527E-01	?(	8.431E-01	9.87E+01	9.09E+01 G
			610.30	-1.022E+01	+	5.527E+01	1.61E+02	5.75E+00 GA
RH-106	I	5.0618E+00					3.74E+02	
			621.92	0.000E+00	(	3.082E+01	1.00E+03	9.93E+00 G
			1050.36	3.728E+01	?(	1.088E+02	8.64E+01	1.56E+00 G
			511.86	1.361E+01	?	6.329E+00	2.60E+01	2.00E+01 GA
AG-108M	C	-5.8259E-01					1.53E+05	
			433.94	-5.826E-01	?(P	1.322E+00	7.60E+01	9.05E+01 G
			722.94	4.657E-01	+	1.291E+00	8.23E+01	9.08E+01 G
			614.28	-6.596E-01	+	3.476E+00	1.57E+02	8.98E+01 G
AG-110M	F	2.8141E-01					2.50E+02	
			884.68	-3.277E-02	%(P	3.169E+00	2.35E+03	7.27E+01 G
			657.76	-6.317E-01	& P	2.479E+00	5.15E+01	9.46E+01 G
			937.49	-2.628E+00	+ P	5.026E+00	8.01E+01	3.44E+01 G
			1384.30	1.221E+00	?(P	4.179E+00	1.46E+02	2.43E+01 G
			763.94	-1.449E+00	& P	7.230E+00	1.68E+02	2.23E+01 G
SN-113	F	4.9987E-01					1.15E+02	
			391.69	4.999E-01	?(P	1.928E+00	1.14E+02	6.40E+01 G
SB-124	F	4.1030E-02					6.02E+01	
			602.73	-4.233E-02	%(P	3.049E+00	1.37E+03	9.83E+01 G
			1690.98	-3.640E-01	+	2.571E+00	3.04E+02	4.78E+01 G
			722.79	7.987E-01	?(	1.052E+01	3.68E+02	1.08E+01 G
SB-125	I	1.3957E+00					1.01E+03	
			427.88	4.292E-01	?(	2.886E+00	2.64E+02	2.96E+01 G
			600.50	-8.672E-01	+ P	1.680E+01	3.65E+02	1.79E+01 G
			635.89	1.802E+00	?(P	9.150E+00	1.46E+02	1.13E+01 G
			463.37	3.689E+00	@(P	1.150E+01	9.27E+01	1.05E+01 G
I-131	I	8.6026E-01					8.02E+00	
			364.48	2.166E-01	?(	9.834E-01	1.80E+02	8.17E+01 G
			284.30	4.588E+00	&(P	1.218E+01	1.03E+02	6.14E+00 G
			636.97	5.002E+00	?(	1.359E+01	8.07E+01	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-8.7170E-01					2.42E+02	
			97.50	-8.717E-01	?(	4.199E+00	1.44E+02	3.00E+01 G
			103.20	-5.299E-01	&	5.469E+00	3.08E+02	2.18E+01 G
Ga-68	C	-1.1613E+01					4.71E-02	
			1077.40	-1.161E+01	?(	5.487E+01	2.11E+02	3.30E+00 G
Tc-99m	I	-3.0874E-01					2.51E-01	
			140.51	-3.087E-01	?(	1.241E+00	1.20E+02	8.93E+01 G
BA-133	F	-1.7212E-01					3.85E+03	
			356.00	-6.767E-01	?(	3.503E+00	1.55E+02	6.20E+01 G
			302.85	1.536E+00	?(	9.645E+00	1.87E+02	1.83E+01 G
			383.84	-1.294E+00	&	1.537E+01	3.47E+02	8.94E+00 GA
			80.99	-9.998E-01	+ P	2.815E+00	6.13E+01	3.41E+01 GA
CS-134	I	3.2077E-01					7.54E+02	
			604.71	-5.950E-01	?(	3.301E+00	1.65E+02	9.76E+01 G
			795.87	5.620E-01	*(	1.533E+00	8.11E+01	8.55E+01 G
			569.32	2.472E+00	?(	5.894E+00	7.16E+01	1.54E+01 G
			801.95	4.427E+00	&(	1.749E+01	1.16E+02	8.69E+00 G
			563.24	-2.250E-02	% P	1.354E+01	2.43E+04	8.35E+00 G
CS-137	I	4.5822E+00					1.10E+04	
			661.66	4.582E+00	(P	9.099E-01	1.21E+01	8.52E+01 G
CE-139	F	2.8672E-01					1.38E+02	
			165.85	2.867E-01	?(	1.025E+00	1.07E+02	7.99E+01 G
Ba-140	I	9.4301E-01					1.28E+01	
			537.26	3.883E-01	?(P	3.844E+00	3.98E+02	2.44E+01 G
			162.66	-4.180E+00	+	1.624E+01	1.16E+02	6.22E+00 G
			304.85	4.097E+00	&(	4.222E+01	3.06E+02	4.29E+00 G
La-140	I	4.6796E-01					1.28E+01	
			1596.21	1.729E-01	?(	1.221E+00	3.04E+02	9.54E+01 G
			487.02	4.681E-01	?(	3.175E+00	1.98E+02	4.55E+01 G
			328.76	1.886E+00	(	4.539E+00	9.37E+01	2.03E+01 G
			815.77	4.402E-01	?(	6.852E+00	4.41E+02	2.33E+01 G
CE-141	I	-6.4135E-01					3.25E+01	
			145.44	-6.414E-01	?(	3.540E+00	1.66E+02	4.82E+01 G
CE-144	I	-1.2408E+00					2.85E+02	
			133.54	-1.241E+00	(	1.026E+01	2.46E+02	1.11E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C -1.2451E-02					3.63E+02	
		696.54	-1.245E-02	%(P	1.483E+00	4.03E+03	9.90E+01 G
		618.06	-1.644E-01	+	3.093E+00	5.55E+02	9.91E+01 G
EU-152	F 8.9438E-01					4.94E+03	
		344.29	-1.348E+00	(	6.178E+00	1.36E+02	2.65E+01 G
		1112.07	-6.210E+00	+	2.326E+01	1.11E+02	1.36E+01 G
		121.78	-8.351E-01	&	2.821E+00	1.01E+02	2.86E+01 G
		778.92	2.328E+00	?(	9.101E+00	1.65E+02	1.29E+01 G
		964.11	3.693E+00	&(	1.782E+01	1.42E+02	1.46E+01 G
		244.69	-4.176E+00	+	3.064E+01	2.20E+02	7.58E+00 G
		1408.00	2.216E+00	?	4.829E+00	9.67E+01	2.10E+01 GA
EU-154	I 2.4825E+00					3.14E+03	
		873.23	3.843E+00	&(	9.348E+00	7.28E+01	1.23E+01 G
		123.10	4.611E-01	- P	1.860E+00	1.20E+02	4.08E+01 G
		1274.54	0.000E+00	-	4.588E+00	1.00E+03	3.52E+01 G
		723.36	2.341E+00	?(	7.061E+00	8.94E+01	2.02E+01 G
		1004.77	1.714E+00	?(	1.542E+01	2.62E+02	1.80E+01 G
		996.33	-8.692E+00	+	2.265E+01	7.81E+01	1.06E+01 G
EU-155	I -3.3430E-02					1.81E+03	
		105.31	-3.343E-02	&(P	5.660E+00	3.16E+03	2.12E+01 G
		86.54	-1.016E+00	+	5.215E+00	1.54E+02	3.07E+01 G
HF-181	F -2.8655E-01					4.24E+01	
		482.00	-6.823E-01	?(	1.844E+00	8.10E+01	8.05E+01 G
		133.02	-6.165E-01	+	2.560E+00	1.24E+02	4.33E+01 G
		345.83	1.827E+00	?(P	9.065E+00	1.47E+02	1.51E+01 G
		136.30	0.000E+00	+	1.984E+01	1.00E+03	5.85E+00 G
Ta-182	F 1.8935E+00					1.14E+02	
		1121.30	1.902E+00	(	7.253E+00	1.12E+02	3.49E+01 G
		1221.41	1.882E+00	(P	5.121E+00	1.21E+02	2.70E+01 G
		1189.05	-3.366E-01	- P	1.044E+01	7.77E+02	1.62E+01 G
Hg-203	F -4.3094E-01					4.66E+01	
		279.20	-4.309E-01	?(	1.461E+00	1.01E+02	8.15E+01 G
TL-208	N 7.4131E+00					6.98E+02	
		583.02	7.413E+00	@(P	8.144E-01	8.79E+00	8.45E+01 G
		277.28	1.619E+01	+	8.898E+00	2.49E+01	6.31E+00 G
		860.56	4.762E+00	- P	9.872E+00	9.20E+01	1.24E+01 G
pm-146	C 1.4079E+00					2.02E+03	
		747.16	1.016E+00	?(	2.786E+00	1.15E+02	3.40E+01 G
		735.72	2.000E+00	?(	4.975E+00	1.06E+02	2.25E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          453.88 3.292E-01 &   1.494E+00 1.80E+02 6.50E+01 G

y-88     F  -1.0009E+00                                     1.07E+02
                          898.04-1.001E+00 ?(  1.944E+00 8.80E+01 9.37E+01 G
                         1836.06 9.462E-01 +   6.973E-01 3.16E+01 9.92E+01 G

Cd-113m     -3.3565E+03                                     5.33E+03
                          263.70-3.357E+03  (  1.634E+04 1.44E+02 6.00E-03   K

Cd-109   F   8.0471E+00                                     4.53E+02
                                                          Derived Ave Activity
                           88.04 8.047E+00 }(  3.887E+01 1.45E+02 3.79E+00 G

Cf-251   T  -9.8742E-01                                     3.28E+05
                          176.60-9.874E-01  (  4.270E+00 1.68E+02 1.70E+01 G
                          227.00-5.246E+00 +   1.372E+01 1.02E+02 6.30E+00 GA

Cf-249   T   6.0157E-01                                     1.28E+05
                          387.95 2.830E-01 &(  2.081E+00 2.16E+02 6.60E+01 G
                          333.44 1.957E+00  (  6.950E+00 1.05E+02 1.55E+01 G

Sn-126      -4.0179E+00                                     3.65E+07
                           87.57 8.278E-01 }   3.874E+00 7.76E+01 3.75E+01 GA
                           64.28-4.018E+00 ?(  1.336E+01 9.98E+01 9.70E+00 G
                           86.94-3.444E+00 +   1.741E+01 1.52E+02 9.04E+00 GA

PB-210   N   1.6007E+01                                     8.14E+03
                           46.54 1.601E+01  (P 3.242E+01 7.66E+01 4.25E+00 G

PB-212   N   1.8913E+01                                     6.98E+02
                          238.63 1.891E+01  (P 1.525E+00 4.92E+00 4.33E+01 G
                          300.03 4.172E+01 + P 1.610E+01 1.85E+01 3.28E+00 GA

PB-214   N   1.5871E+01                                     5.84E+05
                          351.93 1.581E+01 @(P 1.773E+00 7.58E+00 3.76E+01 G
                          295.09 1.598E+01 @(P 3.594E+00 1.22E+01 1.93E+01 G
                          242.00 2.450E+01 +   1.085E+01 1.57E+01 7.43E+00 GA

BI-207   C   2.7815E-01                                     1.18E+04
                          569.70 2.782E-01 &(  1.019E+00 1.07E+02 9.77E+01 G
                         1063.66-1.899E-01 - P 2.237E+00 2.64E+02 7.45E+01 G

BI-212   N  -4.4677E-01                                     6.98E+02
                          727.17-4.468E-01 %(  2.203E+01 1.40E+03 7.55E+00 G
                          785.42 3.951E+01 ?   8.542E+01 9.26E+01 1.28E+00 GA
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	1.2224E+01					5.84E+05	
			609.31	1.222E+01	(P	1.738E+00	9.47E+00	4.61E+01 G
			1120.29	2.529E+01	+	2.912E+00	1.25E+01	1.51E+01 G
			1764.49	4.293E+00	- P	1.053E+01	7.33E+01	1.54E+01 G
BI-210M	T	-1.2675E-01					1.10E+09	
			265.83	-1.268E-01	?(P	2.032E+00	3.97E+02	5.00E+01 G
			304.90	0.000E+00	&	6.543E+00	1.00E+03	2.80E+01 G
AC-228	N	1.9713E+01					2.10E+03	
			911.07	1.841E+01	(P	3.855E+00	1.32E+01	2.90E+01 G
			968.97	2.238E+01	(P	4.038E+00	1.33E+01	1.75E+01 G
			338.32	1.899E+01	*(P	4.961E+00	1.42E+01	1.20E+01 G
			93.35	5.491E+00	-	2.558E+01	1.40E+02	5.56E+00 XA
TH-227	N	2.6306E+00					7.95E+03	
			50.14	1.956E+00	&(	2.304E+01	3.49E+02	8.00E+00 G
			256.24	3.402E+00	?(P	9.000E+00	1.02E+02	7.00E+00 G
TH-229	N	3.6660E+00					2.68E+06	
			193.51	4.999E+00	&(	1.654E+01	1.29E+02	4.40E+00 G
			210.85	1.705E+00	(	2.970E+01	6.72E+02	2.99E+00 G
TH-234	N	9.6114E+00					1.63E+12	
			63.29	1.177E+01	(P	2.260E+01	5.87E+01	3.81E+00 G
			92.59	8.136E+00	(P	1.346E+01	5.08E+01	5.58E+00 G
PA-231	N	1.0486E+01					1.20E+07	
			302.65	9.768E+00	&(	6.017E+01	1.83E+02	2.88E+00 G
			300.07	1.133E+01	*(	6.712E+01	1.76E+02	2.46E+00 G
PA-233	C	-1.7538E-01					7.82E+08	
			312.01	-9.798E-01	?(	5.741E+00	1.75E+02	3.60E+01 G
			300.18	4.495E+00	*(	2.720E+01	1.80E+02	6.20E+00 G
PA-234	N	-3.4745E-01					1.63E+12	
			131.29	-1.473E+00	?(	5.977E+00	1.22E+02	1.80E+01 G
			946.02	3.822E-01	%	9.941E+00	1.10E+03	1.34E+01 G
			569.47	2.123E+00	&(	1.290E+01	1.74E+02	8.20E+00 G
			883.24	-2.399E+00	+	2.331E+01	2.81E+02	9.60E+00 G
			880.53	-1.298E+01	+	3.381E+01	7.81E+01	6.00E+00 GA
PA-234M	N	-1.1403E+02					1.63E+12	
			1001.00	-1.140E+02	&(P	3.160E+02	5.65E+01	8.37E-01 G
			766.41	2.057E+02	&	6.076E+02	8.80E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N  -2.9529E+00                                      2.57E+11
                         143.79-2.953E+00  (P 1.587E+01 7.44E+01 1.10E+01 G
                         205.33 5.191E+00 + P 1.515E+01 1.14E+02 5.01E+00 G
                         163.38-3.422E-02 & P 2.061E+01 1.51E+04 5.08E+00 G

AM-241   T   2.3692E+00                                      1.58E+05
                          59.54 2.369E+00  (  2.016E+00 3.19E+01 3.59E+01 G

Np-237   F   2.1339E+00                                      2.14E+06
                          86.49 2.134E+00 &(P 1.184E+01 1.66E+02 1.31E+01 G

Ir-192   F  -1.3200E-01                                      7.40E+01
                         316.49-4.119E-01 ?(  2.361E+00 1.71E+02 8.70E+01 G
                         468.06 3.387E-01 ?(  2.625E+00 2.26E+02 5.18E+01 G
                         308.44-1.096E+00 +   6.560E+00 1.79E+02 3.18E+01 G

Cs-136   F  -6.6023E-01                                      1.30E+01
                         818.50-6.602E-01 ?(  2.022E+00 9.12E+01 1.00E+02 G
                        1048.07 5.149E-01 +   1.880E+00 1.06E+02 8.00E+01 G
                         340.57-7.522E-01 +   3.566E+00 1.41E+02 4.69E+01 G

Np-239   T   1.0258E+00                                      2.36E+00
                         103.70 0.000E+00 -   5.008E+00 1.00E+03 2.40E+01 X
                         106.13 1.026E+00  (  4.973E+00 1.45E+02 2.27E+01 G
                          99.50-1.739E+00 +   8.506E+00 1.47E+02 1.50E+01 X

Nd-147       1.1358E+00                                      1.11E+01
                         531.00 1.573E+00 ?(  6.695E+00 1.73E+02 1.30E+01 G
                          91.10 9.350E-01 ?(  5.206E+00 1.67E+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	386.	8.	0.004	349.11	1.956E+00	
BA-133	80.99	331.	-31.	-0.017	61.32	-9.998E-01	P
EU-155	86.54	1029.	-30.	-0.016	154.05	-1.016E+00	
Nd-147	91.10	914.	26.	0.014	166.95	9.350E-01	
Gd-153	97.50	698.	-26.	-0.015	144.37	-8.717E-01	
Np-239	99.50	724.	-26.	-0.015	146.65	-1.739E+00	
Gd-153	103.20	640.	-12.	-0.006	307.53	-5.299E-01	
Np-239	106.13	577.	24.	0.013	145.12	1.026E+00	
EU-152	121.78	285.	-24.	-0.013	101.17	-8.351E-01	
EU-154	123.10	250.	19.	0.011	120.30	4.611E-01	P
PA-234	131.29	495.	-26.	-0.015	121.61	-1.473E+00	
HF-181	133.02	521.	-26.	-0.015	124.46	-6.165E-01	
CE-144	133.54	547.	-14.	-0.008	246.25	-1.241E+00	
CO-57	136.47	606.	-29.	-0.016	120.62	-2.809E+00	
Tc-99m	140.51	465.	-26.	-0.014	120.39	-3.087E-01	
U-235	143.79	1214.	-31.	-0.017	74.38	-2.953E+00	P
CE-141	145.44	1152.	-29.	-0.016	165.72	-6.414E-01	
Ba-140	162.66	336.	-23.	-0.013	116.22	-4.180E+00	
CE-139	165.85	221.	20.	0.011	106.73	2.867E-01	
Cf-251	176.60	154.	-14.	-0.008	167.97	-9.874E-01	
TH-229	193.51	132.	17.	0.009	128.74	4.999E+00	
U-235	205.33	130.	19.	0.011	113.54	5.191E+00	P
TH-229	210.85	172.	4.	0.002	671.84	1.705E+00	
Cf-251	227.00	143.	-22.	-0.012	102.31	-5.246E+00	
EU-152	244.69	964.	-20.	-0.011	219.68	-4.176E+00	
TH-227	256.24	59.	15.	0.008	102.15	3.402E+00	P
Cd-113m	263.70	143.	-12.	-0.007	143.86	-3.357E+03	
BI-210M	265.83	152.	-4.	-0.002	396.85	-1.268E-01	P
Hg-203	279.20	194.	-20.	-0.011	101.27	-4.309E-01	
I-131	284.30	70.	16.	0.009	102.65	4.588E+00	P
PA-231	300.07	336.	15.	0.008	176.22	1.133E+01	
PA-233	300.18	351.	15.	0.008	180.00	4.495E+00	
PA-231	302.65	366.	15.	0.008	183.28	9.768E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BA-133	302.85	381.	15.	0.008	186.86	1.536E+00		
Ba-140	304.85	396.	9.	0.005	305.66	4.097E+00		
Ir-192	308.44	516.	-18.	-0.010	178.60	-1.096E+00		
PA-233	312.01	498.	-18.	-0.010	174.90	-9.798E-01		
Ir-192	316.49	480.	-18.	-0.010	171.03	-4.119E-01		
CR-51	320.08	462.	-18.	-0.010	167.28	-3.653E+00		
La-140	328.76	84.	19.	0.011	93.73	1.886E+00		
Cs-136	340.57	276.	-17.	-0.009	141.11	-7.522E-01		
EU-152	344.29	259.	-17.	-0.009	136.41	-1.348E+00		
HF-181	345.83	176.	13.	0.007	146.91	1.827E+00		P
BA-133	356.00	438.	-19.	-0.011	154.53	-6.767E-01		
I-131	364.48	52.	8.	0.004	179.99	2.166E-01		
BA-133	383.84	148.	-5.	-0.003	346.99	-1.294E+00		
SN-113	391.69	114.	14.	0.008	114.33	4.999E-01		P
SB-125	427.88	44.	5.	0.003	263.57	4.292E-01		
AG-108M	433.94	88.	-20.	-0.011	75.96	-5.826E-01		P
pm-146	453.88	52.	8.	0.004	179.99	3.292E-01		
SB-125	463.37	79.	14.	0.008	92.71	3.689E+00		P
Ir-192	468.06	101.	6.	0.004	225.80	3.387E-01		
HF-181	482.00	115.	-19.	-0.011	81.05	-6.823E-01		
La-140	487.02	106.	7.	0.004	198.27	4.681E-01		
RU-103	497.05	26.	11.	0.006	98.66	3.527E-01		
RH-106	511.86	73.	92.	0.051	26.01	1.361E+01		
Nd-147	531.00	30.	7.	0.004	173.02	1.573E+00		
Ba-140	537.26	35.	3.	0.002	398.44	3.883E-01		P
CS-134	569.32	29.	12.	0.006	71.57	2.472E+00		
PA-234	569.47	41.	5.	0.003	174.42	2.123E+00		
BI-207	569.70	36.	8.	0.005	107.11	2.782E-01		
SB-125	600.50	334.	-5.	-0.003	365.43	-8.672E-01		P
CS-134	604.71	382.	-17.	-0.009	165.30	-5.950E-01		
RU-103	610.30	365.	-17.	-0.009	161.09	-1.022E+01		
AG-108M	614.28	348.	-17.	-0.009	156.98	-6.596E-01		
PM-144	618.06	331.	-5.	-0.003	555.32	-1.644E-01		
SB-125	635.89	31.	6.	0.003	145.94	1.802E+00		P
I-131	636.97	27.	10.	0.006	80.69	5.002E+00		
AG-110M	657.76	169.	-16.	-0.009	51.52	-6.317E-01		P
NB-94	702.63	61.	-13.	-0.007	133.43	-5.080E-01		
SB-124	722.79	30.	2.	0.001	367.59	7.987E-01		
AG-108M	722.94	32.	11.	0.006	82.32	4.657E-01		
EU-154	723.36	49.	12.	0.007	89.42	2.341E+00		
ZR-95	724.20	61.	6.	0.003	190.74	5.420E-01		
pm-146	735.72	28.	11.	0.006	106.41	2.000E+00		
pm-146	747.16	19.	8.	0.005	115.31	1.016E+00		
AG-110M	763.94	58.	-8.	-0.004	167.91	-1.449E+00		P
NB-95	765.79	100.	-22.	-0.012	69.27	-9.132E-01		
PA-234M	766.41	72.	14.	0.008	87.97	2.057E+02		
EU-152	778.92	28.	7.	0.004	164.75	2.328E+00		
BI-212	785.42	23.	12.	0.006	92.58	3.951E+01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.87	34.	11.	0.006	81.10	5.620E-01		
CS-134	801.95	46.	9.	0.005	115.56	4.427E+00		
CO-58	810.78	39.	11.	0.006	85.09	4.954E-01		
La-140	815.77	50.	2.	0.001	441.40	4.402E-01		
Cs-136	818.50	82.	-15.	-0.008	91.15	-6.602E-01		
NB-94	871.10	28.	2.	0.001	501.11	7.142E-02		
EU-154	873.23	21.	10.	0.005	72.81	3.843E+00		
PA-234	880.53	72.	-16.	-0.009	78.05	-1.298E+01		
PA-234	883.24	88.	-5.	-0.003	281.45	-2.399E+00		
Sc-46	889.28	97.	8.	0.005	173.96	3.957E-01		
y-88	898.04	55.	-19.	-0.011	87.99	-1.001E+00		
AG-110M	937.49	45.	-18.	-0.010	80.08	-2.628E+00		P
EU-152	964.11	103.	10.	0.006	141.96	3.693E+00		
EU-154	996.33	81.	-17.	-0.010	78.11	-8.692E+00		
PA-234M	1001.00	99.	-18.	-0.010	56.49	-1.140E+02		P
EU-154	1004.77	109.	6.	0.003	262.02	1.714E+00		
Cs-136	1048.07	27.	7.	0.004	106.21	5.149E-01		
RH-106	1050.36	35.	10.	0.006	86.38	3.728E+01		
BI-207	1063.66	32.	-2.	-0.001	264.06	-1.899E-01		P
Ga-68	1077.40	27.	-6.	-0.003	211.36	-1.161E+01		
FE-59	1099.25	43.	-15.	-0.008	104.55	-1.522E+00		
EU-152	1112.07	119.	-14.	-0.008	111.11	-6.210E+00		
ZN-65	1115.55	105.	-12.	-0.007	127.04	-1.375E+00		
Ta-182	1121.30	72.	11.	0.006	112.39	1.902E+00		
CO-60	1173.24	33.	-9.	-0.005	77.48	-5.369E-01		P
Ta-182	1189.05	27.	-1.	0.000	776.56	-3.366E-01		P
Ta-182	1221.41	16.	8.	0.004	121.07	1.882E+00		P
NA-22	1274.53	17.	4.	0.002	154.11	2.685E-01		
FE-59	1291.60	23.	4.	0.002	262.10	6.812E-01		
AG-110M	1384.30	6.	4.	0.002	145.92	1.221E+00		P
EU-152	1408.00	6.	6.	0.004	96.69	2.216E+00		
La-140	1596.21	6.	2.	0.001	304.14	1.729E-01		
SB-124	1690.98	6.	-2.	-0.001	304.14	-3.640E-01		
y-88	1836.06	0.	10.	0.006	31.62	9.462E-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	2.6576E-01	2.6576E-01	1.578E+03%	1.45E+01
NA-22	#A	2.6853E-01	2.6853E-01	1.541E+02%	1.47E+00
K-40		2.6818E+02	2.6818E+02	5.191E+00%	7.23E+00
Sc-46	#A	3.9572E-01	3.9572E-01	1.740E+02%	2.35E+00
CR-51	#A	-3.6532E+00	-3.6533E+00	1.673E+02%	2.05E+01
MN-54	#	9.4237E-01	9.4237E-01	3.854E+01%	7.79E-01

FE-59	#A	-1.5225E+00	-1.5225E+00	1.045E+02%	3.44E+00
Co-56	#	1.1347E+00	1.1347E+00	3.907E+01%	9.35E-01
CO-57	#A	-1.0502E-02	-1.0502E-02	2.743E+03%	9.80E-01
CO-58	#A	4.9544E-01	4.9544E-01	8.509E+01%	1.42E+00
CO-60	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.53E+00
ZN-65	#A	-1.3749E+00	-1.3749E+00	1.270E+02%	5.92E+00
NB-94	#A	-5.0799E-01	-5.0799E-01	1.334E+02%	1.56E+00
ZR-95	#A	2.2848E-01	2.2848E-01	1.907E+02%	1.94E+00
NB-95	#A	-9.1320E-01	-9.1321E-01	6.927E+01%	2.10E+00
RU-103	#A	3.5272E-01	3.5273E-01	9.866E+01%	8.43E-01
RH-106	#A	5.0618E+00	5.0618E+00	8.638E+01%	3.08E+01
AG-108M	#A	-5.8259E-01	-5.8259E-01	7.596E+01%	1.32E+00
AG-110M	#A	2.8141E-01	2.8141E-01	1.459E+02%	3.17E+00
SN-113	#A	4.9987E-01	4.9987E-01	1.143E+02%	1.93E+00
SB-124	#A	4.1030E-02	4.1030E-02	3.676E+02%	3.05E+00
SB-125	#A	1.3957E+00	1.3957E+00	9.271E+01%	2.89E+00
I-131	#A	8.6022E-01	8.6026E-01	7.412E+01%	9.83E-01
Gd-153	#A	-8.7170E-01	-8.7170E-01	1.444E+02%	4.20E+00
Ga-68	#A	-1.1512E+01	-1.1613E+01	2.114E+02%	5.49E+01
Tc-99m	#A	-3.0824E-01	-3.0874E-01	1.204E+02%	1.24E+00
BA-133	#A	-1.7212E-01	-1.7212E-01	1.212E+02%	3.50E+00
CS-134	#A	3.2077E-01	3.2077E-01	5.721E+01%	3.30E+00
CS-137		4.5822E+00	4.5822E+00	1.211E+01%	9.10E-01
CE-139	#A	2.8672E-01	2.8672E-01	1.067E+02%	1.02E+00
Ba-140	#A	9.4298E-01	9.4301E-01	2.511E+02%	3.84E+00
La-140	#A	4.6794E-01	4.6796E-01	9.373E+01%	1.22E+00
CE-141	#A	-6.4135E-01	-6.4135E-01	1.657E+02%	3.54E+00
CE-144	#A	-1.2408E+00	-1.2408E+00	2.462E+02%	1.03E+01
PM-144	#A	-1.2451E-02	-1.2451E-02	4.027E+03%	1.48E+00
EU-152	#A	8.9438E-01	8.9438E-01	8.557E+01%	6.18E+00
EU-154	#A	2.4825E+00	2.4825E+00	7.281E+01%	9.35E+00
EU-155	#A	-3.3430E-02	-3.3430E-02	3.156E+03%	5.66E+00
HF-181	#A	-2.8655E-01	-2.8655E-01	8.105E+01%	1.84E+00
Ta-182	#A	1.8935E+00	1.8935E+00	8.260E+01%	7.25E+00
Hg-203	#A	-4.3094E-01	-4.3094E-01	1.013E+02%	1.46E+00
TL-208	#	7.4131E+00	7.4131E+00	8.794E+00%	8.14E-01
pm-146	#A	1.4079E+00	1.4079E+00	7.845E+01%	2.79E+00
y-88	#A	-1.0009E+00	-1.0009E+00	8.799E+01%	1.94E+00
Cd-113m	#A	-3.3565E+03	-3.3565E+03	1.439E+02%	1.63E+04
Cd-109	#A	8.0471E+00	8.0471E+00	1.450E+02%	3.89E+01
Cf-251	#A	-9.8742E-01	-9.8742E-01	1.680E+02%	4.27E+00
Cf-249	A	6.0157E-01	6.0157E-01	1.055E+02%	2.08E+00
Sn-126	#A	-4.0179E+00	-4.0179E+00	9.979E+01%	1.34E+01
PB-210	A	1.6007E+01	1.6007E+01	7.661E+01%	3.24E+01
PB-212		1.8913E+01	1.8913E+01	4.917E+00%	1.53E+00
PB-214	#	1.5871E+01	1.5871E+01	7.194E+00%	1.77E+00
BI-207	#A	2.7815E-01	2.7815E-01	1.071E+02%	1.02E+00
BI-212	#A	-4.4677E-01	-4.4677E-01	1.402E+03%	2.20E+01
BI-214		1.2224E+01	1.2224E+01	9.469E+00%	1.74E+00

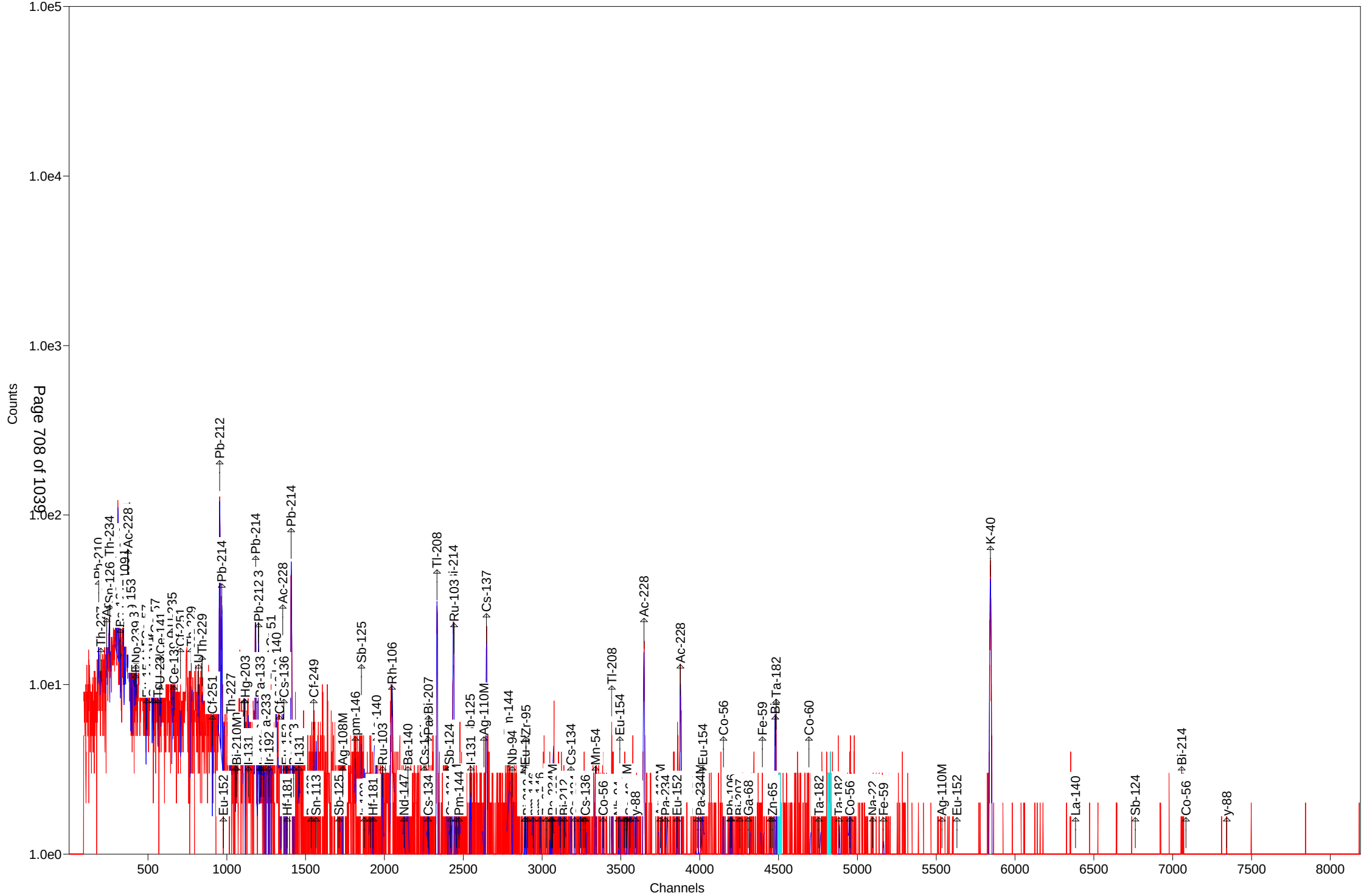
BI-210M#A	-1.2675E-01	-1.2675E-01	3.969E+02%	2.03E+00
AC-228	1.9713E+01	1.9713E+01	7.830E+00%	3.85E+00
TH-227 #A	2.6306E+00	2.6306E+00	1.022E+02%	2.30E+01
TH-229 #A	3.6660E+00	3.6660E+00	1.287E+02%	1.65E+01
TH-234 A	9.6114E+00	9.6114E+00	3.882E+01%	2.26E+01
PA-231 #A	1.0486E+01	1.0486E+01	1.271E+02%	6.02E+01
PA-233 #A	-1.7538E-01	-1.7538E-01	1.255E+02%	5.74E+00
PA-234 #A	-3.4745E-01	-3.4745E-01	1.063E+02%	5.98E+00
PA-234M#A	-1.1403E+02	-1.1403E+02	5.649E+01%	3.16E+02
U-235 #A	-2.9529E+00	-2.9529E+00	7.438E+01%	1.59E+01
AM-241 #	2.3692E+00	2.3692E+00	3.190E+01%	2.02E+00
Np-237 #A	2.1339E+00	2.1339E+00	1.665E+02%	1.18E+01
Ir-192 #A	-1.3200E-01	-1.3200E-01	1.416E+02%	2.36E+00
Cs-136 #A	-6.6021E-01	-6.6023E-01	9.115E+01%	2.02E+00
Np-239 #A	1.0257E+00	1.0258E+00	1.451E+02%	4.97E+00
Nd-147 #A	1.1358E+00	1.1358E+00	1.202E+02%	6.69E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 3.749E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.7488699E+02 Bq/Sample

257318_Gamma_160-17797-A-14-B. 7_Gamma_20161699.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20161005

Sample Description: 257318_Gamma_160-17797-A-15-B
Detector: Detector # 8
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-15-B

Decay to Time: 7/12/2016 12:17 Live Time: 1800 sec
Acquisition Time: 7/12/2016 12:18:15 Real Time: 1853 sec
Analysis Time: 7/12/2016 12:49 Dead Time: 2.88 %
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_2016-07-10_1451.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	1.804E+01
NA-22	-2.403E-01	197.2	4.739E-01	4.741E-01	1.710E+00
K-40	2.608E+02	5.7	1.495E+01	2.004E+01	8.115E+00
Sc-46	3.793E-01	95.1	3.609E-01	3.614E-01	3.462E+00
CR-51	3.580E+00	157.1	5.625E+00	5.629E+00	1.896E+01
MN-54	7.443E-02	913.4	6.798E-01	6.799E-01	1.638E+00
FE-59	5.784E-01	134.7	7.793E-01	7.798E-01	2.222E+00
Co-56	3.308E-01	189.5	6.270E-01	6.273E-01	1.432E+00
CO-57	2.670E-01	125.9	3.362E-01	3.365E-01	1.130E+00
CO-58	2.646E-01	210.1	5.561E-01	5.562E-01	1.937E+00
CO-60	9.120E-02	328.6	2.996E-01	2.997E-01	1.913E+00
ZN-65	-2.255E+00	97.0	2.187E+00	2.190E+00	7.346E+00
NB-94	3.703E-01	69.3	2.565E-01	2.572E-01	1.350E+00
ZR-95	5.074E-01	170.7	8.660E-01	8.664E-01	2.380E+00
NB-95	0.000E+00	1.#INF	1.040E-01	1.040E-01	2.259E+00
RU-103	-6.126E-01	103.1	6.318E-01	6.326E-01	1.506E+00
RH-106	0.000E+00	1.#INF	1.077E+00	1.077E+00	3.571E+01
AG-108M	4.287E-01	126.9	5.439E-01	5.443E-01	1.306E+00
AG-110M	-1.346E+00	99.4	1.338E+00	1.340E+00	4.492E+00
SN-113	-6.707E-01	113.5	7.615E-01	7.622E-01	1.889E+00
SB-124	-3.089E-03	33401.7	1.032E+00	1.032E+00	3.517E+00
SB-125	4.430E+00	28.4	1.258E+00	1.279E+00	3.332E+00
I-131	5.161E-01	110.6	5.707E-01	5.713E-01	1.006E+00
Gd-153	1.419E+00	162.9	2.311E+00	2.313E+00	7.691E+00
Ga-68	2.092E+01	89.3	1.869E+01	1.872E+01	4.327E+01
Tc-99m	4.233E-01	155.6	6.585E-01	6.589E-01	2.197E+00
BA-133	-6.707E-01	175.7	1.179E+00	1.179E+00	3.963E+00
CS-134	9.024E-01	30.5	2.755E-01	2.795E-01	3.550E+00
CS-137	4.841E-01	155.9	7.549E-01	7.553E-01	2.570E+00
CE-139	4.414E-01	93.0	4.106E-01	4.128E-01	1.371E+00
Ba-140	1.822E+00	94.4	1.720E+00	1.722E+00	3.881E+00
La-140	-1.989E-01	85.7	1.705E-01	1.708E-01	2.554E+00
CE-141	7.803E-01	145.9	1.138E+00	1.139E+00	3.798E+00

CE-144	-3.518E+00	135.5	4.766E+00	4.770E+00	1.589E+01
PM-144	1.243E+00	32.0	3.985E-01	4.037E-01	8.209E-01
EU-152	1.676E+00	131.1	2.196E+00	2.198E+00	9.348E+00
EU-154	7.398E-01	108.0	7.990E-01	7.999E-01	1.122E+01
EU-155	-3.131E-01	462.6	1.448E+00	1.449E+00	4.920E+00
HF-181	1.010E-01	101.4	1.024E-01	1.026E-01	2.513E+00
Ta-182	-2.668E+00	110.2	2.941E+00	2.944E+00	9.937E+00
Hg-203	-8.429E-02	538.5	4.539E-01	4.539E-01	1.563E+00
TL-208	6.809E+00	10.0	6.804E-01	7.667E-01	1.052E+00
pm-146	4.909E-01	104.8	5.146E-01	5.152E-01	4.388E+00
y-88	-7.182E-01	58.9	4.230E-01	4.246E-01	1.975E+00
Cd-113m	-8.710E+03	87.0	7.580E+03	7.601E+03	2.527E+04
Cd-109	0.000E+00	1.#INF	1.964E+01	1.964E+01	6.534E+01
Cf-251	-2.583E+00	94.6	2.443E+00	2.454E+00	6.216E+00
Cf-249	5.464E-01	166.5	9.100E-01	9.104E-01	2.446E+00
Sn-126	5.394E+00	111.7	6.022E+00	6.029E+00	2.007E+01
PB-210	1.518E+01	98.4	1.494E+01	1.496E+01	4.986E+01
PB-212	2.164E+01	5.2	1.122E+00	1.794E+00	1.751E+00
PB-214	1.713E+01	6.8	1.172E+00	1.472E+00	2.100E+00
BI-207	-5.761E-01	105.4	6.075E-01	6.082E-01	1.684E+00
BI-212	4.124E+01	12.7	5.246E+00	5.666E+00	4.852E+00
BI-214	1.652E+01	9.5	1.577E+00	1.795E+00	2.215E+00
BI-210M	-8.569E-01	93.9	8.048E-01	8.064E-01	2.693E+00
AC-228	1.804E+01	10.6	1.911E+00	2.121E+00	3.292E+00
TH-227	-7.943E+00	103.5	8.224E+00	8.236E+00	2.744E+01
TH-229	7.648E+00	101.2	7.743E+00	7.768E+00	2.172E+01
TH-234	1.912E+01	51.6	9.876E+00	9.927E+00	3.222E+01
PA-231	-1.589E+01	177.9	2.826E+01	2.828E+01	9.464E+01
PA-233	-1.494E+00	65.5	9.785E-01	9.818E-01	7.934E+00
PA-234	-2.150E+00	135.5	2.914E+00	2.916E+00	9.716E+00
PA-234M	-2.961E+01	192.9	5.711E+01	5.713E+01	2.989E+02
U-235	6.241E-01	196.9	1.229E+00	1.229E+00	1.733E+01
AM-241	-1.029E+00	122.3	1.259E+00	1.260E+00	5.860E+00
Np-237	0.000E+00	1.#INF	5.685E+00	5.685E+00	1.893E+01
Ir-192	-6.140E-01	158.6	9.739E-01	9.746E-01	3.257E+00
Cs-136	2.837E-01	170.6	4.839E-01	4.842E-01	2.028E+00
Np-239	1.459E+00	81.9	1.196E+00	1.199E+00	3.979E+00
Nd-147	1.573E+00	183.3	2.883E+00	2.885E+00	7.195E+00
Total	4.773E+02				

Analyst: Mike Aldridge

Sample description
257318_Gamma_160-17797-A-15-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20161005.An1

Acquisition information
Start time: 7/12/2016 12:18:15 PM
Live time: 1800
Real time: 1853
Dead time: 2.88 %
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	7/12/2016 12:17:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2016-07-10_1451.PBC 7/10/2016 2:51:27 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1437

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	23.	98.41	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
63.19	68.	43.09	0.81	3.088E-02	63.29	3.810	PBC<MDA	TH234
64.26	30.	111.65	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
74.80	221.	10.04	1.03	3.617E-02				
77.15	293.	8.29	1.04	3.700E-02				
87.29	123.	17.30	0.87	3.977E-02	86.49	13.100	1.317E+01	Np237
					86.54	30.700	5.620E+00	EU155
					86.94	9.040	1.904E+01	Sn126
					87.57	37.500	4.576E+00	Sn126
					88.04	3.790	4.517E+01	Cd109
92.62	31.	77.98	1.05	4.072E-02	92.59	5.584	PBC<MDA	TH234
93.38	32.	165.29	1.05	4.083E-02	93.35	5.561	PBC<MDA	AC228
97.50	32.	162.86	1.05	4.133E-02	97.50	30.000	PBC<MDA	Gd153
99.50	8.	668.92	1.05	4.151E-02	99.50	15.000	PBC<MDA	Np239
106.13	25.	81.95	1.06	4.187E-02	106.13	22.700	PBC<MDA	Np239
122.06	17.	125.92	1.07	4.146E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.670E-01	CO57
123.10	18.	108.01	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
140.18	26.	155.57	1.08	3.945E-02	140.51	89.300	PBC<MDA	Tc99m
145.79	26.	145.89	1.09	3.874E-02	145.44	48.200	PBC<MDA	CE141
162.66	16.	144.91	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
166.36	23.	93.04	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
186.28	132.	19.11	0.90	3.322E-02				
193.51	10.	221.59	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
205.33	10.	196.91	1.13	3.083E-02	205.33	5.010	PBC<MDA	U235
210.85	22.	101.25	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	19.	100.58	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.70	411.	6.95	1.08	2.744E-02	238.63	43.300	1.921E+01	PB212
242.05	73.	20.14	1.16	2.714E-02	242.00	7.430	2.006E+01	PB214
276.90	17.	85.15	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
284.30	11.	149.84	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.41	128.	13.91	1.01	2.322E-02	295.09	19.300	1.586E+01	PB214
300.28	32.	30.54	1.20	2.294E-02	300.03	3.280	2.390E+01	PB212
					300.07	2.460	3.187E+01	PA231
					300.18	6.200	1.265E+01	PA233
320.08	14.	157.14	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	163.06	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.49	15.	166.54	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.27	118.	14.79	1.06	2.086E-02	338.32	12.010	2.610E+01	AC228
340.57	16.	170.57	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	101.39	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
351.91	245.	8.08	1.15	2.021E-02	351.93	37.600	1.790E+01	PB214
364.48	7.	162.67	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	8.	184.32	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
427.88	3.	395.81	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
433.94	12.	126.88	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
453.88	11.	104.82	1.32	1.647E-02	453.88	65.000	PBC<MDA	pm146
463.37	49.	28.40	1.32	1.620E-02	463.37	10.470	1.603E+01	SB125
487.02	12.	132.16	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
511.86	54.	42.73	2.61	1.494E-02	511.86	20.000	1.004E+01	RH106
531.00	5.	183.34	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
537.26	8.	121.00	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	165.03	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.32	1.	888.82	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.950E-01	PA234
					569.70	97.740	PBC<MDA	BI207
583.27	143.	9.99	0.90	1.342E-02	583.02	84.500	6.993E+00	TL208
609.46	183.	9.54	1.55	1.294E-02	609.31	46.090	1.700E+01	BI214
					610.30	5.750	1.364E+02	RU103
661.86	88.	14.65	1.26	1.209E-02	661.66	85.210	4.743E+00	CS137
696.54	26.	32.05	1.48	1.158E-02	696.54	99.000	1.243E+00	PM144
702.63	6.	191.49	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
724.20	7.	170.68	1.50	1.121E-02	724.20	44.150	PBC<MDA	ZR95
727.11	63.	12.72	1.23	1.118E-02	727.17	7.550	4.124E+01	BI212
735.72	6.	138.44	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
756.73	3.	389.11	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
784.89	9.	133.96	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212
795.87	28.	30.53	1.54	1.036E-02	795.87	85.530	1.724E+00	CS134
810.78	5.	210.15	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
835.26	1.	913.44	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.43	13.	90.69	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
871.10	8.	69.27	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
873.23	3.	253.36	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
911.33	84.	13.26	1.90	9.247E-03	911.07	29.000	1.740E+01	AC228
964.11	10.	131.05	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.41	53.	16.53	1.82	8.776E-03	968.97	17.460	1.909E+01	AC228
1001.00	-4.	192.87	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	3.	306.00	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1063.66	4.	232.35	1.71	8.106E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	89.32	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	5.	134.73	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1120.49	48.	17.42	2.49	7.754E-03	1120.29	15.100	2.294E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	9.933E+00	Ta182
1120.55	12.	95.13	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
1173.24	3.	328.56	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	4.	275.10	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	6.	189.55	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	2.	324.82	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	4.	152.39	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	1.	914.69	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1461.05	309.	5.73	1.74	6.164E-03	1460.83	10.670	2.608E+02	K40
1764.91	22.	28.30	2.07	5.226E-03	1764.49	15.400	1.507E+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	
298.99	74.79	136.	221.	6.121E+03	10.04	1.034	-	D
308.40	77.14	147.	293.	7.907E+03	8.29	1.036	-	D
744.95	186.28	104.	132.	3.959E+03	19.11	0.902	-	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	251.	23.	0.013	98.41	1.012s
TH-227	200.37	50.14	347.	-26.	-0.014	103.54	1.015s
AM-241	237.95	59.54	521.	-19.	-0.011	122.33	1.022
TH-234	252.96	63.29	198.	41.	0.023	51.65	1.025D
Sn-126	256.93	64.28	532.	30.	0.016	111.65	1.026s
BA-133	323.77	80.99	1253.	-36.	-0.020	140.98	1.039
Np-237	345.77	86.49	1394.	0.	0.000	184.35	1.043A
EU-155	345.98	86.54	1527.	-31.	-0.017	176.84	1.043s
Sn-126	350.09	87.57	1304.	102.	0.057	19.98	1.044D
Cd-109	351.97	88.04	1414.	0.	0.000	170.04	1.044A
Nd-147	364.21	91.10	1275.	0.	0.000	1000.00	1.047s
TH-234	370.17	92.59	270.	31.	0.017	77.98	1.048D
AC-228	373.21	93.35	1346.	32.	0.018	165.29	1.049
Gd-153	389.81	97.50	1314.	32.	0.018	162.86	1.052
Np-239	397.81	99.50	1283.	8.	0.004	668.92	1.053s
EU-155	421.07	105.31	265.	-5.	-0.003	462.60	1.058s
Np-239	424.34	106.13	197.	25.	0.014	81.95	1.058s
EU-152	486.92	121.78	270.	-26.	-0.014	91.24	1.071s
CO-57	488.06	122.06	222.	17.	0.009	125.92	1.071s
EU-154	492.22	123.10	180.	18.	0.010	108.01	1.072s
PA-234	525.00	131.29	721.	-28.	-0.016	135.51	1.078s
HF-181	531.92	133.02	694.	-28.	-0.016	132.89	1.079s
CE-144	533.98	133.54	723.	-28.	-0.016	135.48	1.080s
HF-181	545.02	136.30	751.	-28.	-0.015	140.33	1.082s
CO-57	545.72	136.47	779.	0.	0.000	1000.00	1.082s
Tc-99m	561.86	140.51	805.	26.	0.014	155.57	1.085
U-235	574.97	143.79	785.	-6.	-0.003	397.32	1.087s
CE-141	581.59	145.44	719.	26.	0.015	145.89	1.089s
Ba-140	650.47	162.66	244.	16.	0.009	144.91	1.102
U-235	653.35	163.38	278.	-27.	-0.015	90.88	1.102s
CE-139	663.24	165.85	218.	23.	0.013	93.04	1.104s
Cf-251	706.23	176.60	183.	-27.	-0.015	94.58	1.112s
TH-229	773.87	193.51	128.	10.	0.005	221.59	1.125
U-235	821.17	205.33	117.	10.	0.006	196.91	1.134s
TH-229	843.24	210.85	120.	22.	0.012	101.25	1.138s
Cf-251	907.84	227.00	88.	19.	0.010	100.58	1.151s
PB-212	954.37	238.63	56.	463.	0.257	5.19	1.159D
PB-214	967.84	242.00	71.	73.	0.040	20.14	1.162D
TH-227	1024.81	256.24	112.	-11.	-0.006	190.76	1.172
Cd-113m	1054.65	263.70	204.	-24.	-0.013	87.03	1.178s
BI-210M	1063.18	265.83	157.	-19.	-0.011	93.93	1.179s
TL-208	1108.99	277.28	90.	17.	0.009	85.15	1.188s
Hg-203	1116.66	279.20	129.	-3.	-0.002	538.52	1.189
I-131	1137.05	284.30	68.	11.	0.006	149.84	1.193s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1180.22	295.09	34.	126.	0.070	11.05	1.201D
PB-212	1199.98	300.03	33.	32.	0.018	30.54	1.205D
PA-231	1200.14	300.07	585.	-19.	-0.010	184.09	1.205s
PA-233	1200.58	300.18	566.	-19.	-0.010	181.14	1.205s
PA-231	1210.46	302.65	548.	-19.	-0.010	177.92	1.207s
BA-133	1211.27	302.85	529.	-19.	-0.010	174.87	1.207s
Ba-140	1219.26	304.85	510.	-14.	-0.008	227.95	1.208s
BI-210M	1219.45	304.90	496.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	594.	-21.	-0.012	165.23	1.211s
PA-233	1247.91	312.01	574.	-22.	-0.012	65.51	1.214s
Ir-192	1265.82	316.49	552.	-21.	-0.012	158.61	1.217s
CR-51	1280.20	320.08	233.	14.	0.008	157.14	1.219s
La-140	1314.91	328.76	306.	15.	0.009	163.06	1.226s
Cf-249	1333.63	333.44	322.	15.	0.009	166.54	1.229s
AC-228	1352.93	338.27	38.	118.	0.065	14.79	1.064
Cs-136	1362.15	340.57	344.	16.	0.009	170.57	1.234s
HF-181	1383.19	345.83	22.	10.	0.005	101.39	1.238s
PB-214	1407.51	351.91	31.	245.	0.136	8.08	1.153
BA-133	1423.87	356.00	340.	-15.	-0.008	175.75	1.245s
I-131	1457.81	364.48	32.	7.	0.004	162.67	1.252s
BA-133	1535.24	383.84	116.	8.	0.005	184.32	1.266s
SN-113	1566.64	391.69	65.	-14.	-0.008	113.53	1.271s
SB-125	1711.39	427.88	36.	3.	0.002	395.81	1.297s
AG-108M	1735.64	433.94	52.	12.	0.007	126.88	1.301s
pm-146	1815.41	453.88	31.	11.	0.006	104.82	1.315
SB-125	1853.36	463.37	72.	49.	0.027	28.40	1.322s
Ir-192	1872.14	468.06	124.	-4.	-0.002	396.86	1.325s
BE-7	1910.28	477.60	121.	-15.	-0.009	104.45	1.332s
HF-181	1927.89	482.00	136.	-5.	-0.003	358.80	1.335
La-140	1947.98	487.02	127.	12.	0.007	132.16	1.339s
RU-103	1988.12	497.05	56.	-15.	-0.009	103.13	1.346s
RH-106	2047.36	511.86	70.	54.	0.030	42.73	2.606s
Nd-147	2123.91	531.00	22.	5.	0.003	183.34	1.369s
Ba-140	2148.95	537.26	22.	8.	0.005	121.00	1.373s
CS-134	2252.86	563.24	48.	9.	0.005	165.03	1.391s
CS-134	2277.20	569.32	39.	1.	0.001	888.82	1.395s
PA-234	2277.80	569.47	46.	-4.	-0.002	244.95	1.395s
BI-207	2278.73	569.70	66.	-14.	-0.008	105.45	1.396s
TL-208	2332.98	583.27	16.	143.	0.079	9.99	0.902s
SB-125	2401.92	600.50	339.	-14.	-0.008	188.94	1.416s
CS-134	2418.76	604.71	284.	0.	0.000	1000.00	1.419s
BI-214	2437.77	609.46	20.	183.	0.101	9.54	1.554s
RU-103	2441.12	610.30	284.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	284.	0.	0.000	1000.00	1.426s
PM-144	2472.18	618.06	284.	0.	0.000	1000.00	1.428s
RH-106	2487.60	621.92	284.	0.	0.000	1000.00	1.431s
SB-125	2543.49	635.89	33.	0.	0.000	1000.00	1.440
I-131	2547.83	636.97	36.	-4.	-0.002	209.91	1.441s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	2630.98	657.76	165.	-16.	-0.009	116.30	1.455s
CS-137	2646.58	661.66	93.	9.	0.005	155.94	1.457
PM-144	2786.11	696.54	9.	26.	0.014	32.05	1.480s
NB-94	2810.46	702.63	28.	6.	0.003	191.49	1.484
SB-124	2891.09	722.79	87.	-4.	-0.002	333.54	1.497s
AG-108M	2891.70	722.94	83.	0.	0.000	1000.00	1.498s
EU-154	2893.37	723.36	83.	0.	0.000	1000.00	1.498s
ZR-95	2896.74	724.20	75.	7.	0.004	170.68	1.498s
BI-212	2908.38	727.11	0.	63.	0.035	12.72	1.229
pm-146	2942.83	735.72	14.	6.	0.003	138.44	1.506s
pm-146	2988.59	747.16	33.	-2.	-0.001	731.57	1.513s
ZR-95	3026.87	756.73	23.	3.	0.001	389.11	1.519s
AG-110M	3055.73	763.94	62.	-15.	-0.008	80.10	1.524s
NB-95	3063.11	765.79	76.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	97.	-15.	-0.008	54.09	1.526s
EU-152	3115.64	778.92	33.	-6.	-0.003	218.04	1.534s
BI-212	3141.64	785.42	33.	9.	0.005	133.96	1.538s
CS-134	3183.43	795.87	22.	28.	0.015	30.53	1.544s
CS-134	3207.77	801.95	63.	-4.	-0.002	296.86	1.548s
CO-58	3243.06	810.78	49.	5.	0.003	210.15	1.554s
La-140	3263.04	815.77	54.	0.	0.000	1000.00	1.557s
Cs-136	3273.97	818.50	54.	0.	0.000	1000.00	1.559s
MN-54	3339.36	834.85	33.	1.	0.001	913.44	1.569s
Co-56	3387.05	846.77	24.	-2.	-0.001	506.82	1.577s
TL-208	3442.23	860.56	28.	13.	0.007	90.69	1.585s
NB-94	3484.36	871.10	10.	8.	0.004	69.27	1.592s
EU-154	3492.89	873.23	20.	3.	0.001	253.36	1.593s
PA-234	3522.10	880.53	96.	-17.	-0.009	86.69	1.598s
PA-234	3532.94	883.24	113.	-17.	-0.009	93.26	1.599s
AG-110M	3538.71	884.68	129.	-17.	-0.009	99.43	1.600s
Sc-46	3557.10	889.28	145.	-2.	-0.001	360.83	1.603s
y-88	3592.14	898.04	37.	-11.	-0.006	58.90	1.608s
AC-228	3645.32	911.33	8.	84.	0.047	13.26	1.896s
AG-110M	3749.96	937.49	25.	-2.	-0.001	554.15	1.633s
PA-234	3784.07	946.02	25.	-6.	-0.003	187.70	1.638s
EU-152	3856.43	964.11	80.	10.	0.006	131.05	1.649s
AC-228	3877.64	969.41	4.	53.	0.029	16.53	1.816s
EU-154	3985.31	996.33	52.	-2.	-0.001	414.73	1.668s
PA-234M	4003.99	1001.00	59.	-4.	-0.002	192.87	1.671s
EU-154	4019.10	1004.77	66.	-10.	-0.006	114.09	1.673
Co-56	4151.36	1037.84	15.	3.	0.002	306.00	1.693s
Cs-136	4192.29	1048.07	30.	-14.	-0.008	61.45	1.698s
RH-106	4201.45	1050.36	53.	-2.	-0.001	519.62	1.700s
BI-207	4254.65	1063.66	18.	4.	0.002	232.35	1.708s
Ga-68	4309.61	1077.40	10.	8.	0.005	89.32	1.716s
FE-59	4397.02	1099.25	11.	5.	0.003	134.73	1.728s
EU-152	4448.32	1112.07	128.	-16.	-0.009	103.37	1.736s
ZN-65	4462.20	1115.55	112.	-16.	-0.009	97.01	1.738s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4481.98	1120.49	5.	48.	0.027	17.42	2.491s
Sc-46	4482.22	1120.55	60.	12.	0.007	95.13	1.740s
Ta-182	4485.22	1121.30	96.	-13.	-0.007	110.23	1.741s
CO-60	4692.97	1173.24	29.	3.	0.002	328.56	1.770
Ta-182	4756.23	1189.05	50.	-14.	-0.008	114.21	1.779
Ta-182	4885.67	1221.41	27.	4.	0.002	275.10	1.797
Co-56	4953.16	1238.28	27.	6.	0.004	189.55	1.806s
NA-22	5098.16	1274.53	16.	-3.	-0.002	197.20	1.826s
EU-154	5098.22	1274.54	19.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	11.	2.	0.001	324.82	1.835s
AG-110M	5537.25	1384.30	5.	4.	0.002	152.39	1.884s
EU-152	5632.07	1408.00	16.	1.	0.001	914.69	1.896s
K-40	5844.25	1461.05	2.	309.	0.172	5.73	1.735
La-140	6384.93	1596.21	23.	-12.	-0.007	148.58	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
BI-214	7058.07	1764.49	8.	22.	0.012	28.30	2.067s
Co-56	7085.51	1771.35	42.	-10.	-0.006	95.85	2.070s
y-88	7344.36	1836.06	6.	-2.	-0.001	343.80	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-5.1323E+00				5.31E+01	
			477.60	-5.132E+00	?(	1.804E+01 1.04E+02 1.05E+01	G
NA-22	C	-2.4032E-01				9.50E+02	
			1274.53	-2.403E-01	?(	1.710E+00 1.97E+02 9.99E+01	G
K-40	N	2.6080E+02				4.66E+11	
			1460.83	2.608E+02	(P	8.115E+00 5.73E+00 1.07E+01	G
Sc-46	F	3.7933E-01				8.38E+01	
			889.28	-1.087E-01	?(P	3.462E+00 3.61E+02 1.00E+02	G
			1120.55	8.673E-01	(	2.786E+00 9.51E+01 1.00E+02	G
CR-51	F	3.5798E+00				2.77E+01	
			320.08	3.580E+00	&(P	1.896E+01 1.57E+02 9.94E+00	G
MN-54	C	7.4427E-02				3.12E+02	
			834.85	7.443E-02	?(	1.638E+00 9.13E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	5.7841E-01					4.45E+01	
			1099.25	6.862E-01	?(P	2.222E+00	1.35E+02	5.65E+01 G
			1291.60	4.374E-01	?(	3.361E+00	3.25E+02	4.32E+01 G
Co-56	C	3.3080E-01					7.73E+01	
			846.77	-8.962E-02	?(P	1.432E+00	5.07E+02	9.99E+01 G
			1238.28	7.485E-01	?(	3.164E+00	1.90E+02	6.61E+01 G
			1037.84	1.351E+00	&(P	9.904E+00	3.06E+02	1.41E+01 G
			1771.35	-7.014E+00	+	2.280E+01	9.59E+01	1.55E+01 A
CO-57	C	2.6699E-01					2.72E+02	
			122.06	2.670E-01	?(	1.130E+00	1.26E+02	8.56E+01 G
			136.47	0.000E+00	-	1.727E+01	1.00E+03	1.07E+01 G
CO-58	C	2.6462E-01					7.09E+01	
			810.78	2.646E-01	?(	1.937E+00	2.10E+02	9.95E+01 G
CO-60	F	9.1198E-02					1.93E+03	
			1332.50	-7.801E-02	%(P	1.913E+00	1.00E+03	1.00E+02 G
			1173.24	2.605E-01	&(P	2.059E+00	3.29E+02	9.99E+01 G
ZN-65	F	-2.2549E+00					2.44E+02	
			1115.55	-2.255E+00	?(	7.346E+00	9.70E+01	5.06E+01 G
NB-94	I	3.7026E-01					7.41E+06	
			702.63	2.960E-01	&(	1.350E+00	1.91E+02	9.79E+01 G
			871.10	4.430E-01	?(P	1.018E+00	6.93E+01	9.99E+01 G
ZR-95	I	5.0738E-01					6.40E+01	
			756.73	2.516E-01	&(	2.380E+00	3.89E+02	5.45E+01 G
			724.20	8.228E-01	?(	4.822E+00	1.71E+02	4.42E+01 G
RU-103	I	-6.1260E-01					3.93E+01	
			497.05	-6.126E-01	?(	1.506E+00	1.03E+02	9.09E+01 G
			610.30	0.000E+00	+	6.072E+01	1.00E+03	5.75E+00 GA
AG-108M	C	4.2867E-01					1.53E+05	
			433.94	4.287E-01	?(P	1.306E+00	1.27E+02	9.05E+01 G
			722.94	0.000E+00	-	2.459E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.907E+00	1.00E+03	8.98E+01 G
AG-110M	F	-1.3458E+00					2.50E+02	
			884.68	-1.346E+00	?(	4.492E+00	9.94E+01	7.27E+01 G
			657.76	-7.728E-01	+	3.023E+00	1.16E+02	9.46E+01 G
			937.49	-3.583E-01	+	4.660E+00	5.54E+02	3.44E+01 G
			1384.30	1.298E+00	+	4.769E+00	1.52E+02	2.43E+01 G
			763.94	-3.410E+00	+	9.138E+00	8.01E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-6.7074E-01					1.15E+02	
			391.69	-6.707E-01	&(	1.889E+00	1.14E+02	6.40E+01 G
SB-124	F	-3.0895E-03					6.02E+01	
			602.73	-3.089E-03	&(	3.517E+00	3.34E+04	9.83E+01 G
			1690.98	0.000E+00	+	1.579E+00	1.00E+03	4.78E+01 G
			722.79	-1.830E+00	+	2.113E+01	3.34E+02	1.08E+01 G
SB-125	I	4.4304E+00					1.01E+03	
			427.88	3.259E-01	(	3.332E+00	3.96E+02	2.96E+01 G
			600.50	-3.307E+00	+	2.103E+01	1.89E+02	1.79E+01 G
			635.89	0.000E+00	-	1.159E+01	1.00E+03	1.13E+01 G
			463.37	1.603E+01	(P	1.385E+01	2.84E+01	1.05E+01 G
I-131	I	5.1605E-01					8.02E+00	
			364.48	2.422E-01	?(	1.006E+00	1.63E+02	8.17E+01 G
			284.30	4.159E+00	?(	1.556E+01	1.50E+02	6.14E+00 G
			636.97	-2.588E+00	+	1.909E+01	2.10E+02	7.17E+00 G
Gd-153	F	1.4190E+00					2.42E+02	
			97.50	1.419E+00	?(	7.691E+00	1.63E+02	3.00E+01 G
			103.20	1.164E-07	%	1.032E+01	2.65E+09	2.18E+01 G
Ga-68	C	2.0922E+01					4.71E-02	
			1077.40	2.092E+01	&(	4.327E+01	8.93E+01	3.30E+00 G
Tc-99m	I	4.2327E-01					2.51E-01	
			140.51	4.233E-01	?(	2.197E+00	1.56E+02	8.93E+01 G
BA-133	F	-6.7070E-01					3.85E+03	
			356.00	-6.707E-01	?(	3.963E+00	1.76E+02	6.20E+01 G
			302.85	-2.498E+00	&	1.463E+01	1.75E+02	1.83E+01 G
			383.84	2.769E+00	P	1.741E+01	1.84E+02	8.94E+00 GA
			80.99	-1.527E+00	+	7.158E+00	1.41E+02	3.41E+01 GA
CS-134	I	9.0244E-01					7.54E+02	
			604.71	0.000E+00	?(	3.550E+00	1.00E+03	9.76E+01 G
			795.87	1.724E+00	?(	1.524E+00	3.05E+01	8.55E+01 G
			569.32	2.639E-01	?(	8.395E+00	8.89E+02	1.54E+01 G
			801.95	-2.380E+00	+	2.462E+01	2.97E+02	8.69E+00 G
			563.24	4.217E+00	&(P	1.690E+01	1.65E+02	8.35E+00 G
CS-137	I	4.8411E-01					1.10E+04	
			661.66	4.841E-01	?(P	2.570E+00	1.56E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	4.4135E-01					1.38E+02	
			165.85	4.414E-01	?(	1.371E+00	9.30E+01	7.99E+01 G
Ba-140	I	1.8220E+00					1.28E+01	
			537.26	1.304E+00	?(P	3.881E+00	1.21E+02	2.44E+01 G
			162.66	3.853E+00	?(	1.879E+01	1.45E+02	6.22E+00 G
			304.85	-8.067E+00	+	6.173E+01	2.28E+02	4.29E+00 G
La-140	I	-1.9888E-01					1.28E+01	
			1596.21	-1.217E+00	?(P	2.554E+00	1.49E+02	9.54E+01 G
			487.02	9.682E-01	?(	4.330E+00	1.32E+02	4.55E+01 G
			328.76	1.971E+00	(	1.081E+01	1.63E+02	2.03E+01 G
			815.77	0.000E+00	+	8.689E+00	1.00E+03	2.33E+01 G
CE-141	I	7.8026E-01					3.25E+01	
			145.44	7.803E-01	?(	3.798E+00	1.46E+02	4.82E+01 G
CE-144	I	-3.5182E+00					2.85E+02	
			133.54	-3.518E+00	?(	1.589E+01	1.35E+02	1.11E+01 G
PM-144	C	1.2433E+00					3.63E+02	
			696.54	1.243E+00	?(	8.209E-01	3.20E+01	9.90E+01 G
			618.06	0.000E+00	-	3.560E+00	1.00E+03	9.91E+01 G
EU-152	F	1.6757E+00					4.94E+03	
			344.29	2.379E-01	%(	9.348E+00	1.16E+03	2.65E+01 G
			1112.07	-8.330E+00	+	2.894E+01	1.03E+02	1.36E+01 G
			121.78	-1.221E+00	+	3.712E+00	9.12E+01	2.86E+01 G
			778.92	-2.306E+00	+	1.194E+01	2.18E+02	1.29E+01 G
			964.11	4.285E+00	&(	1.912E+01	1.31E+02	1.46E+01 G
			244.69	7.005E-01	%	3.515E+01	1.49E+03	7.58E+00 G
			1408.00	4.155E-01	?	8.870E+00	9.15E+02	2.10E+01 GA
EU-154	I	7.3975E-01					3.14E+03	
			873.23	1.229E+00	&(P	1.122E+01	2.53E+02	1.23E+01 G
			123.10	5.925E-01	&(	2.147E+00	1.08E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.238E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.105E+01	1.00E+03	2.02E+01 G
			1004.77	-3.806E+00	+	1.476E+01	1.14E+02	1.80E+01 G
			996.33	-1.529E+00	+	2.230E+01	4.15E+02	1.06E+01 G
EU-155	I	-3.1311E-01					1.81E+03	
			105.31	-3.131E-01	(	4.920E+00	4.63E+02	2.12E+01 G
			86.54	-1.435E+00	+	8.445E+00	1.77E+02	3.07E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F 1.0102E-01					4.24E+01	
		482.00	-2.042E-01	&(	2.513E+00	3.59E+02	8.05E+01 G
		133.02	-8.994E-01	+	3.985E+00	1.33E+02	4.33E+01 G
		345.83	1.731E+00	?(	4.449E+00	1.01E+02	1.51E+01 G
		136.30	-6.616E+00	+	3.096E+01	1.40E+02	5.85E+00 G
Ta-182	F -2.6685E+00					1.14E+02	
		1121.30	-2.668E+00	(	9.937E+00	1.10E+02	3.49E+01 G
		1221.41	1.239E+00	+	7.653E+00	2.75E+02	2.70E+01 G
		1189.05	-6.517E+00	+	1.660E+01	1.14E+02	1.62E+01 G
Hg-203	F -8.4291E-02					4.66E+01	
		279.20	-8.429E-02	?(	1.563E+00	5.39E+02	8.15E+01 G
TL-208	N 6.8093E+00					6.98E+02	
		583.02	6.993E+00	(P	1.052E+00	9.99E+00	8.45E+01 G
		277.28	5.957E+00	?(P	1.697E+01	8.51E+01	6.31E+00 G
		860.56	5.993E+00	&(	1.262E+01	9.07E+01	1.24E+01 G
pm-146	C 4.9094E-01					2.02E+03	
		747.16	-2.492E-01	?(	4.388E+00	7.32E+02	3.40E+01 G
		735.72	1.339E+00	?(	4.494E+00	1.38E+02	2.25E+01 G
		453.88	5.847E-01	?(P	1.491E+00	1.05E+02	6.50E+01 G
y-88	F -7.1823E-01					1.07E+02	
		898.04	-7.182E-01	?(P	1.975E+00	5.89E+01	9.37E+01 G
		1836.06	-1.850E-01	+	1.532E+00	3.44E+02	9.92E+01 G
Cd-113m	-8.7101E+03					5.33E+03	
		263.70	-8.710E+03	&(	2.527E+04	8.70E+01	6.00E-03 K
Cf-251	T -2.5832E+00					3.28E+05	
		176.60	-2.583E+00	?(	6.216E+00	9.46E+01	1.70E+01 G
		227.00	5.800E+00	&	1.435E+01	1.01E+02	6.30E+00 GA
Cf-249	T 5.4643E-01					1.28E+05	
		387.95	6.004E-02	%(	2.446E+00	1.18E+03	6.60E+01 G
		333.44	2.616E+00	?(	1.465E+01	1.67E+02	1.55E+01 G
Sn-126	5.3938E+00					3.65E+07	
		87.57	3.798E+00	}	6.360E+00	2.00E+01	3.75E+01 GA
		64.28	5.394E+00	?(	2.007E+01	1.12E+02	9.70E+00 G
		86.94	0.000E+00	}	2.785E+01	2.17E+03	9.04E+00 GA
PB-210	N 1.5178E+01					8.14E+03	
		46.54	1.518E+01	(P	4.986E+01	9.84E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.1637E+01					6.98E+02	
			238.63	2.164E+01	(P	1.751E+00	5.19E+00	4.33E+01 G
			300.03	2.390E+01		2.166E+01	3.05E+01	3.28E+00 GA
PB-214	N	1.7125E+01					5.84E+05	
			351.93	1.790E+01	(P	2.100E+00	8.08E+00	3.76E+01 G
			295.09	1.562E+01	(	3.698E+00	1.10E+01	1.93E+01 G
			242.00	2.006E+01		1.158E+01	2.01E+01	7.43E+00 GA
BI-207	C	-5.7611E-01					1.18E+04	
			569.70	-5.761E-01	?(P	1.684E+00	1.05E+02	9.77E+01 G
			1063.66	3.607E-01	+ P	2.072E+00	2.32E+02	7.45E+01 G
BI-212	N	4.1237E+01					6.98E+02	
			727.17	4.124E+01	(P	4.852E+00	1.27E+01	7.55E+00 G
			785.42	3.866E+01	?	1.215E+02	1.34E+02	1.28E+00 GA
BI-214	N	1.6517E+01					5.84E+05	
			609.31	1.700E+01	@(P	2.215E+00	9.54E+00	4.61E+01 G
			1120.29	2.294E+01	+ P	6.056E+00	1.74E+01	1.51E+01 G
			1764.49	1.507E+01	?(	1.106E+01	2.83E+01	1.54E+01 G
BI-210M	T	-8.5689E-01					1.10E+09	
			265.83	-8.569E-01	&(	2.693E+00	9.39E+01	5.00E+01 G
			304.90	0.000E+00	+	9.330E+00	1.00E+03	2.80E+01 G
AC-228	N	1.8039E+01					2.10E+03	
			911.07	1.740E+01	(	3.292E+00	1.33E+01	2.90E+01 G
			968.97	1.909E+01	(	4.500E+00	1.65E+01	1.75E+01 G
			338.32	2.610E+01	+	7.001E+00	1.48E+01	1.20E+01 G
			93.35	7.725E+00	-	4.250E+01	1.65E+02	5.56E+00 XA
TH-227	N	-7.9433E+00					7.95E+03	
			50.14	-7.943E+00	(	2.744E+01	1.04E+02	8.00E+00 G
			256.24	-3.363E+00	+	1.591E+01	1.91E+02	7.00E+00 G
TH-229	N	7.6480E+00					2.68E+06	
			193.51	3.783E+00	&(	2.172E+01	2.22E+02	4.40E+00 G
			210.85	1.334E+01	?(	3.307E+01	1.01E+02	2.99E+00 G
TH-234	N	1.9122E+01					1.63E+12	
			63.29	1.912E+01	(P	3.222E+01	5.16E+01	3.81E+00 G
			92.59	7.507E+00	- P	1.936E+01	7.80E+01	5.58E+00 G
PA-231	N	-1.5886E+01					1.20E+07	
			302.65	-1.589E+01	(	9.464E+01	1.78E+02	2.88E+00 G
			300.07	-1.844E+01	+	1.137E+02	1.84E+02	2.46E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C  -1.4938E+00                                     7.82E+08
                         312.01-1.494E+00 &(P 7.934E+00 6.55E+01 3.60E+01 G
                         300.18-7.322E+00 +   4.440E+01 1.81E+02 6.20E+00 G

PA-234   N  -2.1505E+00                                     1.63E+12
                         131.29-2.150E+00 *(  9.716E+00 1.36E+02 1.80E+01 G
                         946.02-2.777E+00 +   1.204E+01 1.88E+02 1.34E+01 G
                         569.47-1.980E+00 +   1.699E+01 2.45E+02 8.20E+00 G
                         883.24-1.017E+01 +   3.181E+01 9.33E+01 9.60E+00 G
                         880.53-1.621E+01 +   4.706E+01 8.67E+01 6.00E+00 GA

PA-234M  N  -2.9610E+01                                     1.63E+12
                        1001.00-2.961E+01 ?(P 2.989E+02 1.93E+02 8.37E-01 G
                         766.41-2.612E+02 + P 8.592E+02 5.41E+01 2.94E-01 G

U-235    N   6.2407E-01                                     2.57E+11
                         143.79-7.933E-01 &(P 1.733E+01 3.97E+02 1.10E+01 G
                         205.33 3.725E+00  (P 1.908E+01 1.97E+02 5.01E+00 G
                         163.38-8.213E+00 + P 2.458E+01 9.09E+01 5.08E+00 G

AM-241   T  -1.0291E+00                                     1.58E+05
                          59.54-1.029E+00  (P 5.860E+00 1.22E+02 3.59E+01 G

Ir-192   F  -6.1401E-01                                     7.40E+01
                         316.49-6.140E-01 ?(  3.257E+00 1.59E+02 8.70E+01 G
                         468.06-2.673E-01 +   3.649E+00 3.97E+02 5.18E+01 G
                         308.44-1.641E+00 +   9.070E+00 1.65E+02 3.18E+01 G

Cs-136   F   2.8369E-01                                     1.30E+01
                         818.50 0.000E+00 &(  2.028E+00 1.00E+03 1.00E+02 G
                        1048.07-1.184E+00 +   2.389E+00 6.14E+01 8.00E+01 G
                         340.57 8.886E-01 ?(  5.094E+00 1.71E+02 4.69E+01 G

Np-239   T   1.4591E+00                                     2.36E+00
                         103.70 1.057E-07 %   9.371E+00 2.65E+09 2.40E+01 X
                         106.13 1.459E+00 &(  3.979E+00 8.19E+01 2.27E+01 G
                          99.50 6.767E-01 &   1.513E+01 6.69E+02 1.50E+01 X

Nd-147       1.5726E+00                                     1.11E+01
                         531.00 1.573E+00 ?(  7.195E+00 1.83E+02 1.30E+01 G
                          91.10 0.000E+00 -   8.201E+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	
PB-210	46.54	251.	23.	0.013	98.41	1.518E+01	P
TH-227	50.14	347.	-26.	-0.014	103.54	-7.943E+00	
AM-241	59.54	521.	-19.	-0.011	122.33	-1.029E+00	P
BA-133	80.99	1253.	-36.	-0.020	140.98	-1.527E+00	
EU-155	86.54	1527.	-31.	-0.017	176.84	-1.435E+00	
Gd-153	97.50	1314.	32.	0.018	162.86	1.419E+00	
Np-239	99.50	1283.	8.	0.004	668.92	6.767E-01	
EU-155	105.31	265.	-5.	-0.003	462.60	-3.131E-01	
Np-239	106.13	197.	25.	0.014	81.95	1.459E+00	
EU-152	121.78	270.	-26.	-0.014	91.24	-1.221E+00	
CO-57	122.06	222.	17.	0.009	125.92	2.670E-01	
EU-154	123.10	180.	18.	0.010	108.01	5.925E-01	
PA-234	131.29	721.	-28.	-0.016	135.51	-2.150E+00	
HF-181	133.02	694.	-28.	-0.016	132.89	-8.994E-01	
CE-144	133.54	723.	-28.	-0.016	135.48	-3.518E+00	
HF-181	136.30	751.	-28.	-0.015	140.33	-6.616E+00	
U-235	143.79	785.	-6.	-0.003	397.32	-7.933E-01	P
Ba-140	162.66	244.	16.	0.009	144.91	3.853E+00	
U-235	163.38	278.	-27.	-0.015	90.88	-8.213E+00	P
Cf-251	176.60	183.	-27.	-0.015	94.58	-2.583E+00	
TH-229	193.51	128.	10.	0.005	221.59	3.783E+00	
U-235	205.33	117.	10.	0.006	196.91	3.725E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	210.85	120.	22.	0.012	101.25	1.334E+01	
Cf-251	227.00	88.	19.	0.010	100.58	5.800E+00	
TH-227	256.24	112.	-11.	-0.006	190.76	-3.363E+00	
Cd-113m	263.70	204.	-24.	-0.013	87.03	-8.710E+03	
BI-210M	265.83	157.	-19.	-0.011	93.93	-8.569E-01	
Hg-203	279.20	129.	-3.	-0.002	538.52	-8.429E-02	
I-131	284.30	68.	11.	0.006	149.84	4.159E+00	
PA-231	300.07	585.	-19.	-0.010	184.09	-1.844E+01	
PA-233	300.18	566.	-19.	-0.010	181.14	-7.322E+00	
PA-231	302.65	548.	-19.	-0.010	177.92	-1.589E+01	
BA-133	302.85	529.	-19.	-0.010	174.87	-2.498E+00	
Ba-140	304.85	510.	-14.	-0.008	227.95	-8.067E+00	
Ir-192	308.44	594.	-21.	-0.012	165.23	-1.641E+00	
PA-233	312.01	574.	-22.	-0.012	65.51	-1.494E+00	P
Ir-192	316.49	552.	-21.	-0.012	158.61	-6.140E-01	
CR-51	320.08	233.	14.	0.008	157.14	3.580E+00	P
La-140	328.76	306.	15.	0.009	163.06	1.971E+00	
Cs-136	340.57	344.	16.	0.009	170.57	8.886E-01	
HF-181	345.83	22.	10.	0.005	101.39	1.731E+00	
BA-133	356.00	340.	-15.	-0.008	175.75	-6.707E-01	
I-131	364.48	32.	7.	0.004	162.67	2.422E-01	
BA-133	383.84	116.	8.	0.005	184.32	2.769E+00	P
SN-113	391.69	65.	-14.	-0.008	113.53	-6.707E-01	
AG-108M	433.94	52.	12.	0.007	126.88	4.287E-01	P
pm-146	453.88	31.	11.	0.006	104.82	5.847E-01	P
Ir-192	468.06	124.	-4.	-0.002	396.86	-2.673E-01	
BE-7	477.60	121.	-15.	-0.009	104.45	-5.132E+00	
HF-181	482.00	136.	-5.	-0.003	358.80	-2.042E-01	
La-140	487.02	127.	12.	0.007	132.16	9.682E-01	
RU-103	497.05	56.	-15.	-0.009	103.13	-6.126E-01	
RH-106	511.86	70.	54.	0.030	42.73	1.004E+01	
Nd-147	531.00	22.	5.	0.003	183.34	1.573E+00	
Ba-140	537.26	22.	8.	0.005	121.00	1.304E+00	P
CS-134	563.24	48.	9.	0.005	165.03	4.217E+00	P
CS-134	569.32	39.	1.	0.001	888.82	2.639E-01	
PA-234	569.47	46.	-4.	-0.002	244.95	-1.980E+00	
BI-207	569.70	66.	-14.	-0.008	105.45	-5.761E-01	P
I-131	636.97	36.	-4.	-0.002	209.91	-2.588E+00	
AG-110M	657.76	165.	-16.	-0.009	116.30	-7.728E-01	
NB-94	702.63	28.	6.	0.003	191.49	2.960E-01	
SB-124	722.79	87.	-4.	-0.002	333.54	-1.830E+00	
ZR-95	724.20	75.	7.	0.004	170.68	8.228E-01	
pm-146	735.72	14.	6.	0.003	138.44	1.339E+00	
pm-146	747.16	33.	-2.	-0.001	731.57	-2.492E-01	
ZR-95	756.73	23.	3.	0.001	389.11	2.516E-01	
AG-110M	763.94	62.	-15.	-0.008	80.10	-3.410E+00	
PA-234M	766.41	97.	-15.	-0.008	54.09	-2.612E+02	P
EU-152	778.92	33.	-6.	-0.003	218.04	-2.306E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.87	22.	28.	0.015	30.53	1.724E+00		
CS-134	801.95	63.	-4.	-0.002	296.86	-2.380E+00		
CO-58	810.78	49.	5.	0.003	210.15	2.646E-01		
Co-56	846.77	24.	-2.	-0.001	506.82	-8.962E-02		P
NB-94	871.10	10.	8.	0.004	69.27	4.430E-01		P
EU-154	873.23	20.	3.	0.001	253.36	1.229E+00		P
PA-234	880.53	96.	-17.	-0.009	86.69	-1.621E+01		
PA-234	883.24	113.	-17.	-0.009	93.26	-1.017E+01		
AG-110M	884.68	129.	-17.	-0.009	99.43	-1.346E+00		
Sc-46	889.28	145.	-2.	-0.001	360.83	-1.087E-01		P
y-88	898.04	37.	-11.	-0.006	58.90	-7.182E-01		P
AG-110M	937.49	25.	-2.	-0.001	554.15	-3.583E-01		
PA-234	946.02	25.	-6.	-0.003	187.70	-2.777E+00		
EU-152	964.11	80.	10.	0.006	131.05	4.285E+00		
EU-154	996.33	52.	-2.	-0.001	414.73	-1.529E+00		
PA-234M	1001.00	59.	-4.	-0.002	192.87	-2.961E+01		P
EU-154	1004.77	66.	-10.	-0.006	114.09	-3.806E+00		
Co-56	1037.84	15.	3.	0.002	306.00	1.351E+00		P
Cs-136	1048.07	30.	-14.	-0.008	61.45	-1.184E+00		
RH-106	1050.36	53.	-2.	-0.001	519.62	-8.693E+00		
BI-207	1063.66	18.	4.	0.002	232.35	3.607E-01		P
Ga-68	1077.40	10.	8.	0.005	89.32	2.092E+01		
FE-59	1099.25	11.	5.	0.003	134.73	6.862E-01		P
EU-152	1112.07	128.	-16.	-0.009	103.37	-8.330E+00		
ZN-65	1115.55	112.	-16.	-0.009	97.01	-2.255E+00		
Sc-46	1120.55	60.	12.	0.007	95.13	8.673E-01		
Ta-182	1121.30	96.	-13.	-0.007	110.23	-2.668E+00		
CO-60	1173.24	29.	3.	0.002	328.56	2.605E-01		P
Ta-182	1189.05	50.	-14.	-0.008	114.21	-6.517E+00		
Ta-182	1221.41	27.	4.	0.002	275.10	1.239E+00		
Co-56	1238.28	27.	6.	0.004	189.55	7.485E-01		
NA-22	1274.53	16.	-3.	-0.002	197.20	-2.403E-01		
FE-59	1291.60	11.	2.	0.001	324.82	4.374E-01		
AG-110M	1384.30	5.	4.	0.002	152.39	1.298E+00		
EU-152	1408.00	16.	1.	0.001	914.69	4.155E-01		
La-140	1596.21	23.	-12.	-0.007	148.58	-1.217E+00		P
Co-56	1771.35	42.	-10.	-0.006	95.85	-7.014E+00		
y-88	1836.06	6.	-2.	-0.001	343.80	-1.850E-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	-5.1322E+00	-5.1323E+00	1.045E+02%	1.80E+01
NA-22	#A	-2.4032E-01	-2.4032E-01	1.972E+02%	1.71E+00
K-40		2.6080E+02	2.6080E+02	5.733E+00%	8.12E+00
Sc-46	#A	3.7933E-01	3.7933E-01	9.513E+01%	3.46E+00
CR-51	#A	3.5798E+00	3.5798E+00	1.571E+02%	1.90E+01
MN-54	#A	7.4426E-02	7.4427E-02	9.134E+02%	1.64E+00
FE-59	#A	5.7840E-01	5.7841E-01	1.347E+02%	2.22E+00
Co-56	#A	3.3080E-01	3.3080E-01	1.895E+02%	1.43E+00
CO-57	#A	2.6699E-01	2.6699E-01	1.259E+02%	1.13E+00
CO-58	#A	2.6461E-01	2.6462E-01	2.101E+02%	1.94E+00
CO-60	#A	9.1198E-02	9.1198E-02	3.286E+02%	1.91E+00
ZN-65	#A	-2.2549E+00	-2.2549E+00	9.701E+01%	7.35E+00
NB-94	#A	3.7026E-01	3.7026E-01	6.927E+01%	1.35E+00
ZR-95	#A	5.0737E-01	5.0738E-01	1.707E+02%	2.38E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.26E+00
RU-103	#A	-6.1259E-01	-6.1260E-01	1.031E+02%	1.51E+00
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.57E+01
AG-108M	#A	4.2867E-01	4.2867E-01	1.269E+02%	1.31E+00
AG-110M	#A	-1.3458E+00	-1.3458E+00	9.943E+01%	4.49E+00
SN-113	#A	-6.7073E-01	-6.7074E-01	1.135E+02%	1.89E+00
SB-124	#A	-3.0894E-03	-3.0895E-03	3.340E+04%	3.52E+00
SB-125	#C	4.4304E+00	4.4304E+00	2.840E+01%	3.33E+00
I-131	#A	5.1601E-01	5.1605E-01	1.106E+02%	1.01E+00
Gd-153	#A	1.4190E+00	1.4190E+00	1.629E+02%	7.69E+00
Ga-68	#A	2.0657E+01	2.0922E+01	8.932E+01%	4.33E+01
Tc-99m	#A	4.2226E-01	4.2327E-01	1.556E+02%	2.20E+00
BA-133	#A	-6.7070E-01	-6.7070E-01	1.757E+02%	3.96E+00
CS-134	#A	9.0244E-01	9.0244E-01	3.053E+01%	3.55E+00
CS-137	#A	4.8411E-01	4.8411E-01	1.559E+02%	2.57E+00
CE-139	#A	4.4135E-01	4.4135E-01	9.304E+01%	1.37E+00
Ba-140	#A	1.8219E+00	1.8220E+00	9.439E+01%	3.88E+00
La-140	#A	-1.9887E-01	-1.9888E-01	8.572E+01%	2.55E+00
CE-141	#A	7.8025E-01	7.8026E-01	1.459E+02%	3.80E+00
CE-144	#A	-3.5182E+00	-3.5182E+00	1.355E+02%	1.59E+01
PM-144	#	1.2433E+00	1.2433E+00	3.205E+01%	8.21E-01
EU-152	#A	1.6757E+00	1.6757E+00	1.311E+02%	9.35E+00
EU-154	#A	7.3975E-01	7.3975E-01	1.080E+02%	1.12E+01
EU-155	#A	-3.1311E-01	-3.1311E-01	4.626E+02%	4.92E+00
HF-181	#A	1.0101E-01	1.0102E-01	1.014E+02%	2.51E+00
Ta-182	#A	-2.6685E+00	-2.6685E+00	1.102E+02%	9.94E+00
Hg-203	#A	-8.4290E-02	-8.4291E-02	5.385E+02%	1.56E+00
TL-208		6.8093E+00	6.8093E+00	9.993E+00%	1.05E+00
pm-146	#A	4.9094E-01	4.9094E-01	1.048E+02%	4.39E+00

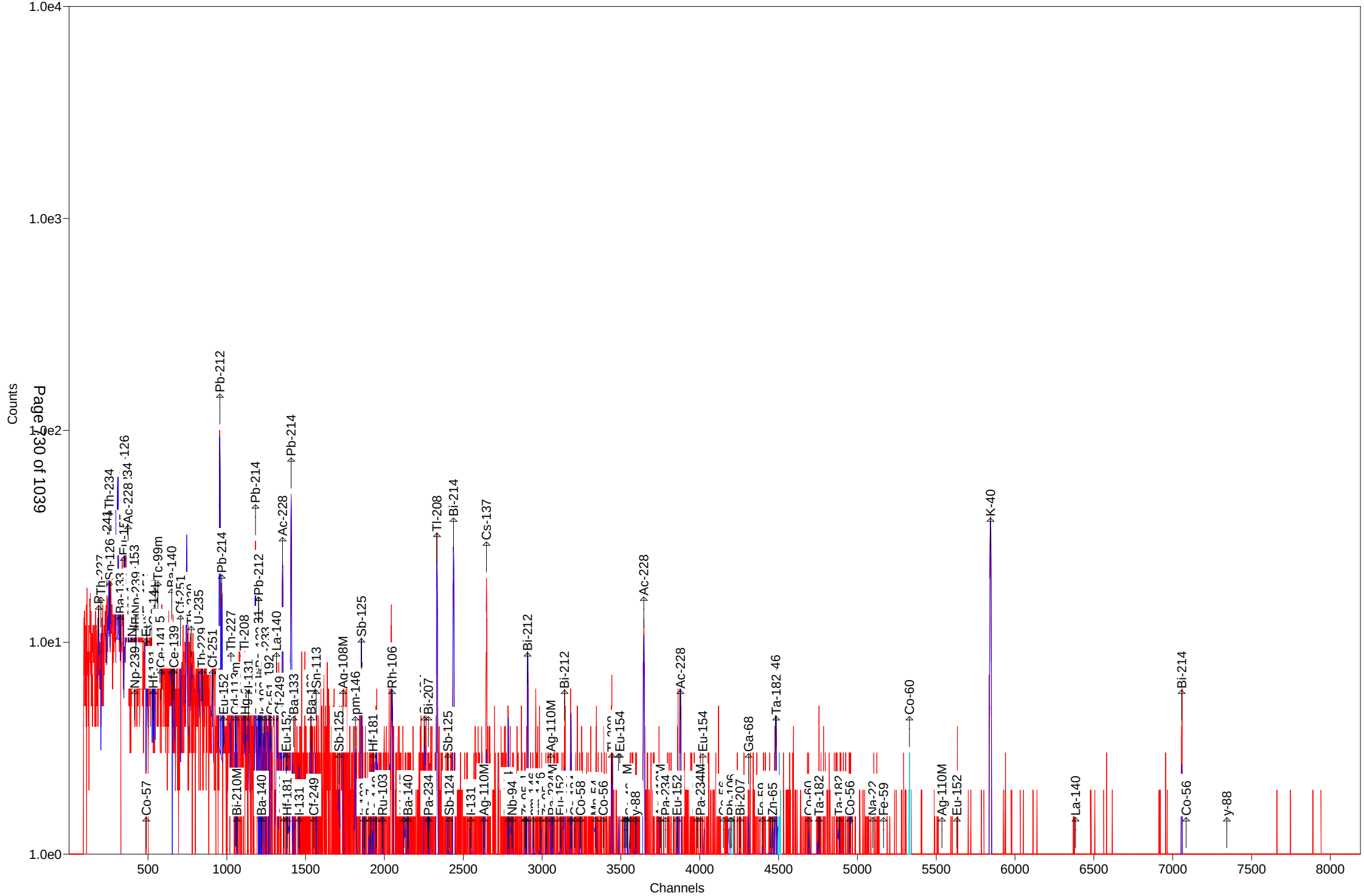
y-88	#A	-7.1822E-01	-7.1823E-01	5.890E+01%	1.98E+00
Cd-113m	#A	-8.7101E+03	-8.7101E+03	8.703E+01%	2.53E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.53E+01
Cf-251	#A	-2.5832E+00	-2.5832E+00	9.458E+01%	6.22E+00
Cf-249	#A	5.4643E-01	5.4643E-01	1.665E+02%	2.45E+00
Sn-126	#A	5.3938E+00	5.3938E+00	1.117E+02%	2.01E+01
PB-210	#A	1.5178E+01	1.5178E+01	9.841E+01%	4.99E+01
PB-212		2.1637E+01	2.1637E+01	5.185E+00%	1.75E+00
PB-214		1.7125E+01	1.7125E+01	6.844E+00%	2.10E+00
BI-207	#A	-5.7611E-01	-5.7611E-01	1.054E+02%	1.68E+00
BI-212		4.1237E+01	4.1237E+01	1.272E+01%	4.85E+00
BI-214		1.6517E+01	1.6517E+01	9.545E+00%	2.21E+00
BI-210M	#A	-8.5689E-01	-8.5689E-01	9.393E+01%	2.69E+00
AC-228		1.8039E+01	1.8039E+01	1.059E+01%	3.29E+00
TH-227	#A	-7.9433E+00	-7.9433E+00	1.035E+02%	2.74E+01
TH-229	#A	7.6480E+00	7.6480E+00	1.012E+02%	2.17E+01
TH-234	#A	1.9122E+01	1.9122E+01	5.165E+01%	3.22E+01
PA-231	#A	-1.5886E+01	-1.5886E+01	1.779E+02%	9.46E+01
PA-233	#A	-1.4938E+00	-1.4938E+00	6.551E+01%	7.93E+00
PA-234	#A	-2.1505E+00	-2.1505E+00	1.355E+02%	9.72E+00
PA-234M	#A	-2.9610E+01	-2.9610E+01	1.929E+02%	2.99E+02
U-235	#A	6.2407E-01	6.2407E-01	1.969E+02%	1.73E+01
AM-241	#A	-1.0291E+00	-1.0291E+00	1.223E+02%	5.86E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.89E+01
Ir-192	#A	-6.1401E-01	-6.1401E-01	1.586E+02%	3.26E+00
Cs-136	#A	2.8368E-01	2.8369E-01	1.706E+02%	2.03E+00
Np-239	#A	1.4588E+00	1.4591E+00	8.195E+01%	3.98E+00
Nd-147	#A	1.5725E+00	1.5726E+00	1.833E+02%	7.19E+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) 4.013E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 4.0128708E+02 Bq/Sample

257318_Gamma_160-17797-A-15-B. 8_Gamma_20161005.spc.



Test America St. Louis Spectrum ID: 3_Gamma_20161207

Sample Description: 257318_Gamma_160-17797-A-16-B
Detector: Detector # 3
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-16-B

Decay to Time: 7/12/2016 12:14 Live Time: 1800 sec
Acquisition Time: 7/12/2016 12:14:53 Real Time: 1803 sec
Analysis Time: 7/12/2016 12:45 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_2016-07-10_0602.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	8.301E-01	523.9	4.349E+00	4.349E+00	1.499E+01
NA-22	-7.297E-01	74.5	5.439E-01	5.451E-01	1.817E+00
K-40	2.379E+02	5.3	1.257E+01	1.750E+01	1.037E+01
Sc-46	5.225E-01	119.7	6.254E-01	6.260E-01	2.121E+00
CR-51	-4.702E+00	81.1	3.811E+00	3.820E+00	2.574E+01
MN-54	-1.984E-01	255.3	5.063E-01	5.064E-01	1.305E+00
FE-59	-1.741E-01	106.3	1.850E-01	1.852E-01	2.789E+00
Co-56	1.129E+00	45.4	5.127E-01	5.160E-01	7.541E-01
CO-57	-7.228E-02	463.5	3.350E-01	3.350E-01	1.137E+00
CO-58	-5.776E-01	86.4	4.992E-01	5.001E-01	1.677E+00
CO-60	6.204E-01	86.4	5.360E-01	5.369E-01	1.162E+00
ZN-65	-4.010E-01	377.3	1.513E+00	1.513E+00	5.232E+00
NB-94	9.206E-01	44.4	4.087E-01	4.115E-01	9.013E-01
ZR-95	-6.746E-01	156.3	1.055E+00	1.055E+00	2.467E+00
NB-95	4.196E-01	113.2	4.751E-01	4.756E-01	1.616E+00
RU-103	1.940E-02	2116.2	4.105E-01	4.105E-01	1.066E+00
RH-106	-1.647E+00	130.7	2.152E+00	2.154E+00	3.338E+01
AG-108M	2.405E-01	225.5	5.422E-01	5.424E-01	1.014E+00
AG-110M	0.000E+00	1.#INF	1.547E-01	1.547E-01	3.020E+00
SN-113	-7.312E-01	112.0	8.188E-01	8.197E-01	2.615E+00
SB-124	3.106E-01	228.6	7.099E-01	7.101E-01	2.810E+00
SB-125	2.397E+00	35.7	8.563E-01	8.651E-01	2.642E+00
I-131	3.595E-02	89.4	3.214E-02	3.219E-02	1.217E+00
Gd-153	-8.968E-01	146.6	1.315E+00	1.316E+00	4.396E+00
Ga-68	-7.581E+00	325.3	2.466E+01	2.467E+01	5.509E+01
Tc-99m	3.016E-01	120.9	3.646E-01	3.650E-01	1.221E+00
BA-133	-7.350E-01	155.2	1.141E+00	1.141E+00	3.821E+00
CS-134	6.148E-01	97.1	5.972E-01	5.981E-01	2.882E+00
CS-137	3.382E+00	14.4	4.866E-01	5.175E-01	8.173E-01
CE-139	-8.773E-02	444.9	3.903E-01	3.904E-01	1.064E+00
Ba-140	1.553E+00	105.0	1.631E+00	1.633E+00	3.938E+00
La-140	7.272E-01	77.3	5.621E-01	5.634E-01	1.077E+00
CE-141	5.621E-01	119.6	6.724E-01	6.730E-01	2.251E+00

CE-144	-2.899E+00	127.6	3.700E+00	3.703E+00	1.235E+01
PM-144	3.861E-01	98.5	3.804E-01	3.809E-01	1.069E+00
EU-152	1.131E+00	90.9	1.028E+00	1.030E+00	6.816E+00
EU-154	2.531E+00	59.2	1.498E+00	1.504E+00	1.115E+01
EU-155	-7.669E-02	1897.0	1.455E+00	1.455E+00	6.455E+00
HF-181	0.000E+00	1.#INF	1.151E-01	1.151E-01	1.995E+00
Ta-182	1.032E+00	170.3	1.757E+00	1.758E+00	7.208E+00
Hg-203	2.422E-01	162.4	3.933E-01	3.936E-01	1.336E+00
TL-208	5.325E+00	12.2	6.499E-01	7.062E-01	1.112E+00
pm-146	4.683E-01	112.1	5.249E-01	5.255E-01	3.269E+00
y-88	4.956E-02	1208.3	5.989E-01	5.989E-01	1.399E+00
Cd-113m	4.769E+03	96.5	4.601E+03	4.611E+03	1.547E+04
Cd-109	-1.012E+01	141.8	1.436E+01	1.437E+01	4.782E+01
Cf-251	-3.725E-01	439.8	1.638E+00	1.639E+00	4.498E+00
Cf-249	5.754E-01	109.7	6.314E-01	6.321E-01	2.203E+00
Sn-126	1.264E+00	342.7	4.331E+00	4.331E+00	1.464E+01
PB-210	2.095E+01	48.4	1.014E+01	1.021E+01	2.849E+01
PB-212	1.729E+01	5.5	9.434E-01	1.463E+00	1.469E+00
PB-214	1.703E+01	6.4	1.096E+00	1.408E+00	2.002E+00
BI-207	-6.446E-01	68.0	4.382E-01	4.395E-01	1.364E+00
BI-212	1.791E+01	24.5	4.384E+00	4.481E+00	9.112E+00
BI-214	1.387E+01	10.8	1.499E+00	1.663E+00	2.589E+00
BI-210M	9.142E-02	101.9	9.316E-02	9.332E-02	2.182E+00
AC-228	1.824E+01	9.6	1.758E+00	1.990E+00	2.149E+00
TH-227	-5.497E+00	129.6	7.125E+00	7.131E+00	2.387E+01
TH-229	-4.856E-01	235.0	1.141E+00	1.142E+00	2.019E+01
TH-234	1.963E+01	34.5	6.766E+00	6.844E+00	1.981E+01
PA-231	-1.481E+01	162.7	2.410E+01	2.412E+01	8.066E+01
PA-233	-1.221E+00	163.6	1.996E+00	1.997E+00	6.679E+00
PA-234	-1.770E+00	121.7	2.154E+00	2.156E+00	7.190E+00
PA-234M	2.895E+01	217.6	6.299E+01	6.300E+01	1.961E+02
U-235	1.385E+00	114.8	1.590E+00	1.591E+00	1.022E+01
AM-241	-1.203E+00	114.0	1.371E+00	1.373E+00	3.667E+00
Np-237	-2.693E+00	157.5	4.242E+00	4.245E+00	1.414E+01
Ir-192	-8.441E-02	102.5	8.650E-02	8.664E-02	2.865E+00
Cs-136	0.000E+00	1.#INF	1.837E-01	1.837E-01	1.618E+00
Np-239	4.774E-01	369.0	1.762E+00	1.762E+00	5.925E+00
Nd-147	-2.337E+00	167.6	3.917E+00	3.920E+00	9.432E+00
Total	5.190E+03				

Analyst: Mike Aldridge

Sample description
257318_Gamma_160-17797-A-16-B

Spectrum Filename: C:\User\SPC\Det3\3_Gamma_20161207.An1

Acquisition information

Start time:	7/12/2016 12:14:53 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	7/12/2016 12:14:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	3_2016-07-10_0602.PBC 7/10/2016 6:02:16 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2144

***** 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
46.48	35.	48.38	0.99	2.214E-02	46.54	4.250	PBC<MDA	PB210
63.31	28.	59.04	0.47	3.418E-02	63.29	3.810	PBC<MDA	TH234
64.28	8.	342.71	0.84	3.475E-02	64.28	9.700	PBC<MDA	Sn126
74.79	161.	14.94	0.85	3.993E-02				
77.01	304.	8.35	0.85	4.080E-02				
87.07	134.	13.83	0.86	4.384E-02	86.49	13.100	1.302E+01	Np237
					86.54	30.700	5.552E+00	EU155
					86.94	9.040	1.881E+01	Sn126
					87.57	37.500	4.521E+00	Sn126
89.75	75.	22.58	0.86	4.441E-02				
93.29	62.	30.44	0.87	4.503E-02	93.35	5.561	1.375E+01	AC228
106.13	9.	369.02	0.88	4.614E-02	106.13	22.700	PBC<MDA	Np239
140.51	20.	120.88	0.92	4.337E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	21.	119.61	0.92	4.257E-02	145.44	48.200	PBC<MDA	CE141
205.33	18.	114.78	0.98	3.437E-02	205.33	5.010	PBC<MDA	U235
210.85	6.	402.60	0.99	3.376E-02	210.85	2.990	PBC<MDA	TH229
227.00	13.	145.85	1.00	3.212E-02	227.00	6.300	PBC<MDA	Cf251
238.72	391.	6.44	0.91	3.104E-02	238.63	43.300	1.616E+01	PB212
242.12	56.	26.51	1.02	3.075E-02	242.00	7.430	1.372E+01	PB214
263.70	15.	96.47	1.04	2.900E-02	263.70	0.006	PBC<MDA	Cd113m
276.79	43.	27.66	1.72	2.801E-02	277.28	6.310	1.349E+01	TL208
279.20	10.	162.39	1.06	2.788E-02	279.20	81.460	PBC<MDA	Hg203

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
295.34	172.	9.93	1.21	2.682E-02	295.09	19.300	1.803E+01	PB214
300.15	60.	23.51	1.44	2.652E-02	300.03	3.280	3.863E+01	PB212
					300.07	2.460	5.152E+01	PA231
					300.18	6.200	2.045E+01	PA233
304.90	16.	119.93	1.08	2.623E-02	304.85	4.290	7.889E+00	Ba140
					304.90	28.000	1.209E+00	BI210M
328.76	15.	109.07	1.11	2.489E-02	328.76	20.300	PBC<MDA	La140
333.44	3.	433.36	1.11	2.464E-02	333.44	15.510	PBC<MDA	Cf249
338.35	108.	16.37	1.34	2.439E-02	338.32	12.010	2.053E+01	AC228
352.01	265.	7.79	1.24	2.372E-02	351.93	37.600	1.651E+01	PB214
387.95	16.	109.74	1.17	2.215E-02	387.95	66.000	PBC<MDA	Cf249
427.88	6.	189.05	1.20	2.065E-02	427.88	29.600	PBC<MDA	SB125
433.94	4.	369.79	1.21	2.045E-02	433.94	90.480	PBC<MDA	AG108M
453.88	13.	112.09	1.23	1.980E-02	453.88	65.000	PBC<MDA	pm146
463.37	35.	35.73	1.24	1.951E-02	463.37	10.470	9.618E+00	SB125
468.06	11.	118.41	1.24	1.936E-02	468.06	51.750	PBC<MDA	Ir192
477.60	3.	523.87	1.25	1.909E-02	477.60	10.520	PBC<MDA	BE7
511.86	118.	18.31	2.54	1.815E-02	511.86	20.000	1.801E+01	RH106
537.26	12.	105.03	1.31	1.752E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	97.13	1.34	1.693E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	255.73	1.34	1.680E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.345E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.37	139.	11.58	1.12	1.650E-02	583.02	84.500	5.325E+00	TL208
600.50	9.	267.26	1.37	1.615E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	249.74	1.37	1.611E-02	602.73	98.260	PBC<MDA	SB124
604.71	10.	251.57	1.38	1.607E-02	604.71	97.620	PBC<MDA	CS134
609.60	195.	9.98	1.01	1.598E-02	609.31	46.090	1.387E+01	BI214
					610.30	5.750	1.182E+02	RU103
614.28	10.	258.08	1.39	1.589E-02	614.28	89.850	PBC<MDA	AG108M
618.06	9.	291.05	1.39	1.582E-02	618.06	99.100	PBC<MDA	PM144
635.89	5.	130.80	1.41	1.549E-02	635.89	11.310	PBC<MDA	SB125
636.97	7.	89.39	1.41	1.547E-02	636.97	7.170	PBC<MDA	I131
661.90	78.	14.39	1.65	1.504E-02	661.66	85.210	3.382E+00	CS137
696.54	12.	98.52	1.46	1.448E-02	696.54	99.000	PBC<MDA	PM144
702.63	23.	44.40	1.47	1.438E-02	702.63	97.900	9.206E-01	NB94
727.42	34.	24.48	1.64	1.402E-02	727.17	7.550	1.791E+01	BI212
735.72	1.	913.44	1.50	1.390E-02	735.72	22.500	PBC<MDA	pm146
747.16	4.	306.16	1.51	1.374E-02	747.16	34.000	PBC<MDA	pm146
765.79	10.	113.22	1.53	1.349E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.425E+02	PA234M
766.41	3.	369.68	1.53	1.348E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.205E+01	PA234M
778.92	11.	90.88	1.54	1.332E-02	778.92	12.940	PBC<MDA	EU152
785.42	12.	90.01	1.55	1.323E-02	785.42	1.280	PBC<MDA	BI212
815.77	7.	159.79	1.57	1.286E-02	815.77	23.280	PBC<MDA	La140
846.77	8.	90.20	1.60	1.251E-02	846.77	99.935	PBC<MDA	Co56
860.84	36.	22.90	1.07	1.236E-02	860.56	12.420	1.287E+01	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
871.10	2.	452.77	1.62	1.224E-02	871.10	99.890	PBC<MDA	NB94
873.23	6.	133.68	1.63	1.222E-02	873.23	12.270	PBC<MDA	EU154
889.28	11.	119.69	1.64	1.205E-02	889.28	99.984	PBC<MDA	Sc46
911.37	107.	10.18	1.76	1.183E-02	911.07	29.000	1.730E+01	AC228
946.02	2.	496.66	1.69	1.150E-02	946.02	13.400	PBC<MDA	PA234
964.11	6.	249.49	1.71	1.133E-02	964.11	14.605	PBC<MDA	EU152
969.74	79.	13.39	1.64	1.129E-02	968.97	17.460	2.231E+01	AC228
996.33	10.	80.82	1.74	1.105E-02	996.33	10.600	PBC<MDA	EU154
1001.00	4.	229.45	1.74	1.101E-02	1001.00	0.837	PBC<MDA	PA234M
1050.36	6.	182.27	1.79	1.062E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	12.	53.40	1.80	1.051E-02	1063.66	74.500	PBC<MDA	BI207
1120.01	23.	44.69	1.85	1.010E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.02	8.	170.29	1.85	1.010E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.236E+00	Ta182
1173.24	1.	919.60	1.89	9.749E-03	1173.24	99.900	PBC<MDA	CO60
1188.75	2.	634.67	1.91	9.648E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	26.	45.42	1.95	9.349E-03	1238.28	66.070	2.308E+00	Co56
1274.54	11.	84.55	1.98	9.142E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.842E+00	EU154
1291.60	6.	166.25	1.99	9.048E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	10.	86.39	2.03	8.830E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	2.	488.62	2.09	8.458E-03	1408.00	21.005	PBC<MDA	EU152
1461.31	384.	5.10	1.63	8.214E-03	1460.83	10.670	2.379E+02	K40
1596.21	5.	127.84	2.24	7.662E-03	1596.21	95.400	PBC<MDA	La140
1690.98	2.	382.88	2.32	7.319E-03	1690.98	47.790	PBC<MDA	SB124
1765.16	37.	18.46	2.37	7.075E-03	1764.49	15.400	1.899E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.91	74.80	207.	161.	4.030E+03	14.94	0.848	- D
307.80	77.02	170.	304.	7.451E+03	8.35	0.850	- D
348.03	87.12	204.	98.	2.246E+03	22.85	0.860	- sD
358.76	89.80	155.	50.	1.115E+03	38.28	0.863	- 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	185.61	46.48	96.	35.	0.020	48.38	0.986s
TH-227	200.24	50.14	320.	-20.	-0.011	129.61	0.822s
AM-241	237.85	59.54	243.	-25.	-0.014	114.04	0.832
TH-234	252.96	63.31	88.	46.	0.026	34.46	0.469
Sn-126	256.84	64.28	341.	8.	0.004	342.71	0.837
BA-133	323.73	80.99	288.	-29.	-0.016	84.09	0.854s
Np-237	345.75	86.49	941.	-28.	-0.015	157.50	0.860
EU-155	345.96	86.54	1006.	-30.	-0.017	148.85	0.860s
Sn-126	347.55	86.94	976.	-30.	-0.017	146.53	0.860
Sn-126	350.08	87.57	945.	-30.	-0.017	144.18	0.861
Cd-109	351.96	88.04	915.	-30.	-0.017	141.80	0.862s
Nd-147	364.21	91.10	885.	-31.	-0.017	138.96	0.865s
TH-234	370.17	92.59	884.	-60.	-0.034	42.26	0.866
AC-228	373.21	93.35	147.	62.	0.034	30.44	0.867D
Gd-153	389.83	97.50	512.	-22.	-0.012	146.59	0.871s
Np-239	397.83	99.50	517.	-22.	-0.012	145.56	0.873s
Gd-153	412.64	103.20	539.	-22.	-0.012	147.95	0.877s
Np-239	424.37	106.13	547.	9.	0.005	369.02	0.880s
EU-152	487.00	121.78	252.	-23.	-0.013	100.16	0.896s
CO-57	488.14	122.06	275.	-5.	-0.003	463.53	0.897s
EU-154	492.30	123.10	270.	-12.	-0.006	201.20	0.898s
PA-234	525.11	131.29	473.	-26.	-0.014	121.70	0.906
HF-181	532.03	133.02	499.	-26.	-0.014	124.62	0.908
CE-144	534.09	133.54	524.	-26.	-0.014	127.64	0.909s
HF-181	545.14	136.30	550.	-17.	-0.009	196.09	0.911s
CO-57	545.83	136.47	552.	-13.	-0.007	260.37	0.912s
Tc-99m	561.99	140.51	294.	20.	0.011	120.88	0.916
U-235	575.10	143.79	322.	-5.	-0.003	498.77	0.919s
CE-141	581.73	145.44	298.	21.	0.012	119.61	0.921s
CE-139	663.43	165.85	155.	-5.	-0.003	444.87	0.942s
Cf-251	706.45	176.60	113.	-4.	-0.002	439.81	0.953s
TH-229	774.13	193.51	137.	-9.	-0.005	242.43	0.970s
U-235	821.46	205.33	115.	18.	0.010	114.78	0.982s
TH-229	843.54	210.85	165.	6.	0.003	402.60	0.988
Cf-251	908.18	227.00	99.	13.	0.007	145.85	1.004s
PB-212	954.74	238.63	50.	418.	0.232	5.46	1.016D
PB-214	968.20	242.00	84.	56.	0.031	26.51	1.020D
TH-227	1025.21	256.24	92.	-6.	-0.003	318.87	1.034
Cd-113m	1055.07	263.70	96.	15.	0.008	96.47	1.041
BI-210M	1063.60	265.83	134.	-14.	-0.008	164.79	1.044s
TL-208	1107.44	276.79	31.	43.	0.024	27.66	1.724s
Hg-203	1117.10	279.20	124.	10.	0.006	162.39	1.057s
PB-214	1181.69	295.34	35.	168.	0.093	10.25	1.213s
PB-212	1200.96	300.15	32.	60.	0.034	23.51	1.444s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1200.63	300.07	573.	-20.	-0.011	169.08	1.078s
PA-233	1201.07	300.18	553.	-20.	-0.011	166.13	1.078s
PA-231	1210.95	302.65	532.	-20.	-0.011	162.75	1.081s
BA-133	1211.76	302.85	512.	-20.	-0.011	159.69	1.081s
Ba-140	1219.75	304.85	533.	-20.	-0.011	162.45	1.083s
BI-210M	1219.94	304.90	176.	16.	0.009	119.93	1.083s
Ir-192	1234.12	308.44	527.	-20.	-0.011	161.05	1.086
PA-233	1248.42	312.01	547.	-20.	-0.011	163.56	1.090s
Ir-192	1266.34	316.49	578.	-20.	-0.011	167.30	1.094s
CR-51	1280.73	320.08	599.	-21.	-0.012	81.05	1.098s
La-140	1315.45	328.76	75.	15.	0.008	109.07	1.107
Cf-249	1334.18	333.44	59.	3.	0.002	433.36	1.111s
AC-228	1353.81	338.35	43.	108.	0.060	16.37	1.341s
Cs-136	1362.71	340.57	280.	-17.	-0.009	145.42	1.119s
EU-152	1377.58	344.29	263.	-6.	-0.004	364.89	1.122s
HF-181	1383.75	345.83	257.	0.	0.000	1000.00	1.124s
PB-214	1408.51	352.01	40.	265.	0.147	7.79	1.241s
BA-133	1424.46	356.00	440.	-19.	-0.011	155.18	1.134s
I-131	1458.41	364.48	69.	-9.	-0.005	229.63	1.142s
BA-133	1535.87	383.84	190.	-18.	-0.010	110.43	1.162
Cf-249	1552.32	387.95	141.	16.	0.009	109.74	1.165s
SN-113	1567.28	391.69	186.	-19.	-0.010	111.98	1.169s
SB-125	1712.08	427.88	32.	6.	0.003	189.05	1.205s
AG-108M	1736.34	433.94	44.	4.	0.002	369.79	1.211s
pm-146	1816.14	453.88	52.	13.	0.007	112.09	1.230s
SB-125	1854.10	463.37	33.	35.	0.020	35.73	1.240
Ir-192	1872.88	468.06	86.	11.	0.006	118.41	1.244
BE-7	1911.04	477.60	122.	3.	0.002	523.87	1.254s
HF-181	1928.65	482.00	125.	0.	0.000	1000.00	1.258s
RH-106	2048.16	511.86	53.	118.	0.065	18.31	2.537s
Nd-147	2124.72	531.00	61.	-10.	-0.005	167.59	1.306s
Ba-140	2149.77	537.26	35.	12.	0.007	105.03	1.312s
CS-134	2253.70	563.24	17.	9.	0.005	97.13	1.337s
CS-134	2278.04	569.32	35.	3.	0.002	255.73	1.342s
PA-234	2278.64	569.47	44.	-3.	-0.002	335.76	1.343s
BI-207	2279.57	569.70	65.	-19.	-0.011	67.98	1.343s
TL-208	2334.24	583.37	29.	134.	0.074	12.20	1.119
SB-125	2402.79	600.50	267.	9.	0.005	267.26	1.372
SB-124	2411.71	602.73	276.	9.	0.005	249.74	1.374s
CS-134	2419.63	604.71	285.	10.	0.005	251.57	1.376s
BI-214	2439.19	609.60	46.	184.	0.102	10.80	1.013s
RU-103	2441.99	610.30	295.	10.	0.005	254.73	1.382s
AG-108M	2457.92	614.28	304.	10.	0.005	258.08	1.385s
PM-144	2473.05	618.06	315.	9.	0.005	291.05	1.389s
RH-106	2488.47	621.92	383.	-14.	-0.008	187.25	1.392s
SB-125	2544.37	635.89	22.	5.	0.003	130.80	1.406s
I-131	2548.71	636.97	16.	7.	0.004	89.39	1.407s
AG-110M	2631.87	657.76	119.	-2.	-0.001	774.60	1.427s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2648.45	661.90	12.	78.	0.043	14.39	1.646
PM-144	2787.02	696.54	28.	12.	0.007	98.52	1.463s
NB-94	2811.37	702.63	19.	23.	0.013	44.40	1.469s
SB-124	2892.00	722.79	80.	-4.	-0.002	285.88	1.488s
AG-108M	2892.61	722.94	76.	0.	0.000	1000.00	1.488s
EU-154	2894.28	723.36	76.	0.	0.000	1000.00	1.488s
BI-212	2910.52	727.42	10.	34.	0.019	24.48	1.642
pm-146	2943.74	735.72	33.	1.	0.001	913.44	1.500s
pm-146	2989.50	747.16	28.	4.	0.002	306.16	1.510s
ZR-95	3027.78	756.73	42.	-9.	-0.005	156.35	1.519s
AG-110M	3056.63	763.94	64.	-7.	-0.004	162.42	1.526s
NB-95	3064.02	765.79	61.	10.	0.006	113.22	1.528s
PA-234M	3066.51	766.41	60.	3.	0.002	369.68	1.528s
EU-152	3116.54	778.92	19.	11.	0.006	90.88	1.540s
BI-212	3142.54	785.42	23.	12.	0.007	90.01	1.546
CS-134	3184.33	795.87	85.	-7.	-0.004	190.06	1.556s
CS-134	3208.67	801.95	104.	-10.	-0.006	145.39	1.561s
CO-58	3243.96	810.78	60.	-13.	-0.007	86.41	1.569s
La-140	3263.94	815.77	63.	7.	0.004	159.79	1.574s
Cs-136	3274.86	818.50	55.	0.	0.000	1000.00	1.576s
MN-54	3340.25	834.85	34.	-5.	-0.003	255.26	1.591
Co-56	3387.93	846.77	9.	8.	0.004	90.20	1.602
TL-208	3444.23	860.84	7.	36.	0.020	22.90	1.070s
NB-94	3485.23	871.10	40.	2.	0.001	452.77	1.625s
EU-154	3493.77	873.23	34.	6.	0.004	133.68	1.627s
PA-234	3522.96	880.53	72.	-15.	-0.008	84.13	1.633s
PA-234	3533.80	883.24	87.	-6.	-0.004	213.13	1.636s
AG-110M	3539.58	884.68	94.	0.	0.000	1000.00	1.637s
Sc-46	3557.96	889.28	86.	11.	0.006	119.69	1.641s
AC-228	3646.31	911.37	5.	107.	0.059	10.18	1.763
AG-110M	3750.78	937.49	40.	-12.	-0.007	119.41	1.685s
PA-234	3784.89	946.02	20.	2.	0.001	496.66	1.692
EU-152	3857.23	964.11	122.	6.	0.004	249.49	1.709s
AC-228	3879.76	969.74	9.	79.	0.044	13.39	1.642
EU-154	3986.08	996.33	30.	10.	0.006	80.82	1.737s
PA-234M	4004.75	1001.00	41.	4.	0.002	229.45	1.742s
Co-56	4152.08	1037.84	25.	0.	0.000	1000.00	1.774s
Cs-136	4192.99	1048.07	37.	-15.	-0.008	62.89	1.783s
RH-106	4202.15	1050.36	48.	6.	0.003	182.27	1.785s
BI-207	4255.33	1063.66	6.	12.	0.007	53.40	1.797s
Ga-68	4310.28	1077.40	32.	-4.	-0.002	325.32	1.809s
FE-59	4397.65	1099.25	32.	-10.	-0.006	132.41	1.828s
EU-152	4448.93	1112.07	111.	-16.	-0.009	98.60	1.839s
ZN-65	4462.81	1115.55	96.	-4.	-0.002	377.32	1.842s
BI-214	4481.77	1120.29	42.	23.	0.013	44.69	1.846D
Sc-46	4482.82	1120.55	92.	0.	0.000	1000.00	1.847
Ta-182	4485.82	1121.30	85.	8.	0.004	170.29	1.847s
CO-60	4693.48	1173.24	27.	1.	0.001	919.60	1.892s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4756.71	1189.05	21.	2.	0.001	634.67	1.906s
Ta-182	4886.09	1221.41	53.	-12.	-0.007	137.57	1.934s
Co-56	4953.53	1238.28	21.	26.	0.014	45.42	1.948
NA-22	5098.46	1274.53	34.	-12.	-0.007	74.54	1.979s
EU-154	5098.51	1274.54	35.	11.	0.006	84.55	1.979s
FE-59	5166.69	1291.60	17.	6.	0.003	166.25	1.993s
CO-60	5330.21	1332.50	11.	10.	0.005	86.39	2.028s
AG-110M	5537.27	1384.30	17.	-5.	-0.003	198.49	2.071s
EU-152	5632.02	1408.00	17.	2.	0.001	488.62	2.090s
K-40	5845.11	1461.31	9.	375.	0.209	5.28	1.632s
La-140	6384.26	1596.21	6.	5.	0.003	127.84	2.242s
SB-124	6763.00	1690.98	6.	2.	0.001	382.88	2.317s
BI-214	7056.73	1764.49	5.	37.	0.021	18.46	2.373
Co-56	7084.14	1771.35	53.	-8.	-0.005	129.21	2.379s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	8.3012E-01					5.31E+01	
			477.60	8.301E-01	&(	1.499E+01	5.24E+02	1.05E+01 G
NA-22	C	-7.2969E-01					9.50E+02	
			1274.53	-7.297E-01	?(	1.817E+00	7.45E+01	9.99E+01 G
K-40	N	2.3790E+02					4.66E+11	
			1460.83	2.379E+02	(P	1.037E+01	5.28E+00	1.07E+01 G
Sc-46	F	5.2251E-01					8.38E+01	
			889.28	5.225E-01	?(	2.121E+00	1.20E+02	1.00E+02 G
			1120.55	0.000E+00	-	2.608E+00	1.00E+03	1.00E+02 G
CR-51	F	-4.7021E+00					2.77E+01	
			320.08	-4.702E+00	?(P	2.574E+01	8.11E+01	9.94E+00 G
MN-54	C	-1.9836E-01					3.12E+02	
			834.85	-1.984E-01	(P	1.305E+00	2.55E+02	1.00E+02 G
FE-59	F	-1.7406E-01					4.45E+01	
			1099.25	-9.592E-01	?(	2.789E+00	1.32E+02	5.65E+01 G
			1291.60	8.528E-01	?(	3.116E+00	1.66E+02	4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 1.1289E+00					7.73E+01	
		846.77	3.490E-01	?(P	7.541E-01	9.02E+01	9.99E+01 G
		1238.28	2.308E+00	?(	2.180E+00	4.54E+01	6.61E+01 G
		1037.84	0.000E+00	-	9.545E+00	1.00E+03	1.41E+01 G
		1771.35	-4.203E+00	+	1.861E+01	1.29E+02	1.55E+01 A
CO-57	C -7.2276E-02					2.72E+02	
		122.06	-7.228E-02	?(	1.137E+00	4.64E+02	8.56E+01 G
		136.47	-1.518E+00	&	1.327E+01	2.60E+02	1.07E+01 G
CO-58	C -5.7765E-01					7.09E+01	
		810.78	-5.776E-01	?(	1.677E+00	8.64E+01	9.95E+01 G
CO-60	F 6.2043E-01					1.93E+03	
		1332.50	6.204E-01	?(P	1.162E+00	8.64E+01	1.00E+02 G
		1173.24	7.323E-02	- P	1.529E+00	9.20E+02	9.99E+01 G
ZN-65	F -4.0101E-01					2.44E+02	
		1115.55	-4.010E-01	?(	5.232E+00	3.77E+02	5.06E+01 G
NB-94	I 9.2058E-01					7.41E+06	
		702.63	9.206E-01	?(	9.013E-01	4.44E+01	9.79E+01 G
		871.10	9.086E-02	-	1.462E+00	4.53E+02	9.99E+01 G
ZR-95	I -6.7463E-01					6.40E+01	
		756.73	-6.746E-01	&(	2.467E+00	1.56E+02	5.45E+01 G
		724.20	-2.460E-02	& P	3.884E+00	4.31E+03	4.42E+01 G
NB-95	I 4.1963E-01					6.40E+01	
		765.79	4.196E-01	?(	1.616E+00	1.13E+02	9.98E+01 G
RU-103	I 1.9399E-02					3.93E+01	
		497.05	1.940E-02	%(P	1.066E+00	2.12E+03	9.09E+01 G
		610.30	5.815E+00	?	5.006E+01	2.55E+02	5.75E+00 GA
RH-106	I -1.6473E+00					3.74E+02	
		621.92	-4.805E+00	&(P	3.338E+01	1.87E+02	9.93E+00 G
		1050.36	1.845E+01	?(	1.168E+02	1.82E+02	1.56E+00 G
		511.86	1.801E+01	?	5.623E+00	1.83E+01	2.00E+01 GA
AG-108M	C 2.4048E-01					1.53E+05	
		433.94	1.069E-01	?(P	1.014E+00	3.70E+02	9.05E+01 G
		722.94	0.000E+00	-	1.882E+00	1.00E+03	9.08E+01 G
		614.28	3.750E-01	?(	3.269E+00	2.58E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-7.3121E-01					1.15E+02	
			391.69	-7.312E-01	(P	2.615E+00	1.12E+02	6.40E+01 G
SB-124	F	3.1060E-01					6.02E+01	
			602.73	3.329E-01	?(P	2.810E+00	2.50E+02	9.83E+01 G
			1690.98	2.647E-01	?(	2.293E+00	3.83E+02	4.78E+01 G
			722.79	-1.642E+00	+	1.625E+01	2.86E+02	1.08E+01 G
SB-125	I	2.3967E+00					1.01E+03	
			427.88	5.453E-01	?(	2.642E+00	1.89E+02	2.96E+01 G
			600.50	1.679E+00	?(P	1.518E+01	2.67E+02	1.79E+01 G
			635.89	1.692E+00	*(	7.739E+00	1.31E+02	1.13E+01 G
			463.37	9.618E+00	(P	7.980E+00	3.57E+01	1.05E+01 G
I-131	I	3.5954E-02					8.02E+00	
			364.48	-2.651E-01	?(P	1.217E+00	2.30E+02	8.17E+01 G
			284.30	-4.382E-01	%	1.401E+01	1.20E+03	6.14E+00 G
			636.97	3.466E+00	?(	1.060E+01	8.94E+01	7.17E+00 G
Gd-153	F	-8.9682E-01					2.42E+02	
			97.50	-8.968E-01	?(	4.396E+00	1.47E+02	3.00E+01 G
			103.20	-1.242E+00	&	6.142E+00	1.48E+02	2.18E+01 G
Ga-68	C	-7.5808E+00					4.71E-02	
			1077.40	-7.581E+00	?(	5.509E+01	3.25E+02	3.30E+00 G
Tc-99m	I	3.0165E-01					2.51E-01	
			140.51	3.016E-01	(	1.221E+00	1.21E+02	8.93E+01 G
BA-133	F	-7.3499E-01					3.85E+03	
			356.00	-7.350E-01	?(	3.821E+00	1.55E+02	6.20E+01 G
			302.85	-2.329E+00	+	1.244E+01	1.60E+02	1.83E+01 G
			383.84	-5.032E+00	+	1.864E+01	1.10E+02	8.94E+00 GA
			80.99	-1.110E+00	+ P	3.163E+00	8.41E+01	3.41E+01 GA
CS-134	I	6.1484E-01					7.54E+02	
			604.71	3.389E-01	?(	2.882E+00	2.52E+02	9.76E+01 G
			795.87	-3.470E-01	&	2.264E+00	1.90E+02	8.55E+01 G
			569.32	7.168E-01	?(	6.483E+00	2.56E+02	1.54E+01 G
			801.95	-4.988E+00	+	2.467E+01	1.45E+02	8.69E+00 G
			563.24	3.653E+00	*(	8.689E+00	9.71E+01	8.35E+00 G
CS-137	I	3.3815E+00					1.10E+04	
			661.66	3.382E+00	(	8.173E-01	1.44E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-8.7728E-02					1.38E+02	
			165.85	-8.773E-02	&(	1.064E+00	4.45E+02	7.99E+01 G
Ba-140	I	1.5531E+00					1.28E+01	
			537.26	1.553E+00	?(P	3.938E+00	1.05E+02	2.44E+01 G
			162.66	-3.020E-01	%	1.803E+01	1.75E+03	6.22E+00 G
			304.85	-1.001E+01	+	5.444E+01	1.62E+02	4.29E+00 G
La-140	I	7.2722E-01					1.28E+01	
			1596.21	3.769E-01	?(P	1.077E+00	1.28E+02	9.54E+01 G
			487.02	-6.489E-02	%	3.583E+00	1.60E+03	4.55E+01 G
			328.76	1.676E+00	&(P	4.745E+00	1.09E+02	2.03E+01 G
			815.77	1.335E+00	?(	7.339E+00	1.60E+02	2.33E+01 G
CE-141	I	5.6213E-01					3.25E+01	
			145.44	5.621E-01	(	2.251E+00	1.20E+02	4.82E+01 G
CE-144	I	-2.8986E+00					2.85E+02	
			133.54	-2.899E+00	?(	1.235E+01	1.28E+02	1.11E+01 G
PM-144	C	3.8610E-01					3.63E+02	
			696.54	4.645E-01	?(P	1.069E+00	9.85E+01	9.90E+01 G
			618.06	3.078E-01	?(P	3.027E+00	2.91E+02	9.91E+01 G
EU-152	F	1.1310E+00					4.94E+03	
			344.29	-5.505E-01	&(	6.816E+00	3.65E+02	2.65E+01 G
			1112.07	-6.275E+00	+	2.079E+01	9.86E+01	1.36E+01 G
			121.78	-9.757E-01	+	3.265E+00	1.00E+02	2.86E+01 G
			778.92	3.452E+00	?(	7.364E+00	9.09E+01	1.29E+01 G
			964.11	2.125E+00	*(	1.816E+01	2.49E+02	1.46E+01 G
			244.69	6.405E-01	%	3.012E+01	1.40E+03	7.58E+00 G
			1408.00	6.254E-01	?	6.856E+00	4.89E+02	2.10E+01 GA
EU-154	I	2.5309E+00					3.14E+03	
			873.23	2.409E+00	&(	1.115E+01	1.34E+02	1.23E+01 G
			123.10	-3.489E-01	-	2.369E+00	2.01E+02	4.08E+01 G
			1274.54	1.842E+00	?(	5.252E+00	8.45E+01	3.52E+01 G
			723.36	0.000E+00	-	8.459E+00	1.00E+03	2.02E+01 G
			1004.77	1.404E-01	%	9.686E+00	1.93E+03	1.80E+01 G
			996.33	4.959E+00	?(	1.349E+01	8.08E+01	1.06E+01 G
EU-155	I	-7.6692E-02					1.81E+03	
			105.31	-7.669E-02	%(P	6.455E+00	1.90E+03	2.12E+01 G
			86.54	-1.257E+00	+	6.233E+00	1.49E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	1.0319E+00					1.14E+02	
			1121.30	1.236E+00	?(	7.208E+00	1.70E+02	3.49E+01 G
			1221.41	-2.686E+00	+	8.001E+00	1.38E+02	2.70E+01 G
			1189.05	5.924E-01	?(	8.614E+00	6.35E+02	1.62E+01 G
Hg-203	F	2.4222E-01					4.66E+01	
			279.20	2.422E-01	&(P	1.336E+00	1.62E+02	8.15E+01 G
TL-208	N	5.3251E+00					6.98E+02	
			583.02	5.325E+00	(P	1.112E+00	1.22E+01	8.45E+01 G
			277.28	1.349E+01	+ P	9.017E+00	2.77E+01	6.31E+00 G
			860.56	1.287E+01	+ P	5.589E+00	2.29E+01	1.24E+01 G
pm-146	C	4.6829E-01					2.02E+03	
			747.16	4.438E-01	*(P	3.269E+00	3.06E+02	3.40E+01 G
			735.72	2.369E-01	?(	5.213E+00	9.13E+02	2.25E+01 G
			453.88	5.612E-01	?(	1.568E+00	1.12E+02	6.50E+01 G
y-88	F	4.9563E-02					1.07E+02	
			898.04	4.956E-02	%(	1.399E+00	1.21E+03	9.37E+01 G
			1836.06	-5.548E-03	% P	6.022E-01	1.02E+04	9.92E+01 G
Cd-113m		4.7690E+03					5.33E+03	
			263.70	4.769E+03	&(	1.547E+04	9.65E+01	6.00E-03 K
Cd-109	F	-1.0124E+01					4.53E+02	
			88.04	-1.012E+01	?(	4.782E+01	1.42E+02	3.79E+00 G
Cf-251	T	-3.7251E-01					3.28E+05	
			176.60	-3.725E-01	?(	4.498E+00	4.40E+02	1.70E+01 G
			227.00	3.569E+00	?	1.347E+01	1.46E+02	6.30E+00 GA
Cf-249	T	5.7539E-01					1.28E+05	
			387.95	5.967E-01	?(	2.203E+00	1.10E+02	6.60E+01 G
			333.44	4.846E-01	?(	5.583E+00	4.33E+02	1.55E+01 G
Sn-126		1.2637E+00					3.65E+07	
			87.57	-1.025E+00	+	4.923E+00	1.44E+02	3.75E+01 GA
			64.28	1.264E+00	(	1.464E+01	3.43E+02	9.70E+00 G
			86.94	-4.264E+00	+	2.081E+01	1.47E+02	9.04E+00 GA
PB-210	N	2.0949E+01					8.14E+03	
			46.54	2.095E+01	(P	2.849E+01	4.84E+01	4.25E+00 G
PB-212	N	1.7291E+01					6.98E+02	
			238.63	1.729E+01	(P	1.469E+00	5.46E+00	4.33E+01 G
			300.03	3.863E+01	+	1.843E+01	2.35E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.7026E+01					5.84E+05	
			351.93	1.651E+01	*(P	2.002E+00	7.79E+00	3.76E+01 G
			295.09	1.803E+01	*(P	3.246E+00	1.02E+01	1.93E+01 G
			242.00	1.372E+01	-	1.102E+01	2.65E+01	7.43E+00 GA
BI-207	C	-6.4463E-01					1.18E+04	
			569.70	-6.446E-01	?(P	1.364E+00	6.80E+01	9.77E+01 G
			1063.66	8.520E-01	+ P	1.001E+00	5.34E+01	7.45E+01 G
BI-212	N	1.7905E+01					6.98E+02	
			727.17	1.791E+01	(P	9.112E+00	2.45E+01	7.55E+00 G
			785.42	3.941E+01	+	8.271E+01	9.00E+01	1.28E+00 GA
BI-214	N	1.3874E+01					5.84E+05	
			609.31	1.387E+01	(P	2.589E+00	1.08E+01	4.61E+01 G
			1120.29	8.436E+00	- P	1.197E+01	4.47E+01	1.51E+01 G
			1764.49	1.899E+01	+ P	6.568E+00	1.85E+01	1.54E+01 G
BI-210M	T	9.1418E-02					1.10E+09	
			265.83	-5.343E-01	&(P	2.182E+00	1.65E+02	5.00E+01 G
			304.90	1.209E+00	?(	4.877E+00	1.20E+02	2.80E+01 G
AC-228	N	1.8245E+01					2.10E+03	
			911.07	1.730E+01	(P	2.149E+00	1.02E+01	2.90E+01 G
			968.97	2.231E+01	+ P	4.670E+00	1.34E+01	1.75E+01 G
			338.32	2.053E+01	*(P	6.294E+00	1.64E+01	1.20E+01 G
			93.35	1.375E+01	-	1.314E+01	3.04E+01	5.56E+00 XA
TH-227	N	-5.4970E+00					7.95E+03	
			50.14	-5.497E+00	?(	2.387E+01	1.30E+02	8.00E+00 G
			256.24	-1.521E+00	+	1.270E+01	3.19E+02	7.00E+00 G
TH-229	N	-4.8565E-01					2.68E+06	
			193.51	-3.059E+00	?(	2.019E+01	2.42E+02	4.40E+00 G
			210.85	3.302E+00	&(	3.443E+01	4.03E+02	2.99E+00 G
TH-234	N	1.9633E+01					1.63E+12	
			63.29	1.963E+01	(P	1.981E+01	3.45E+01	3.81E+00 G
			92.59	-1.338E+01	+ P	3.129E+01	4.23E+01	5.58E+00 G
PA-231	N	-1.4810E+01					1.20E+07	
			302.65	-1.481E+01	?(	8.066E+01	1.63E+02	2.88E+00 G
			300.07	-1.720E+01	+	9.728E+01	1.69E+02	2.46E+00 G
PA-233	C	-1.2205E+00					7.82E+08	
			312.01	-1.221E+00	?(	6.679E+00	1.64E+02	3.60E+01 G
			300.18	-6.825E+00	+	3.794E+01	1.66E+02	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N  -1.7698E+00                                     1.63E+12
                         131.29-1.770E+00 ?(  7.190E+00 1.22E+02 1.80E+01 G
                         946.02 7.211E-01 +   8.491E+00 4.97E+02 1.34E+01 G
                         569.47-1.143E+00 +   1.354E+01 3.36E+02 8.20E+00 G
                         883.24-3.016E+00 +   2.210E+01 2.13E+02 9.60E+00 G
                         880.53-1.145E+01 +   3.229E+01 8.41E+01 6.00E+00 GA

PA-234M  N   2.8952E+01                                     1.63E+12
                        1001.00 2.435E+01 ?(  1.961E+02 2.29E+02 8.37E-01 G
                         766.41 4.205E+01 ?(  5.440E+02 3.70E+02 2.94E-01 G

U-235    N   1.3851E+00                                     2.57E+11
                         143.79-6.105E-01  (P 1.022E+01 4.99E+02 1.10E+01 G
                         205.33 5.751E+00 &(P 1.699E+01 1.15E+02 5.01E+00 G
                         163.38-6.241E-01 % P 2.230E+01 1.15E+03 5.08E+00 G

AM-241   T  -1.2026E+00                                     1.58E+05
                          59.54-1.203E+00 ?(  3.667E+00 1.14E+02 3.59E+01 G

Np-237   F  -2.6934E+00                                     2.14E+06
                          86.49-2.693E+00 &(  1.414E+01 1.57E+02 1.31E+01 G

Ir-192   F  -8.4406E-02                                     7.40E+01
                         316.49-5.120E-01 ?(  2.865E+00 1.67E+02 8.70E+01 G
                         468.06 6.347E-01  (  2.548E+00 1.18E+02 5.18E+01 G
                         308.44-1.368E+00 +   7.376E+00 1.61E+02 3.18E+01 G

Np-239   T   4.7743E-01                                     2.36E+00
                         103.70-1.593E-01 &   5.689E+00 1.06E+03 2.40E+01 X
                         106.13 4.774E-01 &(  5.925E+00 3.69E+02 2.27E+01 G
                          99.50-1.807E+00 +   8.796E+00 1.46E+02 1.50E+01 X

Nd-147      -2.3374E+00                                     1.11E+01
                         531.00-2.337E+00 ?(  9.432E+00 1.68E+02 1.30E+01 G
                          91.10-1.342E+00 +   6.213E+00 1.39E+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.
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- - 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	320.	-20.	-0.011	129.61	-5.497E+00	
AM-241	59.54	243.	-25.	-0.014	114.04	-1.203E+00	
BA-133	80.99	288.	-29.	-0.016	84.09	-1.110E+00	P
Np-237	86.49	941.	-28.	-0.015	157.50	-2.693E+00	
EU-155	86.54	1006.	-30.	-0.017	148.85	-1.257E+00	
Cd-109	88.04	915.	-30.	-0.017	141.80	-1.012E+01	
Nd-147	91.10	885.	-31.	-0.017	138.96	-1.342E+00	
Gd-153	97.50	512.	-22.	-0.012	146.59	-8.968E-01	
Np-239	99.50	517.	-22.	-0.012	145.56	-1.807E+00	
Gd-153	103.20	539.	-22.	-0.012	147.95	-1.242E+00	
Np-239	106.13	547.	9.	0.005	369.02	4.774E-01	
EU-152	121.78	252.	-23.	-0.013	100.16	-9.757E-01	
CO-57	122.06	275.	-5.	-0.003	463.53	-7.228E-02	
EU-154	123.10	270.	-12.	-0.006	201.20	-3.489E-01	
PA-234	131.29	473.	-26.	-0.014	121.70	-1.770E+00	
HF-181	133.02	499.	-26.	-0.014	124.62	-7.408E-01	
CE-144	133.54	524.	-26.	-0.014	127.64	-2.899E+00	
HF-181	136.30	550.	-17.	-0.009	196.09	-3.679E+00	
CO-57	136.47	552.	-13.	-0.007	260.37	-1.518E+00	
Tc-99m	140.51	294.	20.	0.011	120.88	3.016E-01	
U-235	143.79	322.	-5.	-0.003	498.77	-6.105E-01	P
CE-141	145.44	298.	21.	0.012	119.61	5.621E-01	
CE-139	165.85	155.	-5.	-0.003	444.87	-8.773E-02	
Cf-251	176.60	113.	-4.	-0.002	439.81	-3.725E-01	
TH-229	193.51	137.	-9.	-0.005	242.43	-3.059E+00	
U-235	205.33	115.	18.	0.010	114.78	5.751E+00	P
TH-229	210.85	165.	6.	0.003	402.60	3.302E+00	
Cf-251	227.00	99.	13.	0.007	145.85	3.569E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	256.24	92.	-6.	-0.003	318.87	-1.521E+00	
Cd-113m	263.70	96.	15.	0.008	96.47	4.769E+03	
BI-210M	265.83	134.	-14.	-0.008	164.79	-5.343E-01	P
Hg-203	279.20	124.	10.	0.006	162.39	2.422E-01	P
PA-231	300.07	573.	-20.	-0.011	169.08	-1.720E+01	
PA-233	300.18	553.	-20.	-0.011	166.13	-6.825E+00	
PA-231	302.65	532.	-20.	-0.011	162.75	-1.481E+01	
BA-133	302.85	512.	-20.	-0.011	159.69	-2.329E+00	
Ba-140	304.85	533.	-20.	-0.011	162.45	-1.001E+01	
BI-210M	304.90	176.	16.	0.009	119.93	1.209E+00	
PA-233	312.01	547.	-20.	-0.011	163.56	-1.221E+00	
CR-51	320.08	599.	-21.	-0.012	81.05	-4.702E+00	P
La-140	328.76	75.	15.	0.008	109.07	1.676E+00	P
Cf-249	333.44	59.	3.	0.002	433.36	4.846E-01	
Cs-136	340.57	280.	-17.	-0.009	145.42	-8.054E-01	
EU-152	344.29	263.	-6.	-0.004	364.89	-5.505E-01	
BA-133	356.00	440.	-19.	-0.011	155.18	-7.350E-01	
I-131	364.48	69.	-9.	-0.005	229.63	-2.651E-01	P
BA-133	383.84	190.	-18.	-0.010	110.43	-5.032E+00	
Cf-249	387.95	141.	16.	0.009	109.74	5.967E-01	
SN-113	391.69	186.	-19.	-0.010	111.98	-7.312E-01	P
SB-125	427.88	32.	6.	0.003	189.05	5.453E-01	
AG-108M	433.94	44.	4.	0.002	369.79	1.069E-01	P
pm-146	453.88	52.	13.	0.007	112.09	5.612E-01	
SB-125	463.37	33.	35.	0.020	35.73	9.618E+00	P
BE-7	477.60	122.	3.	0.002	523.87	8.301E-01	
RH-106	511.86	53.	118.	0.065	18.31	1.801E+01	
Nd-147	531.00	61.	-10.	-0.005	167.59	-2.337E+00	
Ba-140	537.26	35.	12.	0.007	105.03	1.553E+00	P
CS-134	563.24	17.	9.	0.005	97.13	3.653E+00	
CS-134	569.32	35.	3.	0.002	255.73	7.168E-01	
PA-234	569.47	44.	-3.	-0.002	335.76	-1.143E+00	
BI-207	569.70	65.	-19.	-0.011	67.98	-6.446E-01	P
SB-125	600.50	267.	9.	0.005	267.26	1.679E+00	P
SB-124	602.73	276.	9.	0.005	249.74	3.329E-01	P
CS-134	604.71	285.	10.	0.005	251.57	3.389E-01	
RU-103	610.30	295.	10.	0.005	254.73	5.815E+00	
AG-108M	614.28	304.	10.	0.005	258.08	3.750E-01	
PM-144	618.06	315.	9.	0.005	291.05	3.078E-01	P
RH-106	621.92	383.	-14.	-0.008	187.25	-4.805E+00	P
SB-125	635.89	22.	5.	0.003	130.80	1.692E+00	
I-131	636.97	16.	7.	0.004	89.39	3.466E+00	
AG-110M	657.76	119.	-2.	-0.001	774.60	-7.773E-02	
PM-144	696.54	28.	12.	0.007	98.52	4.645E-01	P
SB-124	722.79	80.	-4.	-0.002	285.88	-1.642E+00	
pm-146	735.72	33.	1.	0.001	913.44	2.369E-01	
pm-146	747.16	28.	4.	0.002	306.16	4.438E-01	P
ZR-95	756.73	42.	-9.	-0.005	156.35	-6.746E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	763.94	64.	-7.	-0.004	162.42	-1.322E+00		
NB-95	765.79	61.	10.	0.006	113.22	4.196E-01		
PA-234M	766.41	60.	3.	0.002	369.68	4.205E+01		
EU-152	778.92	19.	11.	0.006	90.88	3.452E+00		
CS-134	795.87	85.	-7.	-0.004	190.06	-3.470E-01		
CS-134	801.95	104.	-10.	-0.006	145.39	-4.988E+00		
CO-58	810.78	60.	-13.	-0.007	86.41	-5.776E-01		
La-140	815.77	63.	7.	0.004	159.79	1.335E+00		
MN-54	834.85	34.	-5.	-0.003	255.26	-1.984E-01		P
EU-154	873.23	34.	6.	0.004	133.68	2.409E+00		
PA-234	880.53	72.	-15.	-0.008	84.13	-1.145E+01		
PA-234	883.24	87.	-6.	-0.004	213.13	-3.016E+00		
Sc-46	889.28	86.	11.	0.006	119.69	5.225E-01		
AG-110M	937.49	40.	-12.	-0.007	119.41	-1.676E+00		
PA-234	946.02	20.	2.	0.001	496.66	7.211E-01		
EU-152	964.11	122.	6.	0.004	249.49	2.125E+00		
EU-154	996.33	30.	10.	0.006	80.82	4.959E+00		
PA-234M	1001.00	41.	4.	0.002	229.45	2.435E+01		
Cs-136	1048.07	37.	-15.	-0.008	62.89	-9.796E-01		
RH-106	1050.36	48.	6.	0.003	182.27	1.845E+01		
BI-207	1063.66	6.	12.	0.007	53.40	8.520E-01		P
Ga-68	1077.40	32.	-4.	-0.002	325.32	-7.581E+00		
FE-59	1099.25	32.	-10.	-0.006	132.41	-9.592E-01		
EU-152	1112.07	111.	-16.	-0.009	98.60	-6.275E+00		
ZN-65	1115.55	96.	-4.	-0.002	377.32	-4.010E-01		
CO-60	1173.24	27.	1.	0.001	919.60	7.323E-02		P
NA-22	1274.53	34.	-12.	-0.007	74.54	-7.297E-01		
EU-154	1274.54	35.	11.	0.006	84.55	1.842E+00		
FE-59	1291.60	17.	6.	0.003	166.25	8.528E-01		
CO-60	1332.50	11.	10.	0.005	86.39	6.204E-01		P
AG-110M	1384.30	17.	-5.	-0.003	198.49	-1.334E+00		
EU-152	1408.00	17.	2.	0.001	488.62	6.254E-01		
La-140	1596.21	6.	5.	0.003	127.84	3.769E-01		P
SB-124	1690.98	6.	2.	0.001	382.88	2.647E-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	8.3011E-01	8.3012E-01	5.239E+02%	1.50E+01
NA-22	#A	-7.2969E-01	-7.2969E-01	7.454E+01%	1.82E+00
K-40		2.3790E+02	2.3790E+02	5.283E+00%	1.04E+01
Sc-46	#A	5.2251E-01	5.2251E-01	1.197E+02%	2.12E+00
CR-51	#A	-4.7021E+00	-4.7021E+00	8.105E+01%	2.57E+01
MN-54	#A	-1.9836E-01	-1.9836E-01	2.553E+02%	1.30E+00

FE-59	#A	-1.7405E-01	-1.7406E-01	1.063E+02%	2.79E+00
Co-56	#	1.1289E+00	1.1289E+00	4.542E+01%	7.54E-01
CO-57	#A	-7.2276E-02	-7.2276E-02	4.635E+02%	1.14E+00
CO-58	#A	-5.7764E-01	-5.7765E-01	8.641E+01%	1.68E+00
CO-60	#A	6.2043E-01	6.2043E-01	8.639E+01%	1.16E+00
ZN-65	#A	-4.0101E-01	-4.0101E-01	3.773E+02%	5.23E+00
NB-94	#	9.2058E-01	9.2058E-01	4.440E+01%	9.01E-01
ZR-95	#A	-6.7463E-01	-6.7463E-01	1.563E+02%	2.47E+00
NB-95	#A	4.1962E-01	4.1963E-01	1.132E+02%	1.62E+00
RU-103	#A	1.9398E-02	1.9399E-02	2.116E+03%	1.07E+00
RH-106	#A	-1.6473E+00	-1.6473E+00	1.307E+02%	3.34E+01
AG-108M	#A	2.4048E-01	2.4048E-01	2.255E+02%	1.01E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.02E+00
SN-113	#A	-7.3121E-01	-7.3121E-01	1.120E+02%	2.62E+00
SB-124	#A	3.1059E-01	3.1060E-01	2.286E+02%	2.81E+00
SB-125	#A	2.3967E+00	2.3967E+00	3.573E+01%	2.64E+00
I-131	#A	3.5952E-02	3.5954E-02	8.939E+01%	1.22E+00
Gd-153	#A	-8.9681E-01	-8.9682E-01	1.466E+02%	4.40E+00
Ga-68	#A	-7.5126E+00	-7.5808E+00	3.253E+02%	5.51E+01
Tc-99m	#A	3.0114E-01	3.0165E-01	1.209E+02%	1.22E+00
BA-133	#A	-7.3499E-01	-7.3499E-01	1.552E+02%	3.82E+00
CS-134	#A	6.1484E-01	6.1484E-01	9.713E+01%	2.88E+00
CS-137		3.3815E+00	3.3815E+00	1.439E+01%	8.17E-01
CE-139	#A	-8.7727E-02	-8.7728E-02	4.449E+02%	1.06E+00
Ba-140	#A	1.5530E+00	1.5531E+00	1.050E+02%	3.94E+00
La-140	#A	7.2719E-01	7.2722E-01	7.730E+01%	1.08E+00
CE-141	#A	5.6212E-01	5.6213E-01	1.196E+02%	2.25E+00
CE-144	#A	-2.8986E+00	-2.8986E+00	1.276E+02%	1.24E+01
PM-144	#A	3.8610E-01	3.8610E-01	9.852E+01%	1.07E+00
EU-152	#A	1.1310E+00	1.1310E+00	9.088E+01%	6.82E+00
EU-154	#A	2.5309E+00	2.5309E+00	5.921E+01%	1.11E+01
EU-155	#A	-7.6692E-02	-7.6692E-02	1.897E+03%	6.46E+00
HF-181	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.00E+00
Ta-182	#A	1.0319E+00	1.0319E+00	1.703E+02%	7.21E+00
Hg-203	#A	2.4222E-01	2.4222E-01	1.624E+02%	1.34E+00
TL-208		5.3251E+00	5.3251E+00	1.220E+01%	1.11E+00
pm-146	#A	4.6829E-01	4.6829E-01	1.121E+02%	3.27E+00
y-88	#A	4.9562E-02	4.9563E-02	1.208E+03%	1.40E+00
Cd-113m	#A	4.7690E+03	4.7690E+03	9.647E+01%	1.55E+04
Cd-109	#A	-1.0124E+01	-1.0124E+01	1.418E+02%	4.78E+01
Cf-251	#A	-3.7251E-01	-3.7251E-01	4.398E+02%	4.50E+00
Cf-249	#A	5.7539E-01	5.7539E-01	1.097E+02%	2.20E+00
Sn-126	A	1.2637E+00	1.2637E+00	3.427E+02%	1.46E+01
PB-210	A	2.0949E+01	2.0949E+01	4.838E+01%	2.85E+01
PB-212		1.7291E+01	1.7291E+01	5.456E+00%	1.47E+00
PB-214	#	1.7026E+01	1.7026E+01	6.437E+00%	2.00E+00
BI-207	#A	-6.4463E-01	-6.4463E-01	6.798E+01%	1.36E+00
BI-212		1.7905E+01	1.7905E+01	2.448E+01%	9.11E+00
BI-214		1.3874E+01	1.3874E+01	1.080E+01%	2.59E+00

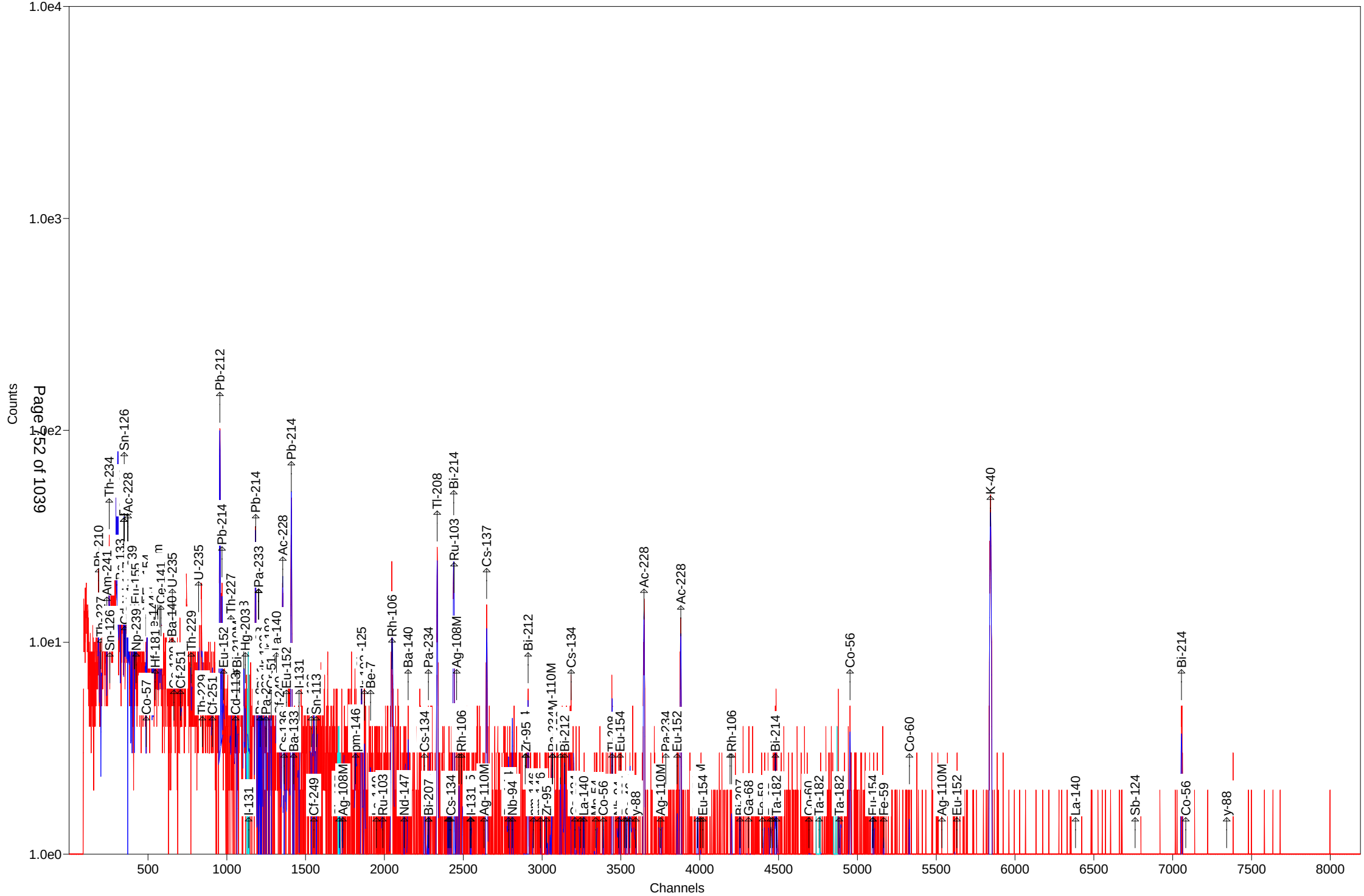
BI-210M#A	9.1418E-02	9.1418E-02	1.019E+02%	2.18E+00
AC-228	1.8245E+01	1.8245E+01	9.638E+00%	2.15E+00
TH-227 #A	-5.4970E+00	-5.4970E+00	1.296E+02%	2.39E+01
TH-229 #A	-4.8565E-01	-4.8565E-01	2.350E+02%	2.02E+01
TH-234 #A	1.9633E+01	1.9633E+01	3.446E+01%	1.98E+01
PA-231 #A	-1.4810E+01	-1.4810E+01	1.627E+02%	8.07E+01
PA-233 #A	-1.2205E+00	-1.2205E+00	1.636E+02%	6.68E+00
PA-234 #A	-1.7698E+00	-1.7698E+00	1.217E+02%	7.19E+00
PA-234M#A	2.8952E+01	2.8952E+01	2.176E+02%	1.96E+02
U-235 #A	1.3851E+00	1.3851E+00	1.148E+02%	1.02E+01
AM-241 #A	-1.2026E+00	-1.2026E+00	1.140E+02%	3.67E+00
Np-237 #A	-2.6934E+00	-2.6934E+00	1.575E+02%	1.41E+01
Ir-192 A	-8.4405E-02	-8.4406E-02	1.025E+02%	2.87E+00
Cs-136 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.62E+00
Np-239 #A	4.7734E-01	4.7743E-01	3.690E+02%	5.93E+00
Nd-147 #A	-2.3373E+00	-2.3374E+00	1.676E+02%	9.43E+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) 3.715E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.6 keV) 3.7152771E+02 Bq/Sample

257318_Gamma_160-17797-A-16-B. 3_Gamma_20161207.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20161272

Sample Description: 257318_Gamma_160-17797-A-17-B
Detector: Detector # 5
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-17-B

Decay to Time: 7/12/2016 12:14 Live Time: 1800 sec
Acquisition Time: 7/12/2016 12:16:55 Real Time: 1808 sec
Analysis Time: 7/12/2016 12:47 Dead Time: 0.43 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev11.lib
Bkgd Correction File: 5_2016-07-10_0601.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	-2.837E+00	177.9	5.046E+00	5.048E+00	1.735E+01
NA-22	-5.179E-01	129.9	6.727E-01	6.732E-01	2.353E+00
K-40	2.554E+02	6.4	1.639E+01	2.096E+01	1.187E+01
Sc-46	6.699E-01	120.4	8.062E-01	8.069E-01	2.751E+00
CR-51	7.174E-01	568.0	4.075E+00	4.075E+00	1.417E+01
MN-54	8.400E-01	95.6	8.034E-01	8.045E-01	1.877E+00
FE-59	-1.480E+00	78.4	1.161E+00	1.163E+00	3.998E+00
Co-56	1.186E+00	54.6	6.473E-01	6.502E-01	1.167E+00
CO-57	2.325E-01	129.7	3.017E-01	3.019E-01	1.020E+00
CO-58	-9.216E-01	79.1	7.288E-01	7.304E-01	2.741E+00
CO-60	3.061E-01	252.6	7.731E-01	7.732E-01	1.828E+00
ZN-65	-1.939E+00	116.6	2.261E+00	2.263E+00	7.669E+00
NB-94	3.019E-01	79.1	2.389E-01	2.394E-01	1.592E+00
ZR-95	1.112E+00	112.7	1.254E+00	1.255E+00	3.062E+00
NB-95	-8.031E-01	91.8	7.375E-01	7.387E-01	2.486E+00
RU-103	0.000E+00	1.#INF	2.275E-01	2.275E-01	1.410E+00
RH-106	6.967E+00	89.9	6.263E+00	6.274E+00	4.286E+01
AG-108M	3.201E-01	203.6	6.518E-01	6.520E-01	1.334E+00
AG-110M	5.446E-01	35.4	1.926E-01	1.946E-01	4.569E+00
SN-113	-1.036E+00	85.8	8.886E-01	8.902E-01	3.792E+00
SB-124	6.092E-01	221.1	1.347E+00	1.347E+00	3.900E+00
SB-125	3.459E+00	32.6	1.127E+00	1.141E+00	2.837E+00
I-131	-3.612E-01	183.3	6.622E-01	6.625E-01	1.734E+00
Gd-153	2.761E-01	403.3	1.113E+00	1.114E+00	3.788E+00
Ga-68	2.445E+01	127.9	3.127E+01	3.130E+01	7.197E+01
Tc-99m	3.112E-01	127.5	3.968E-01	3.972E-01	1.334E+00
BA-133	-2.566E-03	299.4	7.682E-03	7.683E-03	4.109E+00
CS-134	6.686E-01	129.3	8.642E-01	8.649E-01	4.010E+00
CS-137	3.676E+00	23.6	8.688E-01	8.896E-01	1.740E+00
CE-139	2.919E-01	152.6	4.454E-01	4.463E-01	1.504E+00
Ba-140	-1.490E+00	112.3	1.673E+00	1.675E+00	5.340E+00
La-140	3.982E-01	99.1	3.944E-01	3.950E-01	2.263E+00
CE-141	2.167E-01	363.9	7.887E-01	7.888E-01	2.677E+00

CE-144	1.097E+00	336.8	3.695E+00	3.695E+00	1.249E+01
PM-144	7.463E-01	93.4	6.967E-01	6.978E-01	1.676E+00
EU-152	8.572E-01	105.4	9.034E-01	9.045E-01	8.801E+00
EU-154	2.405E+00	99.3	2.390E+00	2.393E+00	1.188E+01
EU-155	-1.754E+00	79.0	1.386E+00	1.390E+00	8.402E+00
HF-181	7.090E-01	97.4	6.903E-01	6.913E-01	2.327E+00
Ta-182	2.745E+00	80.7	2.216E+00	2.220E+00	8.880E+00
Hg-203	-5.432E-01	98.7	5.361E-01	5.370E-01	1.801E+00
TL-208	7.756E+00	9.9	7.652E-01	8.645E-01	8.963E-01
pm-146	-3.173E+00	62.8	1.992E+00	1.999E+00	6.625E+00
y-88	5.436E-01	100.8	5.480E-01	5.487E-01	1.343E+00
Cd-113m	-1.446E+03	388.8	5.621E+03	5.622E+03	1.951E+04
Cd-109	-1.116E+01	146.1	1.630E+01	1.631E+01	5.437E+01
Cf-251	-4.394E-01	447.7	1.967E+00	1.968E+00	5.417E+00
Cf-249	8.213E-01	100.4	8.242E-01	8.253E-01	2.509E+00
Sn-126	-1.399E+00	333.4	4.665E+00	4.666E+00	1.583E+01
PB-210	3.262E+01	38.3	1.249E+01	1.264E+01	3.309E+01
PB-212	2.051E+01	5.6	1.139E+00	1.749E+00	1.475E+00
PB-214	1.570E+01	7.8	1.227E+00	1.473E+00	2.218E+00
BI-207	2.116E-01	220.7	4.669E-01	4.670E-01	1.569E+00
BI-212	1.032E+01	94.1	9.710E+00	9.725E+00	3.271E+01
BI-214	1.623E+01	12.3	2.000E+00	2.170E+00	3.403E+00
BI-210M	7.073E-01	103.7	7.332E-01	7.343E-01	2.473E+00
AC-228	1.961E+01	9.0	1.771E+00	2.034E+00	3.133E+00
TH-227	-1.439E+00	410.3	5.905E+00	5.906E+00	1.857E+01
TH-229	1.266E+01	54.6	6.915E+00	6.989E+00	1.822E+01
TH-234	4.537E+00	97.8	4.435E+00	4.441E+00	3.623E+01
PA-231	1.363E+01	110.3	1.504E+01	1.505E+01	6.900E+01
PA-233	1.850E-01	137.1	2.537E-01	2.539E-01	6.028E+00
PA-234	9.229E-01	74.2	6.850E-01	6.866E-01	8.165E+00
PA-234M	0.000E+00	1.#INF	2.318E+01	2.318E+01	2.790E+02
U-235	3.745E+00	92.7	3.471E+00	3.476E+00	1.101E+01
AM-241	3.411E-01	402.5	1.373E+00	1.373E+00	3.957E+00
Np-237	-3.089E+00	165.8	5.120E+00	5.123E+00	1.708E+01
Ir-192	5.185E-01	103.2	5.349E-01	5.357E-01	1.584E+00
Cs-136	-7.359E-01	129.7	9.548E-01	9.557E-01	3.241E+00
Np-239	-1.591E+00	148.2	2.358E+00	2.360E+00	7.877E+00
Nd-147	1.792E+00	212.0	3.798E+00	3.799E+00	9.807E+00
Total	4.749E+02				

Analyst: Mike Aldridge

TestAmerica Inc Spectrum name: 5_Gamma_20161272.An1

Sample description
257318_Gamma_160-17797-A-17-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20161272.An1

Acquisition information
Start time: 7/12/2016 12:16:55 PM
Live time: 1800
Real time: 1808
Dead time: 0.43 %
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	7/12/2016 12:14:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2016-07-10_0601.PBC 7/10/2016 6:01:50 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1840

***** 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	45.	38.29	0.59	1.789E-02	46.54	4.250	PBC<MDA	PB210
59.54	6.	402.54	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.19	18.	104.20	0.51	2.708E-02	63.29	3.810	PBC<MDA	TH234
74.89	189.	10.96	0.81	3.153E-02				
77.05	298.	7.58	0.81	3.217E-02				
87.15	89.	19.66	0.83	3.446E-02	86.49	13.100	1.100E+01	Np237
					86.54	30.700	4.693E+00	EU155
					86.94	9.040	1.590E+01	Sn126
					87.57	37.500	3.822E+00	Sn126
89.80	76.	20.27	0.83	3.489E-02				
92.62	20.	97.75	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.38	26.	140.72	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
97.50	5.	403.31	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
103.70	20.	118.19	0.84	3.614E-02	103.70	24.000	PBC<MDA	Np239
121.78	10.	205.95	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.752E-01	CO57
122.06	13.	129.73	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.325E-01	CO57
123.10	16.	115.67	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
133.54	8.	336.82	0.87	3.487E-02	133.54	11.090	PBC<MDA	CE144
140.51	16.	127.50	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	17.	131.69	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	6.	363.93	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
163.38	19.	110.64	0.90	3.102E-02	163.38	5.080	PBC<MDA	U235
165.85	13.	152.59	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
193.51	28.	54.60	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
205.33	8.	218.51	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	588.34	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
238.70	351.	6.15	0.90	2.319E-02	238.63	43.300	1.940E+01	PB212
242.08	58.	22.99	0.98	2.293E-02	242.00	7.430	1.885E+01	PB214
244.69	15.	232.23	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
265.83	14.	103.66	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
277.55	22.	48.10	0.99	2.048E-02	277.28	6.310	PBC<MDA	TL208
295.26	112.	12.78	1.07	1.944E-02	295.09	19.300	1.653E+01	PB214
300.02	32.	39.82	0.83	1.918E-02	300.03	3.280	2.826E+01	PB212
					300.07	2.460	3.768E+01	PA231
					300.18	6.200	1.495E+01	PA233
300.07	13.	151.00	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.472E+01	PA231
					300.18	6.200	5.844E+00	PA233
300.18	13.	156.20	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.472E+01	PA231
					300.18	6.200	5.844E+00	PA233
302.65	13.	160.87	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.996E+00	BA133
302.85	5.	377.54	1.04	1.903E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.690E-01	BA133
316.49	6.	203.81	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
320.08	2.	568.02	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
333.44	9.	158.35	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.58	88.	16.16	1.25	1.736E-02	338.32	12.010	2.354E+01	AC228
352.05	174.	9.00	1.27	1.680E-02	351.93	37.600	1.527E+01	PB214
383.84	11.	116.15	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	123.33	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
427.88	11.	77.19	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
433.94	4.	297.91	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
463.37	12.	102.74	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	12.	103.16	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
482.00	13.	97.37	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	8.	99.05	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
511.86	85.	20.50	2.48	1.230E-02	511.86	20.000	1.912E+01	RH106
531.00	5.	211.97	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
569.47	12.	74.73	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.125E+00	PA234
					569.70	97.740	5.979E-01	BI207
569.70	4.	220.69	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.410E+00	PA234
					569.70	97.740	2.023E-01	BI207
583.40	128.	9.87	1.16	1.103E-02	583.02	84.500	7.628E+00	TL208
600.50	9.	234.64	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
602.73	9.	238.91	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	9.	243.13	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.56	145.	12.32	1.10	1.063E-02	609.31	46.090	1.640E+01	BI214
					610.30	5.750	1.316E+02	RU103
614.28	8.	277.60	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
635.89	18.	32.58	1.34	1.026E-02	635.89	11.310	8.778E+00	SB125
657.76	5.	307.06	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.97	56.	23.63	1.05	9.924E-03	661.66	85.210	3.676E+00	CS137
696.54	13.	93.36	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
722.79	3.	372.09	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.102E-01	AG108M
					723.36	20.220	9.446E-01	EU154
727.14	13.	94.07	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	10.	114.60	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
756.73	10.	112.70	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
785.42	6.	191.49	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	9.	133.96	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
801.95	3.	270.80	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
834.85	12.	95.64	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
846.77	7.	94.25	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.97	21.	43.64	1.53	7.963E-03	860.56	12.420	1.180E+01	TL208
871.10	8.	79.13	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	5.	124.28	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
889.28	9.	120.35	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
898.04	7.	100.80	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.66	76.	12.76	1.48	7.591E-03	911.07	29.000	1.909E+01	AC228
964.11	7.	160.82	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
969.35	40.	17.60	1.02	7.209E-03	968.97	17.460	1.778E+01	AC228
996.33	2.	318.75	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1004.77	6.	99.34	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	8.	95.19	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	10.	89.89	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	2.	431.57	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	127.88	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1120.34	27.	33.25	1.72	6.381E-03	1120.29	15.100	1.540E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.35	12.	88.11	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.991E+00	Ta182
1219.43	7.	135.27	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	94.24	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	6.	91.70	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	252.58	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	8.	35.36	1.90	5.340E-03	1384.30	24.290	3.426E+00	AG110M
1408.00	5.	121.64	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.09	250.	6.42	1.30	5.102E-03	1460.83	10.670	2.554E+02	K40
1596.21	2.	480.00	2.02	4.736E-03	1596.21	95.400	PBC<MDA	La140
1762.71	20.	31.84	2.11	4.351E-03	1764.49	15.400	1.653E+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
299.17	74.88	120.	189.	6.005E+03	10.96	0.813	- D
307.84	77.04	106.	298.	9.266E+03	7.58	0.815	- D
348.28	87.12	139.	73.	2.130E+03	25.51	0.825	- sD
358.89	89.77	112.	61.	1.758E+03	27.58	0.828	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev11.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.56	83.	45.	0.025	38.29	0.587s
TH-227	200.11	50.14	120.	-4.	-0.002	410.29	0.787s
AM-241	237.72	59.54	177.	6.	0.003	402.54	0.797s
TH-234	252.74	63.29	193.	6.	0.003	401.27	0.801s
Sn-126	256.71	64.28	249.	-7.	-0.004	333.43	0.802
BA-133	323.61	80.99	240.	-24.	-0.013	115.80	0.819s
Np-237	345.63	86.49	848.	-25.	-0.014	165.78	0.825
EU-155	345.84	86.54	807.	-26.	-0.015	153.94	0.825
Sn-126	347.43	86.94	780.	-26.	-0.015	151.41	0.825
Sn-126	349.95	87.57	754.	-26.	-0.015	148.74	0.826
Cd-109	351.83	88.04	728.	-26.	-0.015	146.07	0.826
Nd-147	364.08	91.10	701.	-22.	-0.012	169.89	0.829s
TH-234	370.05	92.59	171.	20.	0.011	97.75	0.831D
AC-228	373.09	93.35	650.	26.	0.014	140.72	0.832s
Gd-153	389.70	97.50	229.	5.	0.003	403.31	0.836s
Np-239	397.71	99.50	234.	0.	0.000	1000.00	0.838s
Gd-153	412.52	103.20	327.	-22.	-0.012	118.54	0.842s
Np-239	414.52	103.70	278.	20.	0.011	118.19	0.842s
EU-155	420.98	105.31	591.	-24.	-0.013	79.02	0.844s
Np-239	424.25	106.13	596.	-24.	-0.013	148.24	0.845s
EU-152	486.88	121.78	193.	10.	0.005	205.95	0.861
CO-57	488.03	122.06	132.	13.	0.007	129.73	0.861s
EU-154	492.18	123.10	153.	16.	0.009	115.67	0.862s
PA-234	524.99	131.29	374.	-22.	-0.012	128.26	0.871s
HF-181	531.91	133.02	396.	-22.	-0.012	131.55	0.872s
CE-144	533.97	133.54	327.	8.	0.004	336.82	0.873s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	545.02	136.30	369.	-22.	-0.012	127.94	0.876s
CO-57	545.72	136.47	399.	-11.	-0.006	248.25	0.876s
Tc-99m	561.88	140.51	213.	16.	0.009	127.50	0.880s
U-235	574.99	143.79	229.	17.	0.009	131.69	0.883
CE-141	581.61	145.44	260.	6.	0.004	363.93	0.885
Ba-140	650.54	162.66	246.	-16.	-0.009	140.87	0.902
U-235	653.42	163.38	208.	19.	0.010	110.64	0.903
CE-139	663.32	165.85	195.	13.	0.007	152.59	0.905s
Cf-251	706.34	176.60	100.	-4.	-0.002	447.68	0.916s
TH-229	774.03	193.51	63.	28.	0.015	54.60	0.933s
U-235	821.35	205.33	105.	8.	0.005	218.51	0.945s
TH-229	843.44	210.85	114.	3.	0.002	588.34	0.950s
Cf-251	908.08	227.00	100.	-16.	-0.009	113.99	0.966s
PB-212	954.64	238.63	26.	371.	0.206	5.55	0.978D
PB-214	968.10	242.00	59.	58.	0.032	22.99	0.981D
EU-152	978.89	244.69	561.	15.	0.008	232.23	0.984s
TH-227	1025.11	256.24	103.	-7.	-0.004	194.01	0.995s
Cd-113m	1054.97	263.70	82.	-3.	-0.002	388.84	1.002s
BI-210M	1063.50	265.83	91.	14.	0.007	103.66	1.005s
TL-208	1110.39	277.55	30.	22.	0.012	48.10	0.991
Hg-203	1117.00	279.20	120.	-16.	-0.009	98.69	1.017s
I-131	1137.41	284.30	73.	-6.	-0.004	256.06	1.022s
PB-214	1181.27	295.26	30.	112.	0.062	12.78	1.068
PB-212	1200.34	300.02	34.	32.	0.018	39.82	0.833
PA-231	1200.53	300.07	172.	13.	0.007	151.00	1.038
PA-233	1200.97	300.18	185.	13.	0.007	156.20	1.038
PA-231	1210.86	302.65	197.	13.	0.007	160.87	1.040s
BA-133	1211.66	302.85	210.	5.	0.003	377.54	1.040s
Ba-140	1219.66	304.85	215.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	215.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	215.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	224.	-10.	-0.005	225.40	1.049s
Ir-192	1266.25	316.49	84.	6.	0.004	203.81	1.053s
CR-51	1280.63	320.08	87.	2.	0.001	568.02	1.057s
La-140	1315.35	328.76	70.	-9.	-0.005	183.35	1.065s
Cf-249	1334.08	333.44	51.	9.	0.005	158.35	1.070s
AC-228	1354.66	338.58	27.	88.	0.049	16.16	1.250
Cs-136	1362.62	340.57	235.	-15.	-0.008	147.04	1.077s
EU-152	1377.49	344.29	220.	-15.	-0.008	141.99	1.080s
HF-181	1383.66	345.83	217.	-16.	-0.009	133.01	1.082s
PB-214	1408.57	352.05	23.	174.	0.096	9.00	1.271
BA-133	1424.36	356.00	250.	-5.	-0.003	464.71	1.091s
I-131	1458.32	364.48	70.	-9.	-0.005	183.35	1.099
BA-133	1535.78	383.84	76.	11.	0.006	116.15	1.117s
Cf-249	1552.22	387.95	87.	11.	0.006	123.33	1.121s
SN-113	1567.19	391.69	191.	-18.	-0.010	85.77	1.125
SB-125	1711.99	427.88	16.	11.	0.006	77.19	1.158s
AG-108M	1736.25	433.94	36.	4.	0.002	297.91	1.164

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1854.01	463.37	70.	12.	0.007	102.74	1.191s
Ir-192	1872.79	468.06	76.	12.	0.007	103.16	1.195s
BE-7	1910.94	477.59	74.	-7.	-0.004	177.86	1.204
HF-181	1928.56	482.00	77.	13.	0.007	97.37	1.208s
La-140	1948.65	487.02	16.	8.	0.005	99.05	1.212s
RU-103	1988.80	497.05	32.	0.	0.000	1000.00	1.221
RH-106	2048.06	511.86	33.	85.	0.047	20.50	2.485s
Nd-147	2124.62	531.00	28.	5.	0.003	211.97	1.252s
Ba-140	2149.67	537.26	29.	-8.	-0.004	112.29	1.258s
CS-134	2253.60	563.24	20.	0.	0.000	1000.00	1.280s
CS-134	2277.94	569.32	44.	-4.	-0.002	239.79	1.286s
PA-234	2278.54	569.47	33.	12.	0.007	74.73	1.286s
BI-207	2279.47	569.70	37.	4.	0.002	220.69	1.286s
TL-208	2334.29	583.40	7.	128.	0.071	9.87	1.157
SB-125	2402.69	600.50	225.	9.	0.005	234.64	1.313s
SB-124	2411.61	602.73	234.	9.	0.005	238.91	1.315s
CS-134	2419.53	604.71	243.	9.	0.005	243.13	1.317s
BI-214	2438.93	609.56	34.	145.	0.080	12.32	1.104s
RU-103	2441.89	610.30	233.	8.	0.004	273.77	1.322s
AG-108M	2457.82	614.28	241.	8.	0.004	277.60	1.325s
PM-144	2472.94	618.06	296.	-11.	-0.006	217.25	1.328s
SB-125	2544.26	635.89	9.	18.	0.010	32.58	1.344s
I-131	2548.61	636.97	54.	-12.	-0.007	89.06	1.345s
AG-110M	2631.76	657.76	100.	5.	0.003	307.06	1.362s
CS-137	2648.61	661.97	26.	56.	0.031	23.63	1.055
PM-144	2786.90	696.54	30.	13.	0.007	93.36	1.395s
SB-124	2891.88	722.79	68.	3.	0.002	372.09	1.417s
AG-108M	2892.48	722.94	71.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	77.	-7.	-0.004	177.32	1.418s
ZR-95	2897.53	724.20	81.	-12.	-0.007	107.26	1.418s
BI-212	2909.41	727.17	67.	13.	0.007	94.07	1.421
pm-146	2943.61	735.72	26.	10.	0.005	114.60	1.428s
pm-146	2989.37	747.16	52.	-17.	-0.010	62.79	1.437s
ZR-95	3027.65	756.73	26.	10.	0.005	112.70	1.445s
AG-110M	3056.50	763.94	30.	-6.	-0.004	129.24	1.451
NB-95	3063.89	765.79	61.	-13.	-0.007	91.84	1.453s
PA-234M	3066.38	766.41	95.	-14.	-0.008	103.12	1.453s
EU-152	3116.41	778.92	42.	-14.	-0.008	101.77	1.463
BI-212	3142.41	785.42	28.	6.	0.003	191.49	1.468s
CS-134	3184.19	795.87	33.	9.	0.005	133.96	1.477s
CS-134	3208.53	801.95	14.	3.	0.002	270.80	1.482s
CO-58	3243.82	810.78	68.	-14.	-0.008	79.08	1.489s
La-140	3263.80	815.77	81.	-4.	-0.002	325.14	1.493s
Cs-136	3274.72	818.50	96.	-11.	-0.006	129.74	1.495s
MN-54	3340.10	834.85	28.	12.	0.007	95.64	1.508s
Co-56	3387.78	846.77	9.	7.	0.004	94.25	1.518s
TL-208	3442.95	860.56	14.	21.	0.012	43.64	1.529s
NB-94	3485.08	871.10	14.	8.	0.004	79.13	1.537s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3493.61	873.23	15.	5.	0.003	124.28	1.539s
PA-234	3522.80	880.53	62.	-13.	-0.007	89.06	1.544s
PA-234	3533.64	883.24	75.	-13.	-0.007	97.09	1.547s
Sc-46	3557.79	889.28	58.	9.	0.005	120.35	1.551s
y-88	3592.83	898.04	10.	7.	0.004	100.80	1.558s
AC-228	3647.29	911.66	4.	76.	0.042	12.76	1.481
AG-110M	3750.60	937.49	56.	-19.	-0.011	86.09	1.589s
PA-234	3784.70	946.02	23.	-4.	-0.002	241.30	1.595s
EU-152	3857.05	964.11	63.	7.	0.004	160.82	1.609s
AC-228	3878.00	969.35	3.	40.	0.022	17.60	1.024s
EU-154	3985.88	996.33	30.	2.	0.001	318.75	1.633s
PA-234M	4004.55	1001.00	33.	0.	0.000	1000.00	1.636s
EU-154	4019.65	1004.77	13.	6.	0.003	99.34	1.639s
Co-56	4151.87	1037.84	10.	8.	0.004	95.19	1.664s
Cs-136	4192.77	1048.07	40.	-16.	-0.009	59.78	1.671s
RH-106	4201.93	1050.36	36.	10.	0.006	89.89	1.673s
BI-207	4255.11	1063.66	15.	2.	0.001	431.57	1.682s
Ga-68	4310.04	1077.40	20.	8.	0.004	127.88	1.692s
FE-59	4397.41	1099.25	26.	-10.	-0.005	78.43	1.708s
EU-152	4448.68	1112.07	95.	-13.	-0.007	106.69	1.717s
ZN-65	4462.56	1115.55	81.	-11.	-0.006	116.60	1.720s
BI-214	4481.51	1120.29	26.	27.	0.015	33.25	1.723D
Sc-46	4482.57	1120.55	70.	0.	0.000	1000.00	1.723
Ta-182	4485.56	1121.30	50.	12.	0.007	88.11	1.724s
CO-60	4693.21	1173.24	26.	-6.	-0.003	147.79	1.760s
Ta-182	4756.42	1189.05	35.	-9.	-0.005	148.31	1.771s
Ta-182	4885.79	1221.41	16.	7.	0.004	135.27	1.793s
Co-56	4953.23	1238.28	17.	10.	0.006	94.24	1.804s
NA-22	5098.13	1274.53	21.	-5.	-0.003	129.90	1.828s
EU-154	5098.19	1274.54	27.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	6.	0.004	91.70	1.840s
CO-60	5329.85	1332.50	11.	3.	0.002	252.58	1.866
AG-110M	5536.88	1384.30	0.	8.	0.004	35.36	1.899s
EU-152	5631.62	1408.00	5.	5.	0.003	121.64	1.914s
K-40	5843.80	1461.09	4.	250.	0.139	6.42	1.304s
La-140	6383.73	1596.21	11.	2.	0.001	480.00	2.024s
BI-214	7056.06	1764.49	10.	20.	0.011	31.84	2.114s
Co-56	7083.46	1771.35	32.	-1.	-0.001	609.30	2.117s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.8371E+00				5.31E+01	
			477.60	-2.837E+00	&(	1.735E+01 1.78E+02 1.05E+01	G
NA-22	C	-5.1787E-01				9.50E+02	
			1274.53	-5.179E-01	?(	2.353E+00 1.30E+02 9.99E+01	G
K-40	N	2.5541E+02				4.66E+11	
			1460.83	2.554E+02	(P	1.187E+01 6.42E+00 1.07E+01	G
Sc-46	F	6.6986E-01				8.38E+01	
			889.28	6.699E-01	?(	2.751E+00 1.20E+02 1.00E+02	G
			1120.55	0.000E+00	-	3.632E+00 1.00E+03 1.00E+02	G
CR-51	F	7.1740E-01				2.77E+01	
			320.08	7.174E-01	?(	1.417E+01 5.68E+02 9.94E+00	G
MN-54	C	8.4000E-01				3.12E+02	
			834.85	8.400E-01	&(P	1.877E+00 9.56E+01 1.00E+02	G
FE-59	F	-1.4799E+00				4.45E+01	
			1099.25	-1.480E+00	?(P	3.998E+00 7.84E+01 5.65E+01	G
			1291.60	1.446E+00	+ P	3.066E+00 9.17E+01 4.32E+01	G
Co-56	C	1.1856E+00				7.73E+01	
			846.77	5.139E-01	?(	1.167E+00 9.43E+01 9.99E+01	G
			1238.28	1.476E+00	?(P	3.107E+00 9.42E+01 6.61E+01	G
			1037.84	4.576E+00	?(P	1.019E+01 9.52E+01 1.41E+01	G
			1771.35	-1.103E+00	-	2.417E+01 6.09E+02 1.55E+01	A
CO-57	C	2.3253E-01				2.72E+02	
			122.06	2.325E-01	?(	1.020E+00 1.30E+02 8.56E+01	G
			136.47	-1.724E+00	+	1.441E+01 2.48E+02 1.07E+01	G
CO-58	C	-9.2164E-01				7.09E+01	
			810.78	-9.216E-01	?(P	2.741E+00 7.91E+01 9.95E+01	G
CO-60	F	3.0606E-01				1.93E+03	
			1332.50	3.061E-01	?(P	1.828E+00 2.53E+02 1.00E+02	G
			1173.24	-5.530E-01	+ P	2.403E+00 1.48E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.9392E+00					2.44E+02	
			1115.55	-1.939E+00	&(	7.669E+00	1.17E+02	5.06E+01 G
NB-94	I	3.0186E-01					7.41E+06	
			702.63	6.013E-02	%(	1.592E+00	1.05E+03	9.79E+01 G
			871.10	5.388E-01	?(P	1.437E+00	7.91E+01	9.99E+01 G
ZR-95	I	1.1124E+00					6.40E+01	
			756.73	1.112E+00	?(P	3.062E+00	1.13E+02	5.45E+01 G
			724.20	-1.687E+00	+	6.118E+00	1.07E+02	4.42E+01 G
NB-95	I	-8.0305E-01					6.40E+01	
			765.79	-8.031E-01	?(	2.486E+00	9.18E+01	9.98E+01 G
RH-106	I	6.9674E+00					3.74E+02	
			621.92	-3.004E-01	%(	4.286E+01	4.18E+03	9.93E+00 G
			1050.36	5.323E+01	?(	1.620E+02	8.99E+01	1.56E+00 G
			511.86	1.912E+01	?	6.689E+00	2.05E+01	2.00E+01 GA
AG-108M	C	3.2011E-01					1.53E+05	
			433.94	1.740E-01	&(	1.334E+00	2.98E+02	9.05E+01 G
			722.94	0.000E+00	-	2.786E+00	1.00E+03	9.08E+01 G
			614.28	4.672E-01	?(	4.398E+00	2.78E+02	8.98E+01 G
AG-110M	F	5.4461E-01					2.50E+02	
			884.68	-6.701E-02	%(	4.569E+00	1.95E+03	7.27E+01 G
			657.76	2.747E-01	?(	2.907E+00	3.07E+02	9.46E+01 G
			937.49	-4.173E+00	+	8.199E+00	8.61E+01	3.44E+01 G
			1384.30	3.426E+00	?(	3.157E+00	3.54E+01	2.43E+01 G
			763.94	-1.795E+00	+	8.041E+00	1.29E+02	2.23E+01 G
SN-113	F	-1.0361E+00					1.15E+02	
			391.69	-1.036E+00	(P	3.792E+00	8.58E+01	6.40E+01 G
SB-124	F	6.0918E-01					6.02E+01	
			602.73	4.819E-01	?(	3.900E+00	2.39E+02	9.83E+01 G
			1690.98	-8.591E-02	%	4.742E+00	2.37E+03	4.78E+01 G
			722.79	1.766E+00	?(	2.291E+01	3.72E+02	1.08E+01 G
SB-125	I	3.4589E+00					1.01E+03	
			427.88	1.459E+00	?(P	2.837E+00	7.72E+01	2.96E+01 G
			600.50	2.639E+00	(	2.099E+01	2.35E+02	1.79E+01 G
			635.89	8.778E+00	?(	7.866E+00	3.26E+01	1.13E+01 G
			463.37	4.765E+00	(	1.656E+01	1.03E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	-3.6119E-01					8.02E+00	
			364.48	-3.612E-01	?(	1.734E+00	1.83E+02	8.17E+01 G
			284.30	-2.857E+00	+	1.923E+01	2.56E+02	6.14E+00 G
			636.97	-9.357E+00	+	2.807E+01	8.91E+01	7.17E+00 G
Gd-153	F	2.7609E-01					2.42E+02	
			97.50	2.761E-01	?(	3.788E+00	4.03E+02	3.00E+01 G
			103.20	-1.547E+00	+	6.134E+00	1.19E+02	2.18E+01 G
Ga-68	C	2.4450E+01					4.71E-02	
			1077.40	2.445E+01	&(	7.197E+01	1.28E+02	3.30E+00 G
Tc-99m	I	3.1119E-01					2.51E-01	
			140.51	3.112E-01	&(	1.334E+00	1.28E+02	8.93E+01 G
BA-133	F	-2.5659E-03					3.85E+03	
			356.00	-2.600E-01	?(	4.109E+00	4.65E+02	6.20E+01 G
			302.85	8.690E-01	?(	1.117E+01	3.78E+02	1.83E+01 G
			383.84	4.370E+00	?	1.723E+01	1.16E+02	8.94E+00 GA
			80.99	-1.188E+00	+	3.680E+00	1.16E+02	3.41E+01 GA
CS-134	I	6.6857E-01					7.54E+02	
			604.71	4.871E-01	?(	4.010E+00	2.43E+02	9.76E+01 G
			795.87	7.130E-01	&(	2.242E+00	1.34E+02	8.55E+01 G
			569.32	-1.284E+00	+	1.079E+01	2.40E+02	1.54E+01 G
			801.95	2.270E+00	?(	1.524E+01	2.71E+02	8.69E+00 G
			563.24	0.000E+00	-	1.380E+01	1.00E+03	8.35E+00 G
CS-137	I	3.6762E+00					1.10E+04	
			661.66	3.676E+00	(P	1.740E+00	2.36E+01	8.52E+01 G
CE-139	F	2.9191E-01					1.38E+02	
			165.85	2.919E-01	&(	1.504E+00	1.53E+02	7.99E+01 G
Ba-140	I	-1.4902E+00					1.28E+01	
			537.26	-1.490E+00	?(P	5.340E+00	1.12E+02	2.44E+01 G
			162.66	-4.591E+00	&	2.175E+01	1.41E+02	6.22E+00 G
			304.85	0.000E+00	+	4.860E+01	1.00E+03	4.29E+00 G
La-140	I	3.9818E-01					1.28E+01	
			1596.21	2.050E-01	?(	2.263E+00	4.80E+02	9.54E+01 G
			487.02	8.033E-01	?(	2.034E+00	9.91E+01	4.55E+01 G
			328.76	-1.334E+00	+	6.405E+00	1.83E+02	2.03E+01 G
			815.77	-1.138E+00	+	1.282E+01	3.25E+02	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	2.1673E-01					3.25E+01	
			145.44	2.167E-01	(	2.677E+00	3.64E+02	4.82E+01 G
CE-144	I	1.0970E+00					2.85E+02	
			133.54	1.097E+00	?(	1.249E+01	3.37E+02	1.11E+01 G
PM-144	C	7.4626E-01					3.63E+02	
			696.54	7.463E-01	?(P	1.676E+00	9.34E+01	9.90E+01 G
			618.06	-6.036E-01	&	4.425E+00	2.17E+02	9.91E+01 G
EU-152	F	8.5720E-01					4.94E+03	
			344.29	-1.841E+00	?(	8.801E+00	1.42E+02	2.65E+01 G
			1112.07	-8.462E+00	+	3.047E+01	1.07E+02	1.36E+01 G
			121.78	5.243E-01	&	3.662E+00	2.06E+02	2.86E+01 G
			778.92	-6.943E+00	&	1.632E+01	1.02E+02	1.29E+01 G
			964.11	3.766E+00	&(	2.083E+01	1.61E+02	1.46E+01 G
			244.69	4.685E+00	?(	3.649E+01	2.32E+02	7.58E+00 G
			1408.00	2.345E+00	?	6.769E+00	1.22E+02	2.10E+01 GA
EU-154	I	2.4054E+00					3.14E+03	
			873.23	2.718E+00	?(P	1.188E+01	1.24E+02	1.23E+01 G
			123.10	5.907E-01	- P	2.298E+00	1.16E+02	4.08E+01 G
			1274.54	0.000E+00	-	7.384E+00	1.00E+03	3.52E+01 G
			723.36	-2.138E+00	+	1.302E+01	1.77E+02	2.02E+01 G
			1004.77	2.513E+00	?(	8.655E+00	9.93E+01	1.80E+01 G
			996.33	1.861E+00	?(	2.117E+01	3.19E+02	1.06E+01 G
EU-155	I	-1.7545E+00					1.81E+03	
			105.31	-1.754E+00	&(P	8.402E+00	7.90E+01	2.12E+01 G
			86.54	-1.385E+00	&	7.113E+00	1.54E+02	3.07E+01 G
HF-181	F	7.0899E-01					4.24E+01	
			482.00	7.090E-01	?(	2.327E+00	9.74E+01	8.05E+01 G
			133.02	-7.963E-01	+	3.505E+00	1.32E+02	4.33E+01 G
			345.83	-3.451E+00	+	1.544E+01	1.33E+02	1.51E+01 G
			136.30	-5.915E+00	+	2.533E+01	1.28E+02	5.85E+00 G
Ta-182	F	2.7451E+00					1.14E+02	
			1121.30	2.991E+00	?(	8.880E+00	8.81E+01	3.49E+01 G
			1221.41	2.427E+00	&(	7.404E+00	1.35E+02	2.70E+01 G
			1189.05	-5.085E+00	+	1.711E+01	1.48E+02	1.62E+01 G
Hg-203	F	-5.4322E-01					4.66E+01	
			279.20	-5.432E-01	?(	1.801E+00	9.87E+01	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	7.7556E+00					6.98E+02	
			583.02	7.628E+00	(	8.963E-01	9.87E+00	8.45E+01 G
			277.28	9.458E+00	(	1.214E+01	4.81E+01	6.31E+00 G
			860.56	1.180E+01	+	1.132E+01	4.36E+01	1.24E+01 G
pm-146	C	-3.1727E+00					2.02E+03	
			747.16	-3.173E+00	?(P	6.625E+00	6.28E+01	3.40E+01 G
			735.72	2.588E+00	& P	7.257E+00	1.15E+02	2.25E+01 G
			453.88	6.287E-02	%	2.023E+00	1.24E+03	6.50E+01 G
y-88	F	5.4362E-01					1.07E+02	
			898.04	5.436E-01	?(P	1.343E+00	1.01E+02	9.37E+01 G
			1836.06	-4.150E-02	% P	9.809E-01	2.05E+03	9.92E+01 G
Cd-113m		-1.4456E+03					5.33E+03	
			263.70	-1.446E+03	?(	1.951E+04	3.89E+02	6.00E-03 K
Cd-109	F	-1.1158E+01					4.53E+02	
			88.04	-1.116E+01	?(	5.437E+01	1.46E+02	3.79E+00 G
Cf-251	T	-4.3942E-01					3.28E+05	
			176.60	-4.394E-01	?(	5.417E+00	4.48E+02	1.70E+01 G
			227.00	-5.837E+00	+	1.799E+01	1.14E+02	6.30E+00 GA
Cf-249	T	8.2131E-01					1.28E+05	
			387.95	5.992E-01	?(	2.509E+00	1.23E+02	6.60E+01 G
			333.44	1.767E+00	?(	7.358E+00	1.58E+02	1.55E+01 G
Sn-126		-1.3992E+00					3.65E+07	
			87.57	-1.130E+00	+	5.604E+00	1.49E+02	3.75E+01 GA
			64.28	-1.399E+00	(	1.583E+01	3.33E+02	9.70E+00 G
			86.94	-4.696E+00	+	2.372E+01	1.51E+02	9.04E+00 GA
PB-210	N	3.2622E+01					8.14E+03	
			46.54	3.262E+01	*(P	3.309E+01	3.83E+01	4.25E+00 G
PB-212	N	2.0515E+01					6.98E+02	
			238.63	2.051E+01	(	1.475E+00	5.55E+00	4.33E+01 G
			300.03	2.826E+01	+	2.639E+01	3.98E+01	3.28E+00 GA
PB-214	N	1.5698E+01					5.84E+05	
			351.93	1.527E+01	(P	2.218E+00	9.00E+00	3.76E+01 G
			295.09	1.653E+01	(P	4.199E+00	1.28E+01	1.93E+01 G
			242.00	1.885E+01	P	1.258E+01	2.30E+01	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C 2.1155E-01					1.18E+04	
		569.70	2.023E-01	?(	1.569E+00	2.21E+02	9.77E+01 G
		1063.66	2.238E-01	?(	2.322E+00	4.32E+02	7.45E+01 G
BI-212	N 1.0322E+01					6.98E+02	
		727.17	1.032E+01	?(P	3.271E+01	9.41E+01	7.55E+00 G
		785.42	3.029E+01	?	1.382E+02	1.91E+02	1.28E+00 GA
BI-214	N 1.6228E+01					5.84E+05	
		609.31	1.640E+01	@(P	3.403E+00	1.23E+01	4.61E+01 G
		1120.29	1.540E+01	(P	1.518E+01	3.32E+01	1.51E+01 G
		1764.49	1.653E+01	&(P	1.450E+01	3.18E+01	1.54E+01 G
BI-210M	T 7.0727E-01					1.10E+09	
		265.83	7.073E-01	&(	2.473E+00	1.04E+02	5.00E+01 G
		304.90	0.000E+00	-	7.447E+00	1.00E+03	2.80E+01 G
AC-228	N 1.9614E+01					2.10E+03	
		911.07	1.909E+01	(P	3.133E+00	1.28E+01	2.90E+01 G
		968.97	1.778E+01	(P	4.588E+00	1.76E+01	1.75E+01 G
		338.32	2.354E+01	(	7.134E+00	1.62E+01	1.20E+01 G
		93.35	7.312E+00	-	3.434E+01	1.41E+02	5.56E+00 XA
TH-227	N -1.4393E+00					7.95E+03	
		50.14	-1.439E+00	?(P	1.857E+01	4.10E+02	8.00E+00 G
		256.24	-2.493E+00	+ P	1.814E+01	1.94E+02	7.00E+00 G
TH-229	N 1.2664E+01					2.68E+06	
		193.51	1.266E+01	&(	1.822E+01	5.46E+01	4.40E+00 G
		210.85	2.343E+00	- P	3.790E+01	5.88E+02	2.99E+00 G
TH-234	N 4.5371E+00					1.63E+12	
		63.29	3.116E+00	?(P	3.623E+01	4.01E+02	3.81E+00 G
		92.59	5.506E+00	(P	1.793E+01	9.78E+01	5.58E+00 G
PA-231	N 1.3629E+01					1.20E+07	
		302.65	1.269E+01	?(	6.900E+01	1.61E+02	2.88E+00 G
		300.07	1.472E+01	(	7.515E+01	1.51E+02	2.46E+00 G
PA-233	C 1.8501E-01					7.82E+08	
		312.01	-7.895E-01	&(	6.028E+00	2.25E+02	3.60E+01 G
		300.18	5.844E+00	(	3.085E+01	1.56E+02	6.20E+00 G
PA-234	N 9.2290E-01					1.63E+12	
		131.29	-1.902E+00	?(	8.165E+00	1.28E+02	1.80E+01 G
		946.02	-2.443E+00	+	1.422E+01	2.41E+02	1.34E+01 G
		569.47	7.125E+00	?(	1.779E+01	7.47E+01	8.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          883.24-9.780E+00 +   3.202E+01 9.71E+01 9.60E+00 G
                          880.53-1.559E+01 +   4.671E+01 8.91E+01 6.00E+00 GA

U-235    N   3.7449E+00                                      2.57E+11
                          143.79 2.488E+00 ?(  1.101E+01 1.32E+02 1.10E+01 G
                          205.33 3.555E+00 &(P 2.126E+01 2.19E+02 5.01E+00 G
                          163.38 6.644E+00 &(  2.465E+01 1.11E+02 5.08E+00 G

AM-241   T   3.4107E-01                                      1.58E+05
                           59.54 3.411E-01 &(P 3.957E+00 4.03E+02 3.59E+01 G

Np-237   F  -3.0886E+00                                      2.14E+06
                           86.49-3.089E+00 &(  1.708E+01 1.66E+02 1.31E+01 G

Ir-192   F   5.1847E-01                                      7.40E+01
                          316.49 2.261E-01 &(  1.584E+00 2.04E+02 8.70E+01 G
                          468.06 1.010E+00 ?(  3.522E+00 1.03E+02 5.18E+01 G
                          308.44 0.000E+00 -   6.630E+00 1.00E+03 3.18E+01 G

Cs-136   F  -7.3591E-01                                      1.30E+01
                          818.50-7.359E-01 ?(  3.241E+00 1.30E+02 1.00E+02 G
                         1048.07-1.690E+00 +   3.312E+00 5.98E+01 8.00E+01 G
                          340.57-1.028E+00 +   5.087E+00 1.47E+02 4.69E+01 G

Np-239   T  -1.5905E+00                                      2.36E+00
                          103.70 1.302E+00 ?   5.153E+00 1.18E+02 2.40E+01 X
                          106.13-1.591E+00 *(  7.877E+00 1.48E+02 2.27E+01 G
                           99.50 0.000E+00 &   7.634E+00 1.00E+03 1.50E+01 X

Nd-147       1.7917E+00                                      1.11E+01
                          531.00 1.792E+00 ?(  9.807E+00 2.12E+02 1.30E+01 G
                           91.10-1.243E+00 +   7.058E+00 1.70E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       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.
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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	120.	-4.	-0.002	410.29	-1.439E+00	P
AM-241	59.54	177.	6.	0.003	402.54	3.411E-01	P
Sn-126	64.28	249.	-7.	-0.004	333.43	-1.399E+00	
BA-133	80.99	240.	-24.	-0.013	115.80	-1.188E+00	
Np-237	86.49	848.	-25.	-0.014	165.78	-3.089E+00	
EU-155	86.54	807.	-26.	-0.015	153.94	-1.385E+00	
Sn-126	86.94	780.	-26.	-0.015	151.41	-4.696E+00	
Sn-126	87.57	754.	-26.	-0.015	148.74	-1.130E+00	
Cd-109	88.04	728.	-26.	-0.015	146.07	-1.116E+01	
Nd-147	91.10	701.	-22.	-0.012	169.89	-1.243E+00	
Gd-153	97.50	229.	5.	0.003	403.31	2.761E-01	
Gd-153	103.20	327.	-22.	-0.012	118.54	-1.547E+00	
Np-239	103.70	278.	20.	0.011	118.19	1.302E+00	
EU-155	105.31	591.	-24.	-0.013	79.02	-1.754E+00	P
Np-239	106.13	596.	-24.	-0.013	148.24	-1.591E+00	
EU-152	121.78	193.	10.	0.005	205.95	5.243E-01	
CO-57	122.06	132.	13.	0.007	129.73	2.325E-01	
EU-154	123.10	153.	16.	0.009	115.67	5.907E-01	P
PA-234	131.29	374.	-22.	-0.012	128.26	-1.902E+00	
HF-181	133.02	396.	-22.	-0.012	131.55	-7.963E-01	
CE-144	133.54	327.	8.	0.004	336.82	1.097E+00	
HF-181	136.30	369.	-22.	-0.012	127.94	-5.915E+00	
CO-57	136.47	399.	-11.	-0.006	248.25	-1.724E+00	
Tc-99m	140.51	213.	16.	0.009	127.50	3.112E-01	
U-235	143.79	229.	17.	0.009	131.69	2.488E+00	
CE-141	145.44	260.	6.	0.004	363.93	2.167E-01	
Ba-140	162.66	246.	-16.	-0.009	140.87	-4.591E+00	
U-235	163.38	208.	19.	0.010	110.64	6.644E+00	
CE-139	165.85	195.	13.	0.007	152.59	2.919E-01	
Cf-251	176.60	100.	-4.	-0.002	447.68	-4.394E-01	
TH-229	193.51	63.	28.	0.015	54.60	1.266E+01	
U-235	205.33	105.	8.	0.005	218.51	3.555E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	210.85	114.	3.	0.002	588.34	2.343E+00	P
Cf-251	227.00	100.	-16.	-0.009	113.99	-5.837E+00	
EU-152	244.69	561.	15.	0.008	232.23	4.685E+00	
TH-227	256.24	103.	-7.	-0.004	194.01	-2.493E+00	P
Cd-113m	263.70	82.	-3.	-0.002	388.84	-1.446E+03	
BI-210M	265.83	91.	14.	0.007	103.66	7.073E-01	
Hg-203	279.20	120.	-16.	-0.009	98.69	-5.432E-01	
I-131	284.30	73.	-6.	-0.004	256.06	-2.857E+00	
PA-231	300.07	172.	13.	0.007	151.00	1.472E+01	
PA-233	300.18	185.	13.	0.007	156.20	5.844E+00	
PA-231	302.65	197.	13.	0.007	160.87	1.269E+01	
BA-133	302.85	210.	5.	0.003	377.54	8.690E-01	
PA-233	312.01	224.	-10.	-0.005	225.40	-7.895E-01	
Ir-192	316.49	84.	6.	0.004	203.81	2.261E-01	
CR-51	320.08	87.	2.	0.001	568.02	7.174E-01	
La-140	328.76	70.	-9.	-0.005	183.35	-1.334E+00	
Cf-249	333.44	51.	9.	0.005	158.35	1.767E+00	
Cs-136	340.57	235.	-15.	-0.008	147.04	-1.028E+00	
EU-152	344.29	220.	-15.	-0.008	141.99	-1.841E+00	
HF-181	345.83	217.	-16.	-0.009	133.01	-3.451E+00	
BA-133	356.00	250.	-5.	-0.003	464.71	-2.600E-01	
I-131	364.48	70.	-9.	-0.005	183.35	-3.612E-01	
BA-133	383.84	76.	11.	0.006	116.15	4.370E+00	
Cf-249	387.95	87.	11.	0.006	123.33	5.992E-01	
SN-113	391.69	191.	-18.	-0.010	85.77	-1.036E+00	P
AG-108M	433.94	36.	4.	0.002	297.91	1.740E-01	
Ir-192	468.06	76.	12.	0.007	103.16	1.010E+00	
BE-7	477.59	74.	-7.	-0.004	177.86	-2.837E+00	
HF-181	482.00	77.	13.	0.007	97.37	7.090E-01	
La-140	487.02	16.	8.	0.005	99.05	8.033E-01	
RH-106	511.86	33.	85.	0.047	20.50	1.912E+01	
Nd-147	531.00	28.	5.	0.003	211.97	1.792E+00	
Ba-140	537.26	29.	-8.	-0.004	112.29	-1.490E+00	P
CS-134	569.32	44.	-4.	-0.002	239.79	-1.284E+00	
PA-234	569.47	33.	12.	0.007	74.73	7.125E+00	
BI-207	569.70	37.	4.	0.002	220.69	2.023E-01	
SB-124	602.73	234.	9.	0.005	238.91	4.819E-01	
CS-134	604.71	243.	9.	0.005	243.13	4.871E-01	
RU-103	610.30	233.	8.	0.004	273.77	7.243E+00	
AG-108M	614.28	241.	8.	0.004	277.60	4.672E-01	
PM-144	618.06	296.	-11.	-0.006	217.25	-6.036E-01	
I-131	636.97	54.	-12.	-0.007	89.06	-9.357E+00	
AG-110M	657.76	100.	5.	0.003	307.06	2.747E-01	
PM-144	696.54	30.	13.	0.007	93.36	7.463E-01	P
SB-124	722.79	68.	3.	0.002	372.09	1.766E+00	
EU-154	723.36	77.	-7.	-0.004	177.32	-2.138E+00	
ZR-95	724.20	81.	-12.	-0.007	107.26	-1.687E+00	
pm-146	735.72	26.	10.	0.005	114.60	2.588E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
pm-146	747.16	52.	-17.	-0.010	62.79	-3.173E+00		P
ZR-95	756.73	26.	10.	0.005	112.70	1.112E+00		P
AG-110M	763.94	30.	-6.	-0.004	129.24	-1.795E+00		
NB-95	765.79	61.	-13.	-0.007	91.84	-8.031E-01		
PA-234M	766.41	95.	-14.	-0.008	103.12	-2.979E+02		
EU-152	778.92	42.	-14.	-0.008	101.77	-6.943E+00		
CS-134	795.87	33.	9.	0.005	133.96	7.130E-01		
CS-134	801.95	14.	3.	0.002	270.80	2.270E+00		
CO-58	810.78	68.	-14.	-0.008	79.08	-9.216E-01		P
La-140	815.77	81.	-4.	-0.002	325.14	-1.138E+00		
Cs-136	818.50	96.	-11.	-0.006	129.74	-7.359E-01		
MN-54	834.85	28.	12.	0.007	95.64	8.400E-01		P
NB-94	871.10	14.	8.	0.004	79.13	5.388E-01		P
EU-154	873.23	15.	5.	0.003	124.28	2.718E+00		P
PA-234	880.53	62.	-13.	-0.007	89.06	-1.559E+01		
PA-234	883.24	75.	-13.	-0.007	97.09	-9.780E+00		
Sc-46	889.28	58.	9.	0.005	120.35	6.699E-01		
y-88	898.04	10.	7.	0.004	100.80	5.436E-01		P
AG-110M	937.49	56.	-19.	-0.011	86.09	-4.173E+00		
PA-234	946.02	23.	-4.	-0.002	241.30	-2.443E+00		
EU-152	964.11	63.	7.	0.004	160.82	3.766E+00		
EU-154	996.33	30.	2.	0.001	318.75	1.861E+00		
EU-154	1004.77	13.	6.	0.003	99.34	2.513E+00		
Cs-136	1048.07	40.	-16.	-0.009	59.78	-1.690E+00		
RH-106	1050.36	36.	10.	0.006	89.89	5.323E+01		
BI-207	1063.66	15.	2.	0.001	431.57	2.238E-01		
Ga-68	1077.40	20.	8.	0.004	127.88	2.445E+01		
FE-59	1099.25	26.	-10.	-0.005	78.43	-1.480E+00		P
EU-152	1112.07	95.	-13.	-0.007	106.69	-8.462E+00		
ZN-65	1115.55	81.	-11.	-0.006	116.60	-1.939E+00		
CO-60	1173.24	26.	-6.	-0.003	147.79	-5.530E-01		P
NA-22	1274.53	21.	-5.	-0.003	129.90	-5.179E-01		
FE-59	1291.60	5.	6.	0.004	91.70	1.446E+00		P
CO-60	1332.50	11.	3.	0.002	252.58	3.061E-01		P
AG-110M	1384.30	0.	8.	0.004	35.36	3.426E+00		
EU-152	1408.00	5.	5.	0.003	121.64	2.345E+00		
La-140	1596.21	11.	2.	0.001	480.00	2.050E-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	-2.8370E+00	-2.8371E+00	1.779E+02%	1.73E+01
NA-22	#A	-5.1787E-01	-5.1787E-01	1.299E+02%	2.35E+00
K-40		2.5541E+02	2.5541E+02	6.417E+00%	1.19E+01
Sc-46	#A	6.6985E-01	6.6986E-01	1.204E+02%	2.75E+00
CR-51	#A	7.1736E-01	7.1740E-01	5.680E+02%	1.42E+01
MN-54	#A	8.3999E-01	8.4000E-01	9.564E+01%	1.88E+00
FE-59	#A	-1.4799E+00	-1.4799E+00	7.843E+01%	4.00E+00
Co-56	#	1.1856E+00	1.1856E+00	5.460E+01%	1.17E+00
CO-57	#A	2.3253E-01	2.3253E-01	1.297E+02%	1.02E+00
CO-58	#A	-9.2162E-01	-9.2164E-01	7.908E+01%	2.74E+00
CO-60	#A	3.0606E-01	3.0606E-01	2.526E+02%	1.83E+00
ZN-65	#A	-1.9392E+00	-1.9392E+00	1.166E+02%	7.67E+00
NB-94	#A	3.0186E-01	3.0186E-01	7.913E+01%	1.59E+00
ZR-95	#A	1.1124E+00	1.1124E+00	1.127E+02%	3.06E+00
NB-95	#A	-8.0304E-01	-8.0305E-01	9.184E+01%	2.49E+00
RU-103	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.41E+00
RH-106	#A	6.9674E+00	6.9674E+00	8.989E+01%	4.29E+01
AG-108M	#A	3.2011E-01	3.2011E-01	2.036E+02%	1.33E+00
AG-110M	#A	5.4461E-01	5.4461E-01	3.536E+01%	4.57E+00
SN-113	#A	-1.0360E+00	-1.0361E+00	8.577E+01%	3.79E+00
SB-124	#A	6.0916E-01	6.0918E-01	2.211E+02%	3.90E+00
SB-125	#	3.4589E+00	3.4589E+00	3.258E+01%	2.84E+00
I-131	#A	-3.6113E-01	-3.6119E-01	1.833E+02%	1.73E+00
Gd-153	#A	2.7609E-01	2.7609E-01	4.033E+02%	3.79E+00
Ga-68	#A	2.3732E+01	2.4450E+01	1.279E+02%	7.20E+01
Tc-99m	#A	3.0946E-01	3.1119E-01	1.275E+02%	1.33E+00
BA-133	#A	-2.5659E-03	-2.5659E-03	2.994E+02%	4.11E+00
CS-134	#A	6.6857E-01	6.6857E-01	1.293E+02%	4.01E+00
CS-137		3.6762E+00	3.6762E+00	2.363E+01%	1.74E+00
CE-139	#A	2.9191E-01	2.9191E-01	1.526E+02%	1.50E+00
Ba-140	#A	-1.4901E+00	-1.4902E+00	1.123E+02%	5.34E+00
La-140	#A	3.9813E-01	3.9818E-01	9.905E+01%	2.26E+00
CE-141	#A	2.1672E-01	2.1673E-01	3.639E+02%	2.68E+00
CE-144	#A	1.0970E+00	1.0970E+00	3.368E+02%	1.25E+01
PM-144	#A	7.4626E-01	7.4626E-01	9.336E+01%	1.68E+00
EU-152	#A	8.5720E-01	8.5720E-01	1.054E+02%	8.80E+00
EU-154	#A	2.4054E+00	2.4054E+00	9.934E+01%	1.19E+01
EU-155	#A	-1.7545E+00	-1.7545E+00	7.902E+01%	8.40E+00
HF-181	#A	7.0896E-01	7.0899E-01	9.737E+01%	2.33E+00
Ta-182	#A	2.7450E+00	2.7451E+00	8.072E+01%	8.88E+00
Hg-203	#A	-5.4321E-01	-5.4322E-01	9.869E+01%	1.80E+00
TL-208		7.7556E+00	7.7556E+00	9.867E+00%	8.96E-01
pm-146	#A	-3.1727E+00	-3.1727E+00	6.279E+01%	6.62E+00

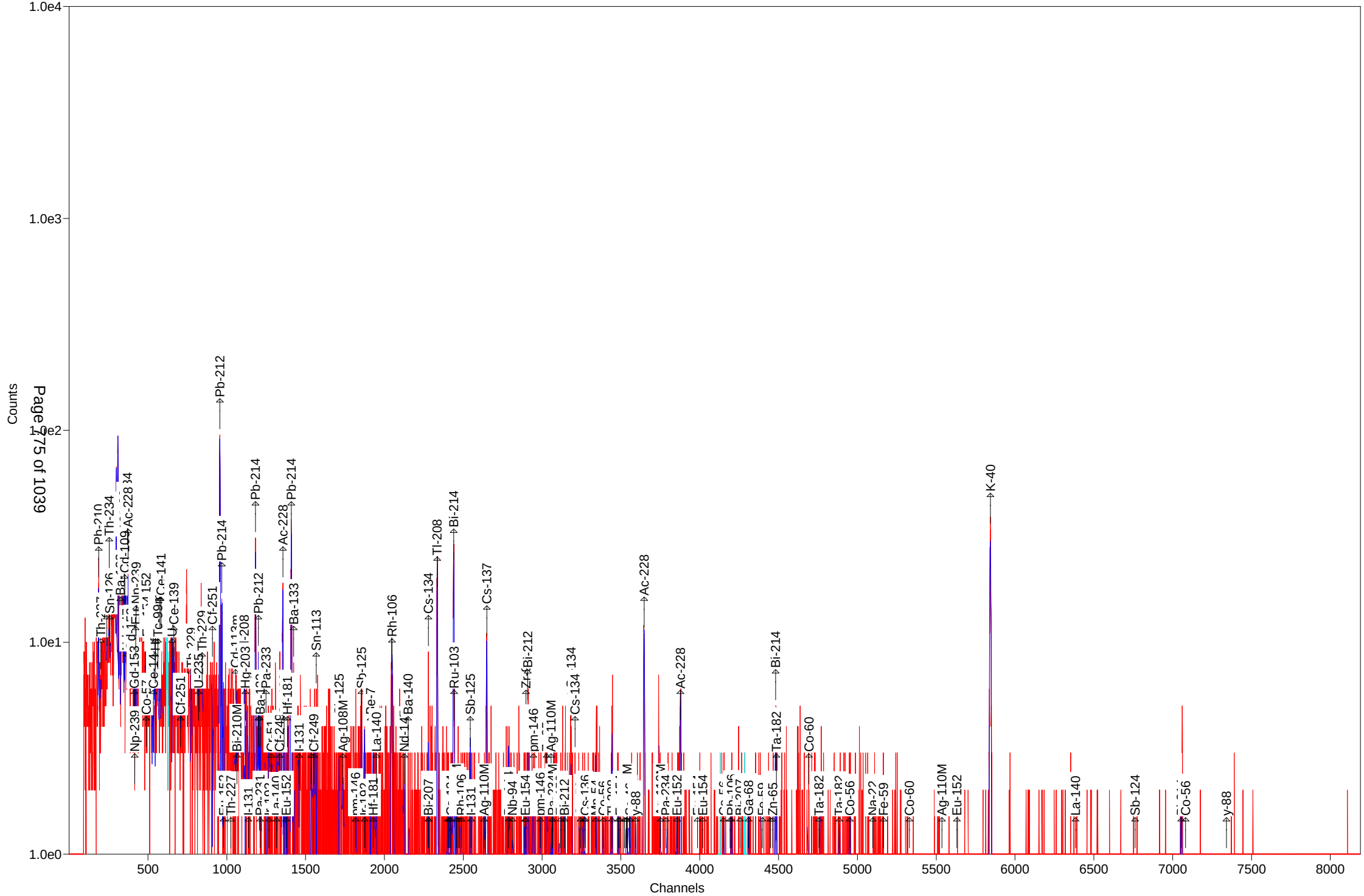
y-88 #A	5.4361E-01	5.4362E-01	1.008E+02%		1.34E+00
Cd-113m#A	-1.4456E+03	-1.4456E+03	3.888E+02%		1.95E+04
Cd-109 #A	-1.1157E+01	-1.1158E+01	1.461E+02%		5.44E+01
Cf-251 #A	-4.3942E-01	-4.3942E-01	4.477E+02%		5.42E+00
Cf-249 #A	8.2131E-01	8.2131E-01	1.004E+02%		2.51E+00
Sn-126 #A	-1.3992E+00	-1.3992E+00	3.334E+02%		1.58E+01
PB-210 #A	3.2622E+01	3.2622E+01	3.829E+01%		3.31E+01
PB-212	2.0515E+01	2.0515E+01	5.550E+00%		1.47E+00
PB-214	1.5698E+01	1.5698E+01	7.817E+00%		2.22E+00
BI-207 #A	2.1155E-01	2.1155E-01	2.207E+02%		1.57E+00
BI-212 #A	1.0322E+01	1.0322E+01	9.407E+01%		3.27E+01
BI-214	1.6228E+01	1.6228E+01	1.232E+01%		3.40E+00
BI-210M#A	7.0727E-01	7.0727E-01	1.037E+02%		2.47E+00
AC-228	1.9614E+01	1.9614E+01	9.031E+00%		3.13E+00
TH-227 #A	-1.4393E+00	-1.4393E+00	4.103E+02%		1.86E+01
TH-229 #A	1.2664E+01	1.2664E+01	5.460E+01%		1.82E+01
TH-234 #A	4.5371E+00	4.5371E+00	9.775E+01%		3.62E+01
PA-231 #A	1.3629E+01	1.3629E+01	1.103E+02%		6.90E+01
PA-233 #A	1.8501E-01	1.8501E-01	1.371E+02%		6.03E+00
PA-234 #A	9.2290E-01	9.2290E-01	7.422E+01%		8.16E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		2.79E+02
U-235 #A	3.7449E+00	3.7449E+00	9.269E+01%		1.10E+01
AM-241 #A	3.4107E-01	3.4107E-01	4.025E+02%		3.96E+00
Np-237 #A	-3.0886E+00	-3.0886E+00	1.658E+02%		1.71E+01
Ir-192 #A	5.1846E-01	5.1847E-01	1.032E+02%		1.58E+00
Cs-136 #A	-7.3583E-01	-7.3591E-01	1.297E+02%		3.24E+00
Np-239 #A	-1.5896E+00	-1.5905E+00	1.482E+02%		7.88E+00
Nd-147 #A	1.7915E+00	1.7917E+00	2.120E+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) 3.715E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 3.7151736E+02 Bq/Sample

257318_Gamma_160-17797-A-17-B. 5_Gamma_20161272.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20161700

Sample Description: 257318_Gamma_160-17797-A-18-B
Detector: Detector # 7
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-18-B

Decay to Time: 7/12/2016 12:15 Live Time: 1800 sec
Acquisition Time: 7/12/2016 12:16:24 Real Time: 1831 sec
Analysis Time: 7/12/2016 12:47 Dead Time: 1.69 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev11.lib
Bkgd Correction File: 7_2016-07-10_0612.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	-3.101E-01	1264.1	3.919E+00	3.919E+00	1.360E+01
NA-22	-1.074E+00	57.3	6.153E-01	6.176E-01	2.006E+00
K-40	2.482E+02	5.4	1.340E+01	1.846E+01	7.230E+00
Sc-46	-5.568E-01	103.9	5.784E-01	5.791E-01	1.959E+00
CR-51	1.991E+00	143.5	2.858E+00	2.860E+00	7.483E+00
MN-54	-4.619E-01	97.8	4.515E-01	4.521E-01	1.508E+00
FE-59	1.384E+00	92.2	1.276E+00	1.278E+00	2.779E+00
Co-56	-8.232E-02	109.3	9.000E-02	9.010E-02	1.527E+00
CO-57	1.717E-01	150.3	2.582E-01	2.583E-01	8.692E-01
CO-58	-4.634E-01	114.9	5.325E-01	5.330E-01	1.811E+00
CO-60	4.892E-01	143.2	7.006E-01	7.011E-01	1.532E+00
ZN-65	-1.329E+00	135.2	1.797E+00	1.798E+00	6.094E+00
NB-94	2.139E-01	231.4	4.950E-01	4.951E-01	1.177E+00
ZR-95	-5.391E-01	229.9	1.239E+00	1.240E+00	2.894E+00
NB-95	-9.707E-01	67.9	6.592E-01	6.611E-01	2.182E+00
RU-103	-5.388E-01	97.1	5.230E-01	5.238E-01	1.242E+00
RH-106	-3.087E+00	132.2	4.082E+00	4.085E+00	3.668E+01
AG-108M	-3.778E-01	164.6	6.217E-01	6.220E-01	1.035E+00
AG-110M	9.275E-01	76.0	7.046E-01	7.062E-01	2.333E+00
SN-113	-3.431E-01	234.3	8.036E-01	8.038E-01	2.334E+00
SB-124	3.667E-01	236.0	8.655E-01	8.657E-01	2.978E+00
SB-125	8.018E-01	208.7	1.674E+00	1.674E+00	3.117E+00
I-131	0.000E+00	1.#INF	7.660E-02	7.660E-02	1.083E+00
Gd-153	7.742E-01	144.5	1.119E+00	1.120E+00	3.739E+00
Ga-68	-2.748E+00	792.1	2.177E+01	2.177E+01	4.994E+01
Tc-99m	2.388E-01	120.9	2.886E-01	2.889E-01	9.670E-01
BA-133	1.922E-01	484.6	9.313E-01	9.314E-01	3.152E+00
CS-134	8.465E-01	42.4	3.588E-01	3.614E-01	3.055E+00
CS-137	6.917E-01	83.5	5.778E-01	5.789E-01	1.933E+00
CE-139	3.799E-02	908.1	3.450E-01	3.450E-01	9.399E-01
Ba-140	3.036E-01	567.3	1.722E+00	1.722E+00	4.254E+00
La-140	3.828E-01	92.6	3.544E-01	3.550E-01	1.221E+00
CE-141	-5.727E-01	164.5	9.420E-01	9.424E-01	3.141E+00

CE-144	-1.801E+00	171.3	3.085E+00	3.087E+00	1.033E+01
PM-144	3.942E-01	97.2	3.833E-01	3.838E-01	9.057E-01
EU-152	1.141E+00	83.7	9.550E-01	9.568E-01	5.913E+00
EU-154	2.171E-01	323.3	7.019E-01	7.020E-01	1.292E+01
EU-155	5.349E-01	155.3	8.304E-01	8.309E-01	5.246E+00
HF-181	6.370E-01	88.6	5.643E-01	5.653E-01	1.237E+00
Ta-182	2.155E+00	81.9	1.765E+00	1.768E+00	6.738E+00
Hg-203	-4.309E-01	101.4	4.368E-01	4.375E-01	1.462E+00
TL-208	5.844E+00	9.7	5.670E-01	6.430E-01	7.860E-01
pm-146	-1.707E+00	101.8	1.738E+00	1.740E+00	4.014E+00
y-88	5.433E-01	37.8	2.053E-01	2.072E-01	1.228E+00
Cd-113m	0.000E+00	1.#INF	3.214E+03	3.214E+03	1.510E+04
Cd-109	0.000E+00	1.#INF	1.164E+01	1.164E+01	3.912E+01
Cf-251	-3.997E-01	416.7	1.665E+00	1.666E+00	4.318E+00
Cf-249	2.866E-01	152.6	4.374E-01	4.377E-01	2.198E+00
Sn-126	3.688E+00	107.9	3.980E+00	3.985E+00	1.328E+01
PB-210	1.460E+01	81.3	1.188E+01	1.191E+01	3.150E+01
PB-212	1.861E+01	4.9	9.067E-01	1.507E+00	1.399E+00
PB-214	1.595E+01	6.9	1.101E+00	1.378E+00	1.920E+00
BI-207	-1.113E-01	336.7	3.747E-01	3.747E-01	1.309E+00
BI-212	6.916E+00	81.5	5.637E+00	5.649E+00	1.891E+01
BI-214	1.377E+01	8.6	1.183E+00	1.382E+00	1.599E+00
BI-210M	3.182E-01	156.4	4.976E-01	4.980E-01	1.694E+00
AC-228	1.999E+01	8.6	1.715E+00	1.995E+00	2.121E+00
TH-227	1.426E+00	458.1	6.533E+00	6.533E+00	2.210E+01
TH-229	-4.117E+00	162.0	6.670E+00	6.678E+00	1.718E+01
TH-234	1.587E+01	46.3	7.343E+00	7.390E+00	2.374E+01
PA-231	4.102E+00	448.7	1.841E+01	1.841E+01	6.219E+01
PA-233	-5.130E-08	2368018128.3	1.215E+00	1.215E+00	4.148E+00
PA-234	-1.481E-01	94.6	1.402E-01	1.404E-01	6.021E+00
PA-234M	3.393E+01	152.3	5.169E+01	5.172E+01	2.390E+02
U-235	-2.506E+00	84.9	2.128E+00	2.132E+00	1.340E+01
AM-241	6.968E-02	1701.2	1.185E+00	1.185E+00	3.214E+00
Np-237	2.187E+00	157.2	3.438E+00	3.440E+00	1.146E+01
Ir-192	3.361E-01	95.5	3.209E-01	3.215E-01	1.258E+00
Cs-136	5.676E-01	92.4	5.245E-01	5.255E-01	1.739E+00
Np-239	1.012E-01	1408.2	1.426E+00	1.426E+00	4.810E+00
Nd-147	1.022E+00	281.5	2.878E+00	2.879E+00	7.113E+00
Total	4.233E+02				

Analyst: Mike Aldridge

TestAmerica Inc Spectrum name: 7_Gamma_20161700.An1

Sample description
257318_Gamma_160-17797-A-18-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20161700.An1

Acquisition information
Start time: 7/12/2016 12:16:24 PM
Live time: 1800
Real time: 1831
Dead time: 1.69 %
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	7/12/2016 12:15:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2016-07-10_0612.PBC 7/10/2016 6:12:03 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1814

***** 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	28.	81.32	0.67	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	6.	458.12	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
63.21	44.	46.28	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.20	26.	107.93	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
74.81	256.	9.93	0.87	4.768E-02				
77.16	395.	7.11	0.87	4.891E-02				
86.54	27.	155.25	0.88	5.281E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.273E-01	EU155
					86.94	9.040	3.141E+00	Sn126
86.76	27.	157.19	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	PBC<MDA	EU155
					86.94	9.040	PBC<MDA	Sn126
87.84	49.	44.14	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.349E+01	Cd109
92.47	40.	54.88	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
93.23	29.	141.44	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
97.50	23.	144.54	0.89	5.550E-02	97.50	30.000	PBC<MDA	Gd153
121.78	21.	101.45	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.451E-01	CO57
122.06	15.	150.33	0.92	5.606E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.717E-01	CO57
140.51	20.	120.87	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	3.	908.08	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
238.67	504.	5.96	1.06	3.601E-02	238.63	43.300	1.794E+01	PB212
242.07	112.	14.50	1.04	3.560E-02	242.00	7.430	2.347E+01	PB214
265.83	9.	156.39	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.80	54.	31.62	1.87	3.172E-02	277.28	6.310	1.499E+01	TL208
295.41	167.	9.80	1.10	3.006E-02	295.09	19.300	1.551E+01	PB214
299.96	45.	25.35	1.10	2.967E-02	300.03	3.280	2.579E+01	PB212
					300.07	2.460	3.439E+01	PA231
					300.18	6.200	1.365E+01	PA233
302.69	6.	448.68	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	6.449E-01	BA133
320.08	10.	143.53	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	16.	92.56	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	11.	152.65	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.30	112.	19.10	0.99	2.677E-02	338.32	12.010	1.939E+01	AC228
340.57	13.	162.29	1.15	2.662E-02	340.57	46.900	PBC<MDA	Cs136
344.29	13.	166.35	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
345.83	13.	173.36	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.07	266.	8.20	0.92	2.587E-02	351.93	37.600	1.519E+01	PB214
356.00	6.	484.64	1.16	2.562E-02	356.00	62.050	PBC<MDA	BA133
468.06	18.	95.46	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
482.00	12.	88.59	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
487.02	5.	256.32	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
511.17	76.	21.11	1.03	1.873E-02	511.86	20.000	1.126E+01	RH106
531.00	4.	281.48	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
537.26	2.	567.28	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
563.24	28.	42.38	1.36	1.720E-02	563.24	8.350	1.068E+01	CS134
569.32	3.	344.80	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.193E+00	PA234
					569.70	97.740	1.001E-01	BI207
569.47	7.	144.98	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.784E+00	PA234
					569.70	97.740	2.336E-01	BI207
583.39	149.	9.66	1.02	1.668E-02	583.02	84.500	5.844E+00	TL208
600.50	12.	208.72	1.40	1.626E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	236.02	1.40	1.621E-02	602.73	98.260	PBC<MDA	SB124
604.71	12.	215.42	1.40	1.616E-02	604.71	97.620	PBC<MDA	CS134
609.51	187.	8.59	1.37	1.605E-02	609.31	46.090	1.405E+01	BI214
					610.30	5.750	1.128E+02	RU103
661.61	16.	83.53	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137
696.54	10.	97.23	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
702.63	5.	231.42	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
722.79	3.	448.45	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.330E-01	AG108M
					723.36	20.220	5.978E-01	EU154
727.56	13.	81.51	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
766.41	10.	152.33	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.397E+02	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
778.92	7.	158.51	1.56	1.291E-02	778.92	12.940	PBC<MDA	EU152
785.24	4.	216.89	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
795.87	8.	131.10	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
818.50	12.	92.41	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
860.54	32.	25.91	1.72	1.181E-02	860.56	12.420	1.208E+01	TL208
884.68	11.	94.55	1.65	1.152E-02	884.68	72.680	PBC<MDA	AG110M
898.04	8.	127.88	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.31	115.	10.03	1.26	1.122E-02	911.07	29.000	1.957E+01	AC228
969.60	70.	14.05	1.61	1.062E-02	968.97	17.460	2.108E+01	AC228
996.33	3.	323.33	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1050.36	5.	199.70	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1099.25	13.	92.20	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1120.41	33.	29.21	1.85	9.311E-03	1120.29	15.100	1.290E+01	BI214
					1120.55	99.987	1.949E+00	Sc46
1121.42	14.	81.91	1.85	9.303E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.456E+00	Ta182
1189.62	9.	108.96	1.90	8.821E-03	1189.05	16.200	PBC<MDA	Ta182
1220.32	4.	356.46	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	7.	211.75	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	7.	143.21	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	118.94	2.04	7.678E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	6.	96.69	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.22	348.	5.40	1.70	7.307E-03	1460.83	10.670	2.482E+02	K40
1596.21	2.	304.14	2.19	6.737E-03	1596.21	95.400	PBC<MDA	La140
1690.98	1.	600.00	2.25	6.388E-03	1690.98	47.790	PBC<MDA	SB124
1764.86	5.	127.81	2.29	6.141E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	80.93	2.29	6.119E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	7.	37.80	2.33	5.919E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.82	74.84	194.	256.	5.361E+03	9.93	0.867	- D
308.21	77.19	197.	395.	8.079E+03	7.11	0.870	- D
2044.37	511.17	56.	76.	4.047E+03	21.11	1.029	- 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	185.73	46.55	150.	28.	0.015	81.32	0.668s
TH-227	200.12	50.14	354.	6.	0.003	458.12	0.840s
TH-234	252.71	63.29	180.	44.	0.024	46.28	0.854D
Sn-126	256.68	64.28	389.	26.	0.015	107.93	0.856s
Np-237	345.53	86.49	902.	27.	0.015	157.19	0.880s
EU-155	345.74	86.54	869.	27.	0.015	155.25	0.880s
Sn-126	347.33	86.94	896.	0.	0.000	1000.00	0.880
Sn-126	349.85	87.57	886.	49.	0.027	44.14	0.881D
Cd-109	351.73	88.04	896.	0.	0.000	1000.00	0.881A
Nd-147	363.97	91.10	896.	0.	0.000	1000.00	0.885s
TH-234	369.93	92.59	220.	40.	0.022	54.88	0.886D
AC-228	372.97	93.35	813.	29.	0.016	141.44	0.887s
Gd-153	389.57	97.50	551.	23.	0.013	144.54	0.892s
Np-239	397.57	99.50	565.	-7.	-0.004	515.75	0.894
Gd-153	412.38	103.20	558.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	558.	0.	0.000	1000.00	0.898s
EU-152	486.69	121.78	220.	21.	0.012	101.45	0.918s
CO-57	487.83	122.06	241.	15.	0.008	150.33	0.918s
EU-154	491.98	123.10	286.	-25.	-0.014	88.99	0.919s
PA-234	524.77	131.29	502.	-26.	-0.015	121.60	0.928s
HF-181	531.68	133.02	529.	-26.	-0.015	124.43	0.930s
CE-144	533.74	133.54	555.	-20.	-0.011	171.32	0.930s
HF-181	544.79	136.30	575.	0.	0.000	1000.00	0.933
CO-57	545.48	136.47	532.	-27.	-0.015	122.58	0.933
Tc-99m	561.63	140.51	278.	20.	0.011	120.87	0.938s
U-235	574.73	143.79	860.	-26.	-0.014	84.91	0.941
CE-141	581.35	145.44	903.	-26.	-0.014	164.47	0.943s
CE-139	663.01	165.85	184.	3.	0.001	908.08	0.965
Cf-251	706.00	176.60	158.	-6.	-0.003	416.67	0.976s
TH-229	773.64	193.51	143.	-14.	-0.008	162.02	0.994s
TH-229	843.01	210.85	187.	-13.	-0.007	198.74	1.012s
Cf-251	907.62	227.00	154.	-23.	-0.013	102.23	1.029s
PB-212	954.15	238.63	62.	522.	0.290	4.87	1.041D
PB-214	967.61	242.00	75.	112.	0.062	14.50	1.045D
EU-152	978.39	244.69	930.	-22.	-0.012	198.55	1.048s
TH-227	1024.59	256.24	114.	-16.	-0.009	160.55	1.060s
Cd-113m	1054.43	263.70	121.	0.	0.000	1000.00	1.067s
BI-210M	1062.96	265.83	104.	9.	0.005	156.39	1.070
TL-208	1110.83	277.80	57.	54.	0.030	31.62	1.875s
Hg-203	1116.44	279.20	194.	-20.	-0.011	101.35	1.083
I-131	1136.83	284.30	85.	-12.	-0.007	122.40	1.089s
PB-214	1181.16	295.38	55.	182.	0.101	11.10	1.129
PB-212	1199.76	300.03	41.	33.	0.018	5.71	1.105A
PA-231	1199.92	300.07	439.	-18.	-0.010	166.11	1.105

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	1200.36	300.18	421.	-18.	-0.010	162.74	1.105
PA-231	1210.24	302.65	392.	6.	0.003	448.68	1.107s
Ir-192	1233.41	308.44	242.	-14.	-0.008	165.05	1.113s
CR-51	1279.99	320.08	56.	10.	0.006	143.53	1.125s
La-140	1314.69	328.76	99.	16.	0.009	92.56	1.134s
Cf-249	1333.41	333.44	146.	11.	0.006	152.65	1.139s
AC-228	1352.86	338.30	68.	112.	0.062	19.10	0.990
Cs-136	1361.93	340.57	223.	13.	0.007	162.29	1.146s
EU-152	1376.80	344.29	237.	13.	0.007	166.35	1.150s
HF-181	1382.97	345.83	248.	13.	0.007	173.36	1.151s
PB-214	1407.92	352.07	44.	266.	0.148	8.20	0.920
BA-133	1423.66	356.00	352.	6.	0.003	484.64	1.162s
I-131	1457.59	364.48	64.	0.	0.000	1000.00	1.170s
BA-133	1535.03	383.84	149.	-13.	-0.007	132.48	1.189s
Cf-249	1551.47	387.95	163.	0.	0.000	1000.00	1.193s
SN-113	1566.43	391.69	170.	-9.	-0.005	234.26	1.197s
AG-108M	1735.43	433.94	52.	-13.	-0.007	164.55	1.239
pm-146	1815.20	453.88	64.	-8.	-0.004	198.96	1.258s
SB-125	1853.15	463.37	137.	-20.	-0.011	111.73	1.268s
Ir-192	1871.93	468.06	134.	18.	0.010	95.46	1.272s
HF-181	1927.68	482.00	49.	12.	0.007	88.59	1.286s
La-140	1947.77	487.02	69.	5.	0.003	256.32	1.291s
RU-103	1987.91	497.05	61.	-17.	-0.009	97.07	1.301s
RH-106	2047.15	511.86	237.	-38.	-0.021	59.80	2.565s
Nd-147	2123.70	531.00	35.	4.	0.002	281.48	1.333s
Ba-140	2148.74	537.26	44.	2.	0.001	567.28	1.339s
CS-134	2252.65	563.24	26.	28.	0.015	42.38	1.364s
CS-134	2276.99	569.32	52.	3.	0.002	344.80	1.369s
PA-234	2277.59	569.47	48.	7.	0.004	144.98	1.370s
BI-207	2278.51	569.70	61.	-3.	-0.002	336.75	1.370s
TL-208	2333.26	583.39	14.	148.	0.082	9.70	1.019s
SB-125	2401.71	600.50	301.	12.	0.007	208.72	1.399s
SB-124	2410.64	602.73	314.	11.	0.006	236.02	1.401s
CS-134	2418.55	604.71	325.	12.	0.007	215.42	1.403s
BI-214	2437.75	609.51	16.	187.	0.104	8.59	1.371s
AG-108M	2456.84	614.28	339.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	339.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	466.	-18.	-0.010	173.39	1.419s
SB-125	2543.28	635.89	36.	-6.	-0.003	285.04	1.432s
I-131	2547.62	636.97	62.	-15.	-0.008	77.50	1.433s
AG-110M	2630.77	657.76	124.	-4.	-0.002	459.98	1.452s
CS-137	2646.36	661.66	79.	16.	0.009	83.53	1.455
PM-144	2785.90	696.54	19.	10.	0.006	97.23	1.487s
NB-94	2810.25	702.63	33.	5.	0.003	231.42	1.493s
SB-124	2890.87	722.79	89.	3.	0.002	448.45	1.511s
AG-108M	2891.48	722.94	92.	0.	0.000	1000.00	1.511s
EU-154	2893.15	723.36	92.	0.	0.000	1000.00	1.511s
BI-212	2908.41	727.17	49.	13.	0.007	81.51	1.515

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2988.37	747.16	42.	-14.	-0.008	101.77	1.533s
ZR-95	3026.65	756.73	56.	-7.	-0.004	229.91	1.541s
AG-110M	3055.51	763.94	52.	-2.	-0.001	546.75	1.548s
NB-95	3062.89	765.79	109.	-23.	-0.013	67.91	1.549s
PA-234M	3065.38	766.41	104.	10.	0.005	152.33	1.550s
EU-152	3115.41	778.92	23.	7.	0.004	158.51	1.561s
BI-212	3141.41	785.42	19.	4.	0.002	216.89	1.567s
CS-134	3183.20	795.87	51.	8.	0.004	131.10	1.576s
CO-58	3242.84	810.78	65.	-10.	-0.006	114.91	1.589s
La-140	3262.82	815.77	76.	0.	0.000	1000.00	1.593s
Cs-136	3273.74	818.50	60.	12.	0.007	92.41	1.596s
MN-54	3339.13	834.85	42.	-10.	-0.006	97.75	1.610s
Co-56	3386.82	846.77	42.	-13.	-0.007	109.33	1.620s
TL-208	3441.91	860.54	9.	32.	0.018	25.91	1.722
NB-94	3484.13	871.10	36.	-4.	-0.002	217.94	1.641s
EU-154	3492.66	873.23	43.	0.	0.000	1000.00	1.643s
PA-234	3521.86	880.53	62.	-12.	-0.007	97.18	1.649s
PA-234	3532.70	883.24	74.	0.	0.000	1000.00	1.652s
AG-110M	3538.47	884.68	48.	11.	0.006	94.55	1.653s
Sc-46	3556.86	889.28	66.	-11.	-0.006	103.89	1.657s
y-88	3591.90	898.04	20.	8.	0.004	127.88	1.664s
AC-228	3644.97	911.31	4.	115.	0.064	10.03	1.262s
AG-110M	3749.71	937.49	45.	-12.	-0.007	95.44	1.697s
PA-234	3783.82	946.02	35.	-11.	-0.006	122.02	1.704s
EU-152	3856.18	964.11	128.	-4.	-0.002	357.98	1.719s
AC-228	3878.15	969.60	6.	70.	0.039	14.05	1.610
EU-154	3985.06	996.33	51.	3.	0.002	323.33	1.746s
Co-56	4151.10	1037.84	35.	-13.	-0.007	74.37	1.780s
Cs-136	4192.02	1048.07	39.	-10.	-0.006	93.81	1.788s
RH-106	4201.18	1050.36	44.	5.	0.003	199.70	1.790s
BI-207	4254.38	1063.66	22.	-2.	-0.001	553.94	1.801s
Ga-68	4309.34	1077.40	21.	-1.	-0.001	792.15	1.812s
FE-59	4396.74	1099.25	27.	13.	0.007	92.20	1.829
EU-152	4448.04	1112.07	128.	-17.	-0.009	97.75	1.839s
ZN-65	4461.92	1115.55	111.	-11.	-0.006	135.17	1.842s
BI-214	4480.88	1120.29	29.	33.	0.018	29.21	1.845D
Sc-46	4481.94	1120.55	100.	0.	0.000	1000.00	1.846
Ta-182	4484.94	1121.30	62.	14.	0.008	81.91	1.846s
CO-60	4692.68	1173.24	54.	-14.	-0.008	72.74	1.886s
Ta-182	4755.93	1189.05	16.	9.	0.005	108.96	1.899s
Ta-182	4885.37	1221.41	43.	4.	0.002	356.46	1.923s
Co-56	4952.84	1238.28	43.	7.	0.004	211.75	1.936s
NA-22	5097.84	1274.53	34.	-16.	-0.009	57.28	1.963s
EU-154	5097.89	1274.54	50.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	23.	-3.	-0.001	423.16	1.975s
CO-60	5329.71	1332.50	17.	7.	0.004	143.21	2.005s
AG-110M	5536.89	1384.30	6.	5.	0.003	118.94	2.042s
EU-152	5631.70	1408.00	6.	6.	0.004	96.69	2.059s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	5844.56	1461.22	3.	348.	0.194	5.40	1.698
La-140	6384.49	1596.21	6.	2.	0.001	304.14	2.185s
SB-124	6763.55	1690.98	6.	1.	0.001	600.00	2.245s
BI-214	7057.56	1764.49	21.	5.	0.003	127.81	2.290s
Co-56	7084.99	1771.35	17.	8.	0.004	80.93	2.294s
y-88	7343.81	1836.06	0.	7.	0.004	37.80	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	-3.1006E-01				5.31E+01	
			477.60	-3.101E-01	&(	1.360E+01 1.26E+03 1.05E+01	G
NA-22	C	-1.0741E+00				9.50E+02	
			1274.53	-1.074E+00	?(	2.006E+00 5.73E+01 9.99E+01	G
K-40	N	2.4824E+02				4.66E+11	
			1460.83	2.482E+02	(P	7.230E+00 5.40E+00 1.07E+01	G
Sc-46	F	-5.5680E-01				8.38E+01	
			889.28	-5.568E-01	?(	1.959E+00 1.04E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.943E+00 1.00E+03 1.00E+02	G
CR-51	F	1.9911E+00				2.77E+01	
			320.08	1.991E+00	&(	7.483E+00 1.44E+02 9.94E+00	G
MN-54	C	-4.6189E-01				3.12E+02	
			834.85	-4.619E-01	?(P	1.508E+00 9.78E+01 1.00E+02	G
FE-59	F	1.3841E+00				4.45E+01	
			1099.25	1.384E+00	&(	2.779E+00 9.22E+01 5.65E+01	G
			1291.60	-4.192E-01	-	3.914E+00 4.23E+02 4.32E+01	G
Co-56	C	-8.2324E-02				7.73E+01	
			846.77	-6.032E-01	?(	1.527E+00 1.09E+02 9.99E+01	G
			1238.28	7.055E-01	(P	3.286E+00 2.12E+02 6.61E+01	G
			1037.84	-5.303E+00	+ P	1.200E+01 7.44E+01 1.41E+01	G
			1771.35	4.676E+00	?	1.280E+01 8.09E+01 1.55E+01	A
CO-57	C	1.7172E-01				2.72E+02	
			122.06	1.717E-01	*(	8.692E-01 1.50E+02 8.56E+01	G
			136.47	-2.592E+00	&	1.060E+01 1.23E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-4.6337E-01					7.09E+01	
			810.78	-4.634E-01	?(	1.811E+00	1.15E+02	9.95E+01 G
CO-60	F	4.8922E-01					1.93E+03	
			1332.50	4.892E-01	?(	1.532E+00	1.43E+02	1.00E+02 G
			1173.24	-8.691E-01	+ P	2.301E+00	7.27E+01	9.99E+01 G
ZN-65	F	-1.3293E+00					2.44E+02	
			1115.55	-1.329E+00	?(	6.094E+00	1.35E+02	5.06E+01 G
NB-94	I	2.1389E-01					7.41E+06	
			702.63	2.139E-01	?(	1.177E+00	2.31E+02	9.79E+01 G
			871.10	-1.904E-01	+	1.460E+00	2.18E+02	9.99E+01 G
ZR-95	I	-5.3906E-01					6.40E+01	
			756.73	-5.391E-01	?(	2.894E+00	2.30E+02	5.45E+01 G
			724.20	7.613E-02	%	4.312E+00	1.62E+03	4.42E+01 G
NB-95	I	-9.7069E-01					6.40E+01	
			765.79	-9.707E-01	?(	2.182E+00	6.79E+01	9.98E+01 G
RU-103	I	-5.3880E-01					3.93E+01	
			497.05	-5.388E-01	?(	1.242E+00	9.71E+01	9.09E+01 G
			610.30	1.132E+00	%	5.321E+01	1.39E+03	5.75E+00 GA
RH-106	I	-3.0870E+00					3.74E+02	
			621.92	-6.312E+00	?(	3.668E+01	1.73E+02	9.93E+00 G
			1050.36	1.744E+01	?(	1.215E+02	2.00E+02	1.56E+00 G
			511.86	-5.618E+00	+	1.106E+01	5.98E+01	2.00E+01 GA
AG-108M	C	-3.7783E-01					1.53E+05	
			433.94	-3.778E-01	?(P	1.035E+00	1.65E+02	9.05E+01 G
			722.94	0.000E+00	&	2.101E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	3.434E+00	1.00E+03	8.98E+01 G
AG-110M	F	9.2746E-01					2.50E+02	
			884.68	7.296E-01	&(P	2.333E+00	9.45E+01	7.27E+01 G
			657.76	-1.375E-01	- P	2.133E+00	4.60E+02	9.46E+01 G
			937.49	-1.785E+00	+ P	5.026E+00	9.54E+01	3.44E+01 G
			1384.30	1.519E+00	?(P	4.179E+00	1.19E+02	2.43E+01 G
			763.94	-3.415E-01	- P	6.881E+00	5.47E+02	2.23E+01 G
SN-113	F	-3.4305E-01					1.15E+02	
			391.69	-3.431E-01	&(P	2.334E+00	2.34E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	3.6669E-01					6.02E+01	
			602.73	3.739E-01	?(P	2.978E+00	2.36E+02	9.83E+01 G
			1690.98	1.820E-01	?(	2.571E+00	6.00E+02	4.78E+01 G
			722.79	1.117E+00	&(	1.738E+01	4.48E+02	1.08E+01 G
SB-125	I	8.0183E-01					1.01E+03	
			427.88	-8.584E-02	%(	3.117E+00	1.42E+03	2.96E+01 G
			600.50	2.273E+00	*(P	1.600E+01	2.09E+02	1.79E+01 G
			635.89	-1.800E+00	+ P	9.705E+00	2.85E+02	1.13E+01 G
			463.37	-5.098E+00	& P	1.487E+01	1.12E+02	1.05E+01 G
Gd-153	F	7.7417E-01					2.42E+02	
			97.50	7.742E-01	?(	3.739E+00	1.45E+02	3.00E+01 G
			103.20	0.000E+00	-	5.113E+00	1.00E+03	2.18E+01 G
Ga-68	C	-2.7479E+00					4.71E-02	
			1077.40	-2.748E+00	?(	4.994E+01	7.92E+02	3.30E+00 G
Tc-99m	I	2.3876E-01					2.51E-01	
			140.51	2.388E-01	*(	9.670E-01	1.21E+02	8.93E+01 G
BA-133	F	1.9217E-01					3.85E+03	
			356.00	1.922E-01	?(	3.152E+00	4.85E+02	6.20E+01 G
			302.85	-4.911E-08	%	9.781E+00	5.87E+09	1.83E+01 G
			383.84	-3.450E+00	+	1.544E+01	1.32E+02	8.94E+00 GA
			80.99	1.023E-01	% P	5.594E+00	1.64E+03	3.41E+01 GA
CS-134	I	8.4648E-01					7.54E+02	
			604.71	4.208E-01	?(	3.055E+00	2.15E+02	9.76E+01 G
			795.87	4.103E-01	?(	1.846E+00	1.31E+02	8.55E+01 G
			569.32	6.360E-01	?(	7.698E+00	3.45E+02	1.54E+01 G
			801.95	5.082E-01	%	1.988E+01	1.11E+03	8.69E+00 G
			563.24	1.068E+01	?(P	1.031E+01	4.24E+01	8.35E+00 G
CS-137	I	6.9174E-01					1.10E+04	
			661.66	6.917E-01	?(P	1.933E+00	8.35E+01	8.52E+01 G
CE-139	F	3.7987E-02					1.38E+02	
			165.85	3.799E-02	&(	9.399E-01	9.08E+02	7.99E+01 G
Ba-140	I	3.0357E-01					1.28E+01	
			537.26	3.036E-01	?(P	4.254E+00	5.67E+02	2.44E+01 G
			162.66	1.844E-01	%	1.548E+01	2.47E+03	6.22E+00 G
			304.85	-2.110E-07	%	4.203E+01	5.87E+09	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	3.8284E-01					1.28E+01	
			1596.21	1.729E-01	?(	1.221E+00	3.04E+02	9.54E+01 G
			487.02	2.919E-01	?(	2.595E+00	2.56E+02	4.55E+01 G
			328.76	1.573E+00	(	4.888E+00	9.26E+01	2.03E+01 G
			815.77	0.000E+00	-	8.331E+00	1.00E+03	2.33E+01 G
CE-141	I	-5.7274E-01					3.25E+01	
			145.44	-5.727E-01	(	3.141E+00	1.64E+02	4.82E+01 G
CE-144	I	-1.8010E+00					2.85E+02	
			133.54	-1.801E+00	?(	1.033E+01	1.71E+02	1.11E+01 G
PM-144	C	3.9420E-01					3.63E+02	
			696.54	3.942E-01	&(P	9.057E-01	9.72E+01	9.90E+01 G
			618.06	0.000E+00	-	3.130E+00	1.00E+03	9.91E+01 G
EU-152	F	1.1406E+00					4.94E+03	
			344.29	1.054E+00	?(	5.913E+00	1.66E+02	2.65E+01 G
			1112.07	-7.348E+00	+	2.410E+01	9.78E+01	1.36E+01 G
			121.78	7.337E-01	*(	2.490E+00	1.01E+02	2.86E+01 G
			778.92	2.217E+00	?(	8.387E+00	1.59E+02	1.29E+01 G
			964.11	-1.605E+00	&	1.974E+01	3.58E+02	1.46E+01 G
			244.69	-4.542E+00	+	3.010E+01	1.99E+02	7.58E+00 G
			1408.00	2.216E+00	?	4.829E+00	9.67E+01	2.10E+01 GA
EU-154	I	2.1708E-01					3.14E+03	
			873.23	0.000E+00	?(	1.292E+01	1.00E+03	1.23E+01 G
			123.10	-6.039E-01	& P	1.984E+00	8.90E+01	4.08E+01 G
			1274.54	0.000E+00	?(	6.799E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	?(	9.446E+00	1.00E+03	2.02E+01 G
			1004.77	1.188E-09	%	8.477E+00	3.04E+11	1.80E+01 G
			996.33	1.603E+00	?(	1.819E+01	3.23E+02	1.06E+01 G
EU-155	I	5.3486E-01					1.81E+03	
			105.31	-3.343E-02	%(P	5.246E+00	3.07E+03	2.12E+01 G
			86.54	9.273E-01	&(	4.800E+00	1.55E+02	3.07E+01 G
HF-181	F	6.3700E-01					4.24E+01	
			482.00	4.141E-01	?(	1.237E+00	8.86E+01	8.05E+01 G
			133.02	-6.211E-01	+	2.579E+00	1.24E+02	4.33E+01 G
			345.83	1.827E+00	&(P	1.068E+01	1.73E+02	1.51E+01 G
			136.30	0.000E+00	&	2.008E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.1548E+00					1.14E+02	
			1121.30	2.456E+00	?(	6.738E+00	8.19E+01	3.49E+01 G
			1221.41	1.006E+00	&(P	7.935E+00	3.56E+02	2.70E+01 G
			1189.05	3.422E+00	?(P	8.346E+00	1.09E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-4.3095E-01					4.66E+01	
			279.20	-4.309E-01	?(	1.462E+00	1.01E+02	8.15E+01 G
TL-208	N	5.8436E+00					6.98E+02	
			583.02	5.844E+00	@(P	7.860E-01	9.70E+00	8.45E+01 G
			277.28	1.499E+01	+	1.052E+01	3.16E+01	6.31E+00 G
			860.56	1.208E+01	+ P	6.355E+00	2.59E+01	1.24E+01 G
pm-146	C	-1.7074E+00					2.02E+03	
			747.16	-1.707E+00	?(	4.014E+00	1.02E+02	3.40E+01 G
			735.72	-1.818E-01	%	5.982E+00	1.38E+03	2.25E+01 G
			453.88	-3.292E-01	+	1.645E+00	1.99E+02	6.50E+01 G
y-88	F	5.4330E-01					1.07E+02	
			898.04	4.173E-01	?(	1.228E+00	1.28E+02	9.37E+01 G
			1836.06	6.623E-01	?(	6.973E-01	3.78E+01	9.92E+01 G
Cf-251	T	-3.9967E-01					3.28E+05	
			176.60	-3.997E-01	&(	4.318E+00	4.17E+02	1.70E+01 G
			227.00	-5.444E+00	+	1.421E+01	1.02E+02	6.30E+00 GA
Cf-249	T	2.8655E-01					1.28E+05	
			387.95	0.000E+00	&(	2.198E+00	1.00E+03	6.60E+01 G
			333.44	1.506E+00	&(	7.789E+00	1.53E+02	1.55E+01 G
Sn-126		3.6877E+00					3.65E+07	
			87.57	1.368E+00	}	3.942E+00	4.41E+01	3.75E+01 GA
			64.28	3.688E+00	?(	1.328E+01	1.08E+02	9.70E+00 G
			86.94	0.000E+00	-	1.651E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.4603E+01					8.14E+03	
			46.54	1.460E+01	(P	3.150E+01	8.13E+01	4.25E+00 G
PB-212	N	1.8609E+01					6.98E+02	
			238.63	1.861E+01	(P	1.399E+00	4.87E+00	4.33E+01 G
			300.03	1.861E+01	} P	1.867E+01	5.71E+00	3.28E+00 GA
PB-214	N	1.5953E+01					5.84E+05	
			351.93	1.519E+01	(P	1.920E+00	8.20E+00	3.76E+01 G
			295.09	1.745E+01	(P	3.554E+00	1.11E+01	1.93E+01 G
			242.00	2.347E+01	+	9.063E+00	1.45E+01	7.43E+00 GA
BI-207	C	-1.1126E-01					1.18E+04	
			569.70	-1.113E-01	?(	1.309E+00	3.37E+02	9.77E+01 G
			1063.66	-1.390E-01	+ P	1.870E+00	5.54E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	6.9159E+00					6.98E+02	
			727.17	6.916E+00	?(	1.891E+01	8.15E+01	7.55E+00 G
			785.42	1.468E+01	?	7.737E+01	2.17E+02	1.28E+00 GA
BI-214	N	1.3768E+01					5.84E+05	
			609.31	1.405E+01	(P	1.599E+00	8.59E+00	4.61E+01 G
			1120.29	1.290E+01	(	1.101E+01	2.92E+01	1.51E+01 G
			1764.49	3.142E+00	- P	1.403E+01	1.28E+02	1.54E+01 G
BI-210M	T	3.1821E-01					1.10E+09	
			265.83	3.182E-01	?(P	1.694E+00	1.56E+02	5.00E+01 G
			304.90	9.700E-08	&	6.440E+00	1.96E+09	2.80E+01 G
AC-228	N	1.9987E+01					2.10E+03	
			911.07	1.957E+01	(P	2.121E+00	1.00E+01	2.90E+01 G
			968.97	2.108E+01	(P	4.137E+00	1.40E+01	1.75E+01 G
			338.32	1.939E+01	(P	7.098E+00	1.91E+01	1.20E+01 G
			93.35	5.255E+00	-	2.477E+01	1.41E+02	5.56E+00 XA
TH-227	N	1.4260E+00					7.95E+03	
			50.14	1.426E+00	?(	2.210E+01	4.58E+02	8.00E+00 G
			256.24	-3.713E+00	& P	1.227E+01	1.61E+02	7.00E+00 G
TH-229	N	-4.1167E+00					2.68E+06	
			193.51	-4.117E+00	&(	1.718E+01	1.62E+02	4.40E+00 G
			210.85	-6.044E+00	+	3.089E+01	1.99E+02	2.99E+00 G
TH-234	N	1.5866E+01					1.63E+12	
			63.29	1.587E+01	(P	2.374E+01	4.63E+01	3.81E+00 G
			92.59	7.319E+00	- P	1.312E+01	5.49E+01	5.58E+00 G
PA-231	N	4.1024E+00					1.20E+07	
			302.65	4.102E+00	?(	6.219E+01	4.49E+02	2.88E+00 G
			300.07	-1.372E+01	+	7.638E+01	1.66E+02	2.46E+00 G
PA-233	C	-5.1297E-08					7.82E+08	
			312.01	-5.130E-08	%(	4.148E+00	2.37E+09	3.60E+01 G
			300.18	-5.444E+00	+	2.970E+01	1.63E+02	6.20E+00 G
PA-234	N	-1.4813E-01					1.63E+12	
			131.29	-1.484E+00	*(	6.021E+00	1.22E+02	1.80E+01 G
			946.02	-4.204E+00	+	1.157E+01	1.22E+02	1.34E+01 G
			569.47	2.784E+00	?(	1.392E+01	1.45E+02	8.20E+00 G
			883.24	0.000E+00	+	2.147E+01	1.00E+03	9.60E+00 G
			880.53	-9.604E+00	+	3.154E+01	9.72E+01	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   3.3931E+01                                      1.63E+12
                         1001.00-3.238E+00 &(P 2.390E+02 1.98E+03 8.37E-01 G
                          766.41 1.397E+02 ?(  7.248E+02 1.52E+02 2.94E-01 G

U-235    N  -2.5062E+00                                      2.57E+11
                          143.79-2.506E+00  (P 1.340E+01 8.49E+01 1.10E+01 G
                          205.33 1.158E-01 % P 1.535E+01 5.06E+03 5.01E+00 G
                          163.38-3.422E-02 & P 1.906E+01 1.47E+04 5.08E+00 G

AM-241   T   6.9684E-02                                      1.58E+05
                           59.54 6.968E-02 %(  3.214E+00 1.70E+03 3.59E+01 G

Np-237   F   2.1869E+00                                      2.14E+06
                           86.49 2.187E+00 &(P 1.146E+01 1.57E+02 1.31E+01 G

Ir-192   F   3.3613E-01                                      7.40E+01
                          316.49-2.252E-02 %(  1.258E+00 1.62E+03 8.70E+01 G
                          468.06 9.393E-01 ?(  3.006E+00 9.55E+01 5.18E+01 G
                          308.44-8.153E-01 +   4.537E+00 1.65E+02 3.18E+01 G

Cs-136   F   5.6760E-01                                      1.30E+01
                          818.50 5.580E-01 ?(  1.739E+00 9.24E+01 1.00E+02 G
                         1048.07-7.022E-01 +   2.234E+00 9.38E+01 8.00E+01 G
                          340.57 5.881E-01 &(  3.220E+00 1.62E+02 4.69E+01 G

Np-239   T   1.0123E-01                                      2.36E+00
                          103.70 0.000E+00 -   4.642E+00 1.00E+03 2.40E+01 X
                          106.13 1.012E-01 %(  4.810E+00 1.41E+03 2.27E+01 G
                           99.50-4.338E-01 +   7.531E+00 5.16E+02 1.50E+01 X

Nd-147       1.0224E+00                                      1.11E+01
                          531.00 1.022E+00 &(  7.113E+00 2.81E+02 1.30E+01 G
                           91.10 0.000E+00 -   5.155E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
```

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	354.	6.	0.003	458.12	1.426E+00	
EU-155	86.54	869.	27.	0.015	155.25	9.273E-01	
Gd-153	97.50	551.	23.	0.013	144.54	7.742E-01	
Np-239	99.50	565.	-7.	-0.004	515.75	-4.338E-01	
EU-152	121.78	220.	21.	0.012	101.45	7.337E-01	
CO-57	122.06	241.	15.	0.008	150.33	1.717E-01	
EU-154	123.10	286.	-25.	-0.014	88.99	-6.039E-01	P
PA-234	131.29	502.	-26.	-0.015	121.60	-1.484E+00	
HF-181	133.02	529.	-26.	-0.015	124.43	-6.211E-01	
CE-144	133.54	555.	-20.	-0.011	171.32	-1.801E+00	
CO-57	136.47	532.	-27.	-0.015	122.58	-2.592E+00	
Tc-99m	140.51	278.	20.	0.011	120.87	2.388E-01	
U-235	143.79	860.	-26.	-0.014	84.91	-2.506E+00	P
CE-141	145.44	903.	-26.	-0.014	164.47	-5.727E-01	
CE-139	165.85	184.	3.	0.001	908.08	3.799E-02	
Cf-251	176.60	158.	-6.	-0.003	416.67	-3.997E-01	
TH-229	193.51	143.	-14.	-0.008	162.02	-4.117E+00	
TH-229	210.85	187.	-13.	-0.007	198.74	-6.044E+00	
Cf-251	227.00	154.	-23.	-0.013	102.23	-5.444E+00	
EU-152	244.69	930.	-22.	-0.012	198.55	-4.542E+00	
TH-227	256.24	114.	-16.	-0.009	160.55	-3.713E+00	P
BI-210M	265.83	104.	9.	0.005	156.39	3.182E-01	P
Hg-203	279.20	194.	-20.	-0.011	101.35	-4.309E-01	
I-131	284.30	85.	-12.	-0.007	122.40	-3.521E+00	P
PA-233	300.18	421.	-18.	-0.010	162.74	-5.444E+00	
Ir-192	308.44	242.	-14.	-0.008	165.05	-8.153E-01	
CR-51	320.08	56.	10.	0.006	143.53	1.991E+00	
La-140	328.76	99.	16.	0.009	92.56	1.573E+00	
Cf-249	333.44	146.	11.	0.006	152.65	1.506E+00	
Cs-136	340.57	223.	13.	0.007	162.29	5.881E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	344.29	237.	13.	0.007	166.35	1.054E+00	
HF-181	345.83	248.	13.	0.007	173.36	1.827E+00	P
BA-133	356.00	352.	6.	0.003	484.64	1.922E-01	
BA-133	383.84	149.	-13.	-0.007	132.48	-3.450E+00	
SN-113	391.69	170.	-9.	-0.005	234.26	-3.431E-01	P
AG-108M	433.94	52.	-13.	-0.007	164.55	-3.778E-01	P
pm-146	453.88	64.	-8.	-0.004	198.96	-3.292E-01	
SB-125	463.37	137.	-20.	-0.011	111.73	-5.098E+00	P
Ir-192	468.06	134.	18.	0.010	95.46	9.393E-01	
HF-181	482.00	49.	12.	0.007	88.59	4.141E-01	
La-140	487.02	69.	5.	0.003	256.32	2.919E-01	
RU-103	497.05	61.	-17.	-0.009	97.07	-5.388E-01	
RH-106	511.86	237.	-38.	-0.021	59.80	-5.618E+00	
Nd-147	531.00	35.	4.	0.002	281.48	1.022E+00	
Ba-140	537.26	44.	2.	0.001	567.28	3.036E-01	P
CS-134	563.24	26.	28.	0.015	42.38	1.068E+01	P
CS-134	569.32	52.	3.	0.002	344.80	6.360E-01	
PA-234	569.47	48.	7.	0.004	144.98	2.784E+00	
BI-207	569.70	61.	-3.	-0.002	336.75	-1.113E-01	
SB-125	600.50	301.	12.	0.007	208.72	2.273E+00	P
SB-124	602.73	314.	11.	0.006	236.02	3.739E-01	P
CS-134	604.71	325.	12.	0.007	215.42	4.208E-01	
RH-106	621.92	466.	-18.	-0.010	173.39	-6.312E+00	
SB-125	635.89	36.	-6.	-0.003	285.04	-1.800E+00	P
I-131	636.97	62.	-15.	-0.008	77.50	-7.615E+00	
AG-110M	657.76	124.	-4.	-0.002	459.98	-1.375E-01	P
PM-144	696.54	19.	10.	0.006	97.23	3.942E-01	P
NB-94	702.63	33.	5.	0.003	231.42	2.139E-01	
SB-124	722.79	89.	3.	0.002	448.45	1.117E+00	
pm-146	747.16	42.	-14.	-0.008	101.77	-1.707E+00	
ZR-95	756.73	56.	-7.	-0.004	229.91	-5.391E-01	
AG-110M	763.94	52.	-2.	-0.001	546.75	-3.415E-01	P
NB-95	765.79	109.	-23.	-0.013	67.91	-9.707E-01	
PA-234M	766.41	104.	10.	0.005	152.33	1.397E+02	
EU-152	778.92	23.	7.	0.004	158.51	2.217E+00	
CS-134	795.87	51.	8.	0.004	131.10	4.103E-01	
CO-58	810.78	65.	-10.	-0.006	114.91	-4.634E-01	
Cs-136	818.50	60.	12.	0.007	92.41	5.580E-01	
MN-54	834.85	42.	-10.	-0.006	97.75	-4.619E-01	P
Co-56	846.77	42.	-13.	-0.007	109.33	-6.032E-01	
NB-94	871.10	36.	-4.	-0.002	217.94	-1.904E-01	
PA-234	880.53	62.	-12.	-0.007	97.18	-9.604E+00	
AG-110M	884.68	48.	11.	0.006	94.55	7.296E-01	P
Sc-46	889.28	66.	-11.	-0.006	103.89	-5.568E-01	
y-88	898.04	20.	8.	0.004	127.88	4.173E-01	
AG-110M	937.49	45.	-12.	-0.007	95.44	-1.785E+00	P
PA-234	946.02	35.	-11.	-0.006	122.02	-4.204E+00	
EU-152	964.11	128.	-4.	-0.002	357.98	-1.605E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	996.33	51.	3.	0.002	323.33	1.603E+00		
Co-56	1037.84	35.	-13.	-0.007	74.37	-5.303E+00		P
Cs-136	1048.07	39.	-10.	-0.006	93.81	-7.022E-01		
RH-106	1050.36	44.	5.	0.003	199.70	1.744E+01		
BI-207	1063.66	22.	-2.	-0.001	553.94	-1.390E-01		P
Ga-68	1077.40	21.	-1.	-0.001	792.15	-2.748E+00		
FE-59	1099.25	27.	13.	0.007	92.20	1.384E+00		
EU-152	1112.07	128.	-17.	-0.009	97.75	-7.348E+00		
ZN-65	1115.55	111.	-11.	-0.006	135.17	-1.329E+00		
CO-60	1173.24	54.	-14.	-0.008	72.74	-8.691E-01		P
Co-56	1238.28	43.	7.	0.004	211.75	7.055E-01		P
NA-22	1274.53	34.	-16.	-0.009	57.28	-1.074E+00		
FE-59	1291.60	23.	-3.	-0.001	423.16	-4.192E-01		
CO-60	1332.50	17.	7.	0.004	143.21	4.892E-01		
AG-110M	1384.30	6.	5.	0.003	118.94	1.519E+00		P
EU-152	1408.00	6.	6.	0.004	96.69	2.216E+00		
La-140	1596.21	6.	2.	0.001	304.14	1.729E-01		
SB-124	1690.98	6.	1.	0.001	600.00	1.820E-01		
Co-56	1771.35	17.	8.	0.004	80.93	4.676E+00		
y-88	1836.06	0.	7.	0.004	37.80	6.623E-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	-3.1005E-01	-3.1006E-01	1.264E+03%	1.36E+01
NA-22	#A	-1.0741E+00	-1.0741E+00	5.728E+01%	2.01E+00
K-40		2.4824E+02	2.4824E+02	5.398E+00%	7.23E+00
Sc-46	#A	-5.5679E-01	-5.5680E-01	1.039E+02%	1.96E+00
CR-51	#A	1.9911E+00	1.9911E+00	1.435E+02%	7.48E+00
MN-54	#A	-4.6189E-01	-4.6189E-01	9.775E+01%	1.51E+00
FE-59	#A	1.3841E+00	1.3841E+00	9.220E+01%	2.78E+00
Co-56	#A	-8.2324E-02	-8.2324E-02	1.093E+02%	1.53E+00
CO-57	#A	1.7172E-01	1.7172E-01	1.503E+02%	8.69E-01
CO-58	#A	-4.6337E-01	-4.6337E-01	1.149E+02%	1.81E+00
CO-60	#A	4.8922E-01	4.8922E-01	1.432E+02%	1.53E+00
ZN-65	#A	-1.3292E+00	-1.3293E+00	1.352E+02%	6.09E+00
NB-94	#A	2.1389E-01	2.1389E-01	2.314E+02%	1.18E+00
ZR-95	#A	-5.3905E-01	-5.3906E-01	2.299E+02%	2.89E+00
NB-95	#A	-9.7068E-01	-9.7069E-01	6.791E+01%	2.18E+00
RU-103	#A	-5.3879E-01	-5.3880E-01	9.707E+01%	1.24E+00
RH-106	#A	-3.0870E+00	-3.0870E+00	1.322E+02%	3.67E+01
AG-108M	#A	-3.7783E-01	-3.7783E-01	1.646E+02%	1.04E+00
AG-110M	#A	9.2746E-01	9.2746E-01	7.597E+01%	2.33E+00
SN-113	#A	-3.4305E-01	-3.4305E-01	2.343E+02%	2.33E+00

SB-124	#A	3.6668E-01	3.6669E-01	2.360E+02%	2.98E+00
SB-125	#A	8.0183E-01	8.0183E-01	2.087E+02%	3.12E+00
I-131	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.08E+00
Gd-153	#A	7.7416E-01	7.7417E-01	1.445E+02%	3.74E+00
Ga-68	#A	-2.7088E+00	-2.7479E+00	7.921E+02%	4.99E+01
Tc-99m	#A	2.3812E-01	2.3876E-01	1.209E+02%	9.67E-01
BA-133	#A	1.9217E-01	1.9217E-01	4.846E+02%	3.15E+00
CS-134	#A	8.4648E-01	8.4648E-01	4.238E+01%	3.06E+00
CS-137	#A	6.9174E-01	6.9174E-01	8.353E+01%	1.93E+00
CE-139	#A	3.7987E-02	3.7987E-02	9.081E+02%	9.40E-01
Ba-140	#A	3.0355E-01	3.0357E-01	5.673E+02%	4.25E+00
La-140	#A	3.8282E-01	3.8284E-01	9.256E+01%	1.22E+00
CE-141	#A	-5.7273E-01	-5.7274E-01	1.645E+02%	3.14E+00
CE-144	#A	-1.8010E+00	-1.8010E+00	1.713E+02%	1.03E+01
PM-144	#A	3.9420E-01	3.9420E-01	9.723E+01%	9.06E-01
EU-152	#A	1.1406E+00	1.1406E+00	8.373E+01%	5.91E+00
EU-154	#A	2.1708E-01	2.1708E-01	3.233E+02%	1.29E+01
EU-155	#A	5.3486E-01	5.3486E-01	1.553E+02%	5.25E+00
HF-181	#A	6.3699E-01	6.3700E-01	8.859E+01%	1.24E+00
Ta-182	#A	2.1548E+00	2.1548E+00	8.191E+01%	6.74E+00
Hg-203	#A	-4.3094E-01	-4.3095E-01	1.014E+02%	1.46E+00
TL-208		5.8436E+00	5.8436E+00	9.704E+00%	7.86E-01
pm-146	#A	-1.7074E+00	-1.7074E+00	1.018E+02%	4.01E+00
y-88	#A	5.4329E-01	5.4330E-01	3.780E+01%	1.23E+00
Cd-113m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.51E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.91E+01
Cf-251	#A	-3.9967E-01	-3.9967E-01	4.167E+02%	4.32E+00
Cf-249	#A	2.8655E-01	2.8655E-01	1.526E+02%	2.20E+00
Sn-126	#A	3.6877E+00	3.6877E+00	1.079E+02%	1.33E+01
PB-210	#A	1.4603E+01	1.4603E+01	8.132E+01%	3.15E+01
PB-212		1.8609E+01	1.8609E+01	4.872E+00%	1.40E+00
PB-214		1.5953E+01	1.5953E+01	6.900E+00%	1.92E+00
BI-207	#A	-1.1126E-01	-1.1126E-01	3.367E+02%	1.31E+00
BI-212	#A	6.9159E+00	6.9159E+00	8.151E+01%	1.89E+01
BI-214		1.3768E+01	1.3768E+01	8.590E+00%	1.60E+00
BI-210M	#A	3.1821E-01	3.1821E-01	1.564E+02%	1.69E+00
AC-228		1.9987E+01	1.9987E+01	8.581E+00%	2.12E+00
TH-227	#A	1.4260E+00	1.4260E+00	4.581E+02%	2.21E+01
TH-229	#A	-4.1167E+00	-4.1167E+00	1.620E+02%	1.72E+01
TH-234	A	1.5866E+01	1.5866E+01	4.628E+01%	2.37E+01
PA-231	#A	4.1024E+00	4.1024E+00	4.487E+02%	6.22E+01
PA-233	#A	-5.1297E-08	-5.1297E-08	2.368E+09%	4.15E+00
PA-234	#A	-1.4813E-01	-1.4813E-01	9.461E+01%	6.02E+00
PA-234M	#A	3.3931E+01	3.3931E+01	1.523E+02%	2.39E+02
U-235	#A	-2.5062E+00	-2.5062E+00	8.491E+01%	1.34E+01
AM-241	#A	6.9684E-02	6.9684E-02	1.701E+03%	3.21E+00
Np-237	A	2.1869E+00	2.1869E+00	1.572E+02%	1.15E+01
Ir-192	#A	3.3612E-01	3.3613E-01	9.546E+01%	1.26E+00
Cs-136	#A	5.6757E-01	5.6760E-01	9.241E+01%	1.74E+00

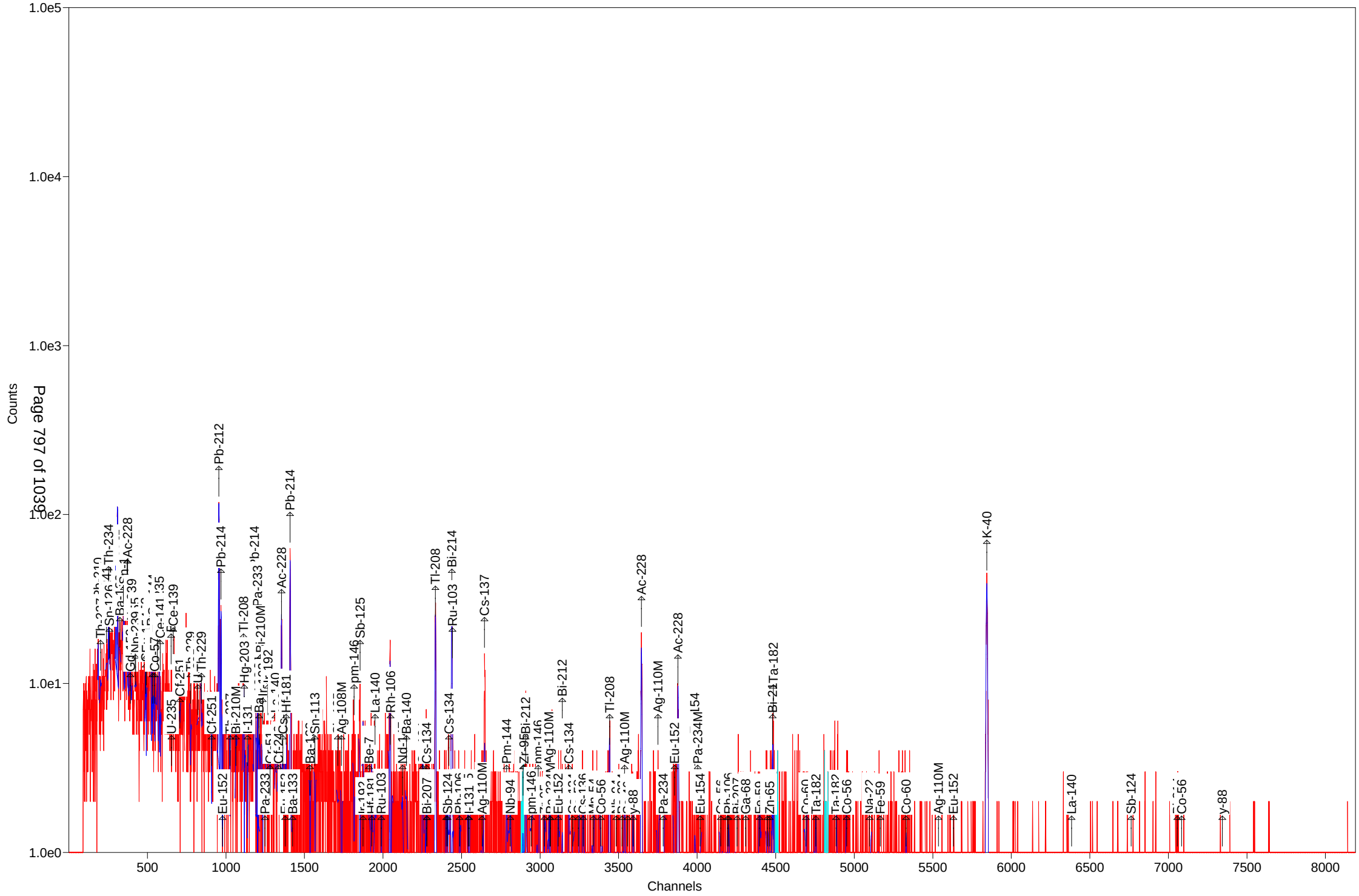
Np-239 #A	1.0120E-01	1.0123E-01	1.408E+03%	4.81E+00
Nd-147 #A	1.0224E+00	1.0224E+00	2.815E+02%	7.11E+00

- 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 2000.1 keV) 3.383E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.3826294E+02 Bq/Sample

257318_Gamma_160-17797-A-18-B. 7_Gamma_20161700.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20161456

Sample Description: 257318_Gamma_160-17797-A-19-B
Detector: Detector #12
Batch ID: 257318
Work Order Number: Gamma
Lot Number: 160-17797-A-19-B

Decay to Time: 7/12/2016 12:20 Live Time: 1800 sec
Acquisition Time: 7/12/2016 12:21:21 Real Time: 1810 sec
Analysis Time: 7/12/2016 12:52 Dead Time: 0.53 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCanCal_90099_100212
Efficiency Cal Date: 10/4/2012 09:05
Energy Cal Date: 2/28/2012 13:26
Library: Client_Long_Rev11.lib
Bkgd Correction File: 12_2016-07-10_1414.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.361E+00	106.8	3.591E+00	3.595E+00	1.214E+01
NA-22	3.882E-02	987.4	3.833E-01	3.833E-01	1.411E+00
K-40	2.218E+02	5.3	1.176E+01	1.634E+01	7.749E+00
Sc-46	-4.853E-01	131.0	6.357E-01	6.362E-01	2.158E+00
CR-51	-3.856E+00	75.2	2.901E+00	2.908E+00	1.623E+01
MN-54	-6.870E-01	96.3	6.615E-01	6.624E-01	1.518E+00
FE-59	-1.256E+00	65.9	8.272E-01	8.296E-01	3.044E+00
Co-56	4.389E-01	89.4	3.926E-01	3.932E-01	9.919E-01
CO-57	-3.520E-01	100.9	3.552E-01	3.557E-01	1.186E+00
CO-58	3.928E-01	86.5	3.398E-01	3.404E-01	1.150E+00
CO-60	3.415E-01	145.5	4.970E-01	4.973E-01	1.109E+00
ZN-65	0.000E+00	1.#INF	1.037E-01	1.037E-01	5.417E+00
NB-94	4.777E-01	93.1	4.446E-01	4.453E-01	1.033E+00
ZR-95	6.386E-01	95.8	6.115E-01	6.124E-01	1.459E+00
NB-95	-4.410E-01	122.0	5.379E-01	5.384E-01	1.825E+00
RU-103	-2.000E-01	245.1	4.904E-01	4.905E-01	1.190E+00
RH-106	-2.406E+00	65.8	1.582E+00	1.587E+00	1.727E+01
AG-108M	2.880E-01	121.7	3.504E-01	3.507E-01	8.833E-01
AG-110M	4.586E-01	95.6	4.385E-01	4.392E-01	2.781E+00
SN-113	7.575E-02	997.5	7.556E-01	7.556E-01	2.586E+00
SB-124	5.593E-01	40.8	2.283E-01	2.302E-01	3.113E+00
SB-125	1.542E+00	67.3	1.037E+00	1.040E+00	3.382E+00
I-131	5.773E-02	101.4	5.854E-02	5.862E-02	1.161E+00
Gd-153	9.212E-01	134.3	1.237E+00	1.238E+00	4.138E+00
Ga-68	2.275E+01	88.8	2.020E+01	2.024E+01	4.419E+01
Tc-99m	-3.991E-01	154.4	6.161E-01	6.165E-01	2.054E+00
BA-133	4.324E-01	233.0	1.007E+00	1.008E+00	3.393E+00
CS-134	1.134E-01	60.9	6.911E-02	6.936E-02	3.062E+00
CS-137	3.820E+00	15.2	5.821E-01	6.151E-01	1.039E+00
CE-139	3.401E-02	1129.2	3.841E-01	3.841E-01	1.309E+00
Ba-140	1.111E+00	104.7	1.163E+00	1.164E+00	4.161E+00
La-140	3.091E-01	59.3	1.833E-01	1.840E-01	1.638E+00
CE-141	-7.524E-01	156.9	1.181E+00	1.181E+00	3.934E+00

CE-144	-3.145E+00	125.9	3.959E+00	3.963E+00	1.589E+01
PM-144	8.657E-02	523.7	4.534E-01	4.534E-01	1.089E+00
EU-152	-1.650E+00	69.5	1.147E+00	1.150E+00	7.137E+00
EU-154	3.415E+00	65.3	2.232E+00	2.238E+00	1.175E+01
EU-155	-9.608E-02	1378.0	1.324E+00	1.324E+00	4.783E+00
HF-181	3.012E-01	159.6	4.807E-01	4.810E-01	1.742E+00
Ta-182	-2.146E+00	123.1	2.643E+00	2.645E+00	8.912E+00
Hg-203	6.859E-02	579.9	3.978E-01	3.978E-01	1.367E+00
TL-208	6.293E+00	10.1	6.332E-01	7.124E-01	9.915E-01
pm-146	2.003E-01	92.4	1.850E-01	1.853E-01	3.754E+00
y-88	3.634E-01	117.4	4.267E-01	4.271E-01	9.941E-01
Cd-113m	-5.487E+03	137.7	7.554E+03	7.562E+03	2.535E+04
Cd-109	0.000E+00	1.#INF	1.377E+01	1.377E+01	4.614E+01
Cf-251	1.165E+00	155.8	1.816E+00	1.819E+00	4.682E+00
Cf-249	-3.934E-02	106.8	4.202E-02	4.207E-02	2.434E+00
Sn-126	1.699E+00	330.6	5.616E+00	5.617E+00	1.888E+01
PB-210	3.591E+01	37.7	1.354E+01	1.371E+01	3.296E+01
PB-212	1.688E+01	5.8	9.829E-01	1.469E+00	1.885E+00
PB-214	1.531E+01	7.9	1.205E+00	1.444E+00	2.612E+00
BI-207	3.537E-01	92.4	3.270E-01	3.275E-01	1.062E+00
BI-212	2.950E+01	18.1	5.354E+00	5.569E+00	8.858E+00
BI-214	1.446E+01	9.8	1.420E+00	1.606E+00	2.315E+00
BI-210M	5.956E-01	138.4	8.241E-01	8.248E-01	2.771E+00
AC-228	2.015E+01	6.6	1.337E+00	1.687E+00	2.545E+00
TH-227	-4.266E+00	177.4	7.568E+00	7.571E+00	2.543E+01
TH-229	-8.136E-01	815.4	6.635E+00	6.635E+00	2.138E+01
TH-234	-2.165E+01	48.7	1.054E+01	1.060E+01	5.122E+01
PA-231	-1.326E+01	156.1	2.071E+01	2.072E+01	6.939E+01
PA-233	8.247E-01	190.9	1.574E+00	1.575E+00	5.293E+00
PA-234	2.947E+00	44.1	1.300E+00	1.309E+00	8.108E+00
PA-234M	0.000E+00	1.#INF	3.262E+01	3.262E+01	2.619E+02
U-235	-3.665E+00	112.5	4.125E+00	4.129E+00	1.665E+01
AM-241	1.327E+00	125.0	1.658E+00	1.660E+00	5.532E+00
Np-237	-2.695E+00	160.4	4.323E+00	4.325E+00	1.441E+01
Ir-192	4.168E-01	122.1	5.091E-01	5.097E-01	2.252E+00
Cs-136	2.419E-01	61.5	1.488E-01	1.495E-01	1.436E+00
Np-239	8.844E-01	136.3	1.205E+00	1.207E+00	4.053E+00
Nd-147	-3.861E+00	98.5	3.802E+00	3.809E+00	9.035E+00
Total	4.134E+02				

Analyst: Mike Aldridge

Sample description
257318_Gamma_160-17797-A-19-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20161456.An1

Acquisition information
Start time: 7/12/2016 12:21:21 PM
Live time: 1800
Real time: 1810
Dead time: 0.53 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev11.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/12/2016 12:20:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2016-07-10_1414.PBC 7/10/2016 2:14:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1665

***** 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
46.77	61.	37.72	1.12	2.229E-02	46.54	4.250	3.591E+01	PB210
59.54	27.	124.97	0.90	3.122E-02	59.54	35.900	PBC<MDA	AM241
65.18	10.	330.58	0.91	3.392E-02	64.28	9.700	PBC<MDA	Sn126
74.66	207.	11.75	0.92	3.870E-02				
77.16	306.	8.00	0.92	3.963E-02				
87.24	131.	13.90	0.93	4.259E-02	86.49	13.100	1.309E+01	Np237
					86.54	30.700	5.584E+00	EU155
					86.94	9.040	1.892E+01	Sn126
					87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	4.486E+01	Cd109
89.95	85.	19.82	0.93	4.319E-02				
93.20	97.	20.03	0.93	4.382E-02	93.35	5.561	2.215E+01	AC228
97.50	22.	134.28	0.94	4.443E-02	97.50	30.000	PBC<MDA	Gd153
99.50	22.	137.33	0.94	4.467E-02	99.50	15.000	PBC<MDA	Np239
103.70	22.	106.34	0.94	4.505E-02	103.70	24.000	PBC<MDA	Np239
106.13	16.	136.31	0.95	4.521E-02	106.13	22.700	PBC<MDA	Np239
123.10	16.	139.58	0.96	4.522E-02	123.10	40.790	PBC<MDA	EU154
131.99	22.	157.11	0.97	4.468E-02	131.29	18.000	PBC<MDA	PA234
133.02	22.	159.61	0.97	4.453E-02	133.02	43.300	PBC<MDA	HF181
162.66	21.	104.69	1.00	4.072E-02	162.66	6.220	PBC<MDA	Ba140
163.38	10.	226.96	1.00	4.061E-02	163.38	5.080	PBC<MDA	U235
176.60	14.	155.84	1.01	3.926E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.86	96.	20.24	1.34	3.798E-02				
238.47	396.	7.32	0.92	3.221E-02	238.63	43.300	1.580E+01	PB212
241.90	88.	18.38	1.07	3.189E-02	242.00	7.430	2.058E+01	PB214
265.83	16.	138.36	1.10	2.994E-02	265.83	50.000	PBC<MDA	BI210M
270.24	91.	21.73	0.59	2.961E-02				
276.65	51.	29.80	0.77	2.914E-02	277.28	6.310	PBC<MDA	TL208
279.20	3.	579.95	1.11	2.896E-02	279.20	81.460	PBC<MDA	Hg203
284.30	13.	101.40	1.11	2.861E-02	284.30	6.140	PBC<MDA	I131
295.14	161.	12.24	1.07	2.789E-02	295.09	19.300	1.662E+01	PB214
299.70	47.	28.85	0.85	2.757E-02	300.03	3.280	2.898E+01	PB212
					300.07	2.460	3.864E+01	PA231
308.47	18.	151.74	1.14	2.706E-02	308.44	31.750	PBC<MDA	Ir192
312.01	14.	190.86	1.14	2.684E-02	312.01	36.000	PBC<MDA	PA233
328.76	16.	93.26	1.15	2.589E-02	328.76	20.300	PBC<MDA	La140
333.44	12.	140.02	1.16	2.564E-02	333.44	15.510	PBC<MDA	Cf249
338.33	123.	11.15	1.51	2.538E-02	338.32	12.010	2.241E+01	AC228
351.80	245.	9.90	1.27	2.471E-02	351.93	37.600	1.464E+01	PB214
356.00	12.	233.00	1.18	2.450E-02	356.00	62.050	PBC<MDA	BA133
391.69	2.	997.50	1.21	2.292E-02	391.69	64.000	PBC<MDA	SN113
433.94	10.	121.66	1.25	2.132E-02	433.94	90.480	PBC<MDA	AG108M
453.88	3.	455.83	1.27	2.065E-02	453.88	65.000	PBC<MDA	pm146
463.37	13.	128.53	1.28	2.035E-02	463.37	10.470	PBC<MDA	SB125
468.06	13.	122.13	1.28	2.020E-02	468.06	51.750	PBC<MDA	Ir192
477.60	13.	106.84	1.29	1.991E-02	477.60	10.520	PBC<MDA	BE7
482.00	3.	434.25	1.29	1.978E-02	482.00	80.500	PBC<MDA	HF181
487.02	13.	113.62	1.30	1.964E-02	487.02	45.500	PBC<MDA	La140
511.86	89.	26.63	2.57	1.895E-02	511.86	20.000	1.310E+01	RH106
537.26	2.	857.02	1.34	1.829E-02	537.26	24.390	PBC<MDA	Ba140
569.70	6.	146.97	1.37	1.753E-02	569.32	15.380	1.330E+00	CS134
					569.47	8.200	2.495E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.07	165.	10.06	1.56	1.724E-02	583.02	84.500	6.293E+00	TL208
600.50	14.	196.41	1.40	1.687E-02	600.50	17.860	PBC<MDA	SB125
602.73	12.	238.92	1.40	1.683E-02	602.73	98.260	PBC<MDA	SB124
609.35	200.	9.81	1.61	1.669E-02	609.31	46.090	1.446E+01	BI214
635.89	10.	67.25	1.43	1.618E-02	635.89	11.310	PBC<MDA	SB125
661.48	92.	15.24	1.20	1.571E-02	661.66	85.210	3.820E+00	CS137
696.54	2.	523.72	1.48	1.513E-02	696.54	99.000	PBC<MDA	PM144
702.63	13.	93.08	1.49	1.503E-02	702.63	97.900	PBC<MDA	NB94
727.12	59.	18.15	1.21	1.465E-02	727.17	7.550	2.950E+01	BI212
735.72	11.	92.37	1.51	1.452E-02	735.72	22.500	PBC<MDA	pm146
756.73	9.	95.75	1.53	1.422E-02	756.73	54.460	PBC<MDA	ZR95
763.94	9.	95.62	1.54	1.412E-02	763.94	22.280	PBC<MDA	AG110M
784.40	12.	99.09	1.56	1.383E-02	785.42	1.280	PBC<MDA	BI212
795.87	11.	60.93	1.56	1.369E-02	795.87	85.530	PBC<MDA	CS134
810.78	9.	86.50	1.58	1.351E-02	810.78	99.460	PBC<MDA	CO58
815.77	9.	108.75	1.58	1.344E-02	815.77	23.280	PBC<MDA	La140
860.64	46.	15.10	2.25	1.291E-02	860.56	12.420	1.593E+01	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
873.23	10.	94.65	1.63	1.277E-02	873.23	12.270	PBC<MDA	EU154
898.04	8.	117.43	1.65	1.250E-02	898.04	93.700	PBC<MDA	y88
911.41	121.	10.67	1.39	1.237E-02	911.07	29.000	1.880E+01	AC228
946.10	14.	44.13	1.69	1.202E-02	946.02	13.400	4.830E+00	PA234
964.11	7.	227.16	1.70	1.184E-02	964.11	14.605	PBC<MDA	EU152
969.21	77.	12.57	2.30	1.180E-02	968.97	17.460	2.085E+01	AC228
1004.77	12.	90.12	1.74	1.148E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	9.	61.53	1.77	1.111E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	98.12	1.77	1.109E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	112.15	1.78	1.099E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	12.	88.78	1.79	1.088E-02	1077.40	3.300	PBC<MDA	Ga68
1120.49	88.	11.21	1.42	1.055E-02	1120.29	15.100	3.060E+01	BI214
					1120.55	99.987	4.622E+00	Sc46
					1121.30	34.900	1.325E+01	Ta182
1189.05	2.	634.67	1.88	1.008E-02	1189.05	16.200	PBC<MDA	Ta182
1238.28	12.	89.44	1.92	9.765E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	1.	987.42	1.95	9.547E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.102E-01	EU154
1332.50	6.	145.52	1.99	9.220E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	3.	327.45	2.03	8.948E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	2.	480.00	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
1460.87	365.	5.30	1.85	8.576E-03	1460.83	10.670	2.218E+02	K40
1690.98	6.	40.82	2.25	7.633E-03	1690.98	47.790	PBC<MDA	SB124
1764.30	7.	101.98	2.30	7.376E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	8.	89.42	2.30	7.354E-03	1771.35	15.480	PBC<MDA	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.17	74.62	192.	207.	5.346E+03	11.75	0.916	-	sD
308.16	77.12	146.	306.	7.720E+03	8.00	0.919	-	D
358.68	89.95	105.	78.	1.806E+03	21.75	0.931	-	D
742.65	185.86	86.	96.	2.523E+03	20.24	1.341	-	s
1079.94	270.24	60.	91.	3.073E+03	21.73	0.590	-	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	186.74	46.77	132.	61.	0.034	37.72	1.116s
TH-227	200.19	50.14	362.	-15.	-0.009	177.41	0.893s
AM-241	237.74	59.54	546.	27.	0.015	124.97	0.902s
TH-234	252.73	63.29	604.	-50.	-0.028	48.68	0.905s
Sn-126	256.70	64.28	548.	10.	0.006	330.58	0.906
BA-133	323.48	80.99	1159.	-29.	-0.016	169.07	0.922s
Np-237	345.47	86.49	921.	-27.	-0.015	160.40	0.928
EU-155	345.68	86.54	966.	-29.	-0.016	150.80	0.928s
Sn-126	347.27	86.94	182.	35.	0.019	57.82	0.928D
Sn-126	349.78	87.57	836.	49.	0.027	41.53	0.929D
Cd-109	351.66	88.04	802.	0.	0.000	339.49	0.929A
TH-234	369.85	92.59	822.	-32.	-0.018	70.88	0.934s
AC-228	372.88	93.35	141.	97.	0.054	20.03	0.934D
Gd-153	389.47	97.50	429.	22.	0.012	134.28	0.938s
Np-239	397.47	99.50	451.	22.	0.012	137.33	0.940s
Np-239	414.25	103.70	269.	22.	0.012	106.34	0.944s
Np-239	423.96	106.13	240.	16.	0.009	136.31	0.946s
EU-152	486.50	121.78	270.	-25.	-0.014	96.83	0.961s
CO-57	487.64	122.06	295.	-25.	-0.014	100.90	0.962s
EU-154	491.79	123.10	244.	16.	0.009	139.58	0.963s
PA-234	524.55	131.29	605.	22.	0.012	157.11	0.970s
HF-181	531.46	133.02	628.	22.	0.012	159.61	0.972s
CE-144	533.51	133.54	882.	-28.	-0.016	125.91	0.973s
HF-181	544.55	136.30	854.	-27.	-0.015	153.66	0.975s
CO-57	545.24	136.47	837.	-27.	-0.015	152.21	0.975s
Tc-99m	561.38	140.51	868.	-27.	-0.015	154.37	0.979s
U-235	574.47	143.79	900.	-31.	-0.017	112.54	0.982s
CE-141	581.09	145.44	964.	-28.	-0.016	156.91	0.984s
Ba-140	649.91	162.66	241.	21.	0.012	104.69	1.000s
U-235	652.79	163.38	263.	10.	0.006	226.96	1.001s
Cf-251	705.64	176.60	132.	14.	0.008	155.84	1.013s
TH-229	773.22	193.51	165.	-2.	-0.001	815.43	1.029s
U-235	820.49	205.33	158.	-23.	-0.013	85.22	1.040s
TH-229	842.54	210.85	172.	-15.	-0.009	162.19	1.046s
PB-212	953.60	238.63	92.	423.	0.235	5.82	1.071D
PB-214	967.05	242.00	86.	88.	0.049	18.38	1.074D
TH-227	1023.99	256.24	121.	-11.	-0.006	189.50	1.088s
Cd-113m	1053.81	263.70	293.	-18.	-0.010	137.66	1.095s
BI-210M	1062.33	265.83	238.	16.	0.009	138.36	1.097
TL-208	1108.11	277.28	132.	9.	0.005	174.81	1.107s
Hg-203	1115.78	279.20	141.	3.	0.002	579.95	1.109
I-131	1136.16	284.30	48.	13.	0.007	101.40	1.114s
PB-214	1179.49	295.14	59.	161.	0.089	12.24	1.072
PB-212	1197.73	299.70	38.	47.	0.026	28.85	0.853

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1199.21	300.07	461.	-19.	-0.010	163.14	1.128
PA-233	1199.65	300.18	442.	-19.	-0.010	159.81	1.128s
PA-231	1209.52	302.65	423.	-19.	-0.010	156.14	1.131s
BA-133	1210.33	302.85	408.	-17.	-0.009	174.37	1.131s
Ir-192	1232.67	308.44	350.	18.	0.010	151.74	1.136s
PA-233	1246.95	312.01	368.	14.	0.008	190.86	1.139s
Ir-192	1264.85	316.49	382.	0.	0.000	1000.00	1.143s
CR-51	1279.22	320.08	251.	-18.	-0.010	75.24	1.147s
La-140	1313.91	328.76	104.	16.	0.009	93.26	1.155s
Cf-249	1332.62	333.44	138.	12.	0.007	140.02	1.159s
AC-228	1352.17	338.33	17.	123.	0.068	11.15	1.513s
Cs-136	1361.13	340.57	334.	-19.	-0.011	134.96	1.165s
EU-152	1375.98	344.29	315.	-20.	-0.011	69.53	1.169s
HF-181	1382.15	345.83	314.	-21.	-0.012	122.79	1.170s
PB-214	1406.02	351.80	77.	245.	0.136	9.90	1.275
BA-133	1422.81	356.00	374.	12.	0.007	233.00	1.180s
I-131	1456.73	364.48	68.	-9.	-0.005	182.46	1.187s
BA-133	1534.13	383.84	171.	-18.	-0.010	106.77	1.205s
Cf-249	1550.56	387.95	189.	-12.	-0.007	161.35	1.209
SN-113	1565.51	391.69	198.	2.	0.001	997.50	1.212s
SB-125	1710.19	427.88	60.	-3.	-0.002	508.81	1.245s
AG-108M	1734.43	433.94	36.	10.	0.006	121.66	1.250s
pm-146	1814.18	453.88	48.	3.	0.002	455.83	1.268s
SB-125	1852.11	463.37	68.	13.	0.007	128.53	1.277
Ir-192	1870.88	468.06	113.	13.	0.007	122.13	1.281
BE-7	1909.00	477.60	85.	13.	0.007	106.84	1.289s
HF-181	1926.61	482.00	103.	3.	0.002	434.25	1.293s
La-140	1946.69	487.02	99.	13.	0.007	113.62	1.298s
RU-103	1986.82	497.05	56.	-6.	-0.004	245.15	1.307s
RH-106	2046.04	511.86	73.	89.	0.050	26.63	2.570s
Nd-147	2122.56	531.00	61.	-17.	-0.009	98.49	1.337s
Ba-140	2147.60	537.26	43.	2.	0.001	857.02	1.342s
CS-134	2251.48	563.24	61.	-18.	-0.010	92.66	1.365s
CS-134	2275.81	569.32	45.	-3.	-0.002	321.46	1.370s
PA-234	2276.41	569.47	48.	0.	0.000	1000.00	1.370
BI-207	2277.34	569.70	42.	6.	0.004	146.97	1.371
TL-208	2330.79	583.07	25.	165.	0.092	10.06	1.562
SB-125	2400.51	600.50	357.	14.	0.008	196.41	1.398s
SB-124	2409.43	602.73	372.	12.	0.006	238.92	1.399s
CS-134	2417.34	604.71	353.	-7.	-0.004	364.37	1.401s
BI-214	2435.88	609.35	40.	200.	0.111	9.81	1.613s
RU-103	2439.69	610.30	346.	0.	0.000	1000.00	1.406s
PM-144	2470.74	618.06	64.	-17.	-0.009	71.02	1.413
RH-106	2486.16	621.92	106.	-17.	-0.010	87.56	1.416s
SB-125	2542.05	635.89	17.	10.	0.006	67.25	1.428
I-131	2546.39	636.97	55.	-14.	-0.008	79.87	1.429s
AG-110M	2629.52	657.76	142.	-10.	-0.006	166.22	1.447s
CS-137	2644.38	661.48	23.	92.	0.051	15.24	1.205

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2784.64	696.54	33.	2.	0.001	523.72	1.481
NB-94	2808.99	702.63	28.	13.	0.007	93.08	1.486s
SB-124	2889.61	722.79	106.	-13.	-0.007	116.98	1.503s
AG-108M	2890.22	722.94	93.	-3.	-0.002	478.79	1.503s
BI-212	2906.96	727.12	10.	59.	0.033	18.15	1.209s
pm-146	2941.34	735.72	19.	11.	0.006	92.37	1.514
pm-146	2987.11	747.16	42.	-6.	-0.003	172.39	1.524s
ZR-95	3025.38	756.73	14.	9.	0.005	95.75	1.532s
AG-110M	3054.24	763.94	34.	9.	0.005	95.62	1.538s
NB-95	3061.63	765.79	87.	-11.	-0.006	121.97	1.539s
PA-234M	3064.12	766.41	91.	-5.	-0.003	292.25	1.540s
EU-152	3114.15	778.92	23.	-2.	-0.001	444.01	1.550s
BI-212	3140.15	785.42	28.	12.	0.007	99.09	1.556s
CS-134	3181.95	795.87	17.	11.	0.006	60.93	1.565s
CS-134	3206.28	801.95	72.	-14.	-0.008	87.05	1.570s
CO-58	3241.58	810.78	29.	9.	0.005	86.50	1.577s
La-140	3261.56	815.77	38.	9.	0.005	108.75	1.581s
Cs-136	3272.49	818.50	47.	0.	0.000	1000.00	1.583s
MN-54	3337.89	834.85	51.	-16.	-0.009	96.29	1.597s
TL-208	3441.09	860.64	1.	46.	0.026	15.10	2.250s
NB-94	3482.90	871.10	42.	-11.	-0.006	88.61	1.627s
EU-154	3491.44	873.23	43.	10.	0.006	94.65	1.629s
PA-234	3520.64	880.53	75.	-12.	-0.007	104.38	1.635s
AG-110M	3537.26	884.68	86.	0.	0.000	1000.00	1.638s
Sc-46	3555.65	889.28	98.	-11.	-0.006	131.01	1.642s
y-88	3590.70	898.04	15.	8.	0.004	117.43	1.649s
AC-228	3644.18	911.41	9.	121.	0.067	10.67	1.390
AG-110M	3748.54	937.49	35.	-7.	-0.004	189.61	1.682s
PA-234	3782.66	946.02	5.	14.	0.008	44.13	1.688s
EU-152	3855.05	964.11	111.	7.	0.004	227.16	1.703s
AC-228	3875.45	969.21	4.	77.	0.043	12.57	2.302s
EU-154	3983.96	996.33	74.	-10.	-0.006	119.52	1.729
PA-234M	4002.64	1001.00	84.	0.	0.000	1000.00	1.733s
EU-154	4017.76	1004.77	53.	12.	0.007	90.12	1.736s
Co-56	4150.07	1037.84	20.	-4.	-0.002	250.83	1.762s
Cs-136	4191.00	1048.07	10.	9.	0.005	61.53	1.771s
RH-106	4200.17	1050.36	15.	6.	0.003	98.12	1.772s
BI-207	4253.39	1063.66	15.	8.	0.004	112.15	1.783s
Ga-68	4308.37	1077.40	21.	12.	0.007	88.78	1.794s
FE-59	4395.81	1099.25	43.	-14.	-0.008	65.86	1.811s
EU-152	4447.13	1112.07	116.	-3.	-0.002	460.87	1.821s
ZN-65	4461.03	1115.55	113.	0.	0.000	1000.00	1.824s
BI-214	4480.82	1120.49	4.	88.	0.049	11.21	1.416s
Sc-46	4481.05	1120.55	113.	0.	0.000	1000.00	1.828s
Ta-182	4484.05	1121.30	146.	-14.	-0.008	123.12	1.828s
CO-60	4691.91	1173.24	43.	-4.	-0.002	248.40	1.869s
Ta-182	4755.20	1189.05	21.	2.	0.001	634.67	1.881
Ta-182	4884.72	1221.41	43.	-9.	-0.005	174.65	1.906

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4952.24	1238.28	22.	12.	0.007	89.44	1.919s
NA-22	5097.34	1274.53	21.	1.	0.000	987.42	1.946s
EU-154	5097.39	1274.54	22.	0.	0.000	1000.00	1.946s
FE-59	5165.65	1291.60	23.	-4.	-0.002	262.59	1.959
CO-60	5329.39	1332.50	11.	6.	0.003	145.52	1.990s
AG-110M	5536.74	1384.30	17.	3.	0.002	327.45	2.029s
EU-152	5631.64	1408.00	11.	2.	0.001	480.00	2.046s
K-40	5843.31	1460.87	5.	365.	0.203	5.30	1.848
La-140	6385.21	1596.21	18.	-7.	-0.004	151.19	2.182s
SB-124	6764.73	1690.98	0.	6.	0.003	40.82	2.247s
BI-214	7059.14	1764.49	24.	7.	0.004	101.98	2.297s
Co-56	7086.61	1771.35	22.	8.	0.004	89.42	2.302s
y-88	7345.80	1836.06	6.	-2.	-0.001	275.72	2.345s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.3611E+00				5.31E+01	
			477.60	3.361E+00	(	1.214E+01 1.07E+02 1.05E+01	G
NA-22	C	3.8817E-02				9.50E+02	
			1274.53	3.882E-02	?(	1.411E+00 9.87E+02 9.99E+01	G
K-40	N	2.2182E+02				4.66E+11	
			1460.83	2.218E+02	(P	7.749E+00 5.30E+00 1.07E+01	G
Sc-46	F	-4.8527E-01				8.38E+01	
			889.28	-4.853E-01	?(	2.158E+00 1.31E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.751E+00 1.00E+03 1.00E+02	G
CR-51	F	-3.8557E+00				2.77E+01	
			320.08	-3.856E+00	&(P	1.623E+01 7.52E+01 9.94E+00	G
MN-54	C	-6.8699E-01				3.12E+02	
			834.85	-6.870E-01	?(	1.518E+00 9.63E+01 1.00E+02	G
FE-59	F	-1.2561E+00				4.45E+01	
			1099.25	-1.256E+00	?(P	3.044E+00 6.59E+01 5.65E+01	G
			1291.60	-5.817E-01	+ P	3.429E+00 2.63E+02 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	4.3890E-01					7.73E+01	
			846.77	1.862E-02	%(P	9.919E-01	2.12E+03	9.99E+01 G
			1238.28	1.075E+00	?(P	2.124E+00	8.94E+01	6.61E+01 G
			1037.84	-1.405E+00	+	8.271E+00	2.51E+02	1.41E+01 G
			1771.35	3.911E+00	?	1.191E+01	8.94E+01	1.55E+01 A
CO-57	C	-3.5201E-01					2.72E+02	
			122.06	-3.520E-01	(	1.186E+00	1.01E+02	8.56E+01 G
			136.47	-3.190E+00	+	1.619E+01	1.52E+02	1.07E+01 G
CO-58	C	3.9282E-01					7.09E+01	
			810.78	3.928E-01	?(	1.150E+00	8.65E+01	9.95E+01 G
CO-60	F	3.4151E-01					1.93E+03	
			1332.50	3.415E-01	?(	1.109E+00	1.46E+02	1.00E+02 G
			1173.24	-2.172E-01	+ P	1.816E+00	2.48E+02	9.99E+01 G
NB-94	I	4.7769E-01					7.41E+06	
			702.63	4.777E-01	?(	1.033E+00	9.31E+01	9.79E+01 G
			871.10	-4.782E-01	-	1.431E+00	8.86E+01	9.99E+01 G
ZR-95	I	6.3862E-01					6.40E+01	
			756.73	6.386E-01	?(P	1.459E+00	9.58E+01	5.45E+01 G
			724.20	-1.678E-02	& P	3.980E+00	7.17E+03	4.42E+01 G
NB-95	I	-4.4105E-01					6.40E+01	
			765.79	-4.410E-01	?(	1.825E+00	1.22E+02	9.98E+01 G
RU-103	I	-2.0004E-01					3.93E+01	
			497.05	-2.000E-01	?(	1.190E+00	2.45E+02	9.09E+01 G
			610.30	0.000E+00	+	5.180E+01	1.00E+03	5.75E+00 GA
RH-106	I	-2.4056E+00					3.74E+02	
			621.92	-5.893E+00	?(	1.727E+01	8.76E+01	9.93E+00 G
			1050.36	1.979E+01	?(	6.705E+01	9.81E+01	1.56E+00 G
			511.86	1.310E+01	?	6.248E+00	2.66E+01	2.00E+01 GA
AG-108M	C	2.8799E-01					1.53E+05	
			433.94	2.880E-01	?(	8.833E-01	1.22E+02	9.05E+01 G
			722.94	-1.192E-01	-	1.979E+00	4.79E+02	9.08E+01 G
			614.28	-1.863E-02	%	3.338E+00	5.27E+03	8.98E+01 G
AG-110M	F	4.5862E-01					2.50E+02	
			884.68	0.000E+00	?(	2.781E+00	1.00E+03	7.27E+01 G
			657.76	-3.844E-01	+	2.169E+00	1.66E+02	9.46E+01 G
			937.49	-9.354E-01	&	4.046E+00	1.90E+02	3.44E+01 G
			1384.30	7.668E-01	?(	5.604E+00	3.27E+02	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	1.619E+00	&(	5.265E+00	9.56E+01	2.23E+01 G
SN-113	F	7.5749E-02					1.15E+02	
			391.69	7.575E-02	?(	2.586E+00	9.97E+02	6.40E+01 G
SB-124	F	5.5931E-01					6.02E+01	
			602.73	3.869E-01	?(P	3.113E+00	2.39E+02	9.83E+01 G
			1690.98	9.138E-01	?(	1.122E+00	4.08E+01	4.78E+01 G
			722.79	-4.470E+00	+	1.768E+01	1.17E+02	1.08E+01 G
SB-125	I	1.5420E+00					1.01E+03	
			427.88	-2.615E-01	?(	3.382E+00	5.09E+02	2.96E+01 G
			600.50	2.533E+00	&(	1.674E+01	1.96E+02	1.79E+01 G
			635.89	3.015E+00	?(	6.713E+00	6.73E+01	1.13E+01 G
			463.37	3.358E+00	(P	1.074E+01	1.29E+02	1.05E+01 G
I-131	I	5.7734E-02					8.02E+00	
			364.48	-2.539E-01	&(	1.161E+00	1.82E+02	8.17E+01 G
			284.30	4.205E+00	(P	1.110E+01	1.01E+02	6.14E+00 G
			636.97	-6.680E+00	+	1.786E+01	7.99E+01	7.17E+00 G
Gd-153	F	9.2121E-01					2.42E+02	
			97.50	9.212E-01	?(	4.138E+00	1.34E+02	3.00E+01 G
			103.20	1.369E-01	&	5.895E+00	1.27E+03	2.18E+01 G
Ga-68	C	2.2753E+01					4.71E-02	
			1077.40	2.275E+01	?(	4.419E+01	8.88E+01	3.30E+00 G
Tc-99m	I	-3.9911E-01					2.51E-01	
			140.51	-3.991E-01	&(	2.054E+00	1.54E+02	8.93E+01 G
BA-133	F	4.3239E-01					3.85E+03	
			356.00	4.324E-01	?(	3.393E+00	2.33E+02	6.20E+01 G
			302.85	-1.831E+00	+	1.071E+01	1.74E+02	1.83E+01 G
			383.84	-4.749E+00	+	1.701E+01	1.07E+02	8.94E+00 GA
			80.99	-1.142E+00	+	6.433E+00	1.69E+02	3.41E+01 GA
CS-134	I	1.1343E-01					7.54E+02	
			604.71	-2.486E-01	?(	3.062E+00	3.64E+02	9.76E+01 G
			795.87	5.267E-01	?(	1.049E+00	6.09E+01	8.55E+01 G
			569.32	-6.178E-01	+	6.995E+00	3.21E+02	1.54E+01 G
			801.95	-6.779E+00	+	1.981E+01	8.71E+01	8.69E+00 G
			563.24	-6.681E+00	+	1.468E+01	9.27E+01	8.35E+00 G
CS-137	I	3.8198E+00					1.10E+04	
			661.66	3.820E+00	(P	1.039E+00	1.52E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.4013E-02					1.38E+02	
			165.85	3.401E-02	%(	1.309E+00	1.13E+03	7.99E+01 G
Ba-140	I	1.1110E+00					1.28E+01	
			537.26	1.963E-01	*(P	4.161E+00	8.57E+02	2.44E+01 G
			162.66	4.698E+00	&(	1.645E+01	1.05E+02	6.22E+00 G
			304.85	-1.811E-06	%	4.689E+01	7.64E+08	4.29E+00 G
La-140	I	3.0905E-01					1.28E+01	
			1596.21	-5.100E-01	?(	1.638E+00	1.51E+02	9.54E+01 G
			487.02	7.933E-01	?(	3.047E+00	1.14E+02	4.55E+01 G
			328.76	1.696E+00	?(	5.310E+00	9.33E+01	2.03E+01 G
			815.77	1.509E+00	?(	5.614E+00	1.09E+02	2.33E+01 G
CE-141	I	-7.5238E-01					3.25E+01	
			145.44	-7.524E-01	&(	3.934E+00	1.57E+02	4.82E+01 G
CE-144	I	-3.1446E+00					2.85E+02	
			133.54	-3.145E+00	?(P	1.589E+01	1.26E+02	1.11E+01 G
PM-144	C	8.6565E-02					3.63E+02	
			696.54	8.657E-02	(	1.089E+00	5.24E+02	9.90E+01 G
			618.06	-5.774E-01	+	1.362E+00	7.10E+01	9.91E+01 G
EU-152	F	-1.6499E+00					4.94E+03	
			344.29	-1.650E+00	?(P	7.137E+00	6.95E+01	2.65E+01 G
			1112.07	-1.279E+00	+	2.032E+01	4.61E+02	1.36E+01 G
			121.78	-1.053E+00	+	3.404E+00	9.68E+01	2.86E+01 G
			778.92	-7.198E-01	+	7.780E+00	4.44E+02	1.29E+01 G
			964.11	2.141E+00	+	1.666E+01	2.27E+02	1.46E+01 G
			244.69	6.297E-01	% P	3.063E+01	1.45E+03	7.58E+00 G
			1408.00	4.993E-01	+	5.512E+00	4.80E+02	2.10E+01 GA
EU-154	I	3.4150E+00					3.14E+03	
			873.23	3.664E+00	(	1.175E+01	9.47E+01	1.23E+01 G
			123.10	4.846E-01	-	2.275E+00	1.40E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.063E+00	1.00E+03	3.52E+01 G
			723.36	-1.868E-01	&	8.719E+00	1.34E+03	2.02E+01 G
			1004.77	3.246E+00	?(	9.861E+00	9.01E+01	1.80E+01 G
			996.33	-4.764E+00	+	1.936E+01	1.20E+02	1.06E+01 G
EU-155	I	-9.6082E-02					1.81E+03	
			105.31	-9.608E-02	%(P	4.783E+00	1.38E+03	2.12E+01 G
			86.54	-1.252E+00	+	6.291E+00	1.51E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	3.0118E-01					4.24E+01	
			482.00	1.161E-01	?(	1.742E+00	4.34E+02	8.05E+01 G
			133.02	6.454E-01	?(	3.442E+00	1.60E+02	4.33E+01 G
			345.83	-3.058E+00	+	1.257E+01	1.23E+02	1.51E+01 G
			136.30	-5.821E+00	+	2.983E+01	1.54E+02	5.85E+00 G
Ta-182	F	-2.1463E+00					1.14E+02	
			1121.30	-2.146E+00	?(	8.912E+00	1.23E+02	3.49E+01 G
			1221.41	-1.807E+00	+	6.911E+00	1.75E+02	2.70E+01 G
			1189.05	5.671E-01	+	8.246E+00	6.35E+02	1.62E+01 G
Hg-203	F	6.8591E-02					4.66E+01	
			279.20	6.859E-02	&(P	1.367E+00	5.80E+02	8.15E+01 G
TL-208	N	6.2934E+00					6.98E+02	
			583.02	6.293E+00	(P	9.915E-01	1.01E+01	8.45E+01 G
			277.28	2.859E+00	& P	1.699E+01	1.75E+02	6.31E+00 G
			860.56	1.593E+01	+ P	2.577E+00	1.51E+01	1.24E+01 G
pm-146	C	2.0027E-01					2.02E+03	
			747.16	-7.059E-01	&(P	3.754E+00	1.72E+02	3.40E+01 G
			735.72	1.789E+00	?(	3.884E+00	9.24E+01	2.25E+01 G
			453.88	1.242E-01	?(	1.448E+00	4.56E+02	6.50E+01 G
y-88	F	3.6336E-01					1.07E+02	
			898.04	3.634E-01	?(P	9.941E-01	1.17E+02	9.37E+01 G
			1836.06	-1.829E-01	-	1.132E+00	2.76E+02	9.92E+01 G
Cd-113m		-5.4874E+03					5.33E+03	
			263.70	-5.487E+03	&(	2.535E+04	1.38E+02	6.00E-03 K
Cf-251	T	1.1654E+00					3.28E+05	
			176.60	1.165E+00	&(	4.682E+00	1.56E+02	1.70E+01 G
			227.00	3.532E-01	&	1.450E+01	1.57E+03	6.30E+00 GA
Cf-249	T	-3.9341E-02					1.28E+05	
			387.95	-4.464E-01	&(	2.434E+00	1.61E+02	6.60E+01 G
			333.44	1.693E+00	(	8.022E+00	1.40E+02	1.55E+01 G
Sn-126		1.6989E+00					3.65E+07	
			87.57	1.699E+00	} P	4.771E+00	4.15E+01	3.75E+01 GA
			64.28	1.699E+00	&(	1.888E+01	3.31E+02	9.70E+00 G
			86.94	4.993E+00		9.482E+00	5.78E+01	9.04E+00 GA
PB-210	N	3.5908E+01					8.14E+03	
			46.54	3.591E+01	*(P	3.296E+01	3.77E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.6875E+01					6.98E+02	
			238.63	1.688E+01	(P	1.885E+00	5.82E+00	4.33E+01 G
			300.03	2.898E+01	+ P	1.927E+01	2.89E+01	3.28E+00 GA
PB-214	N	1.5312E+01					5.84E+05	
			351.93	1.464E+01	(P	2.612E+00	9.90E+00	3.76E+01 G
			295.09	1.662E+01	(P	3.975E+00	1.22E+01	1.93E+01 G
			242.00	2.058E+01	+	1.078E+01	1.84E+01	7.43E+00 GA
BI-207	C	3.5371E-01					1.18E+04	
			569.70	2.094E-01	&(P	1.062E+00	1.47E+02	9.77E+01 G
			1063.66	5.431E-01	?(	1.409E+00	1.12E+02	7.45E+01 G
BI-212	N	2.9504E+01					6.98E+02	
			727.17	2.950E+01	@(P	8.858E+00	1.81E+01	7.55E+00 G
			785.42	3.724E+01	& P	8.607E+01	9.91E+01	1.28E+00 GA
BI-214	N	1.4464E+01					5.84E+05	
			609.31	1.446E+01	@(P	2.315E+00	9.81E+00	4.61E+01 G
			1120.29	3.060E+01	+ P	4.284E+00	1.12E+01	1.51E+01 G
			1764.49	3.570E+00	- P	1.242E+01	1.02E+02	1.54E+01 G
BI-210M	T	5.9561E-01					1.10E+09	
			265.83	5.956E-01	(P	2.771E+00	1.38E+02	5.00E+01 G
			304.90	2.775E-07	%	7.184E+00	7.64E+08	2.80E+01 G
AC-228	N	2.0154E+01					2.10E+03	
			911.07	1.880E+01	(	2.545E+00	1.07E+01	2.90E+01 G
			968.97	2.085E+01	@(	3.137E+00	1.26E+01	1.75E+01 G
			338.32	2.241E+01	*(	3.995E+00	1.12E+01	1.20E+01 G
			93.35	2.215E+01		1.323E+01	2.00E+01	5.56E+00 XA
TH-227	N	-4.2656E+00					7.95E+03	
			50.14	-4.266E+00	(	2.543E+01	1.77E+02	8.00E+00 G
			256.24	-2.844E+00	&	1.396E+01	1.89E+02	7.00E+00 G
TH-229	N	-8.1363E-01					2.68E+06	
			193.51	-8.136E-01	*(P	2.138E+01	8.15E+02	4.40E+00 G
			210.85	-8.150E+00	+	3.396E+01	1.62E+02	2.99E+00 G
TH-234	N	-2.1648E+01					1.63E+12	
			63.29	-2.165E+01	(P	5.122E+01	4.87E+01	3.81E+00 G
			92.59	-7.304E+00	+ P	3.105E+01	7.09E+01	5.58E+00 G
PA-231	N	-1.3262E+01					1.20E+07	
			302.65	-1.326E+01	(	6.939E+01	1.56E+02	2.88E+00 G
			300.07	-1.540E+01	+	8.417E+01	1.63E+02	2.46E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C   8.2474E-01                                      7.82E+08
                         312.01 8.247E-01 ?(  5.293E+00 1.91E+02 3.60E+01 G
                         300.18-6.113E+00 +   3.274E+01 1.60E+02 6.20E+00 G

PA-234   N   2.9465E+00                                      1.63E+12
                         131.29 1.544E+00 &(P 8.108E+00 1.57E+02 1.80E+01 G
                         946.02 4.830E+00 ?(  4.530E+00 4.41E+01 1.34E+01 G
                         569.47 0.000E+00 -   1.352E+01 1.00E+03 8.20E+00 G
                         883.24 2.525E-01 %   2.109E+01 2.39E+03 9.60E+00 G
                         880.53-8.916E+00 +   3.147E+01 1.04E+02 6.00E+00 GA

U-235    N  -3.6652E+00                                      2.57E+11
                         143.79-3.665E+00 &(P 1.665E+01 1.13E+02 1.10E+01 G
                         205.33-7.118E+00 & P 1.909E+01 8.52E+01 5.01E+00 G
                         163.38 2.747E+00 + P 2.107E+01 2.27E+02 5.08E+00 G

AM-241   T   1.3269E+00                                      1.58E+05
                          59.54 1.327E+00 ?(  5.532E+00 1.25E+02 3.59E+01 G

Np-237   F  -2.6951E+00                                      2.14E+06
                          86.49-2.695E+00  (  1.441E+01 1.60E+02 1.31E+01 G

Ir-192   F   4.1682E-01                                      7.40E+01
                         316.49 0.000E+00 ?(  2.252E+00 1.00E+03 8.70E+01 G
                         468.06 6.731E-01  (  2.780E+00 1.22E+02 5.18E+01 G
                         308.44 1.142E+00 ?(  5.814E+00 1.52E+02 3.18E+01 G

Cs-136   F   2.4192E-01                                      1.30E+01
                         818.50 0.000E+00 ?(  1.436E+00 1.00E+03 1.00E+02 G
                        1048.07 5.443E-01 ?(  1.090E+00 6.15E+01 8.00E+01 G
                         340.57-9.105E-01 +   4.119E+00 1.35E+02 4.69E+01 G

Np-239   T   8.8438E-01                                      2.36E+00
                         103.70 1.143E+00 ?   4.065E+00 1.06E+02 2.40E+01 X
                         106.13 8.844E-01 ?(  4.053E+00 1.36E+02 2.27E+01 G
                          99.50 1.837E+00     8.437E+00 1.37E+02 1.50E+01 X

Nd-147      -3.8605E+00                                      1.11E+01
                         531.00-3.861E+00 &(  9.035E+00 9.85E+01 1.30E+01 G
                          91.10 3.450E-07 %   6.046E+00 5.21E+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.
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@ - 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	362.	-15.	-0.009	177.41	-4.266E+00	
AM-241	59.54	546.	27.	0.015	124.97	1.327E+00	
TH-234	63.29	604.	-50.	-0.028	48.68	-2.165E+01	P
BA-133	80.99	1159.	-29.	-0.016	169.07	-1.142E+00	
Np-237	86.49	921.	-27.	-0.015	160.40	-2.695E+00	
EU-155	86.54	966.	-29.	-0.016	150.80	-1.252E+00	
TH-234	92.59	822.	-32.	-0.018	70.88	-7.304E+00	P
Gd-153	97.50	429.	22.	0.012	134.28	9.212E-01	
Np-239	99.50	451.	22.	0.012	137.33	1.837E+00	
Np-239	103.70	269.	22.	0.012	106.34	1.143E+00	
Np-239	106.13	240.	16.	0.009	136.31	8.844E-01	
EU-152	121.78	270.	-25.	-0.014	96.83	-1.053E+00	
CO-57	122.06	295.	-25.	-0.014	100.90	-3.520E-01	
EU-154	123.10	244.	16.	0.009	139.58	4.846E-01	
HF-181	133.02	628.	22.	0.012	159.61	6.454E-01	
CE-144	133.54	882.	-28.	-0.016	125.91	-3.145E+00	P
HF-181	136.30	854.	-27.	-0.015	153.66	-5.821E+00	
CO-57	136.47	837.	-27.	-0.015	152.21	-3.190E+00	
Tc-99m	140.51	868.	-27.	-0.015	154.37	-3.991E-01	
U-235	143.79	900.	-31.	-0.017	112.54	-3.665E+00	P
CE-141	145.44	964.	-28.	-0.016	156.91	-7.524E-01	
Ba-140	162.66	241.	21.	0.012	104.69	4.698E+00	
U-235	163.38	263.	10.	0.006	226.96	2.747E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	176.60	132.	14.	0.008	155.84	1.165E+00	
TH-229	193.51	165.	-2.	-0.001	815.43	-8.136E-01	P
U-235	205.33	158.	-23.	-0.013	85.22	-7.118E+00	P
TH-229	210.85	172.	-15.	-0.009	162.19	-8.150E+00	
TH-227	256.24	121.	-11.	-0.006	189.50	-2.844E+00	
Cd-113m	263.70	293.	-18.	-0.010	137.66	-5.487E+03	
BI-210M	265.83	238.	16.	0.009	138.36	5.956E-01	P
Hg-203	279.20	141.	3.	0.002	579.95	6.859E-02	P
I-131	284.30	48.	13.	0.007	101.40	4.205E+00	P
PA-231	300.07	461.	-19.	-0.010	163.14	-1.540E+01	
PA-233	300.18	442.	-19.	-0.010	159.81	-6.113E+00	
PA-231	302.65	423.	-19.	-0.010	156.14	-1.326E+01	
BA-133	302.85	408.	-17.	-0.009	174.37	-1.831E+00	
PA-233	312.01	368.	14.	0.008	190.86	8.247E-01	
CR-51	320.08	251.	-18.	-0.010	75.24	-3.856E+00	P
La-140	328.76	104.	16.	0.009	93.26	1.696E+00	
Cf-249	333.44	138.	12.	0.007	140.02	1.693E+00	
Cs-136	340.57	334.	-19.	-0.011	134.96	-9.105E-01	
EU-152	344.29	315.	-20.	-0.011	69.53	-1.650E+00	P
HF-181	345.83	314.	-21.	-0.012	122.79	-3.058E+00	
BA-133	356.00	374.	12.	0.007	233.00	4.324E-01	
I-131	364.48	68.	-9.	-0.005	182.46	-2.539E-01	
BA-133	383.84	171.	-18.	-0.010	106.77	-4.749E+00	
Cf-249	387.95	189.	-12.	-0.007	161.35	-4.464E-01	
SN-113	391.69	198.	2.	0.001	997.50	7.575E-02	
SB-125	427.88	60.	-3.	-0.002	508.81	-2.615E-01	
AG-108M	433.94	36.	10.	0.006	121.66	2.880E-01	
pm-146	453.88	48.	3.	0.002	455.83	1.242E-01	
SB-125	463.37	68.	13.	0.007	128.53	3.358E+00	P
BE-7	477.60	85.	13.	0.007	106.84	3.361E+00	
HF-181	482.00	103.	3.	0.002	434.25	1.161E-01	
La-140	487.02	99.	13.	0.007	113.62	7.933E-01	
RU-103	497.05	56.	-6.	-0.004	245.15	-2.000E-01	
RH-106	511.86	73.	89.	0.050	26.63	1.310E+01	
Nd-147	531.00	61.	-17.	-0.009	98.49	-3.861E+00	
Ba-140	537.26	43.	2.	0.001	857.02	1.963E-01	P
CS-134	563.24	61.	-18.	-0.010	92.66	-6.681E+00	
CS-134	569.32	45.	-3.	-0.002	321.46	-6.178E-01	
BI-207	569.70	42.	6.	0.004	146.97	2.094E-01	P
SB-125	600.50	357.	14.	0.008	196.41	2.533E+00	
SB-124	602.73	372.	12.	0.006	238.92	3.869E-01	P
CS-134	604.71	353.	-7.	-0.004	364.37	-2.486E-01	
RH-106	621.92	106.	-17.	-0.010	87.56	-5.893E+00	
SB-125	635.89	17.	10.	0.006	67.25	3.015E+00	
I-131	636.97	55.	-14.	-0.008	79.87	-6.680E+00	
AG-110M	657.76	142.	-10.	-0.006	166.22	-3.844E-01	
NB-94	702.63	28.	13.	0.007	93.08	4.777E-01	
SB-124	722.79	106.	-13.	-0.007	116.98	-4.470E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-108M	722.94	93.	-3.	-0.002	478.79	-1.192E-01		
pm-146	735.72	19.	11.	0.006	92.37	1.789E+00		
pm-146	747.16	42.	-6.	-0.003	172.39	-7.059E-01		P
ZR-95	756.73	14.	9.	0.005	95.75	6.386E-01		P
AG-110M	763.94	34.	9.	0.005	95.62	1.619E+00		
NB-95	765.79	87.	-11.	-0.006	121.97	-4.410E-01		
PA-234M	766.41	91.	-5.	-0.003	292.25	-6.260E+01		
EU-152	778.92	23.	-2.	-0.001	444.01	-7.198E-01		
CS-134	795.87	17.	11.	0.006	60.93	5.267E-01		
CS-134	801.95	72.	-14.	-0.008	87.05	-6.779E+00		
CO-58	810.78	29.	9.	0.005	86.50	3.928E-01		
La-140	815.77	38.	9.	0.005	108.75	1.509E+00		
MN-54	834.85	51.	-16.	-0.009	96.29	-6.870E-01		
NB-94	871.10	42.	-11.	-0.006	88.61	-4.782E-01		
EU-154	873.23	43.	10.	0.006	94.65	3.664E+00		
Sc-46	889.28	98.	-11.	-0.006	131.01	-4.853E-01		
y-88	898.04	15.	8.	0.004	117.43	3.634E-01		P
AG-110M	937.49	35.	-7.	-0.004	189.61	-9.354E-01		
EU-152	964.11	111.	7.	0.004	227.16	2.141E+00		
EU-154	996.33	74.	-10.	-0.006	119.52	-4.764E+00		
EU-154	1004.77	53.	12.	0.007	90.12	3.246E+00		
Co-56	1037.84	20.	-4.	-0.002	250.83	-1.405E+00		
Cs-136	1048.07	10.	9.	0.005	61.53	5.443E-01		
RH-106	1050.36	15.	6.	0.003	98.12	1.979E+01		
BI-207	1063.66	15.	8.	0.004	112.15	5.431E-01		
Ga-68	1077.40	21.	12.	0.007	88.78	2.275E+01		
FE-59	1099.25	43.	-14.	-0.008	65.86	-1.256E+00		P
EU-152	1112.07	116.	-3.	-0.002	460.87	-1.279E+00		
Ta-182	1121.30	146.	-14.	-0.008	123.12	-2.146E+00		
CO-60	1173.24	43.	-4.	-0.002	248.40	-2.172E-01		P
Ta-182	1189.05	21.	2.	0.001	634.67	5.671E-01		
Ta-182	1221.41	43.	-9.	-0.005	174.65	-1.807E+00		
Co-56	1238.28	22.	12.	0.007	89.44	1.075E+00		P
NA-22	1274.53	21.	1.	0.000	987.42	3.882E-02		
FE-59	1291.60	23.	-4.	-0.002	262.59	-5.817E-01		P
CO-60	1332.50	11.	6.	0.003	145.52	3.415E-01		
AG-110M	1384.30	17.	3.	0.002	327.45	7.668E-01		
EU-152	1408.00	11.	2.	0.001	480.00	4.993E-01		
La-140	1596.21	18.	-7.	-0.004	151.19	-5.100E-01		
SB-124	1690.98	0.	6.	0.003	40.82	9.138E-01		
Co-56	1771.35	22.	8.	0.004	89.42	3.911E+00		
y-88	1836.06	6.	-2.	-0.001	275.72	-1.829E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.3611E+00	3.3611E+00	1.068E+02%	1.21E+01
NA-22	#A	3.8817E-02	3.8817E-02	9.874E+02%	1.41E+00
K-40		2.2182E+02	2.2182E+02	5.302E+00%	7.75E+00
Sc-46	#A	-4.8527E-01	-4.8527E-01	1.310E+02%	2.16E+00
CR-51	#A	-3.8556E+00	-3.8557E+00	7.524E+01%	1.62E+01
MN-54	#A	-6.8699E-01	-6.8699E-01	9.629E+01%	1.52E+00
FE-59	#A	-1.2561E+00	-1.2561E+00	6.586E+01%	3.04E+00
Co-56	#A	4.3890E-01	4.3890E-01	8.944E+01%	9.92E-01
CO-57	#A	-3.5201E-01	-3.5201E-01	1.009E+02%	1.19E+00
CO-58	#A	3.9282E-01	3.9282E-01	8.650E+01%	1.15E+00
CO-60	#A	3.4151E-01	3.4151E-01	1.455E+02%	1.11E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.42E+00
NB-94	#A	4.7769E-01	4.7769E-01	9.308E+01%	1.03E+00
ZR-95	#A	6.3861E-01	6.3862E-01	9.575E+01%	1.46E+00
NB-95	#A	-4.4104E-01	-4.4105E-01	1.220E+02%	1.83E+00
RU-103	#A	-2.0003E-01	-2.0004E-01	2.451E+02%	1.19E+00
RH-106	#A	-2.4056E+00	-2.4056E+00	6.576E+01%	1.73E+01
AG-108M	#A	2.8799E-01	2.8799E-01	1.217E+02%	8.83E-01
AG-110M	#A	4.5862E-01	4.5862E-01	9.562E+01%	2.78E+00
SN-113	#A	7.5749E-02	7.5749E-02	9.975E+02%	2.59E+00
SB-124	#A	5.5931E-01	5.5931E-01	4.082E+01%	3.11E+00
SB-125	#A	1.5420E+00	1.5420E+00	6.725E+01%	3.38E+00
I-131	#A	5.7729E-02	5.7734E-02	1.014E+02%	1.16E+00
Gd-153	#A	9.2121E-01	9.2121E-01	1.343E+02%	4.14E+00
Ga-68	#A	2.2442E+01	2.2753E+01	8.878E+01%	4.42E+01
Tc-99m	#A	-3.9808E-01	-3.9911E-01	1.544E+02%	2.05E+00
BA-133	#A	4.3239E-01	4.3239E-01	2.330E+02%	3.39E+00
CS-134	#A	1.1343E-01	1.1343E-01	6.093E+01%	3.06E+00
CS-137		3.8198E+00	3.8198E+00	1.524E+01%	1.04E+00
CE-139	#A	3.4012E-02	3.4013E-02	1.129E+03%	1.31E+00
Ba-140	#A	1.1109E+00	1.1110E+00	1.047E+02%	4.16E+00
La-140	#A	3.0904E-01	3.0905E-01	5.931E+01%	1.64E+00
CE-141	#A	-7.5237E-01	-7.5238E-01	1.569E+02%	3.93E+00
CE-144	#A	-3.1446E+00	-3.1446E+00	1.259E+02%	1.59E+01
PM-144	A	8.6565E-02	8.6565E-02	5.237E+02%	1.09E+00
EU-152	#A	-1.6499E+00	-1.6499E+00	6.953E+01%	7.14E+00
EU-154	#A	3.4150E+00	3.4150E+00	6.535E+01%	1.18E+01
EU-155	#A	-9.6082E-02	-9.6082E-02	1.378E+03%	4.78E+00
HF-181	#A	3.0118E-01	3.0118E-01	1.596E+02%	1.74E+00
Ta-182	#A	-2.1462E+00	-2.1463E+00	1.231E+02%	8.91E+00
Hg-203	#A	6.8590E-02	6.8591E-02	5.799E+02%	1.37E+00
TL-208		6.2934E+00	6.2934E+00	1.006E+01%	9.91E-01
pm-146	#A	2.0027E-01	2.0027E-01	9.237E+01%	3.75E+00

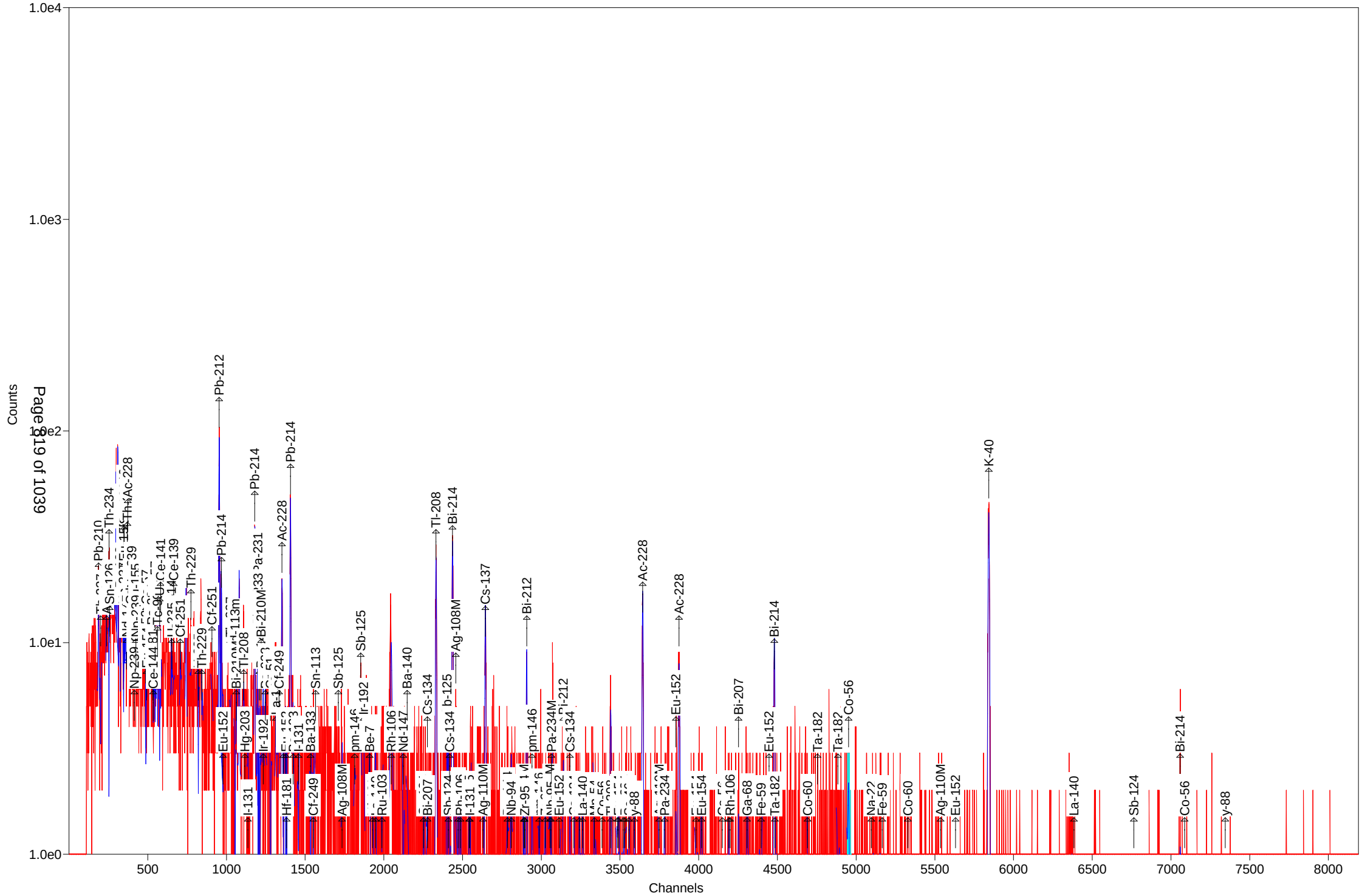
y-88 #A	3.6336E-01	3.6336E-01	1.174E+02%		9.94E-01
Cd-113m#A	-5.4874E+03	-5.4874E+03	1.377E+02%		2.54E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.61E+01
Cf-251 #A	1.1654E+00	1.1654E+00	1.558E+02%		4.68E+00
Cf-249 #A	-3.9341E-02	-3.9341E-02	1.068E+02%		2.43E+00
Sn-126 A	1.6989E+00	1.6989E+00	3.306E+02%		1.89E+01
PB-210 #	3.5908E+01	3.5908E+01	3.772E+01%		3.30E+01
PB-212	1.6875E+01	1.6875E+01	5.825E+00%		1.88E+00
PB-214	1.5312E+01	1.5312E+01	7.869E+00%		2.61E+00
BI-207 #A	3.5371E-01	3.5371E-01	9.244E+01%		1.06E+00
BI-212 #	2.9504E+01	2.9504E+01	1.815E+01%		8.86E+00
BI-214 #	1.4464E+01	1.4464E+01	9.814E+00%		2.32E+00
BI-210M#A	5.9561E-01	5.9561E-01	1.384E+02%		2.77E+00
AC-228	2.0154E+01	2.0154E+01	6.634E+00%		2.55E+00
TH-227 #A	-4.2656E+00	-4.2656E+00	1.774E+02%		2.54E+01
TH-229 #A	-8.1363E-01	-8.1363E-01	8.154E+02%		2.14E+01
TH-234 #A	-2.1648E+01	-2.1648E+01	4.868E+01%		5.12E+01
PA-231 #A	-1.3262E+01	-1.3262E+01	1.561E+02%		6.94E+01
PA-233 #A	8.2474E-01	8.2474E-01	1.909E+02%		5.29E+00
PA-234 A	2.9465E+00	2.9465E+00	4.413E+01%		8.11E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		2.62E+02
U-235 #A	-3.6652E+00	-3.6652E+00	1.125E+02%		1.66E+01
AM-241 #A	1.3269E+00	1.3269E+00	1.250E+02%		5.53E+00
Np-237 #A	-2.6951E+00	-2.6951E+00	1.604E+02%		1.44E+01
Ir-192 A	4.1682E-01	4.1682E-01	1.221E+02%		2.25E+00
Cs-136 #A	2.4191E-01	2.4192E-01	6.153E+01%		1.44E+00
Np-239 #A	8.8413E-01	8.8438E-01	1.363E+02%		4.05E+00
Nd-147 #A	-3.8603E+00	-3.8605E+00	9.849E+01%		9.04E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 3.642E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 3.6415161E+02 Bq/Sample

257318_Gamma_160-17797-A-19-B. 12_Gamma_20161456.spc.



Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 3_20160712001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 7/12/2016 1:23:33 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	59.52	59.79	60.04	PASS
FWHM	0.81	0.00	0.00	0.81	1.91	2.01	PASS
ActivityDiff	647.00	-5.00	-4.00	0.07	4.00	5.00	PASS
QA-662							
FWHM	1.46	0.00	0.00	1.42	3.16	3.26	PASS
ActivityDiff	606.50	-5.00	-4.00	-2.22	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.82	1333.01	1333.26	PASS
FWHM	2.07	0.00	0.00	1.95	4.27	4.37	PASS
ActivityDiff	1183.00	-5.00	-4.00	-2.10	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Background Check

Spectrum: 3_20160712002_BG
Description: Background Contamination Check
Acquired: 7/12/2016 2:03:31 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	2.34	2.18	2.23	2.40	2.44	2.49	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Background Check

Spectrum: 5_20160712001_BG
Description: Background Contamination Check
Acquired: 7/12/2016 12:59:02 AM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.41	1.55	1.60	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Quality Control Check

Spectrum: 5_20160712002_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 7/12/2016 2:12:18 AM
Detector: Detector # 5
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.74	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.93	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.42	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-0.27	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.73	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.95	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-2.65	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Background Check

Spectrum: 7_20160712001_BG
Description: Background Contamination Check
Acquired: 7/12/2016 12:59:48 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	1.23	1.40	1.45	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Quality Control Check

Spectrum: 7_20160712002_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 7/12/2016 2:13:36 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.88	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.55	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.46	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.58	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.80	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.03	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.49	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Background Check

Spectrum: 8_20160712001_BG
Description: Background Contamination Check
Acquired: 7/12/2016 1:00:56 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	1.57	1.68	1.74	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Quality Control Check

Spectrum: 8_20160712002_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 7/12/2016 2:16:03 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	0.85	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-0.60	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.36	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	0.63	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.77	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.75	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.28	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Quality Control Check

Spectrum: 12_20160712001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 7/12/2016 1:32:41 AM
Detector: Detector #12
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.89	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	2.08	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.41	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	2.65	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.44	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	1.96	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.86	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Background Check

Spectrum: 12_20160712002_BG
Description: Background Contamination Check
Acquired: 7/12/2016 2:06:53 AM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.08	1.93	1.98	2.06	2.18	2.23	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Background Check

Spectrum: 14_20160712001_BG
Description: Background Contamination Check
Acquired: 7/12/2016 1:04:23 AM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.82	1.90	1.94	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

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Test America
St. Louis
Quality Control Check

Spectrum: 14_20160712002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 7/12/2016 2:26:51 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.65	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.89	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.37	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.45	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-1.23	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.41	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.92	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	1.40	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

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Test America
St. Louis
Background Check

Spectrum: 16_20160712001_BG
Description: Background Contamination Check
Acquired: 7/12/2016 1:05:38 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	2.59	2.80	2.86	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

Test America
St. Louis
Quality Control Check

Spectrum: 16_20160712002_QCAsLeft
Description: Quality control Check (QC Source 'G') Post Stabilization
Acquired: 7/12/2016 2:28:23 AM
Detector: Detector #16
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.96	0.00	0.00	0.99	2.06	2.16	PASS
ActivityDiff	602.10	-5.00	-4.00	0.29	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.50	3.23	3.33	PASS
ActivityDiff	571.13	-5.00	-4.00	-0.37	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.78	1333.01	1333.26	PASS
FWHM	2.09	0.00	0.00	2.07	4.29	4.39	PASS
ActivityDiff	1139.05	-5.00	-4.00	-1.06	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Amanda Dick

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	Nuclide Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak 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	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4726E+04	46.54	1.473E+04	(	1.744E+02	8.15E+03 6.52E-01 4.25E+00 G
AM-241		1.2416E+03	59.54	1.242E+03	(	1.457E+01	1.58E+05 6.49E-01 3.57E+01 G
CD-109		1.5976E+04	88.03	1.598E+04	(	1.088E+02	4.63E+02 4.29E-01 3.61E+00 G
CO-57		3.4677E+02	122.06	3.468E+02	(	4.144E+00	2.72E+02 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	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.
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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge12
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14446	96.8
Am-241	2037	418	0.3590	1163	1221.2	105.0
Cd-109	2881	591	0.0361	16363	16047	98.1
Co-57	1511	310	0.8560	362	351.89	97.2
Ce-139	2139	439	0.7990	549	541.18	98.6
Hg-203	4651	954	0.8146	1171	1185.4	101.3
Sn-113	3015	618	0.6400	966	985.86	102.1
Cs-137	1938	397	0.8510	467	464.95	99.6
Y-88	7264	1489	0.9370	1589	1567.8	98.6
Co-60	3580	734	0.9997	734	723.38	98.5
Co-60	3581	734	0.9999	734	722.83	98.4
Y-88	7690	1577	0.9920	1589	1631.1	102.6

Reviewed By: Jody Watson

Date: 10/4/2012

Calibration Data from file: 12_Soil_TunaCan.Clb
Energy Calibration Date: 10/4/2012 Time: 8:58:25 AM
Efficiency Calibration Date: 10/4/2012 Time: 9:05:44 AM

Calibration Description:
12_TunaCanCal_90099_100212

Energy Calibration Fit
Energy = 0.0090 +0.250225*Channel -3.66218e-008*Channel**2
FWHM (ch) = 3.4167 +0.000958*Channel -2.51787e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.06	46.54	46.56	-0.05%	0.90	0.90	0.39%
237.95	59.54	59.55	-0.01%	0.89	0.91	-2.27%
351.83	88.03	88.04	-0.01%	0.93	0.94	-1.36%
487.89	122.06	122.08	-0.02%	0.97	0.97	0.15%
663.08	165.85	165.91	-0.04%	1.00	1.01	-0.90%
1115.49	279.17	279.09	0.03%	1.15	1.11	3.32%
1565.26	391.69	391.59	0.03%	1.21	1.21	-0.06%
2645.31	661.66	661.67	-0.00%	1.46	1.44	1.36%
3590.75	898.02	898.03	-0.00%	1.65	1.63	0.91%
4692.00	1173.24	1173.26	-0.00%	1.80	1.84	-2.15%
5329.54	1332.50	1332.55	-0.00%	1.94	1.95	-0.63%
7345.18	1836.01	1835.98	0.00%	2.29	2.27	0.67%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.6978 %
Ln(Eff) = -0.7827 -0.300127*Ln(Eng) -0.0336956*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.9642 %
Ln(Eff) = -22.8841 +8.352717*Ln(Eng) -0.881237*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.1587E-002	2.2292E-002	-3.26%
59.54	3.2562E-002	3.1219E-002	4.12%
88.03	4.1933E-002	4.2777E-002	-2.01%
122.06	4.3987E-002	4.5264E-002	-2.90%
165.85	==========	Knee	==========
165.85	4.0281E-002	4.0886E-002	-1.50%
279.17	2.9349E-002	2.8963E-002	1.31%
391.69	2.3406E-002	2.2919E-002	2.08%
661.66	1.5679E-002	1.5712E-002	-0.21%
898.02	1.2338E-002	1.2502E-002	-1.33%
1173.24	1.0026E-002	1.0183E-002	-1.57%
1332.50	9.0782E-003	9.2201E-003	-1.56%
1836.01	7.3324E-003	7.1442E-003	2.57%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  10/4/2012 9:11:35 AM
TestAmerica, Inc                Spectrum name: 12_TunaCan_20122189.An1

Sample description
     12_TunaCan_90099


Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20122189.An1

Acquisition information
       Start time:                 10/2/2012 10:17:00 AM
       Live time:               7200
       Real time:               7302
       Dead time:                  1.40 %
       Detector ID:                   12

Detector system
     Ge12 S/N10034336


Calibration
       Filename:                   12_Soil_TunaCan.Clb
     12_TunaCanCal_90099_100212


       Energy Calibration
            Created:               10/4/2012 8:58:25 AM
            Zero offset:           0.009 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.662E-08 keV/channel^2

       Efficiency Calibration
            Created:               10/4/2012 9:05:44 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.70 %
            Log(Eff):             -7.827468E-01 + (-3.001271E-01*Log(E) ) +
                                   ( -3.369562E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.96 %
            Log(Eff):             -2.288409E+01 + ( 8.352717E+00*Log(E) ) +
                                   ( -8.812368E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.54keV )
       Stop channel:            8000 (  1999.46keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0301

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.56	96262.	0.47	0.90	2.231E-02	46.54	4.250	1.445E+04	Pb210
59.55	97880.	0.49	0.89	3.122E-02	59.54	35.700	1.221E+03	AM241
88.04	118171.	0.40	0.93	4.278E-02	88.03	3.610	1.605E+04	CD109
122.08	48689.	0.66	0.97	4.526E-02	122.06	85.600	3.519E+02	CO57
136.52	6070.	3.34	0.99	4.419E-02				
165.91	31873.	0.80	1.00	4.088E-02	165.85	79.900	5.412E+02	Ce139
279.09	3381.	4.68	1.15	2.897E-02	279.17	81.500	1.185E+03	Hg203
391.58	19876.	1.11	1.21	2.292E-02	391.69	64.000	9.859E+02	SN113
661.67	44047.	0.60	1.46	1.571E-02	661.66	85.210	4.649E+02	CS137
898.03	22124.	1.09	1.65	1.250E-02	898.02	93.700	1.568E+03	Y898
1173.25	47992.	0.54	1.80	1.018E-02	1173.24	99.900	7.234E+02	Co1173
1332.54	43454.	0.53	1.94	9.220E-03	1332.50	99.982	7.228E+02	Co1332
1835.96	13783.	0.98	2.29	7.144E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.60	136.52	8754.	6070.	1.374E+05	3.34	0.989	-

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.06	46.56	27968.	96262.	13.370	0.47	0.903
AM-241	237.95	59.55	29903.	97880.	13.594	0.49	0.891
CD-109	351.83	88.04	24170.	118171.	16.413	0.40	0.926
CO-57	487.89	122.08	12523.	48689.	6.762	0.66	0.972
Ce-139	663.08	165.91	7948.	31873.	4.427	0.80	1.002
Hg-203	1115.49	279.09	5203.	3381.	0.470	4.68	1.152
SN-113	1565.25	391.58	5206.	19876.	2.760	1.11	1.214
CS-137	2645.31	661.67	4245.	44047.	6.118	0.60	1.464
Y-898	3590.75	898.03	4771.	22124.	3.073	1.09	1.649
Co-1173	4691.96	1173.25	2353.	47992.	6.666	0.54	1.802
Co-1332	5329.49	1332.54	1369.	43454.	6.035	0.53	1.941
Y-1836	7345.05	1835.95	424.	13925.	1.934	0.97	2.293

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

√

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4446E+04				8.15E+03	
			46.54	1.445E+04	(	1.174E+02 4.69E-01 4.25E+00	G
AM-241		1.2212E+03				1.58E+05	
			59.54	1.221E+03	(	1.009E+01 4.87E-01 3.57E+01	G
CD-109		1.6047E+04				4.63E+02	
			88.03	1.605E+04	(	9.875E+01 4.00E-01 3.61E+00	G
CO-57		3.5189E+02				2.72E+02	
			122.06	3.519E+02	(	3.789E+00 6.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.4118E+02					1.38E+02	
		165.85	5.412E+02	(	7.100E+00	8.00E-01	7.99E+01 G
Hg-203	1.1854E+03					4.66E+01	
		279.17	1.185E+03	(	1.188E+02	4.68E+00	8.15E+01 G
SN-113	9.8586E+02					1.15E+02	
		391.69	9.859E+02	(	1.681E+01	1.11E+00	6.40E+01 G
CS-137	4.6495E+02					1.10E+04	
		661.66	4.649E+02	(	3.233E+00	5.99E-01	8.52E+01 G
Y-898	1.5678E+03					1.07E+02	
		898.02	1.568E+03	(	2.300E+01	1.09E+00	9.37E+01 G
Co-1173	7.2338E+02					1.93E+03	
		1173.24	7.234E+02	(	3.448E+00	5.35E-01	9.99E+01 G
Co-1332	7.2283E+02					1.93E+03	
		1332.50	7.228E+02	(	2.913E+00	5.31E-01	1.00E+02 G
Y-1836	1.6311E+03					1.07E+02	
		1836.01	1.631E+03	(	1.156E+01	9.66E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4112E+04	1.4446E+04	4.686E-01%	1.17E+02
AM-241	1.2198E+03	1.2212E+03	4.873E-01%	1.01E+01
CD-109	1.0628E+04	1.6047E+04	3.995E-01%	9.87E+01
CO-57	1.7453E+02	3.5189E+02	6.590E-01%	3.79E+00
Ce-139	1.3551E+02	5.4118E+02	7.998E-01%	7.10E+00
Hg-203	1.9895E+01	1.1854E+03	4.682E+00%	1.19E+02
SN-113	1.8819E+02	9.8586E+02	1.108E+00%	1.68E+01
CS-137	4.5695E+02	4.6495E+02	5.986E-01%	3.23E+00
Y-898	2.6230E+02	1.5678E+03	1.088E+00%	2.30E+01
Co-1173	6.5520E+02	7.2338E+02	5.354E-01%	3.45E+00
Co-1332	6.5470E+02	7.2283E+02	5.311E-01%	2.91E+00
Y-1836	2.7290E+02	1.6311E+03	9.660E-01%	1.16E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.5 keV) 2.878E+04 Bq
Total Decayed Activity (37.5 to 1999.5 keV) 3.9888684E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
       Start time:                 4/23/2012 9:56:44 AM
       Live time:               3600
       Real time:               3665
       Dead time:                  1.77 %
       Detector ID:                   14

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       1/1/2012 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0575
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.67	47449.	0.64	0.73	2.181E-02	46.54	4.250	1.442E+04	Pb210
59.63	48139.	0.67	0.74	3.071E-02	59.54	35.700	1.223E+03	AM241
72.88	1815.	8.13	0.77	3.737E-02				
88.00	74331.	0.47	0.79	4.195E-02	88.03	3.610	1.614E+04	CD109
121.95	35331.	0.76	0.82	4.379E-02	122.06	85.600	3.493E+02	CO57
136.39	4314.	3.84	0.82	4.244E-02				
165.77	33960.	0.70	0.89	3.800E-02	165.85	79.900	5.385E+02	Ce139
279.15	17136.	1.05	1.00	2.596E-02	279.17	81.500	1.206E+03	Hg203
391.65	22586.	0.85	1.13	1.993E-02	391.69	64.000	9.714E+02	SN113
661.68	18625.	0.92	1.36	1.313E-02	661.66	85.210	4.657E+02	CS137
898.06	26064.	0.74	1.56	1.026E-02	898.02	93.700	1.570E+03	Y898
1173.24	20614.	0.80	1.76	8.244E-03	1173.24	99.900	7.242E+02	Co1173
1332.50	18485.	0.81	1.88	7.423E-03	1332.50	99.982	7.206E+02	Co1332
1835.98	15919.	0.83	2.23	5.686E-03	1836.01	99.200	1.634E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
290.81	72.88	9094.	1708.	4.569E+04	9.16	0.857	-
544.77	136.39	6618.	4314.	1.017E+05	3.84	0.819	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4422E+04						8.15E+03	
			46.54	1.442E+04	(	1.659E+02	6.42E-01	4.25E+00	G
AM-241		1.2225E+03						1.58E+05	
			59.54	1.223E+03	(	1.449E+01	6.65E-01	3.57E+01	G
CD-109		1.6145E+04						4.63E+02	
			88.03	1.614E+04	(	1.179E+02	4.73E-01	3.61E+00	G
CO-57		3.4928E+02						2.72E+02	
			122.06	3.493E+02	(	4.431E+00	7.59E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA			Comments
Ce-139	5.3852E+02						1.38E+02	
		165.85	5.385E+02	(	5.643E+00	6.97E-01	7.99E+01	G
Hg-203	1.2059E+03						4.66E+01	
		279.17	1.206E+03	(	2.002E+01	1.05E+00	8.15E+01	G
SN-113	9.7136E+02						1.15E+02	
		391.69	9.714E+02	(	1.115E+01	8.54E-01	6.40E+01	G
CS-137	4.6565E+02						1.10E+04	
		661.66	4.657E+02	(	5.571E+00	9.21E-01	8.52E+01	G
Y-898	1.5700E+03						1.07E+02	

```
                          898.02 1.570E+03  (  1.261E+01 7.43E-01 9.37E+01 G

Co-1173      7.2416E+02                                        1.93E+03
                         1173.24 7.242E+02  (  5.275E+00 7.99E-01 9.99E+01 G

Co-1332      7.2060E+02                                        1.93E+03
                         1332.50 7.206E+02  (  4.737E+00 8.09E-01 1.00E+02 G

Y-1836       1.6340E+03                                        1.07E+02
                         1836.01 1.634E+03  (  6.084E+00 8.27E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



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   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4284E+04    1.4422E+04    6.417E-01%                1.66E+02
 AM-241       1.2219E+03    1.2225E+03    6.654E-01%                1.45E+01
 CD-109       1.3631E+04    1.6145E+04    4.729E-01%                1.18E+02
```

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Gamma Verification per Geometry

Detector:	Ge16
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14377	96.3
Am-241	2037	418	0.3590	1163	1228.5	105.6
Cd-109	2881	591	0.0361	16363	16032	98.0
Co-57	1511	310	0.8560	362	349.8	96.7
Ce-139	2139	439	0.7990	549	538.18	98.0
Sn-113	3015	618	0.6400	966	969.68	100.4
Cs-137	1938	397	0.8510	467	468.24	100.3
Y-88	7264	1489	0.9370	1589	1552.4	97.7
Co-60	3580	734	0.9997	734	725.6	98.8
Co-60	3581	734	0.9999	734	726.23	98.9
Y-88	7690	1577	0.9920	1589	1629.1	102.5

Reviewed By: Jody Watson

Date: 7/13/2012

Calibration Data from file: 16_Soil_TunaCan.Clb
Energy Calibration Date: 7/13/2012 Time: 9:47:11 AM
Efficiency Calibration Date: 7/13/2012 Time: 9:47:24 AM

Calibration Description:
16_TunaCan_90099_071012

Energy Calibration Fit
Energy = 0.1106 +0.250095*Channel -1.95476e-008*Channel**2
FWHM (ch) = 3.6339 +0.000937*Channel -2.1273e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.57	46.54	46.52	0.04%	0.97	0.95	1.52%
237.71	59.54	59.56	-0.03%	0.95	0.96	-1.11%
351.71	88.03	88.07	-0.05%	1.00	0.99	0.52%
487.80	122.06	122.10	-0.04%	1.03	1.02	1.07%
662.91	165.85	165.89	-0.03%	1.08	1.06	1.71%
1115.49	279.17	279.06	0.04%	1.13	1.16	-3.06%
1565.59	391.69	391.61	0.02%	1.25	1.26	-0.74%
2645.84	661.66	661.68	-0.00%	1.44	1.49	-3.61%
3591.32	898.02	898.03	-0.00%	1.74	1.68	3.44%
4692.55	1173.24	1173.26	-0.00%	1.94	1.89	2.70%
5329.87	1332.50	1332.53	-0.00%	1.95	2.01	-2.97%
7344.93	1836.01	1835.99	0.00%	2.34	2.34	0.11%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0068 %
Ln(Eff) = 0.0148 -0.551427*Ln(Eng) -0.0144348*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1708 %
Ln(Eff) = -24.0844 +8.948554*Ln(Eng) -0.95136*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.2670E-002	2.3523E-002	-3.76%
59.54	3.4907E-002	3.3268E-002	4.69%
88.03	4.4561E-002	4.5501E-002	-2.11%
122.06	4.5678E-002	4.7288E-002	-3.52%
165.85	========== Knee ==========		
165.85	4.0710E-002	4.1557E-002	-2.08%
279.17	2.9697E-002	2.8765E-002	3.14%
391.69	2.2647E-002	2.2549E-002	0.43%
661.66	1.5445E-002	1.5368E-002	0.50%
898.02	1.1965E-002	1.2246E-002	-2.35%
1173.24	9.8925E-003	1.0017E-002	-1.26%
1332.50	8.9987E-003	9.0965E-003	-1.09%
1836.01	7.2985E-003	7.1212E-003	2.43%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/13/2012 9:50:48 AM
TestAmerica, Inc.                Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Sample description
     16_Soil_TunaCan_90099_071012


Spectrum Filename: C:\User\SPC\Det16\16_Soil_TunaCan_90099_20120752.A

Acquisition information
       Start time:                 7/10/2012 10:35:34 AM
       Live time:               3600
       Real time:               3674
       Dead time:                  2.03 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Soil_TunaCan.Clb
     16_TunaCan_90099_071012


       Energy Calibration
            Created:               7/13/2012 9:47:11 AM
            Zero offset:           0.111 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.955E-08 keV/channel^2

       Efficiency Calibration
            Created:               7/13/2012 9:47:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.01 %
            Log(Eff):              1.477416E-02 + (-5.514266E-01*Log(E) ) +
                                   ( -1.443482E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.17 %
            Log(Eff):             -2.408438E+01 + ( 8.948554E+00*Log(E) ) +
                                   ( -9.513599E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.62keV )
       Stop channel:            8000 (  1999.62keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0309

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	50908.	0.67	0.97	2.351E-02	46.54	4.250	1.438E+04	Pb210
59.56	52484.	0.66	0.95	3.328E-02	59.54	35.700	1.229E+03	AM241
88.07	71211.	0.52	1.00	4.551E-02	88.03	3.610	1.603E+04	CD109
122.10	31320.	0.80	1.03	4.728E-02	122.06	85.600	3.498E+02	CO57
136.55	3896.	3.92	1.12	4.572E-02				
165.89	24588.	0.86	1.08	4.155E-02	165.85	79.900	5.382E+02	Ce139
279.05	6035.	2.82	1.13	2.877E-02	279.17	81.500	1.223E+03	Hg203
391.61	15948.	1.14	1.25	2.255E-02	391.69	64.000	9.697E+02	SN113
661.68	21809.	0.83	1.44	1.537E-02	661.66	85.210	4.682E+02	CS137
898.03	18524.	0.90	1.74	1.225E-02	898.02	93.700	1.552E+03	Y898
1173.26	24403.	0.75	1.94	1.002E-02	1173.24	99.900	7.256E+02	Co1173
1332.53	22198.	0.75	1.95	9.096E-03	1332.50	99.982	7.262E+02	Co1332
1835.98	11967.	0.97	2.34	7.121E-03	1836.01	99.200	1.629E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.57	136.55	5299.	3896.	8.521E+04	3.92	1.117	-

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.57	46.52	16008.	50908.	14.141	0.67	0.967
AM-241	237.71	59.56	16109.	52484.	14.579	0.66	0.954
CD-109	351.71	88.07	14747.	71211.	19.781	0.52	0.996
CO-57	487.80	122.10	7590.	31320.	8.700	0.80	1.033
Ce-139	662.91	165.89	4947.	24588.	6.830	0.86	1.080
Hg-203	1115.49	279.06	4192.	5963.	1.656	2.79	1.129
SN-113	1565.60	391.61	3105.	15948.	4.430	1.14	1.253
CS-137	2645.84	661.68	2129.	21809.	6.058	0.83	1.439
Y-898	3591.32	898.03	1720.	18524.	5.145	0.90	1.741
Co-1173	4692.53	1173.26	1220.	24403.	6.779	0.75	1.944
Co-1332	5329.86	1332.53	680.	22198.	6.166	0.75	1.948
Y-1836	7344.92	1835.98	144.	11967.	3.324	0.97	2.344

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4377E+04						8.15E+03	
			46.54	1.438E+04	(	1.673E+02	6.66E-01	4.25E+00	G
AM-241		1.2285E+03						1.58E+05	
			59.54	1.229E+03	(	1.391E+01	6.59E-01	3.57E+01	G
CD-109		1.6032E+04						4.63E+02	
			88.03	1.603E+04	(	1.280E+02	5.16E-01	3.61E+00	G
CO-57		3.4980E+02						2.72E+02	
			122.06	3.498E+02	(	4.565E+00	8.01E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3818E+02					1.38E+02	
		165.85	5.382E+02	(	7.233E+00	8.57E-01	7.99E+01 G
Hg-203	1.2081E+03					4.66E+01	
		279.17	1.208E+03	(	6.167E+01	2.79E+00	8.15E+01 G
SN-113	9.6968E+02					1.15E+02	
		391.69	9.697E+02	(	1.595E+01	1.14E+00	6.40E+01 G
CS-137	4.6824E+02					1.10E+04	
		661.66	4.682E+02	(	4.675E+00	8.31E-01	8.52E+01 G
Y-898	1.5524E+03					1.07E+02	
		898.02	1.552E+03	(	1.643E+01	8.98E-01	9.37E+01 G
Co-1173	7.2560E+02					1.93E+03	
		1173.24	7.256E+02	(	4.920E+00	7.53E-01	9.99E+01 G
Co-1332	7.2623E+02					1.93E+03	
		1332.50	7.262E+02	(	4.064E+00	7.46E-01	1.00E+02 G
Y-1836	1.6291E+03					1.07E+02	
		1836.01	1.629E+03	(	7.981E+00	9.68E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4145E+04	1.4377E+04	6.660E-01%	1.67E+02
AM-241	1.2275E+03	1.2285E+03	6.589E-01%	1.39E+01
CD-109	1.2043E+04	1.6032E+04	5.162E-01%	1.28E+02
CO-57	2.1493E+02	3.4980E+02	8.011E-01%	4.56E+00
Ce-139	2.0570E+02	5.3818E+02	8.567E-01%	7.23E+00
Hg-203	7.0659E+01	1.2081E+03	2.787E+00%	6.17E+01
SN-113	3.0697E+02	9.6968E+02	1.140E+00%	1.60E+01
CS-137	4.6263E+02	4.6824E+02	8.306E-01%	4.67E+00
Y-898	4.4842E+02	1.5524E+03	8.985E-01%	1.64E+01
Co-1173	6.7738E+02	7.2560E+02	7.529E-01%	4.92E+00
Co-1332	6.7797E+02	7.2623E+02	7.458E-01%	4.06E+00
Y-1836	4.7056E+02	1.6291E+03	9.676E-01%	7.98E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 3.095E+04 Bq
Total Decayed Activity (37.6 to 1999.6 keV) 3.9805016E+04 Bq

Analyzed by: _____
403135

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc.

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

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 3
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 4
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4212E+04				8.15E+03	
			46.54	1.421E+04	(P	1.177E+02 4.91E-01 4.25E+00	G
AM-241		1.1609E+03				1.58E+05	
			59.54	1.161E+03	(	8.959E+00 4.87E-01 3.57E+01	G
CD-109		1.5419E+04				4.63E+02	
			88.03	1.542E+04	(	1.658E+02 6.81E-01 3.61E+00	G
CO-57		3.3478E+02				2.72E+02	
			122.06	3.348E+02	(	1.063E+01 1.66E+00 8.56E+01	G
Ce-139		5.3191E+02				1.38E+02	
			165.85	5.319E+02	(	7.689E+01 6.14E+00 7.99E+01	G
Hg-203		-6.5193E-03				4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00 8.22E+03 8.15E+01	G
SN-113		9.5011E+02				1.15E+02	
			391.69	9.501E+02	(	3.682E+02 1.63E+01 6.40E+01	G
CS-137		4.4236E+02				1.10E+04	
			661.66	4.424E+02	(P	3.020E+00 7.12E-01 8.52E+01	G
Y-898		1.6655E+03				1.07E+02	
			898.02	1.665E+03	(	6.908E+02 1.92E+01 9.37E+01	G
Co-1173		7.0021E+02				1.93E+03	
			1173.24	7.002E+02	(	4.056E+00 7.32E-01 9.99E+01	G
Co-1332		7.0186E+02				1.93E+03	
			1332.50	7.019E+02	(	1.651E+00 7.07E-01 1.00E+02	G
Y-1836		1.6424E+03				1.07E+02	
			1836.01	1.642E+03	(	1.392E+02 7.47E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%	1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%	8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%	1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%	1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%	7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00
SN-113	6.9747E+00	9.5011E+02	1.633E+01%	3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%	3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%	6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%	4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%	1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%	1.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 8:52:25 AM
TestAmerica                      Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
     7_TunaCan2ndSource_81427-334_032712


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information
       Start time:                 3/27/2012 3:25:25 PM
       Live time:               3600
       Real time:               3684
       Dead time:                  2.28 %
       Detector ID:                   7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	8[illegible]	3.[illegible]E+04	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name    Code  Activity     Energy   Activity Code MDA Value
              Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

Pb-210    N   1.3857E+04                                        8.15E+03
                            46.54 1.386E+04  (P 1.480E+02 6.34E-01 4.25E+00 G

AM-241        1.1504E+03                                        1.58E+05
                            59.54 1.150E+03  (  1.036E+01 5.81E-01 3.57E+01 G

CD-109        1.5217E+04                                        4.63E+02
                            88.03 1.522E+04  (  1.799E+02 7.73E-01 3.61E+00 G

CO-57         3.1712E+02                                        2.72E+02
                           122.06 3.171E+02  (  1.205E+01 2.04E+00 8.56E+01 G

Ce-139        5.1801E+02                                        1.38E+02
                           165.85 5.180E+02  (  7.941E+01 6.45E+00 7.99E+01 G

Hg-203       -4.5441E-01                                        4.66E+01
                           279.17-4.544E-01 ?(  2.347E+00 1.56E+02 8.15E+01 G

SN-113        9.3315E+02                                        1.15E+02
                           391.69 9.332E+02  (  4.178E+02 1.96E+01 6.40E+01 G

CS-137        4.4047E+02                                        1.10E+04
                           661.66 4.405E+02  (  3.706E+00 8.56E-01 8.52E+01 G

Y-898         1.6944E+03                                        1.07E+02
                           898.02 1.694E+03  (  8.216E+02 2.35E+01 9.37E+01 G

Co-1173       6.8172E+02                                        1.93E+03
                          1173.24 6.817E+02  (  4.436E+00 8.58E-01 9.99E+01 G

Co-1332       6.9210E+02                                        1.93E+03
                          1332.50 6.921E+02  (  2.586E+00 8.49E-01 1.00E+02 G

Y-1836        1.7801E+03                                        1.07E+02
                          1836.01 1.780E+03  (  2.065E+02 9.19E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

2nd Source Verification

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

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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:	Ge12
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1143.6	98.2
Cs-137	1926	396	0.851	465	442.3	95.1
Co-60	3611	742	0.99974	742	688.36	92.7
Co-60	3612	742	0.999856	742	696.49	93.8

Reviewed By: Jody Watson

Date: 10/4/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  10/4/2012 1:47:48 PM
TestAmerica, Inc                Spectrum name: 12_TunaCan2nd_20122201.An1

Sample description
     12_TunaCan2nd_81427_104012


Spectrum Filename: C:\User\SPC\Det12\12_TunaCan2nd_20122201.An1

Acquisition information
       Start time:                 10/4/2012 9:10:35 AM
       Live time:               7200
       Real time:               7274
       Dead time:                  1.02 %
       Detector ID:                   12

Detector system
     Ge12 S/N10034336


Calibration
       Filename:                   12_Soil_TunaCan.Clb
     12_TunaCanCal_90099_100212


       Energy Calibration
            Created:               10/4/2012 8:58:25 AM
            Zero offset:           0.009 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.662E-08 keV/channel^2

       Efficiency Calibration
            Created:               10/4/2012 9:05:44 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.70 %
            Log(Eff):             -7.827468E-01 + (-3.001271E-01*Log(E) ) +
                                   ( -3.369562E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.96 %
            Log(Eff):             -2.288409E+01 + ( 8.352717E+00*Log(E) ) +
                                   ( -8.812368E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.54keV )
       Stop channel:            8000 (  1999.46keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2012-09-01_2017.PBC 9/1/2012 8:17:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0602

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.51	1416.	10.10	0.96	1.441E-02				
46.55	84361.	0.42	0.90	2.227E-02	46.54	4.250	1.345E+04	Pb210
49.64	1661.	13.12	1.17	2.460E-02				
59.51	91361.	0.43	0.89	3.120E-02	59.54	35.700	1.144E+03	AM241
74.70	192.	60.04	0.37	3.873E-02				
87.98	38152.	0.76	0.95	4.277E-02	88.03	3.610	1.551E+04	CD109
122.02	7369.	2.14	0.99	4.527E-02	122.06	85.600	3.444E+02	CO57
136.48	773.	12.58	1.02	4.420E-02				
165.75	856.	13.18	0.97	4.024E-02	165.85	79.900	5.800E+02	Ce139
238.46	426.	21.37	0.80	3.221E-02				
270.42	104.	53.05	0.50	2.960E-02				
277.12	37.	187.22	1.11	2.896E-02	279.17	81.500	HL>Cutoff	Hg203
294.88	216.	34.45	0.89	2.790E-02				
351.76	281.	28.30	0.91	2.471E-02				
385.62	79.	49.11	0.42	2.317E-02				
391.36	361.	28.92	0.71	2.293E-02	391.69	64.000	1.472E+03	SN113
469.80	98.	76.63	0.28	2.015E-02				
506.86	66.	63.64	1.31	1.908E-02				
510.13	151.	39.24	1.32	1.899E-02				
517.01	68.	58.29	0.42	1.881E-02				
661.58	40010.	0.58	1.44	1.571E-02	661.66	85.210	4.423E+02	CS137
897.91	201.	34.47	0.69	1.250E-02	898.02	93.700	1.665E+03	Y898
1072.91	53.	57.37	0.45	1.091E-02				
1090.45	58.	68.49	0.42	1.078E-02				
1173.14	35088.	0.63	1.82	1.018E-02	1173.24	99.900	6.884E+02	Co1173
1332.41	32170.	0.59	1.94	9.221E-03	1332.50	99.982	6.965E+02	Co1332
1835.69	150.	11.35	3.27	7.144E-03	1836.01	99.200	2.050E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.90	36.51	6010.	1416.	9.823E+04	10.10	0.958	-	s
198.34	49.64	14478.	1661.	6.754E+04	13.12	1.174	-	sM

298.51	74.70	5238.	192.	4.958E+03	60.04	0.372	-	s

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.45	136.48	2894.	773.	1.749E+04	12.58	1.017	-	
953.09	238.46	2483.	426.	1.323E+04	21.37	0.799	-	s
1080.86	270.42	1260.	104.	3.514E+03	53.05	0.496	-	s
1178.62	294.88	1774.	216.	7.741E+03	34.45	0.889	-	s
1406.03	351.76	1808.	281.	1.136E+04	28.30	0.914	-	s
1541.40	385.62	713.	79.	3.409E+03	49.11	0.419	-	s
1877.98	469.80	1744.	98.	4.856E+03	76.63	0.281	-	s
2026.19	506.79	849.	66.	3.459E+03	63.64	1.314	-	sc
2039.28	510.06	1671.	151.	7.930E+03	39.24	1.317	-	D
2066.76	517.01	651.	68.	3.633E+03	58.29	0.422	-	s
4290.46	1072.91	405.	53.	4.872E+03	57.37	0.452	-	s
4360.63	1090.45	570.	58.	5.382E+03	68.49	0.425	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.51	23444.	86492.	12.013	0.48	0.868
AM-241	237.80	59.51	16320.	91361.	12.689	0.43	0.894
CD-109	351.60	87.98	9992.	38152.	5.299	0.76	0.948
CO-57	487.64	122.02	4562.	7369.	1.024	2.14	0.992
Ce-139	662.45	165.75	3243.	856.	0.119	13.18	0.970
Hg-203	1107.62	277.12	2320.	37.	0.005	187.22	1.114s
SN-113	1565.46	391.64	1973.	296.	0.041	29.35	0.690s
CS-137	2644.92	661.58	2210.	40010.	5.557	0.58	1.443
Y-898	3590.25	897.91	1259.	201.	0.028	34.47	0.688s
Co-1173	4691.52	1173.14	1694.	35088.	4.873	0.63	1.818
Co-1332	5328.99	1332.41	521.	32170.	4.468	0.59	1.937
Y-1836	7344.02	1835.69	28.	150.	0.021	11.35	3.274s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
Pb-210	N	1.3814E+04						8.15E+03	
			46.54	1.381E+04	(P	1.144E+02	4.84E-01	4.25E+00	G
AM-241		1.1436E+03						1.58E+05	
			59.54	1.144E+03	(	7.486E+00	4.26E-01	3.57E+01	G
CD-109		1.5513E+04						4.63E+02	
			88.03	1.551E+04	(	1.905E+02	7.56E-01	3.61E+00	G
CO-57		3.4441E+02						2.72E+02	
			122.06	3.444E+02	(	1.484E+01	2.14E+00	8.56E+01	G
Ce-139		5.7998E+02						1.38E+02	
			165.85	5.800E+02	(	1.816E+02	1.32E+01	7.99E+01	G
Hg-203		2.1493E-01						4.66E+01	
			279.17	2.149E-01	?(	1.337E+00	1.87E+02	8.15E+01	G
SN-113		1.2045E+03						1.15E+02	
			391.69	1.204E+03	(	8.544E+02	2.94E+01	6.40E+01	G
CS-137		4.4230E+02						1.10E+04	
			661.66	4.423E+02	(	2.452E+00	5.77E-01	8.52E+01	G
Y-898		1.6647E+03						1.07E+02	
			898.02	1.665E+03	(	1.389E+03	3.45E+01	9.37E+01	G
Co-1173		6.8836E+02						1.93E+03	
			1173.24	6.884E+02	(	3.816E+00	6.32E-01	9.99E+01	G
Co-1332		6.9649E+02						1.93E+03	
			1332.50	6.965E+02	(	2.361E+00	5.94E-01	1.00E+02	G
Y-1836		2.0501E+03						1.07E+02	
			1836.01	2.050E+03	(	3.740E+02	1.14E+01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	277.12	2320.	37.	0.005	187.22	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2680E+04	1.3814E+04	4.851E-01%		1.14E+02
AM-241	1.1385E+03	1.1436E+03	4.256E-01%		7.49E+00
CD-109	3.4313E+03	1.5513E+04	7.557E-01%		1.91E+02
CO-57	2.6416E+01	3.4441E+02	2.139E+00%		1.48E+01
Ce-139	3.6407E+00	5.7998E+02	1.318E+01%		1.82E+02
Hg-203 #A	2.1493E-01	>12 Halflives	1.8722E+02%	1.3367E+00	
SN-113	2.7995E+00	1.2045E+03	2.935E+01%		8.54E+02
CS-137	4.1507E+02	4.4230E+02	5.769E-01%		2.45E+00
Y-898	2.3870E+00	1.6647E+03	3.447E+01%		1.39E+03
Co-1173	4.7903E+02	6.8836E+02	6.322E-01%		3.82E+00
Co-1332	4.8469E+02	6.9649E+02	5.939E-01%		2.36E+00
Y-1836	2.9396E+00	2.0501E+03	1.135E+01%		3.74E+02

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (516.8 to 1999.5 keV) 1.867E+04 Bq/Sample
Total Decayed Activity (516.8 to 1999.5 keV) 3.8141477E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
     14_TunaCan2nd_rad10_042412


Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
       Start time:                 4/24/2012 8:12:45 AM
       Live time:               3600
       Real time:               3635
       Dead time:                  0.95 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-04-01_0328.PBC 4/1/2012 3:28:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0804

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	-	s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	-	s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-	
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	-	s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	-	s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	-	s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	-	sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	-	s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	-	s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210   N   1.3845E+04                                        8.15E+03
                            46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241       1.1408E+03                                        1.58E+05
                            59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109       1.5678E+04                                        4.63E+02
                            88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57        3.2838E+02                                        2.72E+02
                           122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139       5.8018E+02                                        1.38E+02
                           165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203      -5.1862E-01                                        4.66E+01
                           279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113       1.0438E+03                                        1.15E+02
                           391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137       4.4755E+02                                        1.10E+04
                           661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898        2.2899E+03                                        1.07E+02
                           898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173      6.9001E+02                                        1.93E+03
                          1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332      6.9961E+02                                        1.93E+03
                          1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836       1.8162E+03                                        1.07E+02
                          1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%	1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%	1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%	2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%	1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%	1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00
SN-113	6.4765E+00	1.0438E+03	1.791E+01%	4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%	3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%	9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%	4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%	2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%	1.60E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 6
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

2nd Source Verification

Detector:	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

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	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det5\5_20160128006_EffVerif.An1

Acquisition information

Start time:	1/28/2016 10:21:33 AM
Live time:	7200
Real time:	7242
Dead time:	0.59 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_Soil_TunaCan.Clb

5_Soil_TunaCan_90099_032612

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	3/27/2012 5:20:37 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.43 %
Log(Eff):	-2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files

Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0281

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.59    62614.   0.54   0.73  1.791E-02
   59.55    82059.   0.45   0.73  2.534E-02    59.54 100.000  4.566E+02 AM241
   87.79     1068.   8.88   0.81  3.458E-02
  661.63    22901.   0.71   1.29  9.925E-03   661.66 100.000  3.973E+02 CS137
 1173.12     9966.   1.10   1.75  6.139E-03
 1332.41     8977.   1.09   1.90  5.515E-03  1332.50 100.000  7.707E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.88    46.59     15162.     62614. 3.496E+06    0.54   0.733  -
  350.82    87.79      2502.      1068. 3.087E+04    8.88   0.809  -      s
 4692.76  1173.12       266.      9966. 1.624E+06    1.10   1.754  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.79	59.55	13086.	82059.	11.397	0.45	0.731
CS-137	2647.26	661.63	612.	22901.	3.181	0.71	1.293
Co-1332	5329.50	1332.41	77.	8977.	1.247	1.09	1.898

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5663E+02				1.58E+05	
			59.54	4.566E+02	(	2.981E+00 4.47E-01 1.00E+02 G	
CS-137		3.9735E+02				1.10E+04	
			661.66	3.973E+02	(	2.047E+00 7.08E-01 1.00E+02 G	
Co-1332		7.7068E+02				1.93E+03	
			1332.50	7.707E+02	(	3.743E+00 1.09E+00 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.4986E+02	4.5663E+02	4.468E-01%	2.98E+00
CS-137	3.2049E+02	3.9735E+02	7.077E-01%	2.05E+00
Co-1332	2.2610E+02	7.7068E+02	1.091E+00%	3.74E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 9.965E+02 uCi/Source
Total Decayed Activity (37.6 to 2000.8 keV) 1.6246621E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20160123003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2016-01-23 19:25
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.38E+02	2.5%
Cs-137	661.66	400	3.86E+02	3.6%
Co-1332	1332.5	777	7.19E+02	7.5%

Comments:

Perform ____Kody Saulters 2/4/16_____ Reviev ___Jody Watson 2/4/16_____

C:\User\CRpt\7_20160123003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/23/2016 19:25:53
Analyzed: 2/4/2016 10:49

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.380E+02	0.38
CS-137	3.857E+02	0.59
Co-1332	7.189E+02	0.94
Total	1.543E+03	

TestAmerica Spectrum name: 7_20160123003_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20160123003_EffVerif.An1

Acquisition information
Start time: 1/23/2016 7:25:53 PM
Live time: 7200
Real time: 7361
Dead time: 2.18 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0434

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   36.52     1402.   9.33   1.11  1.474E-02
   46.60    75982.   0.45   0.84  2.485E-02
   59.55   114994.   0.38   0.89  3.702E-02    59.54 100.000  4.380E+02 AM241
   87.94     1428.   8.44   0.97  5.326E-02
  661.74    33440.   0.59   1.49  1.492E-02   661.66 100.000  3.857E+02 CS137
 1173.38    13650.   0.99   1.95  8.928E-03
 1332.63    12093.   0.94   1.99  7.950E-03  1332.50 100.000  7.189E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  145.62    36.52      4964.      1402. 9.512E+04    9.33   1.111  -      s
  185.78    46.56     20640.     82430. 3.318E+06    0.48   0.912  -
  351.31    87.94      3932.      1428. 2.682E+04    8.44   0.972  -      s
 4693.26  1173.38       567.     13650. 1.529E+06    0.99   1.950  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.75	59.55	18759.	114994.	15.971	0.38	0.895
CS-137	2646.69	661.74	882.	33440.	4.644	0.59	1.494
Co-1332	5330.24	1332.63	117.	12093.	1.680	0.94	1.990

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.3796E+02				1.58E+05	
			59.54	4.380E+02	(	2.441E+00 3.82E-01 1.00E+02 G	
CS-137		3.8573E+02				1.10E+04	
			661.66	3.857E+02	(	1.628E+00 5.85E-01 1.00E+02 G	
Co-1332		7.1885E+02				1.93E+03	
			1332.50	7.189E+02	(	3.157E+00 9.42E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.3147E+02	4.3796E+02	3.822E-01%	2.44E+00
CS-137	3.1121E+02	3.8573E+02	5.852E-01%	1.63E+00
Co-1332	2.1125E+02	7.1885E+02	9.418E-01%	3.16E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 9.539E+02 uCi/Source
Total Decayed Activity (37.6 to 2000.1 keV) 1.5425436E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 8**
SpectrumID: 8_20160128004_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 8_Soil_TunaCan_90099_032712
Detector: Ge 8 SN/174

Verification Date: 2016-01-28 18:34
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.79E+02	-6.7%
Cs-137	661.66	400	3.90E+02	2.5%
Co-1332	1332.5	777	7.56E+02	2.7%

Comments:

Perform Aaron Schroder 1/28/16

Reviev __Jody Watson_____1/29/16_____

C:\User\CRpt\8_20160128004_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge 8 SN/174
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 18:34:05
Analyzed: 2/4/2016 10:51

Analyst: Jody Watson

Efficiency: 8_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.789E+02	0.41
CS-137	3.899E+02	0.64
Co-1332	7.564E+02	0.99
Total	1.625E+03	

TestAmerica Spectrum name: 8_20160128004_EffVerif.An1

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det8\8_20160128004_EffVerif.An1

Acquisition information
Start time: 1/28/2016 6:34:05 PM
Live time: 7200
Real time: 7434
Dead time: 3.15 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) +
(-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) +
(-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0632

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.57    74004.   0.44   1.01  2.005E-02
   59.58   102880.   0.35   1.02  2.881E-02    59.54 100.000  5.034E+02 AM241
   88.09     1218.   9.96   0.76  3.993E-02
  661.54    27378.   0.64   1.34  1.209E-02   661.66 100.000  3.899E+02 CS137
 1173.07    11810.   1.00   1.56  7.454E-03
 1332.31    10667.   0.99   1.75  6.678E-03  1332.50 100.000  7.564E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.94    46.53     19029.     71370. 3.560E+06    0.54   0.847  -
  352.16    88.09      3683.      1218. 3.051E+04    9.96   0.764  -      s
 4692.32  1173.07       306.     11810. 1.584E+06    1.00   1.561  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.97	59.54	15110.	97876.	13.594	0.41	0.867D
CS-137	2646.10	661.54	638.	27378.	3.802	0.64	1.335
Co-1332	5329.28	1332.31	68.	10667.	1.482	0.99	1.753

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.7889E+02				1.58E+05	
			59.54	4.789E+02	(	2.816E+00 4.13E-01 1.00E+02 G	
CS-137		3.8993E+02				1.10E+04	
			661.66	3.899E+02	(	1.714E+00 6.40E-01 1.00E+02 G	
Co-1332		7.5635E+02				1.93E+03	
			1332.50	7.564E+02	(	2.913E+00 9.90E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	4.7179E+02	4.7889E+02	4.129E-01%	2.82E+00
CS-137	3.1450E+02	3.8993E+02	6.397E-01%	1.71E+00
Co-1332	2.2187E+02	7.5635E+02	9.900E-01%	2.91E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.008E+03 uCi/Source
Total Decayed Activity (37.5 to 2000.0 keV) 1.6251797E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20160128006_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2016-01-28 13:28
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.53E+02	-0.9%
Cs-137	661.66	400	3.91E+02	2.2%
Co-1332	1332.5	777	7.46E+02	4.0%

Comments:

Perforn _____Jody Watson 1/29/16_____ Revie _____Aaron Schroder 1/29/2016_____

C:\User\CRpt\12_20160128006_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge12 S/N10034336
Source Date: 10/1/2006 11:00
Acquired: 1/28/2016 13:28:46
Analyzed: 1/29/2016 13:56

Analyst: Jody Watson

Efficiency: 12_TunaCanCal_90099_100212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.532E+02	0.41
CS-137	3.911E+02	0.59
Co-1332	7.456E+02	0.90
Total	1.590E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det12\12_20160128006_EffVerif.An1

Acquisition information
Start time: 1/28/2016 1:28:46 PM
Live time: 7200
Real time: 7326
Dead time: 1.72 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) +
(-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) +
(-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0294
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.56	1334.	9.60	1.00	1.444E-02				
46.60	72273.	0.45	0.89	2.231E-02				
59.55	100350.	0.41	0.89	3.122E-02	59.54	100.000	4.532E+02	AM241
87.89	1239.	8.96	1.09	4.274E-02				
238.48	1003.	9.18	1.15	3.221E-02				
661.61	35682.	0.59	1.40	1.571E-02	661.66	100.000	3.911E+02	CS137
1173.14	15564.	0.95	1.81	1.018E-02				
1332.40	14520.	0.90	1.94	9.221E-03	1332.50	100.000	7.456E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.90	36.56	4764.	1334.	9.239E+04	9.60	0.995	-	s
185.89	46.56	20938.	74360.	3.333E+06	0.53	0.874	-	
351.04	87.89	3330.	1239.	2.899E+04	8.96	1.086	-	s
953.01	238.48	2037.	1003.	3.113E+04	9.18	1.146	-	
4691.52	1173.14	752.	15564.	1.528E+06	0.95	1.813	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.79	59.55	16419.	100350.	13.938	0.41	0.888
CS-137	2644.93	661.61	1381.	35682.	4.956	0.59	1.395
Co-1332	5329.01	1332.40	280.	14520.	2.017	0.90	1.943

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5317E+02				1.58E+05	
			59.54	4.532E+02	(	2.709E+00 4.06E-01 1.00E+02 G	
CS-137		3.9106E+02				1.10E+04	
			661.66	3.911E+02	(	1.928E+00 5.91E-01 1.00E+02 G	
Co-1332		7.4558E+02				1.93E+03	
			1332.50	7.456E+02	(	4.143E+00 8.99E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4645E+02	4.5317E+02	4.060E-01%	2.71E+00
CS-137	3.1542E+02	3.9106E+02	5.907E-01%	1.93E+00
Co-1332	2.1873E+02	7.4558E+02	8.990E-01%	4.14E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 9.806E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.4 keV) 1.5898042E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #14**
SpectrumID: 14_20160125003_EffVerif
Analysis Description: ACVTop-776670;TunaCan2006
Calibration: 14_TunaCan_90099_042312
Detector: Ge14 SN/11080670

Verification Date: 2016-01-25 12:29
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.55E+02	-1.4%
Cs-137	661.66	400	3.95E+02	1.3%
Co-1332	1332.5	777	7.57E+02	2.6%

Comments:

Perforn ___Kody Saulters 2/4/16_____ Revie __Jody Watson 2/4/16_____

C:\User\CRpt\14_20160125003_EffVerif.xls

Sample Description: ACVTop-776670;TunaCan2006
Detector: Ge14 SN/11080670
Source Date: 10/1/2006 11:00
Acquired: 1/25/2016 12:29:45
Analyzed: 2/4/2016 09:35

Analyst: Jody Watson

Efficiency: 14_TunaCan_90099_042312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.553E+02	0.40
CS-137	3.948E+02	0.62
Co-1332	7.566E+02	0.94
Total	1.607E+03	

Sample description
ACVTop-776670;TunaCan2006

Spectrum Filename: C:\User\SPC\Det14\14_20160125003_EffVerif.An1

Acquisition information
Start time: 1/25/2016 12:29:45 PM
Live time: 7200
Real time: 7259
Dead time: 0.81 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.
       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                           Status          Comments
       Decay correct to date:          YES       10/1/2006 11:00:00 AM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.1953

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.67    73404.   0.51   0.89  2.181E-02
   59.66    98988.   0.40   0.90  3.073E-02    59.54 100.000  4.553E+02 AM241
   87.86     1381.   7.63   1.19  4.192E-02
  238.23      859.   9.01   1.08  2.935E-02
  661.34    30113.   0.62   1.47  1.314E-02   661.66 100.000  3.948E+02 CS137
 1172.91    13023.   0.94   1.74  8.246E-03
 1332.21    11875.   0.94   1.86  7.424E-03  1332.50 100.000  7.566E+02 Co1332


************ U N I D E N T I F I E D    P E A K   S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  186.09    46.67     18352.     73404. 3.366E+06    0.51   0.888  -      s
  350.79    87.86      3068.      1381. 3.294E+04    7.63   1.186  -      s
  952.14   238.23      1621.       859. 2.928E+04    9.01   1.079  -
 4691.29  1172.91       312.     13023. 1.579E+06    0.94   1.737  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

-------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.04	59.66	15017.	98988.	13.748	0.40	0.897s
CS-137	2644.50	661.34	859.	30113.	4.182	0.62	1.470
Co-1332	5328.79	1332.21	65.	11875.	1.649	0.94	1.861

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.5525E+02				1.58E+05	
			59.54	4.553E+02	(	2.639E+00 4.00E-01 1.00E+02 G	
CS-137		3.9479E+02				1.10E+04	
			661.66	3.948E+02	(	1.826E+00 6.21E-01 1.00E+02 G	
Co-1332		7.5658E+02				1.93E+03	
			1332.50	7.566E+02	(	2.566E+00 9.36E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241 #	4.4851E+02	4.5525E+02	3.997E-01%	2.64E+00
CS-137	3.1849E+02	3.9479E+02	6.211E-01%	1.83E+00
Co-1332	2.2220E+02	7.5658E+02	9.363E-01%	2.57E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.892E+02 uCi/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.6066273E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #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 Counting 1 Sigma	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

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 3_20160709004_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 5:59:54 PM
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	2.34	2.18	2.23	2.41	2.44	2.49	PASS

Analyst: Aaron Schroder Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det3\3_20160709004_BGLong.An1

Acquisition information
Start time: 7/9/2016 5:59:54 PM
Live time: 43200
Real time: 43267
Dead time: 0.15 %
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

(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. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1910

***** 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
46.38	479.	10.48	0.75	6.660E-02	46.54	4.250	3.910E+00	PB210
63.27	429.	13.93	0.93	9.450E-02	63.29	3.810	2.759E+00	TH234
72.78	270.	15.78	0.85	1.103E-01				
74.90	671.	6.93	0.85	1.138E-01				
84.64	352.	11.44	0.86	1.299E-01				
87.41	149.	23.22	0.86	1.345E-01	86.54	30.700	8.454E-02	EU155
92.55	716.	7.38	1.15	1.357E-01	92.59	5.584	2.186E+00	TH234
					93.35	5.561	2.194E+00	AC228
185.82	443.	12.25	1.33	1.149E-01	185.72	54.000	1.654E-01	U235
					185.99	3.280	2.724E+00	Ra226
198.40	113.	27.70	1.07	1.116E-01				
238.78	276.	16.02	0.85	1.010E-01	238.63	43.300	1.460E-01	PB212
351.90	253.	17.34	0.82	7.143E-02	351.93	37.600	2.184E-01	PB214
511.23	1640.	4.45	2.38	5.106E-02	511.86	20.000	3.723E+00	RH106
569.77	93.	27.84	1.21	4.619E-02	569.70	97.740	4.769E-02	BI207
					569.32	15.380	3.029E-01	CS134
					569.47	8.200	5.682E-01	PA234
583.29	127.	26.74	1.48	4.508E-02	583.02	84.500	7.718E-02	TL208
609.64	273.	16.41	1.26	4.286E-02	609.31	46.090	3.197E-01	BI214
					610.30	5.750	2.568E+00	RU103
802.76	113.	25.23	0.96	3.217E-02	801.95	8.690	9.374E-01	CS134
911.97	123.	21.82	2.12	2.760E-02	911.16	29.000	3.567E-01	AC228
969.92	108.	23.35	1.96	2.638E-02	968.97	17.460	5.445E-01	AC228
1461.25	206.	9.85	2.00	1.865E-02	1460.83	10.670	2.397E+00	K40
1764.82	114.	14.92	1.29	1.571E-02	1764.49	15.400	1.094E+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
290.86	72.77	772.	270.	2.447E+03	15.78	0.846	- D
299.35	74.89	746.	671.	5.895E+03	6.93	0.848	- D
338.35	84.61	636.	352.	2.711E+03	11.44	0.858	- sD
349.42	87.37	526.	149.	1.110E+03	23.22	0.861	- sD
793.71	198.40	325.	113.	1.013E+03	27.70	1.072	- M
2045.62	511.23	472.	1640.	3.213E+04	4.45	2.383	- s
3211.90	802.76	146.	113.	3.523E+03	25.23	0.960	- 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	185.41	46.44	720.	488.	0.011	11.67	0.747s
TH-234	252.78	63.27	822.	429.	0.010	13.93	0.934
TH-234	370.02	92.55	592.	716.	0.017	7.38	1.154s
Ra-226	743.36	185.82	602.	443.	0.010	12.25	1.333s
PB-212	955.34	238.78	480.	276.	0.006	16.02	0.847s
PB-214	1408.04	351.90	387.	253.	0.006	17.34	0.818s
BI-207	2279.86	569.77	165.	93.	0.002	27.84	1.207
TL-208	2333.95	583.29	220.	127.	0.003	26.74	1.482
BI-214	2439.37	609.64	325.	273.	0.006	16.41	1.262s
AC-228	3648.70	911.97	113.	123.	0.003	21.82	2.125s
AC-228	3880.48	969.92	100.	108.	0.003	23.35	1.965s
K-40	5844.86	1461.25	44.	206.	0.005	9.85	2.001
BI-214	7058.06	1764.82	25.	114.	0.003	14.92	1.292s

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	2.3967E+00				4.66E+11	
			1460.83	2.397E+00	(	3.912E-01 9.85E+00 1.07E+01	G
TL-208	N	7.7183E-02				6.98E+02	
			583.02	7.718E-02	?(	4.365E-02 2.67E+01 8.45E+01	G
			277.28	0.000E+00	%	2.333E-01 9.24E+01 6.31E+00	G
			860.56	0.000E+00	%	2.202E-01 5.83E+01 1.24E+01	G
PB-210	N	3.9836E+00				8.14E+03	
			46.54	3.984E+00	*(	1.042E+00 1.17E+01 4.25E+00	G
PB-212	N	1.4598E-01				6.98E+02	
			238.63	1.460E-01	(	5.543E-02 1.60E+01 4.33E+01	G
			300.03	0.000E+00	%	4.884E-01 1.00E+03 3.28E+00	GA
PB-214	N	2.1836E-01				5.84E+05	
			351.93	2.184E-01	@(	8.132E-02 1.73E+01 3.76E+01	G
			295.09	0.000E+00	%	8.175E-02 3.30E+01 1.93E+01	G
			242.00	0.000E+00		3.034E-01 0.00E+00 7.43E+00	GA
BI-207	C	4.7689E-02				1.18E+04	
			569.70	4.769E-02	(	3.208E-02 2.78E+01 9.77E+01	G
			1063.66	0.000E+00	%	4.771E-02 7.91E+01 7.45E+01	G
BI-214	N	3.1972E-01				5.84E+05	
			609.31	3.197E-01	*(	1.016E-01 1.64E+01 4.61E+01	G
			1120.29	0.000E+00	%	2.655E-01 6.54E+01 1.51E+01	G
			1764.49	1.094E+00	+	2.474E-01 1.49E+01 1.54E+01	G
AC-228	N	4.2724E-01				2.10E+03	
			911.16	3.567E-01	(	1.509E-01 2.18E+01 2.90E+01	G
			968.97	5.445E-01	&(	2.474E-01 2.34E+01 1.75E+01	G
			338.32	0.000E+00	%	1.508E-01 1.15E+02 1.20E+01	G
			93.35	0.000E+00	?	4.656E-01 0.00E+00 5.56E+00	XA
TH-234	N	2.4183E+00				1.63E+12	
			63.29	2.759E+00	(	8.759E-01 1.39E+01 3.81E+00	G
			92.59	2.186E+00	*(	3.548E-01 7.38E+00 5.58E+00	G
Ra-226		2.7242E+00				5.84E+05	
			185.99	2.724E+00	*(	7.190E-01 1.23E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

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		Activity DPS	Time of Count Uncertainty Counting	1 Sigma	MDA
BE-7	<	1.2370E-01			
NA-22	<	4.4140E-02			
K-40		2.3967E+00	9.8453E+00%		3.912E-01
Sc-46	<	1.4285E-02			
CR-51	<	1.5062E-01			
MN-54	<	2.7766E-02			
FE-59	<	6.3268E-02			
Co-56	<	3.1237E-02			
CO-57	<	1.9432E-02			
CO-58	<	1.6041E-02			

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CO-60	<	3.4318E-02		
ZN-65	<	6.7449E-02		
NB-94	<	3.2012E-02		
ZR-95	<	5.1760E-02		
NB-95	<	4.1117E-02		
RU-103	<	2.3130E-02		
RH-106	<	2.5637E-01		
AG-108M	<	2.1504E-02		
AG-110M	<	4.5685E-02		
SN-113	<	2.8881E-02		
SB-124	<	3.0233E-02		
SB-125	<	6.0431E-02		
I-131	<	1.9339E-02		
BA-133	<	3.1899E-02		
CS-134	<	3.4978E-02		
CS-137	<	3.1819E-02		
CE-139	<	2.5584E-02		
Ba-140	<	8.7595E-02		
La-140	<	4.0205E-02		
CE-141	<	3.4373E-02		
CE-144	<	1.3285E-01		
PM-144	<	3.1250E-02		
EU-152	<	4.5080E-02		
EU-154	<	3.6596E-01		
EU-155	<	5.3244E-02		
HF-181	<	3.2442E-02		
Ta-182	<	1.4126E-01		
Hg-203	<	1.7435E-02		
TL-208	#	7.7183E-02	2.6745E+01%	4.365E-02
pm-146	<	7.6590E-02		
y-88	<	3.9449E-02		
PB-210	#	3.9836E+00	1.1669E+01%	1.042E+00
PB-212	#	1.4598E-01	1.6024E+01%	5.543E-02
PB-214	#	2.1836E-01	1.7336E+01%	8.132E-02
BI-207		4.7689E-02	2.7843E+01%	3.208E-02
BI-212	<	3.4799E-01		
BI-214	#	3.1972E-01	1.6407E+01%	1.016E-01
BI-210M	<	2.8015E-02		
RA-224	<	5.7204E-01		
AC-228		4.2724E-01	1.5979E+01%	1.509E-01
TH-227	<	1.1264E-01		
TH-229	<	3.0603E-01		
TH-234		2.4183E+00	7.3813E+00%	8.759E-01
PA-231	<	3.9748E-01		
PA-233	<	4.4257E-02		
PA-234	<	1.0423E-01		
PA-234M	<	5.2049E+00		
Ra-226	#	2.7242E+00	1.2252E+01%	7.190E-01
U-235	<	1.1006E-01		

AM-241 < 7.1454E-02
Np-237 < 1.8030E-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) 1.276E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 5_20160709002_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 5:58:11 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	1.41	1.55	1.60	PASS

Analyst: Aaron Schroder Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20160709002_BGLong.An1

Acquisition information
Start time: 7/9/2016 5:58:11 PM
Live time: 43200
Real time: 43365
Dead time: 0.38 %
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

(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. 13 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1104

***** 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	389.	9.06	0.82	5.682E-02	46.54	4.250	3.733E+00	PB210
59.44	154.	23.18	0.81	7.407E-02	59.54	35.900	1.338E-01	AM241
63.28	374.	10.23	0.79	7.922E-02	63.29	3.810	2.872E+00	TH234
74.89	115.	24.92	0.81	9.469E-02				
77.28	124.	21.97	0.82	9.789E-02				
92.54	527.	8.35	1.05	1.129E-01	92.59	5.584	1.935E+00	TH234
					93.35	5.561	1.941E+00	AC228
185.89	267.	10.95	1.03	9.603E-02	185.72	54.000	1.191E-01	U235
					185.99	3.280	1.961E+00	Ra226
295.22	104.	23.54	0.82	6.950E-02	295.09	19.300	1.791E-01	PB214
351.67	200.	15.51	1.32	5.580E-02	351.93	37.600	2.213E-01	PB214
511.09	1010.	6.10	2.45	3.835E-02	511.86	20.000	3.052E+00	RH106
609.20	152.	21.54	1.14	3.200E-02	609.31	46.090	2.386E-01	BI214
					610.30	5.750	1.916E+00	RU103
662.36	125.	18.15	1.06	2.860E-02	661.66	85.210	1.187E-01	CS137
1120.29	72.	28.87	0.51	1.646E-02	1120.29	15.100	6.704E-01	BI214
					1120.55	99.987	1.013E-01	Sc46
1460.97	88.	16.39	1.90	1.300E-02	1460.83	10.670	1.469E+00	K40
1764.21	46.	26.11	5.54	1.105E-02	1764.49	15.400	6.188E-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
299.19	74.80	354.	115.	1.216E+03	24.92	0.813	- sD

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
308.75	77.19	306.	124.	1.262E+03	21.97	0.815	- sD
2044.98	511.09	322.	1010.	2.633E+04	6.10	2.452	-

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	185.89	46.59	284.	389.	0.009	9.06	0.820
AM-241	237.34	59.44	336.	154.	0.004	23.18	0.811s
TH-234	252.71	63.28	312.	374.	0.009	10.23	0.794s
TH-234	369.85	92.54	384.	527.	0.012	8.35	1.046s
Ra-226	743.51	185.89	207.	267.	0.006	10.95	1.033
PB-214	1181.13	295.22	174.	104.	0.002	23.54	0.822
PB-214	1407.02	351.67	184.	200.	0.005	15.51	1.317s
BI-214	2437.50	609.20	184.	152.	0.004	21.54	1.137s
CS-137	2650.15	662.36	90.	125.	0.003	18.15	1.060
BI-214	4481.54	1120.29	60.	72.	0.002	28.87	0.506s
K-40	5843.30	1460.97	24.	88.	0.002	16.39	1.897
BI-214	7054.95	1764.21	16.	46.	0.001	26.11	5.540s

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	1.4688E+00				4.66E+11	
			1460.83	1.469E+00	(	4.263E-01 1.64E+01 1.07E+01 G	
CS-137	I	1.1872E-01				1.10E+04	
			661.66	1.187E-01	&(	4.456E-02 1.82E+01 8.52E+01 G	
PB-210	N	3.7332E+00				8.14E+03	
			46.54	3.733E+00	(	7.797E-01 9.06E+00 4.25E+00 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	2.0698E-01					5.84E+05	
			351.93	2.213E-01	*(	7.275E-02	1.55E+01	3.76E+01 G
			295.09	1.791E-01	(	1.108E-01	2.35E+01	1.93E+01 G
			242.00	0.000E+00	%	1.915E-01	9.52E+01	7.43E+00 GA
BI-214	N	2.3861E-01					5.84E+05	
			609.31	2.386E-01	@(	1.035E-01	2.15E+01	4.61E+01 G
			1120.29	6.704E-01	+	3.613E-01	2.89E+01	1.51E+01 G
			1764.49	6.188E-01	+	2.864E-01	2.61E+01	1.54E+01 G
TH-234	N	2.8717E+00					1.63E+12	
			63.29	2.872E+00	*(	6.525E-01	1.02E+01	3.81E+00 G
			92.59	1.935E+00	-	3.452E-01	8.35E+00	5.58E+00 G
Ra-226		1.9614E+00					5.84E+05	
			185.99	1.961E+00	(	5.130E-01	1.10E+01	3.28E+00 G
AM-241	T	1.3383E-01					1.58E+05	
			59.54	1.338E-01	*(	7.659E-02	2.32E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.3676E-01		
NA-22	<	2.4128E-02		
K-40		1.4688E+00	1.6389E+01%	4.263E-01
Sc-46	<	4.9825E-02		
CR-51	<	1.6048E-01		
MN-54	<	2.8526E-02		
FE-59	<	5.4692E-02		
Co-56	<	3.2515E-02		
CO-57	<	1.0937E-02		
CO-58	<	2.9115E-02		
CO-60	<	4.2786E-02		
ZN-65	<	1.1980E-01		
NB-94	<	3.2682E-02		
ZR-95	<	5.2342E-02		
NB-95	<	3.8417E-02		
RU-103	<	2.2589E-02		
RH-106	<	2.7272E-01		
AG-108M	<	2.1208E-02		
AG-110M	<	8.1898E-02		
SN-113	<	2.8203E-02		
SB-124	<	3.6502E-02		
SB-125	<	6.3264E-02		
I-131	<	2.2298E-02		
BA-133	<	4.1125E-02		
CS-134	<	3.2597E-02		
CS-137		1.1872E-01	1.8155E+01%	4.456E-02
CE-139	<	2.2437E-02		
Ba-140	<	8.7346E-02		
La-140	<	4.3283E-02		
CE-141	<	3.5837E-02		
CE-144	<	1.6512E-01		
PM-144	<	3.2987E-02		
EU-152	<	7.1907E-02		
EU-154	<	2.3309E-01		
EU-155	<	5.0521E-02		

HF-181	<	2.0479E-02		
Ta-182	<	2.2686E-01		
Hg-203	<	2.0146E-02		
TL-208	<	3.0257E-02		
pm-146	<	8.0361E-02		
y-88	<	3.6587E-02		
PB-210		3.7332E+00	9.0560E+00%	7.797E-01
PB-212	<	3.1920E-02		
PB-214		2.0698E-01	1.4094E+01%	7.275E-02
BI-207	<	4.3497E-02		
BI-212	<	3.7812E-01		
BI-214	#	2.3861E-01	2.1540E+01%	1.035E-01
BI-210M	<	2.8222E-02		
RA-224	<	5.3272E-01		
AC-228	<	1.1590E-01		
TH-227	<	1.7073E-01		
TH-229	<	3.0616E-01		
TH-234	#	2.8717E+00	1.0232E+01%	6.525E-01
PA-231	<	5.2395E-01		
PA-233	<	4.8273E-02		
PA-234	<	7.6306E-02		
PA-234M	<	3.9131E+00		
Ra-226		1.9614E+00	1.0951E+01%	5.130E-01
U-235	<	9.8216E-02		
AM-241	#	1.3383E-01	2.3177E+01%	7.659E-02
Np-237	<	1.3313E-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) 1.073E+01 DPS

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Test America
St. Louis
Background Check

Spectrum: 7_20160709002_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 5:58:58 PM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Aaron Schroder Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20160709002_BGLong.An1

Acquisition information
Start time: 7/9/2016 5:58:58 PM
Live time: 43200
Real time: 43957
Dead time: 1.72 %
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. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0864

***** 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	414.	10.25	1.08	8.101E-02	46.54	4.250	2.782E+00	PB210
63.39	487.	9.34	0.88	1.231E-01	63.29	3.810	2.408E+00	TH234
92.66	620.	7.31	1.12	1.861E-01	92.59	5.584	1.381E+00	TH234
					93.35	5.561	1.385E+00	AC228
185.53	293.	13.08	1.00	1.634E-01	185.72	54.000	7.691E-02	U235
					185.99	3.280	1.267E+00	Ra226
238.69	196.	18.55	1.10	1.417E-01	238.63	43.300	7.407E-02	PB212
294.98	111.	27.43	2.76	1.186E-01	295.09	19.300	1.122E-01	PB214
351.83	96.	28.46	0.65	9.546E-02	351.93	37.600	6.215E-02	PB214
511.07	989.	6.78	2.38	6.487E-02	511.86	20.000	1.767E+00	RH106
1460.76	61.	21.24	1.84	1.997E-02	1460.83	10.670	6.646E-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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2043.99	511.07	351.	989.	1.525E+04	6.78	2.379	-	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	185.53	46.50	363.	414.	0.010	10.25	1.078s
TH-234	253.12	63.39	396.	487.	0.011	9.34	0.883s
TH-234	370.20	92.66	374.	620.	0.014	7.31	1.119s
Ra-226	741.72	185.53	294.	293.	0.007	13.08	0.998s
PB-212	954.40	238.69	295.	196.	0.005	18.55	1.098s
PB-214	1179.55	294.98	204.	111.	0.003	27.43	2.762s
PB-214	1406.99	351.83	179.	96.	0.002	28.46	0.653s
K-40	5842.73	1460.76	21.	61.	0.001	21.24	1.842

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	Peak MDA Value DPS	COMMENTS
K-40	N	6.6461E-01					4.66E+11
			1460.83	6.646E-01	?(	2.606E-01	2.12E+01 1.07E+01 G
PB-210	N	2.7819E+00					8.14E+03
			46.54	2.782E+00	*(	6.140E-01	1.03E+01 4.25E+00 G
PB-212	N	7.4073E-02					6.98E+02
			238.63	7.407E-02	*(	3.120E-02	1.85E+01 4.33E+01 G
			300.03	0.000E+00	%	2.660E-01	8.80E+01 3.28E+00 GA
PB-214	N	7.9136E-02					5.84E+05
			351.93	6.215E-02	(	4.194E-02	2.85E+01 3.76E+01 G
			295.09	1.122E-01	*(	7.003E-02	2.74E+01 1.93E+01 G
			242.00	0.000E+00	?	1.404E-01	0.00E+00 7.43E+00 GA
TH-234	N	2.4085E+00					1.63E+12
			63.29	2.408E+00	*(	4.720E-01	9.34E+00 3.81E+00 G
			92.59	1.381E+00	-	2.068E-01	7.31E+00 5.58E+00 G
Ra-226		1.2670E+00					5.84E+05
			185.99	1.267E+00	*(	3.572E-01	1.31E+01 3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went

```
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  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    <    1.6047E-01
NA-22   <    3.1555E-02
K-40   #     6.6461E-01   2.1241E+01%               2.606E-01
Sc-46   <    2.0866E-02
CR-51   <    8.7029E-02
MN-54   <    2.0301E-02
FE-59   <    4.3559E-02
Co-56   <    2.0763E-02
CO-57   <    8.3165E-03
CO-58   <    2.4327E-02
CO-60   <    2.7031E-02
ZN-65   <    5.2883E-02
NB-94   <    1.6936E-02
```

ZR-95	<	3.1670E-02		
NB-95	<	2.7458E-02		
RU-103	<	1.5059E-02		
RH-106	<	1.8400E-01		
AG-108M	<	1.1924E-02		
AG-110M	<	2.5931E-02		
SN-113	<	1.6662E-02		
SB-124	<	1.5448E-02		
SB-125	<	3.5797E-02		
I-131	<	1.2488E-02		
BA-133	<	2.6024E-02		
CS-134	<	1.8576E-02		
CS-137	<	1.8852E-02		
CE-139	<	8.6236E-03		
Ba-140	<	5.4914E-02		
La-140	<	3.4319E-02		
CE-141	<	1.6035E-02		
CE-144	<	6.3422E-02		
PM-144	<	1.9340E-02		
EU-152	<	3.6340E-02		
EU-154	<	1.6467E-01		
EU-155	<	2.9252E-02		
HF-181	<	7.9311E-03		
Ta-182	<	1.1886E-01		
Hg-203	<	7.3087E-03		
TL-208	<	2.1832E-02		
pm-146	<	4.7400E-02		
y-88	<	2.5513E-02		
PB-210	#	2.7819E+00	1.0253E+01%	6.140E-01
PB-212	#	7.4073E-02	1.8546E+01%	3.120E-02
PB-214		7.9136E-02	1.9762E+01%	4.194E-02
BI-207	<	2.6280E-02		
BI-212	<	2.8809E-01		
BI-214	<	4.0953E-02		
BI-210M	<	1.5268E-02		
RA-224	<	2.4955E-01		
AC-228	<	8.9822E-02		
TH-227	<	7.8294E-02		
TH-229	<	1.7009E-01		
TH-234	#	2.4085E+00	9.3446E+00%	4.720E-01
PA-231	<	2.8418E-01		
PA-233	<	2.4264E-02		
PA-234	<	4.3918E-02		
PA-234M	<	3.0174E+00		
Ra-226	#	1.2670E+00	1.3081E+01%	3.572E-01
U-235	<	6.4124E-02		
AM-241	<	5.4748E-02		
Np-237	<	7.8646E-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)     7.275E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 8_20160709002_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 6:00:08 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	1.59	1.68	1.74	PASS

Analyst: Aaron Schroder Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20160709002_BGLong.An1

Acquisition information
Start time: 7/9/2016 6:00:08 PM
Live time: 72000
Real time: 74127
Dead time: 2.87 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 1/6/2011 8:07:20 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1316

***** 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
59.50	444.	9.34	1.02	8.677E-02	59.54	35.900	1.974E-01	AM241
63.31	1140.	4.34	1.03	9.238E-02	63.29	3.810	4.496E+00	TH234
76.96	162.	26.05	0.81	1.126E-01				
84.23	215.	28.15	1.11	1.233E-01				
92.62	2014.	3.79	1.02	1.295E-01	92.59	5.584	3.868E+00	TH234
					93.35	5.561	3.881E+00	AC228
140.03	112.	29.81	1.08	1.263E-01				
143.80	244.	15.05	1.09	1.248E-01	143.79	10.960	2.477E-01	U235
185.76	1060.	6.27	0.99	1.108E-01	185.72	54.000	2.462E-01	U235
					185.99	3.280	4.056E+00	Ra226
238.45	366.	14.63	1.21	9.644E-02	238.63	43.300	1.219E-01	PB212
351.72	127.	23.79	1.53	6.558E-02	351.93	37.600	7.154E-02	PB214
569.68	88.	27.87	1.24	4.064E-02	569.70	97.740	3.077E-02	BI207
					569.32	15.380	1.954E-01	CS134
					569.47	8.200	3.666E-01	PA234
583.38	142.	26.31	1.13	3.958E-02	583.02	84.500	5.910E-02	TL208
608.95	138.	26.16	1.08	3.750E-02	609.31	46.090	1.109E-01	BI214
					610.30	5.750	8.908E-01	RU103
661.82	282.	13.58	1.35	3.333E-02	661.66	85.210	1.378E-01	CS137
1000.87	152.	24.47	0.97	2.158E-02	1001.00	0.837	1.172E+01	PA234M
1063.06	123.	20.84	0.86	2.040E-02	1063.66	74.500	1.126E-01	BI207
1173.32	140.	14.76	1.88	1.834E-02	1173.24	99.900	1.064E-01	CO60
1332.46	118.	19.74	1.09	1.637E-02	1332.50	99.980	9.969E-02	CO60
1461.49	88.	22.50	1.95	1.543E-02	1460.83	10.670	7.397E-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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.63	76.96	570.	162.	1.437E+03	26.05	0.806	-
336.73	84.23	898.	215.	1.742E+03	28.15	1.109	-
559.61	139.92	498.	116.	9.201E+02	28.70	1.085	- 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: 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	684.	440.	0.006	9.66	1.022D
TH-234	252.96	63.29	653.	1140.	0.016	4.34	1.025D
TH-234	370.31	92.62	954.	2014.	0.028	3.79	1.022
U-235	574.97	143.79	551.	244.	0.003	15.03	1.087D
U-235	742.71	185.72	777.	1068.	0.015	4.30	0.993D
PB-212	953.63	238.45	602.	366.	0.005	14.63	1.213
PB-214	1406.73	351.72	262.	127.	0.002	23.79	1.525s
BI-207	2278.64	569.68	154.	88.	0.001	27.87	1.235
TL-208	2333.44	583.38	261.	142.	0.002	26.31	1.130
BI-214	2435.72	608.95	259.	138.	0.002	26.16	1.082s
CS-137	2647.23	661.82	229.	282.	0.004	13.58	1.349
PA-234M	4003.48	1000.87	173.	152.	0.002	24.47	0.972s
BI-207	4252.26	1063.06	92.	123.	0.002	20.84	0.859s
CO-60	4693.32	1173.32	67.	140.	0.002	14.76	1.877
CO-60	5329.89	1332.46	76.	118.	0.002	19.74	1.094s
K-40	5846.04	1461.49	58.	88.	0.001	22.50	1.954

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	7.3972E-01					4.66E+11	
			1460.83	7.397E-01	(	3.232E-01	2.25E+01	1.07E+01 G
CO-60	F	1.0304E-01					1.93E+03	
			1332.50	9.969E-02	?(	3.688E-02	1.97E+01	1.00E+02 G
			1173.24	1.064E-01	(	3.090E-02	1.48E+01	9.99E+01 G
CS-137	I	1.3778E-01					1.10E+04	
			661.66	1.378E-01	(	3.581E-02	1.36E+01	8.52E+01 G
TL-208	N	5.9103E-02					6.98E+02	
			583.02	5.910E-02	(	3.237E-02	2.63E+01	8.45E+01 G
			277.28	0.000E+00	&	1.491E-01	8.55E+01	6.31E+00 G
			860.56	0.000E+00	&	1.972E-01	1.00E+03	1.24E+01 G
PB-212	N	1.2191E-01					6.98E+02	
			238.63	1.219E-01	(	3.894E-02	1.46E+01	4.33E+01 G
			300.03	0.000E+00	%	4.687E-01	0.00E+00	3.28E+00 GA
PB-214	N	7.1536E-02					5.84E+05	
			351.93	7.154E-02	(	4.401E-02	2.38E+01	3.76E+01 G
			295.09	0.000E+00	?	7.784E-02	0.00E+00	1.93E+01 G
			242.00	0.000E+00		1.969E-01	0.00E+00	7.43E+00 GA
BI-207	C	3.0770E-02					1.18E+04	
			569.70	3.077E-02	?(	2.117E-02	2.79E+01	9.77E+01 G
			1063.66	1.126E-01	+	4.329E-02	2.08E+01	7.45E+01 G
BI-214	N	1.1091E-01					5.84E+05	
			609.31	1.109E-01	*(	6.245E-02	2.62E+01	4.61E+01 G
			1120.29	0.000E+00	&	1.712E-01	6.22E+01	1.51E+01 G
			1764.49	0.000E+00	&	2.098E-01	1.00E+03	1.54E+01 G
TH-234	N	4.4954E+00					1.63E+12	
			63.29	4.495E+00	(	4.802E-01	4.34E+00	3.81E+00 G
			92.59	3.868E+00	-	2.817E-01	3.79E+00	5.58E+00 G
PA-234M	N	1.1715E+01					1.63E+12	
			1001.00	1.172E+01	(	4.918E+00	2.45E+01	8.37E-01 G
			766.41	0.000E+00	&	7.156E+00	2.83E+02	2.94E-01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N   2.4788E-01                                        2.57E+11
                          185.72 2.479E-01 }   3.078E-02 4.30E+00 5.40E+01 GA
                          143.79 2.479E-01 ?(  1.138E-01 1.50E+01 1.10E+01 G
                          205.33 0.000E+00 %   1.808E-01 4.18E+01 5.01E+00 G
                          163.38 0.000E+00 %   1.676E-01 3.70E+01 5.08E+00 G

AM-241   T   1.9608E-01                                        1.58E+05
                           59.54 1.961E-01  (  5.547E-02 9.66E+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 *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.2101E-01		
NA-22	<	2.3975E-02		
K-40		7.3972E-01	2.2499E+01%	3.232E-01
Sc-46	<	2.0326E-02		
CR-51	<	9.9497E-02		
MN-54	<	2.1634E-02		
FE-59	<	4.0328E-02		
Co-56	<	2.0169E-02		
CO-57	<	1.3309E-02		
CO-58	<	2.1116E-02		
CO-60		1.0304E-01	1.2327E+01%	3.688E-02
ZN-65	<	8.6349E-02		
NB-94	<	1.9827E-02		
ZR-95	<	3.3544E-02		
NB-95	<	3.6005E-02		
RU-103	<	1.6960E-02		
RH-106	<	1.1141E-01		
AG-108M	<	1.6134E-02		
AG-110M	<	3.0125E-02		
SN-113	<	2.3283E-02		
SB-124	<	2.5934E-02		
SB-125	<	5.1466E-02		
I-131	<	1.6253E-02		
BA-133	<	3.4489E-02		
CS-134	<	1.1525E-02		
CS-137		1.3778E-01	1.3585E+01%	3.581E-02
CE-139	<	1.0629E-02		
Ba-140	<	6.6494E-02		
La-140	<	2.3499E-02		
CE-141	<	1.6675E-02		
CE-144	<	5.3313E-02		
PM-144	<	2.1845E-02		
EU-152	<	4.3126E-02		
EU-154	<	1.6647E-01		
EU-155	<	3.9910E-02		
HF-181	<	2.3894E-02		
Ta-182	<	1.1464E-01		
Hg-203	<	1.9366E-02		
TL-208		5.9103E-02	2.6309E+01%	3.237E-02
pm-146	<	6.0638E-02		
y-88	<	2.7289E-02		
PB-210	<	3.9808E-01		
PB-212		1.2191E-01	1.4632E+01%	3.894E-02

PB-214		7.1536E-02	2.3792E+01%	4.401E-02
BI-207	#	3.0770E-02	2.7866E+01%	2.117E-02
BI-212	<	2.6010E-01		
BI-214	#	1.1091E-01	2.6162E+01%	6.245E-02
BI-210M	<	1.8412E-02		
RA-224	<	3.8410E-01		
AC-228	<	9.4185E-02		
TH-227	<	7.6651E-02		
TH-229	<	2.1018E-01		
TH-234		4.4954E+00	4.3383E+00%	4.802E-01
PA-231	<	4.7624E-01		
PA-233	<	2.6774E-02		
PA-234	<	7.3572E-02		
PA-234M		1.1715E+01	2.4472E+01%	4.918E+00
U-235		2.4788E-01	1.5032E+01%	1.138E-01
AM-241		1.9608E-01	9.6560E+00%	5.547E-02
Np-237	<	1.0103E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.803E+01 DPS

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Test America
St. Louis
Background Check

Spectrum: 12_20160709004_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 6:02:45 PM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.08	1.93	1.98	2.04	2.18	2.23	PASS

Analyst: Aaron Schroder Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20160709004_BGLong.An1

Acquisition information
Start time: 7/9/2016 6:02:45 PM
Live time: 72000
Real time: 72724
Dead time: 0.99 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 6:41:14 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1469

***** 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
46.65	1191.	7.31	0.92	6.312E-02	46.54	4.250	6.179E+00	PB210
63.33	829.	9.08	1.00	8.574E-02	63.29	3.810	3.528E+00	TH234
75.04	200.	23.47	0.92	1.016E-01				
77.23	255.	18.37	0.92	1.046E-01				
87.48	179.	26.78	0.99	1.185E-01	86.49	13.100	1.620E-01	Np237
					86.54	30.700	6.910E-02	EU155
92.71	1283.	5.79	1.14	1.198E-01	92.59	5.584	2.663E+00	TH234
					93.35	5.561	2.672E+00	AC228
140.07	162.	23.79	0.98	1.188E-01				
143.77	162.	25.34	0.98	1.177E-01	143.79	10.960	1.749E-01	U235
185.81	679.	11.75	1.14	1.067E-01	185.72	54.000	1.636E-01	U235
					185.99	3.280	2.696E+00	Ra226
238.60	478.	11.15	0.94	9.395E-02	238.63	43.300	1.632E-01	PB212
295.21	201.	20.77	1.00	8.024E-02	295.09	19.300	1.799E-01	PB214
351.90	302.	17.63	1.30	6.651E-02	351.93	37.600	1.677E-01	PB214
511.11	2424.	4.50	2.49	4.819E-02	511.86	20.000	3.496E+00	RH106
569.79	102.	29.17	0.98	4.393E-02	569.70	97.740	3.289E-02	BI207
					569.32	15.380	2.089E-01	CS134
					569.47	8.200	3.919E-01	PA234
583.18	199.	16.73	1.09	4.294E-02	583.02	84.500	7.615E-02	TL208
609.37	254.	17.69	1.20	4.104E-02	609.31	46.090	1.865E-01	BI214
					610.30	5.750	1.497E+00	RU103
1121.05	169.	18.52	2.11	2.185E-02	1120.29	15.100	7.115E-01	BI214
					1120.55	99.987	1.075E-01	Sc46
					1121.30	34.900	3.081E-01	Ta182
1460.16	186.	16.50	1.84	1.768E-02	1460.83	10.670	1.371E+00	K40
1763.54	135.	25.14	1.84	1.522E-02	1764.49	15.400	7.981E-01	BI214

pk energy area uncert fwhm corr nuclide brnch. act. nuc

********** 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
299.70	75.04	1001.	200.	1.968E+03	23.47	0.917	- D
308.44	77.22	973.	255.	2.443E+03	18.37	0.919	- D
349.43	87.48	748.	179.	1.511E+03	26.78	0.991	- M
559.52	140.03	664.	163.	1.369E+03	23.74	0.979	- sD
2043.03	511.11	902.	2424.	5.029E+04	4.50	2.492	- 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	186.23	46.65	1473.	1191.	0.017	7.31	0.916
TH-234	252.92	63.33	1261.	829.	0.012	9.08	0.997
TH-234	370.34	92.71	1102.	1283.	0.018	5.79	1.143s
U-235	574.47	143.79	766.	163.	0.002	25.28	0.982D
U-235	742.09	185.72	1158.	609.	0.008	7.62	1.022D
PB-212	953.48	238.60	675.	478.	0.007	11.15	0.937
PB-214	1179.79	295.21	485.	201.	0.003	20.77	0.995
PB-214	1406.43	351.90	608.	302.	0.004	17.63	1.298
BI-207	2277.70	569.79	233.	102.	0.001	29.17	0.976s
TL-208	2331.23	583.18	248.	199.	0.003	16.73	1.085
BI-214	2436.00	609.37	441.	254.	0.004	17.69	1.202
BI-214	4483.04	1121.05	128.	169.	0.002	18.52	2.107s
K-40	5840.44	1460.16	111.	186.	0.003	16.50	1.842s
BI-214	7055.31	1763.54	108.	135.	0.002	25.14	1.845

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	Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	1.3710E+00				4.66E+11	
			1460.83	1.371E+00	@(	3.812E-01 1.65E+01 1.07E+01	G
TL-208	N	7.6145E-02				6.98E+02	
			583.02	7.615E-02	(	2.912E-02 1.67E+01 8.45E+01	G
			277.28	0.000E+00	%	1.793E-01 4.83E+01 6.31E+00	G
			860.56	0.000E+00	%	1.772E-01 3.52E+01 1.24E+01	G
PB-210	N	6.1788E+00				8.14E+03	
			46.54	6.179E+00	(	9.423E-01 7.31E+00 4.25E+00	G
PB-212	N	1.6322E-01				6.98E+02	
			238.63	1.632E-01	(	4.227E-02 1.11E+01 4.33E+01	G
			300.03	0.000E+00	%	3.532E-01 9.65E+01 3.28E+00	GA
PB-214	N	1.7186E-01				5.84E+05	
			351.93	1.677E-01	(	6.533E-02 1.76E+01 3.76E+01	G
			295.09	1.799E-01	(	9.447E-02 2.08E+01 1.93E+01	G
			242.00	0.000E+00		2.316E-01 0.00E+00 7.43E+00	GA
BI-207	C	3.2890E-02				1.18E+04	
			569.70	3.289E-02	(	2.390E-02 2.92E+01 9.77E+01	G
			1063.66	0.000E+00	%	3.700E-02 1.00E+03 7.45E+01	G
BI-214	N	1.8649E-01				5.84E+05	
			609.31	1.865E-01	(	7.384E-02 1.77E+01 4.61E+01	G
			1120.29	7.115E-01	+	2.334E-01 1.85E+01 1.51E+01	G
			1764.49	7.981E-01	+	3.035E-01 2.51E+01 1.54E+01	G
TH-234	N	3.5279E+00				1.63E+12	
			63.29	3.528E+00	(	7.156E-01 9.08E+00 3.81E+00	G
			92.59	2.663E+00	-	3.268E-01 5.79E+00 5.58E+00	G
U-235	N	1.7532E-01				2.57E+11	
			185.72	1.466E-01	}	3.886E-02 7.62E+00 5.40E+01	GA
			143.79	1.753E-01	(	1.418E-01 2.53E+01 1.10E+01	G
			205.33	0.000E+00	%	2.206E-01 3.41E+02 5.01E+00	G
			163.38	0.000E+00	%	2.024E-01 8.40E+01 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

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```
  ! - 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    <    2.7219E-01
NA-22   <    3.8002E-02
K-40   #     1.3710E+00   1.6500E+01%               3.812E-01
Sc-46   <    3.1031E-02
CR-51   <    1.2683E-01
MN-54   <    2.3180E-02
FE-59   <    4.4375E-02
Co-56   <    2.4196E-02
CO-57   <    1.1945E-02
CO-58   <    2.9618E-02
CO-60   <    2.8127E-02
ZN-65   <    6.1363E-02
```

NB-94	<	2.4173E-02		
ZR-95	<	3.6132E-02		
NB-95	<	3.7318E-02		
RU-103	<	1.8591E-02		
RH-106	<	2.4818E-01		
AG-108M	<	1.6125E-02		
AG-110M	<	4.4107E-02		
SN-113	<	2.2566E-02		
SB-124	<	2.1697E-02		
SB-125	<	4.8742E-02		
I-131	<	1.6921E-02		
BA-133	<	1.4245E-02		
CS-134	<	3.0737E-02		
CS-137	<	2.0647E-02		
CE-139	<	2.2731E-02		
Ba-140	<	6.7390E-02		
La-140	<	3.4685E-02		
CE-141	<	2.7179E-02		
CE-144	<	8.5240E-02		
PM-144	<	2.4647E-02		
EU-152	<	4.8089E-02		
EU-154	<	1.8340E-01		
EU-155	<	4.3244E-02		
HF-181	<	2.5325E-02		
Ta-182	<	8.5978E-02		
Hg-203	<	1.3768E-02		
TL-208		7.6145E-02	1.6729E+01%	2.912E-02
pm-146	<	6.0880E-02		
y-88	<	2.5292E-02		
PB-210		6.1788E+00	7.3098E+00%	9.423E-01
PB-212		1.6322E-01	1.1150E+01%	4.227E-02
PB-214		1.7186E-01	1.3623E+01%	6.533E-02
BI-207		3.2890E-02	2.9169E+01%	2.390E-02
BI-212	<	2.6646E-01		
BI-214		1.8649E-01	1.7686E+01%	7.384E-02
BI-210M	<	2.2674E-02		
RA-224	<	4.7397E-01		
AC-228	<	1.3987E-01		
TH-227	<	1.4594E-01		
TH-229	<	2.3434E-01		
TH-234		3.5279E+00	9.0752E+00%	7.156E-01
PA-231	<	4.6876E-01		
PA-233	<	3.5166E-02		
PA-234	<	5.4518E-02		
PA-234M	<	4.9708E+00		
U-235		1.7532E-01	2.5280E+01%	1.418E-01
AM-241	<	7.8631E-02		
Np-237	<	1.1310E-01		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.4 keV)     1.188E+01  DPS
```

Test America
St. Louis
Background Check

Spectrum: 14_20160709006_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 6:21:58 PM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.80	1.90	1.94	PASS

Analyst: Aaron Schroder Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20160709006_BGLong.An1

Acquisition information
Start time: 7/9/2016 6:21:58 PM
Live time: 43200
Real time: 43317
Dead time: 0.27 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

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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. 15 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1740

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.52	548.	8.55	0.93	6.118E-02	46.54	4.250	6.894E+00	PB210
63.28	337.	13.01	0.89	8.536E-02	63.29	3.810	2.398E+00	TH234
75.07	191.	17.46	0.76	1.024E-01				
92.58	525.	8.78	1.09	1.215E-01	92.59	5.584	1.792E+00	TH234
					93.35	5.561	6.873E+00	AC228
185.41	310.	14.26	0.87	1.072E-01	185.72	54.000	1.240E-01	U235
238.15	218.	18.63	1.11	9.401E-02	238.63	43.300	7.018E+00	PB212
294.80	103.	29.39	1.00	7.973E-02	295.09	19.300	1.560E-01	PB214
351.83	191.	18.22	1.11	6.549E-02	351.93	37.600	1.805E-01	PB214
510.66	1029.	5.35	2.66	4.546E-02	511.86	20.000	4.930E+03	RH106
582.85	118.	19.80	2.28	3.931E-02	583.02	84.500	4.637E+00	TL208
609.21	212.	16.65	1.63	3.708E-02	609.31	46.090	2.885E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
1120.21	69.	19.92	1.03	1.998E-02	1120.29	15.100	5.320E-01	BI214
					1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1460.85	139.	14.93	2.14	1.557E-02	1460.83	10.670	1.939E+00	K40
1764.91	63.	21.47	2.06	1.327E-02	1764.49	15.400	7.171E-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
299.66	75.07	393.	191.	1.863E+03	17.46	0.755	- s
2041.76	510.25	272.	1029.	2.263E+04	5.35	2.657	-

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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	185.49	46.52	495.	548.	0.013	8.55	0.925s
TH-234	252.53	63.28	528.	337.	0.008	13.01	0.886s
TH-234	369.67	92.58	534.	525.	0.012	8.78	1.091s
U-235	740.91	185.41	470.	310.	0.007	14.26	0.867
PB-212	951.84	238.15	389.	218.	0.005	18.63	1.114s
PB-214	1178.37	294.80	258.	103.	0.002	29.39	0.998
PB-214	1406.47	351.83	255.	191.	0.004	18.22	1.107s
TL-208	2330.53	582.85	110.	118.	0.003	19.80	2.281s
BI-214	2435.95	609.21	200.	212.	0.005	16.65	1.633s
BI-214	4480.39	1120.21	30.	69.	0.002	19.92	1.025s
K-40	5843.64	1460.85	36.	139.	0.003	14.93	2.138
BI-214	7060.74	1764.91	20.	63.	0.001	21.47	2.061

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	1.9386E+00				4.66E+11	
			1460.83	1.939E+00	(	4.263E-01 1.49E+01 1.07E+01	G
Ta-182	F	1.5414E-44				1.14E+02	
TL-208	N	4.6370E+00				6.98E+02	
			583.02	4.637E+00	(	2.040E+00 1.98E+01 8.45E+01	G
			277.28	0.000E+00	&	1.277E+01 5.73E+02 6.31E+00	G
			860.56	0.000E+00	%	1.221E+01 2.64E+02 1.24E+01	G
PB-210	N	6.8943E+00				8.14E+03	
			46.54	6.894E+00	*(	1.337E+00 8.55E+00 4.25E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.0176E+00					6.98E+02	
			238.63	7.018E+00	(	3.052E+00	1.86E+01	4.33E+01 G
			300.03	0.000E+00 %		2.550E+01	1.00E+03	3.28E+00 GA
PB-214	N	1.7217E-01					5.84E+05	
			351.93	1.805E-01 *(		7.288E-02	1.82E+01	3.76E+01 G
			295.09	1.560E-01 (		1.172E-01	2.94E+01	1.93E+01 G
			242.00	0.000E+00 ?		2.767E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.8852E-01					5.84E+05	
			609.31	2.885E-01 *(		9.338E-02	1.66E+01	4.61E+01 G
			1120.29	5.320E-01 +		2.177E-01	1.99E+01	1.51E+01 G
			1764.49	7.171E-01 +		2.681E-01	2.15E+01	1.54E+01 G
TH-234	N	2.3985E+00					1.63E+12	
			63.29	2.398E+00 (		7.814E-01	1.30E+01	3.81E+00 G
			92.59	1.792E+00 -		3.768E-01	8.78E+00	5.58E+00 G
U-235	N	1.2400E-01					2.57E+11	
			185.72	1.240E-01 $		4.149E-02	1.43E+01	5.40E+01 GA
			143.79	0.000E+00 %		1.139E-01	1.00E+03	1.10E+01 G
			205.33	0.000E+00 %		2.751E-01	8.61E+01	5.01E+00 G
			163.38	0.000E+00 %		2.545E-01	3.78E+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
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 DPS	Time Corrected Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7			>12 Halflives		
NA-22	<	5.8997E-02	1.1419E+00		
K-40		1.9386E+00	1.9386E+00	1.493E+01%	4.26E-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	<	2.9043E-02	1.2539E-01		
ZN-65			>12 Halflives		
NB-94	<	2.9633E-02	2.9644E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	3.0209E-01	5.6693E+02		
AG-108M	<	1.6306E-02	1.6610E-02		
AG-110M			>12 Halflives		
SN-113			>12 Halflives		
SB-124			>12 Halflives		
SB-125	<	5.5200E-02	9.0335E-01		
I-131			>12 Halflives		
BA-133	<	3.5477E-02	7.3725E-02		
CS-134	<	3.1204E-02	1.3055E+00		
CS-137	<	4.2914E-02	5.5489E-02		
CE-139			>12 Halflives		
Ba-140			>12 Halflives		
La-140			>12 Halflives		
CE-141			>12 Halflives		
CE-144			>12 Halflives		
PM-144	<	3.1813E-02	7.4387E+01		

EU-152	<	9.2091E-02	1.6276E-01		
EU-154	<	2.2470E-01	5.5112E-01		
EU-155	<	4.9998E-02	2.3659E-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	#	8.1892E-02	4.6370E+00	1.980E+01%	2.04E+00
pm-146	<	7.2663E-02	2.9294E-01		
y-88		>12 Halflives			
PB-210	#	4.8791E+00	6.8943E+00	8.549E+00%	1.34E+00
PB-212	#	1.2393E-01	7.0176E+00	1.863E+01%	3.05E+00
PB-214		1.7134E-01	1.7217E-01	1.729E+01%	7.29E-02
BI-207	<	3.8614E-02	4.9059E-02		
BI-212	<	3.4154E-01	1.9339E+01		
BI-214		2.8713E-01	2.8852E-01	1.665E+01%	9.34E-02
BI-210M	<	2.8205E-02	2.8205E-02		
RA-224	<	5.3712E-01	3.0414E+01		
AC-228	<	1.1235E-01	4.2941E-01		
TH-227	<	9.2395E-02	1.3166E-01		
TH-229	<	2.9813E-01	2.9845E-01		
TH-234	#	2.3985E+00	2.3985E+00	1.301E+01%	7.81E-01
PA-231	<	8.7393E-01	8.7414E-01		
PA-233	<	3.7068E-02	3.7068E-02		
PA-234	<	7.2118E-02	7.2118E-02		
PA-234M	<	4.0247E+00	4.0247E+00		
Ra-226	<	7.3638E-01	7.3993E-01		
U-235		1.2400E-01	1.2400E-01	1.426E+01%	4.15E-02
AM-241	<	9.3776E-02	9.5462E-02		
Np-237	<	1.5506E-01	1.5526E-01		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     1.000E+01  DPS
Total Decayed Activity (   37.6 to  1999.5 keV) 2.3470650E+01  DPS
```

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Test America
St. Louis
Background Check

Spectrum: 16_20160709005_BGLong
Description: Background Long PBC Count
Acquired: 7/9/2016 6:23:52 PM
Detector: Detector #16
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.68	2.51	2.56	2.60	2.80	2.86	PASS

Analyst: Aaron Schroder Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det16\16_20160709005_BGLong.An1

Acquisition information

Start time:	7/9/2016 6:23:52 PM
Live time:	43200
Real time:	43407
Dead time:	0.48 %
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: 73.3974

***** 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	980.	5.74	1.03	7.066E-02	46.54	4.250	1.067E+01	PB210
59.54	205.	19.89	0.97	8.955E-02	59.54	35.900	1.501E-01	AM241
63.34	639.	7.07	0.97	9.505E-02	63.29	3.810	4.087E+00	TH234
74.87	209.	21.67	0.69	1.117E-01				
92.68	936.	6.77	1.15	1.312E-01	92.59	5.584	2.957E+00	TH234
					93.35	5.561	1.134E+01	AC228
182.64	124.	25.89	1.08	1.138E-01				
185.72	431.	9.30	1.09	1.130E-01	185.72	54.000	1.633E-01	U235
					185.99	3.280	2.704E+00	Ra226
238.50	390.	13.23	1.03	9.906E-02	238.63	43.300	1.192E+01	PB212
295.14	227.	20.54	1.61	8.409E-02	295.09	19.300	3.258E-01	PB214
351.95	260.	20.01	1.31	6.906E-02	351.93	37.600	2.329E-01	PB214
511.15	1461.	5.32	2.04	4.932E-02	511.86	20.000	6.441E+03	RH106
583.77	179.	20.67	1.48	4.377E-02	583.02	84.500	6.331E+00	TL208
609.67	290.	13.53	1.11	4.171E-02	609.31	46.090	3.500E-01	BI214
					610.30	5.750	HL>Cutoff	RU103
802.85	117.	25.53	0.51	3.114E-02				
1460.64	285.	8.74	1.51	1.797E-02	1460.83	10.670	3.441E+00	K40
1765.33	117.	12.97	2.60	1.550E-02	1764.49	15.400	1.140E+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 Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.15	74.87	688.	209.	1.867E+03	21.67	0.694	- s

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
728.97	182.62	410.	114.	1.000E+03	26.85	1.084	- sD
2043.69	511.15	550.	1461.	2.962E+04	5.32	2.038	- sM
3210.47	802.85	150.	117.	3.758E+03	25.53	0.505	- 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	185.69	46.50	656.	980.	0.023	5.74	1.031
AM-241	237.83	59.54	677.	203.	0.005	19.45	0.971D
TH-234	252.82	63.29	700.	639.	0.015	7.07	0.975D
TH-234	370.34	92.68	880.	936.	0.022	6.77	1.145
Ra-226	743.42	185.99	588.	430.	0.010	9.31	1.087D
PB-212	953.36	238.50	592.	390.	0.009	13.23	1.031
PB-214	1179.85	295.14	469.	227.	0.005	20.54	1.610s
PB-214	1407.04	351.95	506.	260.	0.006	20.01	1.308s
TL-208	2334.16	583.77	245.	179.	0.004	20.67	1.476
BI-214	2437.75	609.67	276.	290.	0.007	13.53	1.112s
K-40	5842.42	1460.64	48.	285.	0.007	8.74	1.507s
BI-214	7061.96	1765.33	17.	117.	0.003	12.97	2.599s

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	Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	3.4412E+00				4.66E+11	
			1460.83	3.441E+00	@(	4.225E-01 8.74E+00 1.07E+01	G
Ba-140	I	1.1210E-44				1.28E+01	
			537.26	0.000E+00	&	0.000E+00 1.00E+03 2.44E+01	G
			162.66	0.000E+00	!	0.000E+00 1.00E+03 6.22E+00	G
			304.85	0.000E+00	%	0.000E+00 1.00E+03 4.29E+00	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
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	1.00E+03	2.70E+01 G
			1189.05	0.000E+00 %		0.000E+00	1.00E+03	1.62E+01 G
TL-208	N	6.3314E+00					6.98E+02	
			583.02	6.331E+00 &(		2.683E+00	2.07E+01	8.45E+01 G
			277.28	0.000E+00 &		1.398E+01	2.22E+02	6.31E+00 G
			860.56	0.000E+00 &		1.934E+01	1.00E+03	1.24E+01 G
PB-210	N	1.0668E+01					8.14E+03	
			46.54	1.067E+01 (		1.328E+00	5.74E+00	4.25E+00 G
PB-212	N	1.1918E+01					6.98E+02	
			238.63	1.192E+01 (		3.550E+00	1.32E+01	4.33E+01 G
			300.03	0.000E+00 %		2.569E+01	0.00E+00	3.28E+00 GA
PB-214	N	2.6441E-01					5.84E+05	
			351.93	2.329E-01 *(		9.632E-02	2.00E+01	3.76E+01 G
			295.09	3.258E-01 (		1.485E-01	2.05E+01	1.93E+01 G
			242.00	0.000E+00 ?		3.364E-01	0.00E+00	7.43E+00 GA
BI-214	N	3.5000E-01					5.84E+05	
			609.31	3.500E-01 (		9.696E-02	1.35E+01	4.61E+01 G
			1120.29	0.000E+00 %		2.737E-01	4.94E+01	1.51E+01 G
			1764.49	1.140E+00 +		2.136E-01	1.30E+01	1.54E+01 G
TH-234	N	4.0867E+00					1.63E+12	
			63.29	4.087E+00 (		8.062E-01	7.07E+00	3.81E+00 G
			92.59	2.957E+00 -		4.453E-01	6.77E+00	5.58E+00 G
Ra-226		2.7024E+00					5.84E+05	
			185.99	2.702E+00 (		7.263E-01	9.31E+00	3.28E+00 G
AM-241	T	1.4871E-01					1.58E+05	
			59.54	1.487E-01 (		9.088E-02	1.95E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Time Corrected Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7			>12 Halflives		
NA-22	<	5.5046E-02	1.0654E+00		
K-40	#	3.4412E+00	3.4412E+00	8.744E+00%	4.23E-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	<	4.3231E-02	1.8665E-01		
ZN-65			>12 Halflives		
NB-94	<	2.9408E-02	2.9419E-02		
ZR-95			>12 Halflives		
NB-95			>12 Halflives		
RU-103			>12 Halflives		
RH-106	<	2.2866E-01	4.2912E+02		
AG-108M	<	2.5348E-02	2.5820E-02		
AG-110M			>12 Halflives		

SN-113			>12 Halflives			
SB-124			>12 Halflives			
SB-125	<	7.7511E-02	1.2685E+00			
I-131			>12 Halflives			
BA-133	<	3.1198E-02	6.4833E-02			
CS-134	<	5.1191E-02	2.1417E+00			
CS-137	<	5.4727E-02	7.0763E-02			
CE-139			>12 Halflives			
Ba-140	C	1.1210E-44	>12 Halflives	0.000E+00%		0.00E+00
La-140			>12 Halflives			
CE-141			>12 Halflives			
CE-144			>12 Halflives			
PM-144	<	3.3884E-02	7.9229E+01			
EU-152	<	8.7882E-02	1.5532E-01			
EU-154	<	2.5965E-01	6.3685E-01			
EU-155	<	6.8362E-02	3.2349E-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		1.1181E-01	6.3314E+00	2.067E+01%		2.68E+00
pm-146	<	7.8034E-02	3.1460E-01			
y-88			>12 Halflives			
PB-210		7.5500E+00	1.0668E+01	5.740E+00%		1.33E+00
PB-212		2.1047E-01	1.1918E+01	1.323E+01%		3.55E+00
PB-214		2.6314E-01	2.6441E-01	1.434E+01%		9.63E-02
BI-207	<	3.5478E-02	4.5075E-02			
BI-212	<	5.4547E-01	3.0887E+01			
BI-214		3.4832E-01	3.5000E-01	1.353E+01%		9.70E-02
BI-210M	<	3.1239E-02	3.1239E-02			
RA-224	<	5.9523E-01	3.3704E+01			
AC-228	<	1.7553E-01	6.7088E-01			
TH-227	<	9.0378E-02	1.2878E-01			
TH-229	<	3.4674E-01	3.4711E-01			
TH-234		4.0867E+00	4.0867E+00	7.069E+00%		8.06E-01
PA-231	<	8.0886E-01	8.0905E-01			
PA-233	<	4.9670E-02	4.9670E-02			
PA-234	<	8.0969E-02	8.0969E-02			
PA-234M	<	4.0313E+00	4.0313E+00			
Ra-226		2.6894E+00	2.7024E+00	9.310E+00%		7.26E-01
U-235	<	1.3933E-01	1.3933E-01			
AM-241	#	1.4609E-01	1.4871E-01	1.945E+01%		9.09E-02
Np-237	<	1.8880E-01	1.8905E-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)     1.885E+01  DPS
Total Decayed Activity (   37.6 to  1999.6 keV) 3.9910660E+01  DPS
```

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
07/09/16 17:59		ICB 160-259819/1		259819			RTM
07/12/16 01:00		CCV 160-260169/1		260169			
07/12/16 01:23		CCV 160-260169/2		260169			RTM
07/12/16 02:03		CCB 160-260169/3		260169			RTM
07/12/16 08:04	60	ZZZZZ		260169			
07/12/16 09:22	60	ZZZZZ		260169			
07/12/16 10:33	30	160-17797-5	WR111-REF-004-SS-P-0(	260169	257318	901.1	RTM
07/12/16 11:27	30	160-17797-12	WR111-REF-011-SS-P-0(	260169	257318	901.1	RTM
07/12/16 12:14	30	160-17797-16	WR111-REF-014-SS-P-0(	260169	257318	901.1	RTM
07/12/16 12:48	30	ZZZZZ		260169			
07/12/16 13:31	30	ZZZZZ		260169			
07/12/16 14:09	30	ZZZZZ		260169			
07/12/16 14:48	30	ZZZZZ		260169			
07/12/16 15:26	30	ZZZZZ		260169			
07/12/16 16:12	30	ZZZZZ		260169			
07/12/16 17:13	30	ZZZZZ		260169			
07/12/16 18:00	30	ZZZZZ		260169			
07/12/16 18:51	30	ZZZZZ		260169			
07/12/16 20:02	30	ZZZZZ		260169			
07/12/16 21:29	30	ZZZZZ		260169			
07/12/16 22:04	30	ZZZZZ		260169			
07/12/16 22:40	30	ZZZZZ		260169			
07/12/16 23:12	30	ZZZZZ		260169			
07/12/16 23:51	30	ZZZZZ		260169			

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
01/28/16 10:21		ACVTOP 160-236240/1		236240			PS
07/09/16 17:58		ICB 160-259822/1		259822			RTM
07/12/16 00:59		CCB 160-260172/1		260172			RTM
07/12/16 01:50		CCV 160-260172/2		260172			
07/12/16 02:12		CCV 160-260172/3		260172			RTM
07/12/16 08:06	60	ZZZZZ		260172			
07/12/16 09:21	30	ZZZZZ		260172			
07/12/16 09:57	30	160-17797-4	WR111-REF-003-SS-P-0(	260172	257318	901.1	RTM
07/12/16 10:34	30	160-17797-6	WR111-REF-005-SS-P-0(	260172	257318	901.1	RTM
07/12/16 11:28	30	160-17797-13	WR111-REF-011-SS-DUI -00	260172	257318	901.1	RTM
07/12/16 12:16	30	160-17797-17	WR111-REF-015-SS-P-0(	260172	257318	901.1	RTM
07/12/16 12:52	30	ZZZZZ		260172			
07/12/16 13:30	30	ZZZZZ		260172			
07/12/16 14:09	30	ZZZZZ		260172			
07/12/16 14:48	30	ZZZZZ		260172			
07/12/16 15:27	30	ZZZZZ		260172			
07/12/16 16:08	30	ZZZZZ		260172			
07/12/16 17:16	30	ZZZZZ		260172			
07/12/16 17:58	30	ZZZZZ		260172			

Gamma Spectroscopy Run Log

Detector: GV5 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/12/16 18:59	30	ZZZZZ		260172			
07/12/16 20:03	30	ZZZZZ		260172			
07/12/16 21:27	30	ZZZZZ		260172			
07/12/16 22:05	30	ZZZZZ		260172			
07/12/16 22:41	30	ZZZZZ		260172			
07/12/16 23:13	30	ZZZZZ		260172			
07/12/16 23:53	30	ZZZZZ		260172			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
01/23/16 19:25		ACVTOP 160-236241/1		236241			PS
07/09/16 17:58		ICB 160-259823/1		259823			RTM
07/12/16 00:59		CCB 160-260170/1		260170			RTM
07/12/16 01:51		CCV 160-260170/2		260170			
07/12/16 02:13		CCV 160-260170/3		260170			RTM
07/12/16 08:08	60	ZZZZZ		260170			
07/12/16 09:20	30	ZZZZZ		260170			
07/12/16 09:58	30	160-17797-3	WR111-REF-002-SS-P-0(	260170	257318	901.1	RTM
07/12/16 10:33	30	160-17797-7	WR111-REF-006-SS-P-0(	260170	257318	901.1	RTM
07/12/16 11:29	30	160-17797-14	WR111-REF-012-SS-P-0(	260170	257318	901.1	RTM
07/12/16 12:16	30	160-17797-18	WR111-REF-016-SS-P-0(	260170	257318	901.1	RTM
07/12/16 12:51	30	ZZZZZ		260170			
07/12/16 13:31	30	ZZZZZ		260170			
07/12/16 14:08	30	ZZZZZ		260170			
07/12/16 14:49	30	ZZZZZ		260170			
07/12/16 15:25	30	ZZZZZ		260170			
07/12/16 16:11	30	ZZZZZ		260170			
07/12/16 17:15	30	ZZZZZ		260170			
07/12/16 17:59	30	ZZZZZ		260170			
07/12/16 18:58	30	ZZZZZ		260170			
07/12/16 20:01	30	ZZZZZ		260170			
07/12/16 21:28	30	ZZZZZ		260170			
07/12/16 22:06	30	ZZZZZ		260170			
07/12/16 22:42	30	ZZZZZ		260170			
07/12/16 23:14	120	ZZZZZ		260170			

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
07/09/16 18:00		ICB 160-259824/1		259824			RTM
07/12/16 01:00		CCB 160-260173/1		260173			RTM
07/12/16 01:53		CCV 160-260173/2		260173			
07/12/16 02:16		CCV 160-260173/3		260173			RTM
07/12/16 08:06	60	ZZZZZ		260173			
07/12/16 09:23	30	ZZZZZ		260173			
07/12/16 09:56	30	160-17797-2	WR111-REF-001-SS-DUI -00	260173	257318	901.1	RTM

Gamma Spectroscopy Run Log

Detector: GV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/12/16 10:39	30	160-17797-8	WR111-REF-007-SS-P-0(	260173	257318	901.1	RTM
07/12/16 11:18		ZZZZZ		260173			
07/12/16 12:18	30	160-17797-15	WR111-REF-013-SS-P-0(	260173	257318	901.1	RTM
07/12/16 12:50	30	ZZZZZ		260173			
07/12/16 13:32	30	ZZZZZ		260173			
07/12/16 14:07	30	ZZZZZ		260173			
07/12/16 14:50	30	ZZZZZ		260173			
07/12/16 15:24	30	ZZZZZ		260173			
07/12/16 16:09	30	ZZZZZ		260173			
07/12/16 17:12	30	ZZZZZ		260173			
07/12/16 18:01	30	ZZZZZ		260173			
07/12/16 18:47	30	ZZZZZ		260173			
07/12/16 20:00	30	ZZZZZ		260173			
07/12/16 21:29	30	ZZZZZ		260173			
07/12/16 22:07	30	ZZZZZ		260173			
07/12/16 22:43	30	ZZZZZ		260173			
07/12/16 23:16	30	ZZZZZ		260173			
07/12/16 23:54	30	ZZZZZ		260173			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/02/12 10:16		IC 160-13156/1		13156			JLW
10/04/12 09:10		ICV 160-13156/2		13156			JLW
01/28/16 13:28		ACVTOP 160-235885/1		235885			PS
07/09/16 18:02		ICB 160-259826/1		259826			RTM
07/12/16 01:06		CCV 160-260174/1		260174			
07/12/16 01:32		CCV 160-260174/2		260174			RTM
07/12/16 02:06		CCB 160-260174/3		260174			RTM
07/12/16 08:13	30	ZZZZZ		260174			
07/12/16 08:50	30	ZZZZZ		260174			
07/12/16 09:28	30	ZZZZZ		260174			
07/12/16 10:01	30	MB 160-257318/1-A		260174	257318	901.1	RTM
07/12/16 10:43	30	ZZZZZ		260174			
07/12/16 11:32	30	160-17797-9	WR111-REF-008-SS-P-0(	260174	257318	901.1	RTM
07/12/16 12:21	30	160-17797-19	WR111-REF-017-SS-P-0(	260174	257318	901.1	RTM
07/12/16 12:55		ZZZZZ		260174			
07/12/16 13:34	30	ZZZZZ		260174			
07/12/16 14:13	30	ZZZZZ		260174			
07/12/16 14:54	30	ZZZZZ		260174			
07/12/16 15:28	30	ZZZZZ		260174			
07/12/16 16:07	30	ZZZZZ		260174			
07/12/16 17:11	30	ZZZZZ		260174			
07/12/16 17:56	30	ZZZZZ		260174			
07/12/16 18:56	30	ZZZZZ		260174			
07/12/16 20:04	30	ZZZZZ		260174			
07/12/16 21:30	30	ZZZZZ		260174			
07/12/16 22:08	30	ZZZZZ		260174			
07/12/16 22:45	30	ZZZZZ		260174			
07/12/16 23:17	120	ZZZZZ		260174			

Gamma Spectroscopy Run Log

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
01/25/16 12:29		ACVTOP 160-235877/1		235877			PS
07/09/16 18:21		ICB 160-259830/1		259830			RTM
07/12/16 01:04		CCB 160-260176/1		260176			RTM
07/12/16 02:04		CCV 160-260176/2		260176			
07/12/16 02:26		CCV 160-260176/3		260176			RTM
07/12/16 08:09	30	ZZZZZ		260176			
07/12/16 08:42	30	ZZZZZ		260176			
07/12/16 09:24	30	ZZZZZ		260176			
07/12/16 10:00	30	160-17797-1	WR111-REF-001-SS-P-0(	260176	257318	901.1	RTM
07/12/16 10:40	30	160-17797-10	WR111-REF-009-SS-P-0(	260176	257318	901.1	RTM
07/12/16 11:32	30	ZZZZZ		260176			
07/12/16 12:20	30	ZZZZZ		260176			
07/12/16 12:56	30	ZZZZZ		260176			
07/12/16 13:35	30	ZZZZZ		260176			
07/12/16 14:15	30	ZZZZZ		260176			
07/12/16 14:55	30	ZZZZZ		260176			
07/12/16 15:29	30	ZZZZZ		260176			
07/12/16 16:06	30	ZZZZZ		260176			
07/12/16 17:05	30	ZZZZZ		260176			
07/12/16 17:51	30	ZZZZZ		260176			
07/12/16 18:43	30	ZZZZZ		260176			
07/12/16 19:52	30	ZZZZZ		260176			
07/12/16 21:29	30	ZZZZZ		260176			
07/12/16 22:09	30	ZZZZZ		260176			
07/12/16 22:43	30	ZZZZZ		260176			
07/12/16 23:18	120	ZZZZZ		260176			

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
07/09/16 18:23		ICB 160-259831/1		259831			RTM
07/12/16 01:05		CCB 160-260175/1		260175			RTM
07/12/16 02:06		CCV 160-260175/2		260175			
07/12/16 02:28		CCV 160-260175/3		260175			RTM
07/12/16 08:10	30	ZZZZZ		260175			
07/12/16 08:41	30	ZZZZZ		260175			
07/12/16 09:25	30	160-17797-1 DU	WR111-REF-001-SS-P-0(DU	260175	257318	901.1	RTM
07/12/16 09:59	30	LCS 160-257318/2-A		260175	257318	901.1	RTM
07/12/16 10:41		ZZZZZ		260175			
07/12/16 12:20	30	160-17797-11	WR111-REF-010-SS-P-0(	260175	257318	901.1	RTM
07/12/16 12:56	30	ZZZZZ		260175			
07/12/16 13:35	30	ZZZZZ		260175			
07/12/16 14:14	30	ZZZZZ		260175			
07/12/16 14:56	30	ZZZZZ		260175			
07/12/16 15:30	30	ZZZZZ		260175			
07/12/16 16:05	30	ZZZZZ		260175			
07/12/16 17:06	30	ZZZZZ		260175			

Gamma Spectroscopy Run Log

Detector: GV16 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/12/16 17:50	30	ZZZZZ		260175			
07/12/16 18:44	30	ZZZZZ		260175			
07/12/16 21:34	30	ZZZZZ		260175			
07/12/16 22:10	30	ZZZZZ		260175			
07/12/16 22:45	30	ZZZZZ		260175			
07/12/16 23:19	30	ZZZZZ		260175			
07/12/16 23:55	30	ZZZZZ		260175			

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: 6/14/2016	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:
WR111-REF-001-SS-P-00	6/14/2016	1320		S	1			X	X	
WR111-REF-001-SS-DUP-00	6/14/2016	1320		S	1			X	X	
WR111-REF-002-SS-P-00	6/14/2016	1325		S	1			X	X	
WR111-REF-003-SS-P-00	6/14/2016	1330		S	1			X	X	
WR111-REF-004-SS-P-00	6/14/2016	1345		S	1			X	X	
WR111-REF-005-SS-P-00	6/14/2016	1350		S	1			X	X	
WR111-REF-006-SS-P-00	6/14/2016	1355		S	1			X	X	
WR111-REF-007-SS-P-00	6/14/2016	1400		S	1			X	X	
WR111-REF-008-SS-P-00	6/14/2016	1405		S	1			X	X	
WR111-REF-009-SS-P-00	6/14/2016	1410		S	1			X	X	
WR111-REF-010-SS-P-00	6/14/2016	1415		S	1			X	X	
WR111-REF-011-SS-P-00	6/14/2016	1420		S	1			X	X	

160-17797 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	6/14/2016 1530		TASR	6.15.16 0915
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax 314.298.8757

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Greg Bright	Site Contact: Bachir Badaoui	Date: 6/14/2016	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:
WR111-REF-011-SS-DUP-00	6/14/2016	1420		S	1			X	X	
WR111-REF-012-SS-P-00	6/14/2016	1430		S	1			X	X	
WR111-REF-013-SS-P-00	6/14/2016	1435		S	1			X	X	
WR111-REF-014-SS-P-00	6/14/2016	1445		S	1			X	X	
WR111-REF-015-SS-P-00	6/14/2016	1440		S	1			X	X	
WR111-REF-016-SS-P-00	6/14/2016	1450		S	1			X	X	
WR111-REF-017-SS-P-00	6/14/2016	1455		S	1			X	X	
WR111-REF-018-SS-P-00	6/14/2016	1500		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	6/14/2016 1530		TA SR	6-15-16 0915
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: 160-17797-1

Login Number: 17797
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.	True	
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?	N/A	
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.	N/A	